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Township of Uxbridge
June 28, 2016

**Alexander Budrevics and Associates Ltd.
Masonsong Associates Engineering Ltd.**

FIELDS OF UXBRIDGE DEVELOPMENT AND SERVICING PLAN

FIELDS OF UXBRIDGE
Uxbridge, Ontario
Project #: 3039



June 06, 2016

Mr. Bob Ferguson
Facilities Manager - Township of Uxbridge
291 Brock Street West, Uxbridge, Ontario

Re: Fields of Uxbridge Development Plan

Dear Mr Ferguson:

We are pleased to present this report which describes the proposed Development and Servicing Plan for Fields of Uxbridge Park. The design of the park has been advanced from the master plan prepared in 2010. We believe that it meets community needs and is a practical guide for detail design leading to phased construction of this important recreational infrastructure.

We appreciate that this project will be developed as financial resources permit and that some of the work will be initiated by community groups and sponsors. The plan provides a framework so that the various components can proceed somewhat independently.

The main road construction, parking lots and the extension of services are high priorities. The development of the park centre and washroom building is also a high priority as the site is already intensively used.

The aquatic centre complex is the major new facility. The building, parking and service road access and the design of the park centre/washroom building and surroundings should be undertaken together at least for the preliminary design so that this important complex can be precisely located on site. This will impact the other related recreation facilities and the ongoing use of the park.

The Fields of Uxbridge Park is an important community resource already and its use will continue to increase as it is developed. The vision of creating a distinctive "Place" developed and managed with sound "Environmental Stewardship" are important goals.

Alexander Budrevics and Associates Ltd. appreciates the opportunity to provide consulting landscape architectural services for this project. We are enthusiastic about the potential and look forward to assisting the Township as required to get the park developed.

Sincerely,

Richard Moore FCSLA
Senior Associate





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1.0 Introduction

The Township of Uxbridge retained the services of Alexander Budrevics and Associates Ltd. (ABAL), assisted by Masonsong Associates Engineering Ltd. to prepare this Development and Servicing Plan for the Fields of Uxbridge (FOU) park. The work was to update the initial Master Plan prepared by ABAL in 2010. This is an important 45 hectare (111 acre) site which was acquired from the Province of Ontario in 2008. It is an important component of the Township's recreational and park infrastructure.

The objectives of the Development Plan include:

- To update the 2010 plan to meet current facility requirements (aquatic centre, soccer fields, tennis courts, baseball diamond, pump track, trails)
- To investigate servicing and storm water management.
- To plan for the road access and parking requirements.
- To provide a landscape management strategy.
- Prepare preliminary cost estimates.
- Identify possible scope of work for 2017 consideration.

The work included review of current site conditions including services, discussions with community representatives (Uxbridge Soccer Club, tennis enthusiasts, pump track sponsors) and evaluation of the previous master plan layout.

The development program has changed over the past five years and this warranted a change in the proposed site plan.

The overall vision for the project remains valid and is outlined and described below:

The Overall Vision is based on two key design principles:

Place Making & Environmental Stewardship



Place Making

The Township should strive to create a distinctive and safe year round destination for all residents. It should meet the needs for facilities but also for passive open space and unstructured leisure activities. It should develop a connected and accessible place with a made in Uxbridge identity.

The site is comprised of open fields, upland deciduous forest and forested valley lands. The landscape has been modified by past uses and will certainly be a place of sports fields and developed recreation facilities. The table land between the sports fields, facilities and the forested valley provides opportunities to create shaded park land which can be used by all visitors. This is a transitional landscape zone that needs spatial definition, shade tree planting and landscape development to create a green place that is inviting to all; a cherished community resource.

Environmental Stewardship

The site is located within the Uxbridge Brook watershed. There are approximately 28.3 hectares of tableland and 17 hectares of forested valley lands along the Uxbridge Brook. An ecosystem and Low Impact Development (LID) approach should be applied to design facilities, Storm Water Management and landscape restoration. Long term management of the park landscape should also be undertaken using environmental stewardship principles.



2.0 The Development Program

The facilities that are currently planned for the park have changed somewhat from the initial 2010 master plan. The municipality undertook some initial architectural space planning studies for the aquatic centre, the soccer clubs have refined their needs as regulations changed, new facilities have been added and others deleted. Following is a list of the current facilities that have been incorporated into the Development Plan.

Outline of Proposed Recreation Facilities

- Aquatic centre including 25m pool, leisure pool, change rooms, a multi purpose room and administration offices (approximately 2,632sm.28,300sf.)
- Soccer fields: 5 Senior (1 lighted), 6 Micros, 4 U 10, and 4 mid size
- Soccer pavilion including storage, a provision for a canteen and potential for long term development of a small washroom
- Two soccer equipment sheds
- 4 Lighted tennis courts including storage shed and shelter
- 1 Baseball field
- Pump track
- Skate board park (existing)
- Park centre building including main park washrooms, small multi purpose room and two offices.
- Main Park Road (6metre wide) connecting Regional Road #1 to Ball Road
- Parking for 550 cars
- Passive park and picnic areas including shelters
- Pedestrian and bicycle paths connecting with nature trails

The current development program for this site will allow the municipality to modify the uses of other parks. Expansion room is provided for the aquatic centre and parking. There is limited remaining tableland to accommodate additional facilities.



3.0 The Development Plan (refer to Figure 4)

3.1 The recommended Development Plan is based on a number of key site planning principles.

1. The Uxbridge Soccer Club has specific requirements for the size and grouping of fields. Furthermore, they will upgrade existing fields as financial resources permit rather than constructing all new fields. Consequently fields and existing topographic conditions must be carefully matched.
2. The aquatic centre has a preferred north south facing orientation to permit natural light into the pool area without glare.
3. The aquatic facility is located in the centre of the park and the main park washrooms are located adjacent but connected. These two components may be developed separately and then connected. This approach results in one building mass that facilitates operation and maintenance. It avoids construction of a separate washroom building that would only be operated seasonally and may be prone to vandalism.
4. The park is intensively used for soccer and will be used for other tournaments and special events. It is essential that a safe place be established with minimal pedestrian / vehicle circulation conflicts. Direct access from parking to sports fields without crossing a road is provided.
5. The aquatic centre will require a 6 meter wide paved road for fire access. Two access routes are provided for emergency.

3.2 Key features of the plan (refer to Figure 4)

1. Soccer fields are located as per the Uxbridge Soccer Club's suggested layout. The preferred north south orientation is provided. Fields are spaced to accommodate viewing and in response to site conditions.
2. The soccer pavilion is located on the north side of the main park road. This is proposed as a storage facility with space provided to accommodate a canteen service which would be operated by volunteers. The building will not have washrooms and sanitary service initially, but these could extend from the aquatic centre in the future if demand warrants.
3. The aquatic centre is located in the area of the former buildings facing north. Provision has been made for building expansion. Service and delivery access is provided from the adjoining parking lot which has 125 spaces. The main entrance is directly from the parking lot and includes an entrance court with seating and provision for bicycle parking. The aquatic centre is connected to other facilities and the trail system.
4. Parking for the aquatic centre has been located to preserve a group of large coniferous trees.
5. The park centre includes a washroom building located immediately to the east of the aquatic centre and connected to it. This facility includes 12 male and 12 female units and a small multipurpose room which could be used for registrations, tournament administration or small meetings.

This space could be used in the winter as a warm up lounge. Two offices and a kitchen are also included. The outdoor area adjacent to the building includes seating, picnic tables and bicycle parking.

6. The baseball field is located between the aquatic centre and the existing skateboard park. The centre field is approximately 390 feet. Parking for 80 cars is provided with direct access to the sports field and seating. This field will be lighted when demand warrants.
7. A tennis court bank of 4 courts is located east of the park centre and north of the forest edge. This is a site partially sheltered by trees. Storage for the ball machine, nets and equipment is proposed along with a shade shelter and seating. Direct access is provided from parking lot E which has 140 spaces. The tennis courts will be lighted when demand warrants.
8. An area adjacent to the existing skate board park is designated for construction of the pump track. The area is 70 x 57m as suggested by the sponsors of this facility. Provision to expand the parking is also included.
9. Two passive park and picnic areas are proposed. One area is located between the baseball diamond and the aquatic centre. This is the site of the former parking lot and is enclosed by large coniferous trees that will be preserved. The other area is east of the aquatic centre adjacent to the tennis courts. This site should be planted with deciduous shade trees.



Figure 1. Existing large Coniferous trees

10. The main park road is proposed as a 6m wide paved surface constructed to fire truck standards. It will accommodate two way traffic and connects Regional Road #1 (Main Street) with Ball Road. The existing paved section of this road is 5.5m wide and will require a slight widening to meet the standard. The new section is approximately 250m in length and intersects with Ball Road which is 7m wide with narrow shoulders and ditches.
11. Engineering work will be required to design this road and the intersections to acceptable standards.
12. The road provides access to the aquatic centre and all the parking lots and should be a year round access and emergency route.

13. The road could have a controlled access section and accent paving for a length of 50 to 60m. During special events or intensive use this section could be closed to vehicle traffic (except emergency use) and would create uninterrupted pedestrian flow between soccer fields on the north and washrooms and picnic / passive park areas on the south.
14. Five parking lots with a total of 550 spaces are located to provide direct access to soccer fields, sports facilities, and the aquatic center.
15. A paved walkway and bicycle route (3m wide) connects the municipal sidewalk system from Main Street to the aquatic centre and facilities. Bicycle parking is proposed at key locations such as the aquatic center, soccer pavilion and tennis courts.
16. The park walkways are to be connected with the forest trails in the natural areas and should create continuous loops. The forest trails must be located on site with adequate setbacks from the Uxbridge Brook. The forest trails will connect with the overall trail system.



Figure 2. Existing Entrance at the Regional Road



Figure 3. Existing 5.5m wide paved road





Figure 4. Development Plan

4.0 Landscape Management Plan (refer to Figure 10)

Fields of Uxbridge is comprised of approximately 28 hectares (70 acres) of tableland and 17 hectares (42 acres) of forested valley lands. The long term management of these resources will require a deliberate, well considered approach. The landscape is in transition and includes sports fields, former agricultural land, upland forest, valley land forest and wetland. All of these landscape units require attention and there are cost implications which will vary according to the methods used.

Environmental Stewardship and Place Making are the two key design principles of the overall “Vision”. These principles impact the landscape design and management.

The identity and visual quality created by the landscape design will assist to establish the character of “The Place”. An ecosystem approach to landscape design and management will contribute towards sound “Environmental Stewardship” of the entire 45 hectare (112 acre) site and the Uxbridge Brook.

The detail landscape design will be undertaken as each phase of park development proceeds. Landscape maintenance activities are ongoing. To assist with both of these the park has been divided into landscape management zones and guidelines suggested for each. These are outlined below and illustrated on Figure 10.



Figure 5. Upland Forest Condition on Site



Figure 6. Wetland Condition on Site



Landscape Management Zones and Guidelines

Highway Corridor Zone

1. 10m (33 ft.) wide zone bordering Regional Road #1
2. Retain existing healthy trees
3. Maintain visibility into park, locate additional planting to create “windows” into the park
4. Plant coniferous trees (picea, pinus, larix) in groups at corners to define property boundaries
5. Overseed with native grass mixture and mow one time per month

Park Road Corridor Zone

1. 15m (49 ft) wide zone each side of roadway or to edge of parking lot
2. Retain existing healthy trees
3. Maintain visibility of sports fields
4. Plant deciduous trees (50mm caliper) selected from upland forest species such as Acer saccharum, Acer rubrum, Quercus rubra and Amelanchier
5. Plant trees in groups rather than formal rows
6. Create spatial definition and separation of park areas
7. Maintained grass area

Park Entrance Features

1. Create two themed entrance landscapes on both sides of road at intersections of highway and Ball Road
2. Mass planting of native grasses and perennials in planting beds to create strong visual impact
3. Incorporate FIELDS of UXBRIDGE park sign
4. Create planted “Gateways”. Beds should be 30m length and 5 to 7m wide.

Naturalized Upland Forest Buffer Zone

1. 15m wide minimum naturalized forest buffer along north and south borders of park in open field area. (To be extended along the edge of existing forest)
2. Plant with native upland tree and shrub species to re establish forest edge landscape and hedge rows
3. Plant for biodiversity and to increase bird habitat
4. Plant with a combination of seedlings and small caliper trees
5. Integrate bioswales and SWM devices
6. Establish this as a no mow zone and install mowing stakes as necessary to preserve planted seedlings



Park Centre Landscape Zone

1. Area to be focus of passive park activities
2. Deciduous shade tree planting required
3. Plant with 50 to 70mm. caliper trees located to create spaces of different sizes, accentuate building entrances and to define pedestrian circulation system
4. Use a combination of ornamental and native species including flowering trees
5. Grading design should create berms to screen parking lots
6. Maintained grass area

Athletic Field Zone

1. All athletic fields must be improved and maintained to enhance player safety
2. The fields should be developed to a level that they can be used for 75 to 80 % of their capacity
3. Green practices for turf maintenance should be used to reduce nutrient laden runoff



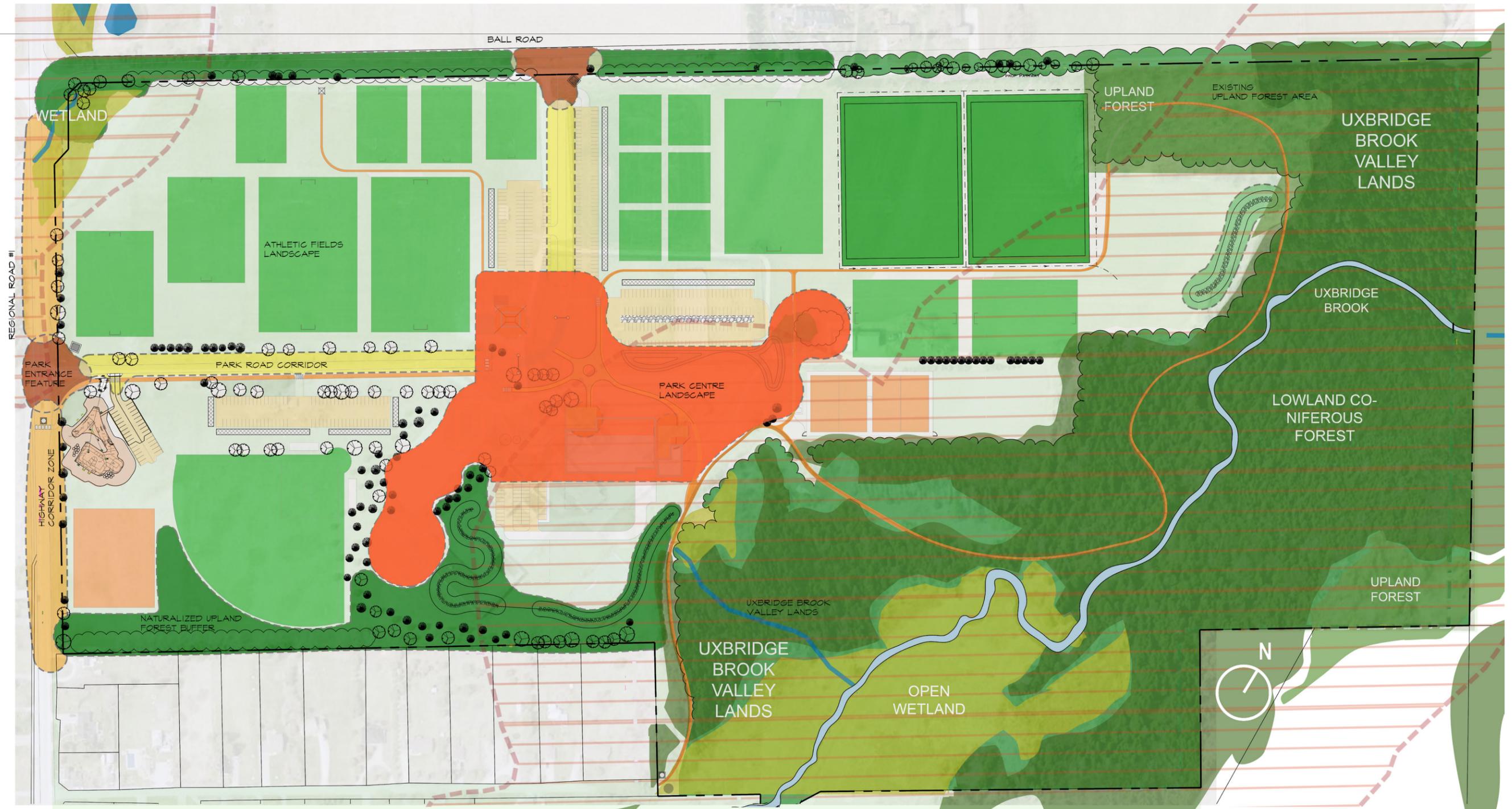
Figure 7. Highway Corridor Zone Condition on Site



Figure 8. Naturalized Upland Forest Buffer Zone Condition on Site



Figure 9. Park Road Corridor Zone Condition on Site



LANDSCAPE MANAGEMENT ZONES:

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Figure 10. Landscape Management Plan

5.0 Servicing and Storm Water Management

5.1 Topography

Two significant natural features define the topographic catchments of the site: the main branch of Uxbridge Brook traverses the southeasterly portion of the site, and the smaller Tributary No. 4 (Trib-4), traverses the very northwesterly corner of the site, with both watercourses generally draining south to north.

The larger eastern portion of the site of approximately 43.5 ha is generally flat with grade changes in the range of 1 m. This area drains in an easterly direction towards the main branch of the Uxbridge Brook. The Uxbridge Brook floodplain represents approximately 12.2 ha of this eastern portion of the site.

A small northwestern portion of the site of approximately 1.4 ha, has a significant grade change in the range of 4 m, generally falling in a northwesterly direction towards the northwesterly corner of the site towards Trib-4. All of the northwest drainage area is a regulated floodplain, and has an existing wetland at the corner of the site at Main Street North and Ball Road.

The topographic survey and delineation of existing drainage areas are illustrated in Figure 11.

5.2 Existing Infrastructure

The site has primary municipal frontage onto Main Street N (Durham Regional Road 1), which in the vicinity of the site is an urbanized regional roadway with water distribution infrastructure and localized storm sewers for roadway drainage. More specifically, the key existing infrastructure which have been reviewed in support of the subject lands include:

Water

A **150mm diameter watermain** is located within the west boulevard of Main Street North. The main is part of the Region's overall well-based supply system for Uxbridge, fed from municipal wells MW5 and MW6 south of Brock Street. The 150 mm main fronting the site is currently the northerly terminus of the Main Street watermain distribution system with a flushing hydrant on Main Street, across from the southwesterly corner of the site, marking the end of the system. An existing 150 mm diameter water main which serviced the former Kennedy House is in fact the terminal water lateral being serviced off the Main Street system.

The former building has since been demolished, but the existing 150 mm diameter water service lateral remains in place, although supply to the site is presumably shut-off at the property line as there is no current water usage within the site.

Sanitary

A **200 mm diameter sanitary gravity sewer** runs in a southerly direction from a control manhole located at the southern limit of the subject site to Colby Road (within an easement traversing through municipal address 17 Colby Road), and then in a southwesterly direction towards Sandy Hook Road (also through various irregular easements), ultimately discharging to the existing Sandy Hook Sanitary Sewer Pump Station (SSPS). The existing gravity system terminates at a control manhole located at the southerly property line of the subject site,

The existing Sandy Hook SSPS consists of 2 pumps (1 duty, 1 standby) with a maximum capacity of 10 L/s each. The SPSS outflow is conveyed by a 100 mm diameter sanitary forcemain to a point of gravity connection further south on Main Street (between Harvey Street and Maple Brook Drive). Region of Durham staff have advised that the Sandy Hook SPSS has an allocated capacity of 8 L/s for the subject site.

The former Kennedy House building was serviced with internal gravity piping that connected to the existing control manhole at the southerly site limit. As with the water service lateral, the existing site sanitary piping is presumed to be abandoned and left in place.

Storm

There are no storm sewer services available within the municipal roadways able to accommodate runoff from the subject site. Storm sewer within the urbanized section of Main Street North only serve to convey road drainage. Surrounding roadways (Ball Road to the north, Colby Road to the south, and the northerly portion of Main Street North) are all rural roads with roadside ditches.

The majority of the site is presently tributary by sheet drainage directly to the main branch of Uxbridge Brook to the east; a small northwesterly portion of the the site presently sheet drains to Trib-4.

5.3 Functional Servicing

The proposed site servicing will generally utilize the existing municipal infrastructure external to the site (sanitary sewers and water main), but will establish new internal site services to support the proposed new facilities. The following is a summary of the functional site servicing, and a confirmation of how the subject Site Plan can be developed in general conformance with the Town of Uxbridge and Region of Durham standards. Functional site servicing and grading Plans are included in the Drawings Appendix for reference in the following discussions on servicing feasibility.

5.3.1 Water Servicing

The existing 150 mm diameter water lateral serviced off the 150 mm municipal main on Main Street will be utilized for supply to the proposed redevelopment of the site. The existing service within the right-of-way should remain in-place up to the property line valve of the subject site. It is presumed that this short section of service main within the right-of-way remains charged, and is flushed on a regular basis to maintain potability.

The remainder of the existing 150 mm water service main within the site is presumed to be decommissioned, either left empty in-place, or left in a stagnant condition. For this reason, it is recommended that the water service main within the site is replaced entirely with new 150 mm diameter piping up to the point of connection at the property line valve.

The existing service connection provided both fire and domestic supply to the former Kennedy House building, which was a large (greater than 70,000 sq.ft.) institutional-use facility. Therefore, on a comparative basis, there should be adequate supply and pressure for the proposed aquatic centre and associated washroom facilities, which will generally occupy approximately the same footprint and be in the same vicinity as the previous building structure, but with a much lower gross-floor area (approximately 28,300 sq.ft.).

However, municipal water supply and pressures vary over time; it is recommended that a municipal hydrant flow and pressure test be conducted as part of the preliminary design of the site plan to confirm the available supply and pressure. If municipal supply and pressure is insufficient at the time of site plan design, supplementary water system improvements (localized on-site booster pumps and/or reservoir tanks) will need to be investigated.

The proposed internal water service is schematically shown in Figure 13, which illustrates the core 150 mm diameter water service line servicing the proposed aquatic centre. It is understood that the recreational facilities will be constructed in phases, and the washroom facilities may be constructed ahead of the main aquatic and administrative building.

It is recommended that the core 150 mm diameter water service is installed in the first phase of construction, so that any interim uses such as washrooms or irrigation facilities may be branched off the service as needed, through detailed design. A temporary flushing hydrant or an auto-flush station at the end of any interim water service needs to be considered at the detailed design stage.

5.3.2 Sanitary Servicing

Sanitary servicing is available from the existing 200 mm diameter PVC sanitary sewer running southerly from the site to the Sandy Hook SSPS. The proposed development is considered an institutional use comprising of a main aquatic centre building (approximately 28,300 sq.ft.) and associated facilities (approximately 24 washrooms). At this preliminary stage of investigation, ahead of any detailed facility design, the anticipated sewage generation is derived from the Region of Durham's area-based sewage generation factors.

$$\begin{aligned}\text{Proposed Wastewater flow} &= 112 \text{ m}^3/\text{gross ha/day} \times \text{Area} \\ \text{(Including Peaking/infiltration)} &= 112,000 \text{ L/gross ha/day} \times 1.89 \text{ ha} \\ &= 211,680 \text{ L/d} \\ &= \mathbf{2.5 \text{ L/s}}\end{aligned}$$

This is an estimated domestic sewage flow which does not include the additional backwash and drawdown requirements of the proposed pool.

Pool Servicing Requirements

In accordance with the Ontario Building Code, the proposed pool will require an outlet capable of draining the pool in 12 hours, equating to a peak pool discharge rate of 10-12 L/s. Combined with the base domestic sewage flows, the aggregate peak sanitary flows from the site are approximately 13 – 15 L/s.

Although the receiving gravity sewer piping system immediately south of the site has sufficient capacity, the additional pool drawdown load will exceed what can currently be serviced by the Sandy Hook SSPS (8 L/s allocated to the subject site, and 10 L/s firm capacity). There are two possible solutions to provide additional sanitary servicing capacity to accommodate the pool.

Option 1: On-Site Storage

An alternative to pump station upgrades is to provide an on-site private storage tank to control the flow from the pool backwash and any peak drawdown. To accommodate the proposed wastewater flow (2.5 L/s) the allowable release rate from the storage tank would need to be attenuated to approximately 5 L/s resulting in a maximum aggregate site discharge of 8 L/s to the Sandy Hook SSPS.

When considering a conservative rate of 12 L/s from the swimming pool facility over 12 hours, and a 5 L/s allowable release rate, the storage tank would need to be approximately 300 m³ (80,000 gal). The creation of a private on-site sanitary attenuation and pump facility will also require a Municipal Class Schedule B Environmental Assessment.



Pool discharge attenuation storage, including pool backwash storage, is not an uncommon design solution where restrictive municipal sewerage capacity is a constraint.

Option 2: SPSS Upgrade

The current SPSS pump capacity of 8 L/s allocated to the subject site is inadequate for the anticipated needs of the facility, and will require upgrades to accommodate the pool. The current SPSS capacity would be sufficient until the proposed aquatic center has been completed, at which point the pump capacity must be upgraded to a targeted 15-20 L/s capacity to accommodate additional flow from the pool.

Prior to upgrading the pump house, a Municipal Class Schedule B Environmental Assessment must be undertaken to assess both the receiving forcemain and gravity sewers on Main Street, as well as the capacity of the Uxbridge Water Pollution Control Plant.

The Proposed sanitary sewer network is shown in Figure 13. For clarity, all other planned facilities (washrooms, buildings, drinking fountains, etc. except for the pool), may be accommodated by the existing receiving sewer infrastructure and SPSS with no additional upgrades required. It is only with the addition of the pool that sanitary servicing alternatives must be further evaluated.

5.3.3 Storm Drainage

The subject site discharge will be attenuated on-site to the pre-construction runoff coefficient of 0.2. The subject site will rely on a dry pond and bioswale system ending at an outlet to Uxbridge Brook as an outlet for the post development flows. The post development drainage conditions are shown in Figure 12.

Discussion of stormwater management is the subject of more detailed analysis in the following sections.



5.4 Stormwater Management

Stormwater management for the subject site is to reflect the Town of Uxbridge stormwater management criteria, and is further guided by best-practices as outlined in the Stormwater Management Planning and Design Manual (MOE, 2003) and the Lake Simcoe Phosphorous Reduction Plan (LSRCA, 2010).

Generally, all stormwater from the site is to be restricted to the allowable pre-development 5-year storm event rate. All run-off in excess of the 5-year design criteria, up to and including the 100-year storm event must be attenuated on-site. Therefore, on-site detention and implementation of acceptable control restriction devices must be considered in the stormwater management strategy.

The proposed development will see an increase in overall imperviousness from the existing conditions due to the addition of paved surfaces (driveways, some parking areas) and roofs, and therefore as a minimum, stormwater quantity controls will be required to attenuate flows to the pre-development levels. The Town of Uxbridge stormwater management criteria for the subject site is summarized as:

- **Quantity Control:**

Attenuation of post-development storm runoff to pre-development levels, up to and including the 100-year storm events. Refer to drawings POST and PRE in for runoff coefficient delineation

- **Quality Control:**

MOECC Enhanced Protection (formerly Level 1), with a minimum 80% reduction in Total Suspended Solids on an average annual basis. A net reduction in total phosphorus will be achieved using on-site retention.

- **Erosion Control:**

Attenuation of the first 25mm storm to be released over 72 hour

- **Water Balance:**

5mm water balance retention target and erosion control criteria.

As no traditional storm sewer services are available within the municipal roadways, alternative approaches incorporating LID strategies (Low Impact Development) will be required. The proposed design is to incorporate bioswales and infiltration galleries as the quality and quantity management component of the stormwater system.

The exact sizing and applicability of the LID devices will be determined as part of the site plan engineering. A key design parameter for infiltration-type devices is subsurface permeability and groundwater levels. While at-source infiltration is a desirable head-stage of a treatment train approach, the underlying soil stratigraphy must support moderate to high permeability rates. It is recommended that a geotechnical investigation be completed as part of the site plan design to ascertain the soil permeability properties.

Should the soils and groundwater levels be conducive to infiltration, further opportunities can be explored for greater use of infiltration galleries in the final site plan design. Individual galleries could then be used for each area of parking, thereby reducing the amount of piping required to handle the runoff.

In order to respect the at-source best management practice treatment train, each major parking field and building will have its own localized LID device (bioswale or infiltration gallery) to provide both stormwater quality control and quantity attenuation. These individual devices will be connected by a sub drainage system to a secondary end-of-pipe LID. This secondary device will also be used to treat the runoff generated from the main aquatic center building in addition to the primary driveway.

Every site component including LID devices, soccer fields, building structures, and parking will be located outside of the designated Uxbridge Brook regional floodplain. Lastly, a key objective will be to prohibit any hard infrastructure (outlets, headwalls, piping) within the ravine limits. To this end, discharge points are proposed to incorporate level-spreader outfalls, such that attenuated flows are sheeted into the Uxbridge Brook valley, rather than controlled to a piped outlet requiring a headwall and engineered dissipation.

The preliminary sizing and layout of the quality/quantity system has been estimated using worst case scenarios for all design parameters, and is illustrated as a schematic facility fit. Detailed design of the stormwater treatment train system will need to be undertaken at the site plan design stage when more accurate design constraints, phasing, and supporting geotechnical reports are available.

5.4.1 Erosion Control

Downstream erosion control will be mitigated by the total-capture and release via level spreader of the 25mm rain event. Therefore, no further extended detention for erosion control will be required.



5.5 Erosion and Sediment Control

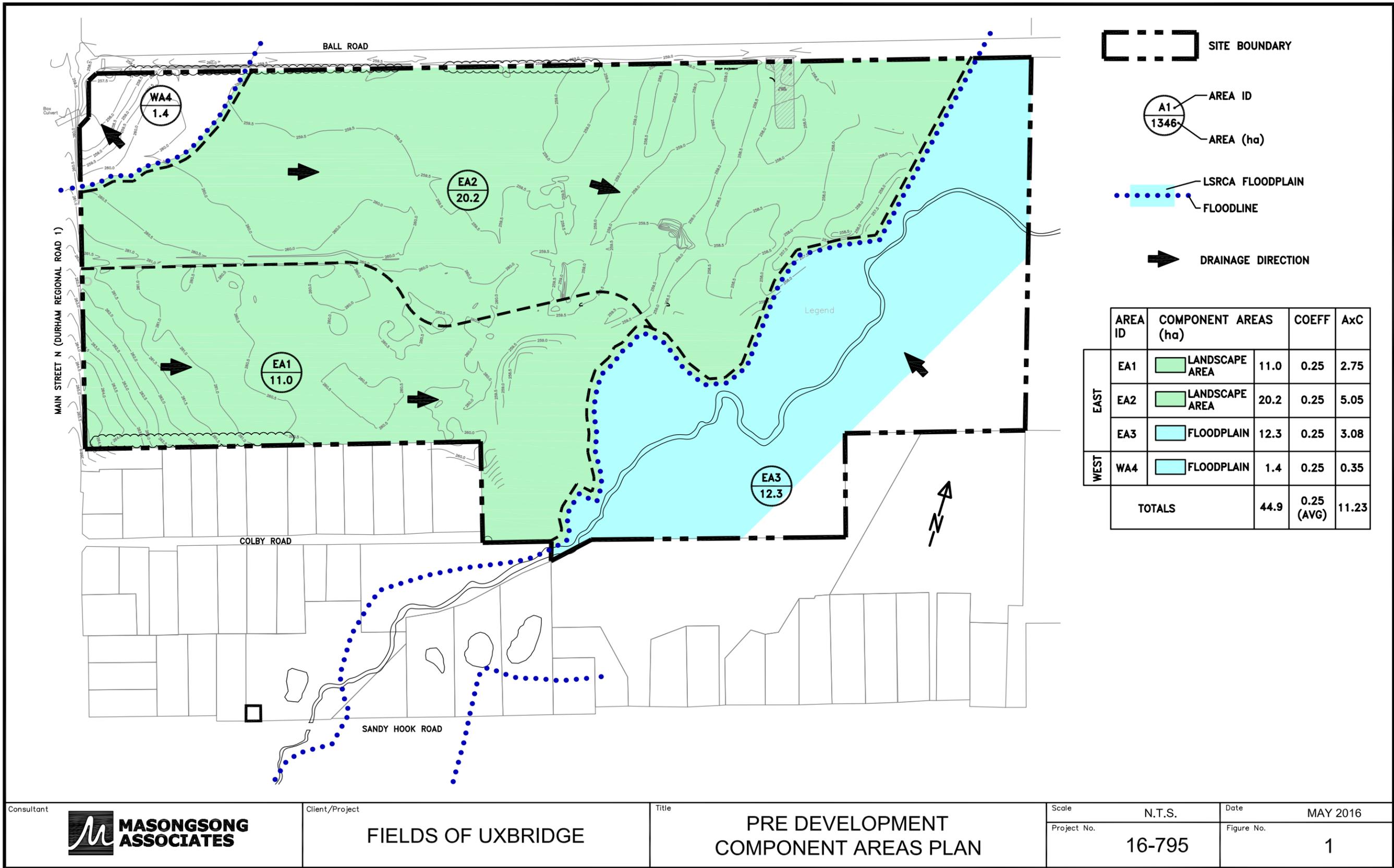
Erosion and sediment control should be implemented for all construction activities within the subject site, and for each consecutive Phase and Stage of Construction, including earthworks, servicing and house building activities. The basic principles considered to minimize erosion and sedimentation and resultant negative environmental impacts include:

- Minimize local disturbance activities (e.g. grading);
- Expose the smallest possible land area to erosion for the shortest possible time;
- Implement erosion and sediment control measures before the outset of construction activities; and,
- Carry out regular inspections of erosion and sediment control measures and repair or maintain as necessary.

The proposed grading, servicing and building construction should be carried out in such a manner that a minimum amount of erosion occurs and such that sedimentation facilities control any erosion that does occur. Erosion and sediment control measures should include but not be limited to the following:

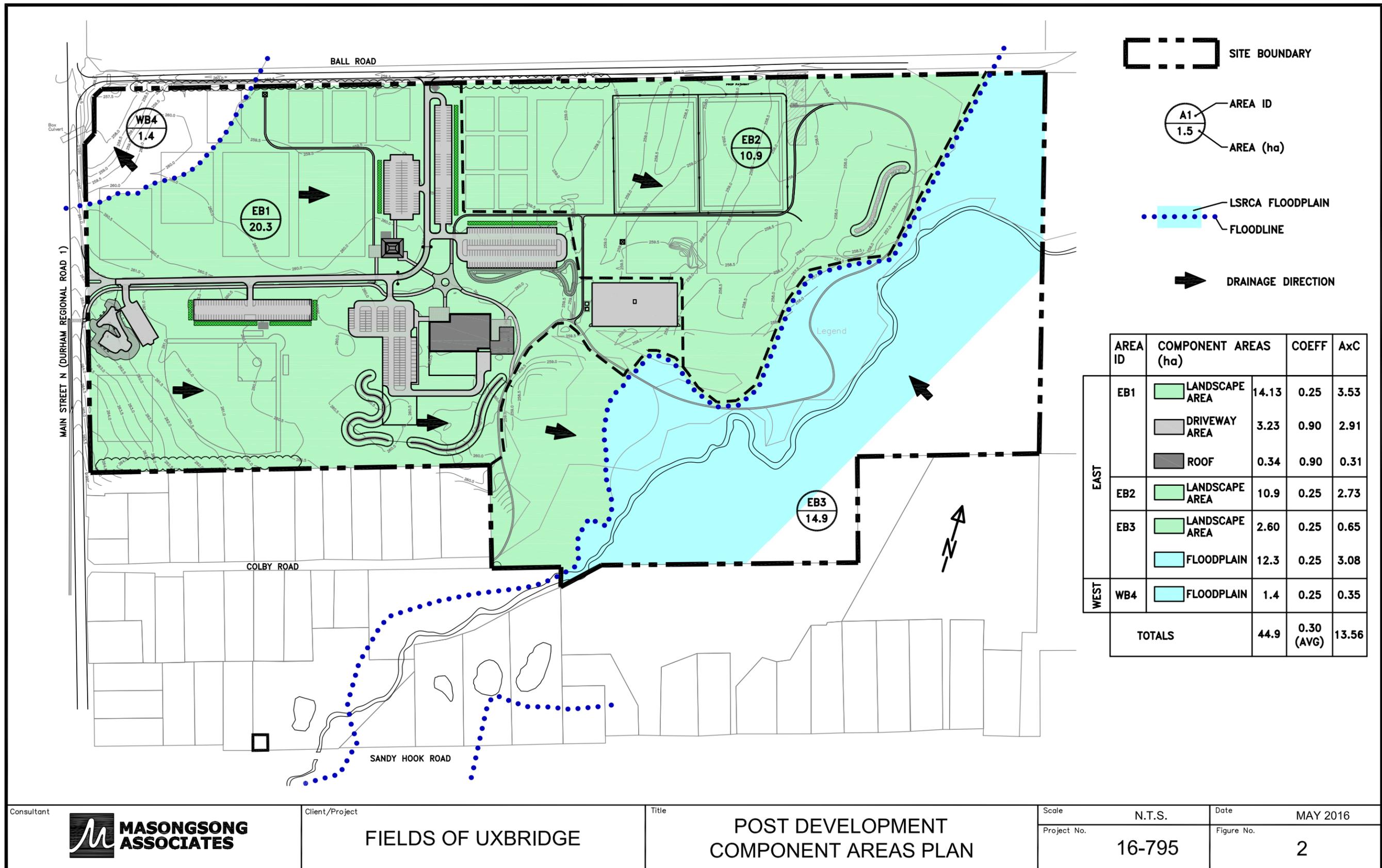
- Temporary off-line siltation control ponds. Current MNR/LSRCA guidance requires siltation/erosion control for 125 m³/ha of dry run-off storage for each facility, with a permanent pool of an additional 125 m³/ha. These temporary sediment ponds are to be located at the low point of the grading for each phase or stage of construction.
- Erection of silt fences around all site perimeters;
- Provide sediment traps (e.g. rock check dams, straw bales, scour basins) along interceptor swales and points of swale discharge;
- Inlet controls at catchbasins, comprising filter cloth overlain with rip-rap;
- Implement a weekly street sweeping and cleaning program for any mud tracking onto the adjacent municipal roadways;
- Provide gravel “mud mats” at construction vehicle access points to minimize off-site tracking of sediments; and,
- Confine refueling/servicing equipment to areas well away from stormwater minor system or major system elements.

Removal of the erosion and sediment controls should be done once construction is completed and sediment run-off from the construction activities has stabilized. A detailed Erosion and Sediment Control Report and Plans are to be provided at the detailed Site Plan design stage.



Consultant	Client/Project	Title	Scale	Date
MASONGSONG ASSOCIATES	FIELDS OF UXBRIDGE	PRE DEVELOPMENT COMPONENT AREAS PLAN	N.T.S.	MAY 2016
			Project No.	Figure No.
			16-795	1

Figure 11. Pre Development Component Areas Plan



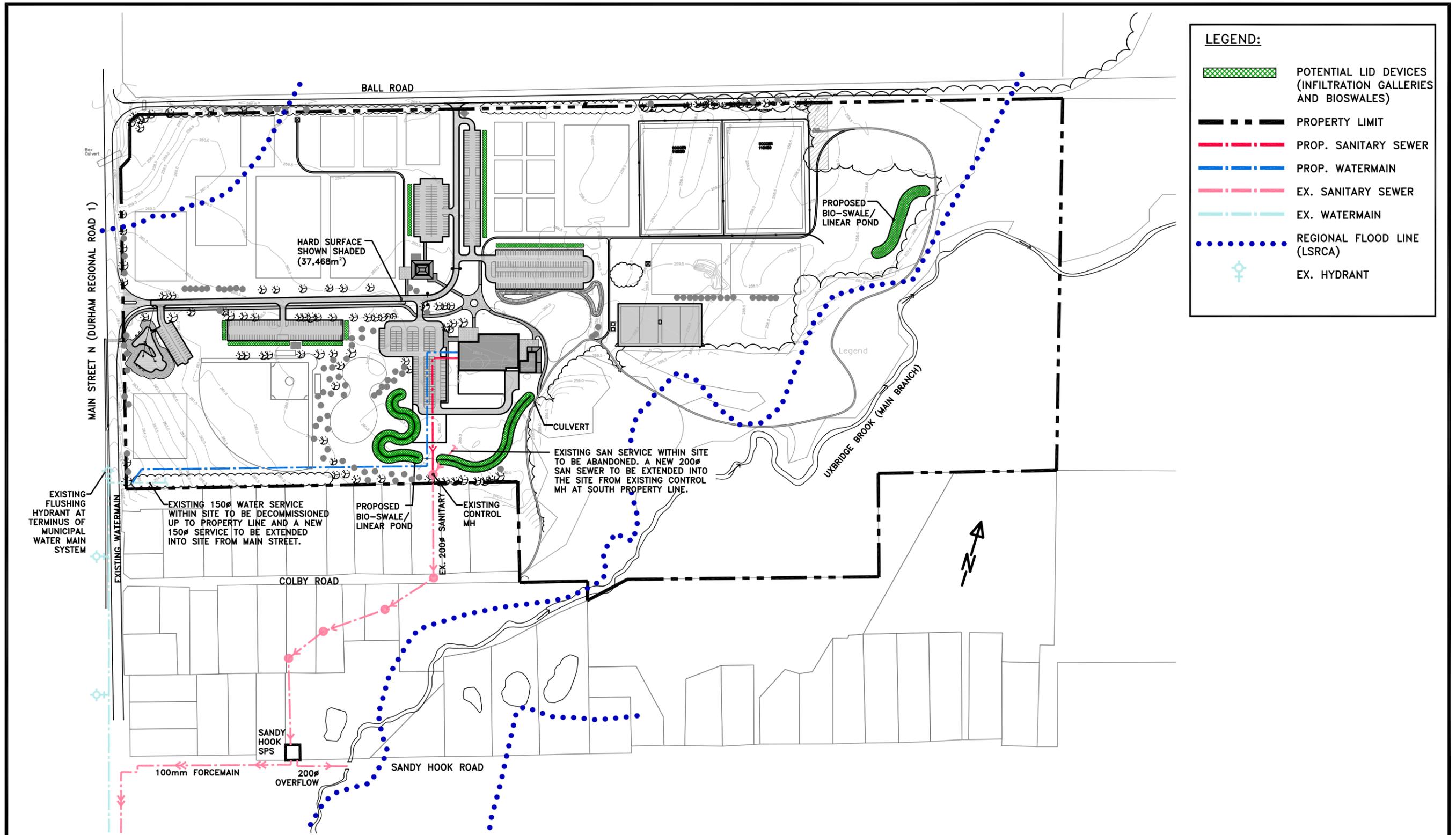
Consultant
MASONGSONG ASSOCIATES

Client/Project
FIELDS OF UXBRIDGE

Title
POST DEVELOPMENT COMPONENT AREAS PLAN

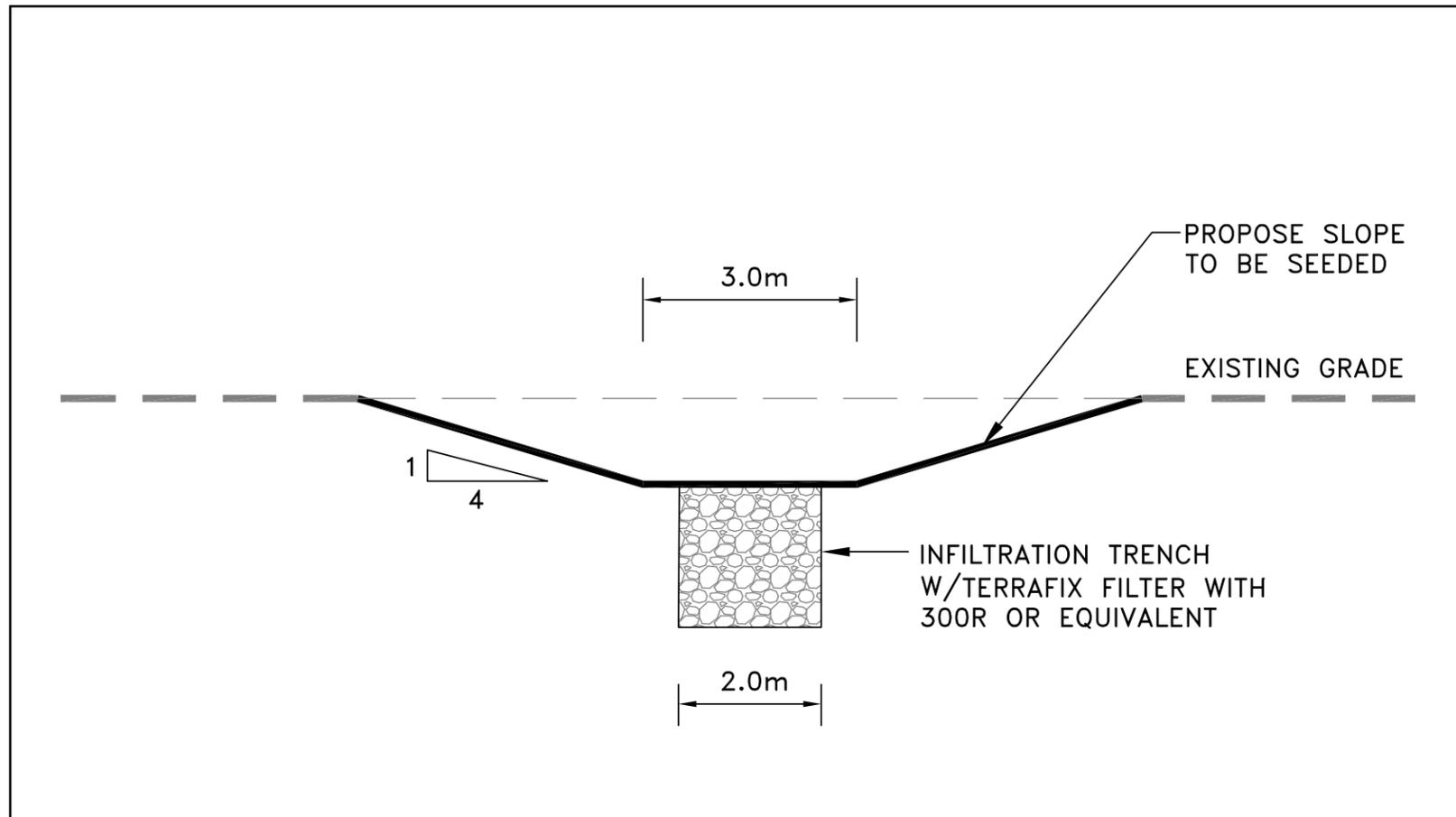
Scale	N.T.S.	Date	MAY 2016
Project No.	16-795	Figure No.	2

Figure 12. Post Development Component Areas Plan



Consultant	Client/Project	Title	Scale	Date
MASONGSONG ASSOCIATES	FIELDS OF UXBRIDGE	SCHEMATIC SERVICING PLAN	N.T.S.	MAY 2016
			Project No. 16-795	Figure No. 3

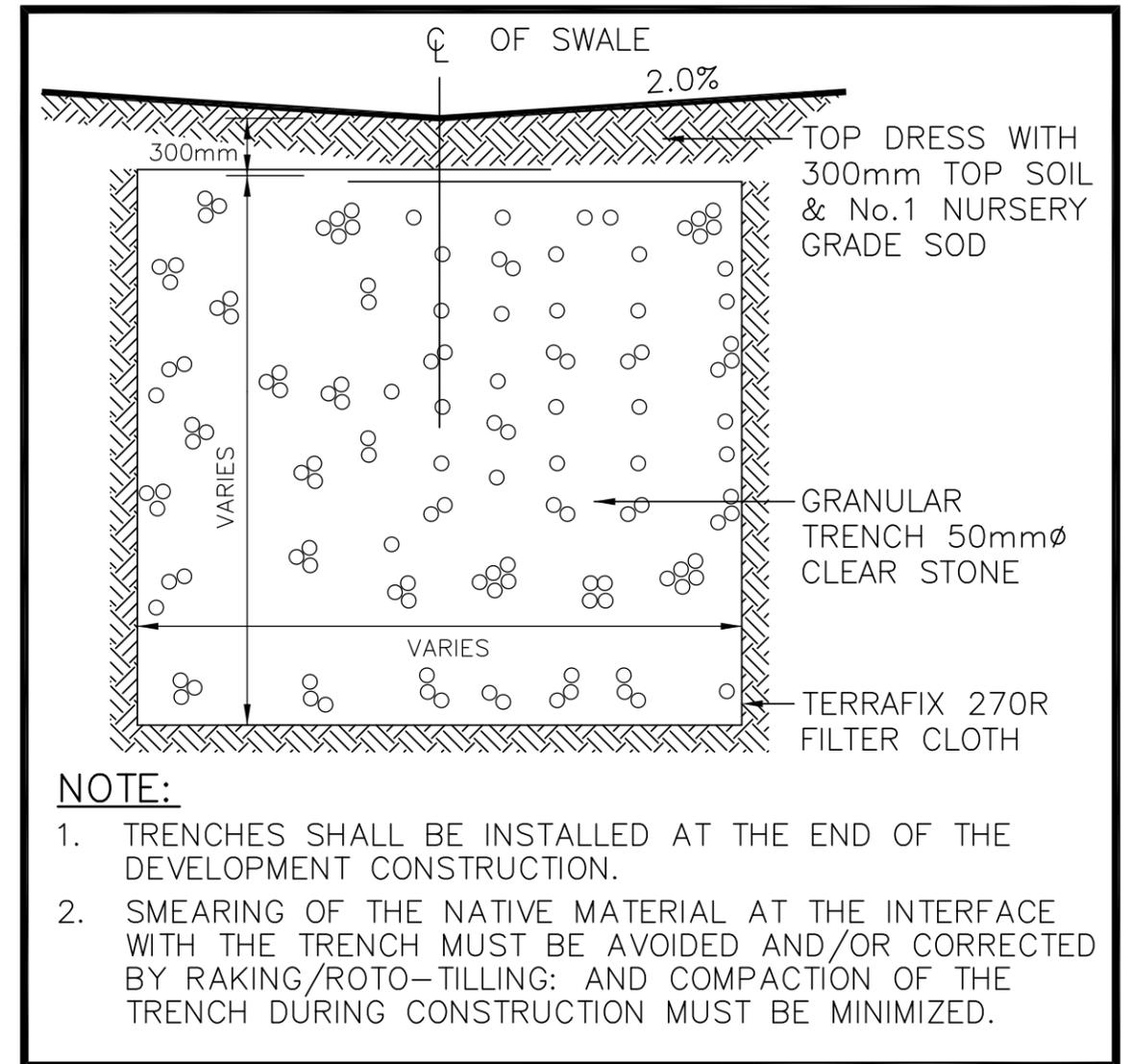
Figure 13. Schematic Servicing Plan



TYPICAL BIO-SWALE

SCALE: NTS

Figure 14 Typical Bio-Swale



NOTE:

1. TRENCHES SHALL BE INSTALLED AT THE END OF THE DEVELOPMENT CONSTRUCTION.
2. SMEARING OF THE NATIVE MATERIAL AT THE INTERFACE WITH THE TRENCH MUST BE AVOIDED AND/OR CORRECTED BY RAKING/ROTO-TILLING: AND COMPACTION OF THE TRENCH DURING CONSTRUCTION MUST BE MINIMIZED.

TYPICAL INFILTRATION TRENCH

SCALE: NTS

Figure 15 Typical Infiltration Trench

6.0 Preliminary Cost Estimates

Preliminary cost estimates for the individual components are outlined below. These have been prepared using costs for similar projects undertaken in other municipalities and must be used for budget purposes only. Geotechnical investigations, engineering testing of existing services and detail design will be required to refine the construction cost estimates. This work will be completed as each development phase is advanced.

The proposed aquatic centre has not been included in the cost estimates as this is subject to detailed architectural and engineering design. This facility, the associated parking, outdoor use areas, service access and landscape will have a significant impact on the park but the basic framework of the plan reserves a building envelope for the aquatic Facility. The development of a separate park centre and washroom building which can be connected and integrated with the aquatic centre does present a design challenge. The design of both facilities should be advanced together.

6.1 New Road Construction

6.1.1 New road 180m x 6m Ball road to precast paving section @ \$ 70/sm	\$75,600
6.1.2 Precast concrete paving section 75m x 6m = 450 sm @\$120/sm	\$54,000
6.1.3 Intersection and ditch improvements Ball Road Allowance	\$15,000
Total Road Construction:	\$144,600

Does not include reconstruction of existing 5.5m wide paved road from Regional Road #1
Detailed engineering will be required to determine upgrading requirements and required schedule.

6.2 Parking Lot Construction C, D, E

6.2.1 Lot C gravel surface 2460 sm, @ \$40/sm.	\$ 98,400
6.2.2 Lot D gravel surface 2400 sm. @ \$40/sm.	\$96,000
6.2.3 Lot E gravel surface 4800 sm. @ \$40/sm.	\$192,000
Total Parking Initial Construction:	\$386,400



6.3 Soccer Field Construction and Upgrading

6.3.1 New senior soccer field #3 70 x 110m	\$130,000
6.3.2 Upgrade senior soccer 1 & 2 (13,000 ea.)	\$26,000
6.3.3 Lighting soccer # 2 (8 lights @ 20,000 ea.)	\$160,000
6.3.4 Upgrade micros 1-6 (@ \$2,500 ea.)	\$15,000
6.3.5 Upgrade U 10 1-4 (@ \$ 3500 ea.)	\$14,000
6.3.6 Upgrade mid 1 & 2 (@ 5000 ea.)	\$10,000
6.3.7 New Construction Mid 3 & 4 (71,500 ea.)	\$143,000
6.3.8 Soccer storage pavilion 15 x 10m (150sm, 1614sf) @ 50\$/sf	\$80,700

Total Soccer Facilities: **\$578,700**

6.4 Baseball Field and Parking Lot A

6.4.1 New Field construction with irrigation	\$146,150
6.4.2 Lighting	\$160,000
6.4.3 Parking lot A (gravel, 2800sm. @\$40/sm.)	\$112,000
6.4.4 Site development allowance (landscaping, tree planting)	\$50,000

Total Baseball Field and Parking: **\$468,150**

6.5 Tennis Court Construction

6.5.1 Four tennis courts 120 x 204 ft. including excavation, granular base, surface, fencing lighting windscreens, perimeter weeping tile	\$402,500
6.5.2 Landscaping allowance	\$25,000
6.5.3 Storage shed and shelters allowance	\$10,000

Total Tennis Courts: **\$437,500**

6.6 Park Centre & Washrooms

6.6.1 Construction of new 360 sm (4000sf) building with 12 men and 12 women washrooms, multi purpose room & registration area, kitchen and two small offices for sports teams. (4000sf. @ \$160 - \$180/sf)	\$640,000 - \$720,000
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6.6.2 Landscape development including 155 sm paving, tree planting (15 @ \$ 450) sod 500 sm.	\$37,930
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Total Park Centre: **\$677,930 - \$757,930**



6.7 Passive Park and Picnic Area

6.7.1 Grading and sodding (7300 sm @ \$10/sm)	\$73,000
6.7.2 Shade tree planting (125@ \$350 ea.)	\$43,750
6.7.3 Picnic shelters (2 @ \$105,000 ea.)	\$210,000

Total Passive Park Area: **\$326,750**

6.8 Perimeter & Corridor Landscape Restoration

6.8.1 Supply and planting of tree seedlings (yearly allowance)	\$10,000
6.8.2 Highway corridor tree planting (56 coniferous trees @ \$350ea)	\$19,600
6.8.3 Main Park Road and parking lot corridor (68 deciduous trees @ \$300 ea)	\$20,400
6.8.4 Entrance feature landscaping (300 sm. planting area ea. x 400 grasses & perennials x 2 beds)	\$12,000
6.8.5 Park entrance signs (2) allowance	\$16,000

Total Perimeter & Corridor Landscape Restoration: **\$78,000**

6.9 Walkways and Bike Paths

6.9.1 Paved walkways (630 m x 3m =1890sm. @\$30/sm)	\$ 56,700
6.9.2 Limestone paths (480 m x 1.5m =720 sm @ \$16/sm)	\$11, 520
6.9.3 Bike parking units (8 x @ \$3500 ea.)	\$28,000

Total Walkways and Bike Paths: **\$96,220**

Total (Infrastructure Components not included): **\$3,274,250**

Infrastructure Components

6.10 Water Service

6.10.1 Water main extension (150mm service internal to site - 480m)	\$107,800
6.10.2 Flushing hydrant or auto-flush station (interim)	\$6,000
Total Water Service:	\$113,800

6.11 Sanitary Sewerage

6.11.1 Sanitary sewer extension (200mm service - 160m)	\$32,000
6.11.2 EA Study for On-site Pump Station (Option 1)	\$20,000
6.11.3 On-site pump station storage (300m ³ - Option 1)	\$180,000
Total Sanitary Sewerag:	\$232,000

6.12 Stormwater Management

6.12.1 Infiltration galleries (2,500m ³)	\$750,000
6.12.2 Bioswales/linear pond (650m ³)	\$325,000
6.12.3 Sub drainage system (450m)	\$15,750
Total Stormwater Management:	\$1,090,750

Total Supporting Infrastructure Costs: **\$1,436,550**

Total for supporting Infrastructure Costs (Rounded): **\$1,440,000**

6.13 Engineering and Landscape architectural fees (15%)

\$707,138

Total: **\$5,421,388**

Additional Cost of a Class EA Study to pursue External
SSPS Upgrade (Option 2): **\$100,000**

7.0 Phasing and Implementation

The development of Fields of Uxbridge Park will be in phases as financial resources permit. The largest and most costly individual project is the aquatic centre. The basic park infrastructure (roads, parking and services) must be improved as these establish the framework for the park and will allow new facilities to be developed as needed.

The construction of the main access road connecting Regional Road #1 to Ball Road, parking lots C, D, E and the extension of water and sanitary service to the park are recommended as top priorities for the municipality.

Additionally the construction of the soccer storage pavilion and the park centre (washrooms) are necessary to support the existing recreational activities.

The upgrading of soccer fields is an ongoing yearly activity in partnership with the Uxbridge Soccer Club. Priorities are to be established as needs and financial resources permit.

The schedule for the construction of the new tennis courts and the baseball field is related to the Township’s plans for other park sites. With the basic park infrastructure in place (road, parking and services) these facilities can be constructed as individual projects. We recommend that parking lot A be constructed when the baseball field is developed.

Landscape improvements including corridor tree planting, perimeter buffers and passive park and picnic areas should be related to the yearly development of the infrastructure and the facilities.

Following is an outline of the recommended work program for the 2016 to 2019 period.

Outline of recommended work program and priorities

Tasks	Year
1. Identify Geotechnical site investigation requirements, define scope of work and commission study	2016
2. Conduct hydrant flow and pressure testing of existing water line	2016
3. Initiate Municipal Class B Environmental Assessment of Sanitary System and Pump Station with Region of Durham	2016
4. Upgrading of existing soccer fields (ongoing)	2016



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5. Detail design and tendering of main park road and parking lots C,D&E along with associated landscaping 2016 - 2017
 6. Detail design and construction of soccer storage pavilion 2016 - 2017
 7. Detail design and construction of Park Centre Building including washrooms and necessary services 2017 - 2018
 8. Preliminary design of aquatic centre 2017 - 2018
 9. Detailed design and construction of selected sports facilities 2017 - 2019
 10. Detail design and tendering of passive park and picnic area 2017- 2019

