STANLEY PIT – MEDWAY CREEK CHANNEL REALIGNMENT DESIGN BRIEF - DRAFT

April 2024

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Disclaimer

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STANLEY PIT – MEDWAY CREEK CHANNEL REALIGNMENT DESIGN BRIEF - DRAFT

1.0 INTRODUCTION

Greck and Associates Limited (Greck) were retained by McCann Redi-Mix to assess the feasibility and design of an alternative natural channel alignment for Medway Creek located north of the City of London Ontario, on the North Half of Lot 13, Concession 14, Former London Township now in The Township of Middlesex Centre, see **Figure** 1. The goal of the project is to realign Medway Creek to allow for further excavation of readily accessible aggregate resources at the existing Stanley Pit, see **Figure 2.**

This document has been prepared to support the design of the proposed construction works. The proposed design plans have bee prepared to achieve the following objectives:

1. Maximize the area available for extracting aggregate.
2. Provide a new channel location that will replicate the existing channel form and function including:
    a. Maintaining and enhancing the watercourse hydraulic functions.
    b. Providing a stable channel form which allows for natural channel processes to occur.
    c. Maintaining and enhancing overall aquatic habitat area.
3. Provide a 30m natural environmental buffer zone from each channel bank top.
4. Minimize earthworks required to remove overburden to construct the watercourse.
5. Provide features that will enhance the natural attributes of the channel and riparian area.

The information presented builds upon the channel design concept developed and the various background studies provided under separate cover. The technical memorandum prepared to support the concept plan is provided in Appendix A.

The design plans have been prepared with information and in collaboration with the following team members:

- McCann Redi-Mix, Owners
- Terrastory Environmental Consulting Inc., Ecology
- Novaterra Environmental Ltd., Geotechnical / Hydrogeology
- Harrington McAvan Ltd., MNRF Permitting and licencing

Figure 1: Project Site Location

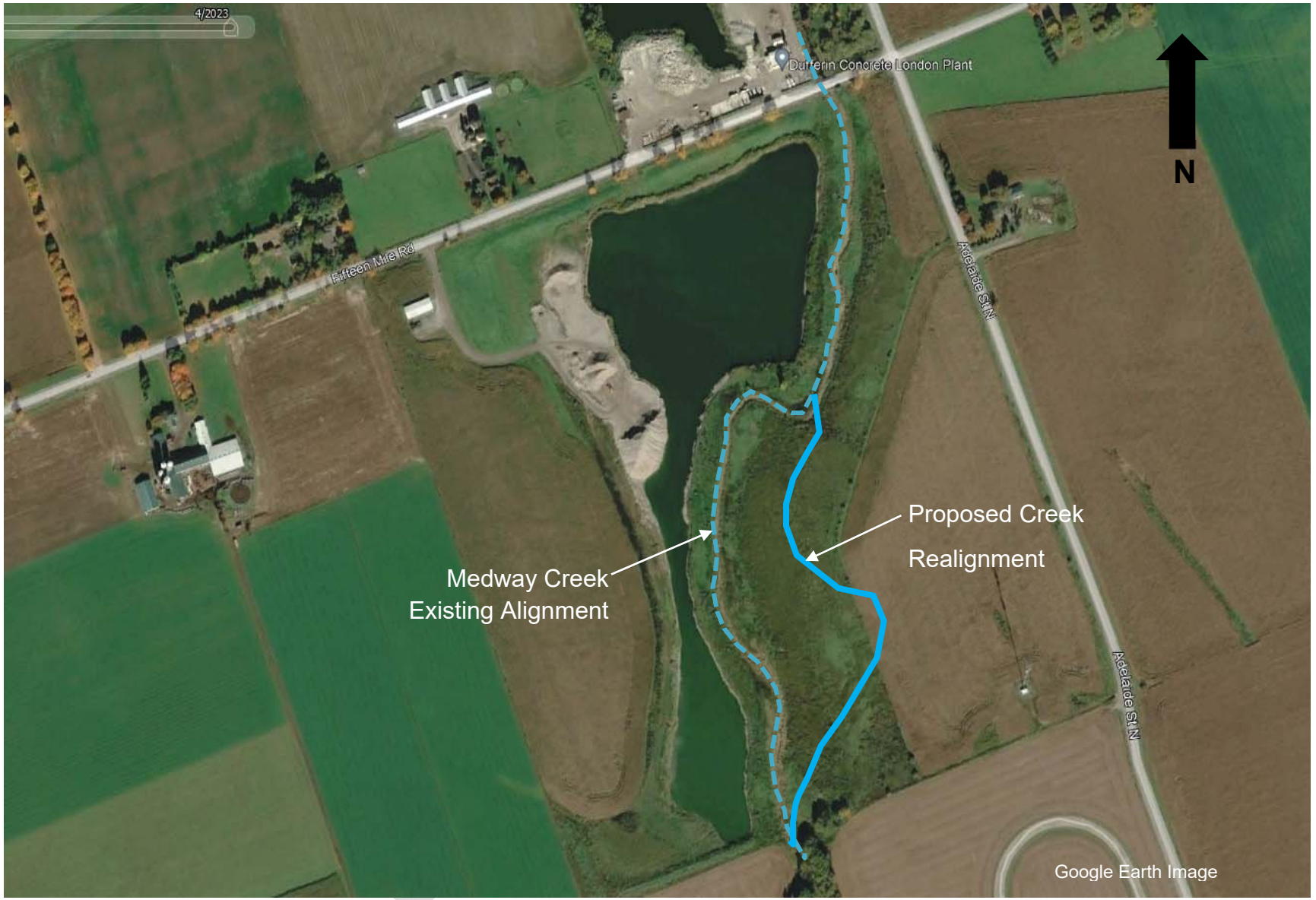


Figure 2: Project Site - Existing and Proposed Alignment of Medway Creek

The content of this report and the associated detailed design plans and include consideration for the review and comment by regulatory agencies. The detailed designs were prepared from the concept plans circulated to the Ontario Ministry of Natural Resources and Forestry (MNRF), the Upper Thames River Conservation Authority (UTRCA) and the federal Department of Fisheries and Oceans (DFO) as part of a pre-consultation/discussion process.

2.0 BACKGROUND INFORMATION

2.1 Existing Channel System

Medway Creek flows in a general north to south direction through the Stanley Pit site, see **Figure 2**. The contributing watershed area is 6,241ha or 62.4km^2. Flows enter the property at a bridge located on Fifteen Mile Road and exit the property onto the adjacent neighbouring agricultural lands. Under the current operating license, the watercourse is to be unaltered and protected with a 30m environmental buffer zone from the top of each channel bank.

Medway Creek is carved in an aggregate deposit consisting of sand and gravel with some cobbles, see **Figure 3.** The reported thickness of sand and gravel varied between 6.7 and 15.5 m below ground surface.

Figure 3: Exposed Aggregate at Current Limit of 30m Buffer Zone

There are two main hydrologic cycles in Medway Creek, a wet cycle when there is variable flow from groundwater and surface water sources, and dry condition when there is no flow in the watercourse. Periods with no flow may last for a few months. This wet and dry cycle limits its ability to support or maintain healthy natural aquatic habitats. Construction activities for realignment of Medway Creek should take advantage of the dry or no flow conditions.

Even with a large watershed area, baseflows are non-existing at times. This is attributed to the extensive deposit of coarse aggregate, resulting in the loss of surface water from

the channel. The coarse granular deposits at the subject site are saturated and thus constitute a water table aquifer (Novaterra 2022).

From basic fluvial geomorphic interpretation of field data and desktop analyses the following existing channel characteristics were determined:

- Width at bankfull (Wbf)=5.4m, depth at bankfull (Dbf)=0.65m Width/depth (W/D) = 8.44m/m.
- The average grade over the length to be relocated is 0.14% (1m of fall over 600m).
- Median channel bed particle size (D50) varies from 30 to 100 mm.
- Estimated bankfull flow rate 2.95m3/s.
- The physical channel bank has a greater capacity suggesting the channel is entrenched.
- Channel sinuosity is relatively low.
- Channel system lacks a sediment supply, likely due to the upstream online ponds.
- Channel system lacks form that can support aquatic habitat features. These features are associated with and typically derived from sediment transport, and riparian vegetation and large woody debris.
- A more natural channel form and function exists at the lower portion of the watercourse just before it crosses into the downstream lands. This may be due to the ability of the channel to recruit sediments from local bank erosion.

2.2 Proposed Channel Realignment

The proposed location for the realigned channel is illustrated in **Figure 2** and the enclosed detailed design plans, see Appendix B. The proposed realignment will abandon 575 m of existing watercourse. Most of the existing watercourse and its associated 30m environmental buffer areas would be used for aggregate extraction. Each connecting end of the existing watercourse will require the placement of fill to form the new 30m environmental buffer zone areas. The net new length of watercourse will be 580m long. As the total length is generally the same, the overall grade of the watercourse will not change.

In addition to allowing for access to approximately 400,000 tonnes of aggregate the proposed channel alignment is expected to offer several additional benefits. The proposed channel will be designed with a stable channel form with a bankfull width, depth, and width to depth ratios, which are more typical of the stream's hydrologic regime and overall gradient. This will result in a slightly smaller than existing channel size, which will

provide more frequent access of high stream flows to the floodplain. This will reduce the overall level of entrenchment of the channel system.

The channel will be constructed with a riffle-pool morphology to support functions, including those required to provide aquatic habitat. This will be an overall improvement to the channel system compared to the existing channel. While the lack of riffle-pool morphology is associated with a limited sediment supply, a stone size has been selected to ensure less mobility of the constructed features. As there will be some contact with an eastern valley slope, there will be the potential for some bank erosion and recruitment of finer sediments. These sediments will aid in maintaining the riffle-pool morphology.

By relocating the channel further to the east, there will be locations where less aggregate and finer-grained soils will exist along the channel bed. This will help to reduce the potential for losses of baseflow to the underlying aggregates. Baseflows will, however, rely more on the supply of water from upstream sources. Deposits of fine-grained soils in the pools will aid in retaining water in drier periods. This has the potential to improve the quantity and quality of aquatic habitats.

To provide the target design channel dimensions, it will be necessary to cut into the gently rolling hillside along with the proposed channel's east limits. The hillside cut heights will vary and generally increase in an upstream direction. The maximum valley height cut will be approximately 5m to the invert of the channel, see design sections shown on Drawing Sheets SP-1 to SP-3. To allow for site access during construction and protect against excessive erosion of the hillside slope, a 6m wide terrace or floodplain area is proposed adjacent to the eastern watercourse bank.

As the current floodplain slopes towards the existing alignment of Medway Creek, it will have to be regraded to accommodate the proposed realignment of the channel. Most of the required floodplain areas will be along the west side of the proposed watercourse. As such, to provide high stream flows with access to the western floodplain it will be graded down with a 2% slope starting from the limits of the 30m environmental buffer, see Drawing Sheet SP-1 to SP-3. Since this area will be within the proposed 30m environmental buffer area, it will be restored with native grasses and riparian shrub and tree plantings.

To mitigate against excessive bank erosion and sediment supply, the watercourse's riparian area will be planted with a variety of native shrubs. The root systems will strengthen the topsoil to offer greater resistance to soil erosion, and the upper plant portion will increase flow roughness to reduce local scour and encourage sediment deposition. This riparian vegetation will also provide aquatic habitat values, including overhead cover and organic materials as food sources.

2.3 Topographic Survey

Greck completed a detailed topographic survey of the watercourse and existing flood plain area on November 4, 2020. Elevations are based on GPS observations from permanent reference stations in the NAD83 (CSRS-2010) coordinate system, with heights converted to orthometric elevations on the CGVD28 datum (1978 adjustment) with geoid model CGG2013, as supplied by Natural Resources Canada. The survey was used to develop a topographic base plan with 0.25m contours.

The geodetic reference used for the survey is noted on the design plans. This reference should be used to facilitate layout of the proposed channel works.

2.4 Watercourse Hydrology and Hydraulics and Flood Hazards

Correspondence with UTRCA confirmed that there is no available hydraulic and hydrologic modelling specific to this portion of the Medway Creek. Under the Conservation Authority Act (CA Act) Section 28 (11), areas licensed for aggregate extraction under the AR Act are exempt from Conservation Authority permitting activities. However, Conservation Authorities may bring local environmental and watershed knowledge into the application review process. For this reason, consideration was given to what potential impacts may occur as a result of the proposed works.

It was concluded that the proposed works will have no significant impacts to watershed hydrology or watercourse hydraulic as it may relate to flood and erosion hazards. The proposed channel realignment works will not significantly alter the runoff surface or infiltration potential of the lands. As such, no significant alteration, increase or decreases in flood hazard flow will occur as a result of the proposed works.

With respect to flood hazards associate with channel flow hydraulics no increased hazards will occur. Alteration in the channel alignment only affect the hydraulics within the watercourse. The goal of the channel realignment works is to replicate the existing channel system. As such channel hydraulics will be similar. During major storm event the channel will be allowed to spill its bank and have access to it floodplain for conveyance and flood water storage as currently occurs.

While some fill will be imported to the site in form of topsoil to support vegetation growth the need to excavate the valley slopes will result in a net cut of land. As such, no increase in flood hazards is anticipated.

With respect to erosion hazards which may be associated with valley slopes none are anticipated. The valley wall slopes as typically low with a maximum height of 5m. These slopes will be cut steeper than 2.5:1 and vegetated.

3.0 DETAILED DESIGN ELEMENTS

The proposed watercourse realignment works consist of the following:

- Site Erosion and Sediment Controls (ESC), and water management,
- Site clearing, and excavation,
- Natural channel feature construction, and
- Site restoration.

Provided in the following sections are details of the proposed construction works.

3.1 ESC and Water Management

This section summarizes the construction phasing, ESC, and water management requirements. Requirements for soil erosion control and off-site sediment transport are required to protect the downstream stability and aquatic habitats within Medway Creek. This includes both the downstream off-site reach and the reach to be relocated.

The primary requirements for ESC's are associated with the following activities:

- Movement of heavy machinery,
- Temporary stockpiling of materials,
- Excavation for the proposed channel and floodplain works,
- Stream flows and groundwater seepage through the active construction site, and
- Post construction site restoration.

It is noted that all parties involved with the construction of the proposed works have various roles and responsibilities for the design, approval, construction, monitoring maintenance and removal of environmental protection works. The Contractor should provide a qualified Environmental Inspector who will be responsible for the enforcement of water quality protection measures/controls.

3.1.1 General Requirements

Requirements for ESC for protection of the natural environment is strictly regulated. A significant component of the approvals to carry out the proposed works requires adherence to the implementation of measures outlined to protect the existing aquatic environment and the use of suitable ESC practices. The proposed design plans have given consideration for implementation of various ESC measure to satisfy regulatory requirements and objectives. Presented below is a list of the specific requirements as provided in the DFO 'Letter of Advice' dated 11 December 2023.

- Plan in-water works, undertakings and activities to respect timing windows to protect fish and fish habitat.
    - Restricted Activity Period March 15 to July 15.
- Limit the duration of in-water works, undertakings and activities so as to not diminish the ability of fish to carry out one or more of their life processes (e.g., spawning, rearing, feeding, migrating).
- Screen intake pipes to prevent entrainment or impingement of fish.
    - Follow the Interim code of practice: End of pipe fish protection screens for small water intakes in freshwater, when using pumps.
- Capture and relocate any fish trapped within an isolated/enclosed work area and safely relocate them to an appropriate location in the same waterbody.
    - Dewater gradually to reduce the potential for stranding fish.
    - Relocate any fish as per applicable permits for capturing and relocating fish.
- Use temporary cofferdams and diversion channels to isolate a section of a watercourse or water body in order to conduct works, undertakings and activities in the dry while maintaining the natural downstream flow.
    - Follow the Interim standard: in-water site isolation, when using temporary cofferdams and diversion channels.
- Maintain fish passage during all phases of works, undertakings and activities.
    - Avoid changing flow or water levels. Avoid obstructing and interfering with the movement and migration of fish.
    - Maintain an appropriate depth and flow (i.e., base flow and seasonal flow of water).
    - Conduct works, undertakings and activities during periods of low flow.
- Maintain an appropriate depth and flow (i.e., base flow and seasonal flow of water) for the protection of fish and fish habitat.
- Salvage, reinstate or match habitat structure (e.g., large wood debris, boulders, instream aquatic vegetation/substrate) to its natural state.
- Install effective erosion and sediment control measures prior to beginning works, undertakings and activities.
    - Schedule work to avoid wet, windy and rainy periods and heed weather advisories.
    - Use only clean materials (e.g., rock, coarse gravel, wood, steel, snow) for works, undertakings and activities.
    - Use appropriate isolation materials and designs to minimize disturbance to the bed and banks of the watercourse or water body.

- Conduct all in-water works, undertakings and activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse.
- Dispose of and stabilize all excavated material above the ordinary high-water mark or top of bank of nearby water bodies and ensure sediment re-entry to the watercourse is prevented.
- Regularly inspect and maintain the sediment control measures and structures during all phases of the project.
- Regularly monitor the watercourse for signs of sedimentation during all phases of the works, undertakings and activities and take corrective action when needed.
- Keep the erosion and sediment control measures in place until all disturbed ground has been permanently stabilized.
- Remove all sediment control materials once site has been stabilized.
- Develop and immediately implement a response plan to prevent deleterious substances from entering a water body.

3.1.2 Consideration for Stages of Construction

For the purpose of ESC three (3) stages of construction are proposed. These stages and the general ESC methodology is outlined below. ESCs are to be adjusted as needed for each stage.

Site Preparations

Access to the construction site will be from Adelaide Street North. There is adequate space for access by heavy machinery and temporary material storage at this location. A mud mat is proposed at the entrance way to Adelaide Street to limit soil tracked on to the roadway by vehicular traffic.

ESC's including silt socks and silt fencing works are proposed around the material storage area and along the access road as shown on the design plans.

Layout of the entire channel work site will be completed at this time to identify how construction methodologies may present the need for site specific ESCs. To limit the potential for soil erosion, construction activities will be directed towards limiting the area of disturbance.

Where soils become exposed due to a loss of vegetative cover, silt fencing and/or erosion control blankets are to be applied.

Stage 1

Stage 1 requires partial construction of the proposed natural channel in the dry. Normal stream flows in Medway Creek will be conveyed in the existing channel by only

constructing of the proposed channel system from approximately station 0+070 to 0+535. Earthworks will include those required for the channel system, floodplain and valley slope regrading. The valley slopes will be cut to a slope of 2.5:1 (H:V). These slopes will be protected with a layer of topsoil, seed and erosion control blanket.

The start and ending reaches of the proposed channel will act as temporary earth plugs restricting the passage of stream flows into the work site. This will allow the channel realignment work to occur in the dry. The length of these reach has been selected based on the need for the soils in these plugs to be used as fill to form the floodplain, buffer area and fill for the abandoned natural channel reach.

It is noted that the abandon natural channel reach will not be entirely backfilled, as it will ultimately be excavated for aggregate extraction. Only the portion which will form the 30 m environmental buffer will be backfilled.

Should groundwater be encountered during the excavation of this work dewatering operations may be required. All dewatering operations will pump sediment laden water in a suitable filtering system as shown on the design plans or as may be approved by the Contract Administrator. As needed intake pipes for pumping operations will be screened to prevent entrainment or impingement of fish.

All required instream natural channel features are to be installed into this reach of watercourse prior to proceeding to the next stage. The constructed in stream works will include the use of stone, vegetation, seed and erosion control blanket to limit the short- and long-term potential for soil erosion once flows are introduced into the channel.

Stage 2

Stage 2 consists of the following:

- Installing temporary stream flow bypass works,
- Construction of the lower new channel reach and
- Backfilling the existing lower channel reach.

Construction of the lower channel reach removes the temporary earth plug. To prevent the backwater of stream flows from the existing channel into the active construction area, clean flow in the existing channel will be temporarily pumped further downstream to bypass the site. To further limit the potential for sediment discharges, the remaining channel will be constructed incrementally in a downstream direction until it is fully connected into the existing channel.

Dewatering and filtration of sediment laden water is to be implemented as needed to prevent sedimentation of the existing and newly constructed natural channel system.

Material excavated to create the new natural channel is to be used as fill in the former natural channel reach.

Flow bypass operations are to remain in operation until the upstream connection in Stage 3 is implemented. Due to typically dry and no baseflow during the summer months flow bypass operations are likely to be minimal.

Stage 3

Stage 3 consists of the following:

- Installing temporary stream flow bypass works,
- Construction of the upper new channel reach and
- Backfilling the existing upper channel reach.

Construction of the upper channel reach removes the temporary earth plug. To prevent the stream flows entering the active construction area, clean flow in the existing channel will be temporarily pumped further downstream to bypass the site. To further limit the potential for sediment discharges, the remaining channel will be constructed incrementally in an upstream direction until it is fully connected into the existing channel.

Dewatering and filtration of sediment laden water is to be implemented as needed to prevent sedimentation of the existing and newly constructed natural channel system.

Material excavated to create the new natural channel is to be used as fill in the former natural channel reach.

Flow bypass operations at both the upstream and downstream ends are to be removed once the newly constructed natural channel is inspected and confirmed to be operational.

3.2 Channel and Floodplain Excavation

The most significant construction operations required at the project site will be excavation of the proposed natural channel system and the grading of its associated floodplain. Excavation will require the removal of an estimated 46,560 m^3 of the native soils. The excavation will take place east of the existing watercourse and lie along the east shallow valley slopes of Medway Creek. A portion of the east floodplain and riparian zone (typically 5m) for the proposed natural channel will be constructed by excavating into the east valley slope. The excavated works will preserve a 30m environmental buffer on each side of the newly aligned Medway Creek. Portions of this buffer area will include the east valley slopes, see proposed channel section shown on Drawings SP-1 to SP-3

In plan form, the channel has a sinuous alignment required to maintain long term natural stability, provide aquatic habitat diversity and to maintain the existing total aquatic habitat area.

In profile, the channel has a relatively shallow grade of 0.14% which is governed by the tie in locations to the existing channel system and the required channel length. Initially

the long channel profile will be uniformly excavated. Minor grading of the channel section will be required to provide the channel cross sectional shape required at riffles and pool. Further definition of riffles and pools is provided with the addition of channel features, see section below.

In the cross sections, two typical channel section are to be used, one for riffles and one for pools. Riffles will be symmetrical with 2.5:1 channel banks leading to a low point or the channel thalweg in the centre. The channel bed will have a cross fall grade of 10:1. At pools, typically located at meander bends, will have an asymmetric section. A bed grade from the channel bank located at the inner channel bend will be graded to at 10:1 to 2.5:1 to represent a point bar. The opposite outer bend bank will be steeper at 2.5:1. The deepest part of the channel will lie on this outer half of the channel section.

Site clearing operations will have no impacts to significant existing natural environmental features. Most of the site is disturbed and has been used for agricultural purposes. There are no notable natural environmental features within the immediate vicinity of the site. The nearest woodlot is 350m southwest of the license boundary. There is no Provincially Significant Wetlands (PSW) within at least a 500m perimeter from the subject site. A small northwestern section of the site falls within the Elginfield Area Moraine, Area of Natural and Scientific Interest (ANSI). This ANSI feature carries provincial significance in the Earth Science field and is classifies as non-sensitive (Novaterra 2022).

Most of the excavated soils can be considered as the normal overburden materials found at this operating pit site. These materials can be temporarily stockpiled on site for future use by the landowner. The excavation is expected however to make some contact with the natural sand and gravel deposits.

The site is to be excavated to an elevation of 288.26m at the upstream end and to 287.44m at the downstream end. Seasonal and isolated contact with groundwater sources is possible, however during construction it is not expected.

Generally, the excavated channel dimensions will be slightly greater than the proposed channel size as material will be added to provide morphological features (riffles), and aquatic habitats.

3.3 Channel Features Construction

Important channel features are proposed to ensure long term channel stability. These features also provide aquatic habitat diversity to the channel and will provide a net ecological improvement to the watercourse. The features proposed include the placement of:

- Fine soil substrate along the channel bed and banks,
- Riffle stone,

- Riparian plantings and
- Large woody debris.

Much of the channels base flow from either upstream or local groundwater sources is lost to the naturally porous aggregate substrate. By relocating the channel further east and away from this aggregate deposit where there is an opportunity to contact more natural finer grained soils which have lower permeability. The lower permeability has the potential to retain base flows in the channel system; thereby providing enhanced aquatic habitat values. To ensure this is achieved a 100mm layer of fine grained silty/clay soils is proposed along the entire reach of the proposed natural channel system.

Pools will be formed at selected locations. The pool depth will be defined by the riffle crest elevation. The pool depth will be sustained by the stability of the riffle crest stone and by the cross-sectional shape of the channel at the pool section. Typically riffle sections are to be graded so the thalweg or deepest part of the channel lies on average along the centre of the channel. The pool cross sections will be graded so the thalweg is located to the outer half of the channel section along the channel bends. This will concentrate channel flows and limit sedimentation of the pool.

The diversity in channel velocities and flows depths at the pools and riffles will provide diversity in aquatic habitats.

As lateral channel migration is a long-term natural channel process, provisions are provided to limit the rate of this migration. The banks and soils at the outer bend of channel meanders will be reinforced with native riparian vegetation. A common soil bioengineering practice is proposed which consists of placing live plants (mostly shrubs) within the stone and along the riparian area at the locations shown on Drawings RP. In addition to enhancing the strength of the soils the riparian plantings add roughness to the channel during periods of bankfull flow. This roughness reduces local channel flow velocity thereby reducing the scour potential along the channel banks.

In addition to providing long term channel stability these works will provide enhancements to aquatic and terrestrial habitats.

To provide additional scour protection for the banks along riffle reaches the use of large woody debris is proposed at select locations. This debris will consist of logs or rootwads which extend into the active channel flow and angled in an upstream direction. The log alignments are designed to refract stream high flows towards the centre of the channel riffle. The large woody debris feature further enhance aquatic habitat to the channel system.

3.4 Site Restoration

Upon completion of channel realignment works the following site restorations are proposed.

- Locally native trees and shrubs are to be planted as shown on the design plans to provide long term soil stabilization and enhance ecological benefits along the riparian area and within the 30m environmental buffer area.
- The site access road is to be restored to original conditions for agricultural purposes. This may require the decompaction of the soil surface.
- All exposed soil surfaces associated with construction activities are to have a 300mm layer of topsoil which is seeded using Ontario Seed Company (OC) Rural Ontario Roadside Native Seed Mixture 8145, supplemented with 2% milkweed species and a cover crop.
- Cover Crop to include (Avena sativa) Oat 40%, (Hordeum vulgare Barley) 45%, (Elymus canadensis) Canada Wild Rye 15%, Dry seeds at 15 kg/ha.
- All seeded surface with a grade of greater than 4:1 or 25% are to have an erosion control blanket(Terrafix SC200B straw/coconut double net or approved equivalent) applied.

The proposed plant species have been selected from existing species found on site. Further details are provided in Natural Environmental Heritage Report (Terrastory 2024).

4.0 LONG-TERM MONITORING AND ADAPTIVE MANAGEMENT.

A key component to the restoration process is implementation of a monitoring program. The monitoring program not only allows for documentation of the restoration process but to also allows for a process of adaptive management.

Monitoring for the first two years is important for the purpose of identifying deficiencies associated with the constructed works.

Post-construction monitoring and analysis is useful in evaluating the effectiveness of temporary and permanent restoration measures. If necessary, remedial action should be taken to repair/replace any erosion control measures that may have failed or are not functioning properly.

In addition, monitoring will be used to assess whether the anticipated outcomes of the channel realignment are met and whether any unexpected and possibly detrimental outcomes arise (e.g. new channel is abandon or an alternative plan form develops).

Monitoring of the site should consider both biological and physical stability elements and for a period of two to five years post-construction. Annual inspection reports are recommended as part of the monitoring program.

Items to consider in the monitoring program include but are not limited to:

- General description of the physical changes to the site.
- Scour in and around the channel works.
- Earth slope stability, settling, and surface erosion.
- Channel bed aggradation or degradation.
- Health and density and species of riparian vegetation growth.
- Presence of invasive species.
- Survival of planted vegetation.
- Evidence of aquatic habitats improvements.
- Changes in water quality.

5.0 REFERENCES

Novaterra Environmental Ltd. (November 22, 2022) HYDROGEOLOGICAL ASSESSMENT - In Support of a Major Site Plan Amendment to the License of Stanley Pit (MNRF License 2191) - Part Lot 13, Concession 14, Municipality of Middlesex Centre (Formerly London Township), Middlesex County, Ontario.

Terrastory Environmental Consulting inc. (April 5, 2024) Natural Environmental Report – Aggregate Resources Act License Amendment Stanley Pit, Middlesex Center.

APPENDIX A
STANLEY PIT – MEDWAY CREEK CHANNEL REALIGNMENT CONCEPT

Technical Memorandum

To: McCann Redi-Mix

Bill McCann (McCann Redi-Mix)

From: Brian Greck, P. Eng. (Greck and Associates Limited)

cc: Paul Aarts,
Bernie Janssen, (Harrington McAvan Ltd.)
Tristan Knight, M.E.S., M.Sc. (Terrastory Environmental Consulting Inc)

Date: February 10, 2021

Re: Stanley Pit – Medway Creek Channel Realignment Concept-
Draft for Discussion

Background

The following technical memorandum has been prepared for the proposed realignment of Medway Creek on the Redi Mix Stanley Pit located at:

North Half of Lot 13, Concession 14
Former London Township
Now in The Township of Middlesex Centre
Ontario

Reach coordinates to be aligned:

Upstream extent - 474213.9976 E: 4777508.9446 N
Downstream extent - 474170.3702 E: 4777058.5010 N

This memorandum was prepared for pre-consultation/discussion purposes with regulatory agencies, particularly the Ontario Ministry of Natural Resources and Forestry (MNRF) and Upper Thames River Conservation Authority (UTRCA). This memorandum is to be reviewed with the concept plan prepared for the proposed channel works.

Medway Creek flows in a general north to south direction through the Stanley Pit site. The contributing watershed area is 6241ha or 62.4km^2. Flows enter the property at a bridge located on Fifteen Mile Road and exit the property onto the adjacent neighbouring agricultural lands. Under the current operating license, the watercourse is to be unaltered and protected with a 30m buffer zone from the top of each channel bank.

To obtain access to what is generally considered to be readily extractable aggregate (**Figure 1**), the owner of the property proposes to realign the watercourse.

Figure 1: Exposed Aggregate at Current Limit of 30m Buffer Zone

Greck and Associates Limited (Greck) was retained to prepare detailed design plans for the proposed realignment works. In support of this objective and preparation of the concept plan, Greck worked with other technical team members, including:

- The owner,
- Pit operators,
- Environmental and Aggregate Resource Planning consultants: Terrastory Environmental Consulting Inc. and Harrington McAvan Ltd., respectively

Generally, the preferred concept is to relocate the watercourse to the east of its current location (**Figure 2**).

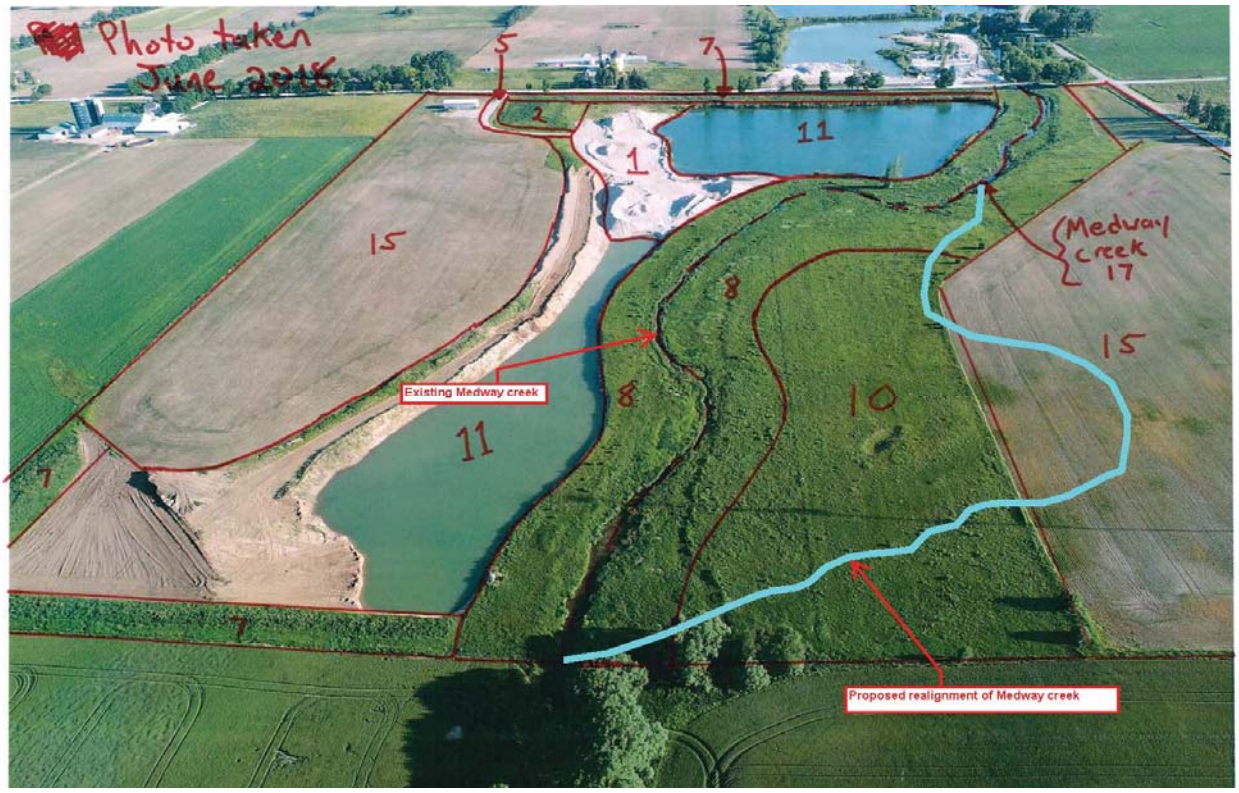


Figure 2: Stanley Pit Site with Medway Creek and Proposed Creek Alignment

The following general design objects and/or constraints were considered when assessing alternative concepts:

1. Maximize the area available for extracting aggregate.
2. Provide a new channel location that will replicate the existing channel form and function from a natural channel perspective. This included:
    a. Ensuring the watercourse hydraulic functions such as baseflow, bankfull flow and flood flows are maintained or improved, by allowing improved access to the floodplain
    b. A stable channel form is constructible which allows for natural channel processes to occur, such as sediment transport.
    c. The overall aquatic habitat area within the channel can be maintained.
3. Provide space that will allow for a 30m natural buffer zone from each channel bank.
4. Minimize earthworks required to remove overburden to construct the watercourse.
5. Where opportunities exist, provides features that will enhance the natural attributes of the channel and riparian area (e.g., plantings, introduction of coarse woody debris, etc.).

Existing Channel System

The watercourse was walked and examined by a professional water resources / civil engineer with considerable natural channel systems knowledge and natural channel design experience to undertake this design. There was no water in the watercourse at the time of inspection (October 23, 2020). This allowed for a close examination of channel features such as pool, riffles, and runs. Selected photographs of the watercourse are provided in **Figure 3** through **Figure 7.**

Figure 3: Existing Channel Riffle with no Stream Flow

Figure 4: Existing Channel Pool Riffle with no Stream Flow

Figure 5: Existing Channel with Grass Invert

Figure 6: Existing Channel Riffle with Riparian Grasses and Stream Flow

Figure 7: Existing Channel Pool with Stream Flow

Even with a large watershed area, no baseflows can occur. This is attributed to the extensive deposit of coarse aggregate, resulting in the loss of surface water from the channel. The recharge of water, however, is likely a valued resource further downstream within the watershed.

Greck completed a detailed topographic survey of the watercourse and existing flood plain area on November 4, 2020. The survey was used to develop a topographic base plan with 0.25m contours, conduct cut and fill analyses, and prepare alternative channel alignment plans for consideration by the design team. The topographic area surveyed is illustrated in the attached concept plan.

A hydrologic model for the watershed was prepared to estimate return period flows. These flow rates will be used to replicate the hydraulic characteristic of the existing channel system to those of the proposed channel. The flow rates are to be incorporated into a hydraulic model such that it can be demonstrated that there are no adverse impacts to flood hazards, which the UTRCA regulates.

Baseflows within the channel are strongly correlated to groundwater elevations, as the channel functions as both a gaining and losing flow system. This has been documented in regular groundwater monitoring studies prepared by others and during a site visit when the channel was observed to have no flow and limited water in small pools. Some sections of the stream bed have become vegetated where sufficient sediment have accumulated or resulted from collapsed channel banks (**Figure 5**). This wet and dry cycle limits its ability to support or maintain permanent natural aquatic habitats. This results in periodic die-offs of non motile or semi-motile organisms (e.g., mussels, some benthic invertebrates, etc.) or exposure of such organisms to predation on an annual basis.

The watershed is largely undeveloped, open agricultural land uses. Immediately upstream of the subject property, one licensed pit (No 2084 County of Middlesex)_ and two former licensed pits exists and has several online ponds within Medway Creek. The online ponds likely provide some attenuation of peak flows for minor, high-frequency wet weather events.

A review of historical aerial photographs and field inspections indicates that the channel is stable and indicative of its hydrologic regime, the native soils, the hard aggregate sub pavement and the type of anthropogenic changes within the watershed.

Basic fluvial geomorphic interpretation of field data and desktop analyses indicate the following channel characteristics:

- Width at bankfull (Wbf)=5.4m, depth at bankfull (Dbf)=0.65m Width/depth (W/D) = 8.44m/m.
- The average grade over the length to be relocated is 0.17% (1m of fall over 600m). Median channel bed particle size (D_{50}) varies from 30 to 100 mm.
- Estimated bankfull flow rate 2.95m^3/s. Similar to Q_{2yr}= 2.46m^3/s.
- Physical channel bank has a greater capacity of 10m^3/s to 14m^3/s and will contain flows up to and including the 25-year design storm. This indicates the channel is entrenched.
- Channel sinuosity is relatively low.
- Channel system lacks a sediment supply, likely due to the upstream online ponds.
- Channel system lacks form that can support aquatic habitat features. These features are associated with and typically derived from sediment transport, and riparian vegetation and large woody debris, i.e., not well define riffles and pools, point bars, undercut banks.
- A more natural channel form and function exists at the lower portion of the watercourse just before it crosses into the downstream lands. This may be due to the ability of the channel to recruit sediments from local bank erosion.

The channel, for the most part, has degraded to the native aggregate deposit. The aggregate is of sufficient size and quantity that the stream has little ability to shear materials for complex riffle pool formations. The lack of deep-rooted riparian vegetation, likely attributed to historical agricultural land uses practices, has resulted in channel over widening. Furthermore, the presence of online ponds upstream of the subject property also acts as sinks for upstream sediment transport. As such, this has led to an entrenched channel system.

Well defined riffle pool features were generally limited to two locations within the channel system; the lower reaches immediately upstream of the south property line and at a meander bend where deep-rooted riparian vegetation was present.

Proposed Channel Realignment

The proposed location for the realigned channel is illustrated in **Figure 2** and attached concept plan. The proposed realignment will abandon the existing watercourse. Most of the existing watercourse and it associated 30 m buffer areas would be used for aggregate extraction. Each connecting end of the existing watercourse will require the placement of fill to form the new 30 m buffer zone areas. Approximately 605m of the existing watercourse will be replaced with 595m of new watercourse. As the total length is generally the same, the overall grade of the watercourse will not change.

In addition to allowing for access to approximately 400,000 tonnes of aggregate the proposed channel alignment is expected to offer several additional benefits. The proposed channel will be designed with a stable channel form with a bankfull width, depth, and width to depth ratios, which are more typical of the stream's hydrologic regime and overall gradient. This will result in a slightly smaller than existing channel size, which will provide more frequent access of high stream flows to the floodplain. This will reduce the overall level of entrenchment of the channel system.

The channel will be constructed with a riffle-pool morphology to support functions, including those required to provide aquatic habitat. This will be an overall improvement to the channel system compared to the existing channel. While the lack of riffle pool morphology is associated with a limited sediment supply, a stone size can be applied to ensure less mobility of the constructed features. As there will be some contact with an east valley slope, there will be the potential for some bank erosion and recruitment of finer sediments. These sediments will aid in maintaining the riffle pool morphology.

By relocating the channel further to the east, there will be locations where less aggregate and finer-grained soils will exist along the channel bed. This will help to reduce the potential for losses of baseflow to the underlying aggregates. Baseflows will, however, rely more on the supply of water from upstream sources. Deposits of fine-grained soils in the pool will aid in holder water in drier periods. This has the potential to improve the quantity and quality of aquatic habitats.

To provide the target design channel dimensions, it will be necessary to cut into the gently rolling hillside along with the proposed channel's east limits. The hillside cut heights will vary and generally increase in an upstream direction. The maximum valley height cut will be 5m to the invert of the channel, see Concept Plan Section A-A to D-D. To allow for site access during construction and protect against excessive erosion of the hillside slope, a 6m wide terrace or flood plain area is proposed adjacent to the east watercourse bank.

Most of the required floodplain areas will be along the west side of the proposed watercourse. To provide high flows with access to the west floodplain, it will be necessary to grade this land, see Concept Plan sections. Since this area will be within the proposed buffer 30m area, it will be restored with native grasses and riparian shrub plantings.

To mitigate against excessive bank erosion and sediment supply, the watercourse's riparian area will be planted with a variety of native shrubs. The root systems will strengthen the topsoil to offer greater resistance to soil erosion, and the upper plant

portion will increase flow roughness to reduce local scour and encourage sediment deposition. This riparian vegetation will also provide aquatic habitat values, including overhead cover and organic materials for food sources. The concept for the typical channel section is illustrated in **Figure 8**.

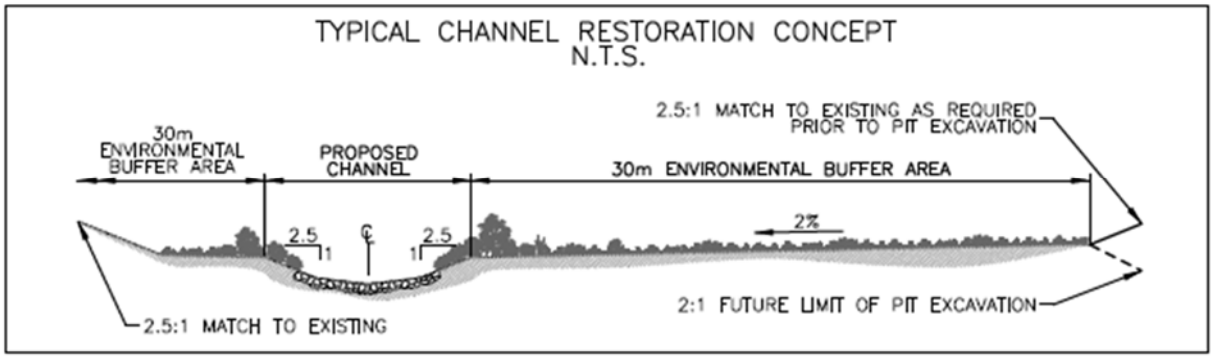


Figure 8: Proposed Channel and Flood Plain Concept.

Conclusions

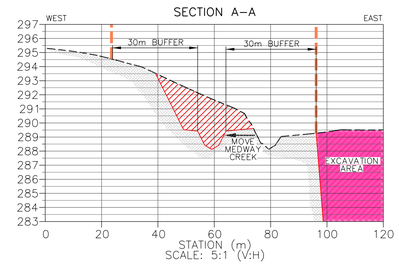
To provide access to approximately 400,000 tonnes of readily accessible aggregate resources, it is proposed that Medway Creek be relocated east of its current location. Field and desktop analyses indicate that approximately 600 m of watercourse can be safely constructed to satisfy this goal.

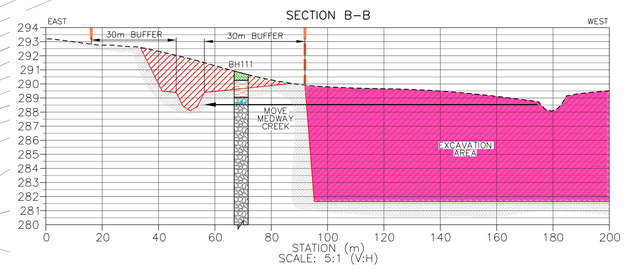
To proposed realignment concept for Medway Creek will provide the following:

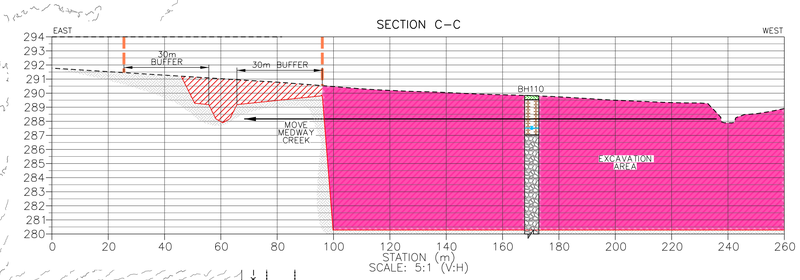
1. A channel form which is stabile and compatible with the natural tendencies for the creek.
2. Has works which have low future maintenance and maintain or reduce the need for additional future works.
3. Respects the value and status of the local environment, provides a 30m buffer zones and an opportunity to provide environmental enhancements.
4. Has good construction feasibility.

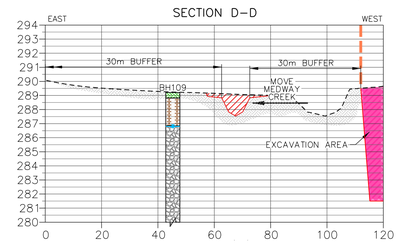
PLOT SCALE: 1:0.0254 DATE PLOTTED: 2021-02-10

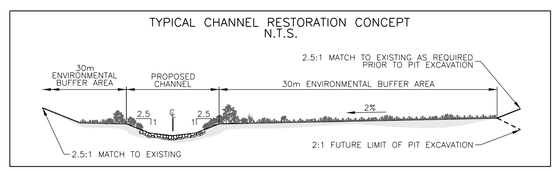
F:\CloudStation\Projects\2020\20-722 - Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn

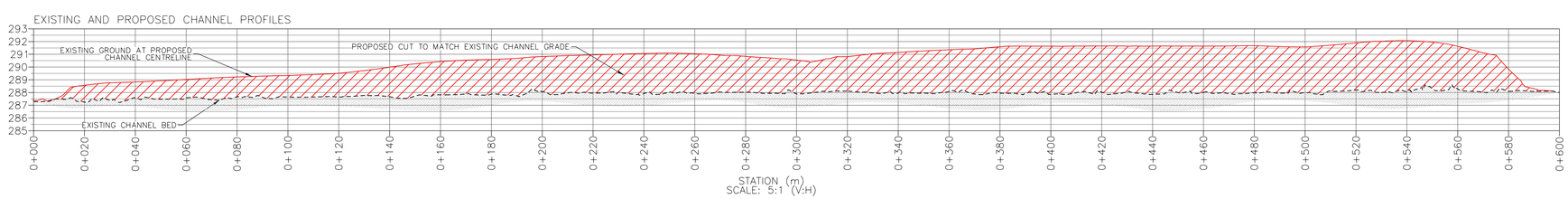


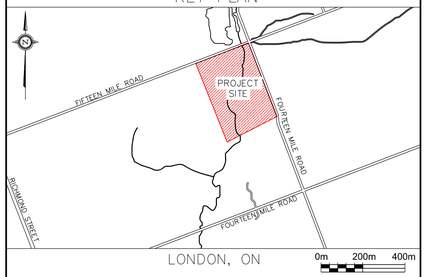












NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL IS 0.25m.
3. TOPOGRAPHIC SURVEY INFORMATION
   - COORDINATE SYSTEM : UTM ZONE 17 N (GRID)
   - HORIZONTAL DATUM : NAD83 (CSRS – 2010)
   - VERTICAL DATUM : CGG2013
   - VERTICAL CONTROL : OBSERVED GPS ELEVATIONS
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. ALL WORK SHALL BE IN ACCORDANCE WITH CURRENT CITY OF TORONTO STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
6. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY CITY OF TORONTO, AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD).
7. THE CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G AND OVERHEAD UTILITIES. CONTRACTOR IS REQUIRED TO OBTAIN ALL LOCATIONS & NOTIFY THE VARIOUS UTILITY COMPANIES 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK. THE CITY OF NORTH YORK AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATIONS OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED

SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- WATERLINE AT TIME OF SURVEY
- 292.00 CONTOUR MAJOR – 0.25m INTERVAL
- 292.25 CONTOUR MINOR – 0.25m INTERVAL
- 292.00 LIDAR CONTOUR MAJOR – 0.25m INTERVAL
- 292.25 LIDAR CONTOUR MINOR – 0.25m INTERVAL
- EXISTING WIRE FENCE
- EXISTING VEGETATION LINE
- BH-XXX 2005 BOREHOLE
- 500mm EXISTING DECIDUOUS TREE AND DBH
- PROPOSED CHANNEL TOP OF BANK
- PROPOSED 30m ENVIRONMENTAL PROTECTION BUFFER
- PROPOSED EXTRACTION AREA ~47,500m²
- PREVIOUSLY PROPOSED EXTRACTION AREA ~27,300m²

BOREHOLE LEGEND

(REFER TO ATKINSON, DAVIS INC. REPORT, DATED MAY 2, 2005 REPORT FOR FULL DETAILS)

- TOPSOIL
- BROWN CLAYEY SILT
- BROWN CLAYEY SILT, SOME COBBLES
- SAND AND GRAVEL, SOME COBBLES
- GROUND WATER ELEVATION

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY

STANLEY PIT FLOOD STUDY & CHANNEL DESIGN

CONCEPT 3

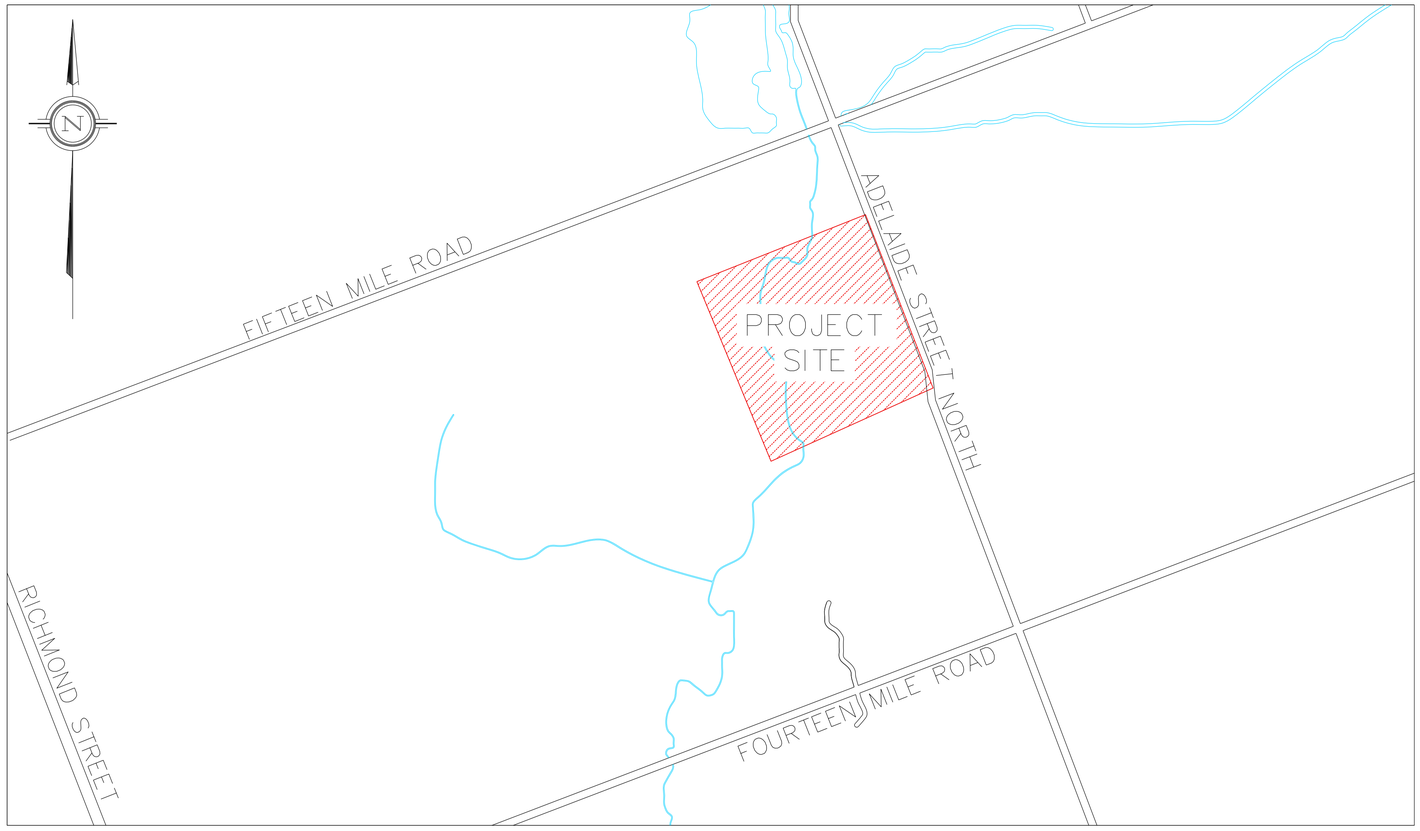
DATE:	DESIGN BY	DWG. BY	APPD. BY
OCTOBER 2020	B.G.	P.G.	B.G.

SCALE:	DRAWING NO.	PROJECT NO.
1:1000 (0m 20m 40m)	SHEET NO.	20-722

APPENDIX B
DESIGN DRAWINGS

STANLEY PIT
NATURAL CHANNEL RELOCATION

PART LOT 13, CONCESSION 14, MUNICIPALITY OF MIDDLESEX CENTRE
(FORMERLY LONDON TOWNSHIP), MIDDLESEX COUNTY, ONTARIO



KEY MAP
(NOT TO SCALE)

INDEX TO DRAWINGS

SHEET NUMBER	DRAWING NUMBER	DRAWING TITLE
1	GP	GENERAL PLAN, REMOVALS AND NOTES
2	ESC-1	EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
3	ESC-2	EROSION AND SEDIMENT CONTROL STAGING PLAN
4	SP-1	SITE PLAN, PROFILE AND SECTIONS - STN. 0+000 TO 0+200
5	SP-2	SITE PLAN, PROFILE AND SECTIONS - STN. 0+200 TO 0+400
6	SP-3	SITE PLAN, PROFILE AND SECTIONS - STN. 0+400 TO 0+590
7	SGP	GENERAL SITE GRADING PLAN
8	CD	CONSTRUCTION DETAILS
9	RP	SITE RESTORATION PLAN

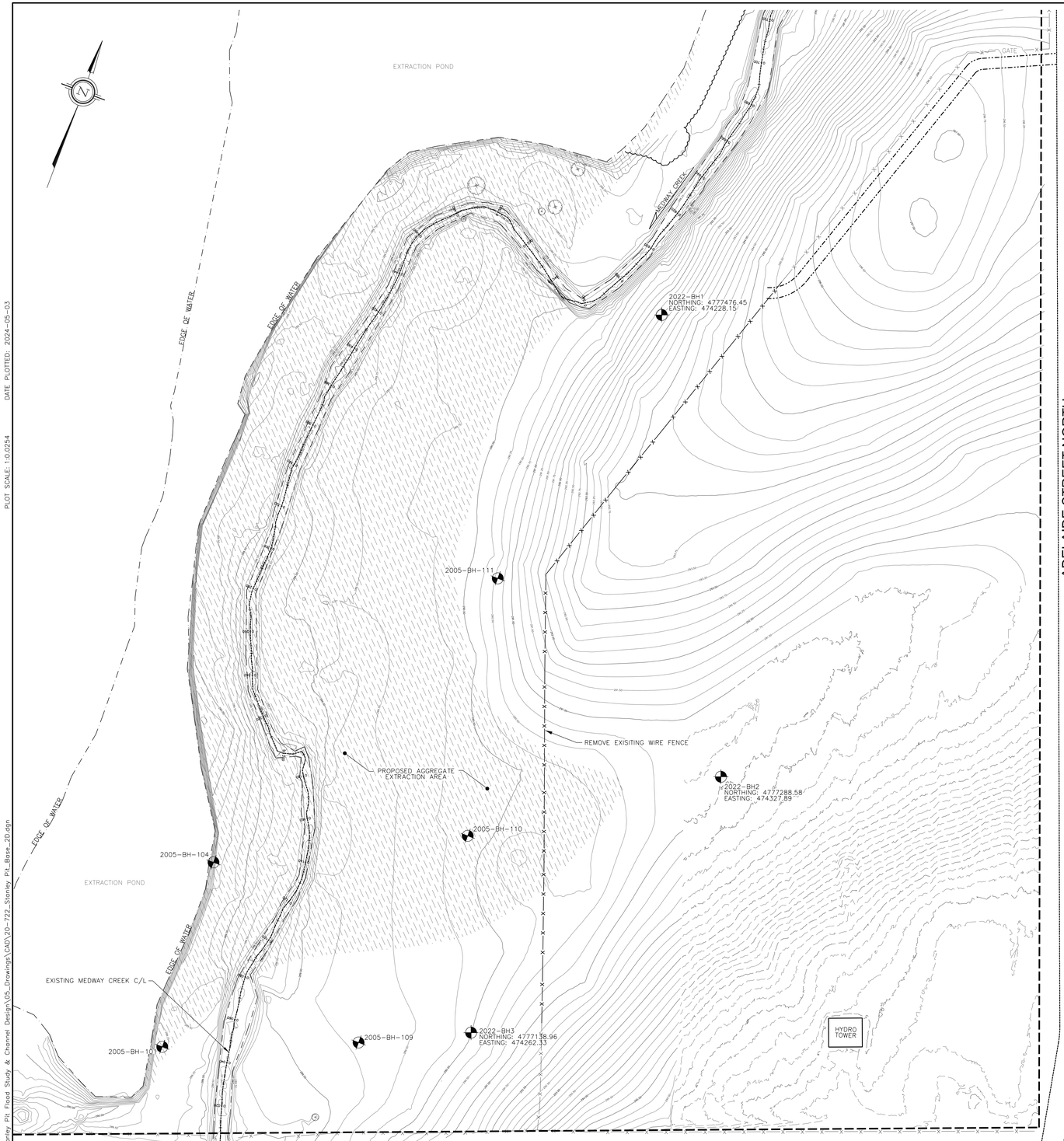
CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953
McCANN REDI-MIX
More Than Concrete

Greck

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03

F:\Projects\2020\20-722 - Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn



PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03

F:\Projects\2020\20-722 - Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn

GENERAL NOTES

1. THIS SET OF DRAWINGS IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN METRIC UNITS AND REFERENCED TO GEODETIC DATUM, UNLESS OTHERWISE SHOWN.
3. ALL DIMENSIONS TO BE CHECKED AND VERIFIED ON SITE BY THE CONTRACTOR AND ANY DISCREPANCIES REPORTED TO THE SITE ENGINEER.
4. SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT AND SURVEY CONTROL DURING CONSTRUCTION. THIS INCLUDES THE EXACT ROUTE FOR SITE ACCESS.
6. THE CONTRACTOR IS RESPONSIBLE FOR EXACTLY LOCATING ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR IS TO ENSURE ALL EXISTING INFRASTRUCTURE (IF APPLICABLE) IS PROTECTED FROM DAMAGES DURING CONSTRUCTION AND WILL BE HELD RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ANY DAMAGES INCURRED DUE TO CONSTRUCTION.
7. THE CONTRACTOR SHALL DELINEATE THE REQUIRED WORKING AREA ON-SITE PRIOR TO THE START OF WORK AND SHALL CONFINE OPERATIONS WITHIN THE DEFINED AREA.
8. WORKING AREA(S), ACCESS REQUIREMENTS, AND TEMPORARY MATERIAL STORAGE AREA(S) ARE TO BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR AT ALL TIMES. AREAS AFFECTED BY THE CONTRACTORS ACTIVITIES ARE TO BE REINSTATED TO EXISTING CONDITIONS OR BETTER.
9. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING EROSION AND SEDIMENT CONTROLS AS SHOWN IN DRAWING #ESC-2, IN GOOD REPAIR FOR THE DURATION OF CONSTRUCTION.
10. EQUIPMENT REFUELING AND MAINTENANCE TO BE COMPLETED ONLY IN DESIGNATED AREA.
11. ALL TREES TO BE REMOVED FOR PROPOSED WORKS AND SITE ACCESS ARE TO BE IDENTIFIED PRIOR TO CONSTRUCTION AND CONFIRMED WITH ENGINEER ON-SITE. TREE REMOVALS WILL ABIDE BY THE MIGRATORY BIRD WINDOW BETWEEN APRIL 1 AND AUGUST 31. SMALL TREES MAY BE SALVAGED AND REPLANTED ON SITE.
12. DISTURBANCE TO THE EXISTING VEGETATED FLOOD PLAIN AREA AND OR WOOD LOT SHOULD BE MINIMIZED. THE LIMITS OF DISTURBANCE ARE TO BE IDENTIFIED AND CLEARLY MARKED PRIOR TO CONSTRUCTION.
13. ALL GENERAL BACKFILL TO BE OF APPROVED MATERIAL AND COMPACTED TO A MINIMUM 95% PROCTOR DENSITY UNLESS OTHERWISE STATED.
14. ANY DAMAGES TO THE SITE ACCESS ROUTE IS TO RESTORED TO EXISTING CONDITIONS OR BETTER UPON COMPLETION OF WORKS. ALL EXPOSED SOIL AREAS ARE TO BE COVERED WITH NATIVE SEED MIX, SEE DRAWING #RP, UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND LEGAL DISPOSAL OF ALL DEBRIS AND EXCESS MATERIAL(S) AS PER OPSS180.
16. ALL INSTREAM WORKS ARE TO BE COMPLETED WITHIN A TIMING WINDOW OF JULY 15 TO MARCH 15, UNLESS OTHERWISE NOTED OR APPROVED WITH THE ASSOCIATED PERMIT(S). NO EQUIPMENT SHALL BE IN AN ACTIVE FLOWING WATERCOURSE.
17. CONSTRUCTION TO PROCEED AS PER GENERAL CONSTRUCTION PLAN SHOWN ON DRAWING #ESC-1, UNLESS OTHERWISE APPROVED BY SITE ENGINEER.
18. INCASE OF A SPILL THE CONTRACTOR IS NOTIFY THE MECP SPILL/SPILLS ACTION CENTRE (SAC) PHONE NUMBER AT 416-325-3000 OR 1-800-268-6060, THE SITE ENGINEER AND OWNER.
19. CONTRACTOR IS TO ENSURE ALL STONE WORKS ARE KEYED IN AND EMBEDDED INTO THE BANK.

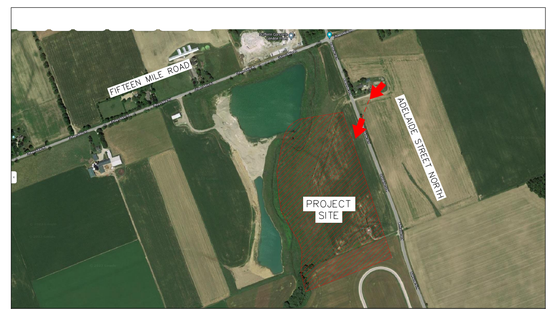
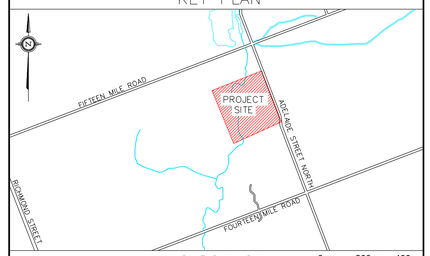


**IMAGE TAKEN FROM GOOGLE EARTH - 10/12/2020

KEY PLAN



LONDON, ON 0m 200m 400m

NOTES

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   - HORIZONTAL DATUM: NAD83 (CSRS - 2010)
   - VERTICAL DATUM: CGQ2013
   - VERTICAL CONTROL: OBSERVED GPS ELEVATIONS
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE PROJECT ENGINEER.
5. ALL WORK SHALL BE N ACCORDANCE WITH CURRENT CITY OF LONDON STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
6. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY CITY OF LONDON AND SECONDLY ONTARIO PROVINCIAL STANDARDS (OPSD).
7. THE CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G AND OVERHEAD UTILITIES. CONTRACTOR IS REQUIRED TO OBTAIN ALL LOCATIONS & NOTIFY THE VARIOUS UTILITY COMPANIES 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK. THE MUNICIPALITY OF MIDDLESEX CENTRE AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF EXISTING UTILITIES AS INDICATED ON THE DRAWING.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

CONTROL POINT 1:
ELEV: 292.56m
NORTHING: 4777805.8940
EASTING: 474206.5790
LOCATION: CROSS IN CONCRETE BY BRIDGE ON FIFTEEN MILE ROAD

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- APPROXIMATE PARCEL FABRIC
- WATERLINE AT TIME OF SURVEY
- 292.00 CONTOUR MAJOR - 0.25m INTERVAL
- 292.25 CONTOUR MINOR - 0.25m INTERVAL
- -292.00- LIDAR CONTOUR MAJOR - 0.25m INTERVAL
- -292.25- LIDAR CONTOUR MINOR - 0.25m INTERVAL
- EXISTING WIRE FENCE
- EXISTING VEGETATION LINE
- 2005-BH-XXX 2005 BOREHOLE
- 2022-BH-X 2022 BOREHOLE
- EXISTING DECIDUOUS TREE
- SITE ACCESS ROUTE
- PROPOSED AGGREGATE EXTRACTION AREA

CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

GENERAL PLAN, REMOVALS, AND NOTES

DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.
SCALE: 1:1000 (0m 20m 40m)	DRAWING NO. GP	PROJECT NO. 20-722	
	SHEET NO. 1		

EROSION AND SEDIMENT CONTROL PLAN NOTES

SECTION 1: SITE MANAGEMENT

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES, TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED AND/OR REPLACED WITHIN 24 HOURS OF THE INSPECTION.
2. DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES.
3. ALL IN-WATER AND NEAR WATER WORKS WILL BE CONDUCTED IN THE DRY WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS.
4. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREAS. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. THE REGULATING ENFORCEMENT OFFICER SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
5. THE CONTRACTOR WILL ASSIGN A CAN-CISEC LEVEL III QUALIFIED PROFESSIONAL TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A DAILY BASIS, OR FOLLOWING RAIN/SNOW MELT EVENT, TO MONITOR ALL WORKS, AND IN PARTICULAR WORKS RELATED TO EROSION AND SEDIMENT CONTROLS, DEWATERING OR UNWATERING, RESTORATION AND IN- OR NEAR- WATER WORKS. SHOULD CONCERNS ARISE ON SITE THE QUALIFIED PROFESSIONAL WILL CONTACT THE REGULATING ENFORCEMENT OFFICER AS WELL AS THE PROPONENT. THE CONTRACTOR IS TO PROVIDE DAILY EROSION AND SEDIMENT CONTROL INSPECTION RECORDS TO THE CONTRACT ADMINISTRATOR TO MEET REGULATORY MONITORING REQUIREMENTS.
6. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METERS FROM THE WATER.
7. THE PROPONENT/CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF CONSTRUCTION TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING LOW-WATER (I.E. NEAR BASEFLOW CONDITIONS). SHOULD A SIGNIFICANT STORM EVENT (>20MM OF RAIN IN 24 HRS) BE FORECAST, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE CHANNEL AND REGIONAL STORM FLOOD PLAIN THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW, E.G., FUEL TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, COFFERDAMS, ETC.
8. ALL DEWATERING/UNWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30 METERS FROM A WATERCOURSE AND ALLOWED TO DRAIN THROUGH A WELL-VEGETATED AREA, IF FEASIBLE. NO DEWATERING EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER.
9. ALL ACCESS TO THE WORK SITE SHALL BE FROM EITHER SIDE OF THE WATERCOURSE. NO EQUIPMENT OR VEHICLES ARE PERMITTED TO CROSS THROUGH AN ACTIVELY FLOWING WATERCOURSE UNLESS APPROVED BY CONTRACT ADMINISTRATOR.
10. THE CONTRACTOR SHALL INSTALL SEDIMENT CONTROL MEASURES, AS REQUIRED TO CONTROL THE DISCHARGE OF EXPOSED SOIL OR TEMPORARY PILE(S) OF EXCAVATED SOILS OR, SOILS AND GRANULAR MATERIAL TO BE USED DURING CONSTRUCTION. WHEN POSSIBLE BIODEGRADABLE ALTERNATIVES TO SILT FENCING SUCH AS BIOSOXX SHOULD BE CONSIDERED.
11. EROSION AND SEDIMENT CONTROL MEASURES ARE TO REMAIN IN PLACE AND IN WORKING ORDER UNTIL ALL ON-SITE CONSTRUCTION IS COMPLETED OR UNTIL ALL EXPOSED SOIL SURFACES HAVE BEEN STABILIZED. NEWLY CONSTRUCTED STREAM BANKS AND BEDS ARE TO BE STABILIZE IMMEDIATELY WITH EROSION CONTROL MEASURES (I.E., TARP OR ESC BLANKET) PRIOR TO ANY PRECIPITATION EVENTS.
12. AREAS WHICH REMAIN DISTURBED FOR MORE THAN 30 DAYS SHALL BE STABILIZED USING TERRASEED OR APPROVED EROSION CONTROL BLANKET OR SIMILAR. IF CONDITIONS AREN'T SUITABLE FOR SEED APPLICATION AN BIODEGRADABLE EROSION CONTROL MATTING WILL BE USED IN ITS PLACE.
13. ALL SLOPES SHALL BE STABILIZED USING MEASURES SUCH AS EROSION CONTROL BLANKET AS PER OPSS MUNI 804 AND 805 OR APPROVED EQUIVALENT. NO EROSION AND CONTROL MEASURE SHALL HAVE ANY PLASTIC, EVEN IF IT IS BIODEGRADABLE.
14. MUNICIPAL ROADS ARE TO BE KEPT CLEAR OF EXCESS SEDIMENT.
15. THE CONTRACTOR MUST HAVE SUITABLE PUMPING AND FLOW BYPASS CAPABILITIES ON SITE AT ALL TIMES TO FACILITATE CONSTRUCTION ACTIVITIES IN THE DRY.
16. WHERE PRACTICAL, WORKS SHOULD BE COMPLETED IN STAGES TO REDUCE THE DURATION OF DISTURBED AREAS.
17. CONTRACTOR CAN DISPOSE OF THE MATERIAL USED IN THE PEA GRAVEL METER BAGS INTO THE CHANNEL OR SURROUNDING AREA. ALL PEA GRAVEL BAG FABRICS ARE TO BE REMOVED OFF OF SITE.
18. REFER TO EROSION AND SEDIMENT CONTROL GUIDE FOR URBAN CONSTRUCTION, 2019 FOR FURTHER EROSION AND SEDIMENT CONTROL MEASURES FOR FURTHER EROSION AND SEDIMENT CONTROL INFORMATION.

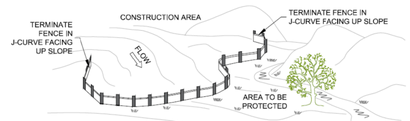
SECTION 2: CONSTRUCTION TIMING

ITEM	OPEN	END
TO PROTECT LOCAL FISH POPULATIONS DURING THEIR SPAWNING, NURSERY AND MIGRATORY PERIODS, IN-WATER/NEAR-WATER ACTIVITIES MAY ONLY OCCUR DURING THE TIME PERIOD OF:	JULY 15	MARCH 15

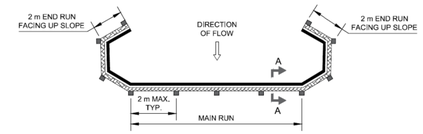
SECTION 3: FISH AND WILDLIFE RELOCATION

19. FISH AND WILDLIFE STRANDED WITHIN THE WORK AREA SHALL BE CAPTURED AND RELEASED LIVE IN SUITABLE HABITAT UPSTREAM OF THE WORK AREA UNDER THE SUPERVISION OF A QUALIFIED AQUATIC BIOLOGIST. A PERMIT FROM THE MINISTRY OF NATURAL RESOURCES AND FORESTRY IS REQUIRED.

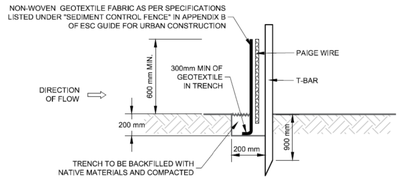
DETAIL 1 – SEDIMENT CONTROL FENCE (SINGLE ROW) N.T.S.



PERSPECTIVE VIEW



PLAN VIEW

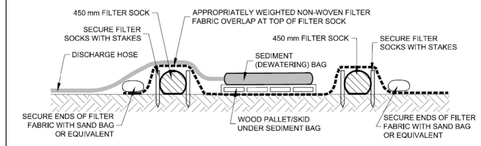


SECTION VIEW

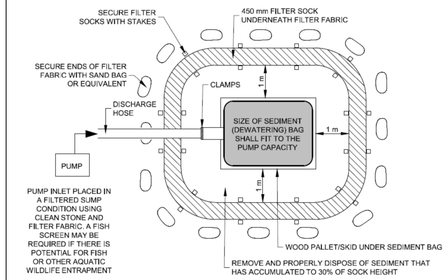
NOTES:

1. THIS DETAIL REPRESENTS AN IDEAL SCENARIO. SITE CONDITIONS VARY AND EROSION AND SEDIMENT MEASURES SHOULD BE TAILORED FOR EACH SITE AND PROEJCT.
2. SILT CONTROL FENCE SHOULD BE ALIGNED WITH CONTOURS FOR SHEET OVERLAND FLOW.
3. SILT/SEDIMENT CONTROL FENCE IS TO LOCATED IN AREAS OF LOW SEDIMENT YEILD.
4. SILT/SEDIMENT CONTROL FENCE SHALL BE INSTALLED WITH FILTER CLOTH TOED INTO THE SOIL A MIN. OF 200mm BY EITHER STATIC SLICING OR TRENCH METHODS WITH COMPACTION OF TRENCH MATERIAL MEETING 95% STANDARD PROCTOR DENSITY.
5. STEEL "T" BAR POSTS ARE TO BE SPACED MAX. 2m ON CENTER.
6. FILTER CLOTH TO BE CONNECTED TO THE FENCE AT 1m INTERVALS.
7. FROZEN GROUND CONDITIONS REQUIRE FILTER CLOTH TO BE BACKFILLED IN TRENCH WITH CLEAR STONE.
8. GEOTEXTILE FILTER CLOTH TO BE COMPRISED OF NON-WOVEN U.V. STABILIZED MATERIAL.
9. SILT FENCE AND STRAW BALE TO BE IN DIRECT CONTACT TO MAXIMIZE FENCE STABILITY

DETAIL 2 – DEWATERING TREATMENT TRAIN N.T.S.



SECTION VIEW

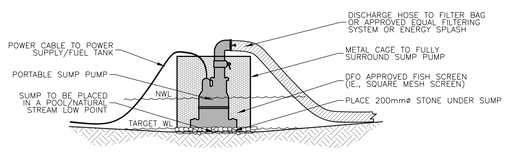


PLAN VIEW

NOTES:

1. PLACE FILTER BAG (3.5m X 5.0m TERRAFIX ENVIROBAG OR APPROVED EQUAL) ON A LEVEL STABILIZED AREA ABOVE THE VALLEY SLOPE. FILTREXX COTTON BIOSOXX (8"Ø GREEN WITH BLACK STRIPE) TO BE PLACE AROUND THE FILTER BAG.
2. TRENCH TO BE PUMPED AND DEWATERED INTO FILTER BAG
3. REPLACE UNIT WHEN HALF FULL OF SEDIMENT OR WHEN SEDIMENT HAS SIGNIFICANTLY REDUCED THE FLOW RATE OF PUMP DISCHARGE
4. ALLOW SEDIMENT BAG TO DRY IN DESIGNATED SEDIMENT DRYING AREA AND THEN DISPOSE OF THE UNIT AND SEDIMENT OFF SITE

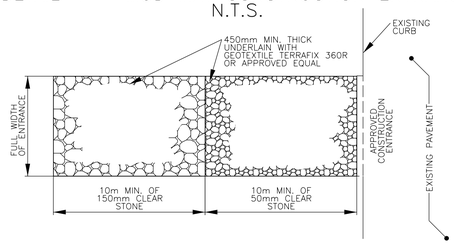
DETAIL 3 – INSTREAM DEWATERING PUMP N.T.S.



NOTES:

- REFER TO DFO INTERIM CODE OF PRACTICE: END-OF-PIPE FISH PROTECTION SCREENS FOR SMALL WATER INTAKES IN FRESHWATER. (HTTP://WWW.DFO-MPO.GC.CA/PNW-PPE/CODES/SCREEN-ECRAN-ENG.HTML)
- ONLY APPLICABLE FOR SMALL-SCALE WATER INTAKES, WHERE THE WATER INTAKE FLOW RATE IS UP TO 0.150m³/s, OR 150(L/S).
- SCREENS MUST BE DESIGNED TO MEET THE GUIDELINES ISSUED BY FISHERIES AND OCEANS CANADA.
- ENSURE THE DESIGN OPENING OF THE SCREEN MATERIAL DOES NOT EXCEED 2.54mm.
- ENSURE THERE ARE NO PROTRUSIONS ON THE SCREEN SURFACE OF SUPPORT STRUCTURES THAT COULD INJURE FISH.
- PROPERLY MAINTAIN CLEANING APPARATUSES, SEALS AND SCREENS.
- TURN OFF INTAKE PUMP PRIOR TO THE REMOVAL OF THE SCREEN FOR CLEANING AND/ OR MAINTENANCE.

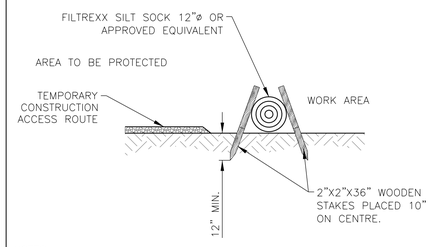
DETAIL 4 – MUD MAT CONSTRUCTION ENTRANCE N.T.S.



NOTES:

1. GRANULAR MATERIAL IS TO BE CLEAN APPROVED MATERIAL AND PLACED AT NOTED DIMENSIONS PRIOR TO LAND DISTURBANCE.
2. GEOTEXTILE IS TO BE UNDERLAIN OVER THE ENTIRE AREA PRIOR TO STONE PLACEMENT.
3. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL REDUCE TRACKING OR FLOWING OF SEDIMENT ONTO R.O.W. AND GRANULAR MATERIAL IS TO BE REPLACED AS WARRANTED OR DIRECTED BY THE SITE ENGINEER.

DETAIL 5 – SILT SOCK INSTALLATION N.T.S.



NOTES:

1. ALL MATERIAL TO MEET MANUFACTURES SPECIFICATIONS.
2. SILT SOCK FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY SITE SUPERVISOR.

CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.

SCALE:	DRAWING NO.	PROJECT NO.
	ESC-1	20-722

SHEET NO. 2

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03

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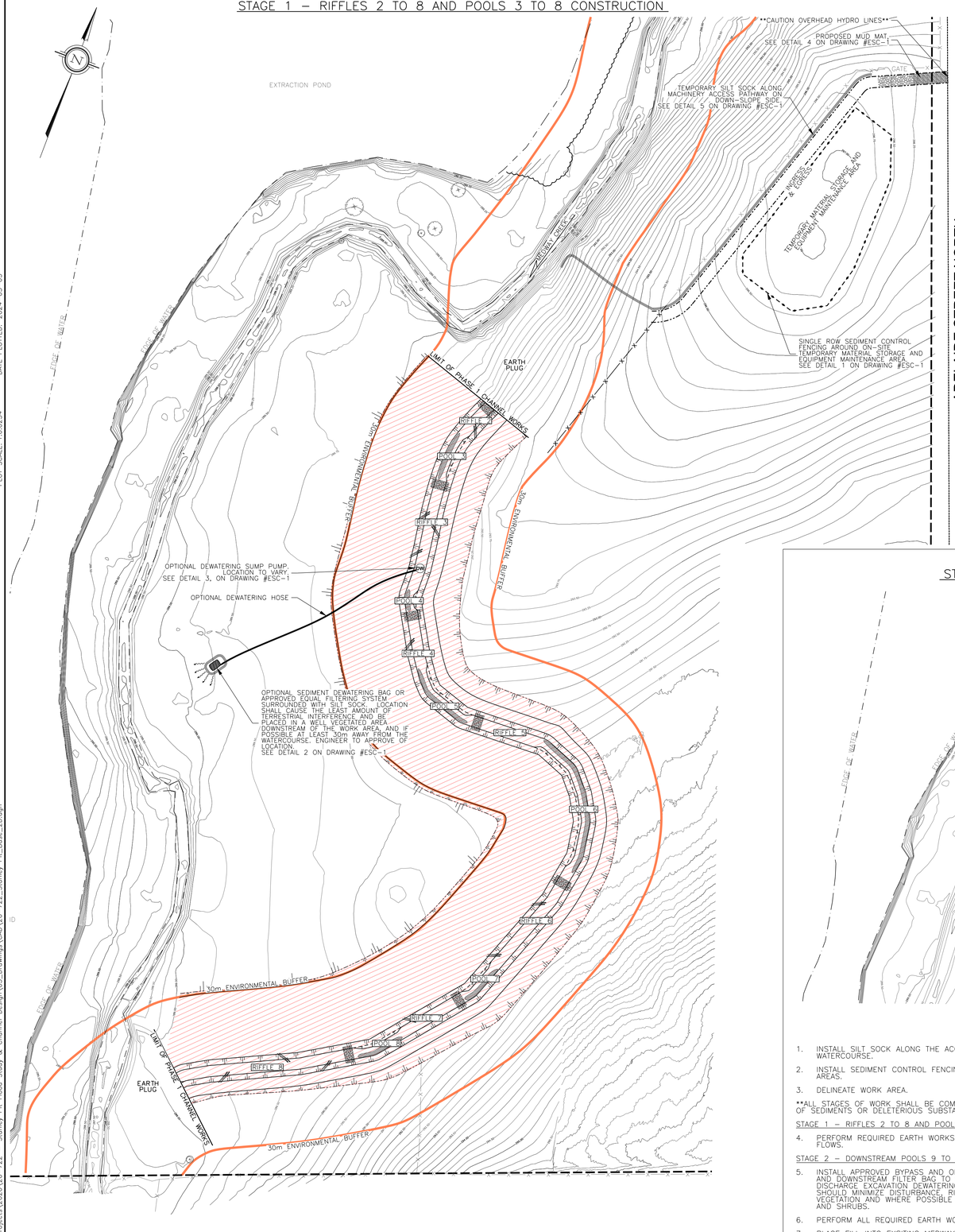
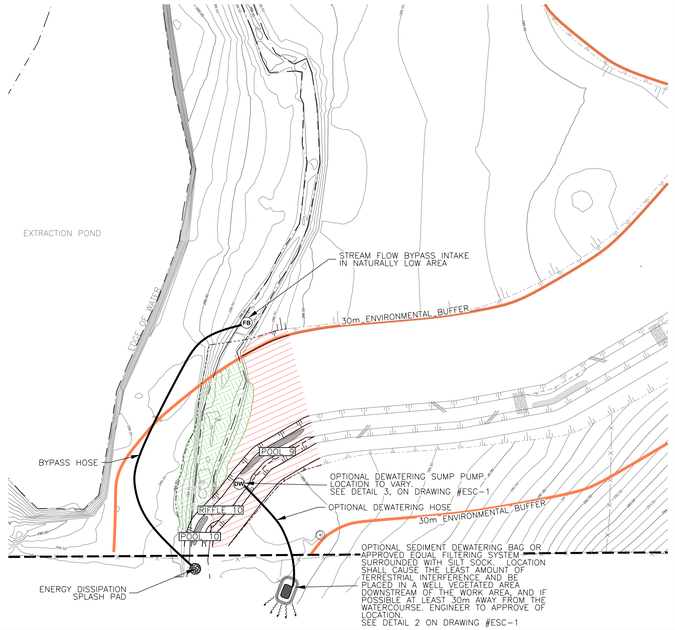
PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03

F:\Projects\2020\20-722 - Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn

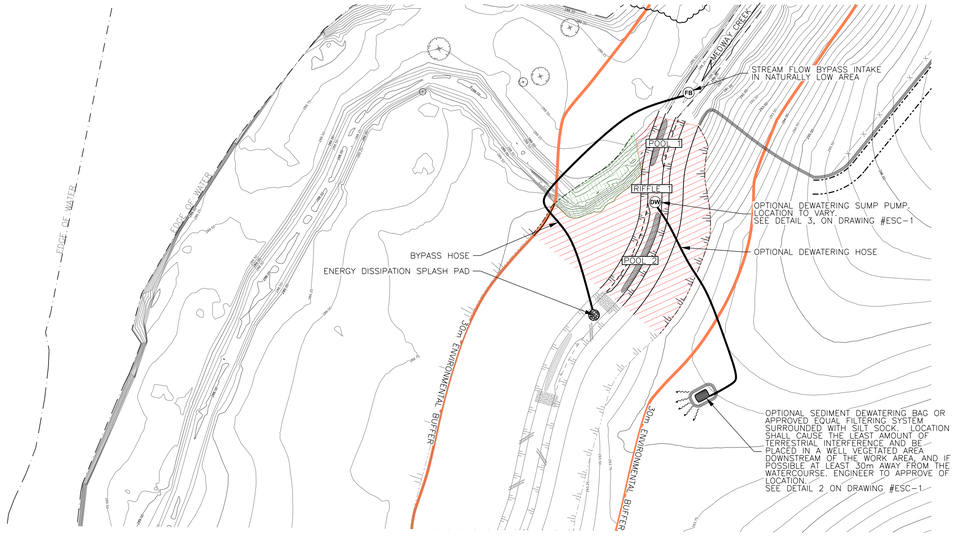
STAGE 1 – RIFFLES 2 TO 8 AND POOLS 3 TO 8 CONSTRUCTION



STAGE 2 – DOWNSTREAM POOLS 9 TO 10 AND RIFFLE 10 CONSTRUCTION



STAGE 3 – UPSTREAM POOLS 1 TO 2 AND RIFFLE 1 CONSTRUCTION



GENERAL CONSTRUCTION STAGING PLAN FOR EROSION CONTROL

1. INSTALL SILT SOCK ALONG THE ACCESS ROAD WHEN IT IS WITHIN 15m OF THE WATERCOURSE.
2. INSTALL SEDIMENT CONTROL FENCING AROUND THE MATERIAL STORAGE AND EQUIPMENT AREAS.
3. DELINEATE WORK AREA.

**ALL STAGES OF WORK SHALL BE COMPLETED IN A MANNER THAT MINIMIZES ANY RELEASE OF SEDIMENTS OR DELETERIOUS SUBSTANCES INTO THE WATERCOURSE.

STAGE 1 – RIFFLES 2 TO 8 AND POOLS 3 TO 8 CONSTRUCTION

4. PERFORM REQUIRED EARTH WORKS WITHOUT DISTURBING EXISTING MEDWAY CREEK FLOWS.

STAGE 2 – DOWNSTREAM POOLS 9 TO 10 AND RIFFLE 10 CONSTRUCTION

5. INSTALL APPROVED BYPASS AND OPTIONAL DEWATERING PUMPS, POWER GENERATOR AND DOWNSTREAM FILTER BAG TO SUIT STAGES OF WORKS TO COLLECT AND DISCHARGE EXCAVATION DEWATERING. THE LOCATION OF THE FILTER BAG SHOULD MINIMIZE DISTURBANCE, RILING AND EROSION TO THE SURROUNDING VEGETATION AND WHERE POSSIBLE BE LOCATED WITHIN AREAS VOID OF TREES AND SHRUBS.
6. PERFORM ALL REQUIRED EARTH WORKS.
7. PLACE FILL INTO EXSITING MEDWAY CREEK TO 30m BUFFER LIMIT TO ACT AS EARTH PLUG

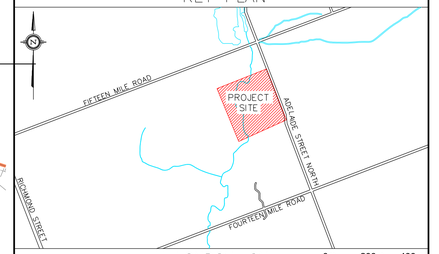
STAGE 3 – UPSTREAM POOLS 1 TO 2 AND RIFFLE 1 CONSTRUCTION

8. REPOSITION BYPASS, OPTIONAL DEWATERING PUMPS, POWER GENERATOR AND DOWNSTREAM FILTER BAG TO SUIT CURRENT STAGE OF WORKS
9. PERFORM ALL REQUIRED EARTH WORKS
10. PLACE FILL INTO EXSITING MEDWAY CREEK TO 30m BUFFER LIMIT TO ACT AS EARTH PLUG.
11. REMOVE ALL PUMPING MEASURES ONCE WORKS ARE COMPLETED.

COMPLETION AND REINSTATEMENT:

1. ALL DISTURBED AREAS TO BE SEEDED AND PROTECTED WITH APPROVED EROSION CONTROL BLANKETS (SC200B STRAW/COCONUT DOUBLE NET OR APPROVED EQUIVALENT) AT THE END OF EACH STAGE.
2. INSTALL LANDSCAPING MEASURES AS SHOWN ON DRAWINGS #RP.
3. REMOVE SEDIMENT CONTROL MEASURES.

KEY PLAN



LONDON, ON

0m 200m 400m

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL IS 0.25m.
3. TOPOGRAPHIC SURVEY INFORMATION:
   COORDINATE SYSTEM: UTM ZONE 17 N (GRID)
   HORIZONTAL DATUM: NAD83 (CSRS – 2010)
   VERTICAL DATUM: CGQ2013
   VERTICAL CONTROL: OBSERVED GPS ELEVATIONS
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE PROJECT ENGINEER.
5. ALL WORK SHALL BE N ACCORDANCE WITH CURRENT CITY OF LONDON STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
6. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY CITY OF LONDON AND SECONDLY ONTARIO PROVINCIAL STANDARDS (OPSD).
7. THE CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G AND OVERHEAD UTILITIES. CONTRACTOR IS REQUIRED TO OBTAIN ALL LOCATIONS & NOTIFY THE VARIOUS UTILITY COMPANIES 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK. THE MUNICIPALITY OF MIDDLESEX CENTRE AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF EXISTING UTILITIES AS INDICATED ON THE DRAWING.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

CONTROL POINT 1:
ELEV: 292.56m
NORTHING: 4777805.8940
EASTING: 474206.5790
LOCATION: CROSS IN CONCRETE BY BRIDGE ON FIFTEEN MILE ROAD

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- 292.00 CONTOUR MAJOR 0.25m INTERVAL
- 292.25 CONTOUR MINOR 0.25m INTERVAL
- 292.00 LIDAR CONTOUR MAJOR 0.25m INTERVAL
- 292.25 LIDAR CONTOUR MINOR 0.25m INTERVAL
- EXISTING DECIDUOUS TREE
- EXISTING WOODY FEATURE
- LIMIT OF EARTH WORKS
- SITE ACCESS ROUTE
- PROPOSED 30m ENVIRONMENTAL BUFFER
- PROPOSED RIFFLE
- PROPOSED POOL
- TEMPORARY MUD MAT
- DW TEMPORARY DEWATERING PUMP
- FB TEMPORARY FLOW BY-PASS PUMP
- TEMPORARY ENERGY DISSIPATION PAD
- TEMPORARY SEDIMENT DEWATERING BAG
- TEMPORARY SEDIMENT CONTROL FENCE
- TEMPORARY SILT SOCK
- PROPOSE FILL
- PROPOSED CUT

CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

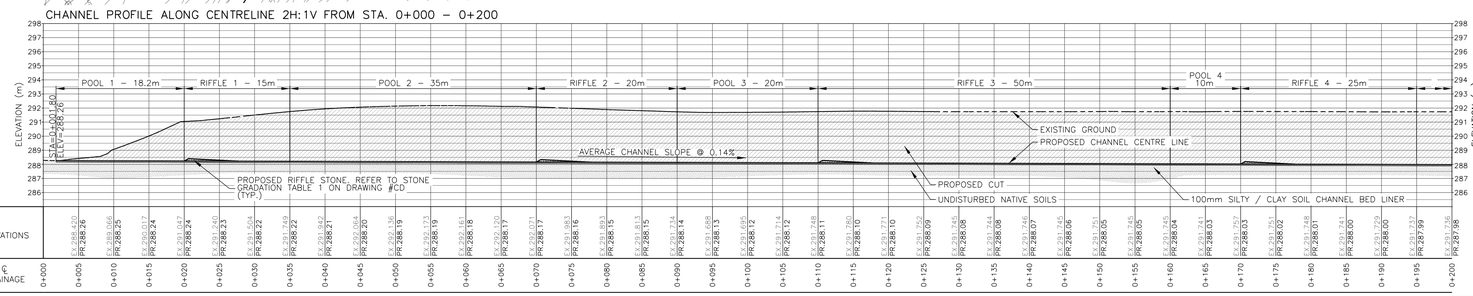
EROSION AND SEDIMENTS CONTROL STAGING PLAN

DATE: MAY 2024

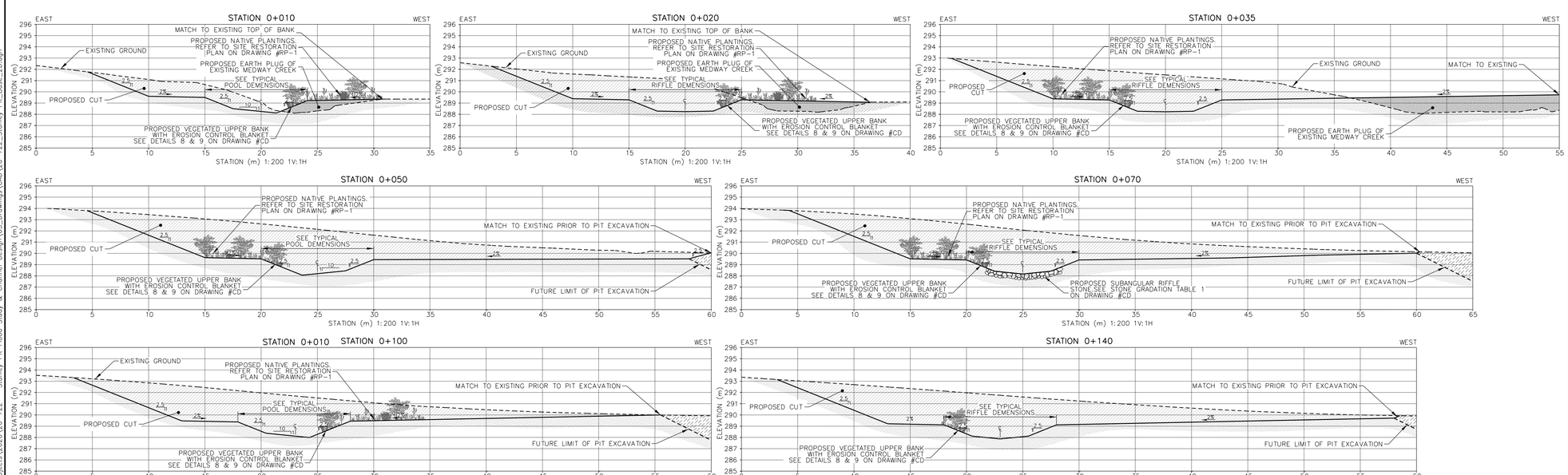
DESIGN BY	DWG. BY	APPD. BY
B.G.	P.G.	B.G.

SCALE: 1:1000
0m 20m 40m

DRAWING NO. ESC-2
PROJECT NO. 20-722
SHEET NO. 3



Station		Channel Section	Downstream direction
0+000	0+020	Pool	Right
0+020	0+025	Riffle	
0+035	0+065	Pool	Left
0+070	0+075	Riffle	
0+090	0+110	Pool	Right
0+110	0+115	Riffle	
0+160	0+170	Pool	Right
0+170	0+175	Riffle	
0+195	0+230	Pool	Right
0+230	0+235	Riffle	



KEY PLAN

NOTES

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COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- WATERLINE AT TIME OF SURVEY
- 292.00 CONTOUR MAJOR – 0.25m INTERVAL
- 292.25 CONTOUR MINOR – 0.25m INTERVAL
- EXISTING DECIDUOUS TREE
- EXISTING WOODY FEATURE
- LIMIT OF EARTH WORKS
- PROPOSED NATIVE PLANTINGS
- PROPOSED 30m ENVIRONMENTAL BUFFER
- PROPOSED RIFFLE
- PROPOSED POOL
- PROPOSED AGGREGATE EXTRACTION AREA
- 2005-BH-XXX 2005 BOREHOLE
- 2022-BH-X 2022 BOREHOLE

CLIENT NAME:
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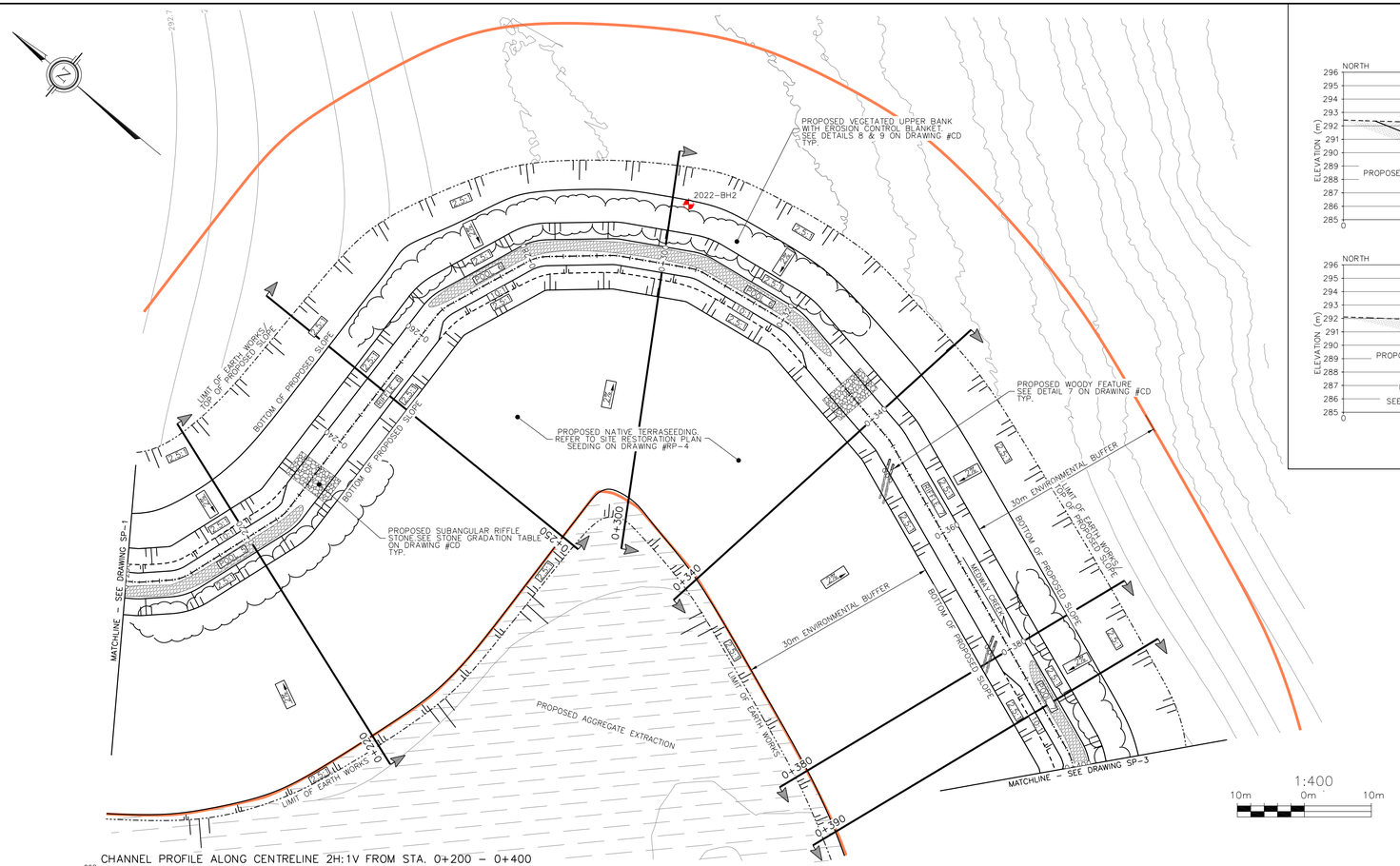
SUBMISSION DRAWING
NOT FOR CONSTRUCTION

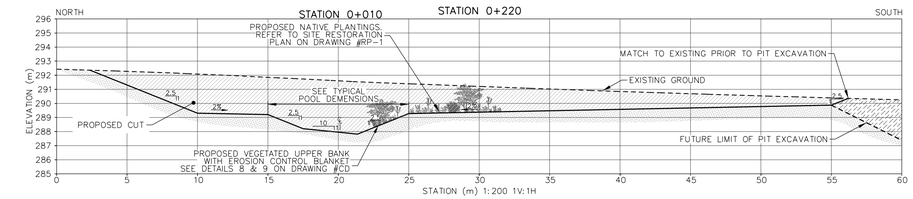
STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

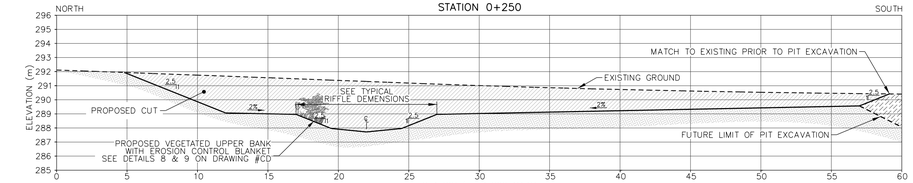
SITE PLAN, PROFILE AND SECTIONS STA. 0+000 TO 0+200

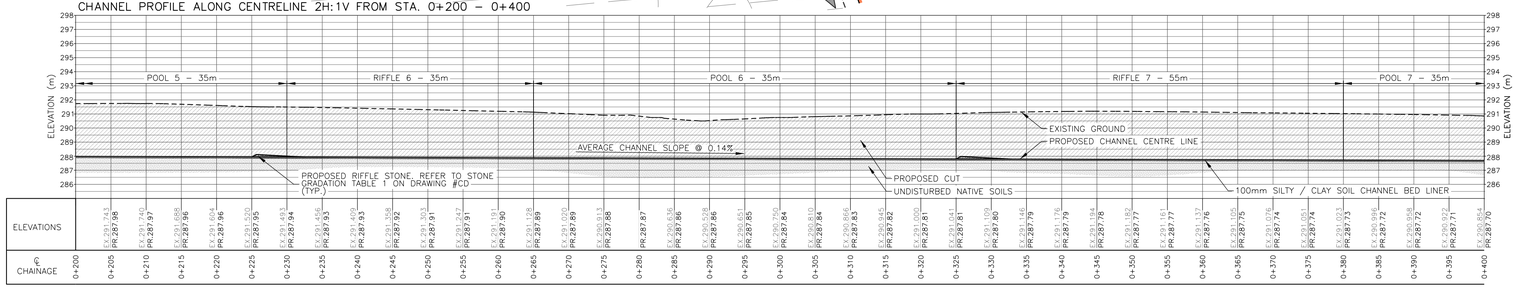
DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.
SCALE: AS SHOWN	DRAWING NO. SP-1	PROJECT NO. 20-722	
	SHEET NO. 4		

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03
F:\Projects\2020\20-722 – Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn

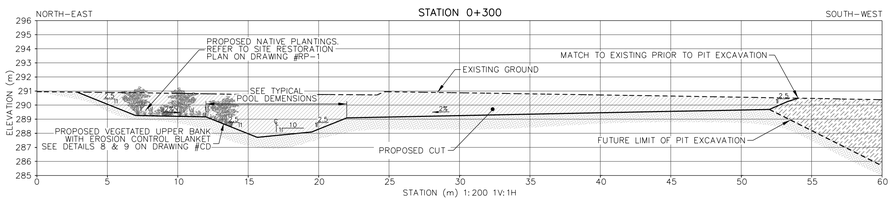


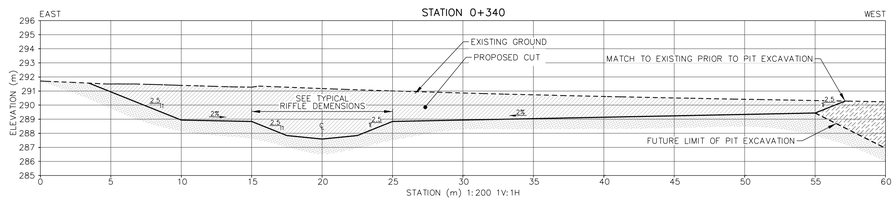


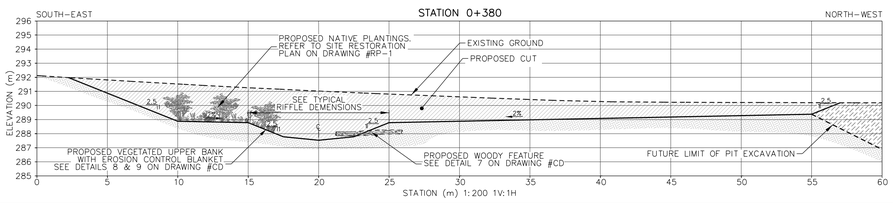


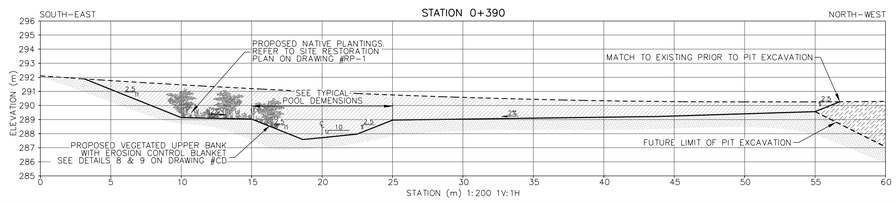


Station		Channel Section	Downstream direction
0+230	0+235	Riffle	
0+265	0+330	Pool	Left
0+335	0+340	Riffle	
0+385	0+405	Pool	Left









BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

CONTROL POINT 1:
ELEV: 292.56m
NORTHING: 4777805.8940
EASTING: 474206.5790
LOCATION: CROSS IN CONCRETE BY BRIDGE ON FIFTEEN MILE ROAD

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- 292.00 — CONTOUR MAJOR - 0.25m INTERVAL
- 292.25 — CONTOUR MINOR - 0.25m INTERVAL
- ~292.00~ — LIDAR CONTOUR MAJOR - 0.25m INTERVAL
- ~292.25~ — LIDAR CONTOUR MINOR - 0.25m INTERVAL
- EXISTING WOODY FEATURE
- LIMIT OF EARTH WORKS
- PROPOSED NATIVE PLANTINGS
- PROPOSED 30m ENVIRONMENTAL BUFFER
- PROPOSED RIFFLE
- PROPOSED POOL
- PROPOSED AGGREGATE EXTRACTION AREA
- 2022-BH-X — 2022 BOREHOLE

CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

SITE PLAN, PROFILE AND SECTIONS STA. 0+200 TO 0+400

DATE: MAY 2024
SCALE: AS SHOWN
DESIGN BY: B.G.
DWG. BY: P.G.
APPD. BY: B.G.
DRAWING NO.: SP-2
PROJECT NO.: 20-722
SHEET NO. 5

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03
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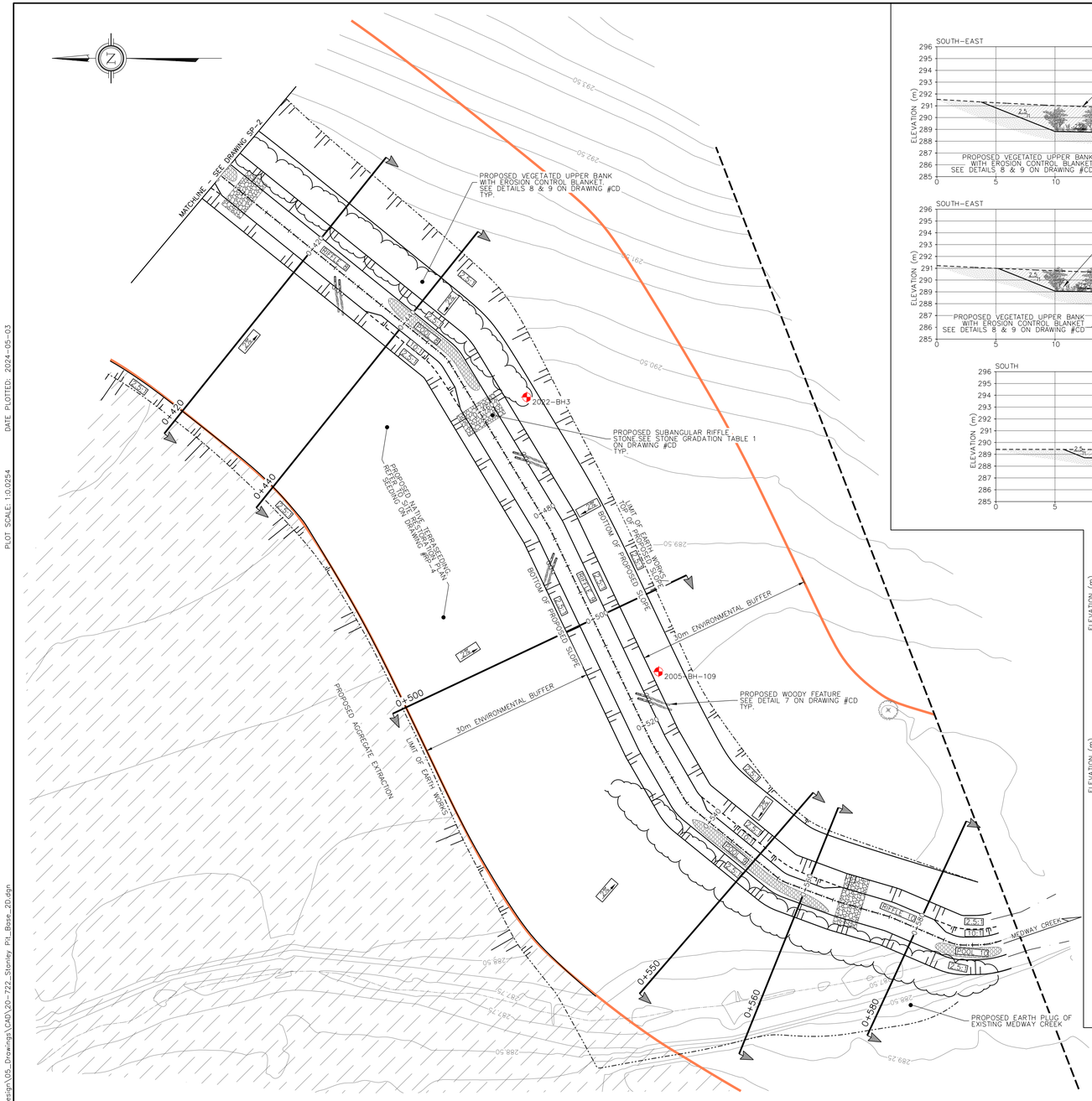
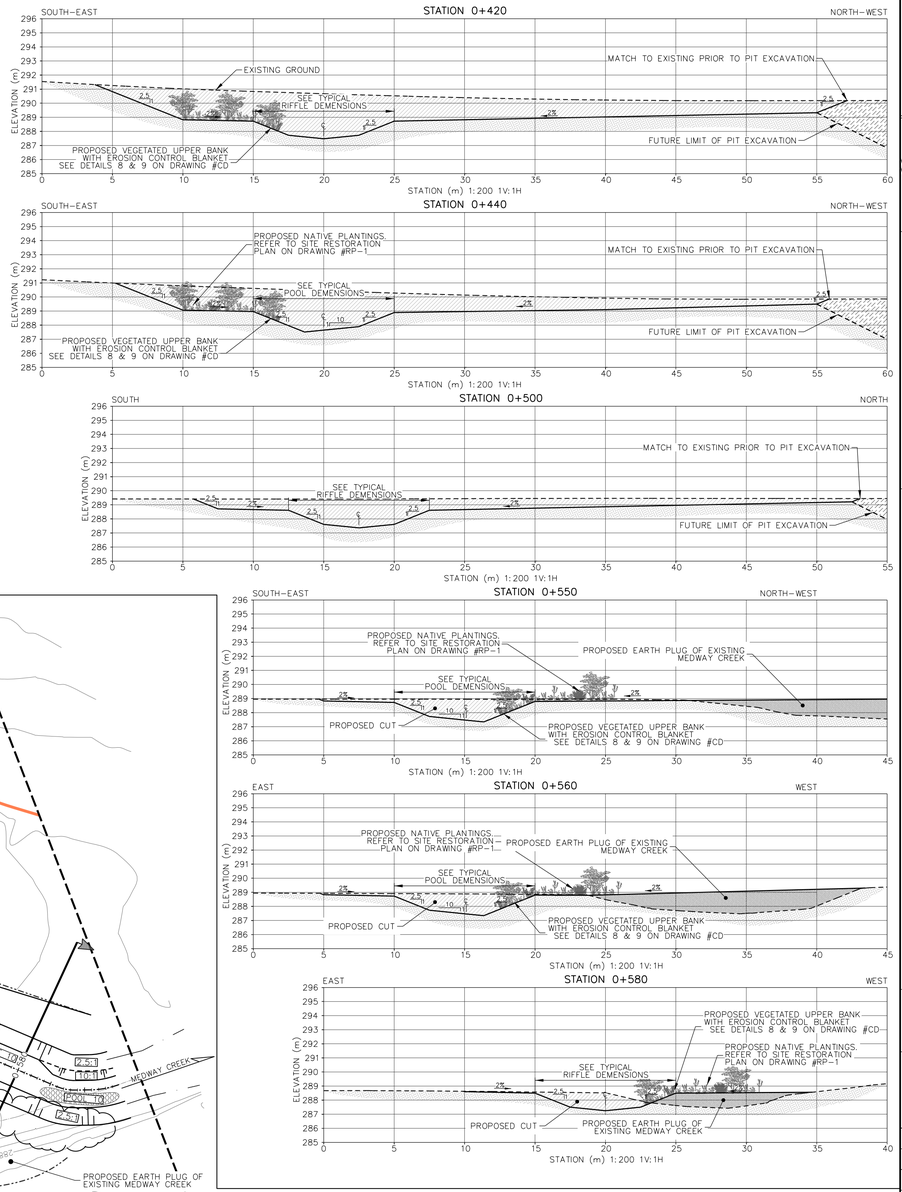
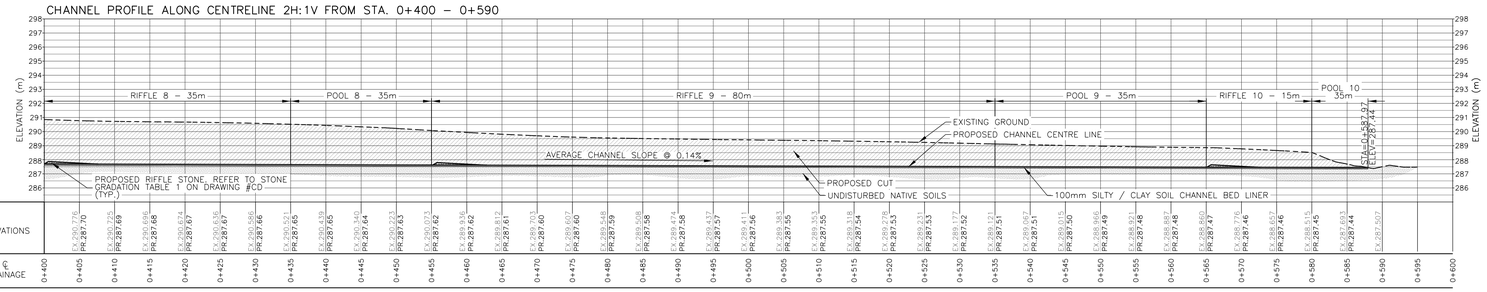
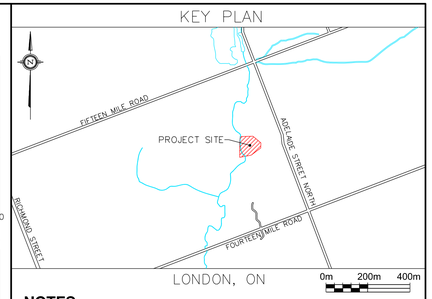






Station		Channel Section	Downstream direction
0+405	0+410	Riffle	
0+435	0+455	Pool	Left
0+460	0+465	Riffle	
0+535	0+565	Pool	Right
0+565	0+570	Riffle	



NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL IS 0.25m.
3. TOPOGRAPHIC SURVEY INFORMATION:
   COORDINATE SYSTEM: UTM ZONE 17 N (GRID)
   HORIZONTAL DATUM: NAD83 (CSRS - 2010)
   VERTICAL DATUM: CGQ2013
   VERTICAL CONTROL: OBSERVED GPS ELEVATIONS
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE PROJECT ENGINEER.
5. ALL WORK SHALL BE N ACCORDANCE WITH CURRENT CITY OF LONDON STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
6. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY CITY OF LONDON AND SECONDLY ONTARIO PROVINCIAL STANDARDS (OPSD).
7. THE CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G AND OVERHEAD UTILITIES. CONTRACTOR IS REQUIRED TO OBTAIN ALL LOCATIONS & NOTIFY THE VARIOUS UTILITY COMPANIES 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK. THE MUNICIPALITY OF MIDDLESEX CENTRE AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF EXISTING UTILITIES AS INDICATED ON THE DRAWING.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

CONTROL POINT 1:
ELEV: 292.56m
NORTHING: 4777805.8940
EASTING: 474206.5790
LOCATION: CROSS IN CONCRETE BY BRIDGE ON FIFTEEN MILE ROAD

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- APPROXIMATE PARCEL FABRIC
- WATERLINE AT TIME OF SURVEY
- 292.00 CONTOUR MAJOR - 0.25m INTERVAL
- 292.25 CONTOUR MINOR - 0.25m INTERVAL
- EXISTING DECIDUOUS TREE
- EXISTING WOODY FEATURE
- LIMIT OF EARTH WORKS
- PROPOSED NATIVE PLANTINGS
- PROPOSED 30m ENVIRONMENTAL BUFFER
- PROPOSED RIFFLE
- PROPOSED POOL
- PROPOSED AGGREGATE EXTRACTION AREA
- 2005-BH-XXX 2005 BOREHOLE
- 2022-BH-X 2022 BOREHOLE

CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

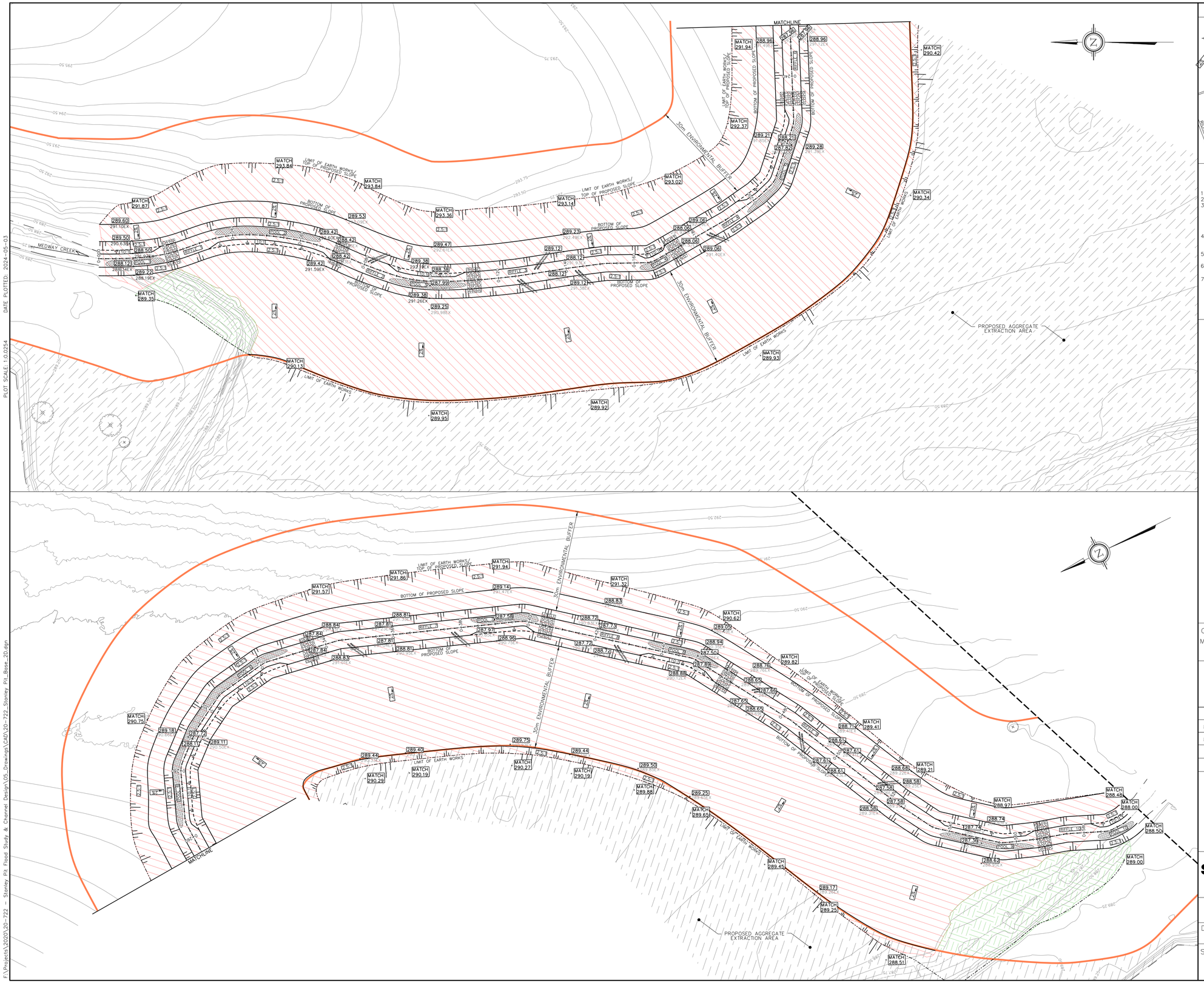
SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

SITE PLAN, PROFILE AND SECTIONS STA. 0+400 TO 0+590

DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.
SCALE: AS SHOWN	DRAWING NO. SP-3	PROJECT NO. 20-722	
	SHEET NO. 6		

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03
F:\Projects\2020\20-722 - Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn



KEY PLAN

LONDON, ON

0m 200m 400m

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL IS 0.25m.
3. TOPOGRAPHIC SURVEY INFORMATION:
   - COORDINATE SYSTEM: UTM ZONE 17 N (GRID)
   - HORIZONTAL DATUM: NAD83 (CSRS – 2010)
   - VERTICAL DATUM: CGQ2013
   - VERTICAL CONTROL: OBSERVED GPS ELEVATIONS
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE PROJECT ENGINEER.
5. ALL WORK SHALL BE N ACCORDANCE WITH CURRENT CITY OF LONDON STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
6. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY CITY OF LONDON AND SECONDLY ONTARIO PROVINCIAL STANDARDS (OPSD).
7. THE CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G AND OVERHEAD UTILITIES. CONTRACTOR IS REQUIRED TO OBTAIN ALL LOCATIONS & NOTIFY THE VARIOUS UTILITY COMPANIES 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK. THE MUNICIPALITY OF MIDDLESEX CENTRE AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF EXISTING UTILITIES AS INDICATED ON THE DRAWING.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS–2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

CONTROL POINT 1:
ELEV: 292.56m
NORTHING: 4777805.8940
EASTING: 474206.5790
LOCATION: CROSS IN CONCRETE BY BRIDGE ON FIFTEEN MILE ROAD

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- WATERLINE AT TIME OF SURVEY
- 292.00 CONTOUR MAJOR – 0.25m INTERVAL
- 292.25 CONTOUR MINOR – 0.25m INTERVAL
- EXISTING DECIDUOUS TREE
- EXISTING WOODY FEATURE
- LIMIT OF EARTH WORKS
- PROPOSED 30m ENVIRONMENTAL BUFFER
- PROPOSED RIFFLE
- PROPOSED POOL
- PROPOSED AGGREGATE EXTRACTION AREA
- PROPOSED FILL – ~570m³
- PROPOSED CUT – ~46,560m³
- •290.49EX EXISTING ELEVATION
- •289.05 PROPOSED ELEVATION

CLIENT NAME:
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Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

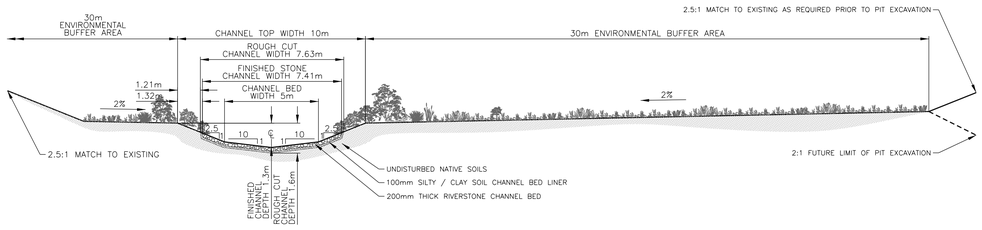
STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

GENERAL SITE GRADING PLAN

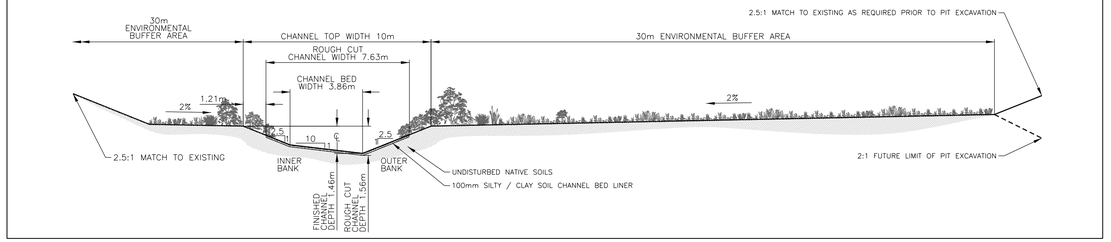
DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.
SCALE: 1:500 (0m 10m 20m)	DRAWING NO. SPG	PROJECT NO. 20-722	
	SHEET NO. 7		

PLOT SCALE: 1:0.0254
DATE PLOTTED: 2024-05-03
F:\Projects\2020\20-722 – Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn

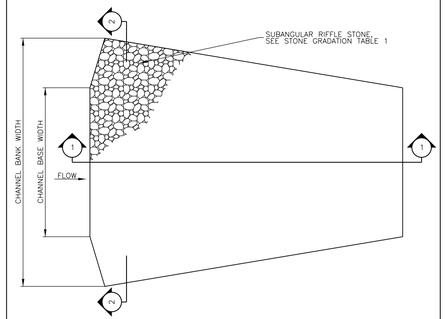
RIFFLE SECTION (TYPICAL)



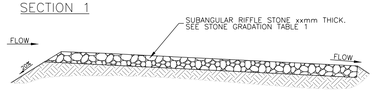
POOL SECTION (TYPICAL)



DETAIL 6 – RIFFLE STONE AND BANKS DESIGN N.T.S.



SECTION 1



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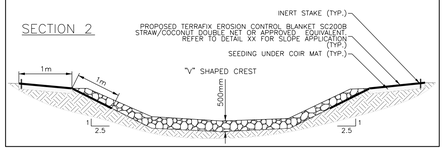
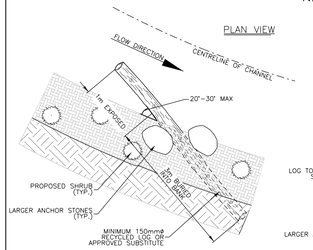


DETAIL 7 – WOODY FEATURE WITH LIVE STAKES AND EROSION CONTROL BLANKET N.T.S.

PLAN VIEW



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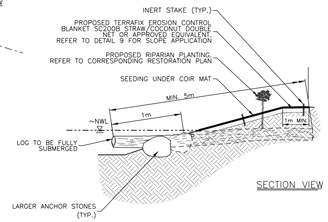
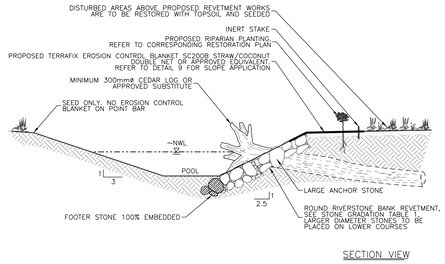


SECTION VIEW

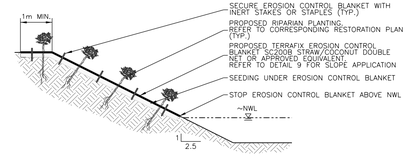
ROOTWAD



SECTION VIEW

NOTE:
- REFER TO CORRESPONDING SITE RESTORATION PLAN FOR PLANT AND SEEDING SPECIES

DETAIL 8 – VEGETATED BANK WITH EROSION CONTROL BLANKET N.T.S.



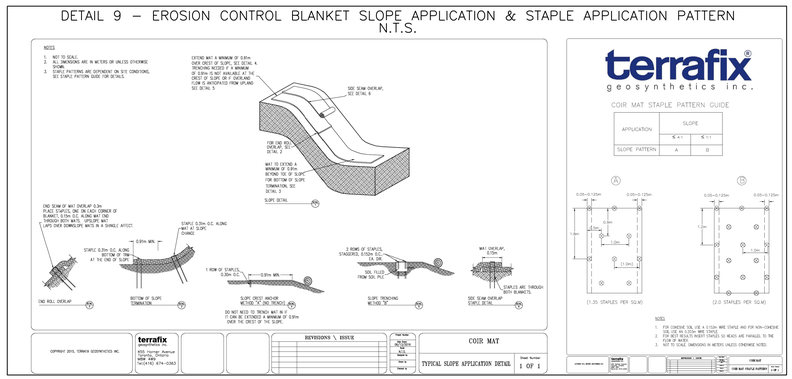
NOTES:
- NO EROSION CONTROL BLANKET ON SLOPES <4:1/25%
- POTTED PLANTS TO BE USED IF PLANTING IS OUTSIDE THE MONTHS OF MARCH AND APRIL
- REFER TO CORRESPONDING SITE RESTORATION PLAN FOR PLANT AND SEEDING SPECIES

STONE GRADATION TABLE 1

(ROUNDED STONE)

STONE SIZE (mm)	PERCENT BY VOLUME
75	20
150	60
300	20
STONE THICKNESS/DEPTH OF 300mm	

DETAIL 9 – EROSION CONTROL BLANKET SLOPE APPLICATION & STAPLE APPLICATION PATTERN N.T.S.



CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1955 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

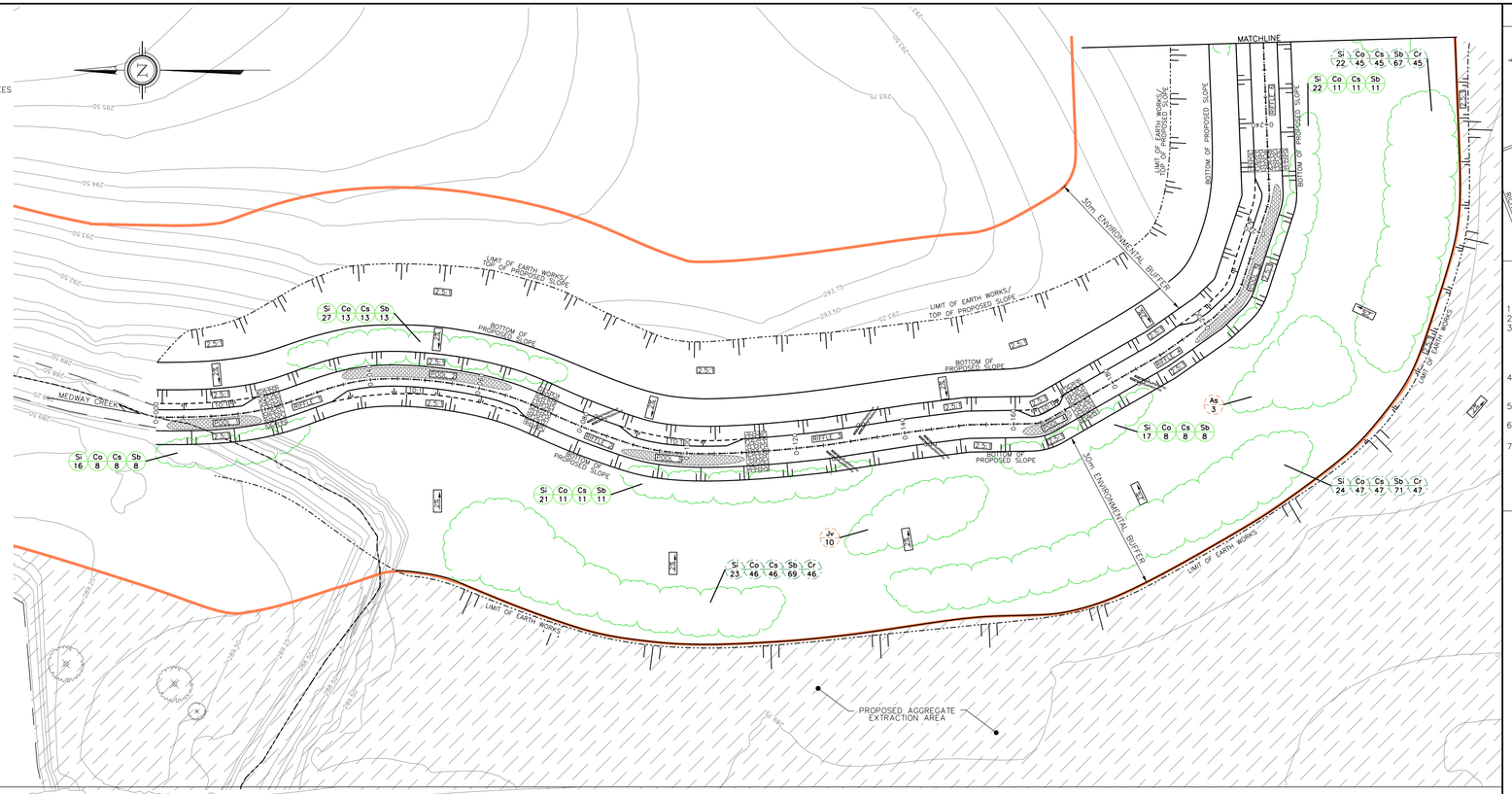
EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

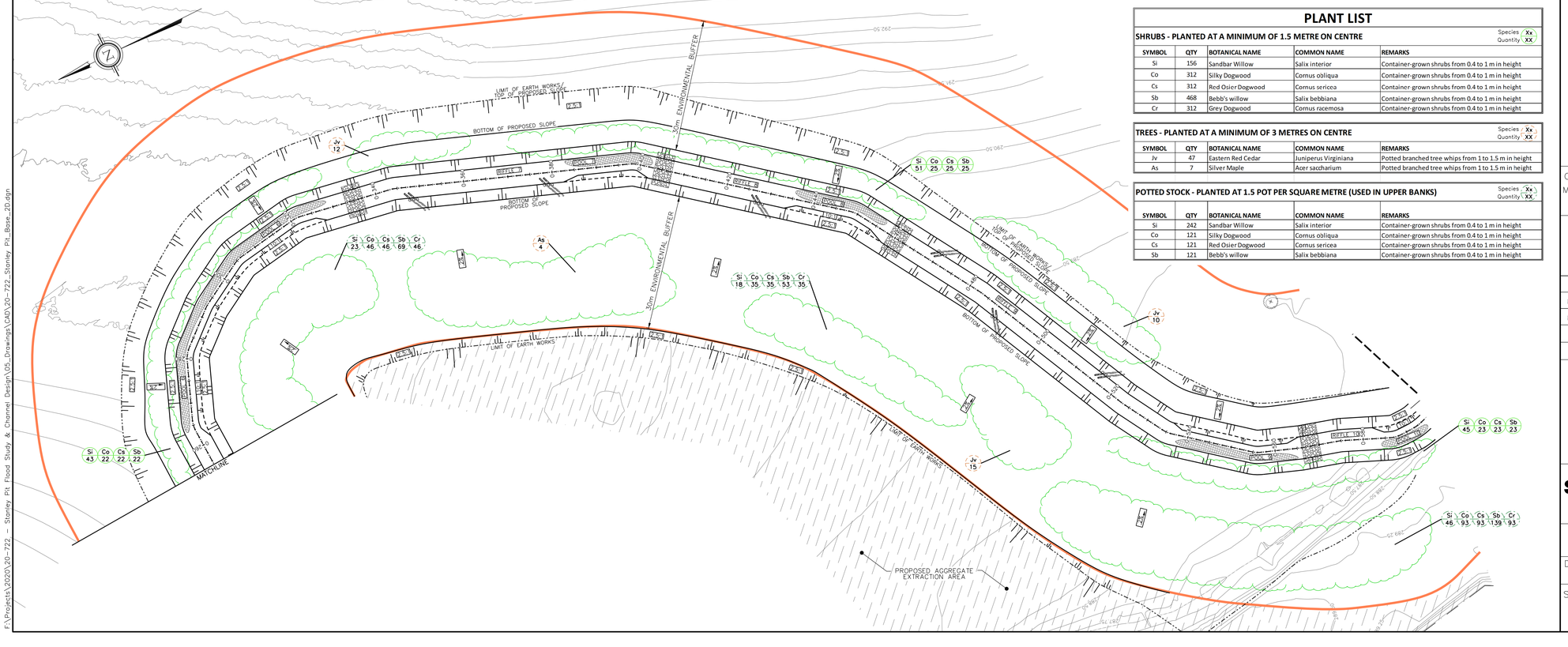
DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.
SCALE:	DRAWING NO. CD	PROJECT NO. 20-722	
	SHEET NO. 8		

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03
F:\Projects\2020\20-722 - Stanley Pit Flood Study & Channel Design\05_Drawings\CAD\20-722_Stanley Pit_Base_20.dgn

LANDSCAPING NOTES

1. DO NOT STOCKPILE TOPSOIL CONSTRUCTION MATERIALS OR DEBRIS WITHIN THE DRIP LINE OF EXISTING TREES TO REMAIN ON SITE. CONTRACTOR TO PROTECT EXISTING TREES TO REMAIN. THE ENGINEER MAY DIRECT THE CONTRACTOR TO MARK AND FENCE PARTICULAR EXISTING TREES PRIOR TO STOCKPILING MATERIALS.
2. IF SPECIFIED, ALL DORMANT MATERIAL SHALL BE INSTALLED IN THE SPRING (MARCH OR APRIL). IF INSTALLED OUTSIDE OF THIS WINDOW POTTED STOCK SHALL BE USED.
3. TREE REMOVAL – NO TREES SHALL BE REMOVED WITHOUT PRIOR APPROVAL FROM THE PROJECT COORDINATOR. ALL TREE REMOVALS TO BE COMPLETED IN ACCORDANCE WITH ACCEPTED FORESTRY PRACTICES AND WITHOUT IMPACT TO EXISTING TREES/VEGETATION TO REMAIN ON SITE.
4. ALL PLANT MATERIAL MUST BE GUARANTEED: PLANT MATERIAL THAT DOES NOT SURVIVE MUST BE REPLACED WITHIN ONE YEAR.
5. ALL EXPOSED SOILS OR AREAS IMPACTED BY CONSTRUCTION ARE TO BE SCARIFIED AND DECOMPACTED HAVING A MINIMUM 300mm DEPTH OF TOPSOIL AND SEEDED WITH A ONTARIO SEED COMPANY (OC) RURAL ONTARIO ROADSIDE NATIVE SEED MIXTURE 8145, SUPPLEMENT WITH 2% MILKWEED SPECIES AND A COVER CROP.
6. COVER CROP TO INCLUDE OAT (AVENA SATIVA) 40%, (HORDEUM VULGARE BARLEY) 45%, (ELYMUS CANADENSIS) CANADA WILD RYE 15%, DRY SEEDS AT 15KG/HA.
7. ALL SEEDED SURFACE WITH A GRADE >4:1 OR 25% ARE TO HAVE AN EROSION CONTROL BLANKET (TERRAFIX SC200B STRAW/COCONUT DOUBLE NET OR APPROVED EQUIVALENT) APPLIED.
8. WITH THE EXCEPTION TO SPECIFIC TREE PLANTING LOCATIONS ALL SHRUB PLANTINGS OR CLUSTERS OF TREE PLANTINGS ARE TO BE IN A RANDOM PATTERN WITH THE SPACING SPECIFIED. PLANTS ARE NOT TO BE INSTALLED IN PERFECT ROWS.





PLANT LIST

SHRUBS - PLANTED AT A MINIMUM OF 1.5 METRE ON CENTRE (Species Xx / Quantity XX)

SYMBOL	QTY	BOTANICAL NAME	COMMON NAME	REMARKS
Si	156	Sandbar Willow	Salix interior	Container-grown shrubs from 0.4 to 1 m in height
Co	312	Silky Dogwood	Cornus obliqua	Container-grown shrubs from 0.4 to 1 m in height
Cs	312	Red Osier Dogwood	Cornus sericea	Container-grown shrubs from 0.4 to 1 m in height
Sb	468	Bebb's willow	Salix bebbiana	Container-grown shrubs from 0.4 to 1 m in height
Cr	312	Grey Dogwood	Cornus racemosa	Container-grown shrubs from 0.4 to 1 m in height

TREES - PLANTED AT A MINIMUM OF 3 METRES ON CENTRE (Species Xx / Quantity XX)

SYMBOL	QTY	BOTANICAL NAME	COMMON NAME	REMARKS
Jv	47	Eastern Red Cedar	Juniperus Virginiana	Potted branched tree whips from 1 to 1.5 m in height
As	7	Silver Maple	Acer saccharium	Potted branched tree whips from 1 to 1.5 m in height

POTTED STOCK - PLANTED AT 1.5 POT PER SQUARE METRE (USED IN UPPER BANKS) (Species Xx / Quantity XX)

SYMBOL	QTY	BOTANICAL NAME	COMMON NAME	REMARKS
Si	242	Sandbar Willow	Salix interior	Container-grown shrubs from 0.4 to 1 m in height
Co	121	Silky Dogwood	Cornus obliqua	Container-grown shrubs from 0.4 to 1 m in height
Cs	121	Red Osier Dogwood	Cornus sericea	Container-grown shrubs from 0.4 to 1 m in height
Sb	121	Bebb's willow	Salix bebbiana	Container-grown shrubs from 0.4 to 1 m in height

KEY PLAN

LONDON, ON

0m 200m 400m

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL IS 0.25m.
3. TOPOGRAPHIC SURVEY INFORMATION:
   - COORDINATE SYSTEM: UTM ZONE 17 N (GRID)
   - HORIZONTAL DATUM: NAD83 (CSRS – 2010)
   - VERTICAL DATUM: CGG2013
   - VERTICAL CONTROL: OBSERVED GPS ELEVATIONS
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE PROJECT ENGINEER.
5. ALL WORK SHALL BE N ACCORDANCE WITH CURRENT CITY OF LONDON STANDARD SPECIFICATIONS AND DRAWINGS UNLESS OTHERWISE NOTED HEREIN.
6. ORDER OF PRECEDENCE OF STANDARDS DRAWINGS IS FIRSTLY CITY OF LONDON AND SECONDLY ONTARIO PROVINCIAL STANDARDS (OPSD).
7. THE CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G AND OVERHEAD UTILITIES. CONTRACTOR IS REQUIRED TO OBTAIN ALL LOCATIONS & NOTIFY THE VARIOUS UTILITY COMPANIES 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK. THE MUNICIPALITY OF MIDDLESEX CENTRE AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF EXISTING UTILITIES AS INDICATED ON THE DRAWING.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS–2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL CGG2013, AS SUPPLIED BY NATURAL RESOURCES CANADA.

CONTROL POINT 1:
ELEV: 292.56m
NORTHING: 4777805.8940
EASTING: 474206.5790
LOCATION: CROSS IN CONCRETE BY BRIDGE ON FIFTEEN MILE ROAD

COMPLETED BY:
GRECK AND ASSOCIATES LIMITED
SURVEY COMPLETED ON THE 4th & 5th DAYS OF NOVEMBER, 2020.

LEGEND

- WATERLINE AT TIME OF SURVEY
- 292.00 CONTOUR MAJOR – 0.25m INTERVAL
- 292.25 CONTOUR MINOR – 0.25m INTERVAL
- EXISTING DECIDUOUS TREE
- EXISTING WOODY FEATURE
- LIMIT OF EARTH WORKS
- PROPOSED 30m ENVIRONMENTAL BUFFER
- PROPOSED NATIVE PLANTINGS
- PROPOSED RIFFLE
- PROPOSED POOL
- PROPOSED AGGREGATE EXTRACTION AREA

CLIENT NAME:
McCann Redi-Mix Inc.

Est. 1953 McCANN REDI-MIX More Than Concrete

Greck
5770 Highway 7, Unit 3, Woodbridge, Ontario L4L 1T8

DATE	REVISION	BY
MAY 29, 2023	30% DESIGN ISSUED FOR REVIEW	B.G.
MAY 03, 2024	ISSUED FOR APPROVALS	B.G.

SUBMISSION DRAWING
NOT FOR CONSTRUCTION

STANLEY PIT FLOOD STUDY & NATURAL CHANNEL DESIGN

GENERAL SITE GRADING PLAN

DATE:	DESIGN BY	DWG. BY	APPD. BY
MAY 2024	B.G.	P.G.	B.G.
SCALE: 1:500 (0m 10m 20m)	DRAWING NO. RP	PROJECT NO. 20-722	
	SHEET NO. 9		

PLOT SCALE: 1:0.0254 DATE PLOTTED: 2024-05-03

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