Stormwater Management Report and Servicing Brief

New Two-Storey Prefabricated Building for
Dog Kennel and Personal Residence

5969 Ottawa St.
Richmond, Ontario

Prepared for:

Al Roberts
61 Strachan Street,
Richmond, Ontario
K0A 2Z0

Attention: Laurie Roberts

LRL File No.: 210341

November 25, 2021

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Al Roberts to complete a Storm Water Analysis and Servicing Brief for the construction of a proposed new two (2) storey prefab building and a paved parking, located in 5969 Ottawa street, Richmond. The site is currently vacant land part of zoning RG3[385r]. The building will be used as a dog kennel as well as the caretaker's residence. The site location is shown in Figure 1.

Figure 1: Aerial view of proposed site

The subject site has an approximate frontage of 305 meters and has an approximate area of 2.22 hectares. The site is divided by a natural flow of water that runs from the front of the property to the back. Since a large portion of the property exists within floodplain boundaries, the client has planned the construction in a small portion of the site that exists out of reach of the floodplain as depicted in figure 2.

Figure 2: Aerial view of proposed development boundary

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The site is 2.22 hectares in area and is currently vacant land occupied by a forested area and divided down the middle by Marlborough creek. It is bordered by Ottawa Street to the south-east, by a railroad track to the north-west and by an automotive repair shop to the east.

There is no municipal servicing on the neighbouring road. There are no sanitary lines, storm, or water pipes. There is a roadside ditch along Ottawa Street and another that runs parallel to the railroad track. There are also no private wells or septic tanks on the existing property.

3 PROPOSED DEVELOPMENT

Once developed, the site will consist of a 453m^2 two storey building to be used as a dog kennel and caretaker's residence, a paved driveway and parking area consisting of 6 parking spots.

The west side of the driveway and parking area is to incorporate a gravel diaphragm and enhanced grass swale which leads to a bio-retention area designed to attenuate and treat collected runoff from the proposed driveway and parking area. The treated runoff is controlled and discharged to the existing roadside ditch along Ottawa St. in the southern end of the site.

Currently, the site does not include any septic system and requires one to be installed.

A private supply well is already located on the site, a sample from this well was collected and tested on July 21, 2021 and proven to be adequate for quality and demand required by the proposed development.

4 FIELD WORK

A topographic survey of the property was completed by H.A.Ken Shipman Surveying Ltd. (Ontario Land Surveyors) on July 5th, 2021. Prior to proposed site development the contractor completing the work is to confirm the location and elevation of the benchmark utilized and noted on the plans in **Appendix D**.

A hydrogeological assessment and terrain analysis study was performed by LRL Associates Ltd. Test pits were dug on July 20, 2021 to determine the general upper soil and groundwater conditions to depths of -2.75m & -3.0m; piezometers were installed in each test pit and found to be dry at the time of sampling on August 11th, 2021.

A geotechnical investigation was also performed by LRL Associates Ltd. on August 23rd, 2021; four (4) boreholes were drilled, and groundwater was carefully monitored and measured during the investigation. Immediately upon completion of drilling, groundwater was measured in all boreholes and was found to be dry.

5 STORMWATER MANAGEMENT

5.1 Existing Stormwater Infrastructure

As previously mentioned, there exists already two (2) ditches along the property boundary. The first runs parallel to the railroad track and the second runs along the frontage of the development boundary parallel to Ottawa Street. Apart from these ditches, no other stormwater infrastructure exists on site.

5.2 Design Criteria

- As per consultation minutes with city of Ottawa officials, the required TSS removal is set by the Rideau Valley Conservation Authority (RVCA) and the stormwater management design considers this value to be at least 80%.
- The peak flow rate post-development must match the peak flow rate pre-development as per section 8.3.6.1 of the City of Ottawa Sewer Design Guidelines (SDG).

5.3 Method of Analysis

The stormwater management criteria for this development are based on pre-consultation correspondence with the City of Ottawa and the Rideau Valley Conservation Authority, refer to **Appendix A**, as well as the Ministry of the Environment's Stormwater Planning and Design Manual, 2003 (SWMP Manual). Stormwater objectives were identified as follows:

- Pre-development and Post-development hydrological conditions are to be equal.
- Target 80% TSS removal is to be met.

5.3.1 Water Quality

It was determined that 80% TSS removal will be required for all contaminated runoff. Stormwater treatment will be provided by a treatment train approach. The stormwater management plan for the runoff generated from the driveway, parking area, and building rooftop will utilize a

combination of best management practices and low impact development (LID) approaches. The LID Guidelines provide several recommendations for enhanced grass swales and bio-retention areas that were taken into consideration, such as:

1) Pre-treatment is provided via a 0.3m wide x 0.6m deep gravel diaphragm perpendicular to the runoff sheet flow through the parking lot (including building rooftop) and driveway towards the enhanced grass swale & bio-retention area. The gravel diaphragm border is to be composed of washed stone between 3 and 10 mm in diameter.
2) Enhanced swale side slopes are maintained as flat as possible with maximum sloping of 3:1 to provide pre-treatment and maximize swale filtering surface.
3) Shallow longitudinal slopes are proposed along enhanced grass swales to promote shallow flows, adequate water treatment and infiltration.
4) Proposed enhanced grass swales are designed at low slopes to maintain flow at a maximum velocity of 0.5 m/s, refer to **Appendix B** for enhanced grass swale design sheet.
5) As per design guidelines, ratio of impervious drainage area to bio-retention treatment area was calculated to be 7.3:1, i.e. within pre-determined accepted range.
6) The hydrogeology report states groundwater was not encountered during test pit investigations, including the lowest test pit (TP21-3) recorded at a depth of 3.0m below surface elevation. The geotechnical report also states that groundwater was not observed immediately after drilling at any of the borehole locations, including the lowest borehole (BH3) recorded at a depth of 6.71m below surface elevation. The proposed LID measures were designed with a minimum vertical distance of 6.17m to the deepest recorded test pit elevation. Hence, it is anticipated that sufficient clearance, exceeding 1.0m, will be achieved between bottom of LID measures and expected groundwater level as recommended per design guidelines.
7) Runoff conveyed through the low sloping enhanced grass swale into the bio-retention area will be truncated because of outlet control which will increase infiltration into the ground prior to leaving the site.

The combined approach described above is believed to provide treatment, promote ground infiltration, and minimize sediment conveyance. Combining these various low-impact development (LID) approaches will likely result in the targeted 80% TSS removal. Refer to **Appendix C** for more details on these LID measures.

The remaining areas of the site include uncontrolled grass areas following existing drainage paths to the existing ditch to the south along Ottawa St and to Marlborough creek to the west. Runoff generated from these areas are determined to be clean water and will not require further treatment.

5.3.2 Water Quantity

To meet the stormwater quantity control criteria, post-development release rates are required to be controlled to pre-development release rates, providing all storms up to and including 100-year design event on site storage as required.

The proposed development, consisting of a 2-storey prefabricated structure and paved parking lot and driveway will result in an increase in the impervious surfaces, therefore quantity control measures will be implemented.

The allowable release rate, to mimic pre-development conditions, was calculated using a runoff coefficient of C=0.30 (determined based on pre-development land cover). The calculation of the pre-development run off coefficient is summarized in **Appendix B**. The 100-year and 5-year post-development flows will be controlled to the respective pre-development levels. To do so, an inlet control device is proposed at the outlet of a catch basin inlet structure in the storm water detention area. Events greater than the 100-year storm will flow overland to the existing roadside ditch and Marlborough creek. Table 1 summarizes the target stormwater release rate.

Table 1: Summary of Stormwater Quantity Control Requirements

Quantity Control Parameters	5 Year Post-Development	100 Year Post-Development
Pre-Development Storm Event	5 Year	100 Year
Calculated Allowable Release Rate (L/s)	27.90	47.82

5.4 Allowable Release Rate

The 100-year and 5-year allowable release rates from the site to the roadside ditch along Ottawa Street are **47.82 L/s** and **27.90 L/s**, respectively. The release rates were calculated based on the entire watershed area of **0.325 ha**, pre-development runoff coefficient of **0.30**, and the time of concentration (Tc) 10 min. The release rates provided will be the maximum rates to which the entire site will be controlled up to during the major storm events.

5.5 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity controls for this development will be accomplished by means of an inlet control device (ICD) and detention in swales and retention areas providing the required storage volume in high flow events.

Table 2 below summarizes the drainage areas on site in post development conditions. Further details of the pre and post-development catchments are included in **Appendix B**.

Table 2: Stormwater Drainage Areas

Drainage Area	**Area (ha)**	**Runoff Coefficient (C)**
WS-01 (un-controlled)	0.109	0.20
WS-02 (un-controlled)	0.105	0.35
WS-03 (controlled)	0.111	0.69

The site was divided into three watersheds; two of which are uncontrolled and follow existing topography. One of these uncontrolled areas is WS-01 (0.109 ha) which consists of the grassed area at the rear of the proposed building as well as the grassed area to the west of the swale and retention features, this area follows existing topography and drains to Marlborough creek. The

other uncontrolled watershed is WS-02 (0.105 ha) which consists of the grassed area to the east and front of the proposed building as well as half of the building rooftop drainage; this area drains to the existing ditch along Ottawa street. WS-03 (0.111 ha) consists of half the proposed building rooftop and asphalt parking/driveway area which will sheet drain to the west overland through a gravel diaphragm towards the enhanced grass swale and retention area at the southern end of the site before reaching the existing ditch along Ottawa St.

Table 3 summarizes the release rates and storage volumes required to meet the allowable release rates for the 100-year, 5-year storm events.

Table 3: Stormwater Release Rate & Storage Volume Summary

Description	Site Area (ha)	Runoff/Storage				Total Storage Provided (m^3)
		100 Year		5 Year		
		Release Rate (L/s)	Storage Required (m^3)	Release Rate (L/s)	Storage Required (m^3)	
WS-01 + WS-02 (uncontrolled)	0.214	36.38	0.00	16.98	0.00	0.00
WS-03 (controlled)	0.111	11.43	34.42	10.92	11.14	34.50
TOTAL	**0.325**	**47.82**	**34.42**	**27.90**	**11.14**	**34.50**

The detailed release rate and storage calculations can be found in **Appendix B.**

The proposed stormwater quantity control measures will be achieved by using an 88 mm diameter orifice plate ICD to be installed on the proposed outlet of the catch basin inlet structure at the south end of the bioretention area in WS-03. The ICD will serve to control flow rates to below the allowable release rates for the 100-year and 5-year storm events. From the ICD, stormwater will be conveyed into the existing road-side ditch, and ultimately, to Marlborough creek.

Table 4 compares the controlled flow rates and allowable release rates for all storm events.

Table 4: Comparison of Allowable Release Rates & Controlled Flow Rates

	100 Year Post Development	5 Year Post Development
Allowable Release Rate from Controlled Area (L/s)	11.43	10.92
Controlled Flow Rate Utilizing ICD (L/s)	11.20	8.53

Although the release rate for a 5 year storm event is still controlled at 8.53 L/s, there is sufficient storage during the stage between the bottom of the bio-retention pond and the catch basin inlet structure grate invert, that the 5 year storm will remain stored in the pond area and infiltrate the soil rather than being discharged from the site.

The stormwater runoff exceeding the allowable release rates will be stored on-site via the stormwater detention area. See LRL drawing C.601 included in ***Appendix D***.

6 WATER SUPPLY

A supply well was installed by the client in June 2021 and tested by LRL Associates Ltd. in the previously mentioned hydrogeological assessment and terrain analysis study performed on July 20, 2021. This report states that the intended use of the supply well meets the quantity demands of the proposed development, however, also recommends considering treatment options for the quality of the water for the parameters exceeding the ODWS and D-5-5 guidelines outlined in the study report. Refer to drawing C.301 included in ***Appendix D*** for the location of the existing well.

7 SANITARY SERVICE

As previously discussed, currently, there are no municipal services available in this area. A proposed septic system designed by Green Valley Environmental Engineering (GVE) will service the proposed development. A copy of the septic design is included in ***Appendix E***. The septic tank shall be cleaned whenever sludge and scum occupy one-third of the tank capacity.

8 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment controls will be provided via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS.MUNI 805. Refer to Erosion and Sediment Control Plan C101 in ***Appendix D*** for additional details.

9 MAINTENANCE

Maintenance is the key issue for all types of stormwater management practices. It ensures performance efficiency of the facilities and prevents undesirable consequences such as flooding or events leading to contamination to the neighboring properties.

The proposed enhanced grass swale maintenance would consist of inspecting the swale and outlet on a periodic basis as well as routine cleaning to remove sedimentation build up as deemed necessary. It is the responsibility of the owner to maintain and clean the retention area outlet and keep a log of all the maintenance activities.

The existing septic tank will require regular maintenance including scheduled cleaning to ensure that the sludge and scum does not occupy more than one-third of the working capacity of the tank.

10 CONCLUSION

This stormwater management and servicing report for the proposed development at 5969 Ottawa St. presents the rationale and details for the design requirements for the subject property. In accordance with the report objectives, the servicing requirements for the development are summarized below.

Stormwater Quantity

- The site will include an outlet to the existing roadside ditch along Ottawa St. located at the southern end of the site and adheres to the following quantity control measures:
    - The post-development flows for the 5-year and 100-year storm events will be less than or equal to pre-development release rates, respectively.
    - Stormwater quantity control rates will be met with an 88mm diameter ICD orifice to limit and control the flow leaving the stormwater retention area.

Stormwater Quality

- The site design uses low-impact development measures on the controlled watershed to achieve the goal of 80% TSS removal; uncontrolled watersheds are grassed areas and considered clean water.
- In the controlled watershed area, a gravel diaphragm pre-treats the overland runoff before water flow reaches a shallow grade enhanced grass swale and bio-retention area designed to enhance infiltration and attenuate stormwater runoff.

Domestic Water

- The existing private drilled supply well is anticipated to adequately service the proposed dog kennel / residence.

Sanitary sewer

- A new septic system has been designed by GVE engineering to accommodate the sanitary discharge from the proposed dog kennel / residence. Refer to ***Appendix E.***

11 REPORT CONDITIONS AND LIMITATIONS

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure the compatibility with the recommendations contained in this document.

In addition, this report has been prepared in consideration of the terms and conditions noted above and with the civil drawings prepared for the new development. Should there be any changes in the design features, which may relate to the stormwater considerations, LRL Associates Ltd. should be advised to review the report recommendations.

If you have any questions or comments, please contact the undersigned.

Prepared by:

LRL Associates Ltd.

Mike Allen, PTech
Civil Designer

Mohan Basnet, P.Eng
Civil Engineer

Appendices

Appendix A

Pre-consultation Meeting Minutes

Site Plan Pre-consultation

Meeting Date: March 18, 2021

5969 Ottawa Street

Applicant/Owner: Al Roberts **Ward- Councillor:** 21 Richmond- Scott Moffatt

Proposal Summary: Construct a 446 square metre two-storey building with a kennel, personal shop, and caretaker's dwelling.

Attendees:

Al Roberts, Applicant
Laurie Roberts, Applicant
Cheryl McWilliams, File lead, PIEDD, City of Ottawa
Damien Whittaker, Project Manager, PIEDD, City of Ottawa
Christine Reist, Infrastructure Approvals, PIEDD, City of Ottawa
Matthew Hayley, Environmental Planner, PIEDD, City of Ottawa
Samantha Willock, Co-op Planning Student, PIEED, City of Ottawa
Mike Giampa, Senior Transportation Engineer, PIEDD, City of Ottawa (regrets)
Eric Lalande, Environmental Planner, Rideau Valley Conservation Authority (regrets)

Meeting Minutes

Proposal details

- Proposed kennel for 3-5 dogs for service dog training.
- Proposed two-storey prefab building for various uses; first floor kennel and personal shop, second storey caretaker's residence.
- One enclosed dog run at the rear of the building.

Planning Comments (Provided by Cheryl McWilliams)

- City staff recommend hiring a consulting firm with engineering, environmental and planning staff who can assist you through this process and prepare the plans and reports required.
- A **site plan** is required, illustrating the proposed building, septic, well, fencing, landscaping, parking and the distance from the dog run to the nearest residence. This plan must show the compliance to the Zoning By-law in a table format- noting the requirement (e.g. setbacks and parking) with a column for requirement and a column for your actual proposed.
- The Zoning By-law requires a kennel to be set back 100 metres from the nearest house for 4 or less dog runs and 210 metres for more than 4 runs.
- The proposed uses will require 4 parking spaces- 1 space for less than 4 dog runs, 1 space for the caretaker unit, and 2 spaces for the shop bay.
- The Zoning setback required for the rail line is a minimum of 30 metres
- A minimum setback of 30 metres is required from Marlborough Creek.
- Landscaping along Ottawa Street must be shown on the site plan- include trees as is possible, shrubs and other perennials, and potentially other features such as stone fence or post and rail fence as decorative elements.
- Provide **building elevation drawings** (colours, materials, etc). Given your building has been ordered and there is very limited opportunity to ensure that the building meets the intent of the new building design guidelines for the Village of Richmond (expanded on below), and there may be limited space for trees, adding in decorative elements may assist in meeting the intent of the buildings guidelines for Richmond. Alternatively, consider faux architectural details on the front of the building- as you indicated there will be no windows. The Community Design Plan (CDP) contains some examples of heritage styles and potential façade changes to existing more modern buildings to be more in keeping with the village character.
- From the Village of Richmond Community Design Plan (ottawa.ca): "Guidelines 1. New buildings and additions should be of their own time and should harmonize with the existing heritage and rural character in the Village. They should:

a. Use design elements inspired by buildings of heritage interest in the Village of Richmond or by buildings and landscape features in other villages and towns in Eastern Ontario as reflected in Section 7.3.1
b. Reflect the existing colours and materials in the village such as clay brick, grey stone/blocks or wood siding or use high-quality, modern and colourful materials that complement the village character".

- Please demonstrate that you have access for equipment (such as drilling) to the well in the rear of the building.
- Please ensure that the kennel run fenced area does not include the well, nor any part of the existing treed area.
- Fence off the floodplain and show it on the plans (including the details of the type of fence, height, etc). It is suggested to use a tighter weave for the bottom 60cm of the fence to protect blanding's turtles from the dogs.
- A **Planning rationale** will be required, which is essentially a cover letter noting how you will comply to zoning, the Richmond CDP and their village heritage feel, and the engineering, transportation and environmental issues. This does not have to go into depth, this report is essentially an overview that can be written by the owner.
- The City suggests contacting the Councillor's office for his information on your proposal.

Environmental Comments (Provided by Matthew Hayley)

- Next to Marlborough Creek provides important habitat including for the Blanding's turtle.
- A Blanding's turtle sighted within 2km- meaning there is regulated habitat on the property along Marlborough Creek, defined as 30m from the edge of the watercourse and then an additional 200m under the Endangered Species Act and Ministry of Environment, Conservation and Parks (MECP). See attached for the discussion on what is considered Blanding's turtle habitat.
- The presence of Blanding's turtle habitat triggers the requirement for an **Environmental Impact Statement** (EIS) to demonstrate that your application will not have a negative impact on the Blanding's habitat. Since it is regulated habitat, MECP needs to sign off on the EIS or the Province may require a permit under the Endangered Species Act. Since the category 3 blanding's turtle habitat is meant for allowing turtles to travel to other areas of habitat, it is feasible to have a development approved in the area outside of the 30m from the watercourse with mitigations since your site is not functioning in that manner.
- The EIS will need to be scoped to address species at risk and include consultation/ signoff with the MECP.
- The attached Excel file lists EIS consultants who provide service in Ottawa. The list is not an approved list, it is collected to provide a list of professionals who provide the service.

Transportation Engineering Comments (Provided by Mike Giampa)

- You need to comply with the Private Approach By-law with a maximum entrance width of 9 metres.
- Please show all required parking and loading spaces on the **site plan**.
- A **stationary noise study** will be required for the kennel- if only one dog run is proposed then it is required if you are looking to have the kennel run located closer than 100 metres from the nearest dwelling.
- A **noise and vibration study** is required for the residential use in proximity to the rail corridor.

Engineering Comments (Provided by Damien Whittaker and Christine Reist)

- A **Survey monument** will be required, shown and annotated, with sufficient information provided to enable a layperson to locate it.
- There are no water pipes in the direct area. Municipal water could be extended to connect to the address, though this could be costly. Alternatively, a drilled well could be used, though re-testing would be required. It will need to be demonstrated that there is access outside of the floodplain for the proposed well.
- There are no sanitary pipes in the direct area and the sanitary pump station is at capacity presently. A **septic design** will be required- with investigation of the greatest groundwater elevation and percolation results determined.
- Please note that sensitive marine clays are anticipated in the area of the proposal and, if so, enhanced **geotechnical investigation and analysis** will be necessary. Investigation of clays should be undertaken with vane shear, Atterberg limits, shrinkage, size, grade raise restriction, consolidation, sensitivity, and liquefaction analysis, amongst others.
- Note that there are considerations for trees in proximity to foundations in sensitive marine clays. In sensitive marine clays, trees in proximity to foundations can cause foundation damage.
- As the application is near the watercourse, slope stability may be a concern; please have a consultant provide **slope stability analysis** or state (with rationale) that it is not required.
- A **hydrogeological report** will be required for the well and for septic (with comprehensive discussion of dog wastes). Enhanced discussion is required as there are suspected thin soils in the area. Well water may be released under artesian pressure and discussion of control will be required if that is the case.
- There are no storm sewers in the Right-of-Way (ROW). If it is proposed to discharge storm water to the existing ditches in the ROW, the ditches will need to be shown to be continuous. If a direct discharge to the watercourse (that has been recorded at least once as Marlborough Creek (or the Richmond By-pass drain)) is proposed, it

would require a direct type of Environmental Compliance Approval (ECA) application submission to the MECP- and the approval timeline is anticipated to be 6-12 months.

- Groundwater is anticipated to be high and the level is to be derived from long-term analysis, with the high groundwater anticipated, the City advises against basements for the development. An **annual groundwater elevation**, from a long-term study will be required.
- There is an existing rail corridor adjacent to the property. Prior to approval of the site plan application, consultation with the railway line owner/operator is required to obtain their approval of the rail safety design.
- A **noise and vibration study** is required to look at the impact from the adjacent rail corridor on the proposed development. In addition, if there are outdoor kennel runs proposed within 100m of a residence, the noise study will also need to include a discussion of the impacts from the proposed kennel runs on the neighbouring residence.
- A **rail safety barrier** will be required in accordance with the study prepared, jointly, by the Railway Association of Canada (RAC) and the Federation of Canadian Municipalities (FCM) titled Guidelines for New Development in Proximity to Railway Operations, published in 2013. The barrier/berm cost is anticipated to be severe. Also, there will likely be challenges associated with the barrier/berm because a large portion of the property is within the floodplain. If floodplain capacity is reduced (e.g. by construction of a rail safety barrier/berm within the floodplain), floodplain compensation volume must be provided elsewhere, however, there is limited area available on the property to provide floodplain compensation. Note that any placing of material in the floodplain (e.g. a rail safety barrier/berm) is regulated by the Conservation Authority and requires approval from RVCA.
- **Stormwater management** quality criteria shall be set by the RVCA and is anticipated to be 80% TSS removal. Reporting of TSS removal shall be extensive and if peer reviewed and published papers are relied on for conclusions, the conclusions shall be patently clear and the report shall show overwhelming agreement.
- The stormwater management quantity criteria for the development is that the post development peak flow rate must match the pre-development peak flow rate as per section 8.3.6.1 of the SDG. The watercourse setback shall be determined (as amended), agreed upon, provided, marked out and shown on drawings.
- Schedule G of the current Official Plan shows Ottawa Street in the location under review to be a rural collector, and, as per annex 1 of the Official Plan a ROW of 26m is required. This appears to have been taken.
- Please refer to the City of Ottawa Private Approach By-law 2003-447 for the entrance design.

Comments provided by RVCA (Provided by Eric Lalande)

- The conservation authority has already issued a permit and has no issues with what was proposed.
- Please note that any changes to the submission previously approved by the conservation authority may require additional review.

ADDITIONAL COMMENTS

Planning Comments

Official Plan: Village

Secondary Plan and/or Community Design Plan: Richmond Secondary Plan/ Village of Richmond CDP

Zoning By-law: Rural General Industrial Zone Subzone 3. Rural Exception 385 (RG3[385r])

1. Parking:
   All parking must comply with Part 4 (Sections 100-114) of the Zoning By-law.

Site Plan Approval Process

Key Steps in the Site Plan Control Approval Process

- File all submissions (plans and reports) noted in the PDF list electronically to Cheryl McWilliams (cheryl.mcwilliams@ottawa.ca). Include the completed Site Plan application form. From there a file number will be assigned and instructions on how to pay will be shared. This is a rural small site plan application so only the fee itself is payable now. This is not subject to formal public consultation though the application is available once filed on the City website through Search Results - Development Applications Search (ottawa.ca).
- City staff will review the submission to deem it complete then circulate it to technical agencies, internal and external contacts (including the Councillor) when we have everything.
- At this point comments are provided to you with any changes needed to the plans and reports, which can then be resubmitted.

- Once all issues/ changes are completed, we prepare a Delegated Authority Report with conditions of approval for your and the Councillor's concurrence, which is then finalized.
- After concurrence, the site plan agreement is prepared by legal service. If works and costs are minimal (to be determined through the process) it may be possible to go through with a letter of undertaking instead that we as staff handle.
- Once the agreement is in place and other permits are obtained, we would issue the commence work for the site works and can then support a building permit being issued. Please note that any work completed in advance of this step is at your own risk and may require changes once the site plan is approved.

Costs

- City direction is that all development must pay for itself. In addition to the fees for plans and reports and the application fee required- once approved the following would be applicable.
    - Cash-in-lieu of parkland (if not already paid previously through planning application such as severance)- estimate 2% of the value of the land before site plan approval
    - Legal fees for preparing and registering the agreement
    - Engineering design review and inspection fee- based on 2% of the value of those on-site works.
- A cost estimate will be required for the exterior works on the site- things like fences, driveway, landscaping grading, ditching, etc. This excludes the building, well, and septic costs. We will then require security (based on 50% of the value of those site works) be provided to ensure the works are completed as approved. This security will be released back once the inspector is satisfied that they are complete.

Building

- Building permits are separate forms and fees, which can be found here.
- Building permits can only be issued once the site plan agreement is registered and any other needed approvals are issued (ex. RVCA permits, MECP permits or stormwater approvals).

Engineering and Hydrogeology Comments:

Water and Sanitary:

- An oil and grit separator should be used where vehicles are maintained, cleaned, or potential for discharge of contaminants.

Storm Water Management:

- Water quality design requirements will be determined by the Rideau Valley Conservation Authority.
- All stormwater management determinations shall have supporting rationale.

Permits and Approvals:

- If a direct stormwater discharge to the watercourse is proposed, an Environmental Compliance Approval (ECA) will be required from the Ministry of the Environment, Conservation and Parks (MECP). Typically, approval timelines for direct submission to the MECP are between 9-11 months.
- Please contact the Ministry of the Environment, Conservation, and Parks (MECP) and Rideau Valley Conservation Authority (RVCA), amongst other federal and provincial departments/agencies, to identify all the necessary permits and approvals required to facilitate the development: responsibility rests with the developer and their consultant for obtaining all external agency approvals. The address shall be in good standing with all approval agencies. Copies of confirmation of correspondence will be required by the City of Ottawa from all approval agencies that a form of assent is given. No construction shall commence until after a commence work notification is given.

Ministry of the Environment, Conservation, and Parks	Rideau Valley Conservation Authority
Contact Information: Jena Leavoy, Senior Environmental Office 613-521-3450 ext.236 Jena.leavoy@ontario.ca	Contact Information: Eric Lalande Eric.lalande@rvca.ca

Plan submission requirements for engineering:

- Layout and Servicing plan
- Erosion and Sediment Control plan
- Grade Control and Drainage Plan

All identified required plans are to be submitted on standard A1 size sheets as per City of Ottawa Guide to Preparing Studies and Plans *and shall note the survey monument used to establish datum on the plans with sufficient information to enable a layperson to locate the monument.*

Report submission requirements for engineering:

- Servicing report
- Hydrogeological report
- Geotechnical report
- Slope Stability study (or adequate justification from an engineering consultant to support that slope stability isn't an issue on this site)
- Stormwater Management Brief
- Noise and Vibration study (for impact from adjacent rail corridor and a discussion of the impact from the proposed kennel runs on the neighbouring residence if within 100m of a residence).
- Rail Safety report.

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca OR (613) 580-2424 ext. 44455

As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.

Application Submission Information

Application Type**: Site Plan Control-Rural, Small**

For information on Zoning By-law Amendment Applications and Site Plan Control Applications, including fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor.

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Please provide electronic copy (PDF) of all plans and studies required.

All plans and drawings must be produced on A1-sized paper and folded to 21.6 cm x 27.9 cm (8½"x 11").

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.

Appendix B

Stormwater Management Design Sheets

LRL Associates Ltd.

Storm Watershed Summary

LRL File No.	210341
Project:	Proposed Dog Kennel
Location:	5969 Ottawa St.
Date:	November 22, 2021
Designed:	Mike Allen
Drawing Reference:	C701/C702

PRE-DEVELOPMENT CATCHMENT AREAS *refer to LRL drawing C701*

WATERSHED	C = 0.20	C = 0.80	C = 0.90	Total Area (m^2)	Total Area (ha)	Combined C
EWS-01	2721.0	523.9	0.0	3244.8	0.324	0.30
TOTAL	**2721.0**	**523.9**	**0.0**	**3244.8**	**0.324**	**0.30**

POST-DEVELOPMENT CATCHMENT AREAS *refer to LRL drawing C702*

WATERSHED	C = 0.20	C = 0.80	C = 0.90	Total Area (m^2)	Total Area (ha)	Combined C
WS-01 (UNCONTROLLED)	1089.5	0.0	0.0	1089.5	0.109	0.20
WS-02 (UNCONTROLLED)	822.2	0.0	226.7	1048.9	0.105	0.35
subtotal	*1911.7*	*0.0*	*226.7*	*2138.4*	0.2138	0.27
WS-03 (CONTROLLED)	322.9	15.3	768.1	1106.3	0.111	0.69
subtotal	*322.9*	*15.3*	*768.1*	*1106.3*	0.1106	0.69
TOTAL	**2234.6**	**15.3**	**994.9**	**3244.8**	**0.324**	**0.42**

LRL File No.	210341
Project:	Proposed Dog Kennel
Location:	5969 Ottawa St.
Date:	November 22, 2021
Designed:	Mike Allen
Drawing Ref.:	C601

Stormwater Management
5-Year Design Sheet

RUNOFF EQUATION

Q = 2.78CIA (L/s)

C = Runoff coefficient
I = Rainfall intensity (mm/hr)
A = Area (ha)
T_c = Time of concentration (min)

$= A / (T_d + C)^B$

A	*T_d*	*C*	*B*
998.071 /	*(10*	*+ 6.053)*	*0.814*

PRE-DEVELOPMENT STORMWATER MANAGEMENT

$I_5 = 998.071 / (10 + 6.053)^{0.814}$

C =	0.30	
I =	104.19	mm/hr
A =	0.324	ha

Allowable Release Rate (Q) = **27.90** L/s

POST-DEVELOPMENT STORMWATER MANAGEMENT

					$\sum R_{2\&5}$
Controlled	WS-03	0.111	ha	R=	0.69
	Total Controlled =	**0.111**	**ha**	**∑R=**	**0.69**
Un-controlled	WS-01	0.109	ha	R=	0.20
	WS-02	0.105	ha	R=	0.35
	Total Un-Controlled =	**0.214**	**ha**	**∑R=**	**0.27**
	Total Site Area =	**0.324**	ha	**∑R=**	**0.42**

POST-DEVELOPMENT STORMWATER MANAGEMENT (*UNCONTROLLED* CATCHMENT WS-01 & WS-02)

$I_5 = 998.071 / (10 + 6.053)^{0.814}$

C =	0.27	
I =	104.19	mm/hr
A =	0.214	ha

Uncontrolled runoff = *16.98* L/s
Controlled release rate constant = *0.00* L/s
Total Release Rate (Q) = **16.98** L/s

POST-DEVELOPMENT STORMWATER MANAGEMENT (*CONTROLLED* CATCHMENT WS-03)

$I_5 = 998.071 / (10 + 6.053)^{0.814}$

C =	0.69	
I =	104.19	mm/hr
A =	0.111	ha

Total allowable release rate for controlled catchment area WS-03 = **10.92** L/s
Design rate used for storage calculation (same as 100 year storm) = **5.72** L/s

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	22.25	9.92	5.72	0.00	5.72
15	83.56	17.84	10.91	5.72	0.00	5.72
20	70.25	15.00	**11.14**	5.72	0.00	5.72
25	60.90	13.00	10.93	5.72	0.00	5.72
30	53.93	11.52	10.44	5.72	0.00	5.72
35	48.52	10.36	9.75	5.72	0.00	5.72
40	44.18	9.44	8.93	5.72	0.00	5.72
45	40.63	8.68	7.99	5.72	0.00	5.72
50	37.65	8.04	6.97	5.72	0.00	5.72
60	32.94	7.03	4.75	5.72	0.00	5.72
70	29.37	6.27	2.33	5.72	0.00	5.72
80	26.56	5.67	0.00	5.72	0.00	5.72
90	24.29	5.19	0.00	5.72	0.00	5.72
100	22.41	4.78	0.00	5.72	0.00	5.72
110	20.82	4.45	0.00	5.72	0.00	5.72
120	19.47	4.16	0.00	5.72	0.00	5.72

Total Storage Required = **11.14** m^3
Available Surface Storage = **34.50** m^3 refer to LRL drawing C601

Inlet Control Device (ICD)

Discharge =	**10.92**	**L/s**
Head =	0.26	m

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES

Catchment Area	Drainage Area (ha)	5-year Release Rate (L/s)	5-Year Required Storage (m3)	Total Available Storage (m3)
WS-01 + WS-02	0.214	16.98	0.00	0.00
WS-03	0.111	10.92	11.14	34.50
TOTAL	**0.324**	**27.90**	**11.14**	**34.50**

LRL File No.	210341
Project:	Proposed Dog Kennel
Location:	5969 Ottawa St.
Date:	November 22, 2021
Designed:	Mike Allen
Drawing Ref.:	C601

Stormwater Management
100-Year Design Sheet

RUNOFF EQUATION

Q = 2.78CIA (L/s)

C = Runoff coefficient
I = Rainfall intensity (mm/hr)
A = Area (ha)
T_c = Time of concentration (min)

$= A / (T_d + C)^B$

A	T_d	*C*	*B*
1735.688 /	*(10*	*+ 6.014)*	*0.82*

PRE-DEVELOPMENT STORMWATER MANAGEMENT

$I_{100} = 1735.688 / (10 + 6.014)^{0.82}$

C =	0.30	
I =	178.56	mm/hr
A =	0.324	ha

Allowable Release Rate (Q) = **47.82** L/s

POST-DEVELOPMENT STORMWATER MANAGEMENT

					$\sum R_{2\&5}$	$\sum R_{100}$
Controlled	WS-03	0.111	ha	R=	0.69	0.87
	Total Controlled =	**0.111**	**ha**	**∑R=**	**0.69**	**0.87**
Un-controlled	WS-01	0.109	ha	R=	0.20	0.25
	WS-02	0.105	ha	R=	0.35	0.44
	Total Un-Controlled =	**0.214**	**ha**	**∑R=**	**0.27**	**0.34**
	Total Site Area =	**0.324**	ha	**∑R=**	**0.42**	**0.52**

POST-DEVELOPMENT STORMWATER MANAGEMENT (*UNCONTROLLED* CATCHMENT WS-01 & WS-02)

$I_{100} = 1735.688 / (10 + 6.014)^{0.82}$

C =	0.34			
I =	178.56	mm/hr	*Uncontrolled runoff =*	*36.38* L/s
A =	0.214	ha	*Controlled release rate constant =*	*0.00* L/s
			Total Release Rate (Q) =	**36.38** L/s

POST-DEVELOPMENT STORMWATER MANAGEMENT (*CONTROLLED* CATCHMENT WS-03)

$I_{100} = 1735.688 / (10 + 6.014)^{0.82}$

C =	0.87	
I =	178.56	mm/hr
A =	0.111	ha

Total allowable release rate for controlled catchment area WS-03 = **11.43** L/s

Design rate used for storage calculation (% of allowable) *50.00* **5.72** L/s

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	47.66	25.17	5.72	0.00	5.72
15	142.89	38.14	29.18	5.72	0.00	5.72
20	119.95	32.02	31.56	5.72	0.00	5.72
25	103.85	27.72	33.01	5.72	0.00	5.72
30	91.87	24.52	33.85	5.72	0.00	5.72
35	82.58	22.04	34.29	5.72	0.00	5.72
40	75.15	20.06	**34.42**	5.72	0.00	5.72
45	69.05	18.43	34.33	5.72	0.00	5.72
50	63.95	17.07	34.06	5.72	0.00	5.72
60	55.89	14.92	33.13	5.72	0.00	5.72
70	49.79	13.29	31.81	5.72	0.00	5.72
80	44.99	12.01	30.21	5.72	0.00	5.72
90	41.11	10.97	28.39	5.72	0.00	5.72
100	37.90	10.12	26.41	5.72	0.00	5.72
110	35.20	9.40	24.29	5.72	0.00	5.72
120	32.89	8.78	22.06	5.72	0.00	5.72

Total Storage Required = **34.42** m^3
Available Surface Storage = **34.50** m^3 refer to LRL drawing C601

Inlet Control Device (ICD)

Discharge =	**11.43**	**L/s**
Head =	0.45	m

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES

Catchment Area	Drainage Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m3)	Total Available Storage (m3)
WS-01 + WS-02	0.214	36.38	0.00	0.00
WS-03	0.111	11.43	34.42	34.50
TOTAL	**0.324**	**47.81**	**34.42**	**34.50**

LRL File No.	210341
Project:	Proposed Dog Kennel
Location:	5969 Ottawa St.
Date:	November 22, 2021
Designed:	Mike Allen
Drawing Ref.:	C601

Stormwater Management
Stage storage table

BIO-RETENTION WS-03

Orifice Dia. (mm) **88** *USE min. 75mm ORIFICE*

100 year allowable release rate = **11.43**

	SURFACE STORAGE						
	Stage	**Ponding**	**head h**	**delta d**	**V**	**V acc**	**Q release**
	(m)	*(m2)*	*(m)*	*(m)*	*(m3)*	*(m3)*	*(L/s)*
Orifice Inv	93.44	0.36	0	0	0	0	0
Interior structure volume	*93.74*	*0.36*	*0.30*	*0.30*	*0.11*	*0.11*	*0.0*
Bottom of bio-retention pond	93.59	93.33	0.00	0	0.00	0.11	0.0
Structure grate inlet	93.74	114.59	0.30	0.3	31.13	31.24	9.1
	93.79	122.11	0.35	0.05	5.92	37.16	9.9
Max Ponding	93.89	136.33	0.45	0.10	12.92	50.07	**11.20**

Note:

The required 5 year storm storage volume is 11.14m^3.

The structure inlet elevation (93.74) is set 150mm above the pond bottom (93.59), which creates 15.62m^3 of available storage; therefore a 5 year storm event will not enter the inlet structure.

LRL File No.	210341
Project:	Proposed Dog Kennel
Location:	5969 Ottawa St.
Date:	November 22, 2021
Designed:	Mike Allen
Drawing Ref.:	C701/C702

Stormwater Management
Enhance swale design

Enhanced bioswale drainage (100 year storm event)

C	Tc (min)	I_{100} (mm/hr)	Area (ha)	Q (L/s)	Avg Depth (m)	side slope (X:1)	bot. width (m)	Mannings n	slope (%)	length (m)	A_{flow} (m2)	Wet. Per (m)	R (m)	V (m/s)	Qcap (L/s)
0.20	10.00	178.56	0.005	0.51	0.30	3.00	0.00	0.03	0.50	25.90	0.27	3.70	0.07	0.4	111.18

Enhanced bioswale drainage (5 year storm event)

C	Tc (min)	I_{100} (mm/hr)	Area (ha)	Q (L/s)	Avg Depth (m)	side slope (X:1)	bot. width (m)	Mannings n	slope (%)	length (m)	A_{flow} (m2)	Wet. Per (m)	R (m)	V (m/s)	Qcap (L/s)
0.20	10.00	104.19	0.005	0.30	0.30	3.00	0.00	0.03	0.50	25.90	0.27	3.70	0.07	0.4	111.18

LRL File No. 210341
Project: Proposed Dog Kennel
Location: 5969 Ottawa St.
Date: November 22, 2021
Designed: Mike Allen
Drawing Ref.: C701/C702

Stormwater Management
Storm pipe sizing

DESIGN GUIDELINES

Rational method (peak flow L/s)
Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/h
A = Drainage area (ha)
T_c = Time of concentration (r

Runoff coefficient (C)			
Grass	Gravel	Asphalt	Rooftop
0.2	0.8	0.9	0.9

Rainfall intensity (mm/hr)	
Ottawa MacDonald-Cartier International Airport	
Storm event:	5 years
Intensity equation:	$I_5 = A / (T_d + C)^B$
	$I_5 = 998.071 / (10 + 6.053)^{0.8}$
Intensity value:	104.2

Pipe Design Parameters	
Minimum velocity	Manning's "n"
0.80 m/s	0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From	To	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc.	Rainfall Intensity	Peak Flow (Q)	Controlled Flow (Q)	Pipe Dia.	Type	Slope	Length	Capacity Full (Q_{FULL})	Velocity Full	Time of Flow	Ratio Q /Q_{FULL}
								(min)	*(mm/hr)*	*(L/s)*	*(L/s)*	*(mm)*		*(%)*	*(m)*	*(L/s)*	*(m/s)*	*(min)*	
WS-03	inlet	outlet	0.032	0.002	0.077	0.21	0.21	10.00	104.19	22.25	11.20	200.00	PVC	1.00%	11.0	32.80	1.04	0.18	0.68

Note:
An 88mm ICD installed at pond outlet will control flow at 11.20 L/s (H=0.45 m)

Appendix C

Low-impact Development Fact Sheets

BIORETENTION

CVC/TRCA LOW IMPACT DEVELOPMENT
PLANNING AND DESIGN GUIDE - FACT SHEET

GENERAL DESCRIPTION

As a stormwater filter and infiltration practice, bioretention temporarily stores, treats and infiltrates runoff. Depending on native soil infiltration rate and physical constraints, the system may be designed without an underdrain for full infiltration, with an underdrain for partial infiltration, or with an impermeable liner and underdrain for filtration only (i.e., a biofilter). The primary component of the practice is the filter bed which is a mixture of sand, fines and organic material. Other elements include a mulch ground cover and plants adapted to the conditions of a stormwater practice. Bioretention is designed to capture small storm events or the water quality storage requirement. An overflow or bypass is necessary to pass large storm event flows. Bioretention can be adapted to fit into many different development contexts and provide a convenient area for snow storage and treatment.

Source: Minnesota Businesses for Clean Water

Source: City of Portland

DESIGN GUIDANCE

SOIL CHARACTERISTICS

Bioretention can be constructed over any soil type, but hydrologic soil group A and B are best for achieving water balance goals. If possible, bioretention should be sited in the areas of the development with the highest native soil infiltration rates. Bioretention in soils with infiltration rates less than 15 mm/hr will require an underdrain. Designers should verify the native soil infiltration rate at the proposed location and depth through measurement of hydraulic conductivity under field saturated conditions.

GEOMETRY & SITE LAYOUT

Key geometry and site layout factors include:

- The minimum footprint of the filter bed area is based on the drainage area. Typical drainage areas to bioretention are between 100 m2 to 0.5 hectares. The maximum recommended drainage area is 0.8 hectares. Typical ratios of impervious drainage area to treatment facility area range from 5:1 to 15:1.
- Bioretention can be configured to fit into many locations and shapes. However, cells that are narrow may concentrate flow as it spreads throughout the cell and result in erosion.
- The filter bed surface should be level to encourage stormwater to spread out evenly over the surface.

PRE-TREATMENT

Pretreatment prevents premature clogging by capturing coarse sediment particles before they reach the filter bed. Where the runoff source area produces little sediment, such as roofs, bioretention can function effectively without pretreatment. To treat parking area or road runoff, a two-cell design that incorporates a forebay is recommended. Pretreatment practices that may be feasible, depending on the method of conveyance and the availability of space include:

- *Two-cell design (channel flow):* Forebay ponding volume should account for 25% of the water quality storage requirement and be designed with a 2:1 length to width ratio.
- *Vegetated filter strip (sheet flow):* Should be a minimum of three (3) metres in width. If smaller strips are used, more frequent maintenance of the filter bed can be anticipated.
- *Gravel diaphragm (sheet flow):* A small trench filled with pea gravel, which is perpendicular to the flow path between the edge of the pavement and the bioretention practice will promote settling out of sediment and maintain sheet flow into the facility. A drop of 50-150 mm into the gravel diaphragm can be used to dissipate energy and promote settling.
- *Rip rap and/or dense vegetation (channel flow):* Suitable for small bioretention cells with drainage areas less than 100 square metres.

GRAVEL STORAGE LAYER

- DEPTH: Should be a minimum of 300 mm deep and sized to provide the required storage volume. Granular material should be 50 mm diameter clear stone.
- PEA GRAVEL CHOKING LAYER: A 100 mm deep layer of pea gravel (3 to 10 mm diameter clear stone) should be placed on top of the coarse gravel storage layer as a choking layer separating it from the overlying filter media bed.

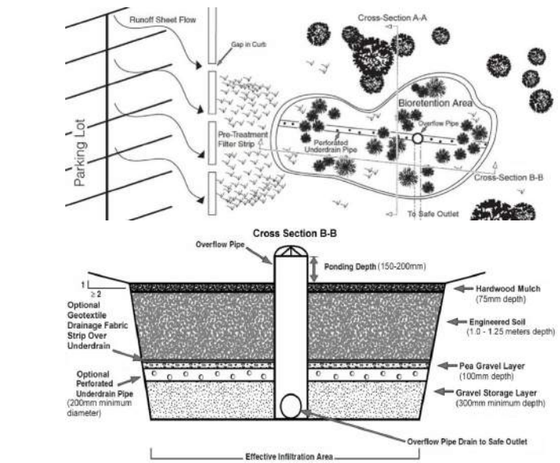
FILTER MEDIA

- COMPOSITION: To ensure a consistent and homogeneous bed, filter media should come pre-mixed from an approved vendor.
- DEPTH: Recommended depth is between 1.0 and 1.25 m. However in constrained applications, pollutant removal benefits may be achieved in beds as shallow as 500 mm. If trees are to be included in the design, bed depth must be at least 1.0 m.
- MULCH: A 75 mm layer of mulch on the surface of the filter bed enhances plant survival, suppresses weed growth and pretreats runoff before it reaches the filter bed.

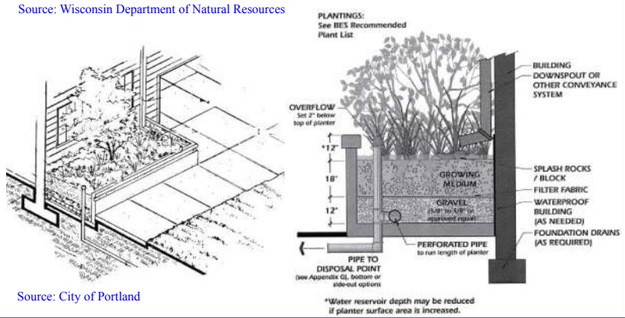
CONVEYANCE AND OVERFLOW

Bioretention can be designed to be inline or offline from the drainage system. Inline bioretention accepts all flow from a drainage area and conveys larger event flows through an overflow outlet. Overflow structures must be sized to safely convey larger storm events out of the facility. The invert of the overflow should be placed at the maximum water surface elevation of the bioretention area, which is typically 150-250 mm above the filter bed surface.

Offline bioretention practices use flow splitters or bypass channels that only allow the required water quality storage volume to enter the facility. This may be achieved with a pipe, weir, or curb opening sized for the target flow, but in conjunction, create a bypass channel so that higher flows do not pass over the surface of the filter bed. Using a weir or curb opening minimizes clogging and reduces maintenance frequency.



Source: Wisconsin Department of Natural Resources



Source: City of Portland

ABILITY TO MEET SWM OBJECTIVES

BMP	Water Balance Benefit	Water Quality Improvement	Stream Channel Erosion Control Benefits
Bioretention with no underdrain	Yes	Yes - size for water quality storage requirement	Partial - based on available storage volume and infiltration rates
Bioretention with underdrain	Partial - based on available storage volume beneath the underdrain and soil infiltration rate	Yes - size for water quality storage requirement	Partial - based on available storage volume beneath the underdrain and soil infiltration rate
Bioretention with underdrain and impermeable liner	Partial - some volume reduction through evapotranspiration	Yes - size for water quality storage requirement	Partial - some volume reduction through evapotranspiration

UNDERDRAIN

- Only needed where native soil infiltration rate is less than 15 mm/hr (hydraulic conductivity of less than 1x10-6 cm/s).
- Should consist of a perforated pipe embedded in the coarse gravel storage layer at least 100 mm above the bottom.
- A strip of geotextile filter fabric placed between the filter media and pea gravel choking layer over the perforated pipe is optional to help prevent fine soil particles from entering the underdrain.
- A vertical standpipe connected to the underdrain can be used as a cleanout and monitoring well.

MONITORING WELLS

A capped vertical stand pipe consisting of an anchored 100 to 150 mm diameter perforated pipe with a lockable cap installed to the bottom of the facility is recommended for monitoring drainage time between storms.

GENERAL SPECIFICATIONS

Material	Specification	Quantity
Filter Media Composition	Filter Media Soil Mixture to contain: • 85 to 88% sand • 8 to 12% soil fines • 3 to 5% organic matter (leaf compost) Other Criteria: • Phosphorus soil test index (P-Index) value between 10 to 30 ppm • Cationic exchange capacity (CEC) greater than 10 meq/100 g • Free of stones, stumps, roots and other large debris • pH between 5.5 to 7.5 • Infiltration rate greater than 25 mm/hr	Recommended depth is between 1.0 and 1.25 metres.
Mulch Layer	Shredded hardwood bark mulch	A 75 mm layer on the surface of the filter bed
Geotextile	Material specifications should conform to Ontario Provincial Standard Specification (OPSS) 1860 for Class II geotextile fabrics. Should be woven monofilament or non-woven needle punched fabrics. Woven slit film and non-woven heat bonded fabrics should not be used as they are prone to clogging. For further guidance see CVC/TRCA LID SWM Planning and Design Guide, Table 4.5.5.	Strip over the perforated pipe underdrain (if present) between the filter media bed and gravel storage layer (stone reservoir)
Gravel	Washed 50 mm diameter clear stone should be used to surround the underdrain and for the gravel storage layer Washed 3 to 10 mm diameter clear stone should be used for pea gravel choking layer.	Volume based on dimensions, assuming a void space ratio of 0.4.
Underdrain	Perforated HDPE or equivalent, minimum 100 mm diameter, 200 mm recommended.	• Perforated pipe for length of cell. • Non-perforated pipe as needed to connect with storm drain system. • One or more caps. • T's for underdrain configuration

CONSTRUCTION CONSIDERATIONS

Ideally, bioretention sites should remain outside the limit of disturbance until construction of the bioretention begins to prevent soil compaction by heavy equipment. Locations should not be used as sediment basins during construction, as the concentration of fines will prevent post-construction infiltration. To prevent sediment from clogging the surface of a bioretention cell, stormwater should be diverted away from the bioretention until the drainage area is fully stabilized.

For further guidance regarding key steps during construction, see the CVC/TRCA LID SWM Planning and Design Guide, Section 4.5.2 - Construction Considerations)

OPERATION AND MAINTENANCE

Bioretention requires routine inspection and maintenance of the landscaping as well as periodic inspection for less frequent maintenance needs or remedial maintenance. Generally, routine maintenance will be the same as for any other landscaped area; weeding, pruning, and litter removal. Regular watering may be required during the first two years until vegetation is established.

For the first two years following construction the facility should be inspected at least quarterly and after every major storm event (> 25 mm). Subsequently, inspections should be conducted in the spring and fall of each year and after major storm events. Inspect for vegetation density (at least 80% coverage), damage by foot or vehicular traffic, channelization, accumulation of debris, trash and sediment, and structural damage to pretreatment devices.

Trash and debris should be removed from pretreatment devices, the bioretention area surface and inlet and outlets at least twice annually. Other maintenance activities include reapplying mulch, pruning, weeding replacing dead vegetation and repairing eroded areas as needed. Remove accumulated sediment on the bioretention area surface when dry and exceeding 25 mm depth.

SITE CONSIDERATIONS

Wellhead Protection

Facilities receiving road or parking lot runoff should not be located within two (2) year time-of-travel wellhead protection areas.

Available Space

Reserve open areas of about 10 to 20% of the size of the contributing drainage area.

Site Topography

Contributing slopes should be between 1 to 5%. The surface of the filter bed should be flat to allow flow to spread out. A stepped multi-cell design can also be used.

Available Head

If an underdrain is used, then 1 to 1.5 metres elevation difference is needed between the inflow point and the downstream storm drain invert.

Water Table

A minimum of one (1) metre separating the seasonally high water table or top of bedrock elevation and the bottom of the practice is necessary.

Soils

Bioretention can be located over any soil type, but hydrologic soil group A and B soils are best for achieving water balance benefits. Facilities should be located in portions of the site with the highest native soil infiltration rates. Where infiltration rates are less than 15 mm/hr (hydraulic conductivity less than 1x10-6 cm/s) an underdrain is required. Native soil infiltration rate at the proposed facility location and depth should be confirmed through measurement of hydraulic conductivity under field saturated conditions.

Drainage Area & Runoff Volume

Typical contributing drainage areas are between 100 m2 to 0.5 hectares. The maximum recommended contributing drainage area is 0.8 hectares. Typical ratios of impervious drainage area to treatment facility area range from 5:1 to 15:1.

Pollution Hot Spot Runoff

To protect groundwater from possible contamination, runoff from pollution hot spots should not be treated by bioretention facilities designed for full or partial infiltration. Facilities designed with an impermeable liner (filtration only facilities) can be used to treat runoff from pollution hot spots.

Proximity to Underground Utilities

Designers should consult local utility design guidance for the horizontal and vertical clearances required between storm drains, ditches, and surface water bodies.

Overhead Wires

Check whether the future tree canopy height in the bioretention area will interfere with existing overhead phone and power lines.

Setback from Buildings

If an impermeable liner is used, no setback is needed. If not, a four (4) metre setback from building foundations should be applied.

Toronto and Region Conservation for The Living City

CVC Credit Valley Conservation

FOR FURTHER DETAILS SEE SECTION 4.5 OF THE CVC/TRCA LID SWM GUIDE

ENHANCED GRASS SWALES

CVC/TRCA LOW IMPACT DEVELOPMENT
PLANNING AND DESIGN GUIDE - FACT SHEET

GENERAL DESCRIPTION

Enhanced grass swales are vegetated open channels designed to convey, treat and attenuate stormwater runoff (also referred to as enhanced vegetated swales). Check dams and vegetation in the swale slows the water to allow sedimentation, filtration through the root zone and soil matrix, evapotranspiration, and infiltration into the underlying native soil. Simple grass channels or ditches have long been used for stormwater conveyance, particularly for roadway drainage. Enhanced grass swales incorporate design features such as modified geometry and check dams that improve the contaminant removal and runoff reduction functions of simple grass channel and roadside ditch designs.

Where development density, topography and depth to water table permit, enhanced grass swales are a preferred alternative to both curb and gutter and storm drains as a stormwater conveyance system. When incorporated into a site design, they can reduce impervious cover, accent the natural landscape, and provide aesthetic benefits.

DESIGN GUIDANCE

GEOMETRY AND SITE LAYOUT

- Shape: Should be designed with a trapezoidal or parabolic cross section. Trapezoidal swales will generally evolve into parabolic swales over time, so the initial trapezoidal cross-section design should be checked for capacity and conveyance assuming it is a parabolic cross-section. Swale length between culverts should be 5 metres or greater.
- Bottom Width: Should be designed with a bottom width between 0.75 and 3.0 metres. Should allow for shallow flows and adequate water quality treatment, while preventing flows from concentrating and creating gullies.
- Longitudinal Slope: Slopes should be between 0.5% and 4%. Check dams should be incorporated on slopes greater than 3%.
- Length: When used to convey and treat road runoff, the length simply parallels the road, and therefore should be equal to, or greater than the contributing roadway length.
- Flow Depth: A maximum flow depth of 100 mm is recommended during a 4 hour, 25 mm Chicago storm event.
- Side Slopes: Should be as flat as possible to aid in providing pretreatment for lateral incoming flows and to maximize the swale filtering surface. Steeper side slopes are likely to have erosion gullying from incoming lateral flows. A maximum slope of 2.5:1 (H:V) is recommended and a 4:1 slope is preferred where space permits.

PRE-TREATMENT

A pea gravel diaphragm located along the top of each bank can be used to provide pretreatment of any runoff entering the swale laterally along its length. Vegetated filter strips or mild side slopes (3:1) also provide pretreatment for any lateral sheet flow entering the swale. Sedimentation forebays at inlets to the swale are also a pretreatment option.

CONVEYANCE AND OVERFLOW

Grass swales must be designed for a maximum velocity of 0.5 m/s or less for the 4 hour 25 mm Chicago storm event. The swale should also convey the locally required design storm (usually the 10 year storm) at non-erosive velocities.

SOIL AMENDMENTS

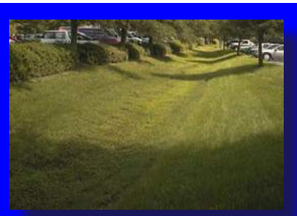
If soils along the location of the swale are highly compacted, or of such low fertility that vegetation cannot become established, they should be tilled to a depth of 300 mm and amended with compost to achieve an organic content of 8 to 15% by weight or 30 to 40% by volume.


Source: Delaware Department of Transportation

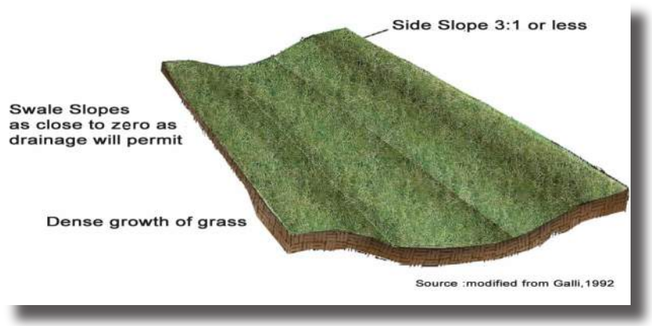
Source: Seattle Public Utilities


Source: Thomas Engineering

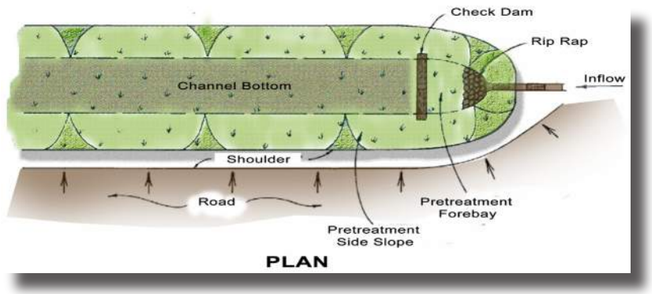

Source: Sue Donaldson

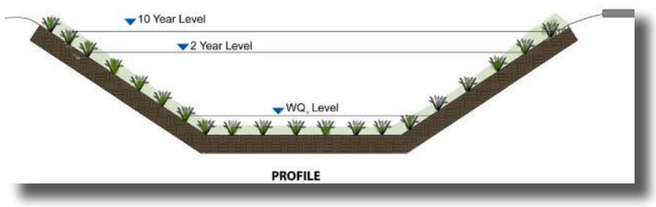



Source: CWP



PLAN VIEW OF A GRASS SWALE





PLAN AND PROFILE VIEWS

ABILITY TO MEET SWM OBJECTIVES

BMP	Water Balance Benefit	Water Quality Improvement	Stream Channel Erosion Control Benefit
Enhanced Grass Swale	Partial - depends on soil infiltration rate	Yes, if design velocity is 0.5 m/s or less for a 4 hour, 25 mm Chicago storm	Partial - depends on soil infiltration rate

GENERAL SPECIFICATIONS

Component	Specification	Quantity
Check Dams	Constructed of a non-erosive material such as suitably sized aggregate, wood, gabions, riprap, or concrete. All check dams should be underlain with geotextile filter fabric. Wood used for check dams should consist of pressure treated logs or timbers, or water-resistant tree species such as cedar, hemlock, swamp oak or locust.	Spacing should be based on the longitudinal slope and desired ponding volume.
Gravel Diaphragm	Washed stone between 3 and 10 mm in diameter.	Minimum of 300 mm wide and 600 mm deep.

CONSTRUCTION CONSIDERATIONS

Grass swales should be clearly marked before site work begins to avoid disturbance during construction. No vehicular traffic, except that specifically used to construct the facility, should be allowed within the swale site. Any accumulation of sediment that does occur within the swale must be removed during the final stages of grading to achieve the design cross-section. Final grading and planting should not occur until the adjoining areas draining into the swale are stabilized. Flow should not be diverted into the swale until the banks are stabilized.

Preferably, the swale should be planted in the spring so that the vegetation can become established with minimal irrigation. Installation of erosion control matting or blanketing to stabilize soil during establishment of vegetation is highly recommended. If sod is used, it should be placed with staggered ends and secured by rolling the sod. This helps to prevent gullies.

OPERATION AND MAINTENANCE

Generally, routine maintenance will be the same as for any other landscaped area; weeding, pruning, and litter removal. Grassed swales should be mown at least twice yearly to maintain grass height between 75 and 150 mm. The lightest possible mowing equipment should be used to prevent soil compaction. Routine roadside ditch maintenance practices such as scraping and re-grading should be avoided. Regular watering may be required during the first two years until vegetation is established. Routine inspection is very important to ensure that dense vegetation cover is maintained and inlets and pretreatment devices are free of debris.

For the first two years following construction the swale should be inspected at least quarterly and after every major storm event (> 25 mm). Subsequently, inspections should be conducted in the spring and fall of each year and after major storm events. Inspect for vegetation density (at least 80% coverage), damage by foot or vehicular traffic, accumulation of debris, trash and sediment, and structural damage to pretreatment devices.

Trash and debris should be removed from pretreatment devices and the surface of the swale at least twice annually. Other maintenance activities include weeding, replacing dead vegetation, repairing eroded areas, dethatching and aerating as needed. Remove accumulated sediment on the swale surface when dry and exceeding 25 mm depth.

SITE CONSIDERATIONS

Available Space
Grass swales usually consume about 5 to 15% of their contributing drainage area. A width of at least 2 metres is needed.

Site Topography
Site topography constrains the application of grass swales. Longitudinal slopes between 0.5 and 6% are allowable. This prevents ponding while providing residence time and preventing erosion. On slopes steeper than 3%, check dams should be used.

Drainage Area & Runoff Volume
The conveyance capacity should match the drainage area. Sheet flow to the grass swale is preferable. If drainage areas are greater than 2 hectares, high discharge through the swale may not allow for filtering and infiltration, and may create erosive conditions. Typical ratios of impervious drainage area to treatment facility area range from 5:1 to 10:1.

Soil
Grass swales can be applied on sites with any type of soils.

Pollution Hot Spot Runoff
To protect groundwater from possible contamination, source areas where land uses or human activities have the potential to generate highly contaminated runoff (e.g., vehicle fueling, servicing and demolition areas, outdoor storage and handling areas for hazardous materials and some heavy industry sites) should not be treated by grass swales.

Proximity to Underground Utilities
Utilities running parallel to the grass swale should be offset from the centerline of the swale. Underground utilities below the bottom of the swale are not a problem.

Water Table
The bottom of the swale should be separated from the seasonally high water table or top of bedrock elevation by at least one (1) metre.

Setback from Buildings
Should be located a minimum of four (4) metres from building foundations to prevent water damage.

TORONTO AND REGION Conservation for The Living City
CVC CREDIT VALLEY CONSERVATION

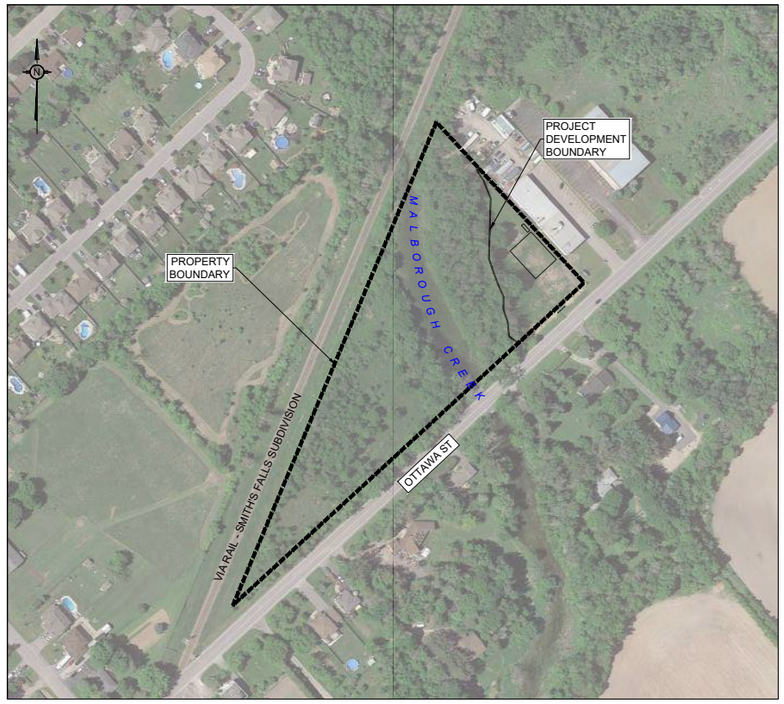
FOR FURTHER DETAILS SEE SECTION 4.8 OF THE CVC/TRCA LID SWM GUIDE

Appendix D

Civil Engineering Drawings

PROPOSED DOG KENNEL
5969 OTTAWA ST., OTTAWA, ON

REVISION 01



KEY PLAN (NTS)

DRAWING INDEX	
TITLE PAGE	
SEDIMENT AND EROSION CONTROL PLAN	C101
DEMOLITION PLAN	C102
SITE DEVELOPMENT PLAN	C201
GRADING AND DRAINAGE PLAN	C301
STORMWATER MANAGEMENT PLAN	C601
PRE-DEVELOPMENT WATERSHED PLAN	C701
POST-DEVELOPMENT WATERSHED PLAN	C702
CONSTRUCTION DETAIL PLAN	C901

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
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PROPOSED DOG KENNEL
5969 OTTAWA ST., OTTAWA, ON
REV.01 - ISSUED FOR APPROVAL - NOV 25, 2021
LRL PROJECT no: 210341

GENERAL NOTES

1. ALL WORKS MATERIALS SHALL CONFIRM TO THE LAST REVISION OF THE STANDARDS AND SPECIFICATIONS FOR THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE. LOCAL UTILITY STANDARDS AND MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
2. THE CONTRACTORS SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTORS SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION , TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION, ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTORS TO CONFIRM UTILITY LOCATIONS AND NOTIFY ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT CONTRACTOR'S EXPENSE.
4. ANY AREA BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE. RELOCATING OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR DETECTED BY THE ENGINEER AT THE EXPENSE OF DEVELOPERS.
5. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 'OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS'. THE GENERAL CONTRACTORS SHALL BE DEEMED TO BE THE 'CONTRACTOR' AS DEFINED IN THE ACT.
6. ALL THE CONSTRUCTION SIGNAGE MUST CONFIRM TO THE MINISTRY OF TRANSPORTATION OF ONTARIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PER LATEST AMENDMENT.
7. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THE CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES TO PREVENT CONFLICTS.
8. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
9. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
10. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
11. FOR DETAILS RELATING TO STORMWATER MANAGEMENT AND ROOF DRAINAGE REFER TO THE SITE SERVICING AND STORMWATER MANAGEMENT REPORT.
12. ALL SEWERS CONSTRUCTED WITH GRADES LESS THAN 1.0% SHALL BE INSTALLED USING LASER ALIGNMENT AND CHECKED WITH LEVEL INSTRUMENT PRIOR TO BACKFILLING.
13. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND TO BEAR THE COST OF THE SAME.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL BEDDING, OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH AS SPECIFIED BY OPSD IS EXCEEDED.
15. ALL PIPE/CULVERT SECTION SIZES REFER TO INSIDE DIMENSIONS.
16. SHOULD DEEPLY BURIED ARCHAEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY.
17. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING/REMOVAL.
18. DRAWINGS SHALL BE READ ON CONJUNCTION WITH ARCHITECTURAL SITE PLAN.
19. THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER ON SET OF AS CONSTRUCTED SITE SERVICING AND GRADING DRAWINGS.
20. BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

THE CONTRACTOR ACKNOWLEDGES THAT SURFACE EROSION AND SEDIMENT RUNOFF RESULTING FROM THEIR CONSTRUCTION OPERATIONS HAS POTENTIAL TO CAUSE A DETRIMENTAL IMPACT TO ANY DOWNSTREAM WATERCOURSE OR SEWER, AND THAT ALL CONSTRUCTION OPERATIONS THAT MAY IMPACT UPON WATER QUALITY SHALL BE CARRIED OUT IN MANNER THAT STRICTLY MEETS THE REQUIREMENT OF ALL APPLICABLE LEGISLATION AND REGULATIONS.

AS SUCH, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARRYING OUT THEIR OPERATIONS, AND SUPPLYING AND INSTALLING ANY APPROPRIATE CONTROL MEASURES, SO AS TO PREVENT SEDIMENT LADEN RUNOFF ENTERING ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA.

THE CONTRACTOR ACKNOWLEDGES THAT NO ONE MEASURE IS LIKELY TO BE 100% EFFECTIVELY FOR EROSION PROTECTION AND CONTROLLING SEDIMENT RUNOFF AND DISCHARGES FROM THE SITE. THEREFORE, WHERE NECESSARY THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES ARRANGED IN SUCH MANNER AS TO MITIGATE SEDIMENT RELEASE FROM THE CONSTRUCTION OPERATIONS AND ACHIEVE SPECIFIC MAXIMUM PERMITTED CRITERIA WHERE APPLICABLE. SUGGESTED ON-SITE MEASURES MAY INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING METHODS: SEDIMENT PONDS, FILTER BAGS, PUMP FILTERS, SETTLING TANKS, SILT FENCE, STRAW BALES, FILTER CLOTHS, CATCH BASIN FILTERS, CHECK DAMS AND/OR OTHER RECOGNIZED TECHNOLOGIES AND METHOD AVAILABLE AT THE TIME OF CONSTRUCTION. SPECIFIC MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF OPSS 577 WHERE APPROPRIATE, OR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

WHERE, IN THE OPINION OF THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, THE INSTALLED CONTROL MEASURES FAIL TO PERFORM ADEQUATELY, THE CONTRACTOR SHALL SUPPLY AND INSTALL ADDITIONAL OR ALTERNATIVE MEASURES AS DIRECTED BY THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, AS SUCH, THE CONTRACTOR SHALL HAVE ADDITIONAL CONTROL MATERIALS ON SITE AT ALL TIME WHICH ARE EASILY ACCESSIBLE AND MAY BE IMPLEMENTED BY HIM AT THE MOMENT'S NOTICE.

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL SUBMIT TO THE CONTRACT ADMINISTRATOR SIX COPIES OF A DETAILED EROSION AND SEDIMENT CONTROL PLAN (ESCP). THE ESCP WILL CONSIST OF WRITTEN DESCRIPTION AND DETAILED DRAWINGS INDICATING THE ON-SITE ACTIVITIES AND MEASURES TO BE USED TO CONTROL EROSION AND SEDIMENT MOVEMENT FOR EACH STEP OF THE WORK.

CONTRACTOR'S RESPONSIBILITIES

THE CONTRACTOR SHALL ENSURE THAT ALL WORKERS, INCLUDING SUB-CONTRACTOR, IN THE WORKING ARE ARE AWARE OF THE IMPORTANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES AND INFORMED OF THE CONSEQUENCES OF THE FAILURE TO COMPLY WITH THE REQUIREMENTS OF ALL REGULATORY AGENCIES.

THE CONTRACTOR SHALL PERIODICALLY, AND WHEN REQUESTED BY THE CONTRACT ADMINISTRATOR, CLEAN OUT ACCUMULATED SEDIMENT DEPOSITS AS REQUIRED AT THE SEDIMENT CONTROL DEVICES, INCLUDING THOSE DEPOSITS THAT MAY ORIGINATE FROM OUTSIDE THE CONSTRUCTION AREA. ACCUMULATED SEDIMENT SHALL BE REMOVED IN SUCH A MANNER THAT PREVENTS THE DEPOSITION OF THIS MATERIAL INTO THE SEWER WATERCOURSE AND AVOIDS DAMAGE TO CONTROL MEASURES. THE SEDIMENT SHALL BE REMOVED FROM THE SITE AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH REQUIREMENTS FRO EXCESS EARTH MATERIAL, AS SPECIFIED ELSEWHERE IN THE CONTRACT.

THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE CONTRACT ADMINISTRATOR ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO EITHER THE WATERCOURSE OR THE STORM SEWER SYSTEM. FAILURE TO REPORT WILL BE CONSTITUTE A BRACH OF THIS SPECIFICATION AND THE CONTRACTOR MAY ALSO BE SUBJECT TO THE PENALTIES IMPOSED BY THE APPLICABLE REGULATORY AGENCY. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, THE MEASURE OR MEASURES, IS NO LONGER REQUIRED. NO CONTROL MEASURE MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE CONTRACT ADMINISTRATOR. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS THE ENTRY OF ANY EQUIPMENT, OTHER THAN HAND-HELD EQUIPMENT, INTO ANY WATERCOURSE, AND PREVENTS THE RELEASE OF ANY SEDIMENT OR DEBRIS INTO ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA. ALL ACCUMULATED SEDIMENT SHALL BE REMOVED FROM THE WORKING AREA AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH THE REQUIREMENTS FOR EXCESS EARTH MATERIAL

WHERE, IN THE OPINION OF EITHER THE CONTRACT ADMINISTRATOR OR A REGULATORY AGENCY, ANY OF THE TERMS SPECIFIED HEREIN HAVE NOT BEEN COMPLIED WITH OR PERFORMED IN A SUITABLE MANNER, OR TAT ALL, THE CONTRACTOR ADMINISTRATOR OR A REGULATORY AGENCY HAS THE RIGHT TO IMMEDIATELY WITHDRAW ITS PERMISSION TO CONTINUE THE WORK BUT MAY RENEW ITS PERMISSION UPON BEING SATISFIED THAT THE DEFAULTS OR DEFICIENCIES IN THE PERFORMANCE OF THIS SPECIFICATION BY THE CONTRACTOR HAVE BEEN REMEDIED.

SPILL CONTROL NOTES

1. ALL CONSTRUCTION EQUIPMENT SHALL BE RE-FUELED, MAINTAINED, AND STORED NO LESS THAN 30 METRES FROM WATERCOURSE, STEAMS, CREEKS, WOODLOTS, AND ANY ENVIRONMENTALLY SENSITIVE AREAS, OR AS OTHERWISE SPECIFIED.
2. THE CONTRACTOR MUST IMPLEMENT ALL NECESSARY MEASURES IN ORDER TO PREVENT LEAKS, DISCHARGES OR SPILLS OF POLLUTANTS, DELETERIOUS MATERIALS, OR OTHER SUCH MATERIALS OR SUBSTANCES WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT.
3. IN THE EVENT OF A LEAK, DISCHARGE OR SPILL OF POLLUTANT, DELETERIOUS MATERIAL OR OTHER SUCH MATERIAL OR SUBSTANCE WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT, THE CONTRACTOR SHALL:
   - 3.1. IMMEDIATELY NOTIFY APPROPRIATE FEDERAL, PROVINCIAL, AND LOCAL GOVERNMENT MINISTRIES, DEPARTMENTS, AGENCIES, AND AUTHORITIES OF THE INCIDENT IN ACCORDANCE WITH ALL CURRENT LAWS, LEGISLATION, ACTS, BY-LAWS, PERMITS, APPROVALS, ETC.
   - 3.2. TAKE IMMEDIATE MEASURES TO CONTAIN THE MATERIAL OR SUBSTANCE, AND TO TAKE SUCH MEASURES TO MITIGATE AGAINST ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT.
   - 3.3. RESTORE THE AFFECTED AREA TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION.

MUD MAT NOTES

1. THE GRANULAR MATERIAL WILL REQUIRE PERIODIC REPLACEMENT AS IT BECOMES CONTAMINATED BY VEHICLE TRAFFIC.
2. SEDIMENT SHALL BE CLEANED FROM PUBLIC ROADS AT THE END OF EACH DAY.
3. SEDIMENT SHALL BE REMOVED FROM PUBLIC ROADS BY SHOVELING OR SWEEPING AND DISPOSED OR PROPERLY IN A CONTROLLED SEDIMENT DISPOSAL AREA.

SITE GRADING NOTES

1. PRIOR TO THE COMMENCEMENT OF THE SITE GRADING WORKS, ALL SILTATION CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL PER EROSION CONTROL PLAN.
2. ALL GRANULAR AND PAVEMENT FOR ROADS/PARKING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
3. ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD AND PARKING AREAS ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
4. GRANULAR 'A' SHALL BE PLACED TO A MINIMUM THICKNESS OF 30MM AROUND ALL STRUCTURES WITHIN THE PAVEMENT AREA.
5. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 30MM LIFTS.
6. ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR BACKFILLING.
7. CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE, IF REQUIRED BY THE MUNICIPALITY.
8. ALL PAVEMENT MARKING FEATURES AND SITE SIGNAGE SHALL BE PLACED PER ARCHITECTURAL SITE PLAN. LINE PAINTING AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT PAINT.
9. REFER TO ARCHITECTURAL SITE PLAN FOR DIMENSIONS AND SITE DETAILS.
10. STEP JOINTS ARE TO BE USED WHERE PROPOSED ASPHALT MEETS EXISTING ASPHALT. ALL JOINTS MUST BE SEALED.
11. WHERE APPLICABLE THE CONTRACTOR IS TO SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS MUST BE SITE SPECIFIC, SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER. THE CONTRACTOR WILL ALSO BE REQUIRED TO SUPPLY AND GEOTECHNICAL CERTIFICATION OF THE AS-CONSTRUCTED RETAINING WALL TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

STORM SEWER NOTES

STORM

12. RIP-RAP TREATMENT SEWER AND CULVERT OUTLETS PER OPSD 810.010.
13. ALL STORM SEWER/ CULVERTS TO BE INSTALLED WITH FROST TREATMENT PER OPSD 803.031 WHERE APPLICABLE.

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CADD FILES OR OTHER ELECTRONIC MEDIA AND COPIED THERE OF FURNISHED BY THE ENGINEER ARE HIS PROPERTY, THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

UNLESS THE REVISION TITLE IS "ISSUED FOR CONSTRUCTION", THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT.

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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021/11/25
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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5430 Canotek Road I Ottawa, ON, K1J 9G2
www.lrl.ca I (613) 842-3434

CLIENT
AL ROBERTS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

DRAWING TITLE
GENERAL NOTES

PROJECT NO.
210341

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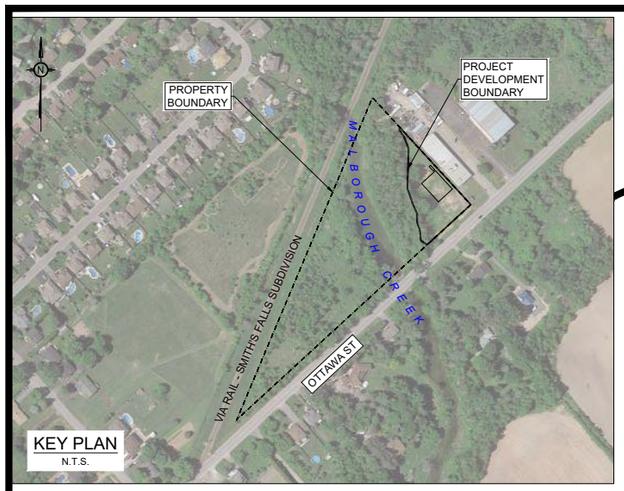
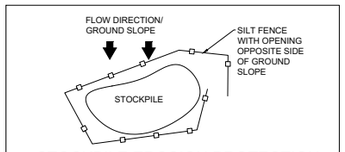
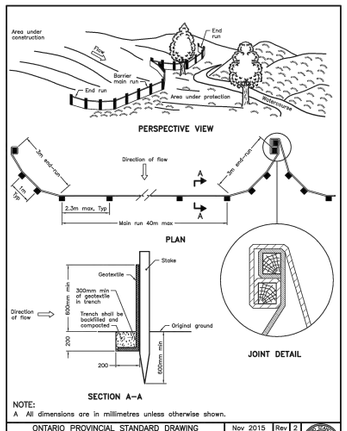
C001



KEY PLAN
N.T.S.



STOCKPILE EROSION PROTECTION
N.T.S.



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110

EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **

1. PRIOR TO START OF CONSTRUCTION:

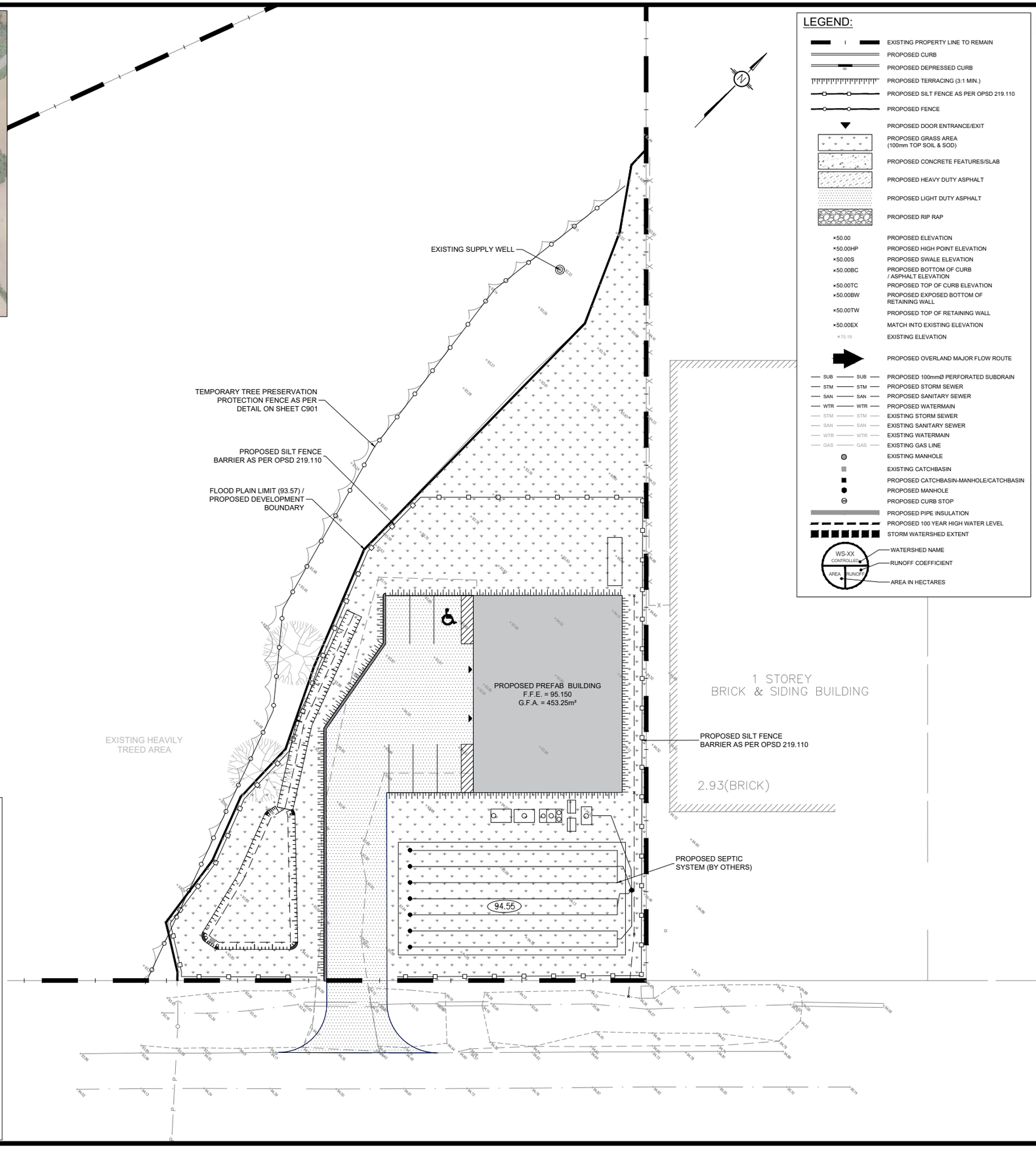
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASINS STRUCTURES
- INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. DURING CONSTRUCTION:

- WORK TO BE DONE IN THE VICINITY OF MAJOR WATERWAYS TO BE CARRIED OUT FROM JULY TO SEPTEMBER ONLY.
- MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.
- PROTECT DISTURBED AREAS FROM RUNOFF.
- PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS.
- INSPECT SILT FENCES, FILTER CLOTHS AND CATCH BASIN SUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
- CONSTRUCT SWALES AS PER DETAIL.
- PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION
- EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
- DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (LONGER THAN 30 DAYS).
- CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED).
- ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
- NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS.
- CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC. AT THE END OF EACH WORK DAY.
- PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG, 4M WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHERT-RUN LIMESTONE) MATERIAL. MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.
- DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.
- ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
- TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.

3. AFTER CONSTRUCTION:

- PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREAS.
- REMOVE STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.
- INSPECT AND CLEAN CATCH BASIN SUMPS AND STORM SEWERS.



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- WS-XX CONTROLLER / AREA / RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES

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SCALE: 1:250

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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501936
2021/11/25
PROVINCE OF ONTARIO

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CLIENT
AL ROBERTS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

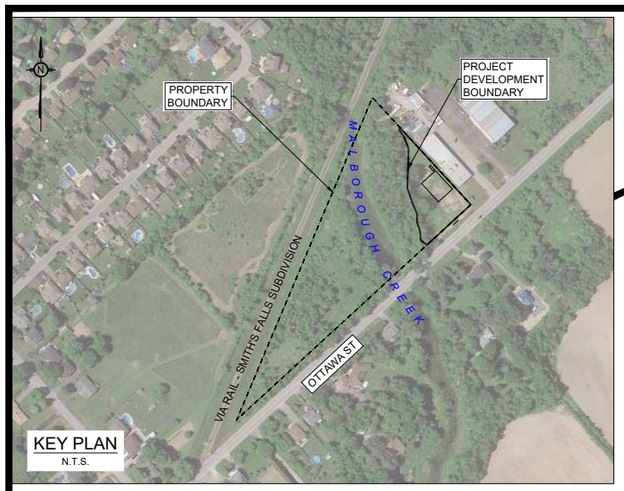
PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
210341

DATE
27 JULY 2021

C101



KEY PLAN
N.T.S.

EXISTING SUPPLY WELL

FLOOD PLAIN LIMIT (93.57) / PROPOSED DEVELOPMENT BOUNDARY

EXISTING GRAVEL TO BE REMOVED

EXISTING HEAVILY TREED AREA

EXISTING ELECTRICAL SERVICE BOX TO BE REMOVED

EXISTING 500mmØ CSP CULVERT TO BE REMOVED.

EXISTING 500mmØ CSP CULVERT TO BE REMOVED. CONTRACTOR TO CLEAN AND REINSTATE DITCH

1 STOREY
BRICK & SIDING BUILDING

2.93(BRICK)

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PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

DRAWING TITLE
DEMOLITION PLAN

PROJECT NO.
210341

DATE
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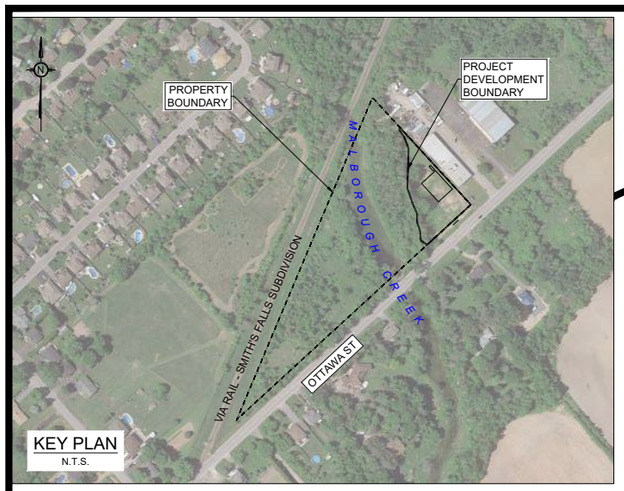
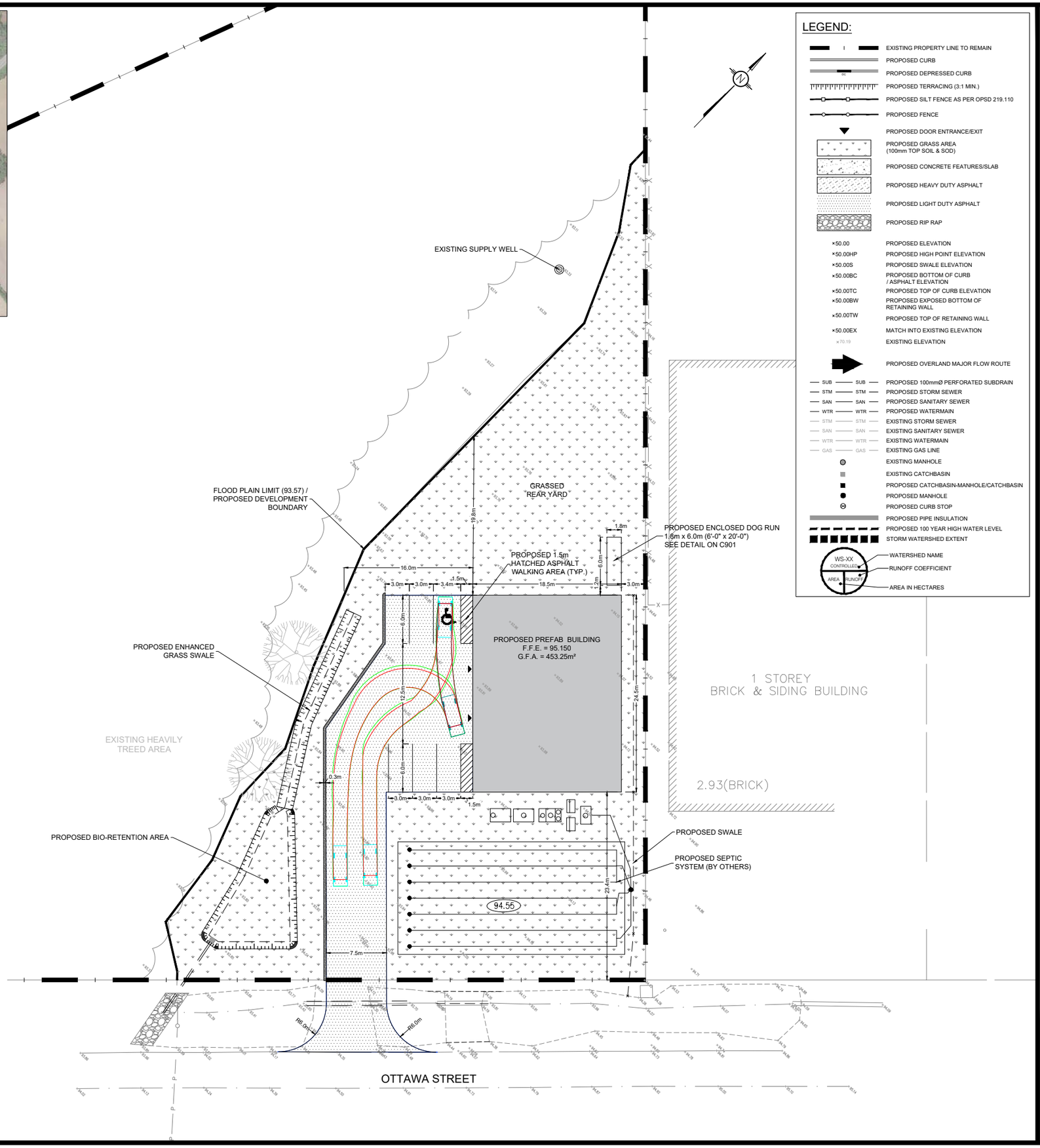
C102



DETAILS OF DEVELOPMENT

DATA		REQUIRED	PROVIDED
	ZONING	RG3[385r] (RURAL GENERAL)	
SETBACKS	FY	15.0m	23.4m
	RY	15.0m	19.8m
	INT.SY	3.0m	16.0m
	EXT.SY	3.0m	3.0m
NET LOT AREA (sqm)		3240 sqm	
BUILDING COVERAGE		50 % (MAX)	14 %
BUILDING HEIGHT		15 m (MAX)	7.62 m (25')
GROSS FLOOR AREA		453.25 sqm	
No. of UNITS		1	
LOADING SPACES		N/A	N/A
PARKING:		4	5 + 1 HC
No. OF STOREYS			2
OTHER:			



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
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- PROPOSED LIGHT DUTY ASPHALT
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- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- STM EXISTING STORM SEWER
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- GAS EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX WATERSHED NAME
- CONTROLLER RUNOFF COEFFICIENT
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USE AND INTERPRETATION OF DRAWINGS

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5m 0 5 10m

SCALE: 1:250

NOT FOR CONSTRUCTION TENDER OR PERMIT

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.A.	25 NOV 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021/11/25
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road I Ottawa, ON, K1J 9G2
www.lrl.ca I (613) 842-3434

CLIENT
AL ROBERTS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

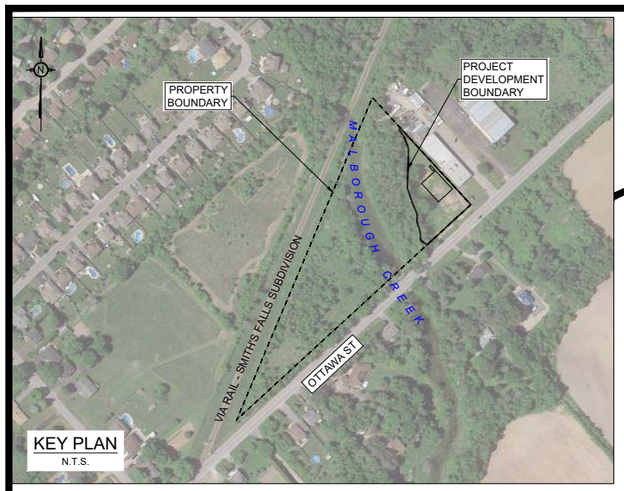
PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

DRAWING TITLE
SITE DEVELOPMENT PLAN

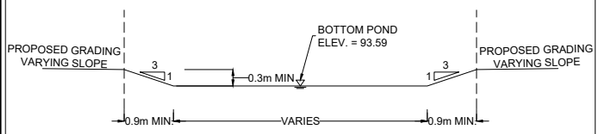
PROJECT NO.
210341

DATE
27 JULY 2021

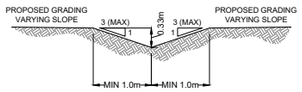
C201



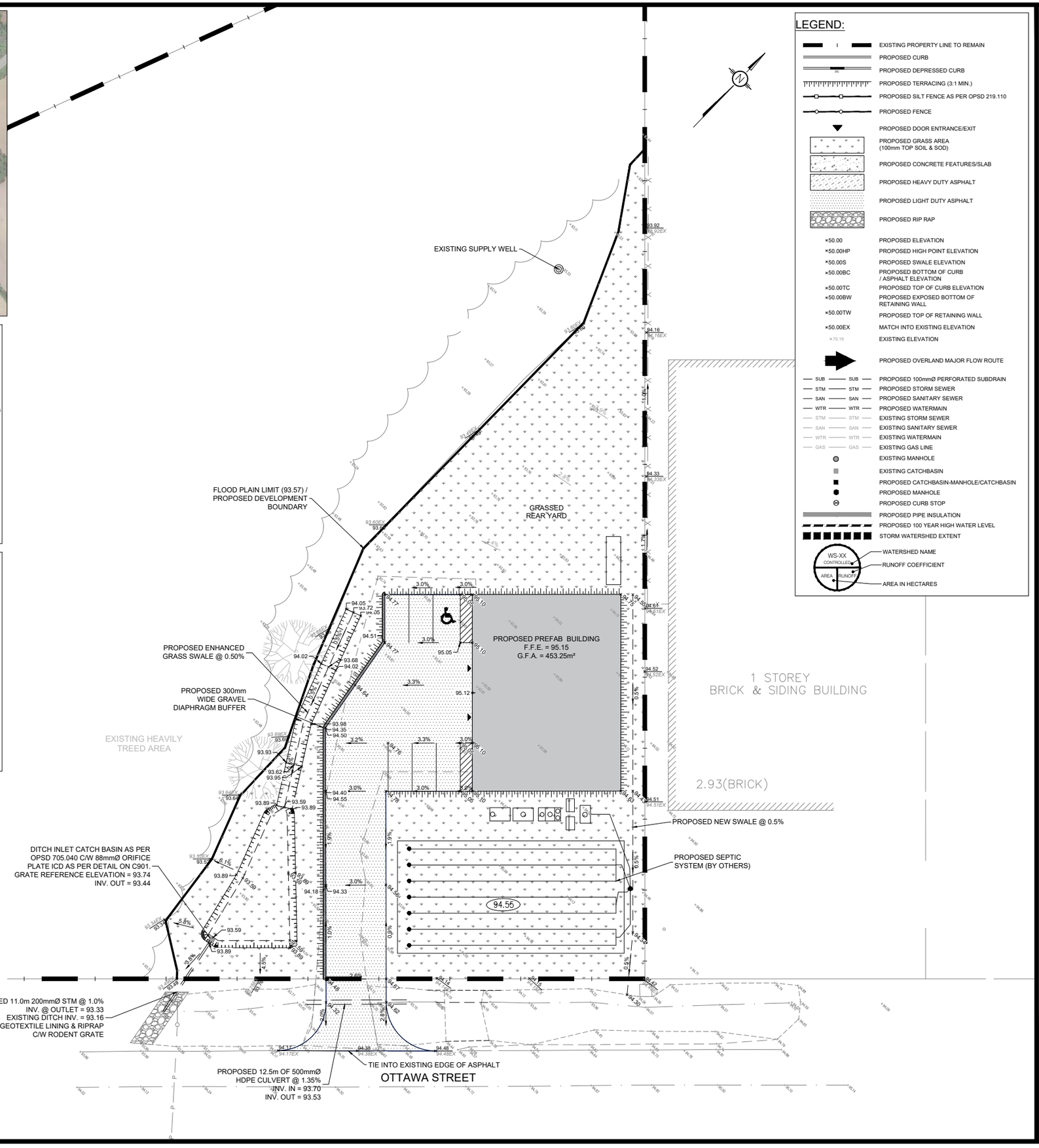
KEY PLAN
N.T.S.



TYPICAL STORMWATER BIO-RETENTION AREA
CROSS SECTION
(N.T.S.)



TYPICAL STORMWATER BIO-SWALE
CROSS SECTION
(N.T.S.)



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- STORM WATERSHED EXTENT

WS-XX
CONTROLLED
AREA | RUNOFF

- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

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5m 0 5 10m
SCALE: 1:250

NOT FOR CONSTRUCTION TENDER OR PERMIT

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.A.	25 NOV 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501936
2021/11/25
PROVINCE OF ONTARIO
NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INSPIRED
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
AL ROBERTS

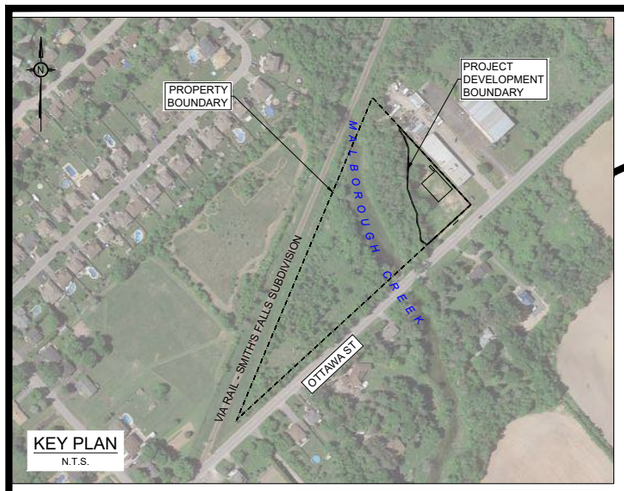
DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

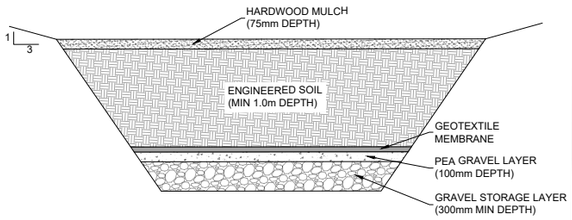
DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
210341
DATE
27 JULY 2021

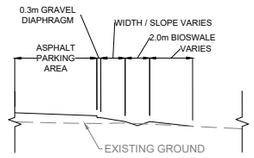
C301



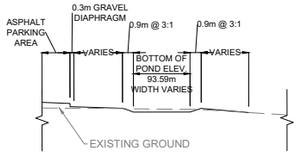
KEY PLAN
N.T.S.



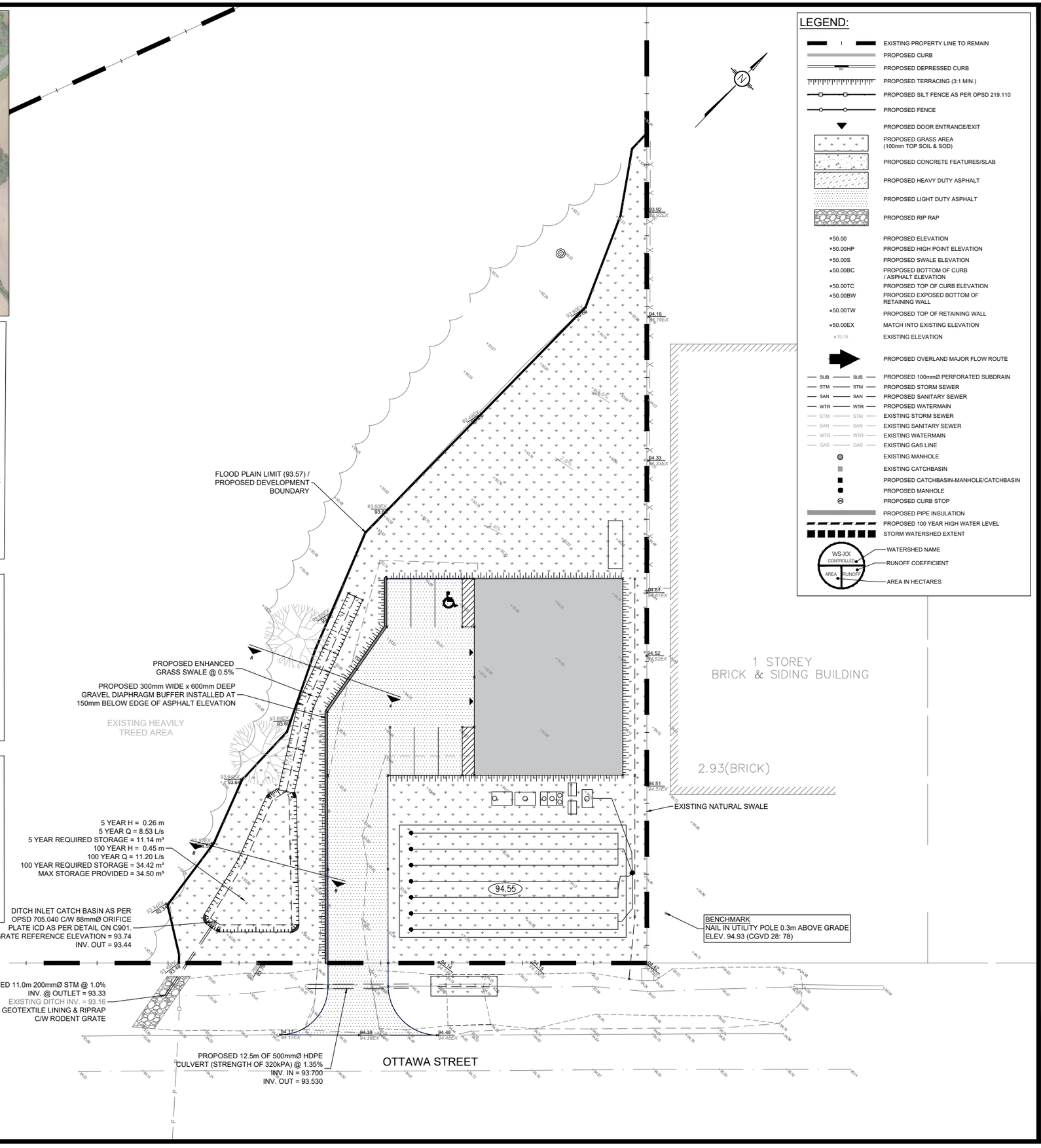
BIORETENTION FACILITY - TYPICAL DETAIL
(N.T.S.)



SECTION A-A
(N.T.S.)



SECTION B-B
(N.T.S.)



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CLIENT
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DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

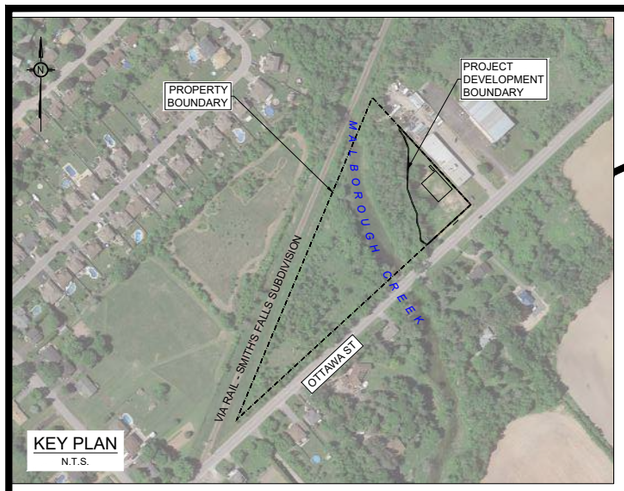
PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

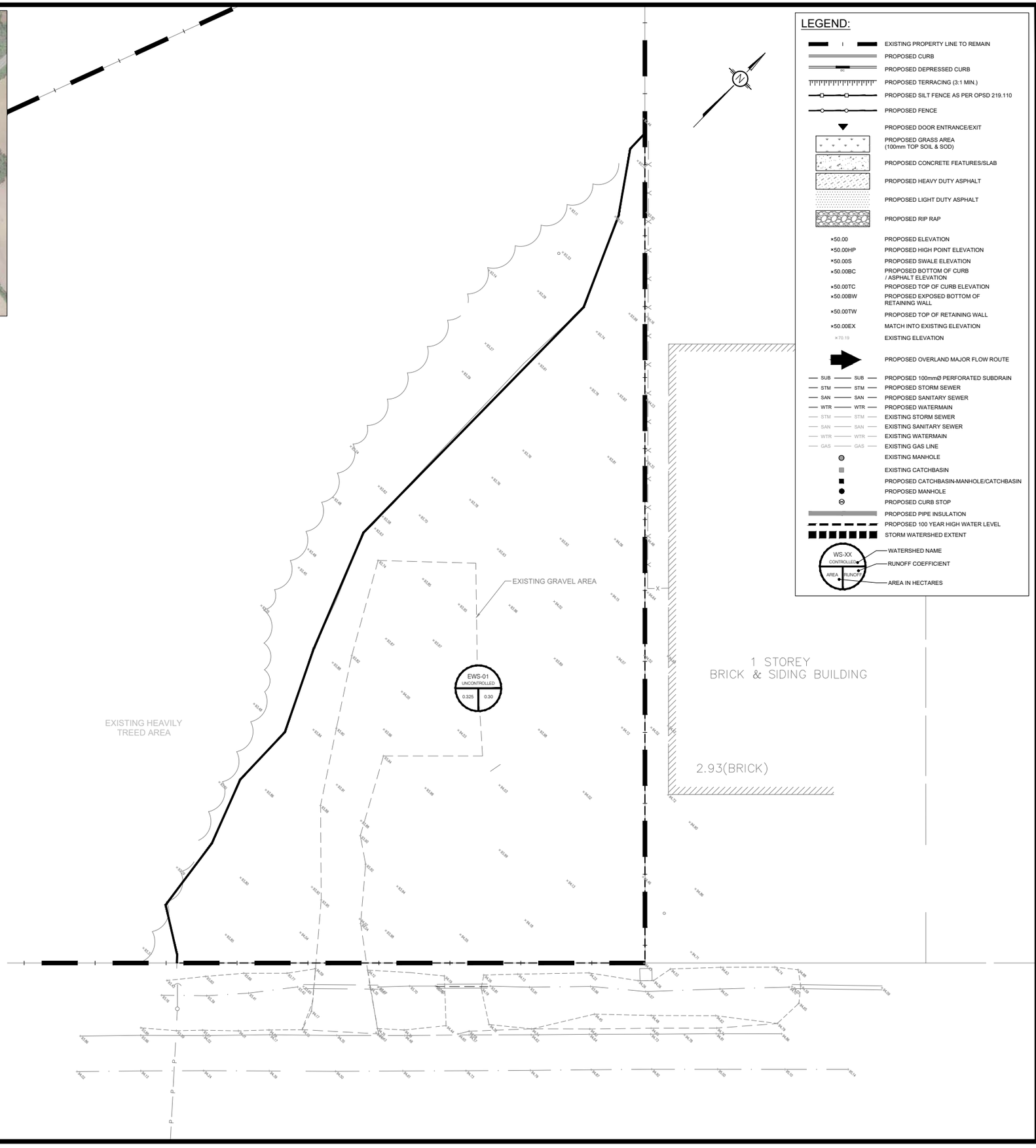
DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
210341

DATE
27 JULY 2021

C601





LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
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- SUB — SUB — PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM — STM — PROPOSED STORM SEWER
- SAN — SAN — PROPOSED SANITARY SEWER
- WTR — WTR — PROPOSED WATERMAIN
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- EXISTING CATCHBASIN
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- PROPOSED MANHOLE
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- STORM WATERSHED EXTENT
- WS-XX / CONTROLLER / AREA / RUNOFF — WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

USE AND INTERPRETATION OF DRAWINGS

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5m 0 5 10m

SCALE: 1:250

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No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.A.	25 NOV 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021/11/25
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
AL ROBERTS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

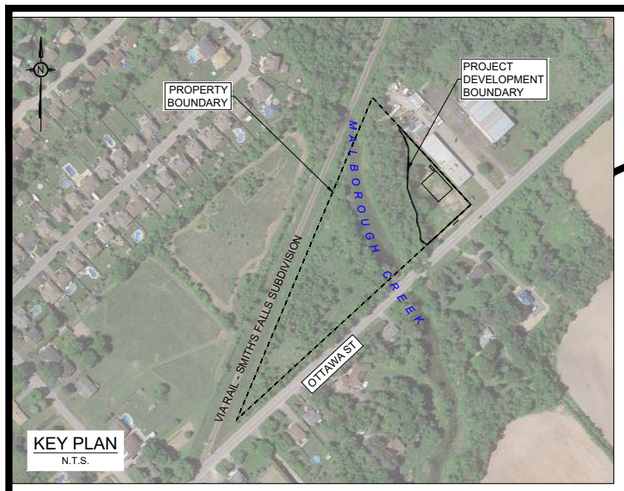
PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

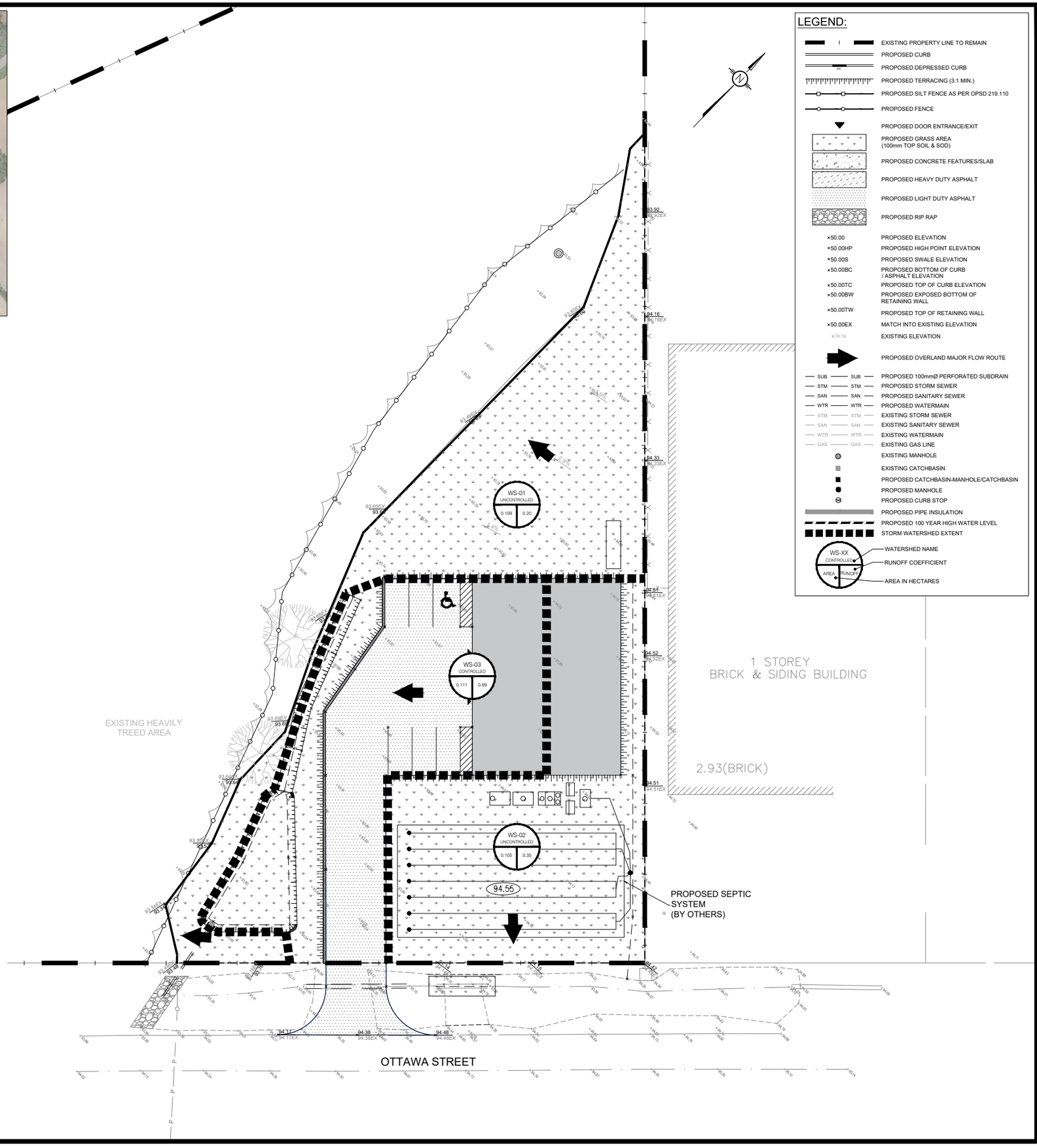
DRAWING TITLE
PRE-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
210341

DATE
27 JULY 2021

C701





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WS-XX (CONTROLLED) — AREA — RUNOFF

- WATERSHED NAME
- RUNOFF COEFFICIENT
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5m 0 5 10m

SCALE: 1:250

NOT FOR CONSTRUCTION TENDER OR PERMIT

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.A.	25 NOV 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501936
2021/11/25
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING I INGÉNIERIE
5430 Canotek Road I Ottawa, ON, K1J 9G2
www.lrl.ca I (613) 842-3434

CLIENT

AL ROBERTS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

PROJECT

PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

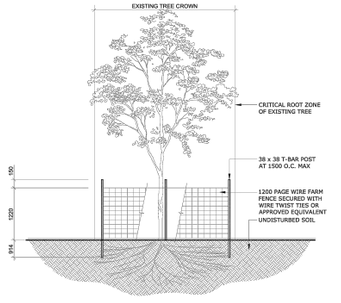
DRAWING TITLE

POST-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
210341

DATE
27 JULY 2021

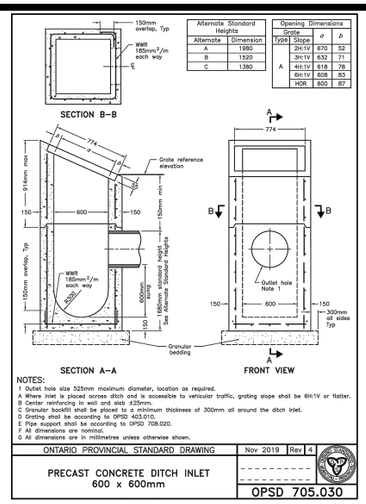
C702



NOTES:

1. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
2. THE AREA WITHIN THE CRITICAL ROOT ZONE OF ALL EXISTING TREES SHALL BE PROPERLY PROTECTED WITH TEMPORARY FENCING AS PER THE APPROVED LANDSCAPE PLAN
3. THE SURVEY SHALL SHOW EXISTING ELEVATION AT BASE OF ALL TREES TO BE PRESERVED AS SHOWN BY "+"
4. THE AREA WITHIN THE PROTECTED FENCING SHALL REMAIN UNDISTURBED AND SHALL NOT BE USED FOR THE STORAGE OF BUILDING MATERIALS OR EQUIPMENT. REMOVE ALL DEBRIS
5. PRUNE BRANCHES TO REMOVE DAMAGED OR OBJECTIONABLE BRANCHES. DO NOT PRUNE LEADERS
6. TREE PROTECTION SHALL REMAIN UNTIL SUBSTANTIAL PERFORMANCE OF THE PROJECT
7. IF CUTTING OF ROOTS OR CHANGING OF GRADES AROUND EXISTING TREES IS CALLED FOR, FOLLOW APPROPRIATE DETAILS AS DIRECTED BY LANDSCAPE ARCHITECT
8. IF TREES ARE BEING AFFECTED BY CONSTRUCTION, A WATER AND FERTILIZING PROGRAM WILL BE REQUIRED TO THE SATISFACTION OF THE CITY

Ottawa	TITLE: TREE PRESERVATION PROTECTION FENCE	DATE:	FEB 2013
		REV:	FEB2017
		DWG No:	F7

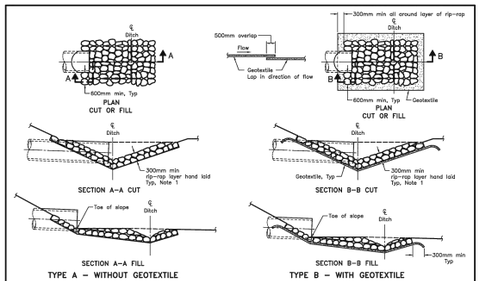


Alternate Standard Heights	
Alternate	Dimension
A	1980
B	1520
C	1380

Opening Dimensions			
Grate Type	Slope	a	b
A	2H:1V	670	52
	3H:1V	632	71
	4H:1V	618	78
	6H:1V	608	83
	HOR	600	87

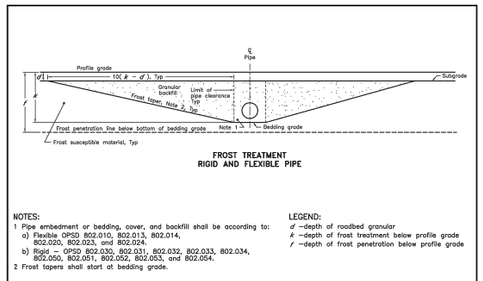
NOTES:
1 Outlet hole size 525mm maximum diameter, location as required.
A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope shall be 6H:1V or flatter.
B Center reinforcing in wall and slab ±25mm.
C Granular backfill shall be placed to a minimum thickness of 300mm all around the ditch inlet.
D Grating shall be according to OPSD 403.010.
E Pipe support shall be according to OPSD 708.020.
F All dimensions are nominal.
G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2019	Rev 4
PRECAST CONCRETE DITCH INLET 600 x 600mm			
		OPSD 705.030	



NOTES:
1 The thickness of the rip-rap layer shall be at least 1.5 times the rip-rap mean diameter.
A All dimensions are in millimetres unless otherwise shown.

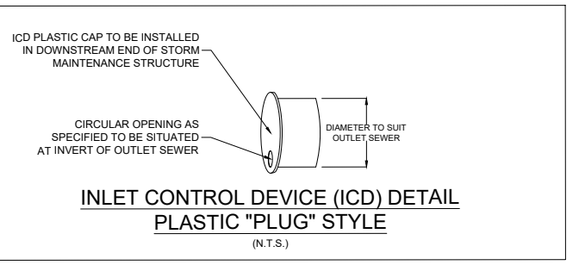
ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2018	Rev 3
GENERAL RIP–RAP LAYOUT FOR SEWER AND CULVERT OUTLETS			
		OPSD 810.010	



NOTES:
1 Pipe embedment or bedding, cover, and backfill shall be according to:
a) Flexible OPSD 802.010, 802.013, 802.014, 802.020, 802.023, and 802.024.
b) Rigid – OPSD 802.030, 802.031, 802.032, 802.033, 802.034, 802.050, 802.051, 802.052, 802.053, and 802.054.
2 Frost tapers shall start at bedding grade.

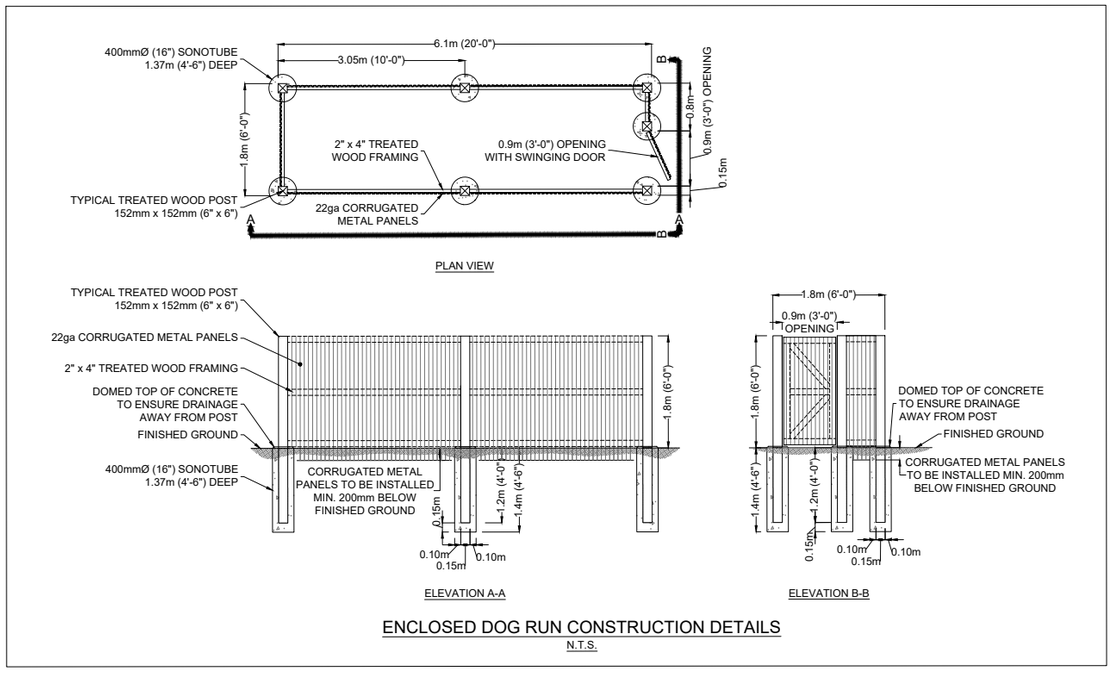
LEGEND:
d' –depth of roadbed granular
k –depth of frost treatment below profile grade
d –depth of frost penetration below profile grade

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev 3
FROST TREATMENT – PIPE CULVERTS FROST PENETRATION LINE BELOW BEDDING GRADE			
		OPSD 803.030	



INLET CONTROL DEVICE (ICD) DETAIL PLASTIC "PLUG" STYLE

(N.T.S.)



ENCLOSED DOG RUN CONSTRUCTION DETAILS

N.T.S.

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NOT FOR CONSTRUCTION TENDER OR PERMIT

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.A.	25 NOV 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021/11/25
PROVINCE OF ONTARIO
NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
AL ROBERTS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.A.	M.A.	M.B.

PROJECT
PROPOSED DOG KENNEL
5969 OTTAWA STREET,
OTTAWA, ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

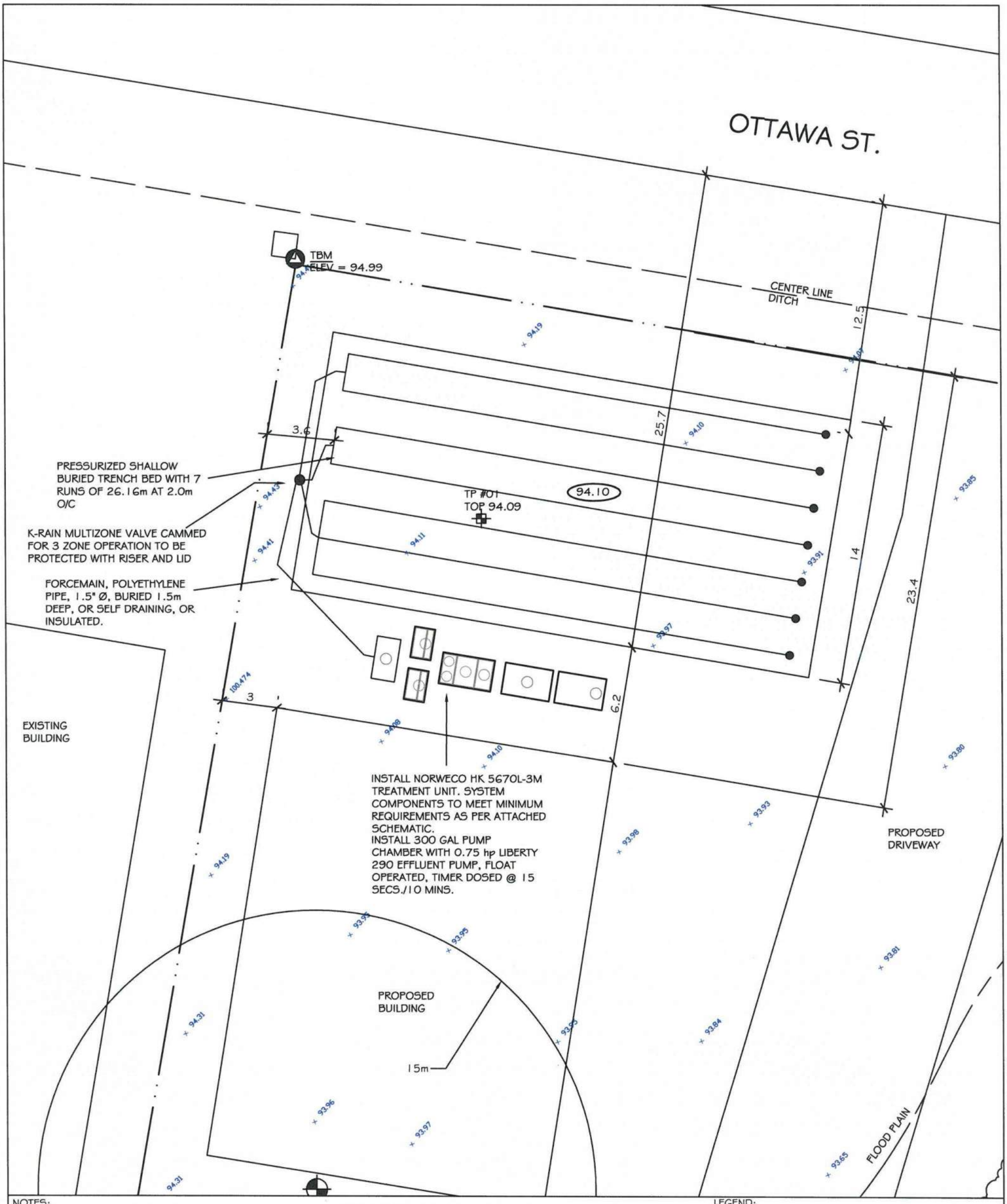
PROJECT NO.
210341

DATE
27 JULY 2021

C901

Appendix E

Septic System Assessment



NOTES:

1. ALL TREATMENT UNITS AND LEACHING BED ARE TO BE INSTALLED IN ACCORDANCE WITH MINIMUM OBC CLEARANCE DISTANCES. ANY OMISSIONS OR INACCURACIES SHALL BE BROUGHT TO THE ATTENTION OF GVE AND OSSO.

2. CARE IS TO BE EXERCISED DURING CONSTRUCTION ACTIVITIES NEAR OVERHEAD HYDRO WIRES.

3. EXISTING ELEVATIONS ARE APPROXIMATE. CONTRACTOR MUST VERIFY ALL ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.

4. SOIL CONDITIONS ARE ACCURATE FOR THE LOCATIONS SHOWN. CONTRACTOR MUST CONTACT THE DESIGN ENGINEER OR REGULATORY AUTHORITY SHOULD SOIL CONDITIONS DIFFER.

5. ALL DIMENSIONS AND CONDITIONS TO BE VERIFIED ON SITE, FIGURED DIMENSIONS TAKE PRECEDENCE OVER SCALE.

6. UTILITY LOCATES SHALL BE COMPLETED PRIOR TO ANY EXCAVATION.

7. THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

8. THIS DOCUMENT IS COPYRIGHT PROTECTED AND IS THE SOLE PROPERTY OF GVE GROUP. THIS DRAWING SHALL NOT BE ALTERED IN ANY MANNER.

9. EXISTING LOT SERVICED WITH A DRILLED WELL.

METRIC:

DISTANCES AND ELEVATIONS SHOWN ON THIS PLAN ARE IN METERS AND MAY BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Drawn by: JP	Drawn by: JP	Checked by: WS	
Rev.	Description		Date
Township	Plan#	Lot / Sublot / Con	
			Drwg. No.: SP6982-21
County:	Civic Address: 5969 OTTAWA ST.	Date: 14/14/21	Scale: 1:200
GREEN VALLEY ENVIRONMENTAL			
On-Site Sewage Treatment Plan for the Residence of: AL ROBERTS			

LEGEND:

- PROPOSED ELEVATION
- EXISTING ELEVATION
- EXISTING WORKS
- PROPOSED SEWAGE WORKS
- FENCE LINE
- PROPERTY LINE
- TBM — TEMPORARY BENCH MARK (DESCRIPTION: TOP OF CONCRETE PAD
- TEST PIT LOCATION

SEPARATION DISTANCES:

1. MINIMUM CLEARANCE FROM SEPTIC PIPE TO:
   - LOT LINE = 3.0m
   - HOUSE = 5.0m
   - DRILLED WELL = 15.0m

2. MINIMUM CLEARANCE FROM TREATMENT UNITS TO:
   - LOT LINE = 3.0m
   - HOUSE = 1.5m
   - DRILLED WELL = 15.0m