Edmonton Bike Park Environmental Impact Assessment

FINAL REPORT

Prepared for:
Edmonton Mountain Bike Alliance

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Project 2420

FIERA Biological Consulting

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1.0 Introduction

1.1. Project Description

The Edmonton Bike Park (hereafter “the bike park”) located within Queen Elizabeth Park (QEP) in central Edmonton, will be the City’s first and only river valley bike skills park. The bike park was envisioned as a core design element in the Queen Elizabeth Park Master Plan, which was developed and endorsed by the City of Edmonton in 2013.

As per the QEP Master Plan, the bike park will be located immediately adjacent to the North Saskatchewan River, within the North Saskatchewan River Valley and Ravine system (Map 1). The vision for the bike park includes a skills area that will be sited within the footprint of a decommissioned wastewater treatment plant, as well as an area of existing and new single-track trails located immediately adjacent to the skills area. Most of the development associated with the bike park will include existing trails or will be limited to areas that have been previously disturbed (e.g., the wastewater treatment site), thereby limiting environmental impacts associated with construction. The portion of the park that will include the new trails includes an area that has been impacted by ad hoc trail development and encampments. By integrating this area into the bike park, these trails will be part of a sanctioned network of single-track trails that will be built and maintained to a high design standard, thereby minimizing or preventing erosion, as well as controlling human use in the area. The bike park will be easily accessible by people using the existing river valley trail system, and will provide skill development opportunities for cyclists of all ages and abilities.

1.2. The Property

Land Ownership:	City of Edmonton
Municipal Address:	10380 Queen Elizabeth Park Rd NW
Current Zoning:	River Valley Zone A

Originally established in 1909 as Riverside Park, this area was home to Edmonton’s first swimming pool, which was constructed in 1922 and closed in 2003. Between 1920 and 1930, various facilities were constructed in the park, including a brewery and wastewater treatment plant, which were decommissioned between 1950 and the early 1980s. In 1939, the park was renamed Queen Elizabeth Park. More details about the history and land use of this area, including a historical air photo review, can be found in the QEP Master Plan (City of Edmonton 2013).

Today, QEP includes two distinct areas, referred to as the lower (north) and upper (south) park, which are separated by Queen Elizabeth Park Road (Map 1). There are a range of amenities that can be found within the park, including picnic areas, walking and cycling trails, a playground, and an Indigenous Art Park (Ȧᓂ° (ÎNÎW) River Lot 11∞).

Map 1. Overview of the proposed location of the Edmonton Bike Park, within the boundary of Queen Elizabeth Park (delineated in yellow) in central Edmonton.

1.3. Summary of Regulatory Requirements

The following is a summary of the various federal, provincial, and municipal acts, regulations, bylaws, or policies that may need to be considered during the planning, design, and construction of the project.

1.3.1. Federal

Fisheries Act

The *Fisheries Act* [R.S.C., 1985, c. F-14] is federal legislation established to manage and protect Canada's fisheries resources. This *Act* protects fish and fish habitat in commercial, recreational, and Aboriginal fisheries and regulates pollution prevention, the harvesting of fish, and the safe use of fish. Projects that follow best management practices and mitigation measures to avoid harm to fish and fish habitat as per Fisheries and Oceans guidelines do not require authorization under the *Fisheries Act.*

Migratory Birds Convention Act & Migratory Birds Regulations

The federal *Migratory Birds Convention Act* [S.C. 1994, c. 22] (MBCA) and the Migratory Birds Regulation [SOR/2022-105] (MBR) prohibits disturbance or damage to birds or their nests. Specifically, the MBCA protects migratory birds at all times and the nests of all migratory birds when the nest contains a live bird or viable egg. Additionally, Schedule 1 of the MBR provides year-round protection for the nests of 18 species that regularly reuse their nests, including pileated woodpecker, a species commonly found in Edmonton. As per Schedule 1, nests of pileated woodpeckers are protected unless it can be demonstrated that the nest has been unoccupied for a period of 36 months. All unoccupied nests must be reported through the Abandoned Nest Registry[1] before a permit can be issued for tree removal.

1.3.2. Provincial

Historical Resources Act

The Alberta *Historical Resources Act* [R.S.A. 2000, c. H-9] protects historic resources that are susceptible to the effects of time and can be damaged by modern human activities. Activities that are likely to result in the alteration of, damage to, or destruction of a historic resource generally require the completion of a Historic Resources Impact Assessments (HRIAs), as well as mitigation studies for any impacts that cannot be avoided.

Water Act

The Alberta *Water Act* [R.S.A. 2000, c. W-3] stipulates that all water in the province is vested in the Crown. As such, an approval or notification must be submitted before undertaking any works that might impact a surface waterbody or the aquatic environment. Projects that meet all requirements under the Code of Practice for Watercourse Crossings (Government of Alberta 2013) and the Code of Practice for Outfall Structures on Water Bodies (Government of Alberta 2013) and can follow the written specifications of a Qualified Aquatic Environment Specialist (QAES) generally do not require authorization under the *Water Act.*

Public Lands Act

The bed and shores of all permanent watercourses and water bodies are considered public lands and are owned by the Crown, unless ownership is otherwise stated. As such, approvals under the Alberta *Public Lands Act* [R.S.A. 2000, c. P-40] are required for any activity on the bed or shore of Crown-owned rivers,

[1] https://www.permis-permits.ec.gc.ca/en/AbandonedNests

streams, or lakes. Any activity that alters or occupies the bed and shore of a waterbody may be done only after written approval.

Species at Risk Program & Wildlife Act

Alberta has a Species at Risk Program, which was initiated as a response to the Province's commitment to the Accord for the Protection of Species at Risk in Canada. The intent of the Accord is to prevent species in Canada from becoming extinct as a consequence of human activity. Any species that is designated as Endangered or Threatened becomes legally protected under Alberta's *Wildlife Act [R.S.A 2000, c.W-10]*. This legal designation prohibits the disturbance, killing or trafficking of these species, and provides immediate protection of birds of prey nests and den sites. Any species that is designated as "Sensitive" after a general assessment, or as "Special Concern" after a detailed assessment becomes eligible for special management actions designed to prevent the species from becoming "At Risk". Additionally, Section 36 of the *Wildlife Act* declares it unlawful to willfully molest, disturb, or destroy a house, nest, or den of prescribed wildlife at certain times of the year. The Wildlife Regulation further specifies that Section 36(1) applies to nests and dens of endangered animals, upland game birds and migratory birds, snake and bat hibernacula, and houses and dens of beavers not located on private lands.

Weed Control Act

The *Weed Control Act* provides legal authority to manage native and introduced species that present significant economic, social or ecological risks. The duties of individuals, local authorities, municipalities, and the Crown related to the prevention, control, and destruction of weeds are described in the Act. Specifically, Part 1 of the Act specifies that noxious weeds must be controlled and prohibited noxious weeds must be destroyed.

1.3.3. Municipal

Queen Elizabeth Park Master Plan

The Edmonton Bike Park was identified as a central design element in the Queen Elizabeth Park Master Plan, which was approved by City Council on August 28, 2013. The vision for the bike park, as articulated in the Master Plan, includes a facility that can be easily accessed by the public from the existing river valley trail network, and provides skill development opportunities for cyclists of all ages and abilities. Specifically, the QEP Master Plan specifies that "*a Bike Skills Park will be established in the lower park*" (City of Edmonton 2013, page 101), with further specific reference to the park being "*situated on the remediated site of a former wastewater treatment plant*" (City of Edmonton 2013, page 127).

North Saskatchewan River Valley ARP (Bylaw 7188)

Bylaw 7188 was adopted to protect and conserve the North Saskatchewan River Valley and associated ravine systems (City of Edmonton 1985). A major goal of the bylaw is to develop a park system that accommodates a range of recreational uses, while also conserving the North Saskatchewan River and Ravine System by limiting industrial and residential development within, and adjacent to, the river and ravine network. Clauses within the bylaw that are relevant to this project include:

3.2.1. Areas with significant vegetation, potential wildlife and waterfowl habitat, or other unique physical features shall be managed as nature conservation areas.

3.2.7. The City may acquire through subdivision all lands lying below the geomorphic limit of the River Valley and Ravine System as Environmental Reserve.

3.3.1. Areas containing natural resources will be preserved and enhanced for recreational, scenic, and ecological purposes.

3.3.3. All proposed public development and development on public lands requires an environmental impact screening and assessment.

Ribbon of Green

The City of Edmonton developed the *Ribbon of Green: North Saskatchewan River Valley and Ravine System Concept Plan* (1990) and the subsequent *Ribbon of Green: North Saskatchewan River Valley and Ravine System Master Plan* (City of Edmonton 1992) to guide future park development in North Saskatchewan River valley and associated ravine systems. This plan identifies preservation, conservation, and extensive use management zones within the river valley based on biophysical resources and provides suitable recreational activities, construction practices, and management plans within each of these zones.

Edmonton Metropolitan Region Growth Plan

The Edmonton Metropolitan Region Growth Plan (EMRGP) came into effect on October 26, 2017. One of the guiding principles of this plan is to "Protect natural living systems and environmental assets". Specifically, the Plan indicates the following:

2.1.1 Natural living systems of regional, provincial and federal significance identified on Schedule 4 will be conserved in addition to other natural features identified for protection under provincial and federal legislation to maintain and enhance the Region's biodiversity.

The North Saskatchewan River valley is identified on Schedule 4 as an environmental feature of significance.

City Plan

Edmonton's City Plan, Charter Bylaw 20,000 was approved by City Council on 7 December 2020. The City Plan combines a Municipal Development Plan and Transportation Master Plan, and includes strategic direction in environmental planning, social planning, and economic development. The City Plan sets strategic direction for the way Edmonton grows, its mobility systems, open spaces, employment, and social networks, generally touching on most aspects of life in Edmonton.

The following is a list of City Plan policies that align with the Edmonton Bike Park project:

1.1.1 Promote personal and community wellness and connection through inclusive and welcoming places.

1.2.1 Promote active communities through the design of diverse, welcoming and playful public places.

1.3.2 Support Edmonton's identity as a winter city through its infrastructure, design, events and economy.

2.1.1 Ensure that publicly accessible spaces and facilities are designed and maintained for the year-round safety, security and comfort of all users.

4.1.2 Ensure safety of all users in the planning and design of city infrastructure, networks and spaces.

5.1.1 Ensure protection, enhancement and opportunities for access to open space and the river valley and ravine system.

5.1.2 Promote the conservation and restoration of natural systems to improve ecological connectivity and reduce habitat fragmentation

Breathe: Green Network Strategy

The main goal of Breathe is to plan and sustain a healthy city by encouraging connection and integration of open space at the site, neighbourhood, city, and regional levels. Breathe aligns a number of strategic goals for the City of Edmonton, including improving livability, preserving and sustaining the environment, transforming urban form, and encouraging the use of public transit, walking, and cycling. The following is a list of policies set out in Breathe that are relevant to this project:

4.1.1a Incorporate Crime Prevention Through Environmental Design (CPTED) principles in the (re)design and programming of open spaces and the facilities within them, including efforts to encourage passive surveillance and a sense of ownership over open spaces through animation, active uses and community building initiatives.

4.1.3a Wherever feasible, trails and pathways should be (re)designed and maintained to ensure universal access. While not every open space will provide accessible trails and pathways (e.g. some natural trails, mountain bike trails), the network as a whole will provide a diverse range of safe, challenging and accessible pathways for recreation and active transportation.

4.2.1a Adopt best practices in landscape and urban design during open space (re)development to encourage social interaction and compatible relationships with surrounding uses.

4.2.1e Explore opportunities through landscape and urban design to recognize and emphasize Edmonton's scenic landscapes, ecological heritage and cultural connections to the land (e.g. native species and vegetation patterns).

4.2.1g Encourage year-round usage of open spaces by employing siting and design that promotes sheltering from winter climate impacts, and incorporating well-designed artificial lighting to extend winter hours of operation.

4.2.1l Protect vistas, views and visual connections between the North Saskatchewan River Valley and Ravine System and the top of bank through implementation of top-of-bank development standards, development of public roadways and view points, and responsible maintenance of vegetation.

4.2.1m Where appropriate, incorporate elements into open space design that encourage people to gather and linger, such as seating, public art, lighting and shade structures.

4.5.1d Require development proponents to articulate, through sound market and/or consultation research, key demographic characteristics of the population to be served by the development, and use such demographic information to create an appropriate program for the proposed open space.

4.6.3h Provide well integrated transitions among sidewalks, cycling infrastructure, the shared-use pathway network, other pedestrian networks, transit facilities and open spaces (particularly those in the River Valley and Ravine System). Open spaces should be connected to surrounding areas by sidewalks and pathways to increase pedestrian and cyclist mobility and access.

4.7.1b Maintain and enhance wildlife connectivity by preserving existing areas of natural land cover; minimizing disturbance and removing barriers in the River Valley and Ravine system and other connectivity corridors; and encouraging development on public and private land that maintains the connections between open spaces.

Corporate Tree Management Policy (Policy C456C)

The purpose of the Corporate Tree Management Policy is to ensure that all trees on City owned property are adequately protected from destruction, loss or damage. The Project will impact City owned trees. Tree Protection or Preservation Plans will be prepared as required by the Corporate Tree Management Policy.

Parkland Bylaw (Bylaw 2202)

The purpose of the Parkland Bylaw is to regulate the conduct and activities of people on Parkland in order to promote the safe, enjoyable and reasonable use of the property and to preserve natural ecosystems. The bylaw states 'no person shall: build a structure, whether permanent or temporary'; and 'store or leave construction equipment or related items'. Permits (e.g., for construction laydowns, access routes, etc.) may be needed.

Public Spaces Bylaw (Bylaw 20700)

This bylaw takes effect on May 12th, 2025. The purpose of this bylaw is to regulate the City's public spaces and other areas in a manner that supports fairness, fosters safe and viable communities and the well-being of the environment and promotes responsible stewardship of City assets and resources.

Public Tree Bylaw (Bylaw 18825)

The Public Tree Bylaw mandates the protection and preservation of City trees. A Tree Permit is required when work is conducted within 5 meters of any Boulevard and Open Space trees, or within 10 meters of Natural Stand. Ground excavation and grading activities within these areas require a Tree Preservation Plan.

2.0 Environmental Context

2.1. Overview & Methods

The Edmonton Bike Park will be located within the lower portion of Queen Elizabeth Park, east of the Walterdale Bridge and within the floodplain of the North Saskatchewan River. The Area of Interest (AOI) for this Environmental Impact Assessment included the proposed footprint of the bike park, as well as an additional area east of the proposed bike park facility (Map 2).

Most of the infrastructure associated with the bike park facility will be restricted to the area that has been previously disturbed by a decommissioned wastewater treatment plant, which is located on a relatively flat floodplain terrace (Map 3). However, given the nature of this facility, several of the existing and proposed trails are located on steeper terrain to the south and east of the main facility. A more detailed description of the proposed bike park is provided in Section 3.

As per the Terms of Reference for the EIA, developed in consultation with the City of Edmonton, this section includes an overview of conditions related to surface water, geology/soils, vegetation, wildlife, and historical resources, which provide an overall description of the environmental sensitivities within the AOI.

The descriptions of environmental conditions and features included in this section are based primarily on a review of existing studies completed as part of earlier phases of planning and construction associated with the implementation of the QEP Master Plan and construction of the Walterdale bridge. This background information was supplemented with additional desktop analysis that primarily included terrain analysis in ArcGIS and QGIS using spatial data available through the City of Edmonton Open Data portal. The desktop information gathered for the site was verified during a field reconnaissance visit that was conducted on June 17, 2024.

Map 2. Area of Interest for the Environmental Impact Assessment and proposed footprint for the Edmonton Bike Park.

2.2. Site Location Study

A site location study was completed in June 2024, which outlined the project scope and proposed design. This included a location analysis and justification for the project, as well as an opportunities and constraints analysis. The study concluded that this facility was identified as a design element in the Queen Elizabeth Park Master Plan, which was approved by City Council in 2013. The vision for the bike park, as articulated in the Master Plan, includes a facility that can be easily accessed by the public from the existing river valley trail network and provides skill development opportunities for cyclists of all ages and abilities. Additionally, the Master Plan identifies the site of the decommissioned wastewater treatment plant as an ideal location for the bike park. The siting of the facility in this particular location will revitalize this area of the park, which is currently underutilized, while also integrating existing trail features, some of which are not sanctioned and are therefore not designed or maintained to prevent erosion. The site also offers opportunities to expand the single-track trail system in a way that leverages the existing topographic features, while also minimizing the loss of natural vegetation on the site. A copy of the site location study is provided in Appendix A.

2.3. Historical Resources

The spring 2024 Listing of Historic Resources (the Listing) available from the Government of Alberta[2] was consulted to determine the Historic Resource Value (HRV) of the lands associated with the proposed Bike Park location. The proposed location has been assigned an HRV of 1-h, meaning that an approval under the *Historical Resources Act* must be issues prior to undertaking any work. A *Historical Resources Act* approval with Conditions was issued for the Edmonton Bike Park on January 15, 2025. A copy of this approval is provided in Appendix B.

2.4. Hydrology

Several geotechnical studies have been completed within the AOI as part of previous work associated with the QEP Master Plan and the Walterdale Bridge replacement. The most recent and relevant work completed includes a geotechnical investigation of the project area conducted by J.R. Paine & Associates Ltd. (JRP), which included a review of previous geotechnical reports, a desktop study, and a field investigation (JRP 2025). A copy of this report is provided in Appendix C.

Prior to that study, a geotechnical investigation and a limited Phase III assessment was conducted by Thurber Engineering in 2018. As part of that work, test holes and a groundwater monitoring well were drilled within the footprint of the former wastewater treatment facility. Results from the short-term groundwater observations at the single well indicated that the depth to groundwater was 8.9 m below ground surface (bgs) at the time of drilling, with a second reading taken six weeks later indicating a depth of 9.0 m bgs (Thurber 2018a and 2018b). The groundwater level was located within a sand deposit and was close to the river elevation at the time of sampling; however, it was noted that the groundwater levels likely vary in response to seasonal factors and precipitation (Thurber 2018a).

Slope, surface water flow paths, and depressional areas were modelled for the AOI with the City of Edmonton Digital Elevation Model using a tools in ArcGIS and Whitebox (Lindsay 2016). Slopes within the AOI are varied, with a flat terrace associated with the former wastewater treatment facility, and areas with very steep slopes (>15%) immediately adjacent to the river, as well as upslope and east of the proposed Bike Park (Map 3). Due to the steep slopes, the site is well-drained and surface water flows north to the river, with only a handful of small depressions that may collect surface water temporarily during high runoff events (Map 4).

[2] Data was downloaded from: https://www.alberta.ca/listing-historic-resources#listing-historic-resources-download

No streams or wetlands were observed within the AOI during the field reconnaissance visit; however, a seepage area was noted in the eastern portion of the AOI (Map 4; Photo 1). The seepage area was located mid-slope and was associated with an area of bank instability. This portion of the AOI is associated with the eastern end of Queen Elizabeth Park, which is characterized by very steep slopes. Previous studies have noted that this area is associated with the "lavigne bank" where slope stability is affected by groundwater levels (UMA Engineering 1991, cited in City of Edmonton 2013).

As noted earlier, the AOI is located within the floodplain of the North Saskatchewan River, and portions of the proposed bike park are located within a flood hazard area (GOA 2024). Flood hazard areas are defined as lands that will flood during a 1:100 design flood, and include two main zones:

- **Floodway** – the area of highest hazard where design flood flows are deepest, fastest, and most destructive.
- **Flood Fringe** – The part of the flood hazard area outside of the floodway. Water in the flood fringe is typically shallower and flows more slowly than in the floodway.

Portions of the proposed bike park fall within an area that has been identified as flood fringe, with a small area also falling within an area that has been mapped as part of the river's floodway (Map 5).

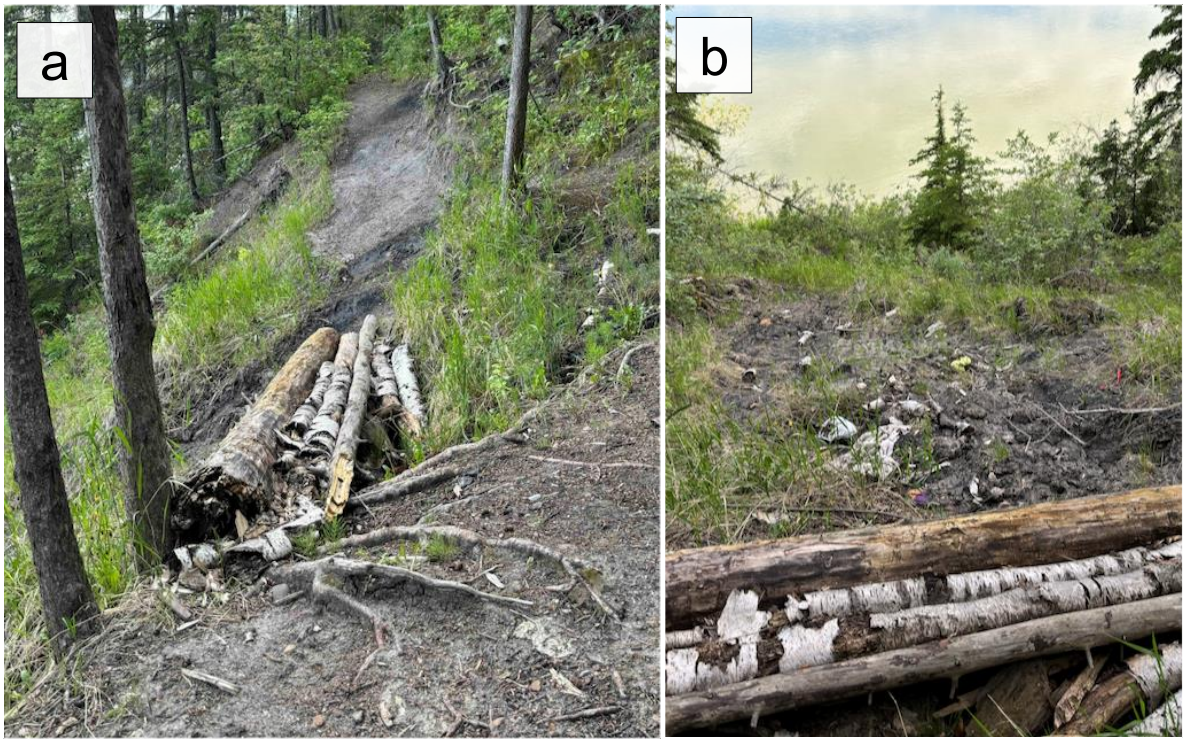
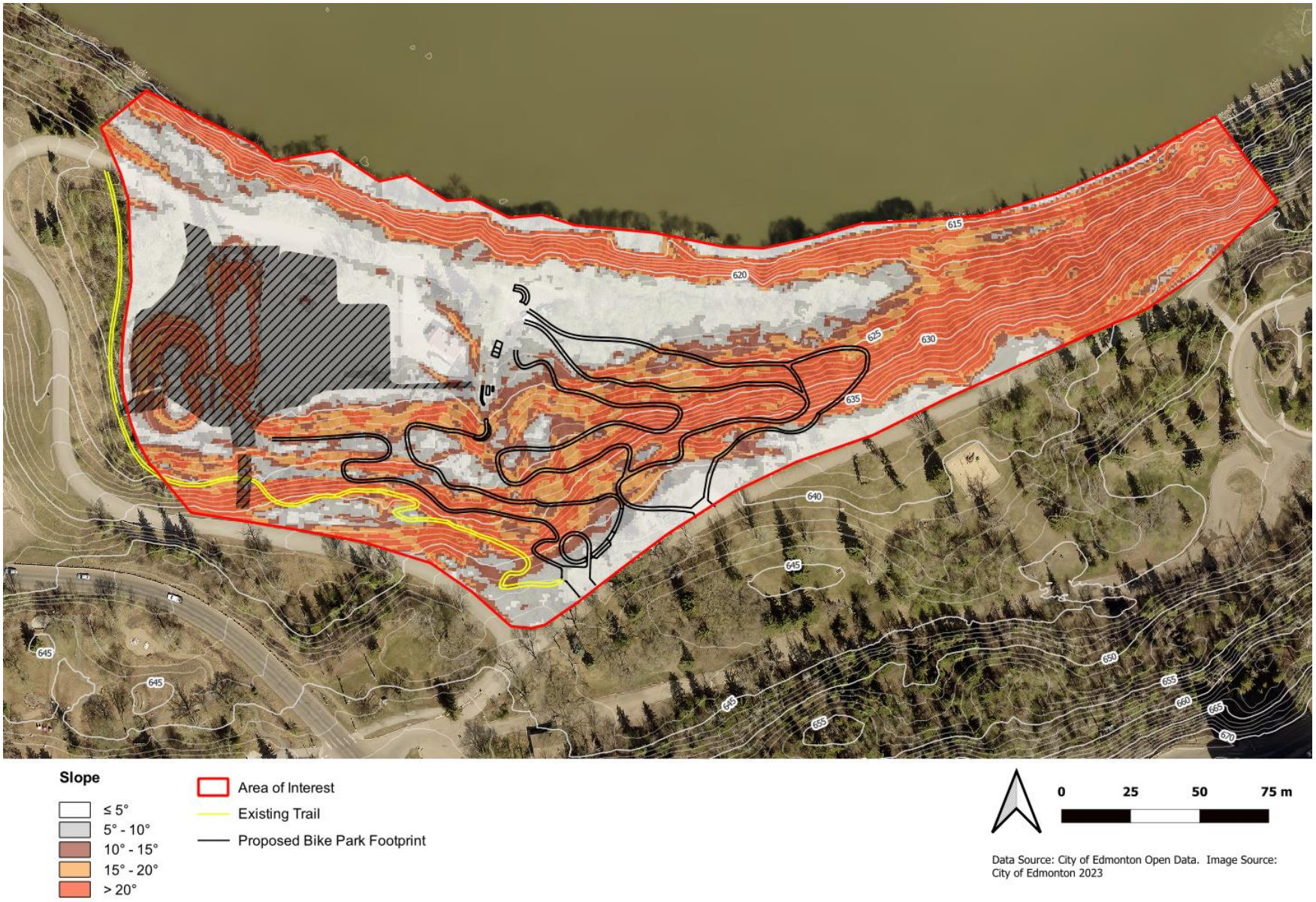
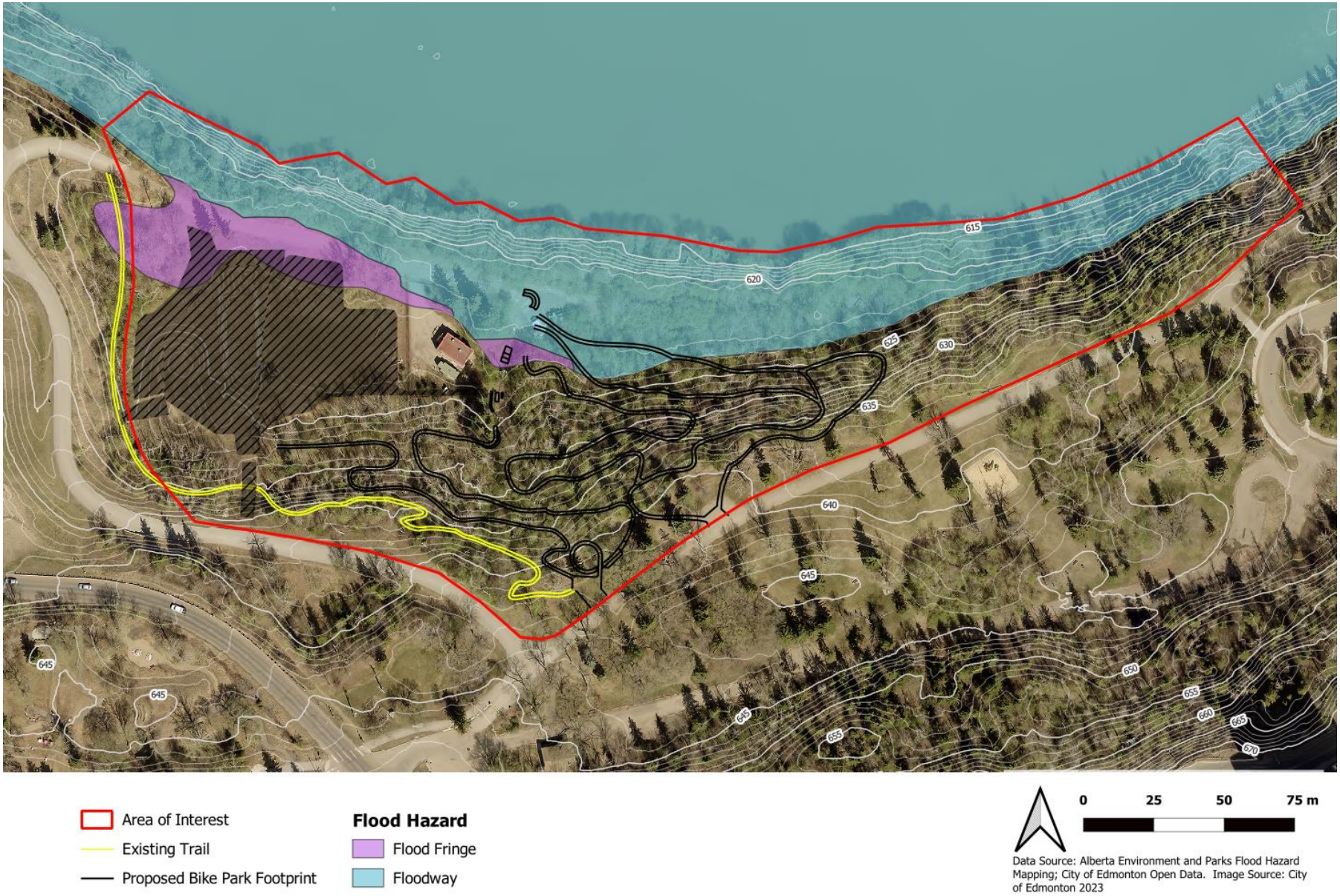


Photo 1. Seepage area looking east (a) and downslope (b).



Map 3. Slope characteristics within the Area of Interest.

Map 4. Modelled surface water flow paths and depressional areas, and location of seepage area observed during the field reconnaissance within the Area of Interest.



Map 5. Flood hazard mapping (GOA 2024) showing areas within the AOI designated as Floodway and Flood Fringe.

2.5. Geology/Geomorphology and Soils

As per the geotechnical investigations completed by JRP (2025), three local surficial geologies were identified within the site or on the slope above the site, which correspond with the Thurber (2018a) characterization of the surficial geology along the south valley slope of the North Saskatchewan River within the AOI "consists of alluvial sand, gravel, silt and clay deposits (fining upwards) overlying bedrock of the Horseshoe Canyon formation" with the alluvium being noted as more than 10 m thick (Thurber 2018, pg. 3). The report also notes that in this location, the exposed alluvial deposits on the bank immediately adjacent to the river are subject to ongoing river toe erosion.

At the top of the river valley above the proposed bike park location, the bedrock is covered by surficial Quaternary deposits consisting of glacial till overlain by glaciolacustrine clay and silt (Thurber 2018a). The valley wall in this location is further described by Thurber (2018a, pg. 3) as:

> *"…broadly covered by colluvium as a results of past landslide activity and ongoing seasonal creep movements, except for small outcrops in ravines where the bedrock is exposed. The colluvium may be separated into units; main scarp, valley slope landslide (inactive), secondary (inactive) landslide, and areas of recent creep movement. The main back scarp at the crest of the valley slope is mantled by a thin veneer (few meters) of colluvium, originating from glaciolacustrine deposits, till or weathered bedrock."*

This portion of the valley wall is part of the larger "Lavigne landslide zone", which is described by Thurber (2018a, pg. 3) as:

> *"…a deep-seated rupture surface along a bentonite layer in the bedrock at approximately 620 m elevation. However, within the study area, this major landslide feature appears to be in an inactive state. The landslide is composed of a few major blocks and many smaller parts. One of the major blocks is identified on Drawing 23243-1 (see Map 6) as a "Secondary landslide". This block also appears to be inactive.*
>
> *Notwithstanding these inactive landslide features, the valley wall is characterized by signs of slow, seasonal creep movement. The creep movement is believed to be a result of gravitational downslope mass movement caused by seasonal freezing and thawing. The creep movement is only a few meters deep and it is mostly active within the surficial colluvial deposits or weathered bedrock. Some areas with more intensive creep movement could potentially develop into shallow landslides."*

As part of the limited Phase III EAS completed by Thurber (2018b), the stratigraphy recorded in borehole TH18-5, which was located within the proposed footprint of the bike park (see Map 6 for borehole location), indicated the following subsurface conditions:

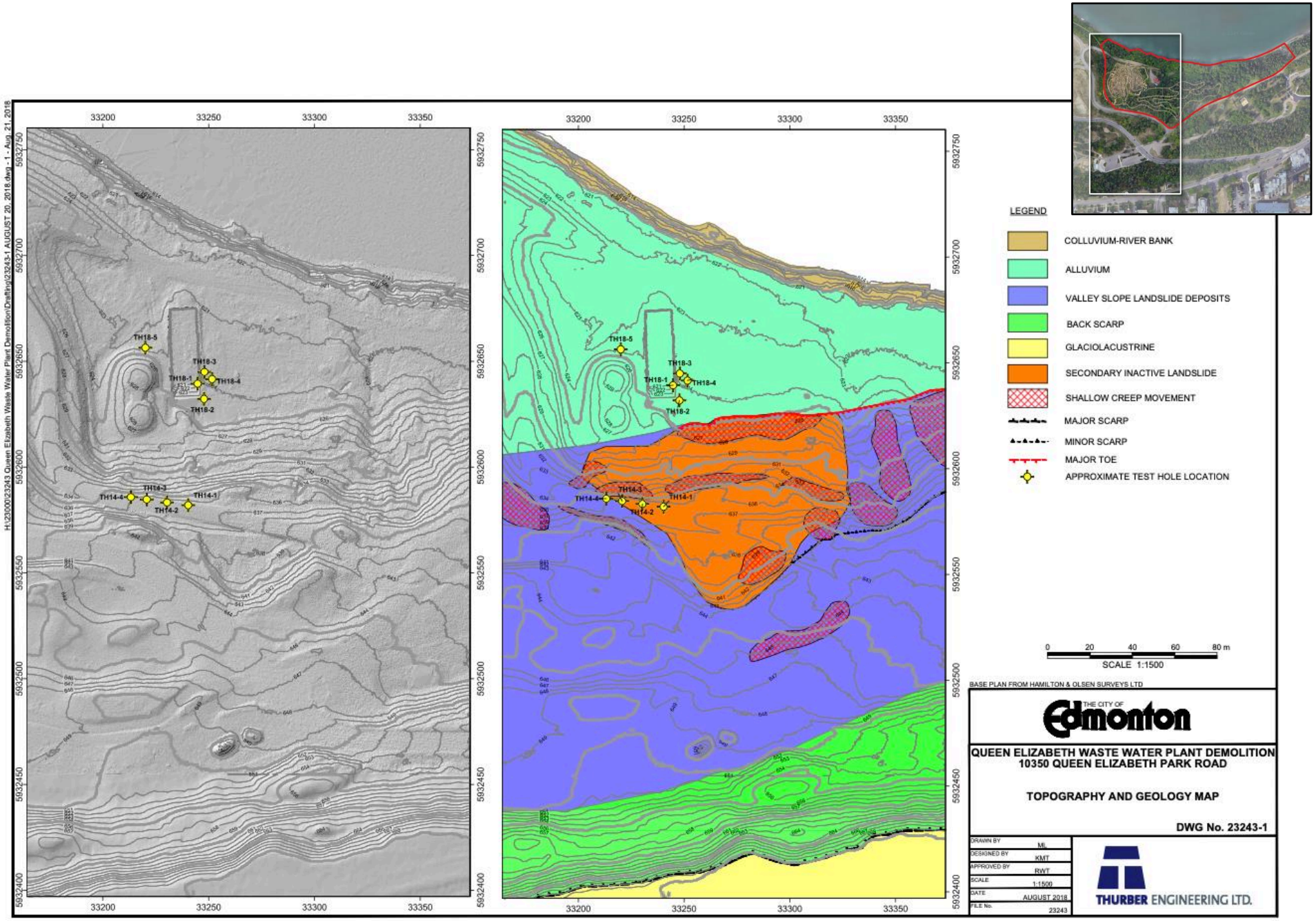
- native silt (dark-brown to brown, trace fine sand to sandy) from 0 m bgs 8.4 mbgs;
- fine-grained sand from 8.4 m bgs to 11.4 m bgs.
- gravel and sand from 11.4 m bgs to 12.5 m bgs,
- clay shale from 12.5 m bgs to 13 m bgs

Several areas of bank instability were noted east of the proposed bike park during the field reconnaissance conducted on June 17, 2024. These areas were characterized by vegetation that had been uprooted and/or was leaning due to apparent bank sliding or movement (Photo 2a and 2b). One of these areas (location b on Map 7) was located immediately downslope of the seep described in Section 2.4. No signs of major slope instability were observed within the proposed footprint of the bike park; however, Thurber (2018b) notes that the river valley wall in this location is subject to slow, seasonal creep movement, and in some areas, more intensive creep movement within the surficial colluvial deposits and weathered bedrock could develop into shallow landslides over time.

The most recent geotechnical assessment of the project area was performed by JRP (2025) and included a slope stability analysis and recommendation for the proposed bike park main site and flow trails. This report concludes that based on review of the subject site and current slope conditions, there are no major concerns that would cause recommendation that the bike park and trail development be halted. Key recommendations for bike park and trail design and construction include:

- Based on visual review of the bike park site area, a minimum 30 m setback from the secondary top of bank (TOB) at the river was recommended to limit the impact of the toe erosion noted over the next 100 to 150 years. The study noted that the proposed bike park site is less than this at approximately 20 to 25 m from the secondary TOB, and suggested that the bike park site can be monitored for nearness to any future toe erosion and adjustment made accordingly. The report concluded that given that toe erosion occurs incrementally (assuming erosion of approximately 30 m over 150 years and 20 m over 100 years), erosion can be monitored and addressed as needed for the bike park development.
- Planned timber features on the trails should have limited slope impact with small wooden piles utilized to construct them. Any planned fill features for the trails on the slope should have further stability assessment, as this will create a surcharge load. Further, tree clearing and any vegetation disturbances should be minimized.
- Grades should be kept high as possible and proper site drainage of hard surfaces is required to ensure adequate subgrade support and minimal risk of swelling and shrinkage below hard surfaced areas.

Additionally, geotechnical consultation will be provided by JRP to the project as part of the flow trail construction process to ensure dirt and wood features are installed in areas where surcharge load will not impact slope stability. Continued consultation will also be provided with regards to proposed trail width and cutting of trail into 2H:1V or steeper slopes to ensure slope stability is maintained.



Map 6. Surficial geology of the western portion of the AOI (Source: Thurber 2018). The extent of the area mapped by Thurber is indicated in the inset map).

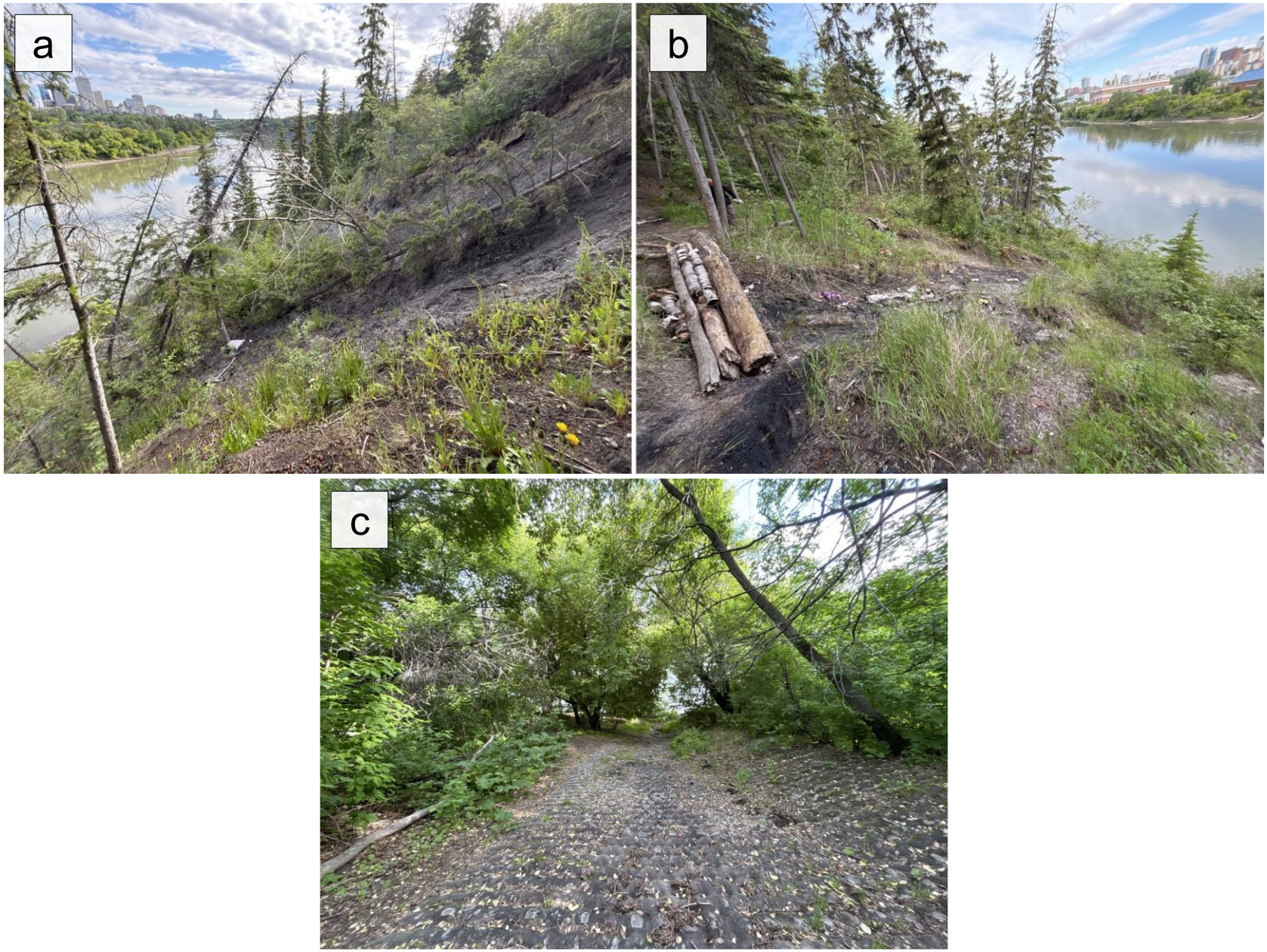


Photo 2. Bank slumping (a and b) and existing erosion protection installed along the river bank (c) directly to the east of the proposed bike park.

Map 7. Location of bank slumping and existing bank stabilization structures within the AOI. Letters correspond to Photos 2a, 2b, and 2c.

2.6. Vegetation

In 2014, a "*Constraints and Development Sensitivity Mapping Study*" (Klohn Crippen Berger 2014) was completed for QEP, including the proposed location for the Bike Park. The objective of the study was to assess the current state of the vegetation within the park, and included a land cover health assessment and rare plant survey. As per the TOR for the Bike Park EIA, the 2014 study formed the primary basis for the desktop assessment of vegetation within the AOI, with updates to this initial work being completed as per observations from the June 17, 2024 site reconnaissance.

The 2014 study described the AOI as having urban (vegetated), deciduous (closed), mixed (closed), conifer (closed), and barren cover types (Klohn Crippen Berger 2014). Additionally, invasive species were observed in the area and no rare plants were detected. Vegetation health within the AOI was rated as a combination of "unhealthy" and "healthy with problems" and invasive species were observed in the area. No rare plants were detected.

During the site reconnaissance, the AOI was found to contain a mix of naturally vegetated areas as well as areas that have been disturbed and/or are actively managed (Map 8). Disturbed areas included those associated with the former wastewater treatment plant, the existing pumphouse and associated infrastructure (road/pathway), a transmission line, an erosion control structure (previously described in Section 2.3, see Photo 2c), and manicured grass at the top of the river terrace.

Areas covered by natural vegetation were dominated by mature conifer (white spruce), mature mixedwood (white spruce/balsam poplar/trembling aspen), and mature deciduous (balsam poplar/trembling aspen) forest. Box elder was a significant component of the understory in all forested areas, alongside various exotic shrub and tree species such as caragana, cotoneaster, lilac, and mountain ash (Table 1). Several encampments (active and inactive) and informal trails were encountered within the forested areas (Map 9), and garbage and other debris was prevalent throughout the AOI (Photo 3 a-f). Overall, the condition of the vegetation within the forested areas was consistent with the "healthy with problems" and "unhealthy" conditions reported in 2014 (Klohn Crippen Berger 2014).

The site of the former wastewater treatment plant and the areas adjacent to the existing pumphouse were dominated by grasses and forbs, many of which are exotic (Table 1). Several of these exotic species are also listed as Noxious or Prohibited Noxious under the provincial *Weed Control Act* (Table 2). There were numerous infestations of these weeds noted throughout the former wastewater treatment plant site where the majority of the Bike Park infrastructure will be located (Map 9; Photo 4 a-c).

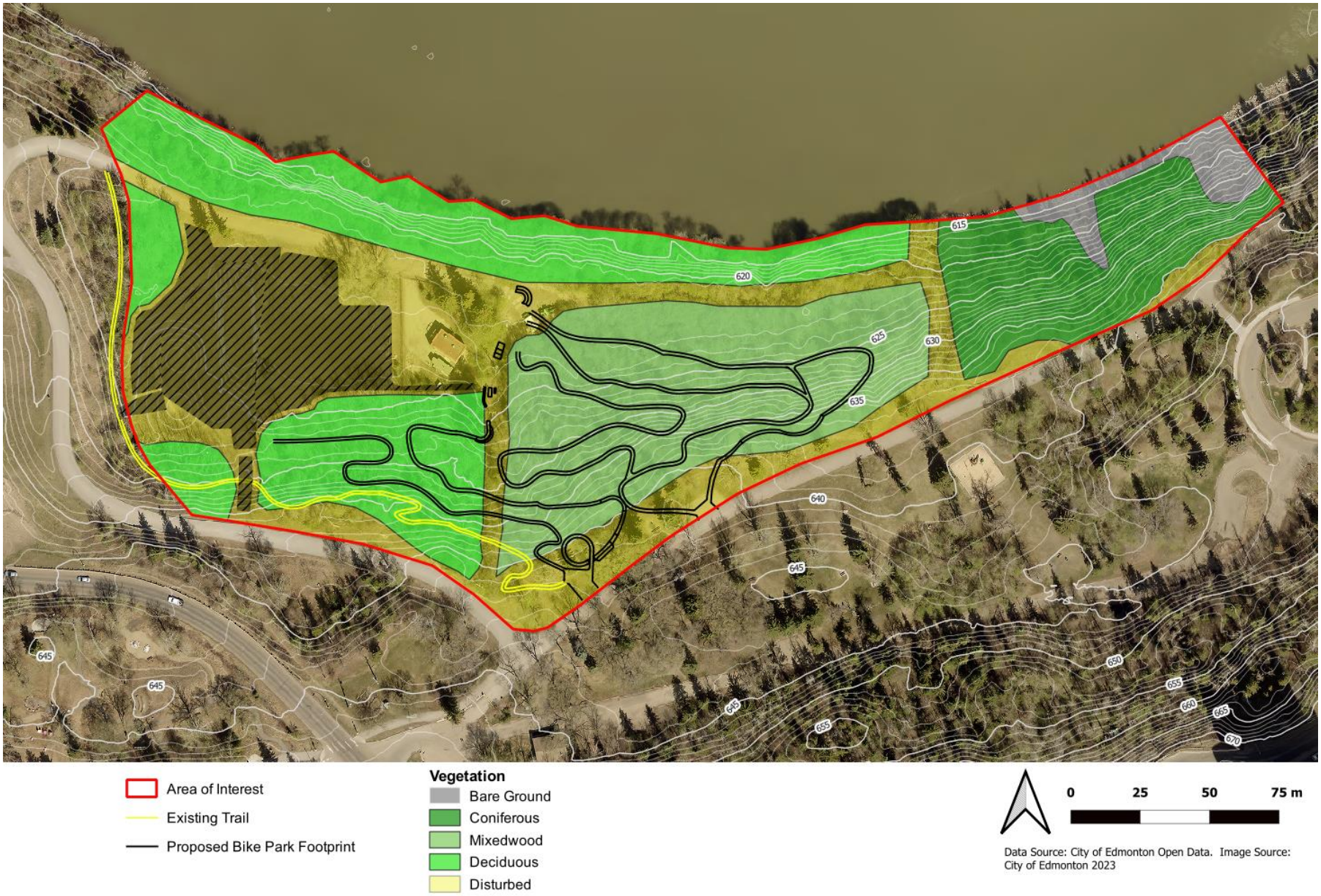
In addition to the plants noted during the field reconnaissance (Table 1), a list of vascular plants and weed species that have been reported in Queen Elizabeth Park was compiled based on a query of the Alberta Conservation Information Management System (ACIMS), as well as research grade plant observations from iNaturalist. These lists are provided in Appendix D.

Table 1. List of plant species observed during the field reconnaissance visit on June 17, 2024.

Common Name	Scientific Name	S Rank	Status
Absinthe Wormwood	*Artemisia absinthium*	SNA	Exotic
Alfalfa	*Medicago sativa*	SNA	Non-native
Alsike Clover	*Trifolium hybridum*	SNA	Exotic
Balsam Poplar	*Populus balsamifera*	S5	Native
Bearberry	*Arctostaphylos uva-ursi*	S5/SNA	Native
Box Elder	*Acer negundo*	SU	Unknown/Undetermined
Bur Oak	*Quercus macrocarpa*	SU	Unknown/Undetermined
Caragana	*Caragana arborescens*	SNA	Exotic
Common dandelion	*Taraxacum officinale*	SNA	Exotic
European Mountain Ash	*Sorbus aucuparia*	SNA	Exotic
Field Horsetail	*Equisetum arvense*	S5	Native
Fireweed	*Chamaenerion angustifolium*	S5	Native
Honeysuckle	*Lonicera dioica*	S5	Native
Goldenrod Spp.	*Solidago spp.*	Varied	Native
Greater Plantain	*Plantago major*	SNA	Exotic
Green Foxtail	*Setaria viridis*	SNA	Exotic
Hedge Mustard	*Sisybrium officinale*	SNA	Exotic
Hemp Nettle	*Galeopsis tetrahit*	SNA	Exotic
Kentucky Bluegrass	*Poa pratensis*	S5	Native
Lilac	*Syringa vulgaris*	SNA	Exotic
Palmate Coltsfoot	*Petasites frigidus var. palmatus*	S5	Native
Paper Birch	*Betula papyrifera*	S5	Native
Pincherry	*Prunus pensylvanica*	S5	Native
Quackgrass	*Elymus repens*	SNA	Exotic
Red Currant	*Ribes triste*	S5	Native
Red Elderberry	*Sambucus racemosa*	S4	Native
Red Raspberry	*Rubus idaeus*	S5	Native
Red-Osier Dogwood	*Cornus sericea*	S5	Native
Sarsaparilla	*Aralia nudicaulis*	S5	Native
Saskatoon	*Amelanchier alnifolia*	S5	Native
Shiny Cotoneaster	*Cotoneaster lucidus*	SNA	Exotic
Star-flowered Lily-of-the-valley	*Mainthemum stellatum*	S5	Native
Stinging Nettle	*Urtica dioica*	S5	Native
Tall Bluebell	*Mertensia paniculata*	S5	Native
Touch-me-nots	*Impatiens capensis*	S4	Native
Trembling Aspen	*Populus tremuloides*	S5	Native
Tufted Vetch	*Vicia cracca*	SNA	Exotic
Western Dock	*Rumex occidentalis*	S5	Native
White Spruce	*Picea glauca*	S5	Native
Woods' Rose	*Rosa woodsii*	S5	Native

Table 2. List of plants designated as Noxious and Prohibited Noxious weeds under the provincial Weed Control Act observed during the field reconnaissance visit on June 17, 2024.

Common Name	Scientific Name	Weed Control Act Designation
Canada Thistle	*Cirsium arvense*	Noxious
Dame's Rocket	*Hesperis matronalis*	Noxious
Lesser Burdock	*Arctium minimus*	Noxious
Perennial Sow Thistle	*Sonchus arvensis*	Noxious
Yellow Toadflax	*Linaria vulgaris*	Noxious
Common Tansy	*Tanacetum vulgare*	Noxious
Himalayan Balsam	*Impatiens glandulifera*	Prohibited Noxious



Map 8. Dominant vegetation cover types within the AOI.

Map 9. Notable weed occurrences and other disturbances within the AOI.

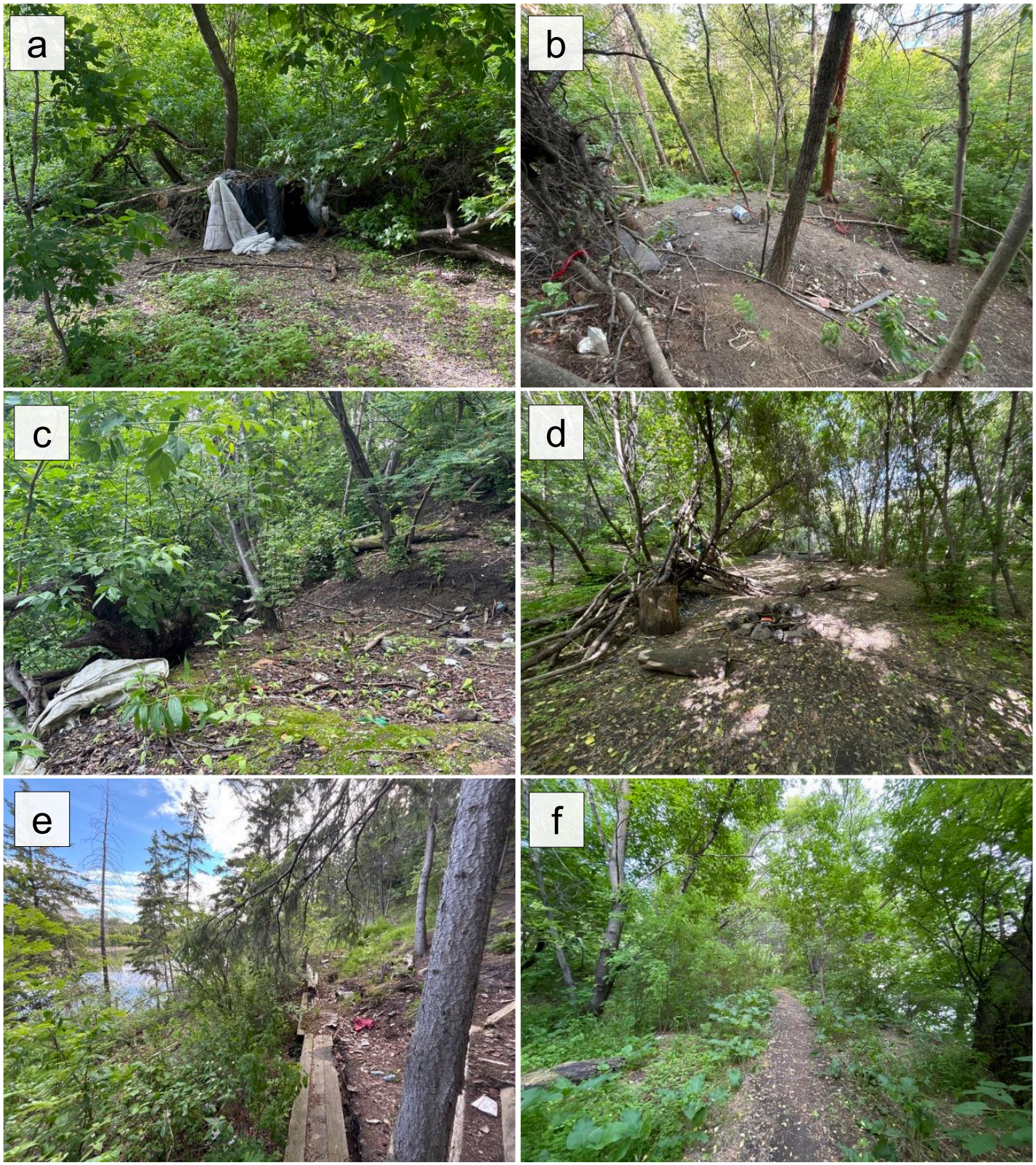


Photo 3. Numerous disturbances were evident throughout the forested areas of the AOI, including homeless encampments (a-d) and non-sanctioned trails (e-f).

Photo 4. Weeds were prevalent within the disturbed areas of the AOI, including a Himalayan balsam infestation east of the existing pump house (a-b). Numerous other Noxious weeds were abundant throughout the site of the former wastewater treatment facility, including burdock, which can be seen in the foreground (c) .

2.7. Wildlife

The 2014 "*Constraints and Development Sensitivity Mapping Study*" (Klohn Crippen Berger 2014) included information about wildlife suitability for the QEP area, including predictions related to wildlife movement for eight priority species. This 2014 study formed the primary basis for the desktop assessment of wildlife and wildlife habitat within the AOI, with updates as per observations made during the June 17, 2024 site reconnaissance. Generally, the 2014 study concluded that the habitat within the AOI was high or moderately suitable for priority species, as compared to other locations within the Park, and likely movement paths for priority species were identified along the western and southern edge of the AOI (Klohn Crippen Berger 2014).

A limited number of wildlife species were observed during the field reconnaissance (Table 3), most of which are commonly found in the Edmonton river valley. Several of the species that were observed rely on riparian habitats dominated by deciduous trees and shrubs, such as beaver, red-eyed vireo, and yellow warbler, as well as older forest with complex structure, such as pileated woodpecker. Notably, pileated woodpecker is provincially listed as a Sensitive species (Table 3). Additionally, because pileated woodpeckers often re-use their nests, trees that contain nesting cavities are protected under the federal Migratory Birds Regulation and cannot be disturbed or destroyed unless the nest is unoccupied. There are many dead and dying trees in the AOI that offer good foraging and nesting habitat for pileated woodpeckers, and at least one tree with large cavities that appeared to be suitable nesting or roosting habitat for pileated woodpeckers was observed during the field reconnaissance (Map 10).

The AOI provides suitable habitat for a wide range of other wildlife species that were not observed during the site reconnaissance, but are expected to occur in the area. As such, a more comprehensive list of birds, mammals, and reptiles that have been observed in or near the AOI was compiled using records obtained from FWMIS, iNaturalist, and eBird. This includes 13 species that are listed provincially as Sensitive or May Be At Risk, and two that are listed federally as Special Concern (Appendix D, Table D-3).

While large and mid-sized mammals have been observed in the vicinity of the AOI (e.g., deer, coyote), there was little direct evidence (e.g., track, scat, bedding sites, den sites) of use by these species during the field reconnaissance. While deer and coyote may utilize this area for denning and/or feeding, the AOI is likely not being used as a major wildlife corridor as much of the area includes slopes >20 degrees (Map 3), a characteristic that does not typically favour wildlife movement (Fraser et al. 2019; Ford et al. 2020). It is likely that if wildlife are moving through QEP, they are doing so along the western and southern boundary of the AOI, as previously noted in the 2014 *Constraints and Development Sensitivity Mapping* study (Klohn Crippen Berger 2014).

Table 3. Wildlife observations recorded during the field reconnaissance visit on June 17, 2024.

Common Name	Scientific Name	Residency	Provincial Status	Federal Status	Type of Observation
American Crow	*Corvus brachyrhynchos*	Seasonal	Secure	Not listed	Auditory
American Robin	*Turdus migratorius*	Seasonal	Secure	Not listed	Auditory
Black-capped Chickadee	*Poecile atricapilla*	Year-round	Secure	Not listed	Auditory
Beaver	*Castor canadensis*	Year-round	Secure	Not listed	Sign
Black-billed Magpie	*Pica hudsonia*	Year-round	Secure	Not listed	Auditory
Downy Woodpecker	*Dryobates pubescens*	Year-round	Secure	Not listed	Sign/Auditory
Pileated Woodpecker	*Dryocopus pileatus*	Year-round	**Sensitive**	Not listed	Sign
Red Squirrel	*Tamiasciurus hudsonicus*	Year-round	Secure	Not listed	Sign
Red-eyed Vireo	*Vireo olivaceus*	Seasonal	Secure	Not listed	Auditory
Yellow Warbler	*Dendroica petechia*	Seasonal	Secure	Not listed	Auditory

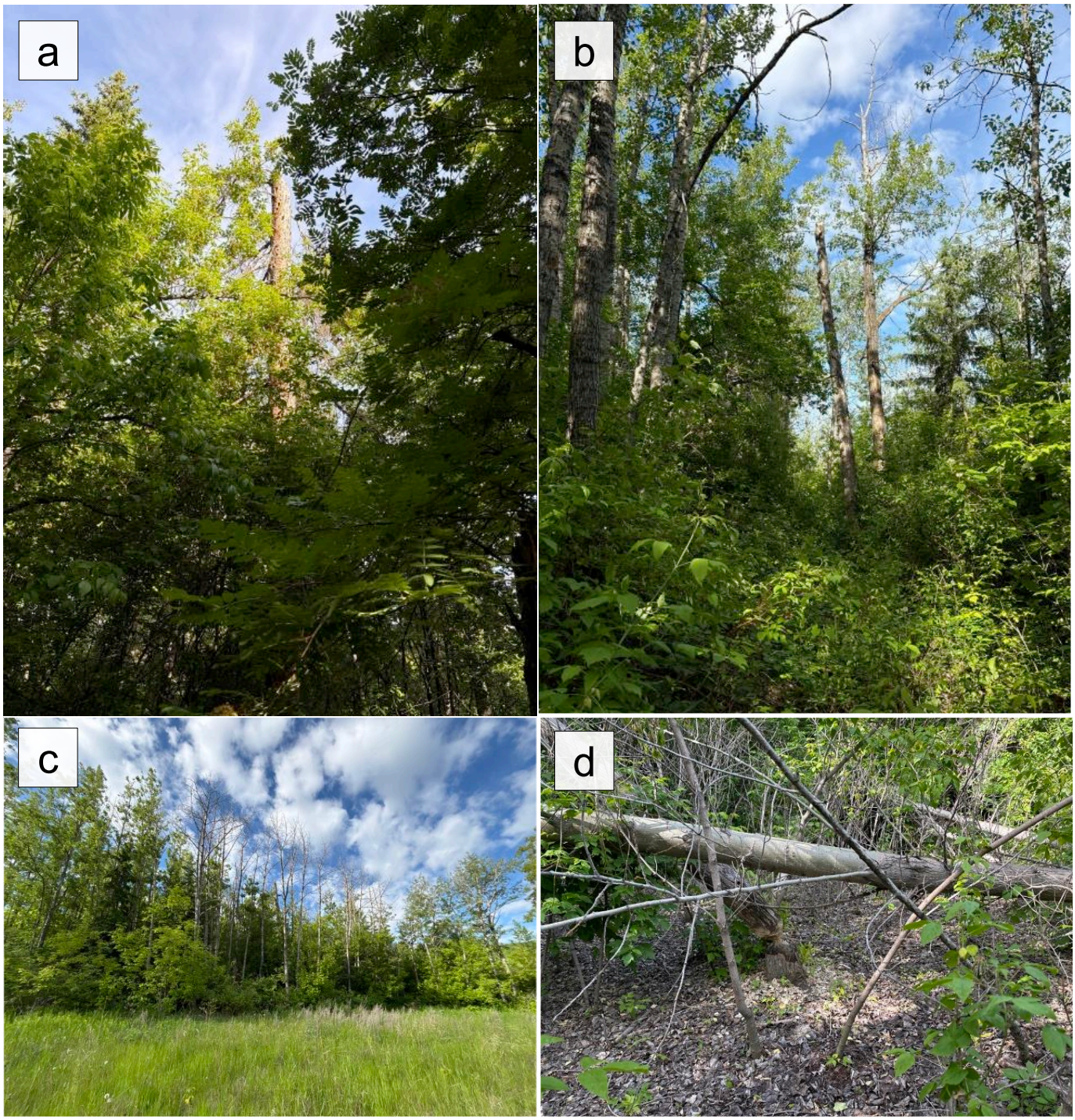


Photo 5. Notable wildlife and wildlife habitat observations in the AOI, including wildlife trees with large cavities (a-b), large snags (c), and beaver activity (d).

Map 10. Notable wildlife observations in the AOI during the field reconnaissance on June 17, 2024, including a probable pileated woodpecker (PIWO) nesting cavity.

3.0 The Project

3.1. Concept Plans & Drawings

The Edmonton Bike Park will consist of four distinct elements: a jump park, a pump track, a skills loop, and a series of flow trails (Map 11). These elements have been designed to primarily utilize an area that was formerly a wastewater treatment plant, thereby repurposing this disturbed an underutilized area into a recreational facility that will tie into existing multi-use and mountain bike trails that will allow for easy access by cyclists and pedestrians via existing path networks, and vehicles via existing recreational facility parking areas. Each of the four distinct elements of the Edmonton Bike Park are described in more detail below.

Jump Park: The jump park will be located on the site of the former wastewater treatment plant, and will utilize existing elevated location as the start platform for all jump lines. The park will be built-up from the existing ground elevation, with minimal excavation. Removal of hazard trees is planned, as identified and required by City of Edmonton Urban Foresters.

Pump Track: The asphalt surfaced pump track will be located beside the jump park, on the site of the former wastewater plant. The track will use existing elevations, with minimal excavation. Drainage from the track will be directed to LID features to be designed and incorporated within and surrounding the pump track.

Flow Trails: A series of flow trails is proposed to the east of the jump park and pump track, in an area the currently contains ad hoc trail development. One existing trail will be retained and integrated into the new trail development (denoted in yellow in Map 11) and several new trails will be constructed as part of the Bike Park. The new trails will be recognized as official mountain bike trails and will be maintained as part of EMBA's agreement with the City, thereby preventing further use and development of ad hoc trails in the area.

The primary objectives in the design and construction of the flow trails is to avoid unstable areas (if any), minimize clearing of existing trees and other vegetation, as well as maintain connectivity for wildlife species that currently utilize the QEP area as a travel corridor. The design of the flow trails has gone through several iterations, with the layout and alignments changed as part of field reconnaissance activities by EMBA and based on consultation from geotechnical experts (J. R. Paine) and relevant City staff. The current layout of the proposed flow trails has been concentrated to areas of steeper slopes away from the riparian area and floodway of the North Saskatchewan River (Map 5) with a total length of approximately 1.02 km of trail within the 41 ha AOI. For reference, in Nelly McClung Park, which is an area to the east of QEP that has a network of single-track trails, granular paths, and paved paths, there is approximately 4.04 km of trails within approximately 93 ha.

Given that the flow trails will be receiving ongoing geotechnical consultation from J. R. Paine and input from Natural Area Operations during their construction, the layout of the flow trails in any maps in this report and accompanying documentation should be treated as somewhat proposed and preliminary. The final exact locations of the flow trails will be determined during construction and will be located to ensure the least environmental impact and highest sustainability possible.

Skills Areas: The skills areas will be located within the western and central portions of the bike park, and will contain built features (e.g., rock garden, teeter totter, etc.) that will promote skill development. The majority of the features associated with the skills loop will be located within the former wastewater treatment facility. Additional built features will be located at the exit of the flow trails located east of the Walterdale Pump Station. The skills features will be built and placed in already cleared and impacted areas. As such, excavation and vegetation removal will be limited.

Map 11. Concept design for the Edmonton Bike Park, showing the four distinct design elements that will be integrated into the facility. Note that the locations of the flow trails is proposed and preliminary, and subject to change as part of on-the-ground geotechnical and environmental consultation during the construction phase.

3.2. Construction Activities & Timing

3.2.1. Site Access

No access roads will be built in the study area. Construction equipment will access the area using the existing EPCOR access road (Map 12). Vehicle and equipment travel in the area will not traverse open space and will be limited to specified and planned minimally impactful haul routes (e.g., on paved paths). Travel will be away from low areas where water retention may occur and will not occur during inclement weather or within a minimum of 48 hours after major inclement weather events.

3.2.2. Construction Activities

The following activities are expected to occur as part of the development of the Bike Park:

- Jump Park: Construction of dirt and timber features.
- Pump Track: Construction of an asphalt surface that will be placed on top of the natural ground surface. This will be surrounded by landscaped areas, drainage points, and LID features.
- Skills Loop: Construction of dirt, rock, and timber features.
- Flow Trail: Construction of singletrack trails designed to Whistler (2003) standards. Some sections of the flow trails, such as corners that require berms, will require added fill and topping material, which will be clay/sand/silt mixture that will be tested for quality and contamination to ensure it meets COE standards. Fill material will be applied in a manner so that it does not significantly alter the drainage in the area. The flow trails will be oriented so that all natural drainage locations remain clear. Trail alignment will be adjusted as needed during construction based on geotechnical and environmental consultation.
- Construction of timber structures that will be placed along the existing path/open area leading from the exit of the flow trails back to the main bike park area. These structures will be built on moveable skids to allow them to be relocated out of the floodway if required.
- Timber furniture and signage will be installed throughout the park.

All timber features will be built using pressure treated timber and will be authenticated by the appropriate professionals as needed. Examples of certified timber features and berms that may be implemented as part of the final bike park design are provided in Appendix E.

3.2.3. Site Preparation

Staging and laydown areas will be located within the main bike park area, within the footprint of the former wastewater treatment facility and immediately adjacent to the EPCOR access road (Map 12). All topsoil stripped from the site will be stored in the laydown areas so it can be reused to construct dirt features in the Jump Park. Additionally, new clay and aggregates for construction of the Pump Track and dirt features in the Jump Park will be stored in the laydown areas. All clay and dirt materials brought from off-site will be approved by the City of Edmonton to ensure that no weeds or foreign materials are introduced to the site. The staging area will be fenced and will include a shipping container that will store small equipment and other supplies required during construction. The shipping container will be relocated on site between the jump park and pump track for permanent storage after construction.

3.2.4. Tree Protection

Six large trees are located within the main bike park area (Map 12) and will be retained as part of the Bike Park design. As per existing City tree regulations, these trees will be protected with fencing during construction. Additionally, a 5 m tree protection area will be established along the perimeter of the main bike park area to protect the natural tree stands surrounding the area (Map 12). The natural tree stands will be protected with temporary fencing compliant with City tree regulations.

3.2.5. Vegetation Clearing and Stripping of Topsoil

Extensive vegetation clearing and stripping of topsoil will be required in the main area of the Bike Park. The vegetation clearing will consist of the removal of existing grassy vegetation and isolated small shrubs. Removal of hazard trees is planned, as identified and required by City of Edmonton Foresters. Vegetation clearing will occur in two rounds. The first round will include hand removal of noxious weeds, and the second round will include stripping using small equipment. Stripped topsoil will be stored in laydown areas for reuse in construction of dirt Jump Park features.

3.2.6. Grading and Stormwater Drainage

Topographic survey of the main bike park area indicates that the existing grade is from south to north towards the North Saskatchewan River. The Bike Park was designed to minimize grading and utilize existing topography and Low Impact Development (LID) features to manage stormwater runoff. As such, limited grading will occur within the main area to accommodate the natural direction of flow from south to north and within the pump track area towards LID features that will be located to retain excess runoff. All grading will be done using small equipment and no excavation is planned for the area. Within the asphalt pump track, localized drainage interventions will be used to control drainage around the pump track. The topographic survey, grading plan, and proposed LID feature design schematic and location of LID features are provided in Appendix E.

3.2.7. Erosion and Sedimentation Control

Erosion and sedimentation control will consist of a combination of erosion control blankets and perimeter methods, such as silt fencing. Erosion control blankets will be used on exposed north-facing slopes associated with the jump park “launch” area adjacent to the paved path and at the exit of the flow trails. Perimeter control will be installed adjacent to the natural areas to the west of the main area, as well as along the northern boundary of the Bike Park, adjacent to North Saskatchewan River.

Soil stored and stockpiled in laydown areas will be covered at all times by waterproof coverings (e.g., tarpaulins) that will be secured in place. The perimeter around stockpiled soil will be controlled using silt fencing or straw bale barriers to prevent any runoff from leaving the laydown areas.

Other best management practices that will be applied include minimizing the length of time soils are left exposed to weathering elements, avoiding construction during extremely wet or rainy periods, and covering of all materials in laydown areas. If required during construction, further temporary erosion and sedimentation control measures will be implemented to protect from the release of sediments. These may include, but are not limited to; additional silt fencing, soil stabilization, and temporary drainage catch ditching and impoundments.

The erosion and sediment control plan is provided in Appendix F.

3.2.8. Revegetation & Rehabilitation

Revegetation and rehabilitation after construction will be completed and will include:

- Replacing topsoil that was stripped in areas located outside the Bike Park footprint.
- Hydroseeding of all disturbed earth surfaces to allow for rapid growth of native grasses (grassland blend, mixed grassland blend, and riparian blend on minimum 300 mm depth topsoil). Wildflower species will be included within the native grass seed mix to increase biodiversity in the area, establish faster, and help outcompete weeds.
- Newly landscaped areas will be protected from public access to ensure successful establishment of planted native grasses.
- Monitoring of site for prohibited and noxious weeds listed in the Weed Control Act (2008).

- Re-vegetation as per LID/landscaping design plans to offer sediment stability, filtration of runoff, and erosion protection and control.

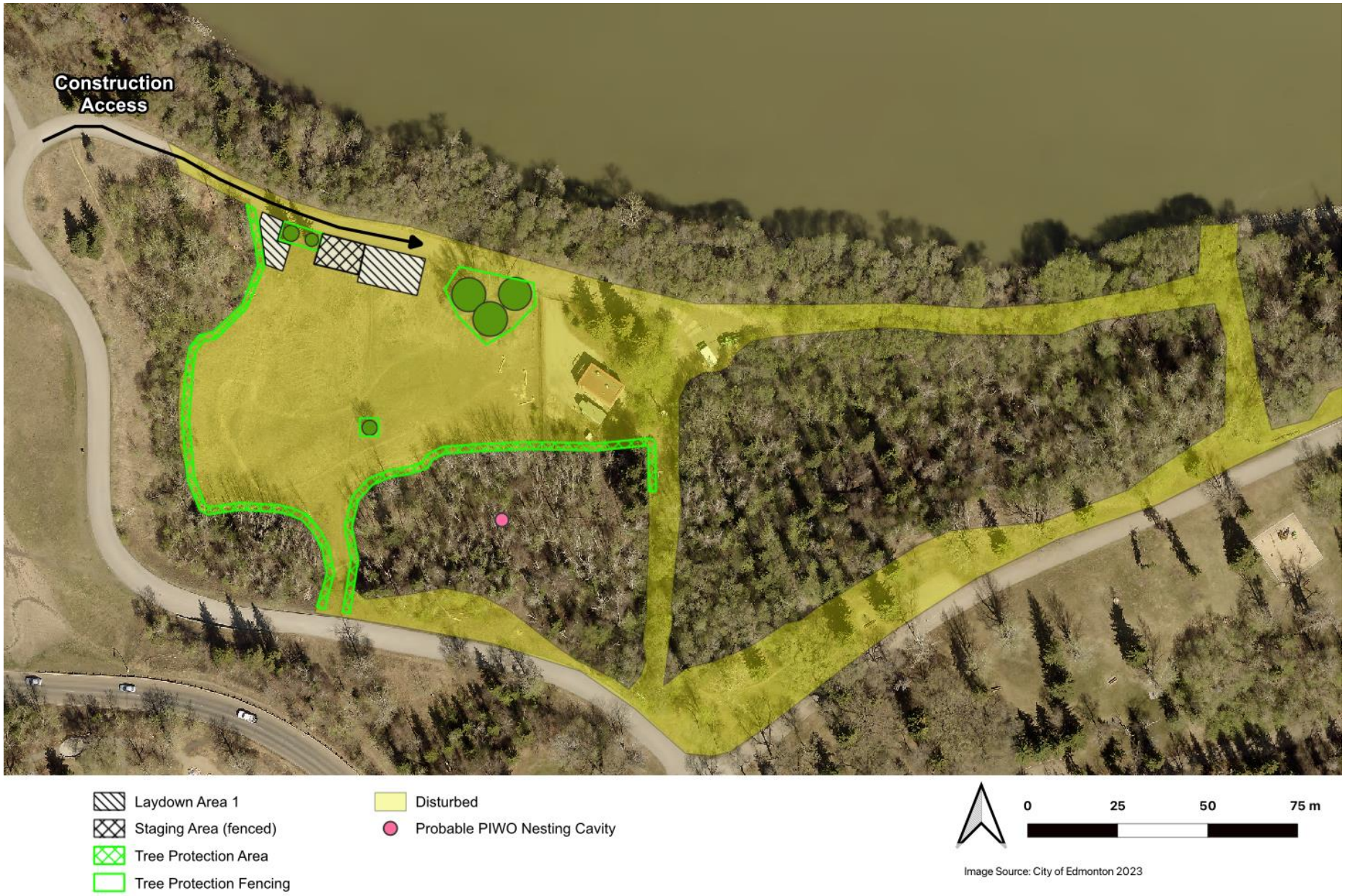
The landscape plan is provided in Appendix E.

3.2.9. Operations and Maintenance

Maintenance of trails and features will be performed by EMBA on an on-going and as-needed basis. Trails and dirt jumps within the main bike park area will require recurring shaping and maintenance with use and depending on weather conditions. Similarly, wood features will be regularly inspected for wear, and will be repaired and/or replaced as needed. Maintenance of vegetated areas and monitoring of weeds will be performed by a dedicated maintenance person in agreement with conditions set by Natural Area Operations. Similarly, LID features associated with the pump track will be inspected regularly to ensure they are operating sufficiently and managing runoff from the asphalt pump track and general areas. Additional support for maintenance activities will be provided by trained EMBA volunteers.

3.2.10. Construction Schedule

Site preparation to prepare the main area of the site is planned for Summer of 2025. Development and work on the flow trails is also planned to commence at this time, with construction of the main Bike Park area planned to begin in the Summer of 2025. The grand opening of the Edmonton Bike Park is planned for June 2026.



Map 12. Location of construction access, laydown areas, and vegetation protection features associated with the Bike Park construction.

4.0 Project Impacts & Mitigation Measures

4.1. Assessing Impacts

This section includes an assessment of the potential impacts of the construction and operation of the bike park on environmental elements within the AOI. This includes a description of the type, extent, duration, and timing of impacts, as well as an assessment of the likelihood (probability) of the impact occurring. For each potential impact, a proposed list of mitigation measures is provided, and a description of any potential residual effects is provided for each environmental element. A residual impact is defined as the impact(s) that are expected to occur after the proposed mitigation measures have been implemented.

A description of the anticipated interactions, mitigations, and potential residual effects of bike park construction and operation on environmental elements of concern is provided below and is summarized in Table 4.

4.1.1. Hydrology, Geology & Soils

Impacts to surface and groundwater within the AOI and downstream within the North Saskatchewan River are expected to be minimal, and are primarily related to sedimentation and erosion risks associated with construction and on-going maintenance of the facility. Risks associated with construction will be mitigated through the development and implementation of a sedimentation and erosion control plan (See Appendix F), including detailed specifications for re-establishing vegetation in erosion prone areas post-construction and the application of erosion and sedimentation control measure described in Section 3.2.7. On-going risks of erosion and sedimentation can be managed through effective surface water management, including proper site drainage and trail design. To this end, all trails will be designed and built following guidelines and standards outlined in Whistler (2003) and with consultation from geotechnical experts, and trails will be regularly monitored and repaired if required to prevent erosion.

On-going risks associated with slope stability, sedimentation, and erosion can be further mitigated by following the recommendations outlined by Thurber (2018a, page 10), as follows:

> *"If paved walkways or other infrastructure is planned for the site, the upper one metre of the backfill should consist of imported low to medium plastic clay, or imported granular fill for improved site trafficability. Site grading fills below pavement, sidewalks, etc., should be placed in 150 mm thick lifts and compacted to at least 95 percent of SPMDD within plus or minus 2 percent of the Optimum Moisture Content (OMC), or to City specifications if greater. The upper 150 mm of subgrade under roadways should be compacted to 100 percent of SPMDD within plus or minus 2 percent of the Optimum Moisture Content (OMC)."*

4.1.2. Historical Resources

A Historical Resources Act Approval with Conditions (HRA number: 4725-25-0001-001) was granted on January 15, 2025. The conditions specify that the depth of subsurface disturbance must be limited to reduce the likelihood for impacts to deep archaeological deposits that have been observed in adjacent areas. There are no HRA requirements for the site associated with paleontological, Indigenous traditional use sites, historic structures, or Provincially Designated Historic Resources; however the proponent must comply with standard requirements under the HRA for reporting the discovery of any historic resources if any are discovered during land disturbance.

Table 4. Summary of the anticipated interactions, mitigations, and potential residual effects of bike park construction and operation on environmental elements of concern.

Environmental Element	Description of the Extent, Duration & Timing of Interaction	Likelihood (High / Medium / Low)	Proposed Mitigation Measures	Potential Residual Effects
Hydrology	**Construction**: Short-term & seasonal impacts to surface water within the AOI and North Saskatchewan River due erosion of exposed soils **Facility operation**: Long-term, seasonal impacts to surface water within the AOI and North Saskatchewan River due to trail erosion and/or improper site drainage	**Construction**: Low **Facility operation**: Low	• Develop and implement a sedimentation and erosion control plan during construction • Reestablish vegetation on exposed soils as soon as construction is complete • Construct and maintain trails following Whistler (2003) standards • Integrate appropriate stormwater management measures including LID into project design and monitor trails to ensure proper drainage	No permanent adverse impacts are expected
Geology & Soils	**Construction**: Short-term, seasonal soil disturbance and erosion of exposed soils **Facility operation**: Short-term, seasonal trail erosion. Long-term, year-round potential for shallow landslides	**Construction**: Low **Facility operation**: Low to Medium	• Develop and implement a sedimentation and erosion control plan during construction and reestablish vegetation on exposed soils as soon as construction is complete • Construct and maintain trails following Whistler (2003) standards • Avoid trail construction on unstable slopes, as per recommendations from a geotechnical engineer, and follow construction recommendations outlined in JRP (2025) and Thurber (2018a) • Address trail erosion issues by closing and remediating trails (if necessary) and/or repairing issues as soon as they occur	Shallow landslides within the bike park may occur but will be limited to the local area. This may result in short- or long-term erosion issues if maintenance is not performed immediately to manage surface flows and restabilize the affected area
Historical Resources	**Construction**: No excavation is required for this work; therefore, no interaction with historical resources is expected **Facility operation**: No interaction is expected	**Construction**: Low **Facility operation**: Low	• A Historical Resources Act Approval with Conditions (HRA number: 4725-25-0001-001) was granted on January 15, 2025 for construction activities associated with the Bike Park	No permanent adverse impacts are expected

Continued …

Table 4 *continued*. Summary of the anticipated interactions, mitigations, and potential residual effects of bike park construction and operation on environmental elements of concern.

Environmental Element	Description of the Extent, Duration & Timing of Interaction	Likelihood (High / Medium / Low)	Proposed Mitigation Measures	Potential Residual Effects
Vegetation (non-woody)	**Construction**: Short-term, seasonal loss of vegetation **Facility operation**: Long-term, seasonal loss and impacts to vegetation	**Construction**: High **Facility operation**: Low	• Minimize vegetation clearing during construction • Remove and actively manage weeds during and after construction • Develop a restoration plan that includes native vegetation and follows the City of Edmonton's Design and Construction Standards (Volume 5 Landscaping)	No permanent adverse impacts are expected Possible net positive impact if facility maintenance results in the control of Noxious and Prohibited Noxious weeds currently located on-site
Mature Trees	**Construction**: Short-term, seasonal loss of selected trees **Facility operation**: Long-term, seasonal impacts to root systems	**Construction**: High **Facility operation**: Low	• To the maximum extent possible, design flow trails and place skill features to avoid trees to minimize removal and impacts to tree roots • Schedule a site meeting with Natural Area Operations at least 4 weeks prior to construction to review requirements for construction within 10 meters of any trees • Obtain a Public Tree Permit (as per Public Tree Bylaw 18825) and prepare and submit a Tree Preservation Plan 4-6 weeks prior to construction • Place construction laydown area fencing outside the boundary of the tree stand and ensure all vehicles, equipment, construction supplies, and debris are located a minimum of 5 meters from any trees • Work with Urban Forestry during the construction phase to make field adjustments, if required, to mitigate damage to trees and roots • As per the Corporate Tree Management Policy (C456C). compensation will be provided for any trees that are removed as a result of project construction • After construction, employ proper pruning techniques to prevent disease and promote overall tree health • During facility operation, and in consultation with Urban Forestry, protect tree root systems that become exposed by using appropriate remediation measures (e.g., covering roots with clean fill material) • Increase the density and diversity of native trees and shrubs within the bike park through landscaping	No permanent adverse impacts are expected Possible net positive impact if the park landscaping design includes tree and shrub planting within the footprint of the former wastewater treatment facility

Continued …

Table 4 *continued*. Summary of the anticipated interactions, mitigations, and potential residual effects of bike park construction and operation on environmental elements of concern.

Environmental Element	Description of the Extent, Duration & Timing of Interaction	Likelihood (High / Medium / Low)	• Proposed Mitigation Measures	Potential Residual Effects
Wildlife	**Construction**: Short-term, seasonal impacts to habitat use and movement **Facility operation**: Long-term, year-round impacts to habitat use and movement	**Construction**: Low to Medium **Facility operation**: Low to Medium	• Conduct a pre-disturbance wildlife sweep within 7-days of the commencement of any construction work to check for denning wildlife and/or nesting birds (owls and migratory songbirds) and establish species-appropriate restricted activity buffers if nesting/denning activity is detected • Construction activities will be limited to specific hours, as per the City of Edmonton's Community Standards Bylaw • Maintain and manage snags as wildlife trees. If snags must be removed and contain cavities, they should be checked by a qualified professional prior to removal to ensure the cavities are not being used by pileated woodpeckers for nesting. All coarse woody debris should be retained on-site if snags are removed due to safety concerns • Once operational, if active coyote dens are observed within or near the bike park, temporary trail or facility closures may be required to protect wildlife and park users • Utilize wildlife friendly lighting to minimize sensory disturbance • When necessary, proactively manage beaver activity within the area by utilizing tree protection tools such as tree wiring	Direct habitat loss as a result of vegetation removal and/or disturbance Indirect habitat loss and changes to daily/seasonal movement and activity patterns as a result of increased sensory disturbance (e.g., noise, light, human use) Increase in direct and indirect mortality risk due to vegetation loss, habituation and/or more frequent human-wildlife encounters/conflicts
Species of Special Status (local, provincial, federal)	**Construction**: Short-term, seasonal impacts to nest cavities **Facility operation**: Long-term, seasonal impacts to nest cavities	**Construction**: Low **Facility operation**: Low	• If construction activity occurs within 100 m of the identified pileated woodpecker nest cavity between April 8 and August 24, the nest should be checked by a qualified professional to determine if it is occupied. If the nest is occupied, appropriate mitigation measures should be established to minimize impacts to the nesting bird • If trees with visible cavities are to be removed as part of the construction or maintenance of the facility, the tree must be inspected by a qualified professional to ensure that pileated woodpecker nests are not being destroyed	No permanent adverse impacts are expected

4.1.3. Vegetation, Trees, Wildlife & Species of Special Status

The AOI contains suitable habitat for a range of wildlife species, including a large diversity of birds and other urban-adapted mammals species such as coyote, deer, and beaver. The proposed project has the potential to impact wildlife during both during the construction and operation of the facility. The primary mechanisms for wildlife disturbance include:

- Direct habitat loss as a result of vegetation removal and/or disturbance (e.g., clearing, brushing, mowing) and the disturbance or loss of snags and other woody debris (e.g., grubbing, mulching, moving, clearing)
- Indirect habitat loss and changes to daily/seasonal movement and activity patterns as a result of increased sensory disturbance (e.g., noise, light, human use)
- Increase in direct and indirect mortality risk due to vegetation loss, habituation, and/or more frequent human-wildlife encounters/conflicts

Vegetation removal as a result of this project will occur within the footprint of the former wastewater treatment plant site and will primarily include ground vegetation (i.e., grasses, forbs). A limited amount of vegetation will also be lost along the proposed flow trails, and this will primarily include ground vegetation and shrubs. Few trees (if any) will be removed as part of the construction of the bike park. Once the facility is operational, disturbance to vegetation may include damage to trees as a result of trail use (e.g., root exposure), as well as loss of wildlife trees that may pose a safety risk to park users.

The nests of certain bird species are protected year-round under the provincial *Wildlife Act* (e.g., hawks, eagles, owls, falcons, and herons) and all pileated woodpecker nest cavities are protected under the Migratory Birds Regulation, unless they are unoccupied for 36 months (GOC 2022). Further, migratory birds and their nests are protected under the federal *Migratory Bird Convention Act* during the primary nesting period, which for the Edmonton region, extends from April 8 to August 24. Additionally, under the *Wildlife Act*, it is an offence to disturb or destroy the den or lodge of wildlife (e.g., coyote, beaver) without a permit.

To mitigate impacts to wildlife that may result from vegetation removal during construction and operation of the facility, the following measures will be taken:

- At all times of the year, a pre-disturbance wildlife sweep will be conducted within 7-days of the commencement of any vegetation removal to check for denning wildlife and/or nesting birds. If nesting/denning activity is detected, species-appropriate restricted activity buffers will be established.
- If trees with visible cavities are to be removed as part of the construction or maintenance of the facility, the tree must be inspected by a qualified professional to ensure that pileated woodpecker nests are not being destroyed. All coarse woody debris should be retained on-site if snags are removed due to safety concerns.
- If any construction activity is to occur within 100 m of the identified pileated woodpecker nest cavity (Map 12) between April 8 and August 24, the nest should be checked by a qualified professional to determine if it is occupied. If the nest is occupied, appropriate mitigation measures should be established to minimize impacts to the nesting bird.

Beyond the direct effects of habitat loss associated with vegetation removal, the project is expected to result in indirect habitat loss and changes to daily and seasonal activity and movement patterns by highly mobile wildlife, such as coyote and deer. While these species are generally well-adapted to an urban environment, the cumulative effects of increased human presence in Queen Elizabeth Park may result in an increased avoidance of this area, particularly during the daytime, over baseline conditions. To mitigate impacts on wildlife movement through the larger area, the location of the flow trails has been concentrated to areas of steeper slopes (Map 3), which wildlife are likely to avoid since steep slopes do not favour movement. While concentrating trails to a smaller area increases the localized density of trails, this serves to minimize the overall footprint of the flow trail area, and leave areas to the east and north within the AOI undisturbed and available for wildlife use and movement. As noted in the 2014 *Constraints and Development Sensitivity Mapping* study (Klohn Crippen Berger 2014), wildlife are predicted to move through QEP along the western and southern boundary of the AOI. Along with these predicted movement

areas, with no development or trails being built along the northern portion of the AOI adjacent to the North Saskatchewan River, there will be intact habitat and a potential east to west corridor along the riparian area. When considering trail density, relative to Nelly McClung Park, which has an approximate length of trails and paths of 4.04 km within approximately 93 ha, the project AOI has a lower density with approximately 1.02 km of trails within 41 ha. When considering just the area associated with the flow trails, the density is higher; again however, considering the steep terrain of the flow trail area, impacts on movement and use by wildlife are expected to be limited. While no dens were detected during the field assessment, the AOI does appear to provide suitable denning habitat for coyote. Additionally, escorting behavior by a coyote has been previously observed in the upper portion of QEP, south of the bike park project area, which is suggestive of an active territory containing a den. The potential for coyote to den in the AOI increases the risk of conflict between coyote and bike park users. If an active den is detected near the bike park, trail closures should be utilized to protect both wildlife and users of the park.

Potential conflict with beaver is also a possibility, given the extensive evidence of beaver activity within the AOI during the field reconnaissance. Beaver can cause extensive damage to deciduous trees and shrubs over large areas, and beaver activity within the bike park may result in damage to park infrastructure or increase maintenance time/cost. Proactive measures should be taken to manage beaver activity, including the implementation of textural repellent or tree wiring/exclusion fencing, where appropriate.

4.2. Cumulative Impacts

As per the Terms of Reference provided by the City of Edmonton for this EIA, cumulative impacts are defined as "*compound environmental effects that may result due to multiple or successive development or site alteration activities*". Further, the TOR indicates that cumulative impacts should be "*estimated by considering project effects within an expanded geographic area as well as a longer timeframe*."

When the potential residual effects of the proposed bike park are considered at a larger geographic and temporal scale, and with consideration for additional development within that space and time, cumulative impacts associated with this project are estimated to be low to moderate. Most of the work contemplated in the 2013 QEP Master Plan has already been completed, and the park is located within a well-established neighbourhood. Further, most of the remaining parkland that surrounds QEP is located on very steep slopes and is unsuitable for construction. These factors reduce the likelihood that new or expanded development will occur along the south shore of the North Saskatchewan River in proximity to the proposed bike park.

While the potential for cumulative impacts associated with larger projects is estimated to be low, there is the potential for more localized cumulative impacts associated with increased human use in this area of the park. While human use is likely to increase, this area of QEP has already seen a substantial increase in human activity associated with the construction of the new Walterdale Bridge and the associated redevelopment of the area surrounding Dantzer's Hill. It is likely that the most notable increase in human use associated with the bike park will be during the winter, as the bike park will be utilized year-round by the cycling community, and this winter use is likely to be higher than the baseline conditions.

There is also the potential for cumulative impacts associated with the proliferation of ad hoc trails; however, this risk is considered to be low. The proposed bike park will be located in an area where ad hoc trails are already present, and the creation of a well-designed and connected network of trails is expected to reduce the number of ad hoc trails that are created in this area going forward. Further, the proposed flow trails will be designed to a high standard and will be routinely monitored and maintained, which will reduce short-cutting and re-routing that is often an issue in areas with ad hoc trails.

The bike park will also serve as an opportunity to engage with the cycling community to educate users about proper trail etiquette and the ecological impacts of unsanctioned trails. The bike park will include signage promoting the importance of caring for the ecological integrity of the river valley, and encouraging users to engage in volunteer programs such as Trail Days and Adopt-A-Trail. These programs provide an opportunity to engage the public on issues related to proper use and maintenance of trails in the river

valley, which is expected to improve the cycling community's overall understanding of how unsanctioned trails can impact the ecological health and integrity of the river valley, thereby reducing the risk of cumulative effects associated with ad hoc trail proliferation.

4.3. Environmental Monitoring

EMBA is committed to reducing environmental risks associated with the operation of the Edmonton bike park, including risks associated with sedimentation, erosion, and damage to trees and root systems. As such, regularly scheduled forest health assessments will be conducted to identify areas requiring maintenance or intervention. A landscape plan (see Appendix E) will outline restoration activities and revegetated areas that may require weed monitoring. Protocols for management and monitoring will be determined in consultation Natural Area Operations. A dedicated maintenance person will be responsible for performing monitoring and site management duties. Erosion and sedimentation will be managed and monitored as per the Erosion and Sedimentation Control Plan (see Appendix F). This proactive approach will ensure that any issues are identified in a timely manner and are addressed promptly.

5.0 Public Consultation

Public consultation was conducted as part of the development of the Queen Elizabeth Park Master Plan, which was approved by council in 2013. This consultation included three rounds of consultation between 2012 and numerous meetings and surveys that gathered public opinion and input from 522 residents during the spring, summer, and fall of 2012 (City of Edmonton 2013). The these consultations covered a variety of topics and focused on gathering input regarding major principles that should inform park design. Throughout the consultation, there was consistent and strong support for the construction of a bike skills area and single track trails, and the former wastewater treatment facility was identified as the preferred location for the bike park.

The QEP Master Plan vision has been implemented using a phased approach since the plan was approved in 2013. In the early 2020s, the Edmonton Mountain Bike Alliance (EMBA), in collaboration with the City of Edmonton, initiated work on the bike park as a community-led project. To date, EMBA has undertaken a range of assessments and studies to advance the bike park project, including the following public engagement activities:

1. **Pre-Concept Plan Survey** (October to November 2021):
    - This survey, which was completed by 1,663 people, included questions about the overall design of the bike park and the type of features users would like to see integrated into the park. Additionally, the survey collected information about how often and at what time of the year people would be most likely to use the facility. The information gathered in this engagement was used to help inform an initial concept design for the park.
2. **Needs Assessment** (March 2022 to August 2023)**:**
    - This engagement included community surveys, informal assessments at events, and online engagement to identify the demand and desired features for the bike park.
3. **Concept Plan Survey** (April 23 to May 31, 2023):
    - Once an initial concept plan was developed for the bike park, EMBA solicited feedback from potential users on the design via an on-line survey. The survey was advertised through EMBA's social media channels, newsletter, website, and an in-person fundraising event. In total, 134 people responded to the survey and the feedback was used to help finalize the park concept plan.

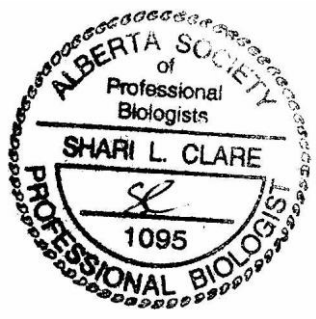
6.0 Conclusion

The Edmonton Bike Park will be the City's first and only facility dedicated to the development of cycling skills for users of all ages and abilities. This park was envisioned as a core design element in the Queen Elizabeth Park Master Plan, which was approved by Council in 2013, and will be located within the North Saskatchewan River Valley and Ravine System.

Most of the development associated with the bike park will include existing trails or will be limited to areas that have been previously disturbed. In areas with new trail development, vegetation clearing will be limited, and efforts will be made to conserve and protect mature trees and their root systems during construction and operation of the facility. Regular monitoring of the trails will also ensure that any required maintenance is completed in a timely manner, thereby reducing risks associated with erosion and sedimentation. EMBA will also work collaboratively with the City of Edmonton during the operation of the facility to ensure that any forest health issues that may arise are appropriately addressed. The construction of the bike park is expected to increase the number of park users over the current baseline conditions, particularly in the winter months, which has the potential to impact wildlife use and movement through this area. However, given the current high human use of QEP in the area surrounding the Walterdale Bridge, the bike facility is not expected to displace any sensitive wildlife species.

6.1. Closure

This report was written by:



Shari Clare, PhD, PBiol
Director, Sr. Biologist

Shantel Koenig, MGIS, PhD,
Landscape Ecologist and GIS Specialist

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Appendix A: Site Location Study

Edmonton Bike Park

SITE LOCATION STUDY – FINAL REPORT

Prepared for:
Edmonton Mountain Bike Alliance

April 2025

Project 2420

FIERA
Biological Consulting

1.0 Overview

1.1. Project Name

Edmonton Bike Park

1.2. Project Description

The Edmonton Bike Park (hereafter “the bike park”), located within Queen Elizabeth Park in central Edmonton, will be the City’s first and only river valley bike skills park (Map 1). The bike park was envisioned as a core design element in the Queen Elizabeth Park (QEP) Master Plan, which was developed and endorsed by the City of Edmonton in 2013.

As per the QEP Master Plan, the bike park will be located on the south shore of the North Saskatchewan River, within the North Saskatchewan River Valley and Ravine system. The vision for the bike park includes a skills area that will be sited within the footprint of a decommissioned wastewater treatment plant, as well as an area of existing and new single-track trails located immediately adjacent to the skills area. The bike park will be easily accessible by people using the existing river valley trail system, and will provide skill development opportunities for cyclists of all ages and abilities.

Most of the development associated with the bike park will be limited to areas that have been previously disturbed (e.g., the decommissioned wastewater treatment site), or will integrate already existing trails, thereby limiting environmental impacts associated with the development of the bike park. The new single-track trails that are proposed as part of the bike park design will be located in an area that has been previously impacted by ad hoc trail development. By integrating this area into the bike park, these trails will become part of a sanctioned network of single-track trails that will be built and maintained to a high design standard, thereby improving existing conditions and minimizing or preventing future trail erosion.

Map 1. Overview of the proposed location of the Edmonton Bike Park, within the boundary of Queen Elizabeth Park in central Edmonton.

1.3. Project Scope

The Edmonton Bike Park will include four distinct elements: a jump park, a pump track, a skills loop, and a series of flow trails (Map 2).

As per the concept plan for the bike park (Common Ground 2022), these elements have been designed to utilize an area within QEP that was formerly a wastewater treatment plant, thereby repurposing this disturbed and underutilized area into a recreational facility that will tie into existing multi-use and mountain bike trails. Each of the four distinct elements identified in the Edmonton Bike Park concept plan are described in more detail below.

Jump Park: The jump park will be located on the site of the former wastewater treatment plant, and will utilize existing elevated locations as the start platform for all jump lines. The park will be built-up from the existing ground elevation, with minimal excavation. Removal of hazard trees is planned, as identified and required by City of Edmonton Urban Foresters.

Pump Track: The asphalt surfaced pump track will be located beside the jump park, on the site of the former wastewater plant. The track will use existing elevations, with minimal excavation. Drainage from the track will be directed to LID features to be designed and incorporated within and surrounding the pump track.

Flow Trail: A series of flow trails is proposed to the east of the jump park and pump track, in an area the currently contains ad hoc trail development. One existing trail will be retained and integrated into the new trail development and several new trails will be constructed as part of the Bike Park. The new trails will be recognized as official mountain bike trails and will be maintained as part of EMBA's agreement with the City, thereby preventing further use and development of ad hoc trails in the area.

The primary objectives in the design and construction of these trails will be to avoid unstable areas (if any), minimize clearing of existing trees and other vegetation, as well as maintain connectivity for wildlife species that currently utilize the area as a travel corridor. Given that the flow trails will be receiving ongoing geotechnical consultation and input from Natural Area Operations during their design and construction, the layout of the flow trails in any maps in this site location study should be treated as proposed and preliminary. The final locations of the flow trails will be determined during construction and will be located to ensure the least environmental impact and highest sustainability.

Skills Loop: The skills areas will be located within the western and central portions of the bike park, and will contain built features (e.g., rock garden, teeter totter, etc.) that will promote skill development. The majority of the features associated with the skills loop will be located within the former wastewater treatment facility. Additional built features will be located at the exit of the flow trails in the north eastern portion of the bike park area and along existing pathways. The skills features will be built and placed in already cleared and impacted areas. As such, excavation and vegetation removal will be limited.

The bike park will be designed for easy access by cyclists, pedestrians, and vehicles via existing path networks. The drainage strategy for the park will include overland flow north towards the river, with pits and pipes located strategically in small catchment areas that will connect to the existing sewer.

Map 2. Concept design for the Edmonton Bike Park, showing the four distinct design elements that will be integrated into the facility.

2.0 Location Analysis & Justification

The Edmonton Bike Park was identified as a central design element in the QEP Master Plan, which was approved by City Council in August 2013. The QEP Master Plan specifies that "*a Bike Skills Park will be established in the lower park*" (City of Edmonton 2013, page 101), with further specific reference to the park being "*situated on the remediated site of a former wastewater treatment plant*" ((City of Edmonton 2013, page 127). The rationale for selecting this location extends well beyond historical planning documents. The site was chosen through a careful and policy-aligned lens, incorporating environmental, recreational, and strategic factors that ensure the project meets the City of Edmonton's broad goals for sustainable development, public access, and equitable recreation.

2.1. Centrality Within the Trail Network

The location sits at the geographic and functional heart of Edmonton's singletrack trail system, forming a natural hub for mountain biking activity. It is one of the most highly used areas by mountain bikers in the city, serving as a key access point, convergence zone, and informal skills area. Consolidating a formal Bike Park in this location allows for the accommodation of existing user patterns, supports progression and education within a managed environment, and reduces ecological pressure on more remote or sensitive trail segments.

This centrality also enables the Bike Park to act as an orientation point for trail users by providing wayfinding, signage, safety education, and stewardship messaging that radiates outward into the broader network. As a result, the park enhances the connectivity, navigability, and legitimacy of Edmonton's entire natural surface trail system.

2.2. Use of Remediated Brownfield Site

The proposed site is previously disturbed, having served as part of a municipal wastewater treatment plant. It has since been remediated and is largely devoid of canopy, mature vegetation, or ecological features of concern. Redeveloping this brownfield area for recreation aligns with the City's green infrastructure principles by repurposing underutilized urban land and avoiding the degradation of intact natural systems elsewhere in the River Valley. The compacted substrate, established road access, and low ecological value of the site allow for infrastructure development with minimal ground disturbance, reduced grading requirements, and negligible loss of habitat. This makes it an environmentally responsible location for a project of this scope.

2.3. Environmental Consideration in Design

From the outset, the design of the Edmonton Bike Park has prioritized environmental protection and low-impact construction. The alignment of flow trails and features has been refined in collaboration with City ecological planners to:

- Avoid wetland areas, riparian zones, and seasonal drainage corridors;
- Preserve mature trees and root zones;
- Limit cut-and-fill and grading to naturally compacted areas;
- Maintain vegetated buffers and avoid sensitive slopes;
- Ensure that staging areas for construction remain within pre-compacted footprints.

Long-term environmental stewardship will be ensured through EMBA's formal maintenance agreement with the City, which includes annual vegetation trimming, erosion control, trail surface repair, and routine inspections.

2.4. Accessibility and Active Transportation

The location of the Bike Park supports equitable and sustainable transportation. Situated adjacent to downtown Edmonton, it is easily accessible via public transit, multi-use trails, bike lanes, and pedestrian connections. This centrality encourages active transportation, reduces vehicle dependency, and supports the City's energy transition and mode-shift objectives. This also ensures that the park is accessible to a broad demographic, including youth, newcomers, and equity-seeking groups, many of whom may not have private vehicle access to remote trailheads or recreation destinations outside the core.

2.5. Alternatives and Rationale for Dismissal

Alternate locations within or beyond the River Valley were reviewed and dismissed based on the following criteria:

- Sites outside the River Valley lacked the topographic variety required for safe and engaging mountain biking;
- Greenfield or forested sites would introduce habitat disruption, require new road infrastructure, and increase construction-related impacts;
- Peripheral or suburban locations would not be integrated with the current singletrack trail network and would not support the same level of connectivity or progressive use.

No other site considered offers the same combination of central location, user demand, environmental resilience, and operational feasibility. This location allows the City to fulfil the intent of the QEP Master Plan while maximizing return on social and ecological investment.

2.6. Alignment with City of Edmonton Strategic Goals

The Edmonton Bike Park directly advances a wide range of City of Edmonton strategies and priorities, including:

- **The City Plan (2020)**: Supports Healthy City goals by promoting physical and mental wellbeing, aligns with 15-minute community ideals, and supports mode shift through active transportation access.
- **Ribbon of Green (Draft 2023)**: Concentrates recreation within an identified activity node while protecting ecologically sensitive areas elsewhere in the valley.
- **Recreation and Sport Strategy (2022–2032)**: Delivers inclusive, progression-based recreation opportunities for users of all skill levels in a central and accessible location.
- **Edmonton Energy Transition Strategy**: Reduces greenhouse gas emissions by encouraging non-vehicular access to outdoor amenities and repurposes developed land rather than expanding into undisturbed zones.
- **Breathe: Edmonton's Green Network Strategy**: Intensifies recreation use in already modified spaces while preserving green connectivity across the broader network.
- **Environmental Strategic Plan**: Applies low-impact development principles and long-term stewardship, avoiding environmental degradation while promoting volunteer-led maintenance.
- **TRC Calls to Action & Indigenous Engagement Commitments**: The project is progressing toward meaningful Indigenous involvement through consultation, educational signage, and representation, ensuring the park is a space that reflects Edmonton's reconciliation priorities.

3.0 Opportunities & Constraints Analysis

The development of the Edmonton Bike Park is a fully funded, community-led project that transforms a previously disturbed site into a sustainable recreation facility and is being guided by the Edmonton Mountain Bike Alliance (EMBA), in collaboration with the City of Edmonton. To date, EMBA has undertaken a wide range of assessments and studies to advance the bike park project, including outreach and engagement with the public. A summary of this work is provided below.

1. **Needs Assessment** (March 2022 to August 2023)**:**
    - Included community surveys, informal assessments at events, and online engagement to identify the demand and desired features for the bike park.

2. **Business Case Development** (February 2023 to January 2024)**:**
    - A comprehensive business case was developed and circulated amongst various City of Edmonton departments for feedback and approval.

3. **Feasibility Study & Concept Plan** (April 2023 to September 2023)**:**
    - Confirmed the suitability of Queen Elizabeth Park for the bike park, considering location, community demand, and environmental factors.

4. **Facility Lifecycle Plan** (June 2023 to October 2023)**:**
    - Outlines maintenance, operational, and financial aspects of the bike park, ensuring its sustainability.

5. **Economic Impact Assessment** (August 2023 to November 2023)**:**
    - This assessment highlighted significant positive economic impacts, supporting the project's viability and community benefits.

Financial

EMBA initiated a fundraising campaign and has secured full funding for the project with a $407,000 grant from the City of Edmonton through the Recreation Partner and Facility Investment Program (RPFIP) and a $617,000 provincial grant through the Community Facility Enhancement Program (CFEP). Use of a cleared site reduces construction costs. Maintenance will be managed under EMBA's agreement with the City, with long-term responsibilities outlined in a detailed Maintenance Plan, which is currently under development.

Social

Located near downtown and accessible via trails and transit, the park supports equitable access. Extensive public engagement (1,800+ responses) shaped the design and confirmed strong support. Based on community outreach that EMBA has completed, there is a great deal of interest and public support for the bike park in its currently approved location.

Environmental

The park utilizes a brownfield site, minimizing the need for vegetation removal. The construction of the Flow Trails located away from the brownfield site will require minimal tree removal and will provide an opportunity to repair extensive damage caused by encampments and encourage stewardship in the area.

Institutional

The park aligns with City policies (City Plan, Ribbon of Green, Breathe, etc.) and meets all permitting and regulatory requirements under the NSRV ARP. City departments have been actively engaged, and

recommendations have been incorporated into final design and staging. Given that a location for the bike park was specified in the QEP Master Plan, all of the work and fundraising efforts that have been completed to date have been focused on the river valley location that was approved by Council in 2013. Because of this, any changes to the project location would result in the loss of a substantial amount of work, much of which has been completed through volunteer efforts contributed by members of the cycling community in Edmonton.

4.0 Conclusion

The Edmonton Bike Park will be the first and only dedicated bike park facility in the City of Edmonton. This facility was identified as a design element in the Queen Elizabeth Park Master Plan, which was approved by City Council in 2013. The vision for the bike park, as articulated in the Master Plan, includes a facility that can be easily accessed by the public from the existing river valley trail network, and provides skill development opportunities for cyclists of all ages and abilities. Additionally, the Master Plan identifies the site of the decommissioned wastewater treatment plant as an ideal location for the bike park. The siting of the facility in this particular location will revitalize this area of the park, which is currently underutilized, while also integrating existing trail features, some of which are not sanctioned and are therefore not designed or maintained to prevent erosion. The site also offers opportunities to expand the single track trail system in a way that leverages the existing topographic features, while also minimizing the loss of vegetation on the site.

The design and construction of the Edmonton Bike Park is a community-led effort, and a great deal of time and resources have been dedicated towards the planning and execution of this project. All of the work completed to date has focused on the site identified in the Queen Elizabeth Park Master Plan, and no other locations outside the river valley have been considered. Given the characteristics of the currently approved site, and considering the time and financial resources that have already been dedicated to project planning, this location is considered essential to the success of the project.

5.0 Citations

City of Edmonton. 2013. Queen Elizabeth Park Master Plan. Approved by City Council August 28, 2013.

Common Ground Pty Ltd. 2022. Edmonton Bike Park Concept Design. Prepared for Edmonton Mountain Bike Alliance. Pp. 20.

Appendix B: Historical Resources Act Approval

Alberta

HRA Number: 4725-25-0001-001
January 15, 2025

Historical Resources Act Approval with Conditions

Proponent: Edmonton Mountain Bike Alliance
P.O. Box 88173, Rabbit Hill Post Office, Edmonton, AB T6R 0M5
Contact: Matt Edwards

Agent: Edmonton Mountain Bike Alliance (EMBA)
Contact: Matt Edwards

Project Name: **Edmonton Bike Park**

Project Components: Sports / Recreation Facility

Application Purpose: Requesting HRA Approval / Requirements

Historical Resources Act approval is granted for the activities described in this application and its attached plan(s)/sketch(es) subject to the following conditions.

David Link
Assistant Deputy Minister
Heritage Division
Alberta Arts, Culture and Status of Women

SCHEDULE OF CONDITIONS

ARCHAEOLOGICAL RESOURCES

Historical Resources Act approval is granted in relation to archaeological resources, subject to the conditions outlined below.

1. *Historical Resources Act* approval is issued for the proposed Edmonton Bike Park project with the condition to limit the depth of subsurface disturbance to reduce the likelihood for impacts to deep archaeological deposits that have been observed in adjacent areas.

PALAEONTOLOGICAL RESOURCES

There are no *Historical Resources Act* requirements associated with palaeontological resources; however, the proponent must comply with Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources, which are applicable to all land surface disturbance activities in the Province.

INDIGENOUS TRADITIONAL USE SITES

OPaC HR Application # 028723795 Page 1 of 2
HRM Project # 4725-25-0001

SCHEDULE OF CONDITIONS (continued)

There are no *Historical Resources Act* requirements associated with Indigenous traditional use sites of a historic resource nature; however, the proponent must comply with Standard Requirements under the Historical Resources Act: Reporting the Discovery of Historic Resources, which are applicable to all land surface disturbance activities in the Province.

HISTORIC STRUCTURES

There are no *Historical Resources Act* requirements associated with historic structures; however, the proponent must comply with Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources, which are applicable to all land surface disturbance activities in the Province.

PROVINCIALLY DESIGNATED HISTORIC RESOURCES

There are no *Historical Resources Act* requirements associated with Provincially Designated Historic Resources; however, the proponent must comply with Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources, which are applicable to all land surface disturbance activities in the Province.

ADDITIONAL COMMENTS

1. In addition to any specific conditions detailed above, the proponent must abide by all Standard Conditions under the *Historical Resources Act*.

Proposed Development Location:

MER	RGE	TWP	SEC	LSD List
4	24	52	29	15-16

Documents Attached:

Document Name	Document Type
concept plan (reduced file size)	Miscellaneous

Appendix C: Geotechnical Report

J.R. Paine & Associates Ltd.
CONSULTING & TESTING ENGINEERS
• GEOTECHNICAL • ENVIRONMENTAL • MATERIALS •

DESKTOP STUDY

Proposed QE2 Bike Park
First Submission

Queen Elizabeth Park
Edmonton, Alberta

FILE: 5001 - 2

April 28, 2025

J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS
EDMONTON – GRANDE PRAIRIE – PEACE RIVER

REPORT NO: 5001 - 2

Desktop Study – First Submission

Proposed QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

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DESKTOP STUDY

PROJECT: Proposed QE2 Bike Park

LOCATION: Queen Elizabeth Park
Edmonton, Alberta

CLIENT: Edmonton Mountain Bike Alliance
c/o Arthouse Residential Inc.
10948 – 80 Avenue NW
Edmonton, Alberta
T6G 0R1

ATTENTION: Jesse Soneff

1.0 INTRODUCTION

J.R. Paine & Associates Ltd. (our firm / JRP) is pleased to present a summary of a desktop study for the proposed construction of the QE2 Bike Park in Queen Elizabeth Park, Edmonton, Alberta. Based on information provided to our firm, the project will consist of construction of a bike park in the flat terrace area near the river and dirt bike trails throughout the treed slope as shown on the concept design in the Appendix. The objective of the desktop study is to provide recommendations to aid in the design and construction of the bike park and comment on visual slope stability conditions for the bike trails. Any environmental issues are beyond the scope of this report. Authorization to proceed was received from Arthouse Residential Inc.

2.0 SITE DESCRIPTION & RESEARCH

The Queen Elizabeth Park is intersected by Queen Elizabeth Park Road and is bordered by Saskatchewan Drive to the south, Walterdale Hill to the west, the North Saskatchewan River to the north, and Lavigne Road and the Strathcona Neighbourhood to the east.

2.1 Site Description

The subject site is near the river and is bordered to the west and south by existing asphalt trails and park areas, to the north by the North Saskatchewan River and an existing service road and to the east by a treed slope continuing along the river. It is approximately 40 m south of Queen Elizabeth Park Road and 200 m east of Walterdale Hill. The subject area is approximately 300 m long, along the river and extends up from the river approximately 130 m at the west of the site and 70 m at the east end. Based on information from ground contour maps of the area, the slope on the subject site is approximately 22 m high with a terrace in the northwest corner of the site and located directly south of the subject site. The overall height of the slope from Saskatchewan Drive down to the North Saskatchewan river is

approximately 56.5 m high. The secondary top-of-bank (TOB) at the river, approximately 15 m north of the existing service road drops steeply to the toe of the slope at the river and is approximately 7.5 m high.

Existing asphalt trails run along the south of the site from east to west. Currently, an existing EPCOR Pump Station is located near the river in the center of the site at the east end of the existing service road and beside the flat, terrace area for the proposed bike park. There is an existing dirt trail that runs from the south of the subject site, near where the existing asphalt trails converge, to the west below the asphalt trail. An existing concrete drainage channel borders the east edge of the site, running from the asphalt trail down to the river. The proposed bike trails are planned throughout the site, mostly to the east and south of the terrace along the heavily treed slope and converging at the proposed bike park. Based on discussions with the client, it is understood that the proposed bike park will feature dirt tracks and jumps, as well as an asphalt pump track. The proposed bike trails will attempt to utilize existing topography and pathways through the trees with some added timber features.

2.2 Geotechnical Report Review

No report of any previous geotechnical investigation that covered the subject site was found in our library. However, the following reports of geotechnical investigations that covered the subject site were forwarded to our firm.

1. *Whittaker, Laviolette, Leckie & Co. Ltd., 105 Street Bridge Complex, Site Investigation, Edmonton, Alberta, dated September 11, 1970, prepared by R.M Hardy & Associates Ltd., file # C-1163*
2. *Walterdale Bridge Replacement, Edmonton, Alberta, Geotechnical Investigation, dated January 31, 2013, prepared by Thurber Engineering Ltd., file # 19-598-370*
3. *Queen Elizabeth Park Pedestrian Trails, Geotechnical Investigation, dated October 10, 2013, prepared by Thurber Engineering Ltd., file # 14-31-354*
4. *Walterdale Bridge Replacement, Queen Elizabeth Park Service Road, Geotechnical Investigation, dated September 29, 2014, prepared by Thurber Engineering Ltd. file # 19-598-415*
5. *Geotechnical Investigation, Queen Elizabeth Park Upgrades, Edmonton, AB, dated June 12, 2016, prepared by Stantec Consulting Ltd., file # 1161104805*
6. *Former Queen Elizabeth Wastewater Treatment Plant, 10350 Queen Elizabeth Park Road NW, Edmonton, Alberta, Geotechnical Investigation, dated August 28, 2018, prepared by Thurber Engineering Ltd., file # 23243*
7. *Edmonton Bike Park Environmental Impact Assessment, dated April 2025, prepared by Fiera Biological Consulting, project # 2420*

At least 7 reports with soil or slope information within Queen Elizabeth Park were found. However, testhole locations in many of the reports could not be accurately plotted onto the current site plan. Among the reports with accurate testhole locations, only one geotechnical testhole in Report 6 was located in the proposed bike park and 4 testholes were located directly adjacent to the subject site in Report 4. The approximate testhole locations can be found in Figure 6 in the Appendix, and the soil logs of relevant testholes are also attached in the Appendix.

The above noted reports documented slope observations of the North Saskatchewan River Valley over the years. From review of the available geological information, it is understood that the slope extending from Saskatchewan Drive down to the terrace at the North Saskatchewan River is defined by deep seated ancient landslides. The landslides are understood to be the cause of weak layers in the clay shale bedrock but are inactive. Reports 2, 3 ,5, 6 and 7 reference a "secondary landslide" or "active landslide" area south of the Queen Elizabeth Wastewater Treatment Plant (QEWWTP), originally noted by Thurber Engineering Ltd. (Thurber) in Reports 2 and 3 as shown on Thurber's Drawing No. 19-598-370-4 copied to our Appendix. Additionally, the included Thurber drawing highlights the site terrain features well. Report 2 by Thurber categorized the "secondary landslide" area as a zone of creep movement. Report 6 by Thurber notes that the "secondary landslide" appeared to be inactive in 2018 as noted in Thurber Drawing No. 23243-1 copied to our Appendix. The slow seasonal creep movements were noted to be shallow and confined to the surficial soils. Thurber noted some bent tress on the backslope of the "secondary landslide" but the area was noted to be covered in dense vegetation with no signs of active movement. Other areas of small creep movements were also noted within or near the subject site. Report 7 by Fiera notes an area of seepage and slope instability although this area is noted to be east of the proposed bike park trails. It is understood from Reports 1 and 5, that significant fills had been placed prior to 1970, directly west of the subject site for a proposed bridge abutment.

Report 4 by Thurber addressed an embankment failure and significant cracking of the service road located directly above the SW portion of the site and south of the QEWWTP. Several erosion gullies were also noted above and below the service road. The slope failure was due to poor embankment fill and Thurber recommended it be excavated and re-built with the addition of geo-grid. Report 6 by Thurber also noted and photographed cracking in the service road. According to Report 6 it was understood that the section of roadway had been excavated and rebuilt by the time the report was finalized.

Report 6 addressed the planned removal/demolition of structures from the former QEWWTP and redevelopment as public parkland. Based on the report it is understood that the existing structures were planned to be excavated to the lesser of 3.0 m below ground surface (BGS) or bottom of the foundations and backfilled to original ground. Since the area was planned for public parkland at the time compaction

to a minimum of 92 percent of Standard Proctor Density in 150 mm thick lifts was recommended for backfill of the excavations.

In general, the above noted reports mentioned previous and ongoing slope movements but did not observe signs of recent major slope instability.

2.3 Historical Aerial Image Review Findings

Aerial photography coverage of the subject site and surrounding area was obtained and reviewed for any changes and disturbances. A total of 4 sets of air photos covering the timespan from 1962 to 2002 were reviewed. The scale of photographs varied between 1:5,000 and 1:31,680 and therefore more details were obtained from the newer higher resolution photographs. Historical imagery from Google Earth covering the timespan from 2004 to 2024 was also reviewed.

In 1962, structures from the QEWWTP were visible covering most of the flat terrace area. A service road was visible running from the west end of the site north of the wastewater treatment plant. The slope appeared to be in a similar condition to the current state. The slope south and east of the wastewater treatment plant appeared to be well vegetated. No major slumps are observable. The North Saskatchewan River appeared close to its current alignment. The surrounding areas to the east, west and south of the subject site were mostly treed. A road or trail was visible running from the subdivision to the east along the southeast limits of the subject site and connecting to Queen Elizabeth Park Road. A small structure was noted above the subject site at the intersection of the two roads. Queen Elizabeth Park Road was visible south of the site and appeared to be close to its current alignment. The Queen Elizabeth Pool was noted south of Queen Elizabeth Park Road above the west portion of the subject site.

In 1971, grading operations were noted and the trees had been removed from the area at the west edge of the subject site to Queen Elizabeth Park Road. A small laydown area or small stockpiles were visible directly east of the QEWWTP on the terrace area. No other significant changes to the subject site were noted.

In 1977, no significant changes were noted on the subject site. The structure south of the site no longer appeared visible.

In 1984, trails were visible at the top of the slope just below the road/trail and along the west edge of the site. Some small trees were visible growing on the west edge of the site where the grading had occurred. The stockpiles east of the QEWWTP were no longer visible. The concrete drainage channel had been constructed bordering the east edge of the site.

In 2002, the pump station at the east end of the QEWWTP was visible. The path for the power lines just east of the pumpstation and running up the slope was clearly visible. The area around the vegetation around the concrete drainage channel had grown back. More trees were visible at the toe

of the slope along the river at the east end of site. The access to the road/trail to the east had been visibly cut off for vehicles.

In 2004, no significant changes were noted on the subject site.

In 2011, the service road running east of the QEWWTP appeared to be slightly overgrown with vegetation. No other significant changes were noted.

In 2013, the asphalt trail bordering the southwest and west portion of the site was being graded. The hill directly west of the subject site was being utilized as a laydown area for the realignment of Queen Elizabeth Park Road and start of construction for the piers of the Walterdale Bridge. The Queen Elizabeth Pool had been demolished and a temporary service road was visible.

In 2014, the asphalt trail bordering the southwest and west of the site had been rebuilt. The realigned Queen Elizabeth Park Road appeared to be open. No other significant changes were noted on the subject site.

In 2018, the trees directly to the west of the QEWWTP and a small area to the south had been cut down. Construction of the Walterdale Bridge had been completed and the area west of the site was no longer being utilized as a laydown area. Several paths had been constructed in the area of the old laydown area. A parking lot had been constructed where the previous Queen Elizabeth Pool had been located.

In 2020, the QEWWTP structures had been removed with the exception of the pump station at the east, which appeared to be surrounded by the fence. The terrace area appeared to be mostly open and flat, similar to the current state.

From 2021 to 2024, no significant changes were noted on the subject site or surrounding area.

The North Saskatchewan River and River Valley Slope appeared to remain in the same configuration throughout the reviewed air photos. No major slope movement signs were observed, apart from the ancient landslide event. Toe erosion movement adjacent to the site was not observed. The main changes observed on the subject site was the removal of the QEWWTP and construction of surrounding trails. Copies of the 1984, 2002, 2013 and 2020 air photos are attached.

2.4 Coal Mine Records Review

The Alberta Coal Mine Atlas, available in the Alberta Energy Regulator website, showed records of 1 coal mines potentially located near the site as summarized below.

Table 2.4.1: Coal Mine Summary

Coal Mine #	Name	Owner	Type	Mining Method
X53/9039	I.X.L.	I.X.L. Company	underground	unknown

The approximate location of the coal mine south of the subject site can be found in Figure 5 in the Appendix although it is noted that the location was uncertain.

More information in "Atlas: Coal-mine Workings of the Edmonton Area, date 1971 by Richard Spence Taylor" stated the mine was classed as very small. Overall, the risk of settlement from the abandoned coal mines cannot be ruled out, but is considered low.

3.0 FIELD INVESTIGATION

A total of 5 testholes in Reports 4 and 6 were located in or directly adjacent to the proposed bike park. A summary of the testhole soils can be found in Section 4.2. No additional soil sampling was planned for this desktop study.

The subject site was inspected on May 24 and 27, 2024 including a slope walk above the lower terrace area spanning the site from east to west where the bike trails are planned. JRP met Jesse Soneff of Arthouse Residential onsite on May 24, 2024 to get an idea of approximate trail layouts throughout the treed slope which are planned to utilized portions of most of the site and converge at the proposed bike park in the lower flat terrace area. The finalized flow trail alignments were not marked at the time of the initial slope walk. JRP will further walk and assess the finalized flow trail alignments once marked onsite.

As previously mentioned, the slope is roughly 22 m high. The slopes encountered across the span of the site were variable ranging from approximately 2 horizontal (H):1 vertical (V) to 5H:1V with the east portion notably steeper than the west. Vegetation across the slope consisted of mature poplar and spruce trees up to approximately 1 m in diameter along with the occasional birch tree and a number of shrubs of varying size. The slope contained moderate vegetation in most areas. Some leaning and dead trees were noted near the 3rd trail head at the top of the slope and along the slope throughout the site with some additional fallen trees.

The general terrain can be described as hummocky in places with some old small scarps noted but overall, the grades observed were gradual. A minor old scarp approximately 40 m long was noted near the top of the slope on the subject site. Several old scarps were noted in the middle of the steepest slopes. A large old slump estimated at approximately 80 m long and 15 m high was noted in the middle of the steep slope. A large slump was noted in the middle of the shallower portion and seemed to correlate approximately with the zone of creep movement area shown on the Thurber 2013 drawing. No major erosion gullies were visible. Large portions of the slope were scarred from human activity with flat spots dug out and bare soil visible. A moderate amount of garbage remained in these areas. Several rough trails accessing the flat spots were noted along the slope.

The terrace area, most prominent at the west end of the site, was relatively flat and grassy. The terrace area, although smaller continues east past the existing pump station. The terrace area

ended near the east end of the subject site at the concrete drainage channel. Large rip rap was noted at the toe of the slope at the east end of the site. As previously noted, the toe of the slope at the North Saskatchewan River was approximately 7.5 m high. Overall, the toe of the slope was approximately 2H:1V. Some toe erosion was visible at the North Saskatchewan River. Several areas along the toe of the slope below the terrace area were noted to have visible erosion with some fallen trees. Recent slumps were also noted with a 1H:1V or near vertical face with small bushes and trees growing.

Several manholes and water valves were noted at the base of the slope near the existing pump station and throughout portions of the slope. An active manhole was noted at the top of the subject site slope with a green stake and audible running water. An approximately 10 m diameter EPCOR vault was noted on a portion of the slope A powerline was noted running approximately north to south for the length of the slope on the subject site, east of the pump station. A longitudinal crack was noted in the service road directly above and south of the terrace area as shown in Picture 18 where the previous slope repair had been completed.

The slope walk confirmed no recent major signs of major slope instabilities or JRP concerns. Similar to the reviewed reports signs of previous and ongoing slope movements were observed.

3.1 Site Pictures

Several pictures detailing the observations from the site inspection and points of note are detailed below.

Picture 1: small leaning trees at top of slope

Picture 2: minor old scarp at top of slope

Picture 3: small bare areas and fallen trees

Picture 4: small trail and bare face

Picture 5: small erosion gully

Picture 6: gradual slope area

Picture 7: debris from human activity

Picture 8: slope scarred by human activity

Picture 9: Terrace area looking W

Picture 10: terrace area looking NW

Picture 11: Terrace area E of pump station

Picture 12: terrace area looking E/pump station

Picture 13: erosion at toe of slope along river

Picture 14: toe of slope, leaning trees/bare soil

Picture 15: power lines E of pump station

Picture 16: manholes SE of pump station

Picture 17: human made flat area and debris

Picture 18: Service road crack S of terrace area

4.0 SOIL & GROUNDWATER CONDITIONS

4.1 Site Geology

According to GIS maps made available by Alberta Geological Survey, 3 local surficial geologies were identified within the site or on the slope above the site. The north portion of the site along the river and lower terrace area was classified as fluvial deposits of Holocene epoch. The fluvial deposit was described in the legend as sand, gravel, silt, and clay, with some organic sediments, deposited by streams and rivers. The south portion of the site, the lower portion of the North Saskatchewan River Valley slope, was classified as colluvial deposits of Holocene epoch. The fluvial deposit was described in the legend as bedrock, till, glaciolacustrine, glaciofluvial and/or eolian sediments and sometimes fluvial deposits, from slope and slumps deposits along valley sides and floors. The upper portion of the North Saskatchewan River Valley slope above the subject site was classified as glaciolacustrine deposit of Pleistocene epoch. The glaciolacustrine deposit was described in the legend as fine-grained sediments deposited within or along the margins of glacial lakes. Offshore sediment consisted of fine sand, silt, and clay, with debris released from floating ice. The near shore sediment consisted of well sorted silty sand and gravelly sand, with minor gravel.

The general bedrock geology in the region was identified as the Horseshoe Canyon Formation of late Cretaceous period. The Horseshoe Canyon Formation generally comprised of grey feldspathic clayey sandstone and bentonitic mudstone, with scattered coal and bentonite beds of various thickness.

4.2 Testhole Soils

Only Thurber Testholes 14-1, 14-2, 14-3 and 14-4 from Report 4 and Testhole 18-5 from Reports 6, located within or near the subject site were included in this desktop study. A detailed description of the soils encountered can be found on the attached soil logs in the Appendix. The testholes from Report 4 were drilled on the asphalt service road just above the west end of the site and encountered surficial asphalt and gravel/ sand fill. Below the pavement structure, the soil profile encountered near surface clay fill underlain by clay shale with a coal seam encountered at depth. Testhole 18-5 from Report 6, noted above, was drilled in the subject proposed bike park area and the soil profile encountered was silt underlain by sand and gravel before transitioning to clay shale at depth.

The native silt and sand encountered in Testhole 18-5 appeared similar to the previously described fluvial sediments. The clay shale and coal encountered in Testholes 14-1 to 14-4 appeared similar to the previously described bedrock deposits on the river valley slope.

4.3 Testhole Conditions Upon Completion

At the completion of drilling, sloughing condition was observed in 4 testholes while immediate groundwater seepage was observed in 1 testhole as summarized below.

Table 4.3.1: Groundwater Seepage And Sloughing Conditions At Completion

Testhole	Approximate Water Accumulation At Hole Bottom (m)	Approximate Slough Thickness At Hole Bottom (m)
14-1	0.2	none
14-2	n/a	n/a
14-3	0.3	0.1
14-4	0.8	0.8
18-5	4.1	1.6

4.4 Groundwater Conditions

Several watertable readings were found in 3 of the testholes as summarized below.

Table 4.2.1: 2014 Watertable Measurements

Testhole	Testhole Elevation (m)	Watertable Level Below Ground Surface (m)			Watertable Elevation (m)
		Aug 7, 2014 (0 days)	Aug 18, 2014 (11 days)	Sep 4, 2014 (28 days)	
14-2	636.53	3.6	3.6	3.6	632.93
14-4	635.82	5.0	4.1	4.1	631.72

Table 4.2.2: 2018 Watertable Measurements		
	Watertable Level Below Ground Surface (m)	
Testhole	Jul 6, 2018 (0 days)	Aug 7, 2018 (42 days)
18-5	8.9	9.0

Considering the relatively large site, the actual groundwater level will likely vary along the slope.

5.0 DISCUSSION AND RECOMMENDATIONS

Based on our geotechnical review of the site for the proposed bike park and associated bike trails, the following discussion and recommendations are provided. Based on our review of the subject site and current slope conditions JRP does not have any major concerns that would cause us to recommend the bike park and trail development be halted. The following recommendations should be followed for the trail and bike park design and construction.

1. It is understood that the proposed bike trails on the slope will be narrow, trying to utilize the natural terrain with the addition of some small timber features. The limited trails planned should have a minimal impact on the slope that has already seen some manmade trails and scarring from human activity. Additionally, the trails should not have an effect on the area of past creep movements noted by Thurber. It should be noted that future slope movement may cause damage to trails which would require repair, although the risk of this is low.
2. Based on discussions with the client it is understood that the planned timber features on the trails should have limited slope impact with small wooden piles utilized to construct them. Any planned fill features for the trails on the slope should have further stability assessment, as this will create a surcharge load. It is important to attempt to minimize the impact of trail construction on the vegetation cover. Vegetation above and below the trails will be critical to prevent erosion. Tree clearing and other vegetation disturbances should be minimized. It is understood that the Edmonton Mountain Bike Alliance will not remove trees greater than 1”/25mm in diameter in the trail making process. JRP considers this acceptable for slope stability concerns.
3. Based on discussions with the client and the most recent design drawings it is understood that the Whistler Trail Standards for single tracks will be utilized for the flow trails. JRP will review the provided information and provide geotechnical comments.
4. Some areas of the slope, especially to the east, were notably steeper at approximately 2H:1V and may prove more challenging for trail construction. Cutting trails into the 2H:1V slopes may leave a bare cut face that may not hold up. Trails cut into the steep areas should be monitored for signs of minor slope instability and remedied if any arise. Our firm or an experienced geotechnical engineer should review the trails at the time of construction to confirm they do not contribute to slope instability

5. The open terrace area is considered suitable for the proposed bike park. Disturbance to vegetation at the base of the slope should be limited. One of the main concerns noted onsite is the toe erosion at the North Saskatchewan River. Based on JRPs visual review of the site our firm recommends a minimum 30 m setback from the secondary TOB at the river to limit the impact of the toe erosion noted over the next 100 to 150 years. Looking at the included concept design it is estimated that the proposed bike park site is approximately 20 to 25 m from the secondary TOB. Alternatively, the bike park site can be monitored for the actual toe erosion rate and adjustment made accordingly. Toe erosion occurs incrementally and slowly, and therefore can be monitored and addressed as needed for a bike park development.

If it is assumed erosion of approximately 30m takes place over 150 years that would indicate approximately 20m over 100 years. If these project life limitations aren't adequate, erosion can be monitored for the actual rates.

6. It is understood a drop-in is planned south of the proposed bike park at or just below the existing service road. As noted in Report 4 a slope failure occurred in this area due to poor embankment fill. Based on Report 6 and the engineering repair it is understood was completed, the risk for future large scale slope movement in this area is low. As previously noted, during JRP's recent site walk a longitudinal crack was visible in the repaired service road. Small creep movements may occur in this area in the future.

7. A concern for the bike park would be unknown fill conditions from the removal of the QEWWTP structures. Based on the Thurber Report 6, it was recommended that backfill following demolition be compacted at a minimum 92 percent of Standard Proctor Density since most of the area was planned as a park with no structures. From the aerial photography review, the structures were removed and backfilled approximately 4 years ago. Settlement of the fill should not be a concern below the planned dirt features on the west end of the proposed bike park. There is a potential for settlement below concrete and asphalt features although this should be low due to the age of the fill. Fill encountered below asphalted and concreted areas should be inspected for suitability by a qualified geotechnical engineer at the time of construction.

8. Loose or very loose silt was encountered near the surface in Thurber Testhole TH18-5. As noted in the Thurber Report 6 the silt is sensitive to changes in moisture content and may be difficult to compact and may not provide adequate subgrade support if they are disturbed. Care must be taken not to allow any excess moisture into exposed silt soils during construction. Additionally, the surficial silts encountered are considered highly frost susceptible. The closer the watertable is to the surface, the higher is the frost heave potential. The measured watertable levels

measured were low to moderate, the actual watertable level may be variable due to variable terrain. Therefore, frost heave may be a concern. Grades should be kept high as possible and proper drainage of hard surface areas is key.

9. The clay shale encountered near the surface of Thurber Testholes TH14-1 to TH 14-4 was high plastic and exhibited a high swelling and shrinkage potential. At least some of the clay fill encountered near the surface was high plastic as well and exhibited a high swelling and shrinkage potential. Therefore, the risk of soil movement from swelling and shrinkage is present on site if similar high plastic clay fill is encountered. Proper site drainage and cement stabilization of the subgrade will help prevent changes to soil moisture content and reduce the risk of swelling and shrinkage below hard surfaced areas.
10. Report 7 by Fiera noted visible seepage, although the seepage noted was east of the proposed bike park development. No similar seepage was noted during our site walk. Our firm or an experienced geotechnical engineer should be consulted if similar seepage is encountered on the slopes within the proposed bike park development.
11. As previously noted, existing utilities were observed near the pump station and on the slope. The location of utilities should be considered in the trail layout and bike park construction.
12. It is understood that no buildings are planned for the subject site, therefore no recommendations for engineered foundations have been addressed in this report. Further investigation would be required if recommendations for engineered foundations are desired.

6.0 CLOSURE

This report has been prepared for the exclusive and confidential use of Edmonton Mountain Bike Alliance, Arthouse Residential Inc., the City of Edmonton and their authorized agents. Use of this report is limited to the subject proposed trails and bike park only. The recommendations given are based on the subsurface soil conditions encountered during test boring, current construction techniques and generally accepted engineering practices. No other warranty, expressed or implied, is made. Due to geological randomness of many soil formations, no interpolation of soil conditions between or away from the testholes has been made or implied. Soil conditions are known only at the test boring location. Should other soils be encountered during construction or other information pertinent become available, the undersigned should be contacted as the recommendations may be altered or modified.

We trust this information is satisfactory. If you should have any questions, please contact our office.

Respectfully Submitted,

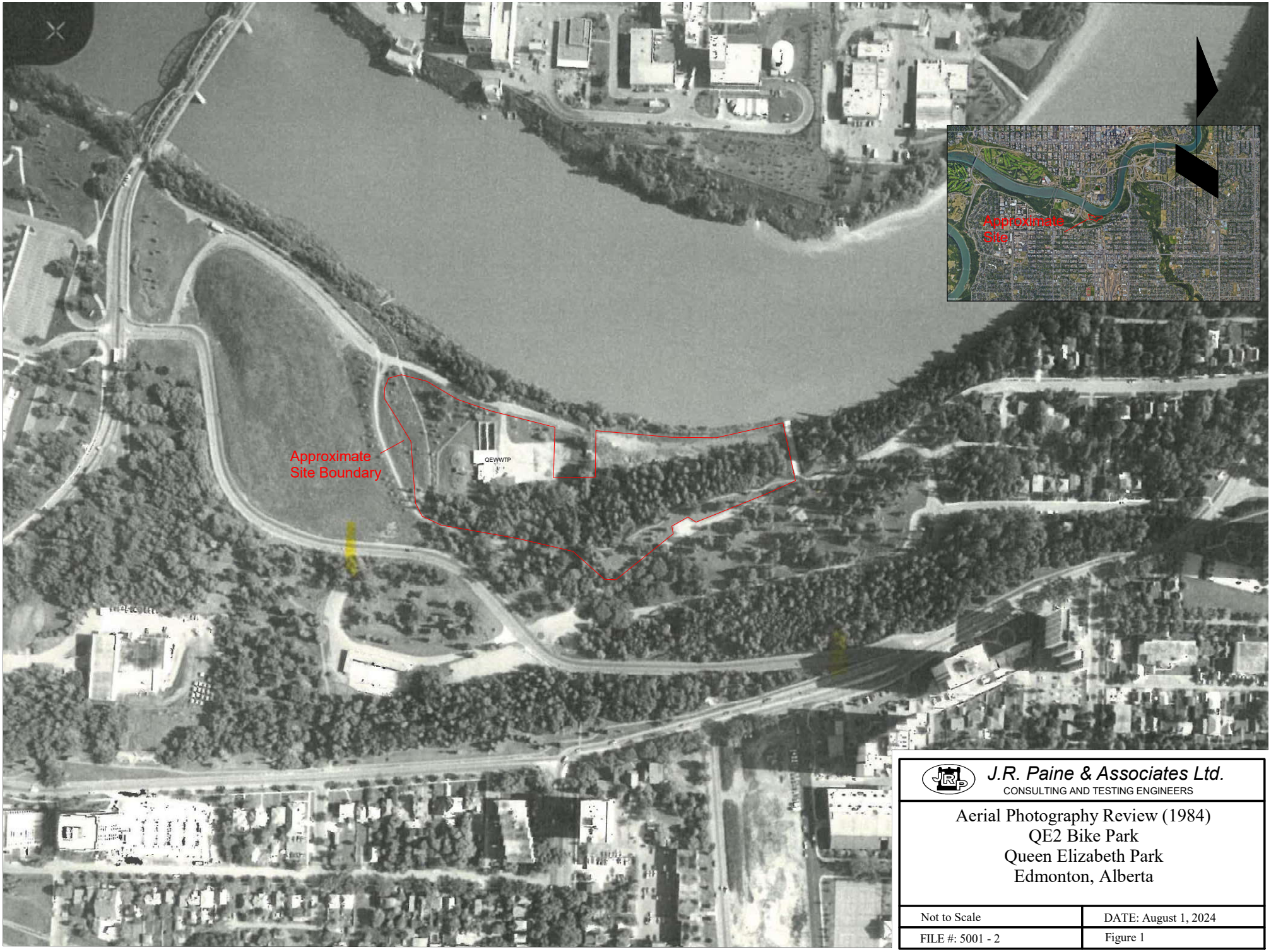
J.R. PAINE & ASSOCIATES LTD.

J.P. Deys, P. Eng.
jp.deys@jrpaine.ca

Reviewed by: Rick Evans, P. Eng.
President

H:\DATA 2025\5001 Arthouse Residential Inc\5001-2(Curr) QEII Bike Park\r3417art.docx

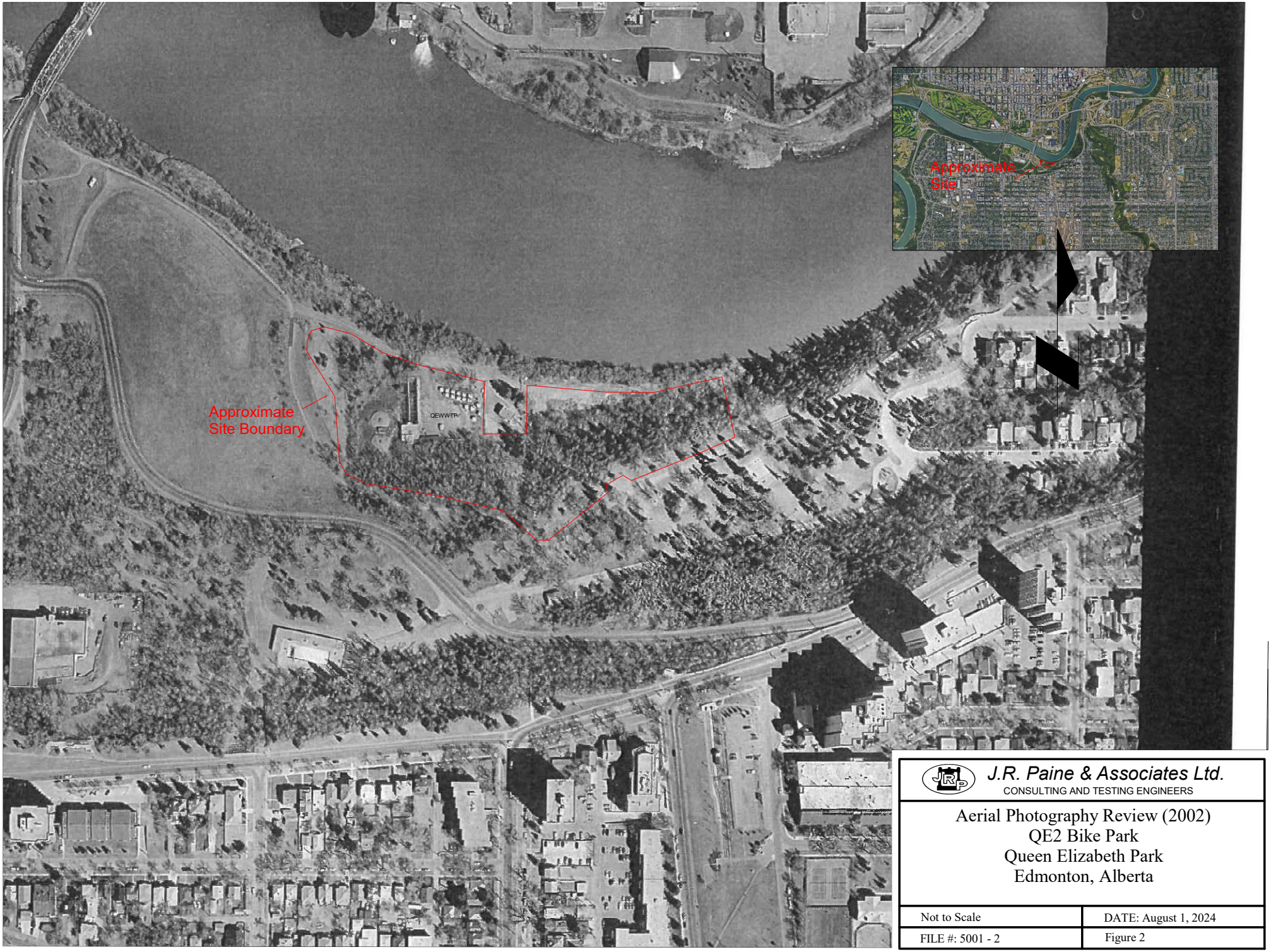
7.0 APPENDIX



J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Aerial Photography Review (1984)
QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

Not to Scale	DATE: August 1, 2024
FILE #: 5001 - 2	Figure 1



J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Aerial Photography Review (2002)
QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

Not to Scale	DATE: August 1, 2024
FILE #: 5001 - 2	Figure 2

J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

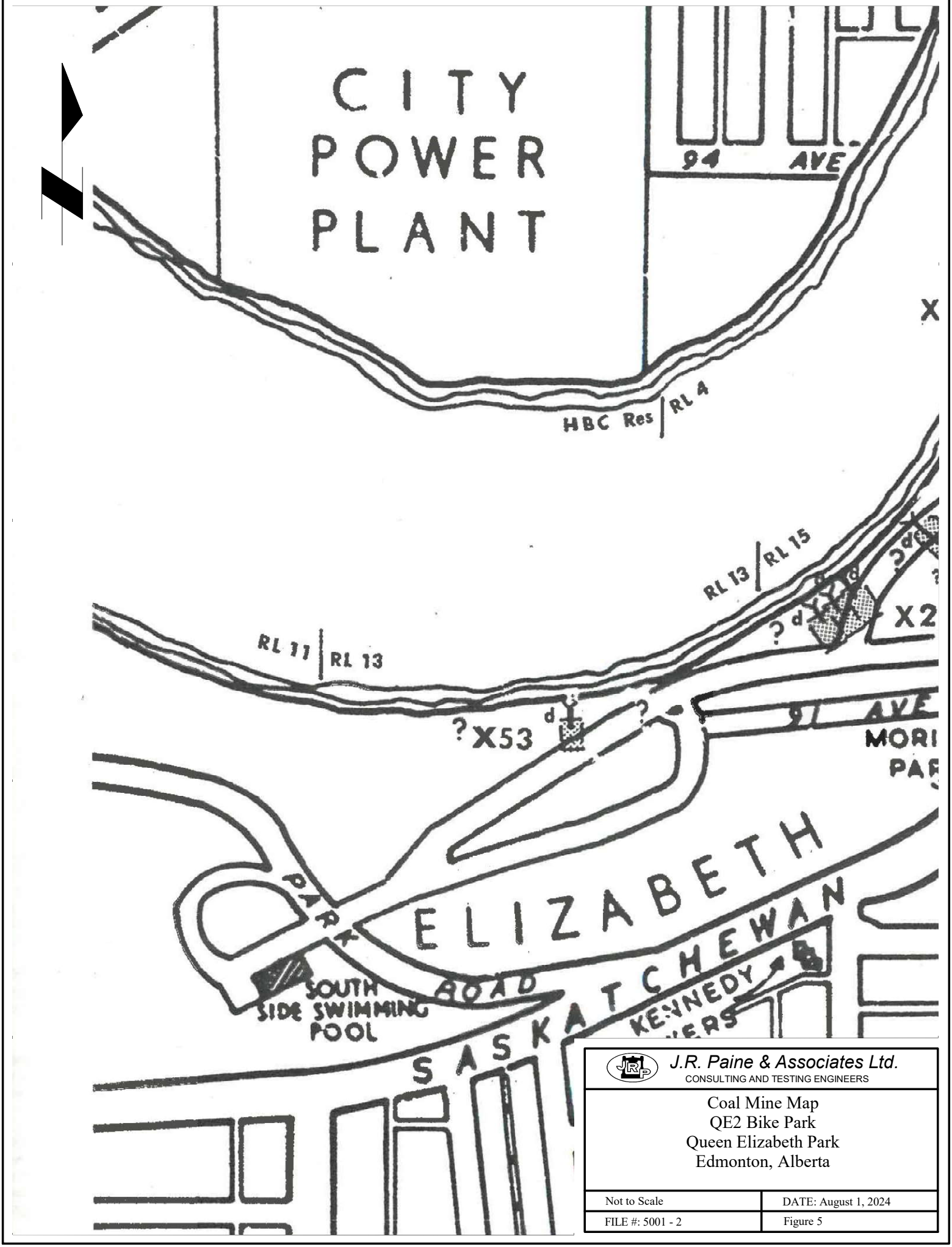
Aerial Photography Review (2013)
QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

Not to Scale	DATE: August 1, 2024
FILE #: 5001 - 2	Figure 3

J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Aerial Photography Review (2020)
QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

Not to Scale	DATE: August 1, 2024
FILE #: 5001 - 2	Figure 4



J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Coal Mine Map
QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

Not to Scale	DATE: August 1, 2024
FILE #: 5001 - 2	Figure 5

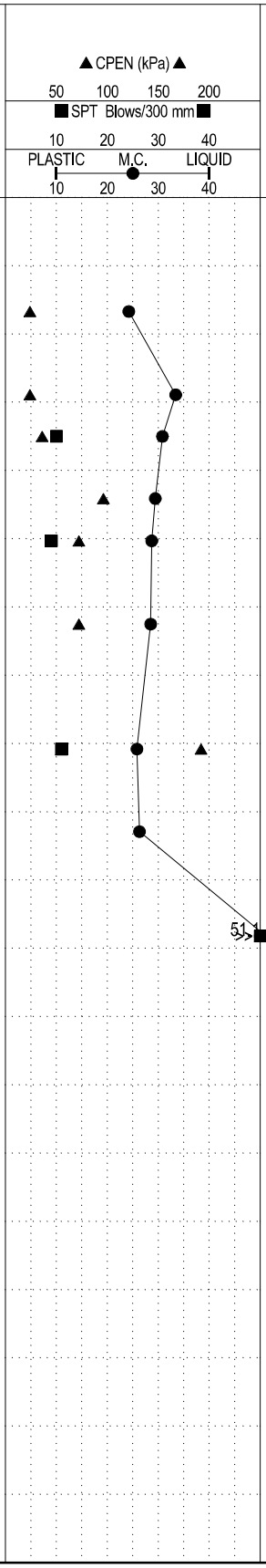
J.R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Approximate Testhole Locations
QE2 Bike Park
Queen Elizabeth Park
Edmonton, Alberta

Not to Scale	DATE: August 1, 2024
FILE #: 5001 - 2	Figure 6

CLIENT: ISL ENGINEERING & LAND SERVICES LTD	PROJECT: WALTERDALE BRIDGE - QE PARK SERVICE ROAD	BOREHOLE NO: **TH14-1**
DRILLING COMPANY: ALL SERVICE DRILLING INC	DATE DRILLED: August 7, 2014	PROJECT NO: 19-598-415
DRILL/METHOD: Geoprobe 7822DT / Solid Stem Augers	LOCATION: N5932582.027, E33240.326	ELEVATION: 636.64 (m)

SAMPLE TYPE ▯ GRAB SAMPLE ▨ SPT



DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	ELEVATION (m)
0			ASPHALT	
			GRAVEL AND SAND (FILL), dark brown, crushed gravel, medium to fine grained silty sand	636
1	CI		CLAY (FILL) stiff, brown, silty, occasional sand and pebbles	
	CI		-occasional thin weathered sandstone lenses	
2	CH		-some clay shale within clay matrix	635
	CH		CLAY SHALE	
	CI-CH		stiff, brown, silty, moderately weathered, occasional rootlets	634
3	CH			
				633
4	CH			
	CH		-dark brown, carbonaceous	632
5	COAL		COAL, very hard, black	
			END OF TEST HOLE AT 5.5m UPON COMPLETION: (Below ground surface) -No slough -Water at 5.3m Backfilled with drill cuttings and cold mix at surface	631
6				630
7				629
8				628
9				627
10				

REMARKS

THURBER ENGINEERING LTD.

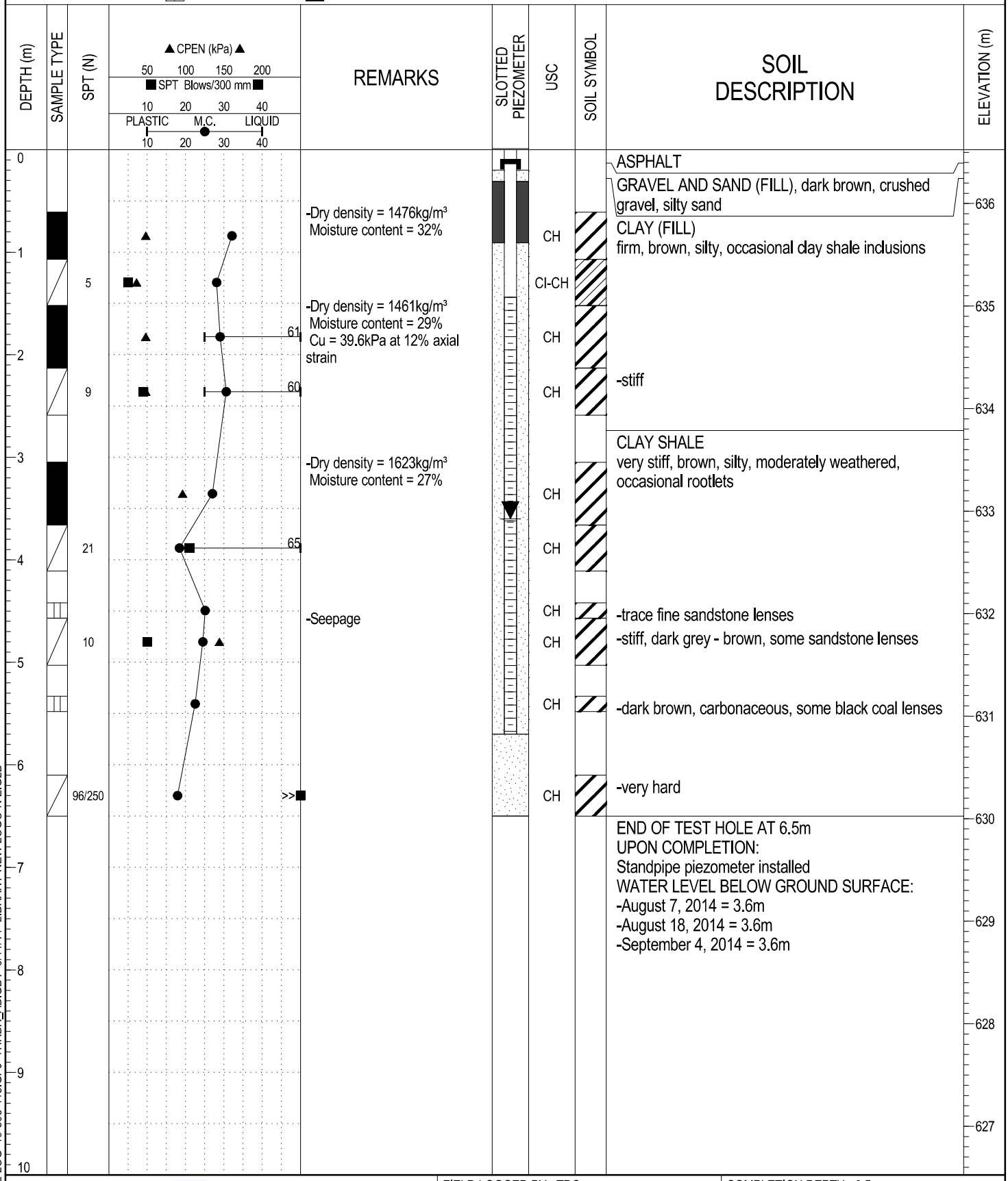
FIELD LOGGED BY: TDC	COMPLETION DEPTH: 5.5 m
PREPARED BY: XW	COMPLETION DATE: 8/7/14
REVIEWED BY:	Page 1 of 1

BOREHOLE LOG 19-598-415.GPJ THRBR_AB.GDT 9/11/14 - LIBRARY-NEW LOGO-N E.GLB

CLIENT: ISL ENGINEERING & LAND SERVICES LTD	PROJECT: WALTERDALE BRIDGE - QE PARK SERVICE ROAD	BOREHOLE NO: **TH14-2**
DRILLING COMPANY: ALL SERVICE DRILLING INC	DATE DRILLED: August 7, 2014	PROJECT NO: 19-598-415
DRILL/METHOD: Geoprobe 7822DT / Solid Stem Augers	LOCATION: N5932583.352, E33230.327	ELEVATION: 636.53 (m)

SAMPLE TYPE: SHELBY TUBE | SPT | GRAB SAMPLE

BACKFILL TYPE: SAND | BENTONITE

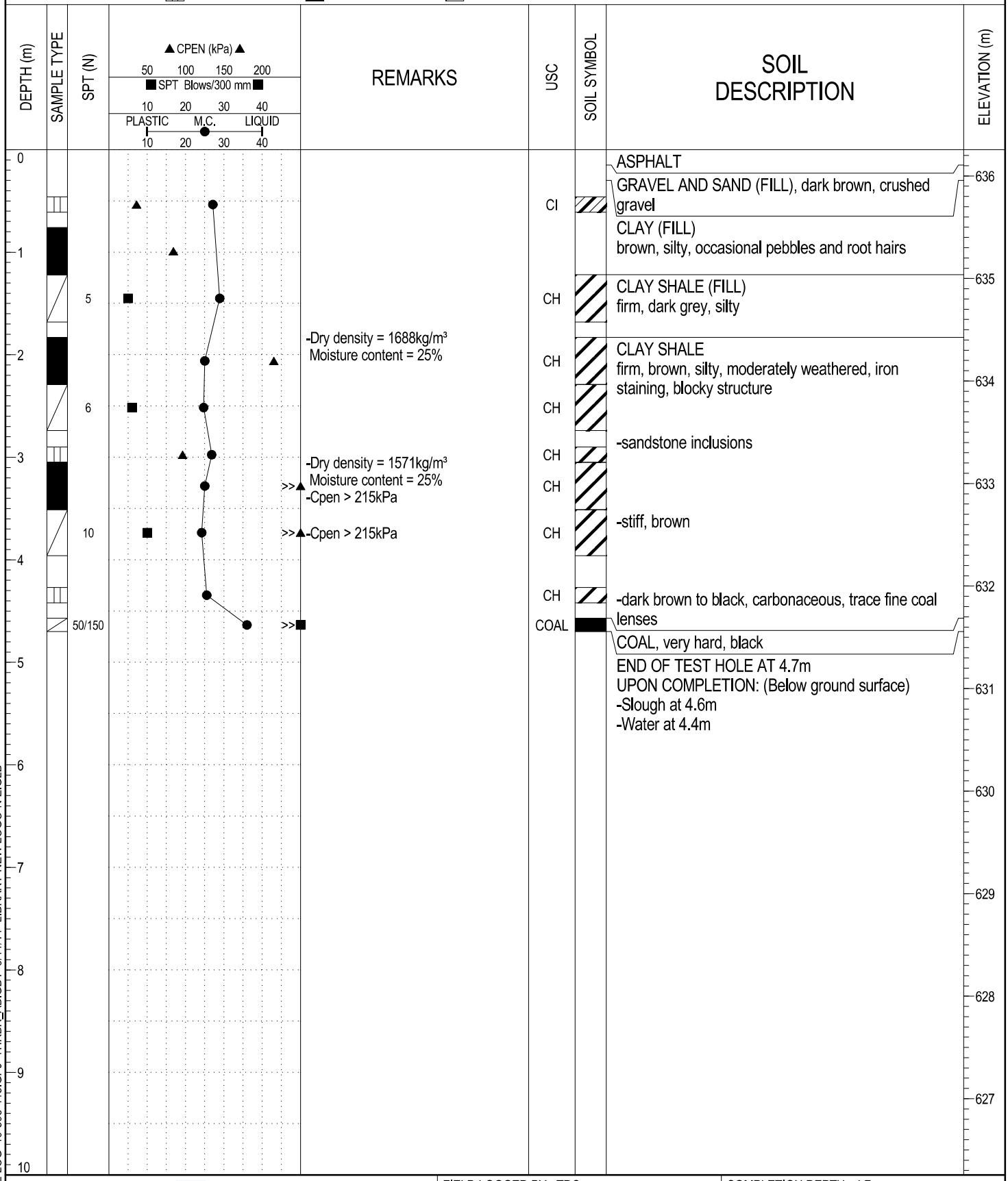


THURBER ENGINEERING LTD.	FIELD LOGGED BY: TDC	COMPLETION DEPTH: 6.5 m
	PREPARED BY: XW	COMPLETION DATE: 8/7/14
	REVIEWED BY:	Page 1 of 1

BOREHOLE LOG 19-598-415.GPJ THRBR_AB.GDT 9/11/14 - LIBRARY-NEW LOGO-N E.GLB

CLIENT: ISL ENGINEERING & LAND SERVICES LTD	PROJECT: WALTERDALE BRIDGE - QE PARK SERVICE ROAD	BOREHOLE NO: **TH14-3**
DRILLING COMPANY: ALL SERVICE DRILLING INC	DATE DRILLED: August 7, 2014	PROJECT NO: 19-598-415
DRILL/METHOD: Geoprobe 7822DT / Solid Stem Augers	LOCATION: N5932584.715, E33220.716	ELEVATION: 636.26 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | SPT



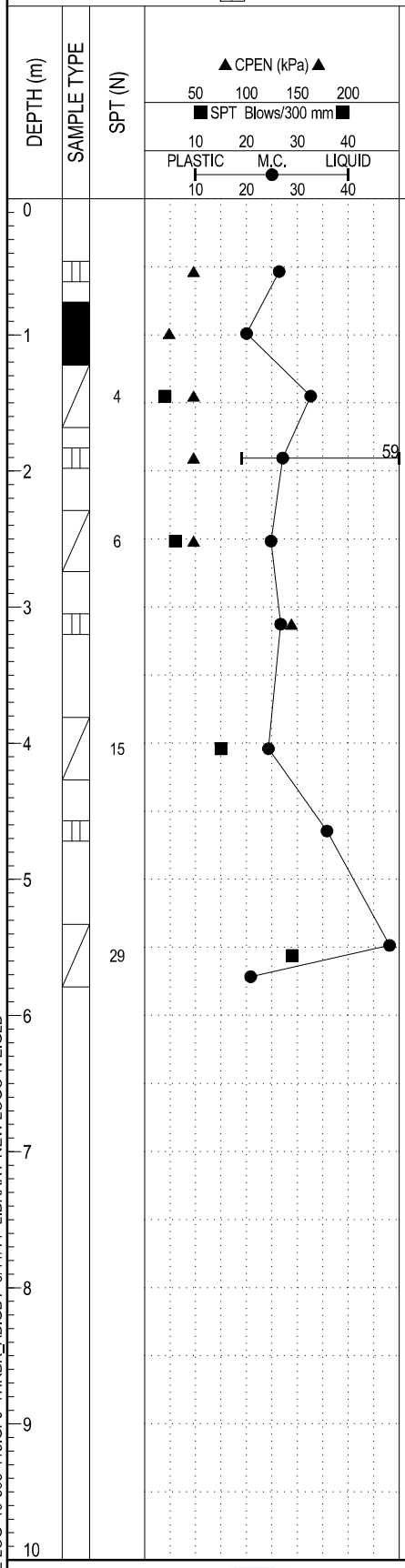
THURBER ENGINEERING LTD.	FIELD LOGGED BY: TDC	COMPLETION DEPTH: 4.7 m
	PREPARED BY: XW	COMPLETION DATE: 8/7/14
	REVIEWED BY:	Page 1 of 1

BOREHOLE LOG 19-598-415.GPJ THRBR_AB.GDT 9/11/14 - LIBRARY-NEW LOGO-N E.GLB

CLIENT: ISL ENGINEERING & LAND SERVICES LTD	PROJECT: WALTERDALE BRIDGE - QE PARK SERVICE ROAD	BOREHOLE NO: **TH14-4**
DRILLING COMPANY: ALL SERVICE DRILLING INC	DATE DRILLED: August 7, 2014	PROJECT NO: 19-598-415
DRILL/METHOD: Geoprobe 7822DT / Solid Stem Augers	LOCATION: N5932585.831, E33213.243	ELEVATION: 635.82 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | SPT

BACKFILL TYPE: SAND | BENTONITE | SLOUGH



REMARKS

-Dry density = 1616kg/m³
Moisture content = 20%

SLOTTED PIEZOMETER

USC	SOIL SYMBOL	SOIL DESCRIPTION	ELEVATION (m)
		ASPHALT, black	635.82
		GRAVEL AND SAND (FILL), dark brown, crushed gravel	
CI-CH		CLAY (FILL)	635
CI		brown, silty, occasional clay shale inclusions	
CH		CLAY SHALE (FILL), firm, brown, silty, occasional ironstone inclusions	
CH		CLAY SHALE	634
		firm, brown - grey, silty, moderately weathered, occasional sandstone inclusions	
CH		-occasional iron staining	
		-very stiff, dark brown	633
CH			
			632
CH			
		COAL, very stiff, black, some carbonaceous clay shale lenses	
COAL			631
COAL			
CH		CLAY SHALE, very stiff, dark grey, silty	630
		END OF TEST HOLE AT 5.8m	
		UPON COMPLETION: (Below ground surface)	
		-Slough at 5.0m	
		-Water at 5.0m	
		Standpipe piezometer installed	
		WATER LEVEL BELOW GROUND SURFACE:	629
		-August 7, 2014 = 5.0m	
		-August 18, 2014 = 4.1m	
		-September 4, 2014 = 4.1m	
			628
			627
			626

THURBER ENGINEERING LTD.

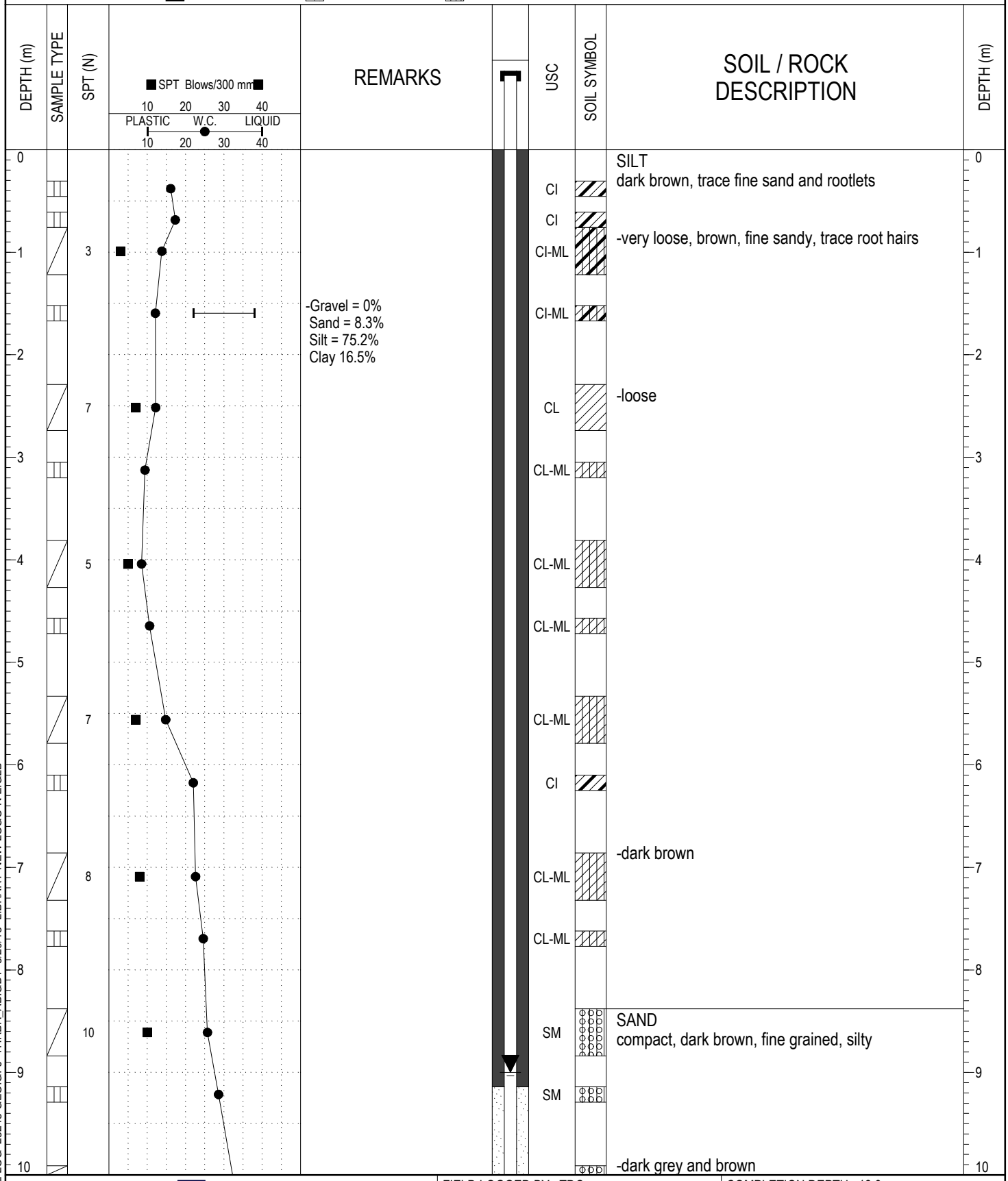
FIELD LOGGED BY: TDC	COMPLETION DEPTH: 5.8 m
PREPARED BY: XW	COMPLETION DATE: 8/7/14
REVIEWED BY:	Page 1 of 1

BOREHOLE LOG 19-598-415.GPJ THRBR_AB.GDT 9/11/14 - LIBRARY-NEW LOGO-N E.GLB

CLIENT: City of Edmonton	PROJECT: Queen Elizabeth WWTP Demolition	BOREHOLE NO: **TH18-5**
DRILLING COMPANY: All Service	DATE DRILLED: July 6, 2018	PROJECT NO: 23243
DRILL/METHOD: Track, Solid Stem	LOCATION: N5932667, E33219	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE, SPT

BACKFILL TYPE: BENTONITE, SAND, SLOUGH



THURBER ENGINEERING LTD.

FIELD LOGGED BY: TDC	COMPLETION DEPTH: 13.0 m
PREPARED BY: KMT	COMPLETION DATE: 7/6/18
REVIEWED BY: RWT	Page 1 of 2

BOREHOLE LOG 23243-GEO.GPJ THRBR_AB.GDT 8/20/18- LIBRARY-NEW LOGO-N E.GLB

CLIENT: City of Edmonton	PROJECT: Queen Elizabeth WWTP Demolition	BOREHOLE NO: **TH18-5**
DRILLING COMPANY: All Service	DATE DRILLED: July 6, 2018	PROJECT NO: 23243
DRILL/METHOD: Track, Solid Stem	LOCATION: N5932667, E33219	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE, SPT

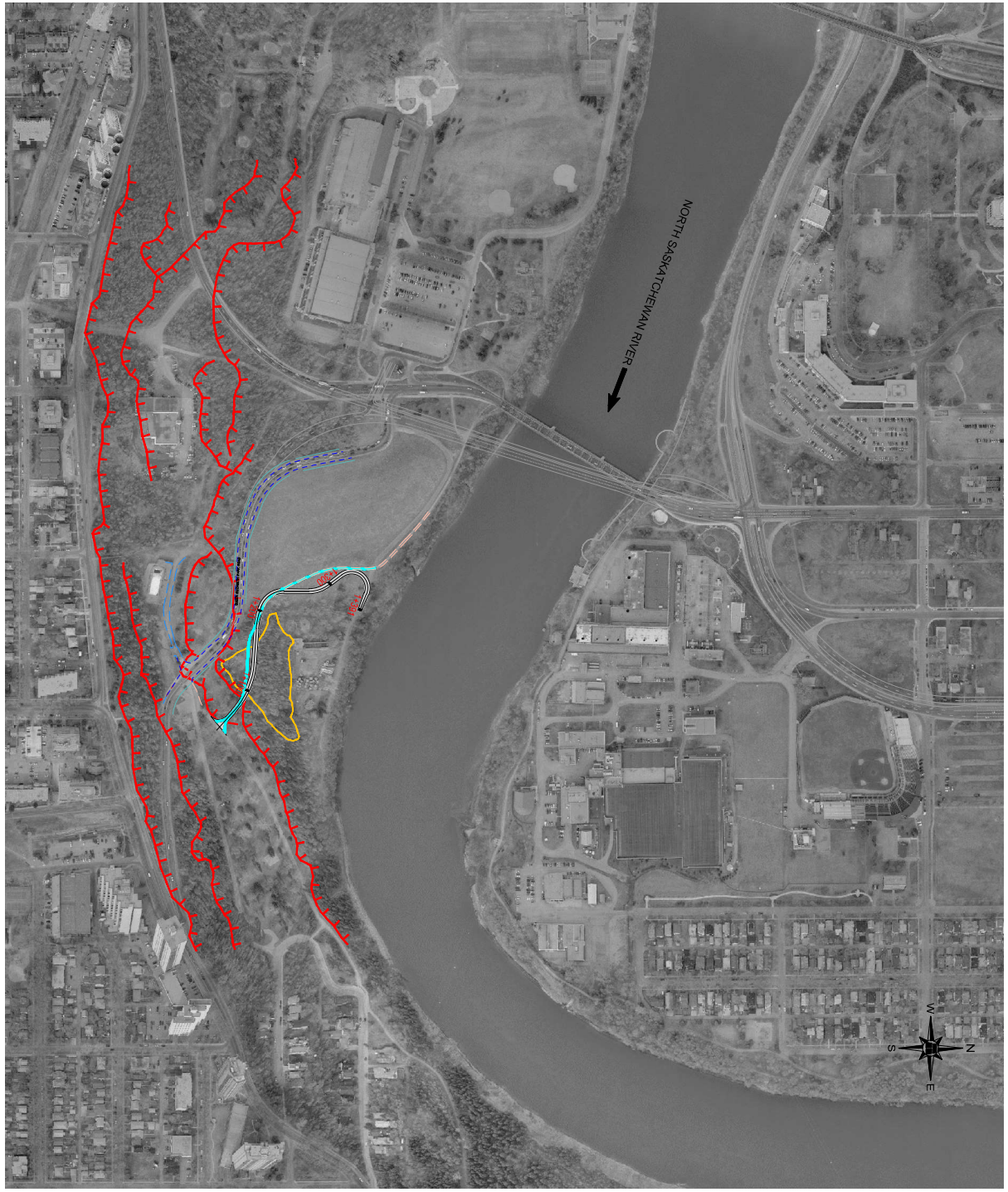
BACKFILL TYPE: BENTONITE, SAND, SLOUGH

DEPTH (m)	SAMPLE TYPE	SPT (N)	SPT Blows/300 mm; PLASTIC W.C. LIQUID	REMARKS	WELL INSTALLATION	USC	SOIL SYMBOL	SOIL / ROCK DESCRIPTION	DEPTH (m)
10		9				SM		SAND - CONTINUED	10
						SM		-trace coal partings	
11		45				GM		GRAVEL AND SAND dense, brown, medium to fine grained sand	11
12						GM			12
						CH		CLAY SHALE dark brown, silty	
13								END OF TEST HOLE AT 13.0m UPON COMPLETION: (below ground surface) -Water at 9.14m -Slough at 11.43m Monitoring Well Installed WATER LEVEL BELOW GROUND SURFACE: July 6, 2018 = 8.9m -August 17, 2018 = 9.0m	13
14									14
15									15
16									16
17									17
18									18
19									19
20									20

THURBER ENGINEERING LTD.

FIELD LOGGED BY: TDC	COMPLETION DEPTH: 13.0 m
PREPARED BY: KMT	COMPLETION DATE: 7/6/18
REVIEWED BY: RWT	Page 2 of 2

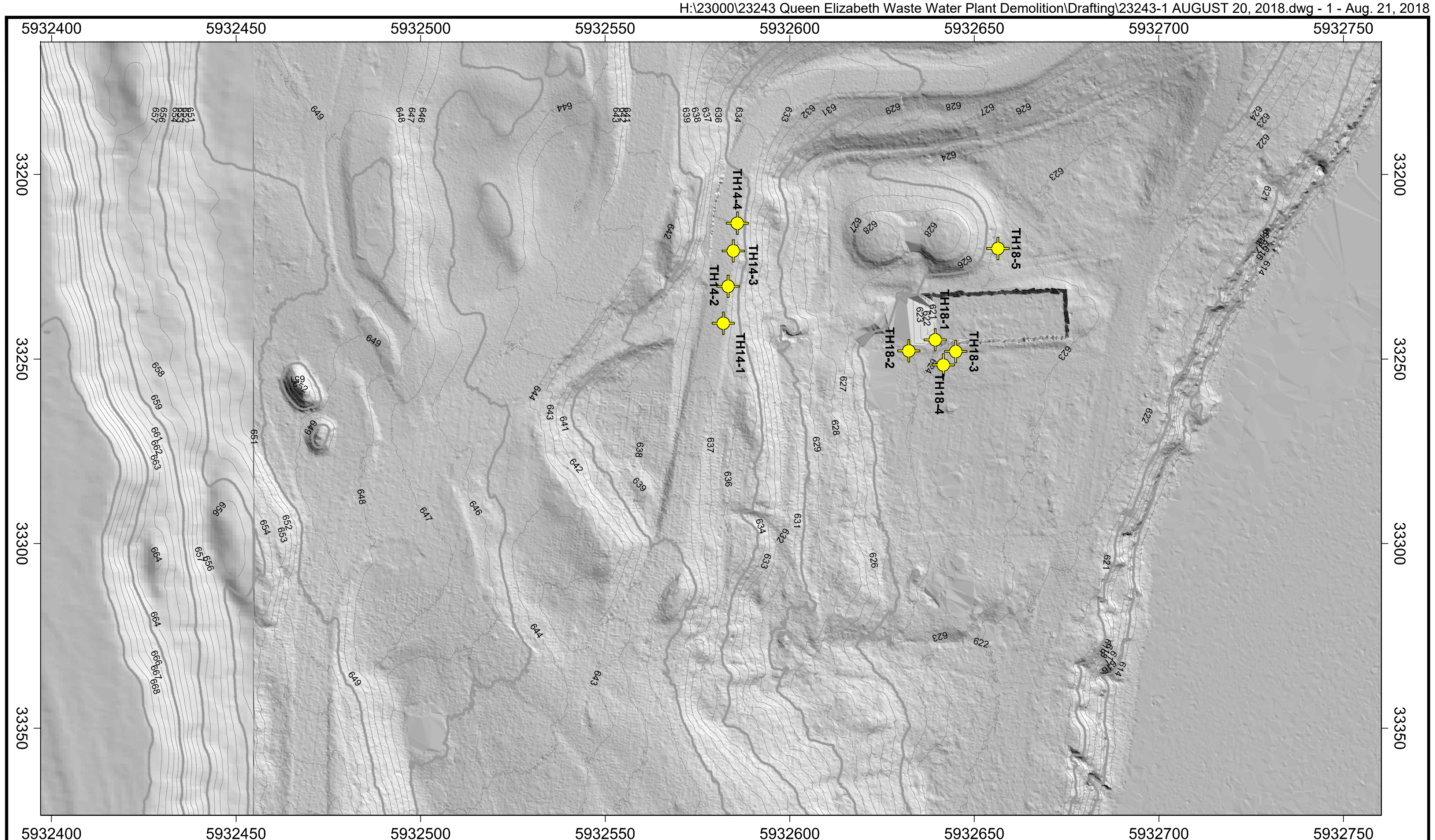
BOREHOLE LOG 23243-GEO.GPJ THRBR_AB.GDT 8/20/18- LIBRARY-NEW LOGO-N E.GLB

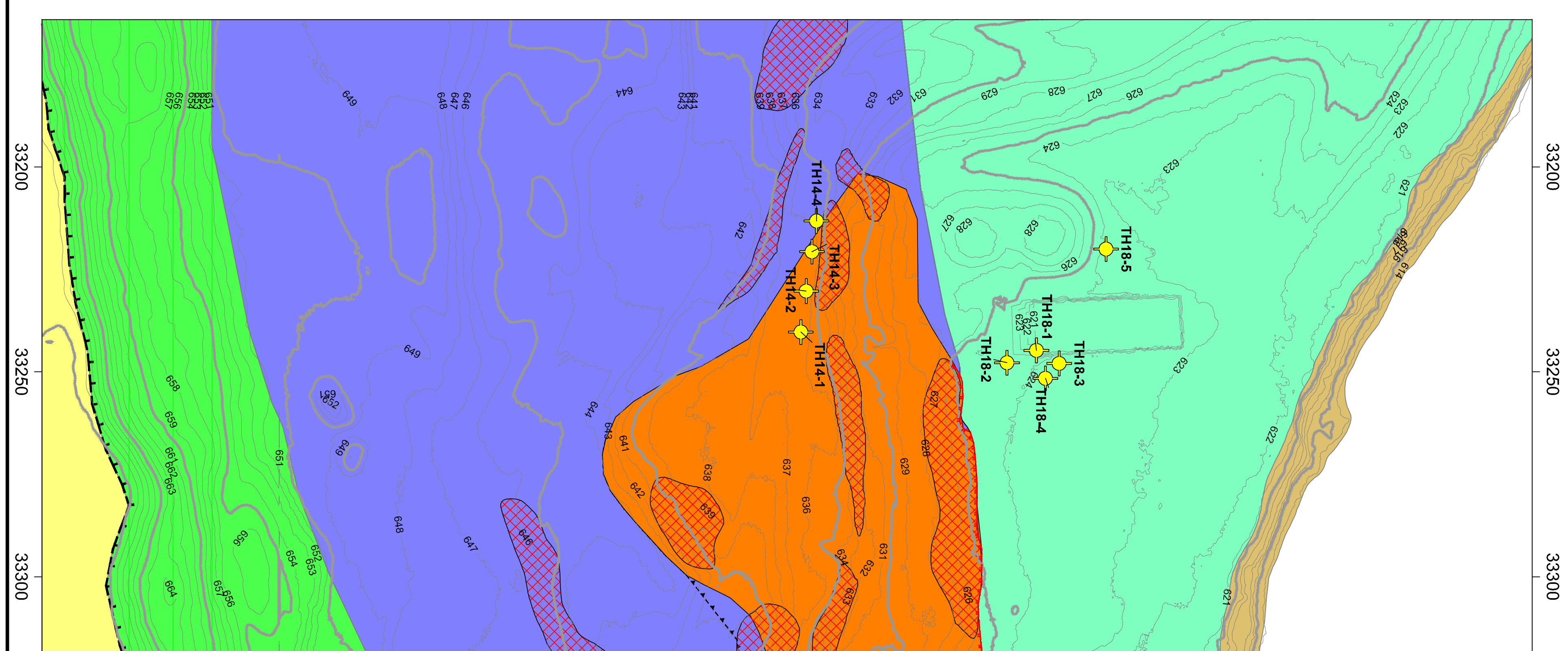


FILE No.	
DATE	
SCALE	
APPROVED	
DESIGNED	
DRAWN BY	

WA

H:\23000\23243 Queen Elizabeth Waste Water Plant Demolition\Drafting\23243-1 AUGUST 20, 2018.dwg - 1 - Aug. 21, 2018



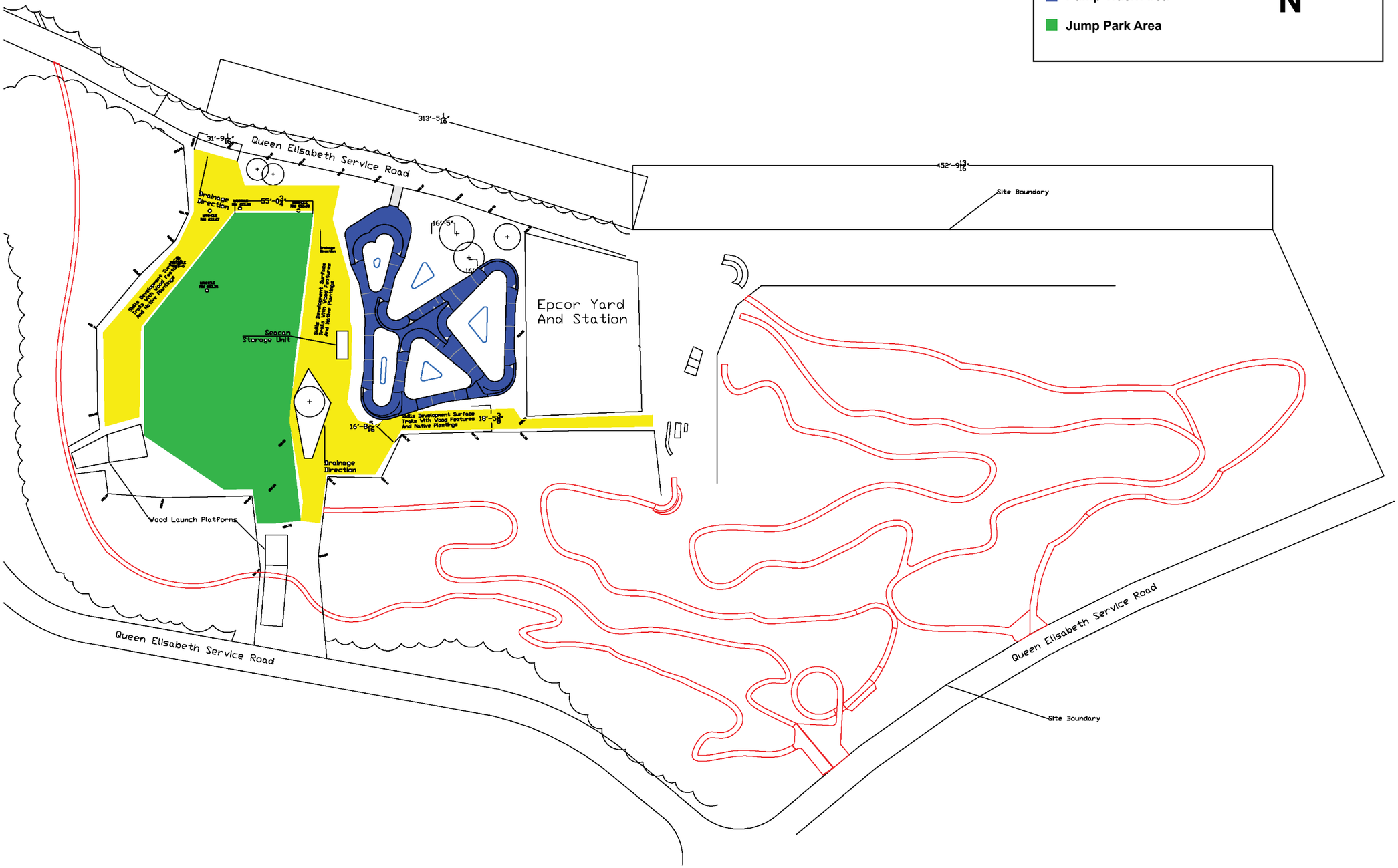


Legend

This site plan shows the locations of each main park componeny.

- Flow Trails
- Skills Park Area
- Pump Track Area
- Jump Park Area

N



Design Package By:

ArtHouse RESIDENTIAL

jsoneff@edmbikepark.ca 780-298-2431

Project:

EDMONTON BIKE PARK

Jump Park Design By:

CABIN

lpriest@cabinworks.ca 250-475-3655

Construction Management & Consulting By:

PEAKPLAY PEAKPLAY.CA

Info@peakplay.ca 780-475-3655

Issued for Approval: May 20,2025

Issued for Permits: TBD

Issued for Construction: TBD

Zone: River Valley A

Site Area: 26,680sg m

Description:

Address: 10370 Queen Elizabeth Park Road
Lot: 1
Block: 1
Plan: 162 0101

Page **SP 1**

Appendix D: Species Observations

Table D-1. List of vascular plants that have been observed in or near the Area of Interest, as reported by iNaturalist and ACIMS.

Common Name	Science Name	S-Rank	Status
Alfalfa	*Medicago sativa*	SNA	Exotic
Alsike Clover	*Trifolium hybridum*	SNA	Exotic
Balsam Fir	*Abies balsamea*	S5	Native
Balsam Poplar	*Populus balsamifera*	S5	Native
Bird'S-Foot Trefoil	*Lotus corniculatus*	SNA	Exotic
Box-Elder	*Acer negundo*	SU	Native
Bur Oak	*Quercus macrocarpa*	SU	Unknown
Canada Mayflower	*Maianthemum canadense*	S5	Native
Chokecherry	*Prunus virginiana*	S5	Native
Common Raspberry	*Rubus idaeus*	S5	Native
Common Yarrow	*Achillea millefolium*	SNA	Exotic
Crested Wheatgrass	*Agropyron cristatum*	SNA	Exotic
Cut-Leaved Ragwort	*Senecio eremophilus*	S5	Native
European Mountain Ash	*Sorbus aucuparia*	SNA	Exotic
False London-Rocket	*Sisymbrium loeselii*	SNA	Exotic
Field Horsetail	*Equisetum arvense*	S5	Native
Field Penny-Cress	*Thlaspi arvense*	SNA	Exotic
Fireweed	*Chamerion angustifolium*	S5	Native
Foxtail Barley	*Hordeum jubatum*	S5	Native
Fragrant Bedstraw	*Galium triflorum*	S5	Native
Fringed Loosestrife	*Lysimachia ciliata*	S4	Native
Guelder-Rose	*Viburnum opulus*	S3S4	Native
Hairy Evening Primrose	*Oenothera villosa*	SU	Native
Hungarian Lilac	*Syringa josikaea*	Not Listed	Exotic
Marsh Grass-Of-Parnassus	*Parnassia palustris*	S5	Native
Musk Mallow	*Malva moschata*	SNA	Exotic
Northern Bedstraw	*Galium boreale*	S5	Native
Pale Vetchling	*Lathyrus ochroleucus*	S5	Native
Paper Birch	*Betula papyrifera*	S5?	Native
Purple Clematis	*Clematis occidentalis*	S5	Native
Red Baneberry	*Actaea rubra*	S5	Native
Red Clover	*Trifolium pratense*	SNA	Exotic
Red Osier Dogwood	*Cornus sericea*	S5	Native
Red-Berried Elder	*Sambucus racemosa*	S4	Native
Red-Fruited Red Baneberry	*Actaea rubra rubra*	S5	Native
Saskatoon	*Amelanchier alnifolia*	S5	Native
Shiny Cotoneaster	*Cotoneaster lucidus*	SNA	Exotic
Showy Aster	*Eurybia conspicua*	S5	Native
Siberian Peashrub	*Caragana arborescens*	SNA	Exotic
Silverberry	*Elaeagnus commutata*	S5	Native
Smooth Blue Aster	*Symphyotrichum laeve*	S5	Native
Smooth Brome	*Bromus inermis*	SNA	Exotic
Spinulose Wood Fern	*Dryopteris carthusiana*	S5	Native
Star-Flowered Lily-Of-The-Valley	*Maianthemum stellatum*	S5	Native
Strict Blue-Eyed Grass	*Sisyrinchium montanum*	S5	Native
Tall Bluebell	*Mertensia paniculata*	S5	Native
Tatarian Honeysuckle	*Lonicera tatarica*	SNA	Exotic
Timothy Grass	*Phleum pratense*	SNA	Exotic
Touch-Me-Not Balsam	*Impatiens noli-tangere*	S5	Native
Trembling Aspen	*Populus tremuloides*	S5	Native
Tufted Vetch	*Vicia cracca*	SNA	Exotic
Western Blue Clematis	*Clematis occidentalis grosseserrata*	S5	Native
Western Snowberry	*Symphoricarpos occidentalis*	S5	Native
White Clover	*Trifolium repens*	SNA	Exotic
Wild Sarsaparilla	*Aralia nudicaulis*	S5	Native
Wild Strawberry	*Fragaria vesca*	S4	Native
Wormwood	*Artemisia absinthium*	SNA	Exotic
Yellow Sweetclover	*Melilotus officinalis*	SNA	Exotic

Table D-2. List of Noxious and Prohibited Noxious weeds that have been observed in or near the Area of Interest, as reported by iNaturalist.

Common Name	Science Name	S-Rank	Status
Yellow Toadflax	*Linaria vulgaris*	SNA	Noxious
Canada Thistle	*Cirsium arvense*	SNA	Noxious
Common Buckthorn	*Rhamnus cathartica*	SNA	Prohibited
Common Tansy	*Tanacetum vulgare*	SNA	Noxious
Creeping Bellflower	*Campanula rapunculoides*	SNA	Noxious
Dame's Rocket	*Hesperis matronalis*	SNA	Noxious
Hound'S-Tongue	*Cynoglossum officinale*	SNA	Noxious
Lesser Burdock	*Arctium minus*	SNA	Noxious
Orange Hawkweed	*Pilosella aurantiaca*	SNA	Prohibited
Oxeye Daisy	*Leucanthemum vulgare*	SNA	Noxious
Perennial Sow Thistle	*Sonchus arvensis*	SNA	Noxious
Scentless Mayweed	*Tripleurospermum inodorum*	SNA	Noxious
White Campion	*Silene latifolia*	SNA	Noxious

Table D- 3. List of wildlife observed in or near the Area of Interest, as reported by eBird, iNaturalist, and FWMIS.

Common Name	Scientific Name	Provincial Status	Federal Status
Birds			
Alder Flycatcher	*Empidonax alnorum*	Secure	Not listed
Northern Goshawk	*Accipiter atricapillus*	**Sensitive**	Not listed
American Crow	*Corvus brachyrhynchos*	Secure	Not listed
American Redstart	*Setophaga ruticilla*	Secure	Not listed
American Robin	*Turdus migratorius*	Secure	Not listed
American Tree Sparrow	*Spizelloides arborea*	Secure	Not listed
American White-winged Crossbill	*Loxia leucoptera leucoptera*	Not Listed	Not listed
Bald Eagle	*Haliaeetus leucocephalus*	**Sensitive**	Not at Risk
Baltimore Oriole	*Icterus galbula*	Secure	Not listed
Barred Owl	*Strix varia*	**Sensitive**	Not listed
Black-billed Magpie	*Pica hudsonia*	Secure	Not listed
Black-capped Chickadee	*Poecile atricapillus*	Secure	Not listed
Blackpoll Warbler	*Dendroica striata*	Secure	Not listed
Bay-breasted Warbler	*Dendroica castanea*	**Sensitive**	Not listed
Belted Kingfisher	*Megaceryle alcyon*	Secure	Not listed
Black-backed Woodpecker	*Picoides arcticus*	**Sensitive**	Not listed
Black-throated Green Warbler	*Dendroica virens*	**Sensitive**	Not listed
Blue Jay	*Cyanocitta cristata*	Secure	Not listed
Bohemian Waxwing	*Bombycilla garrulus*	Secure	Not listed
Boreal Chickadee	*Poecile hudsonicus*	Secure	Not listed
Brown Creeper	*Certhia americana*	**Sensitive**	Not listed
Brown-headed Cowbird	*Molothrus ater*	Secure	Not listed
Canada Goose	*Branta canadensis*	Secure	Not listed
Cedar Waxwing	*Bombycilla cedrorum*	Secure	Not listed
Chipping Sparrow	*Spizella passerina*	Secure	Not listed
Clay-colored Sparrow	*Spizella pallida*	Secure	Not listed
Common Goldeneye	*Bucephala clangula*	Secure	Not listed
Common Merganser	*Mergus merganser*	Secure	Not listed
Common Raven	*Corvus corax*	Secure	Not listed
Common Redpoll	*Acanthis flammea*	Secure	Not listed
Common Yellowthroat	*Geothlypis trichas*	**Sensitive**	Not listed
Cooper's Hawk	*Accipityer cooperii*	Secure	Not at Risk
Dark-eyed Junco	*Junco hyemalis*	Secure	Not at Risk
Downy Woodpecker	*Dryobates pubescens*	Secure	Not listed
Eastern Kingbird	*Tyrannus tyrannus*	**Sensitive**	Not listed
European Starling	*Sturnus vulgaris*	Exotic/Alien	Not listed
Evening Grosbeak	*Coccothraustes vespertinus*	Secure	**Special Concern**
Feral Pigeon	*Columba livia domestica*	Exotic/Alien	Not listed
Great Horned Owl	*Bubo virginianus*	Secure	Not listed
Green-winged Teal	*Anas crecca*	Secure	Not listed
Hairy Woodpecker	*Dryobates villosus*	Secure	Not listed
House Finch	*Carpodacus mexicanus*	Secure	Not listed
House Sparrow	*Passer domesticus*	Exotic/Alien	Not listed
House Wren	*Troglydytes aedon*	Secure	Not listed
Killdeer	*Charadrius vociferus*	Secure	Not listed
Least Flycatcher	*Empidonax minimus*	Secure	Not listed
Lincoln's Sparrow	*Melospiza lincolnii*	Secure	Not listed
Magnolia Warbler	*Dendroica magnolia*	Secure	Not listed
Mallard	*Anas platyrhynchos*	Secure	Not listed
Merlin	*Falco columbarius*	Secure	Not at Risk

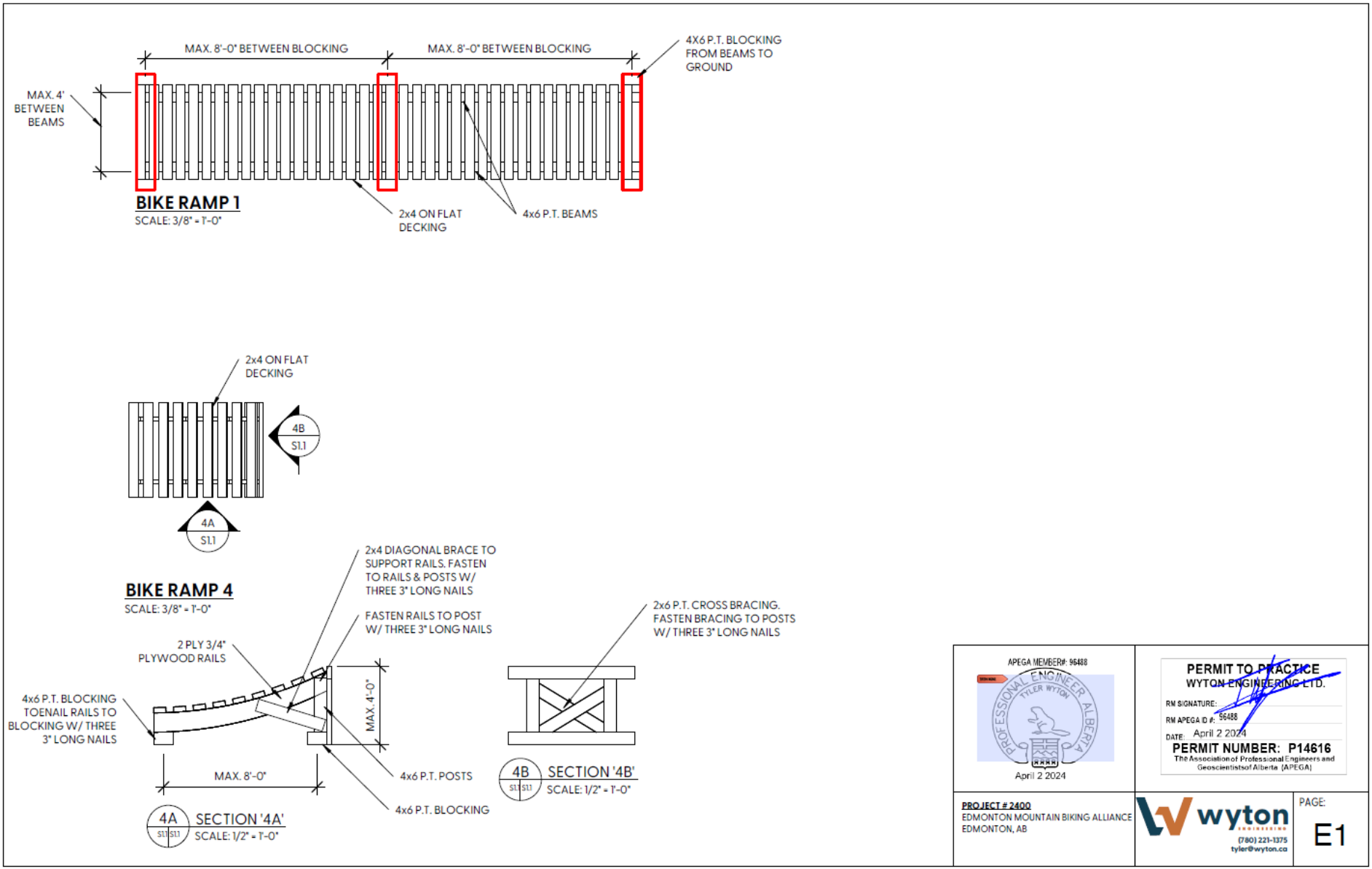
Continued…

Table D- 3 continued. List of wildlife observed in or near the Area of Interest, as reported by eBird, iNaturalist, and FWMIS.

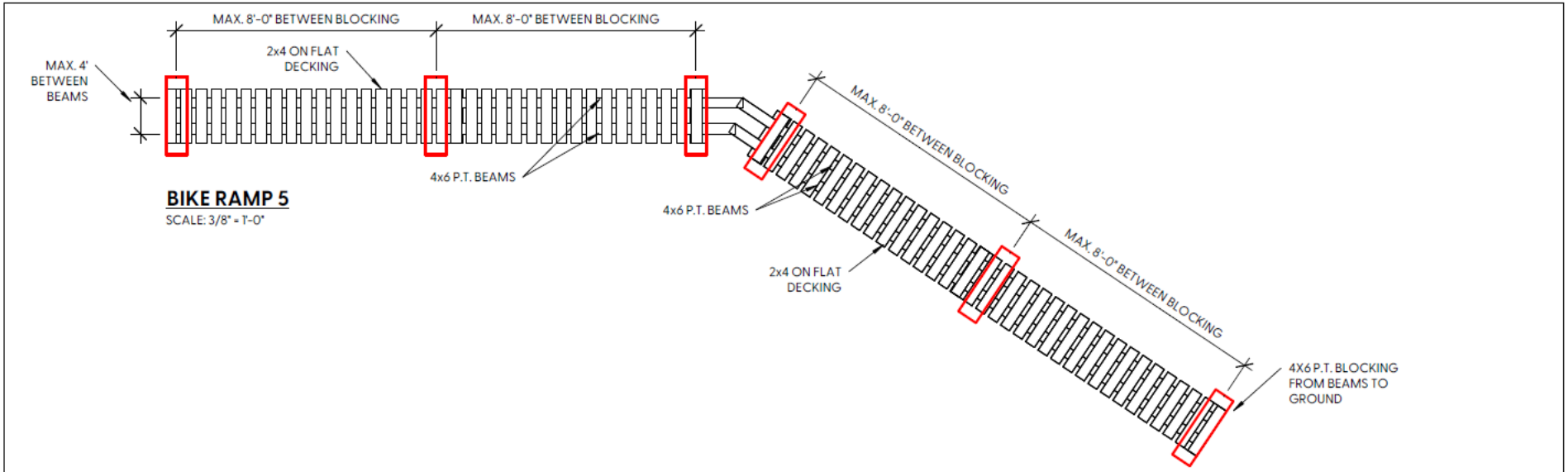
Common Name	Scientific Name	Provincial Status	Federal Status
Birds			
Mourning Warbler	*Oporornis philadelphia*	Secure	Not listed
Myrtle Warbler	*Dendrocia coronata coronata*	Secure	Not listed
Nashville Warbler	*Leiothlypis s ruficapilla*	Secure	Not listed
Northern Flicker	*Colaptes auratus*	Secure	Not listed
Northern Saw-whet Owl	*Aegolius acadicus*	Secure	Not listed
Northern Yellow-shafted Flicker	*Colaptes auratus luteus*	Secure	Not listed
Olive-sided Flycatcher	*Contopus cooperi*	**May Be at Risk**	**Special Concern**
Orange-crowned Warbler	*Vemivora celata*	Secure	Not listed
Osprey	*Pandion haliaetus*	Secure	Not listed
Ovenbird	*Seiurus aurocapilla*	Secure	Not listed
Pileated Woodpecker	*Dryocorpus pileatus*	**Sensitive**	Not listed
Pine Grosbeak	*Pinicola enucleator*	Secure	Not listed
Pine Siskin	*Spinus pinus*	Secure	Not listed
Purple Finch	*Carpodacus purpureus*	Secure	Not listed
Red-breasted Nuthatch	*Sitta canadensis*	Secure	Not listed
Red-eyed Vireo	*Vireo olivaceus*	Secure	Not listed
Red-tailed Hawk	*Buteo jamaicensis*	Secure	Not at Risk
Ring-necked Duck	*Aythya collaris*	Secure	Not at Risk
Rock Pigeon	*Columba livia*	Exotic/Alien	Not listed
Ruby-crowned Kinglet	*Regulus calendula*	Secure	Not listed
Ruby-throated Hummingbird	*Archilochus colubris*	Secure	Not listed
Savannah Sparrow	*Passerculus sandwichensis*	Secure	Not listed
Sharp-shinned Hawk	*Accipiter striatus*	Secure	Not at Risk
Slate-coloured Junco	*Junco hyemalis hyemalis*	Secure	Not listed
Solitary Sandpiper	*Tringa solitaria*	Secure	Not listed
Swainson's Hawk	*Buteo swainsoni*	Secure	Not listed
Song Sparrow	*Melospiza melodia*	Secure	Not listed
Spotted Sandpiper	*Actitis macularius*	Secure	Not listed
Swainson's Thrush	*Catharus ustulatus*	Secure	Not listed
Tennessee Warbler	*Leiothlypis peregrina*	Secure	Not listed
Warbling Vireo	*Vireo gilvus*	Secure	Not listed
Western Tanager	*Piranga ludoviciana*	**Sensitive**	Not listed
Western Wood-Pewee	*Contopus sordidulus*	**May Be at Risk**	Not listed
White-breasted Nuthatch	*Sitta carolinensis*	Secure	Not listed
White-crowned Sparrow	*Zonotrichia leucophrys*	Secure	Not listed
White-throated Sparrow	*Zonotrichia albicollis*	Secure	Not listed
White-winged Crossbill	*Loxua leucoptera*	Secure	Not listed
Wilson's Warbler	*Wilsonia pusilla*	Secure	Not listed
Wood Duck	*Aix sponsa*	Secure	Not listed
Yellow Warbler	*Dendroica petechia*	Secure	Not listed
Yellow-bellied Sapsucker	*Sphyrapicus varius*	Secure	Not listed
Yellow-rumped Warbler	*Dendroica coronata*	Secure	Not listed
Mammals			
White-tailed Jackrabbit	*Lepus townsendii*	Secure	Not listed
North American Porcupine	*Erethizon dorsatum*	Secure	Not listed
American Red Squirrel	*Tamiasciurus hudsonicus*	Secure	Not listed
Coyote	*Canis latrans*	Secure	Not listed
Snowshoe Hare	*Lepus americanus*	Secure	Not listed
Meadow Vole	*Microtus pennsylvanicus*	Secure	Not listed
Mule Deer	*Odocoileus hemionus*	Secure	Not listed
Canadian Beaver	*Castor canadensis*	Secure	Not listed
Muskrat	*Ondatra zibethicus*	Secure	Not listed
Least Chipmunk	*Neotamias minimus*	Secure	Not listed
Reptiles			
Red-sided Garter Snake	*Thamnophis sirtalis parietalis*	Secure	Not listed

Appendix E: Additional Documentation

Timber Feature Designs



Timber Feature Designs cont.



APEGA MEMBER#: 96488

April 2 2024

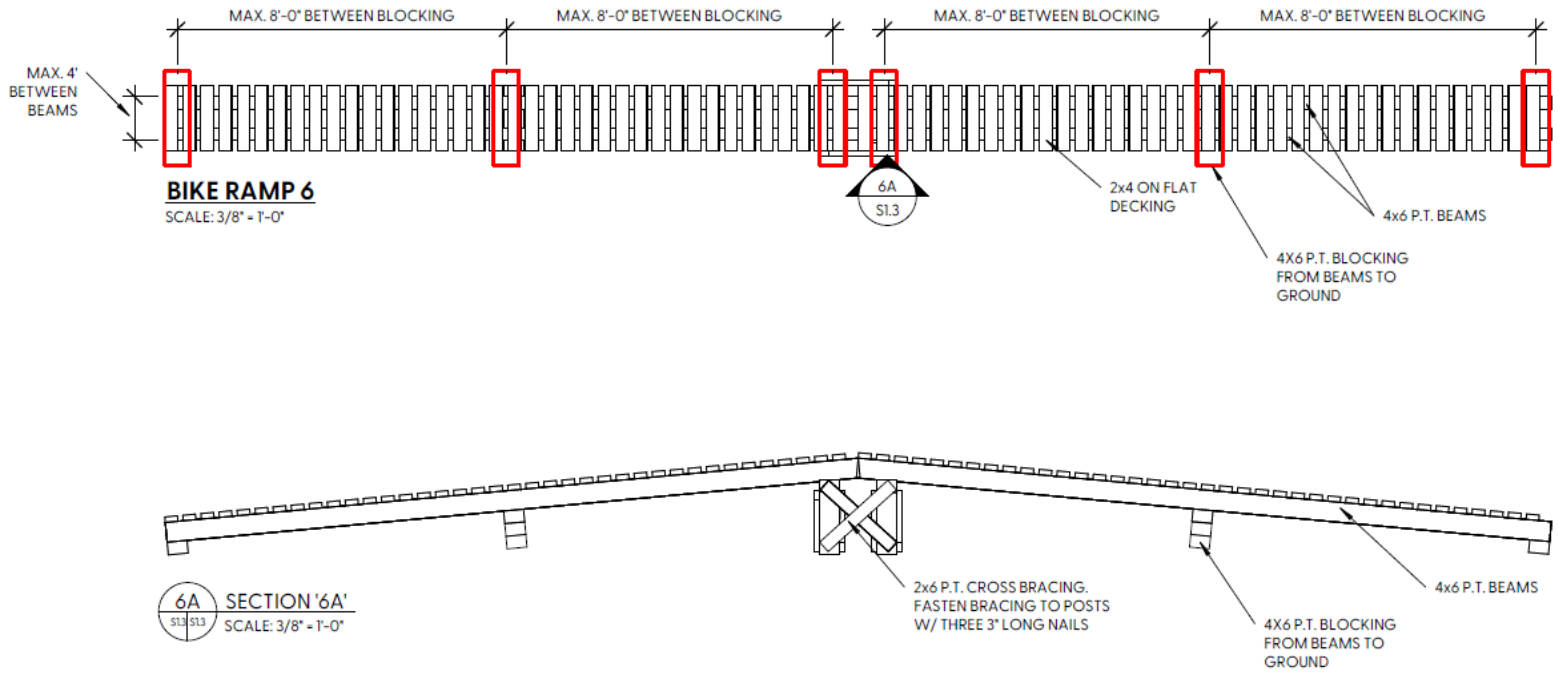
PERMIT TO PRACTICE
WYTON ENGINEERING LTD.
RM SIGNATURE:
RM APEGA ID #: 96488
DATE: April 2 2024
PERMIT NUMBER: P14616
The Association of Professional Engineers and Geoscientistsof Alberta (APEGA)

PROJECT # 2400
EDMONTON MOUNTAIN BIKING ALLIANCE
EDMONTON, AB

wyton ENGINEERING
(780) 221-1375
tyler@wyton.ca

PAGE: E2

Timber Feature Designs cont.



APEGA MEMBER#: 96488
PROFESSIONAL ENGINEER ALBERTA
April 2 2024

PERMIT TO PRACTICE
WYTON ENGINEERING LTD.
RM SIGNATURE:
RM APEGA ID #: 96488
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(780) 221-1375
tyler@wyton.ca

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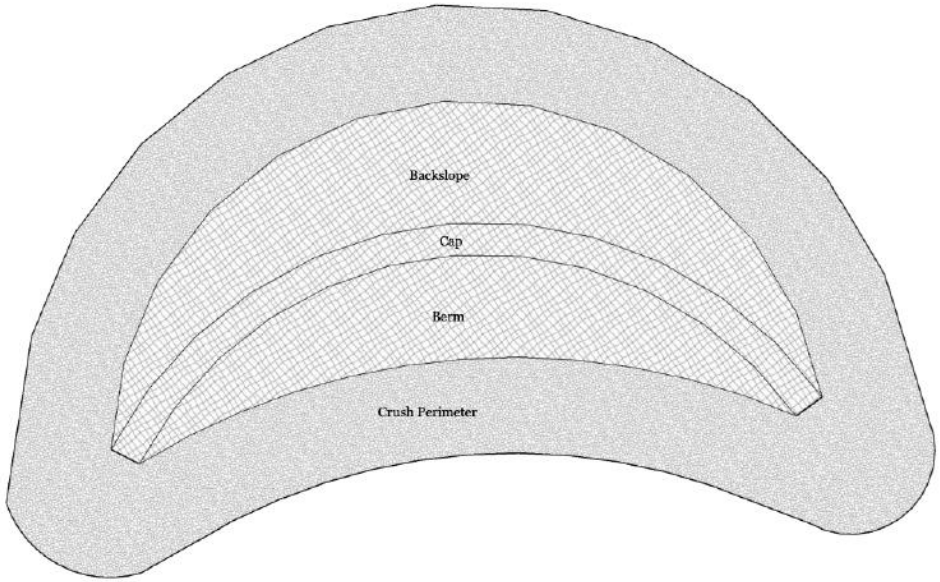
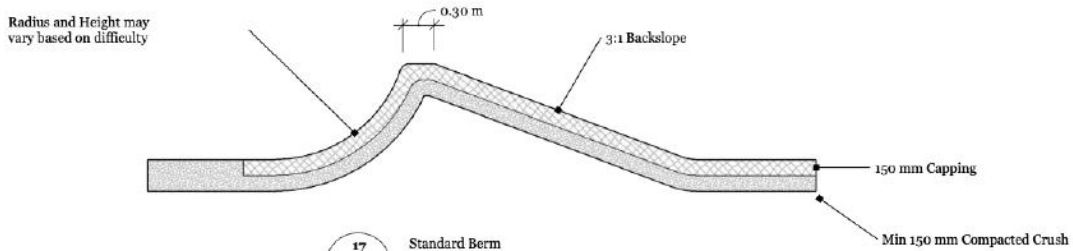
Berm Designs



17 / A13 Standard Berm
Plan View



17 / A13 Standard Berm
Elevation View

Design Package By

ArtHouse RESIDENTIAL

780 298 2431
Jsoneff@edmbikepark.ca

Project

EDMONTON BIKE PARK

Jump Park Design By

CABIN

Cabin Resource Management Ltd
20A - 100 Kalamalka Lake Rd
Vernon, BC
V1T 9G1
Tel: 250 475 3655

Construction Managment & Consulting by

PEAKPLAY

780-475-2669 | info@peakplay.ca

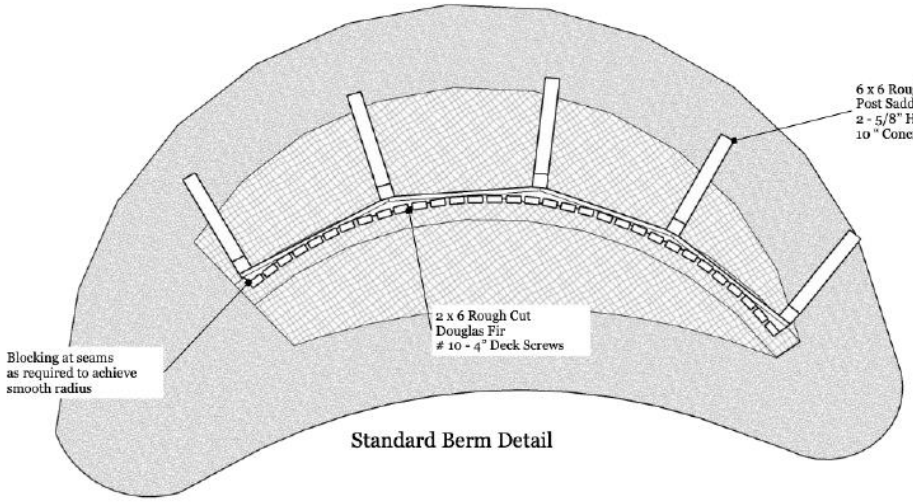
Description

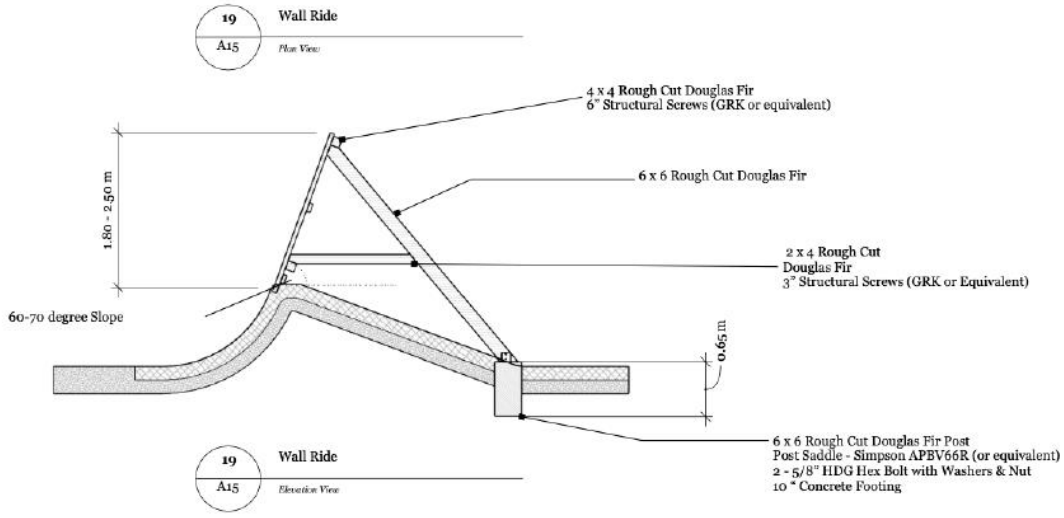
Berm detail may be used throughout the park

Page

JP 14

Berm Designs cont.





Design Package By

ArtHouse RESIDENTIAL

780 298 2431
Jsoneff@edmbikepark.ca

Project

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Tel: 250 475 3655

Construction Managment & Consulting by

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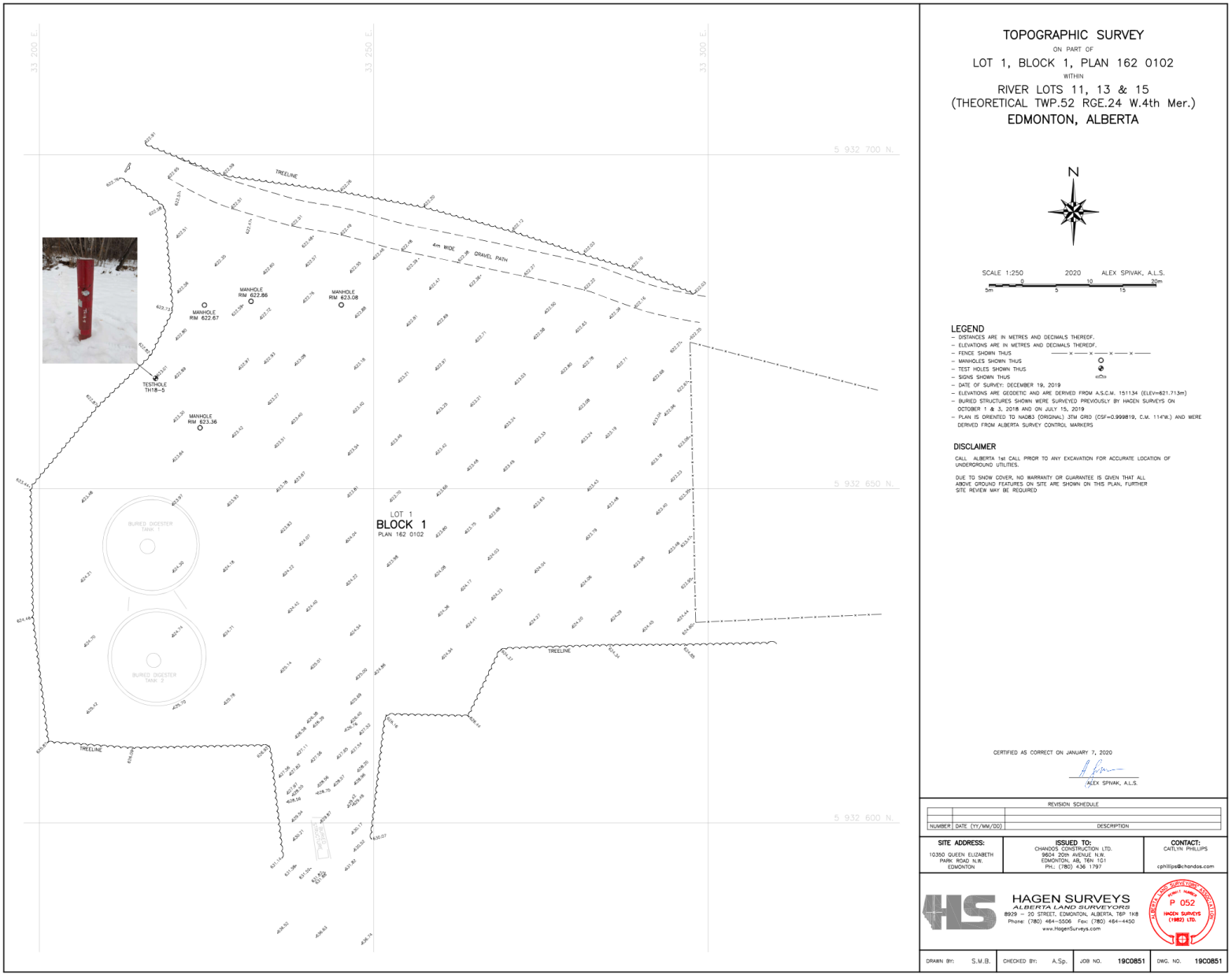
Description

Berm detail may be used throughout the park

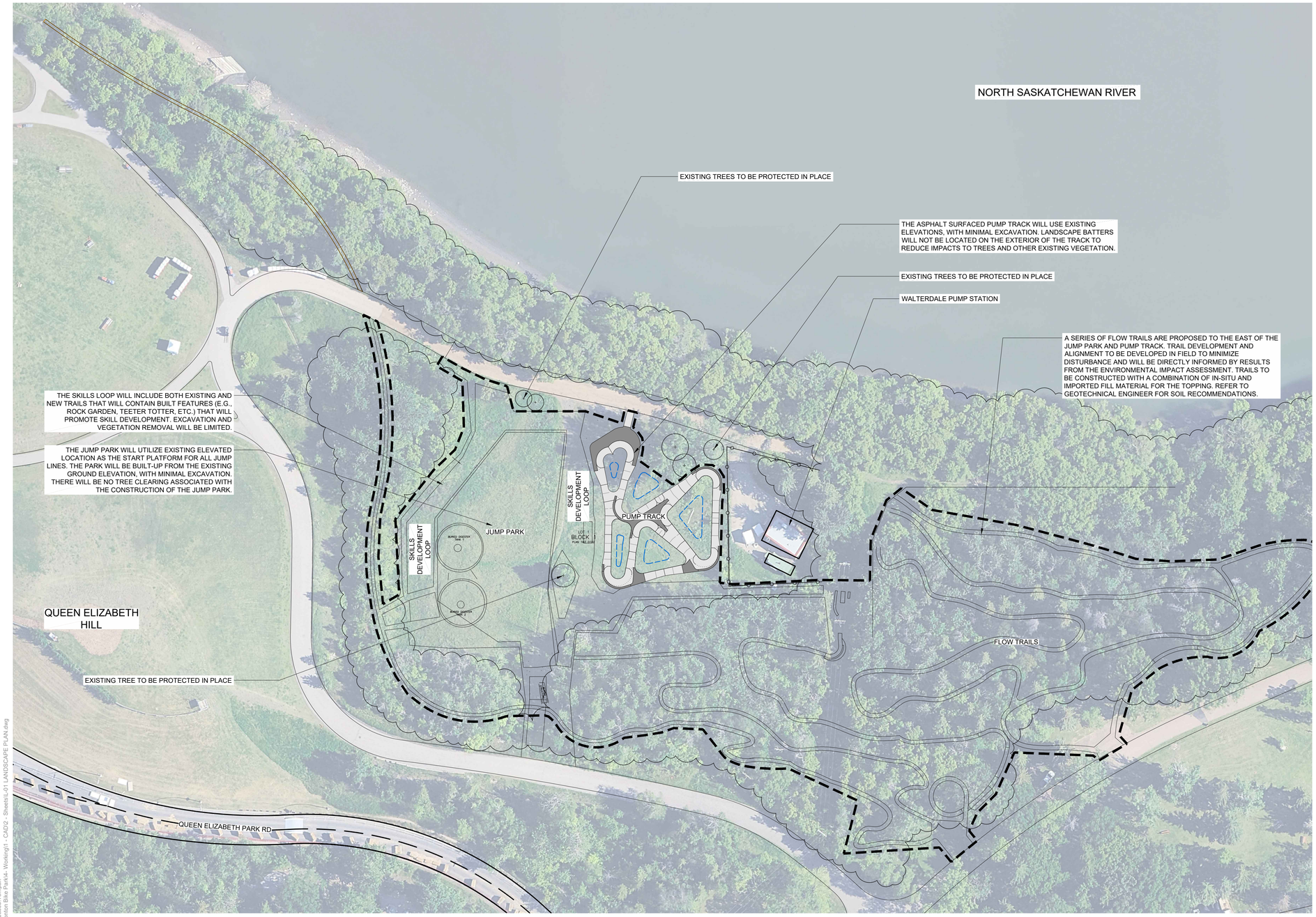
Page

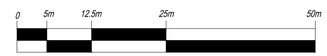
JP 16

Topographic Survey



Grading/Drainage Plan & Landscape Plan





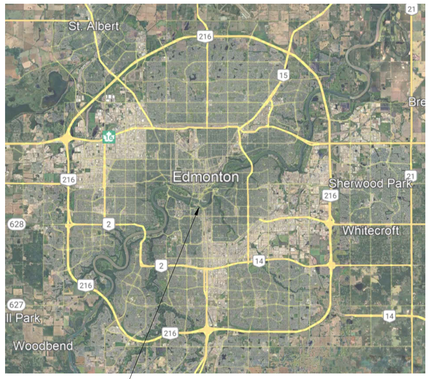
SCALE: 1:500

PROJECT CONTACTS

LANDSCAPE ARCHITECT: O2
PROJECT MANAGER: Myles Carbert
1.403.837.1977
myles.carbert@o2design.com

CLIENT: ArtHouse Residential
PROJECT MANAGER: Jesse Soneff

CITY OF EDMONTON CONTEXT



LEGEND

- PROJECT BOUNDARY
- EXISTING TREE CANOPY
- PROPOSED RAIN GARDEN - REFER TO L-02 FOR SECTION DETAIL

NOTES:

1. DISTURBANCE AREAS AND RAIN GARDENS TO BE PLANTED WITH ECOLOGIC NATURES TURF (GRASSLAND BLEND, MIXED GRASSLAND BLEND, & RIPARIAN BLEND USED ACROSS THE SITE ON MINIMUM 300mm DEPTH TOPSOIL)

O2

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

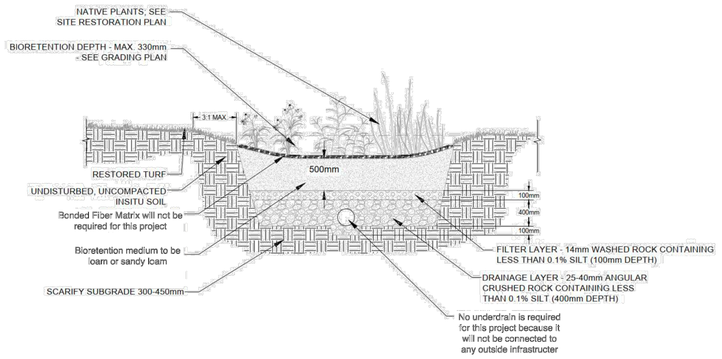
No.	Date Issued	Description
02	2025-05-16	ISSUED FOR REVIEW
01	2025-04-25	ISSUED FOR DEVELOPMENT PERMIT

Design XX Drawn XX Check XX

Scale: AS SHOWN
Seal
DP No.: DP-XXXX-XXXX
Approval
Project Name: ArtHouse Residential Edmonton Bike Park
Project No.: 250319

NOT YET APPROVED

Drawing Name: **Landscape Plan**
Drawing No.: **L-01**
Sheet Size ANSI D



RAIN GARDEN SECTION

LEGEND

- ▲ RAIN GARDEN - REFER TO SECTION DETAIL

SITE

- PROJECT BOUNDARY
- EXISTING TREE CANOPY
- XXX.XX — EXISTING SPOT ELEVATION
- SLOPE — SLOPE DIRECTION

NOTES:

1. SITE TO UTILIZE EXISTING DRAINAGE PATTERNS
2. SITE TO BE CONSTRUCTED WITH PERVIOUS MATERIALS WITH THE EXCEPTION OF THE ASPHALT PUMP TRACK.
3. LOCALIZED DRAINAGE INTERVENTIONS LIKE DRY WELLS AND FRENCH DRAINS TO BE UTILIZED TO CONTROL DRAINAGE AROUND THE PUMP TRACK
4. REFER TO ENVIRONMENTAL IMPACT ASSESSMENT FOR EROSION SEDIMENT CONTROL PLAN

0 5m 12.5m 25m 50m

SCALE: 1:500

02

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Date Issued	Description
02	2025-05-16	ISSUED FOR REVIEW
01	2025-04-25	ISSUED FOR DEVELOPMENT PERMIT

Design XX Drawn XX Check XX

Scale AS SHOWN

Seal

DP No. DP-XXXX-XXXX

Approval **NOT YET APPROVED**

Project Name ArtHouse Residential Edmonton Bike Park

Project No. 250319

Drawing Name **Drainage Plan**

Drawing No. **L-02**

Sheet Size ANSI D

Appendix F: Erosion and Sediment Control Plan

EDMONTON MOUNTAIN BIKE ALLIANCE SKILLS PARK

CONSTRUCTION SEDIMENT AND EROSION CONTROL PLAN

PREPARED BY:
Owen Marshall, MSc. BIT, BC-CESCL
Junior Biologist
Cabin Operations Ltd.
&
Linden Priest, RPF
Recreation Planner
Cabin Operations Ltd.

PREPARED FOR:
Jesse Soneff
Edmonton Bike Park Alliance

Cabin Operations LTD
Unit 2 – 3304 Appaloosa Road
Kelowna, BC, V1V 2W5
Office: 778-475-3655
Fax: n/a

CABIN

UNIT 2 – 3304 APPALOOSA ROAD
KELOWNA, BC, V1V2W5
778-475-3655

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778-475-3655

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KELOWNA, BC, V1V2W5
778-475-3655

Project Disclaimer

Environmental information including biological resources, timing windows, monitoring details, and environmental mitigations are specific to the project as it is defined in the text of this report. This management plan is not intended for use on other projects/activities not detailed in this document. The information provided in this report was prepared to the best of the Qualified Environmental Professional's knowledge and expertise. However, data collection, including field observations and historical information reviewed, may be subject to any of the following limitations:

- Availability and accuracy of environmental information relevant to the project location
- Resources required to screen for all potential wildlife and natural resources which may be affected throughout the project
- Project timing
- Climatic or topographical constraints
- Updates to current best management practices
- Changes/amendments to federal, provincial, or municipal legislation

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Background Information

Cabin Operations was retained by the Edmonton Bike Park Association to provide conceptual designs along with the preparation of a Sediment and Erosion Control Plan for a bike park construction project in Edmonton, Alberta. The bike park is to be located in Queen Elizabeth Park within the footprint of a decommissioned wastewater treatment facility, between Queen Elizebeth Park Road and the North Saskatchewan River and will consist of four key areas: Jump Track, Pump Track, Flow Trail, and Skills Area and Features (Figure 1). An Environmental Impact Assessment was completed independently by FIERA Biological Consulting for the Edmonton Mountain Bike Alliance in April 2025.

The scope of the Construction Sediment and Erosion Control Plan is to proactively manage water, erosion, and sedimentation during the construction phases of the bike park beginning in July 2025. Addressed in this report is the Site Overview in regard to topography and runoff, strategies for managing runoff, erosion, and sedimentation, and Best Management Practices for runoff, erosion, and sedimentation control measures.

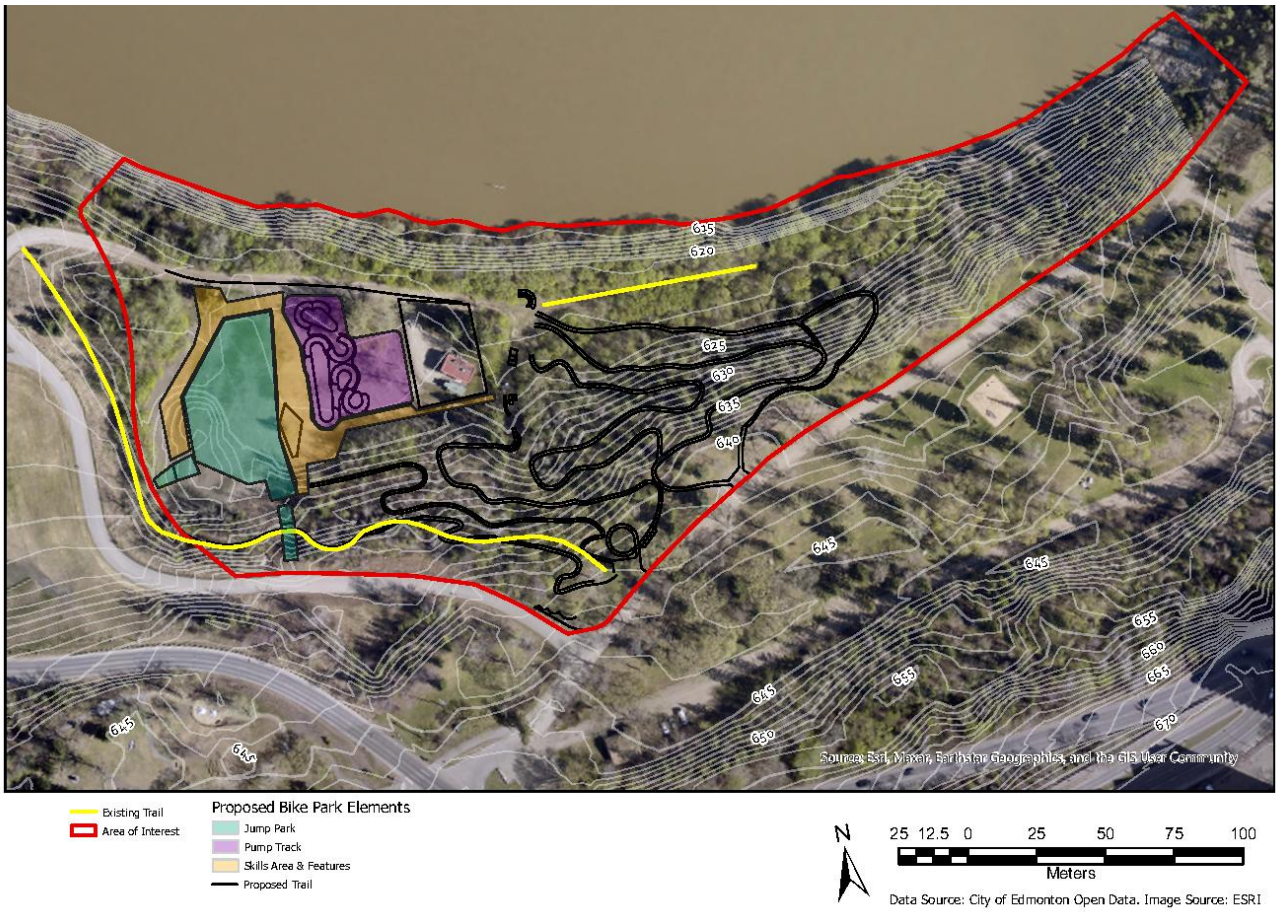

Figure 1. Conceptual design of the Edmonton Bike Park and proposed trails

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Site Details

The site of construction is on a north aspect slope, with stormwater runoff being directed towards the Saskatchewan River. There is a vegetation barrier, dirt road and culvert, and further vegetation buffering between the site and the Saskatchewan River, making it unlikely that surface water runoff would directly reach/impact the Saskatchewan River. Historical imagery showed structures on the site from 2004-2018 indicating that the subgrade may be compact and impermeable from having buildings on top, leading to poor ground absorption of precipitation and increased risk of runoff. As seen in Figure 4 and Figure 5, the site is mostly flat and does not accurately follow the contour lines shown from in Figures 2, 3, or 9.

Figure 2. Image from 2004 of buildings on the site of the proposed Jump Track

Figure 3. Image from 2018 of buildings on the site of the proposed Jump Track

Figure 4. View of site from the proposed start platform on the top of the roll-in, facing north taken April, 2025.

Figure 5. View of the site from the bottom, facing south taken April, 2025.

Construction will begin with the stripping of surface organics and materials. First phase of stripping will be the removal of hazard trees and noxious weeds, followed by the stripping of topsoil. It is expected that a staging area for stockpiling stripped materials and imported materials will be required. Excavated or disturbed material within the work area must be graded to a stable angle of repose and sediment mobilization mitigation measures must be employed.

Stockpile areas will be located on the north end of the Jump Track as shown in Figure 6. Material will be transported by wheelbarrow or small rubber-tracked dump crawler to the flow track as needed from the stockpile. The disturbed area covers roughly half of the Area of Interest, with most of the disturbance being in the Jump Track, Pump Track, and Skills and Features areas.

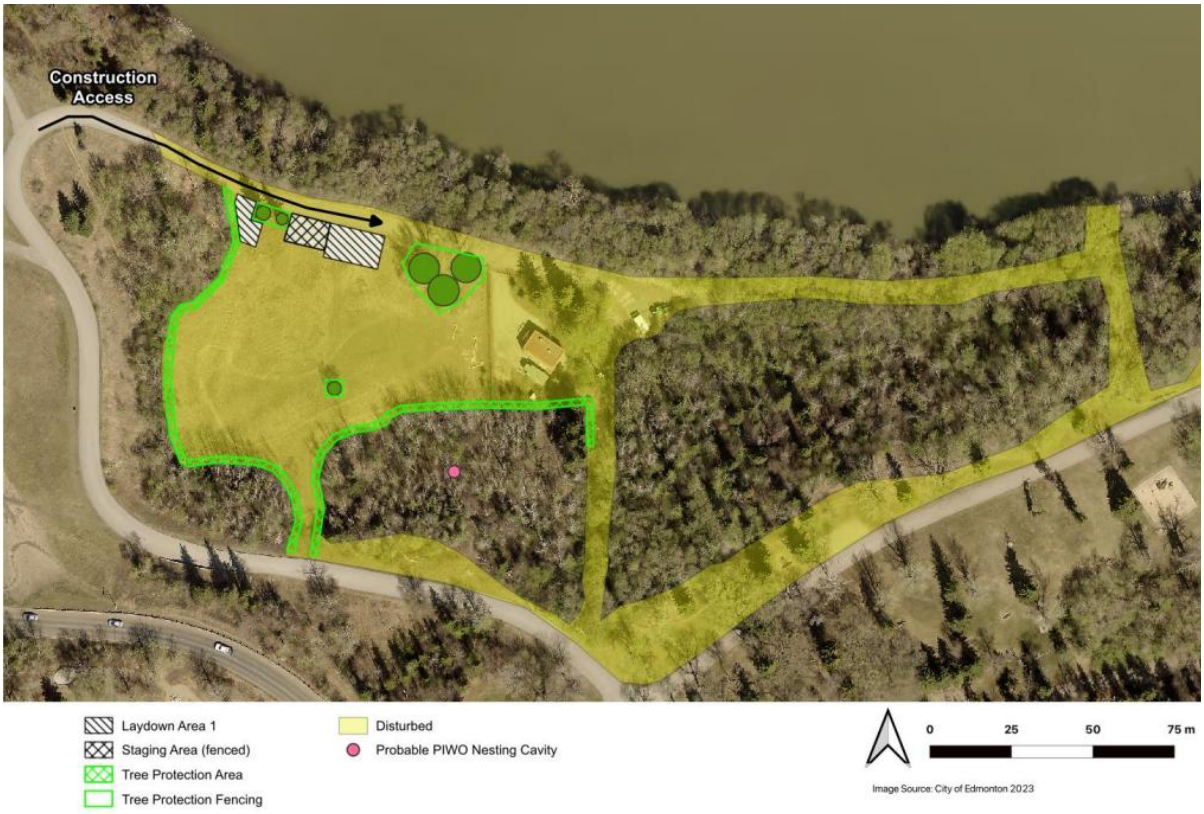

Figure 6. Laydown and staging areas for materials along with disturbed surfaces areas.

Water Sources and Topography

i) Groundwater

Testing shows the groundwater depths to be 8.9m and 9.0m below ground surface on separate occasions (Thurber 2018a and 2018b). Groundwater should not be reached and therefore potential impacts to groundwater quality will be negligible due to the elevation of the site and the excavation depth required for stripping materials.

ii) Water Diversions

No stream diversions or current stormwater infrastructure alteration will be required.

iii) Dust Control

Dust may occur during dry periods, wind events, machine work, or driving on unpaved roads. Dust control may require the use of water trucks to spray surfaces of unpaved roads, exposed soils, or uncovered stockpiles of materials, adding surface water and runoff to the site.

iv) Precipitation

Precipitation will be the main source of water leading to runoff, erosion, and sedimentation which requires management. Average monthly precipitation values represented in Figure 7 was referenced for the purpose of water management planning. It was noted that construction is set to begin in July, the month with the highest level of precipitation.

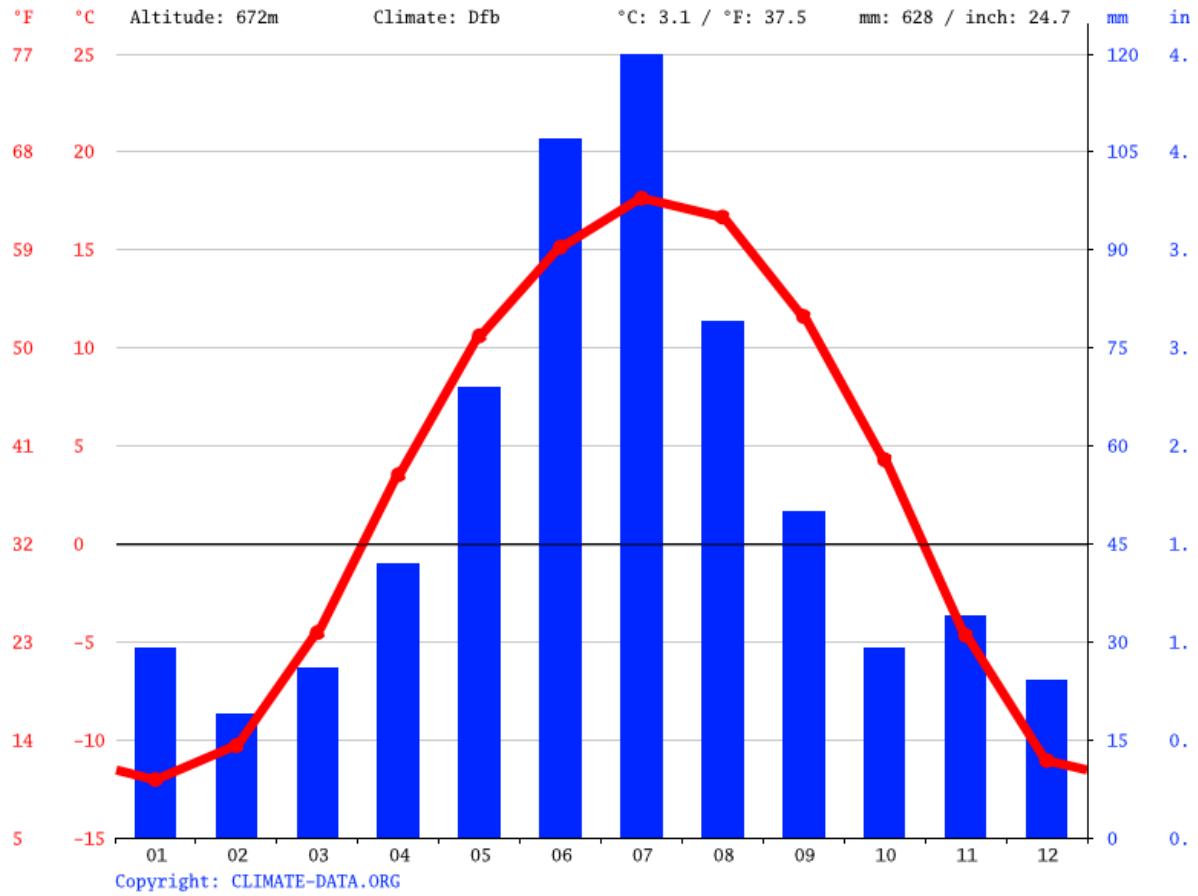

Figure 7. Average monthly precipitation and temperature in Edmonton

v) Topography

Topographical maps were referenced to estimate flow paths for runoff. Figure 7 shows a seepage pool in the Jump Track area, where historical images of the site show this to be a location for structure or building as seen in Figures 2 and 3. During construction, surface water will flow north-northwest following the general slope of the site for the Jump Track construction area. Figure 9 shows the water in the Jump Track area may pool and percolate into the ground, in the footprint of the historic building. Surface water is shown to collect

in channels in the Flow Track and flow north, indicating drainage options should be considered for the maintenance of the trails.

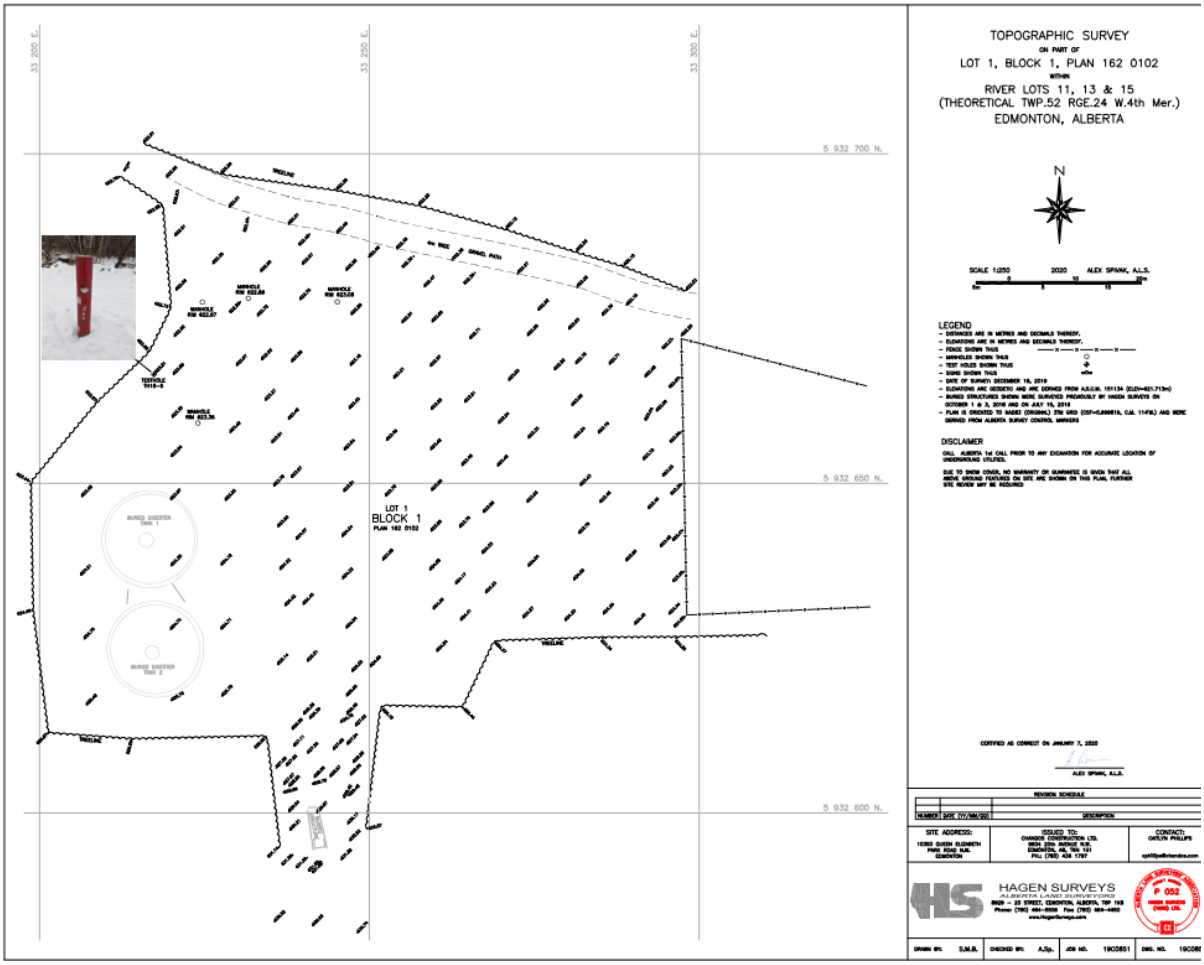

Figure 8. Topographic survey of the bike park site showing buried structures.

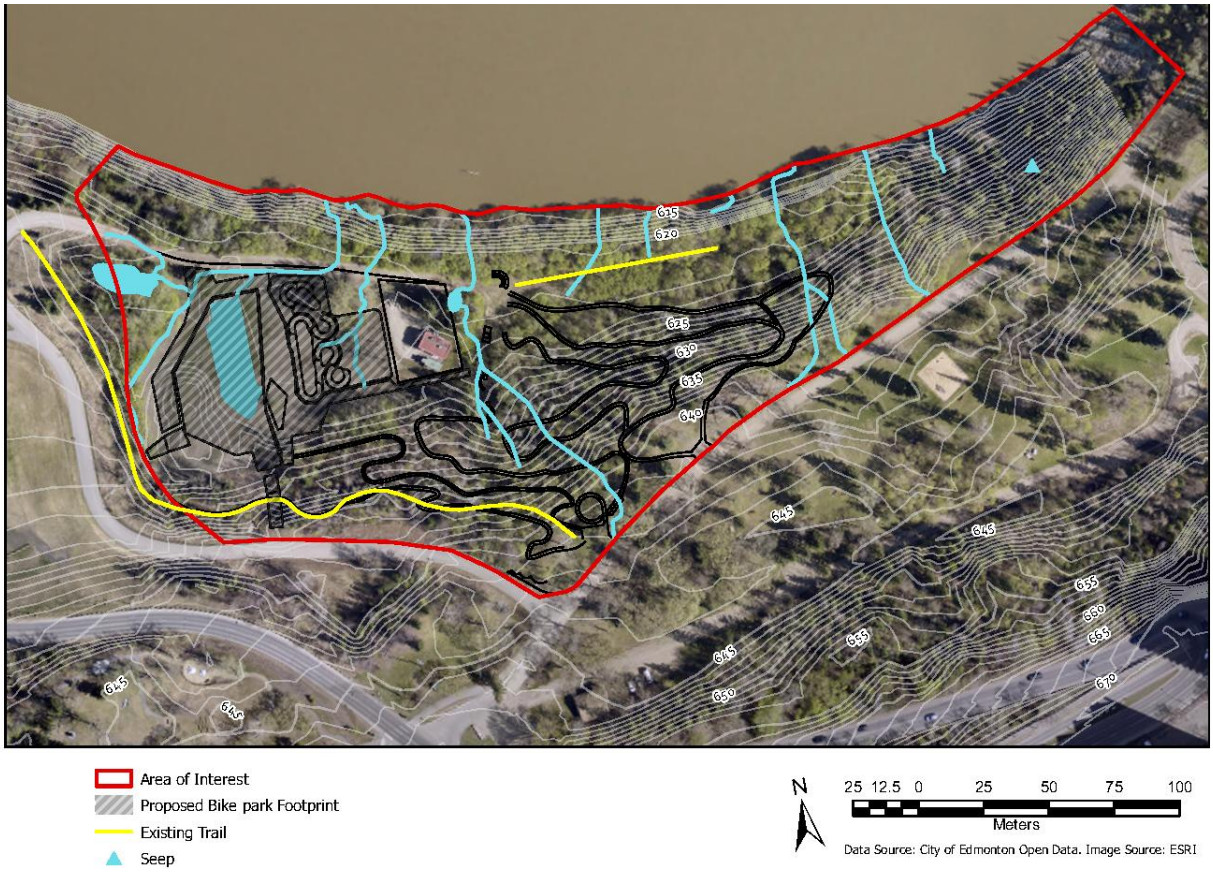

Figure 9. Topographic map of proposed bike park construction footprint depicting potential runoff routes, depressional areas, and seepage areas.

Runoff, Erosion, and Sediment Control

This plan addresses effective management of surface water and contact runoff during construction. Activities that have the potential to result in erosion at the project include vegetation clearing and topsoil stripping, excavation, grading and filling, stockpiling of topsoil, and construction of roads and infrastructure. Fill, excavated material, debris, or other erodible materials must be contained and placed at least thirty (30.0) metres outside of the bank of any stream and to an area where the material will not result in sediment run-off into a stream. Potential effects from the above activities in the absence of planned mitigation measures include increased surface erosion from disturbed and rehabilitated areas, increased sediment load entering the natural water system, and siltation or erosion of watercourses and water bodies.

Sediment mobilization and erosion can be minimized by limiting the extent of land disturbance, reducing water velocities across the ground using surface roughening, and re-contouring, particularly on exposed surfaces and in areas where water concentrates, progressively rehabilitating disturbed land and constructing drainage controls to improve stability of rehabilitated land, protecting natural drainages and watercourses by constructing appropriate sediment control devices such as collection and diversion ditches, sediment traps, in-channel rock energy dissipaters, and sediment basins restricting access to rehabilitated areas, and

constructing appropriate temporary "Best Management Practices" (BMPs) measures (e.g., silt fences, hay bales, waddles, etc.) downslope of disturbed sites (where more permanent sediment control measures are not appropriate, or in combination with more permanent measures).

Erosion and sedimentation control will consist of a combination of erosion control blankets and perimeter methods, such as silt fencing. Erosion control blankets will be used on exposed north-facing slopes associated with the jump park "launch" area adjacent to the paved path and at the exit of the flow trail. Perimeter controls will be installed adjacent to the natural areas to the west of the main area, as well as along the northern boundary of the Bike Park, adjacent to North Saskatchewan River. Soil stored and stockpiled in laydown areas will be covered at all times by waterproof coverings (e.g., tarpaulins) that will be secured in place. Other best management practices that will be applied include minimizing the length of time soils are left exposed to weathering elements, avoiding construction during extremely wet or rainy periods, and covering of all materials in laydown areas. If activities or works occur during periods of heavy or persistent precipitation, these must be halted if sedimentation from them poses a significant risk of harm to the stream, stream channel or aquatic environment. The first step towards controlling erosion and sedimentation during construction is the installation of temporary erosion and sediment control features or BMPs. All temporary sediment and erosion control features will require regular maintenance and inspection. These temporary features will be removed after achieving soil and sediment stabilization. If required during construction, further temporary erosion and sediment control measures will be implemented to protect from the release of sediments. These may include, but are not limited to; additional silt fencing, soil stabilization, and temporary drainage structures including catch ditching, water bars, and impoundments. All runoff, erosion, and sediment controls and BMPs will be field fit to maximize effectiveness.

Best Management Practices (BMPs)

i) Silt Fencing

Silt fencing is a perimeter control type BMP used to intercept sheet flow runoff and used in conjunction with other BMPs. Typical silt fencing comprises a geotextile fabric anchored to posts driven into the ground. Silt fencing promotes sediment control by filtering water that passes through the fabric and increases short term retention time, allowing suspended sediments to settle. Silt fences will be placed parallel to slope contours in order to maximize ponding efficiency. Barrier locations are informally chosen based on site features and conditions (e.g., soil types, terrain features, sensitive areas, etc.), design plans, existing and anticipated drainage courses, and other available erosion and sediment controls. Typical barrier sites are catch points beyond the toe of fill or on side slopes above waterways or drainage channels. Silt fences should not be used for wide low flow, low-velocity drainage ways, for concentrated flows, in continuous flow streams, for flow diversion, or as check dams. To ensure it is properly anchored, silt fencing will be installed in backfilled trenches. The perimeter around stockpiled materials will be controlled using silt fencing or straw bale barriers to prevent any runoff from leaving the laydown areas. Proper installation and frequent inspection and maintenance is required for effective silt fence use.

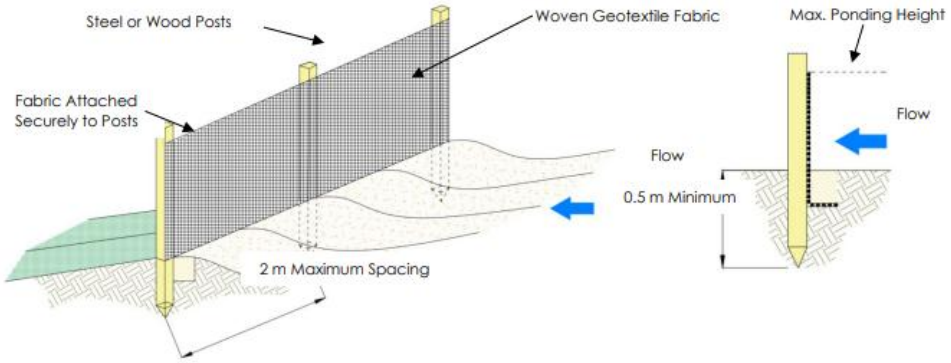

Figure 10. Silt fence installation

ii) Vegetation Management and Re-vegetation

Natural vegetation is one of the best and most cost-effective methods of reducing the potential for erosion and sedimentation. Vegetation keeps soil secure and ground cover reduces raindrop velocities. In order to preserve vegetation, a "no-entry" vegetation buffer will be maintained to prevent excess clearing, particularly around water bodies, prior to clearing vegetation from surrounding areas. Disturbance to existing vegetation on and adjacent to a stream or stream banks must be avoided. If preserving natural vegetation is not a viable option, cleared areas that will not include infrastructure will be re-vegetated as soon as practical after construction activities have ended. Any diverted flow is carried to a vegetated area or area (e.g., settling basin) where fine particulates and/or sediment can settle out before the water can be returned to the stream. Revegetation and rehabilitation after construction will be completed as soon as possible and will include replacing topsoil that was stripped in areas located outside the Bike Park footprint, hydroseeding of all disturbed earth surfaces to allow for rapid growth of native grasses, and re-vegetation as per LID/landscaping design plans.

iii) Temporary Sediment Traps and Sediment Basins

A sediment trap/basin is a temporary structure used to detain runoff from small drainage areas (generally less than 2 hectares (ha)) to allow sediment to settle out. Sediment traps/basins are generally used for relatively small drainage areas and will be located in areas where access can be maintained for sediment removal and proper disposal. A sediment trap/basin can be created by excavating a basin, utilizing an existing depression such as the one present in the Jump Track location, or constructing a small dam on a slight slope downward from the work area. Contact runoff from the disturbed site is conveyed to the trap/basin via ditches, slope drains, or diversion dikes. Ditches, water bars, or water diversions in the work area must be constructed so they do not directly discharge sediment-laden surface run-off into the stream unless the discharge is authorized (e.g., waste discharge permit). The trap/basin is a temporary measure, with a nominal design life of approximately six months, and is to be maintained until the site is permanently protected against erosion by vegetation and/or structures. Temporary sediment traps and sediment basins will be constructed at the end of collection ditches to detain sediment-laden runoff long enough to allow the majority of the sediment to settle out.

iv) Best Management Practices (BMPs) Summary

Best Management Practices for temporary runoff, erosion, and sedimentation controls are summarized in Tables 1 , 2, 3, and 4.

Good Housekeeping Measures (Section 5.7) [Apply to all Projects Including Single Residential Lots]	Erosion Control BMPs (Section 5.8) [First Line of Defense Against Erosion And Sedimentation]	Transport Control BMPs (Section 5.9) [Control The Direction, Volume And Velocity Of Stormwater]	Sedimentation Control BMPs (Section 5.10) [Last Line Of Defense Against Erosion And Sedimentation]
Place **stockpiles** away from sensitive areas, and stabilize stockpiles from erosion	**Maintain vegetation:** minimizes erosion, provides filtration	**Grassed channels/swales:** convey runoff and are often used with erosion control measures (ECB, etc.) Limited drainage area and grade	**Sediment basins:** used to trap sediment on disturbed areas
Limit **site access**	**Construction sequencing:** conduct clearing, stripping and grading in stages as needed	**Buffer strips:** used around construction site perimeters, above steep slopes and around protected areas. Not suitable for concentrated flow	**Sediment traps:** detain sediment laden runoff Limited drainage areas
Protect **catch basins** and manholes from sediment	**Slope treatments:** horizontal depressions that are created on a slope to help establish vegetation, reduce runoff and increase infiltration	**Silt fences:** are a sediment or transport control measure not an erosion control measure. Suitable for short slopes and low flow areas. Are often used inappropriately	**Sediment barriers:** trap sediment from sheet flow runoff Limited drainage areas
Remove **accumulated sediment** and debris	**Mulching/hydromulching:** protect exposed soils from raindrop impact and increase infiltration Mulching should not be used on slopes steeper than 3H:1V or in concentrated water flow Hydromulching is preferred on steeper slopes	**Geosynthetic matting:** used in channels where flow velocity may damage natural vegetation Includes **Turf Reinforcement Mats (TRM)** and **Erosion Control Revegetation Mats (ECRM)**	**Floatation Silt Curtains:** used on open, deep water to keep sediment out of the water body Can be used for shore and bank construction, and at a discharge point
	Erosion control netting (ECN): stabilizes soil and provides protection from precipitation in moderate site conditions	**Fibre rolls:** used to reduce velocities, allow water to filter through and trap sediment Are biodegradable Designed for small areas, low flows, short slopes	**Inlet protection measures:** considered the last line of defense Consists of a permeable barrier around an inlet to reduce sediment into the water body Includes drop inlet sediment barriers and catch basin inlet barriers
	Dust control: important in windy and high traffic areas. Soil binders can be used on haul roads, stockpiles and exposed slopes	**Rock/brush filters:** temporary measures to filter sediment out of runoff Used along streams, channels and toe of slopes	**Dewatering:** may be necessary after heavy precipitation events or due to site conditions (high groundwater table, etc.)
		Energy dissipaters: used as erosion/velocity control measure for outlet protection (pipes, culverts, channels) or flash floods/ intensive flows	**Silt fences:** are a sediment or transport control measure not an erosion control measure. Suitable for short slopes and low flow areas. Are often used inappropriately

Table 1. General housekeeping, erosion, transport, and sedimentation control best management practices.

Site Feature	Runoff Control BMPs								
	Surface Texturing	Slope Drains	Fibre Rolls & Wattles	Check Dams	Diversion Ditch	Energy Dissipator	Vegetated Soil Wrap	Ditch Blocks	Asphalt Berms
Slopes	✓	✓	✓		✓	✓			
Natural Channels							✓	✓	
Drainage Channel			✓	✓	✓	✓		✓	
Pipes and Culverts		✓				✓		✓	
Large Flat Surfaces	✓				✓				✓
Borrow/Stockpiles	✓				✓				
Adjacent Properties	✓				✓				✓
BMP	1	2	3	4	5	6	7	8	9

Table 2. Runoff Control Best Management Practices

Site Feature	Erosion Control BMPs										
	Topsoil	Seeding	Mulching	Sodding	Vegetated Riprap Armouring	Live Staking and Brush Layering	Riprap or Rock Cover	Stabilized Entrances	Rolled Erosion Control Products	Cellular Confinement System	Impermeable Sheeting
Slopes	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Natural Channels					✓	✓	✓			✓	✓
Drainage Channel	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Pipes and Culverts				✓			✓				
Large Flat Surfaces	✓	✓	✓	✓	✓						✓
Borrow & Stockpiles	✓	✓	✓	✓	✓	✓			✓	✓	✓
Adjacent Properties	✓	✓	✓	✓	✓			✓			
BMP	10	11	12	13	14	15	16	17	18	19	20

Table 3. Erosion Control Best Management Practices

Site Feature	Sediment Control BMPs								
	Vegetated Buffer Strip	*Synthetic Permeable Barriers*	*Fibre Rolls or Wattles*	*Sediment Fence*	*Brush Berm/Earth Dyke*	*Drain Inlet Sediment Barrier*	*Check Dams*	*Sediment Control Pond*	*Pump Outlet Filter Bag*
Slopes	✓	✓	✓	✓	✓				
Natural Channels	✓				✓				
Drainage Channel	✓	✓	✓				✓	✓	✓
Pipes and Culverts	✓			✓		✓			
Large Flat Surfaces					✓				
Borrow and Stockpiles				✓					
Adjacent Properties	✓			✓	✓	✓			
BMP	21	22	3	23	24	25	4	26	27

Table 4. Sediment Control Best Management Practices

Monitoring and Maintenance

Regular monitoring and maintenance of sediment and erosion control measures are required for their continued function throughout the construction process. Temporary perimeter controls are installed prior to any construction activities and removed once all work is completed and soil and sediment stability is achieved. Maintenance may involve removing sediment from silt fences once sediment reaches one third the height of the fence, removing sediment from catch basins once they are one third full, re-staking down tarps or erosion blankets and watering re-vegetated areas to promote establishment. All sediment and erosion controls and BMPs are to be inspected weekly, and after heavy rain or wind events.

UNIT 2 – 3304 APPALOOSA ROAD
KELOWNA, BC, V1V2W5
778-475-3655

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