FEBRUARY 15TH, 2022

Project No. 2020-090

SELF STORAGE BUILDINGS
COUNTY ROAD 21 & 18
STORMWATER DESIGN REPORT

TOWNSHIP OF MULMUR

CAPES ENGINEERING

355310 BLUE MOUNTAINS-EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0

Table of Contents

Drawings

Appendices

1.0 Introduction

CAPES Engineering Ltd. has been retained by Mr. Daniel Tosello (Alpha Storage Inc.) to prepare drawings and a stormwater management report to support Site Plan approval for the 1.6 ha site located at the north east corner of the intersection of County Road 18 (Airport Road) and County Road 21 in the rural settlement area of Randwick in the Township of Mulmur. The existing lot is vacant containing a mix of treed and open field conditions. There is currently a trailer parked on the site accessed via an existing entrance from County Rd. 21 and a cleared path through the site. Some advertisement signs are located along the west side on the site adjacent to County Rd. 18.

It is proposed to initially construct a 445.9 m^2 (4,800 ft^2) self storage building in the south west corner of the site.

Access to the storage building will be provided by an asphalt driveway located east of the current entrance location from County Rd. 21. There will be no staff or office space located on site and buildings will not require electrical, water or sanitary connections. Portable toilets will be provided on the site to serve as washroom facilities.

The site is currently zoned as Highway Commercial (CH) and no zoning alterations are required to support the proposed development. The site is not located within a regulated area of the Niagara Escarpment Commission or the Nottawasaga Valley Conservation Authority and approvals are not required from either the NEC or NVCA.

The proposed development is designed to meet the standards and guidelines of the Township of Mulmur and County of Dufferin. The purpose of this report is to provide support for Site Plan Approval from the Township of Mulmur for the proposed development.

2.0 Existing Site Conditions

The lot is legally described as Part 2 and 3, Registered Plan 7R-1725 as part of Lot 26, Concession 7 in the Township of Mulmur, County of Dufferin. The legal plan provided by the client that was originally prepared by Zubek, Emo and Patten Ltd. in 1978, is included in **Appendix A** for reference.

The site is rectangular in shape with a triangle section removed from the rectangle at the intersection of County Road 18 and County Road 21 for a sight triangle. The site has a frontage of approximately 134 m along County Road 21 and a frontage of approximately 103 m along County Road 18. Per the Township of Mulmur zoning map, the immediately adjacent lots to the north and east are zoned Countryside Area. The lot on the south east corner of the intersection is zoned Rural Residential and the small lot at the north west corner of the intersection is zoned General Commercial. The lot at the south west corner of the intersection and the lot surrounding the small lot at the north west corner are zoned Open Space.

The site is currently accessed via an existing driveway located off County Road 21. The site remains mostly treed with some sections that have been cleared mostly on the south western portion of the lot. There is a trailer on site that is accessed via a path through the site. There is an existing well located south east of the trailer which is currently not being used.

CAPES Engineering
355310 Blue Mountains-Euphrasia Townline
Clarksburg, ON
N0H 1J0

There is a steep 3-4 m high bank located at the north west corner of the lot drops into the site and the entire frontage on County Road 18 is significantly lower than the road centreline. The south east portion of the site along the County Road 21 frontage is slightly lower than County Road 21 centreline. However, east of the existing entrance the lot is raised significantly above the road centreline by 1.5-2 m with a steep bank from property line sloping down to the roadside ditch. There are numerous locations with berms and some localized low points. The overall site slopes at an average of 5% east from the high point (elevation 273.79) in the NW corner to a low area approximately at the mid point of the eastern property line (elevation 265.96).

County Road 18 and County Road 21 are two lane paved rural roads with approximately 3.7 m wide lanes and gravel shoulders. Utilities are located overhead on both roads. The utility poles on County Road 21 are on the south side of the road and the utility poles are on the east side of County Road 18 north of the intersection and switch to the west side south of the intersection.

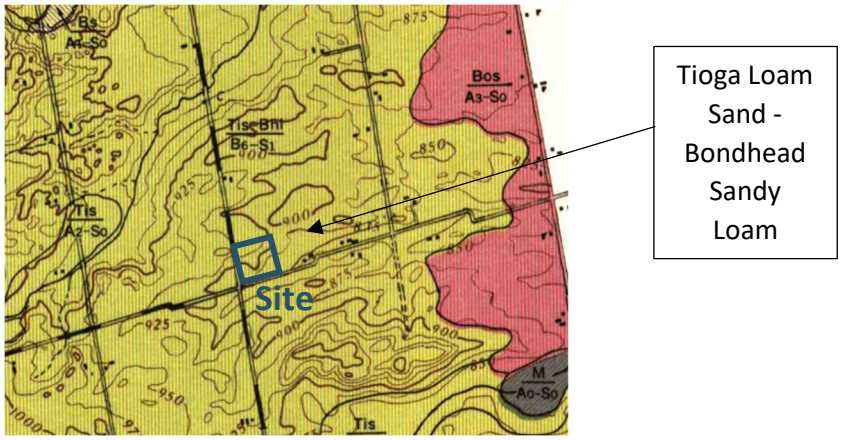
2.1 Geotechnical Information

There is currently no geotechnical investigation complete for this Site. The Ontario Geological Survey (OGS) has identified the area as glaciofluvial deposits with river deposits and delta topset facies with sandy deposits. Please see the excerpt from the OGS mapping below.

Ontario Geological Survey Mapping

Soil mapping for Dufferin County from the Canada Department of Agriculture completed in 1963 identifies the area as Tioga Loam Sand-Bondhead with sandy loam to loam sand with good drainage. The site is shown in the image below overlaying the soil mapping for reference. Please note that OGS mapping supersedes the Department of Agriculture soil mapping shown below. In general, the soil mapping supports the OGS mapping identifying the area as glaciofluvial deposits.

Dufferin County Soil Mapping



The MECP Well Record for the onsite well, included in **Appendix B** for reference, indicates 0 to 2.4m below ground surface (mbgs) consist of sand with gravel followed by sand with clay layers from 2.4 to 7.0mbgs. Water was found at a depth of approximately 34mbgs. Other nearby wells indicate water found at a depth of 28 to 35mbgs with a sand to clayey sand layer as the surficial soil. The well records support the sandy loam soil type identified above as well as indicate groundwater is significantly below ground surface.

2.2 Existing Stormwater Infrastructure

Most of the northern property line contains a significant slope of approximately 4m in grade change at approximately a 4:1 slope. The middle area of the site is significantly flatter with localized hummocky terrain. The majority of the southern property line is elevated with a gentle slope north towards the middle area of the site and this elevated area along the southern property line slopes down towards the roadside ditch at a higher grade. The overall site slopes at an average of 4-5% easterly but the middle part of the site has a fairly flat grade before outletting into the neighbouring property.

The eastern side of County Road 18 contains no ditch and slopes from the edge of the road into the site. The western side of County Road 18 contains a shallow ditch formed due to raised grade at property line. There is no evidence of an outlet for this ditch as it reaches the intersection, and we believe it would overflow across County Road 21 to a low area south west of the intersection.

Runoff from the north side of County Road 21, east of the intersection, drains into the site where it is at a lower elevation than the edge of the road. A shallow ditch is formed further east where the elevation at property line is higher than the road. The ditch on the north side of County Road 21 drains east

beyond the site frontage. There is no ditch along the south side of County Road 21 with flows passing into private property south of the centreline.

The overall drainage of the area occurs via overland sheet flow with limited ditching and culverts. It is anticipated that there is little runoff as infiltration occurs due to the soil type present.

2.2.1 Stormwater Management Approval Criteria

The Township of Mulmur does not have formal stormwater management criteria, however the site is within the NVCA jurisdiction (but not within a regulated area) and therefore we have generally followed the NVCA stormwater guidelines, although we do not believe the NVCA will be providing review of this site due to the size and nature of the development.

In general, the site needs to conform to the following stormwater criteria:

- Post Development peak flows must be controlled to Pre-Development levels for the 2-100 year storm events (inclusive).
- Quality control for 4 hr Chicago 25 mm storm must be provided to meet the MECP "Enhanced" level of protection (80% TSS Removal)
- Best efforts towards a water balance must be provided for the site
- A minimum of 5 mm of rainfall must be retained on site through the use of LID
- Pre-Development total phosphorous (TP) levels must be matched in the post development and best efforts to achieve an additional 20% TP reduction below pre-development.
- Erosion and Sediment Controls (ESC) must be provided for the site to reduce or eliminate sediment transport offsite during construction and until vegetation has been re-established.

2.2.2 Existing Condition Stormwater Modelling

We have utilized PCSWMM 2020 modelling software (Version 7.3.3095, SWMM version 5.0.013-5.1.015 to undertake the analysis of the existing site.

The contributing drainage area for the site was determined by using a combination of aerial imagery from County of Dufferin Mapping and a topographic survey of the site completed in 2020.

The site is 1.62 ha in size with 0% impervious area at an overall slope of 4.1%. There are external flows passing through the site from an area of approximately 2.03 ha with 16% imperviousness at an average slope of 9.1%. The external flow area includes incoming flows from the neighbouring property to the north as well as road runoff from both County Road 18 and County Road 21. These flows pass into the site and discharge with the site flow into the neighbouring property to the east.

A loamy sand soil type will be used for modeling of existing conditions for the site per available soil type information as specified above. Please refer to **Appendix C** for the Existing Condition Catchment Plan as well as the PCSWMM output summary. Below are the selected Green Ampt Parameters for the Site.

Saturated Hydraulic Conductivity (K_{fs})= 59.8 mm/hr (Table 5.5.5 Handbook of Hydrology, 1993)

Suction Head = 61.3 mm (as per Rawls 1983)

Initial Deficit (fraction) = 0.312 (as per Rawls 1983)

Additional PCSWMM model input parameters for the Manning's roughness coefficient (*n*) and depression storage were determined from the USDA TR55 and UNESCO SWM Manual as follows:

Table 5.9: Manning Roughness Coefficients - Overland Flow

Cover	*n*
Impervious areas	0.013
Woods	
with light underbrush	0.4
with dense underbrush	0.8
Lawns	
Short grass	0.15
Dense grass	0.24
Agriculture Land	0.050-0.170

Ref: Adapted from Soil Conservation Service, Urban Hydrology for Small Watersheds, U.S. Dept. of Agriculture, Soil Conservation Service, Engineering Division, Technical Release 55, June 1986

10.2 Initial Abstraction/Depression Storage

Table 10.2: Initial abstraction/depression storage

Cover	Depth (mm)
Woods	10
Pasture/Meadow	8
Cultivated	7
Lawns	5
Wetland	12/16
Impervious areas	2

Ref: UNESCO, Manual on Drainage in Urbanized Areas, 1987.

The pervious portion of the pre-development drainage area is partially treed and partially lawn resulting in a Manning roughness coefficient of 0.24 and a depression storage of 8 mm. The impervious area is modeled with a Manning roughness coefficient of 0.013 and a depress storage of 2 mm per the tables above.

IDF Curves were obtained of the rainfall data from the Ministry of Transportation IDF Curve Look-up Tool and have been included in **Appendix C.** The IDF curves were used to model the 2-100 year 4-Hour Chicago storms and the 2-100 year 24-Hour SCS Type II storms as per NVCA guidelines. The Regional Timmins storm and the 4-Hour 25 mm Chicago (quality control) storm events were also modeled.

Please refer to **Table 1** below for a summary of the results from the model.

Table 1 – Existing Condition Modelling Results

Storm Event	Peak Flow Into Site (External Area) (m^3/s)	Peak Flow Offsite Including Incoming External Flows Total (m^3/s)
24 Hr SCS Type II		
2-year	0.06	0.00
5-year	0.08	0.00
10-year	0.09	0.00
25-year	0.11	0.01
50-year	0.13	0.05
100-year	0.19	0.10
4 Hr Chicago		
2-year	0.11	0.00
5-year	0.14	0.00
10-year	0.16	0.00
25-year	0.19	0.00
50-year	0.22	0.00
100-year	0.24	0.00
25 mm	0.06	0.00
Timmins	0.04	0.00

The PCSWMM summary output file for the 100 year 24-Hour SCS Type II storm has been included in **Appendix C** for reference. The remaining output files can be provided upon request in either digital or hardcopy format.

Runoff is generated by the impervious area from the external drainage area which flows onto the development site. Due to the topography of the site, the vegetative cover the runoff is largely all absorbed except for the largest storm events (25, 50 and 100 year 24-Hour SCS Type II design storms).

3.0 Proposed Site Plan

The proposed site plan includes one self storage building with slab on grade construction that is 445.91 m^2 (4,800 ft^2) in size. The storage building will be accessed via a 9.0 m wide gravel driveway around the building to provide emergency access.

The site will not be staffed or include an office space. The buildings do not require electrical connections or water/sanitary connections. The site will be accessed from a new driveway entrance off County Road

21 located east of the existing entrance. The existing entrance will be removed, and the new entrance will be located 85m east of the County Road 18 centreline.

The proposed stormwater conditions include a cut off swale to direct incoming stormwater runoff flows from the north west around the development. Incoming flows from west of the site will flow into the subject site and flow towards the right-of-way south of the subject site where the ditch regrading will provide a positive drainage outlet. The discharge from the rain garden will also be directed into the roadside ditch on the north side of County Road 21 that flows east.

3.1 Proposed Stormwater Management Plan

To support review of the stormwater management to support the Site Plan application being completed for the development of the site. We have utilized the same software for modelling of the proposed conditions as was used for the existing conditions (PCSWMM 2020 Version 7.3.3095, SWMM version 5.0.013-5.1.015).

The Green Ampt infiltration parameters used for the proposed development will be the same as the pre-development condition. In the proposed conditions the pervious areas will be a combination of treed areas and grassed areas; therefore, the Mannings n value and depression storage are calculated with regard to the proposed conditions for each subcatchment.

The proposed enhanced grassed swale is designed with reference to the document produced by the CVC/TRCA titled Low Impact Development Stormwater Management Planning and Design Guide. Certain components of the swales such as longitudinal slope, side slopes and grass cover are chosen to increase infiltration within the site.

The proposed development results in an increase of impervious area from 0% to 11% impervious (overall). The majority of the impervious area is located in the south west portion of the site with the north and east areas largely untouched and to remain in existing condition.

Incoming runoff flows from the northern property and the right-of-way to the west will continue to flow easterly to match the existing condition. The runoff flows from the right-of-way west of the site will be directed around the development where the drainage pattern is interrupted by the proposed development. The runoffs flows from the west will encounter a berm and will then be directed south towards the ditch on the north side of County Road 21 that flows east. Previously the grading forced ponding on site to occur. As part of the development, the county ditch on the north side of County Road 21 will be reconstructed to provide a positive outlet for the incoming flows from the west. The majority of the developed area will be directed into a rain garden on the southern edge of the property. Discharge from this rain garden will be directed into the ditch along the north side of County Road 21. A variety of swales and enhanced grass swales will be provided to ensure adequate outlets for the stormwater runoff.

The proposed rain garden will include a 100 mm dia. outlet pipe to control the stormwater quantity discharge rates. An emergency overflow weir is also included in the stormwater management design. Based on the modelled flows this weir will only be utilized in a situation where the 100 mm dia. outlet pipe is clogged.

The proposed condition model is divided into 10 subcatchments as follows:

- Subcatchments S1, S6_1, S6_2 and S8 (combined 2.03 ha) are the external drainage areas. S1 contains the neighbouring property to the north as well as a portion of County Rd. 18 located north of the site. S1 is 1.75 ha and stormwater runoff flows south into the site where it then is directly easterly across the subject site. S8 contains a portion of runoff from County Rd. 21. S5 is 0.03ha and flows north. This flow originally discharged into the site, however, now it will be contained in the road side ditch located on the north side of County Road 21. S6_1 is 0.17ha and contains the County Rd. 18 ROW east of the centreline that is interrupted by the proposed berm located within the site. The stormwater runoff passes through the site and is now provided with a positive outlet to the reconstructed roadside ditch on the north side of County Rd. 21. S6_2 is 0.08 ha in size and is the stormwater runoff from County Road 18 that flows easterly into the side and continues flowing east through the site and is not disrupted by the new proposed berm.
- Subcatchment S3 is 0.12 ha in size and contains the north and western areas of the proposed building and access lane. The stormwater runoff is directed west into an enhanced grass swale that is proposed to discharge into the rain garden.
- Subcatchment S4_2 is 0.11 ha in size and contains most of the southern portion of the building and adjacent driving lane. The stormwater runoff for subcatchment S4_2 is directed into the southern enhanced grass swale that slopes west towards the rain garden.
- Subcatchment S6 and S4 (0.01 ha each) are the subcatchments located at the entrance of the site from the high point in the driveway directed south to the roadside ditch on the north side of County Road 21.
- Subcatchment S7 (0.07 ha) is located in the south west portion of the site. Subcatchment S7 receives stormwater runoff from subcatchment S6_1 and the combined runoff flows southerly, eventually discharging into the roadside ditch located on the north side of County Road 21.
- Subcatchment S2 (1.02 ha) consists of primarily the pervious eastern and northern portions of the site. A small section of driveway along the far east portion of the development will be directed into subcatchment S2. A grass lined swale is to be constructed east of this section of driveway to direct drainage around an existing berm on site to the low area where any stormwater runoff can continue to flow east as it does in existing conditions.

Please refer to **Drawing C4** for a plan of the subcatchments detailed above and to the grading and stormwater details on the proposed Grading and Servicing Plan **Drawing C3**.

Please refer to **Table 2** for a summary of the existing and post re-development Peak Flows and to **Appendix D** for the 100 year 24-Hour SCS Type II storm PCSWMM output results.

Table 2 – Pre and Post Modelling Results

Storm Event	Peak Flow Into Site (External Area) (m^3/s)	Existing Peak Flow Offsite Total (m^3/s)	Peak Flow at East Outfall (m^3/s)	Peak Flow at South Outfall (m^3/s)	Proposed Peak Flow Offsite Total (m^3/s)
24 Hr SCS Type II					
2-year	0.06	0.00	0.00	0.00	0.00
5-year	0.08	0.00	0.00	0.01	0.01
10-year	0.09	0.00	0.00	0.03	0.03
25-year	0.11	0.01	0.03	0.04	0.07
50-year	0.13	0.05	0.07	0.05	0.12
100-year	0.19	0.10	0.11	0.07	0.18
4 Hr Chicago					
2-year	0.11	0.00	0.00	0.01	0.00
5-year	0.14	0.00	0.00	0.01	0.00
10-year	0.16	0.00	0.00	0.01	0.00
25-year	0.19	0.00	0.00	0.01	0.01
50-year	0.22	0.00	0.00	0.02	0.02
100-year	0.24	0.00	0.00	0.03	0.03
25 mm	0.06	0.00	0.00	0.00	0.00
Timmins	0.04	0.00	0.00	0.02	0.02

In the existing conditions a significant portion of the external flows are infiltrated into the site as seen in **Table 2** above in the difference between the columns for the "Peak Flow Into Site (External Area)" and the "Existing Peak Flow Offsite Total". For all of the design storms above, the proposed peak flow offsite is lower than the peak incoming flow from external areas.

Currently, the site is accepting stormwater runoff from external areas and infiltrating some or all of the runoff from these external areas. Peak flows discharging from the site are increasing in some storm events, however, this is due to the large incoming peak stormwater runoff flows and some redirecting of these flows to the roadside ditch as opposed to discharging all of these flows to mostly infiltrate within the site.

Discharging, where possible, the incoming and development runoff flows towards the County Road 21 regraded north ditch, instead of utilizing the site and neighbouring property provides a positive outlet for these areas instead of utilizing private property to infiltrate the runoff flows from the County Road right-of-way.

If the external flows are removed from the model, the peak flow offsite for the 100-year SCS design storm is 0.06 m^3/s and similarly the peak flow offsite for the 50-year SCS design storm is 0.04 m^3/s. These are lower than the existing peak flow offsite, indicating that the major reasoning for the increase in peak flow offsite is due to rerouting and eliminating the existing treatment of the runoff currently entering site from the County right-of-way.

There is no requirement to control the Regional event but the Timmins storm peak flow also decreases from the incoming external peak flow. The regional storm is safely conveyed within the site. The 25mm quality design storm also decreases from the incoming external flows.

3.1.1 Stormwater Quality Control

Stormwater quality has been analyzed using a 25 mm 4-hour Chicago design storm. The 25 mm design storm represents 95% of all rainfall activities in an average year. By basing quality controls off of the 25 mm design storm, quality measures will be effective for most rain events in a given year.

The grass swales and the rain garden will reduce the peak outflow from the 25 mm design storm to 0.00 m^3/s, or a decrease of 0.06 m^3/s from the incoming external peak flow, for the proposed development of the site. Therefore, more stormwater is treated than runoff for the site. As the peak outflow is reduced to lower than the incoming flows from external areas, full treatment is achieved for TSS removal for the quality design storm (25 mm 4-Hour Chicago).

As per NVCA guidelines the elimination of the runoff during the 25 mm storm reduces the phosphorous discharge from the site to 0 and the TSS removal is 100%.

3.1.2 Enhanced Grass Swale

The enhanced grass swales used on site are designed to promote treatment of the stormwater. Per the Low Impact Development Stormwater Management Planning and Design Guide by the CVC, the following factors increase pollutant removal rates:

- Longitudinal slope <1%: The slope in the enhanced grass swale is 1.0% or less
- Soil infiltration rate is 15 mm/hr or greater: Per the anticipated soil conditions, the existing sandy soil is very permeable and will promote infiltration. Additional soil testing may be required by the Town or NVCA to confirm the soil infiltration rate.
- Flow velocity within channel is 0.5 m/s or less during quality design storm: The maximum velocity occurring in the swale is 0.3 m/s for the 25 mm 4-Hour Chicago design storm in both the west and south swales.
- Side slopes 3:1 or less: Side slopes in the enhanced swales are 3:1

3.1.3 Rain Garden

It is proposed to implement a rain garden within the site which is designed in general conformance with the CVC/TRCA LID Manual with 3:1 side slopes, 750 mm of filter medium (compost amended potting soil), 75 mm of mulch on the surface and will be planted with a mixture of long grasses and wildflowers to ensure a greater than 80% TSS removal.

The rain garden is located in the south west corner of the site abutting the southern property line. The entire rain garden is west of the new access off County Rd. 21. The 123.8 m^2 facility is a maximum of 0.94 m deep including the 0.3 m freeboard. The available volume is 69.2 m^3 and will operate on pure infiltration for the bottom 0.25 m and have a 100 mm dia. outlet let pipe and a 1m wide overflow weir. The outlet pipe is set 0.25 m above the bottom of the pond and the bottom of the overflow weir is set at 0.70 m above the bottom with 3:1 side slopes. Please refer to **Appendix D** for a copy of the outlet calculations. The maximum water surface elevation occurs during the 100 year SCS storm event where the water reaches a depth of 0.63 m (elevation 266.91).

3.2 Fire Flow

As per the request of the Town we have calculated the fire flow water demand for the site using the OBC (Office of the Fire Marshal, OFM Guideline, Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code (Oct 1999)). Please refer to **Appendix E** for the calculations.

Based on the calculations the building will require 54,000 L of stored water to fight a fire for 30 minutes. However, these calculations are only provided as reference as it is our understanding that the Town is not requiring fire suppression water storage be provided on the site.

The proposed access route provided around the proposed building is 9 m wide with a minimum clear width of 6 m. The centreline radius is 12 m for each bend and corner. The access route provides access for emergency response vehicles to the site.

The existing well on the site may be able to provide some additional fire flows. The MECP Well record indicates a recommended pumping rate of 25 GPM or 1.6 L/s, however the well currently has no electrical connection for the pump, and the recommended pump rate is far below the required rate of 30 L/s. In addition, the location of the well is not well suited to access with a fire truck.

3.3 Erosion and Sediment Control

We recommend that silt fence per OPSD 219.130 be installed along the exterior of the limit of development of the Site as shown in **Drawing C5.** These controls should remain in place and be maintained until the vegetation is re-established on the lot.

The rain garden will need to be cleaned out following construction, the native soil scarified, and the potting soil and vegetation established.

3.4 Water and Sewer Servicing

There is an area on site for portable toilets to be provided to serve as washroom facilities for the proposed development as per discussions with the Town. No potable water or other sanitary servicing will be provided.

4.0 Conclusions

It is proposed to construct a mini self storage building on the 1.6 ha currently vacant parcel of land located at the NE corner of County Rd. 18 and County Rd. 21 in the Township of Mulmur.

The building will be accessed by abandoning the existing entrance and installing a new entrance located east of the existing entrance. The proposed entrance will be an asphalt surface as per County of Dufferin standards and the access road within the site will be gravel surfaced sufficient for emergency vehicle access.

The primary stormwater quality and quantity controls for the site will be through the use of infiltration-based LID (rain garden) and the design ensures an enhanced level of treatment and a reduction in peak flows to existing levels.

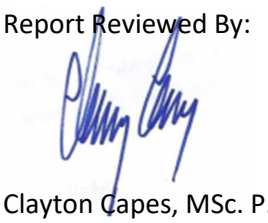
The buildings will not require electricity, or a water or sewage connection and there will be no staff on-site. The site will not have external lighting (either street or on-building) and as such will primarily be used only by day. There is an area on the site for portable toilets to provide washroom facilities.

This report is intended to demonstrate the site can be constructed and serviced and will meet the County, Township and NVCA design criteria. The site will require Site Plan approval from the Township as well as approval from the County, however a permit is not required from the NVCA or NEC.

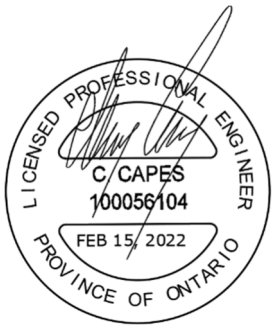
Report Prepared By:

Brianna Collins, E.I.T.
CAPES Engineering

Report Reviewed By:



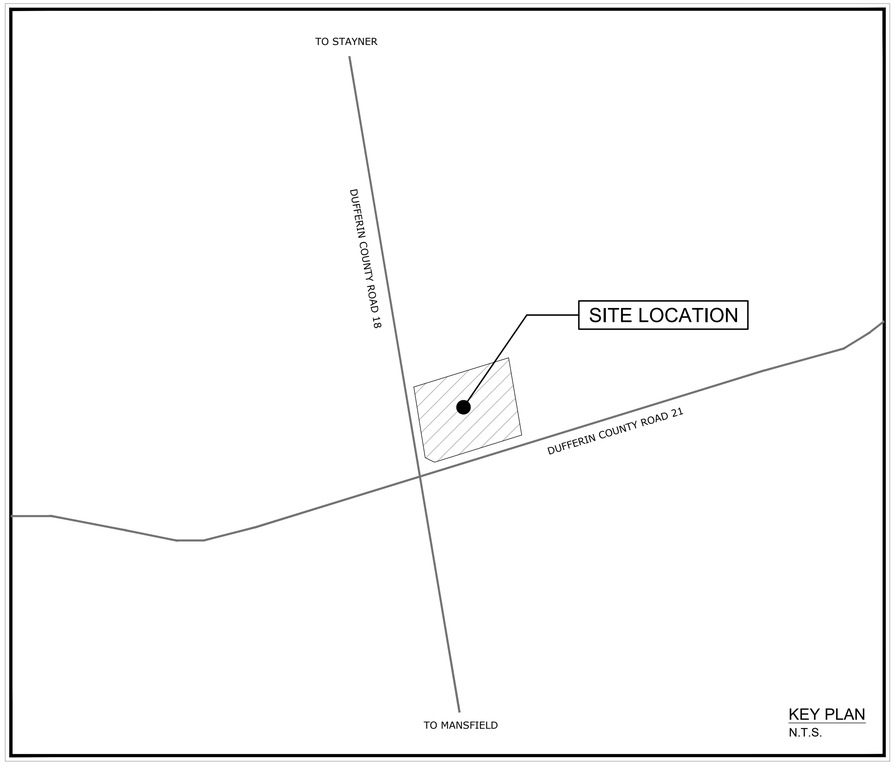
Clayton Capes, MSc. P.Eng.
CAPES Engineering Ltd.



ALPHA STORAGE INC.

W PART LOT 26, CONCESSION 7E MINI STORAGE

DRAWING INDEX



ALPHA STORAGE INC.

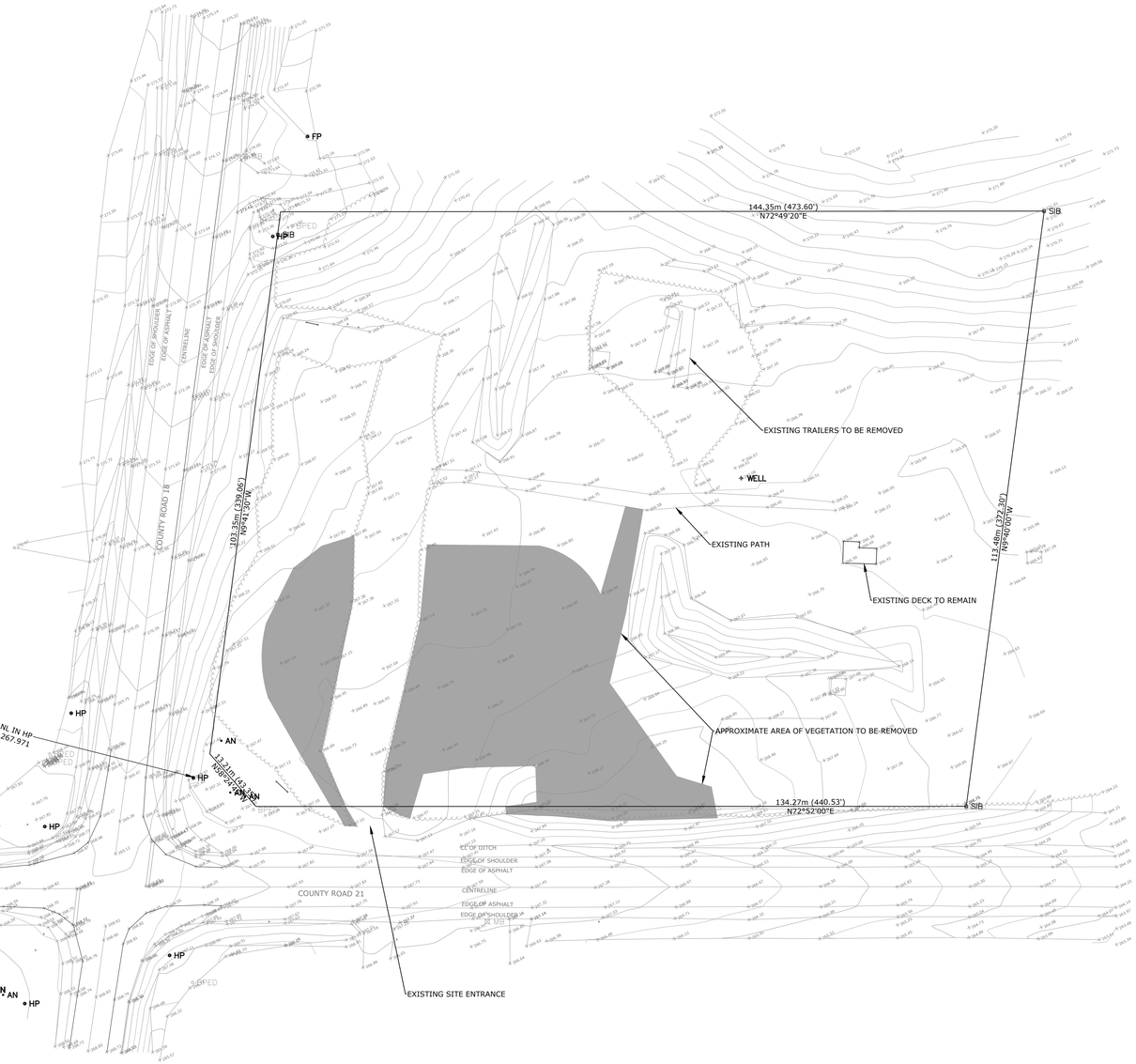
Project No. 2020-090

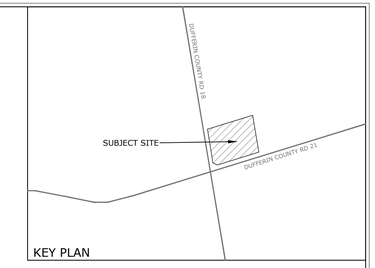
REISSUED FOR APPROVALS - 22/02/15

CAPES ENGINEERING

2020-090 - W PART LOT 26, CONCESSION 7E MINI STORAGE - ALPHA STORAGE INC.

REISSUED FOR APPROVALS -2022/02/15





LEGEND

× 221.21	PROPOSED ELEVATION
221.21	EXISTING ELEVATION
	MAXIMUM 3:1 SLOPE UNLESS OTHERWISE NOTED

RP 7R-1725 PARTS 2 & 3
CONCESSION 7 PT LOT 26
TOWNSHIP OF MULMUR
COUNTY OF DUFFERIN

Notes
1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

No	Revision	Date
1	ISSUED FOR APPROVALS	21/01/15
2	REISSUED FOR APPROVALS	21/01/27
3	REISSUED FOR APPROVALS	22/02/11
4	REIUSSED FOR APPROVALS	22/02/15

NOTES:

TOPOGRAPHICAL SURVEY COMPLETED BY SMC GEOMATICS INC. HORIZONTAL AND VERTICAL CONTROL ESTABLISHED USING LEICA SMARTNET RTK

LEGAL SURVEY INFORMATION PROVIDED BY OWNER. THE BEARINGS SHOWN ARE FOR REFERENCE ONLY. THIS IS NOT A LEGAL PLAN OF SURVEY AND SHALL NOT BE USED AS SUCH. BOUNDARY IS SHOWN APPROXIMATELY ONLY.

BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

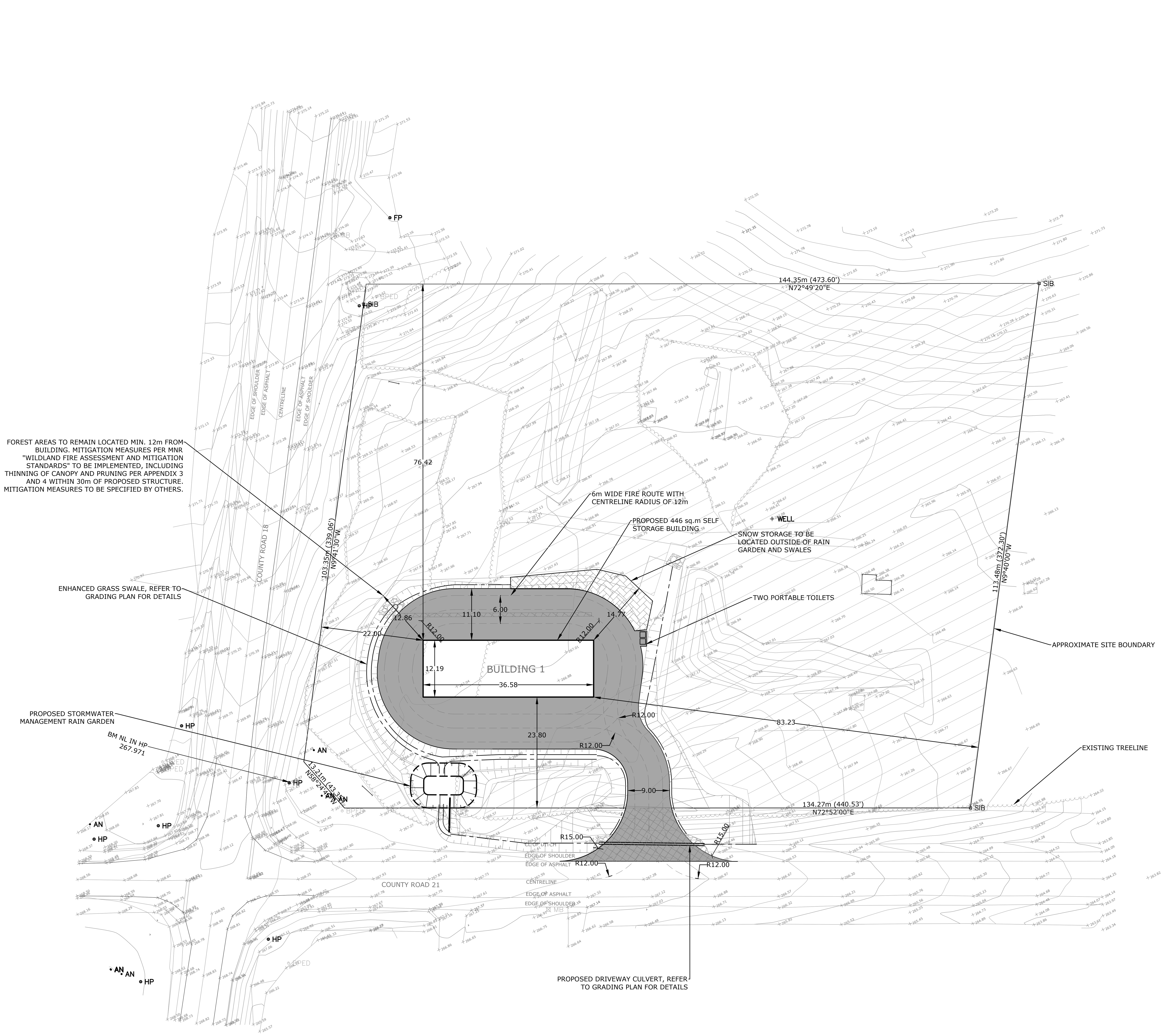
LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
FEB 15, 2022
PROVINCE OF ONTARIO

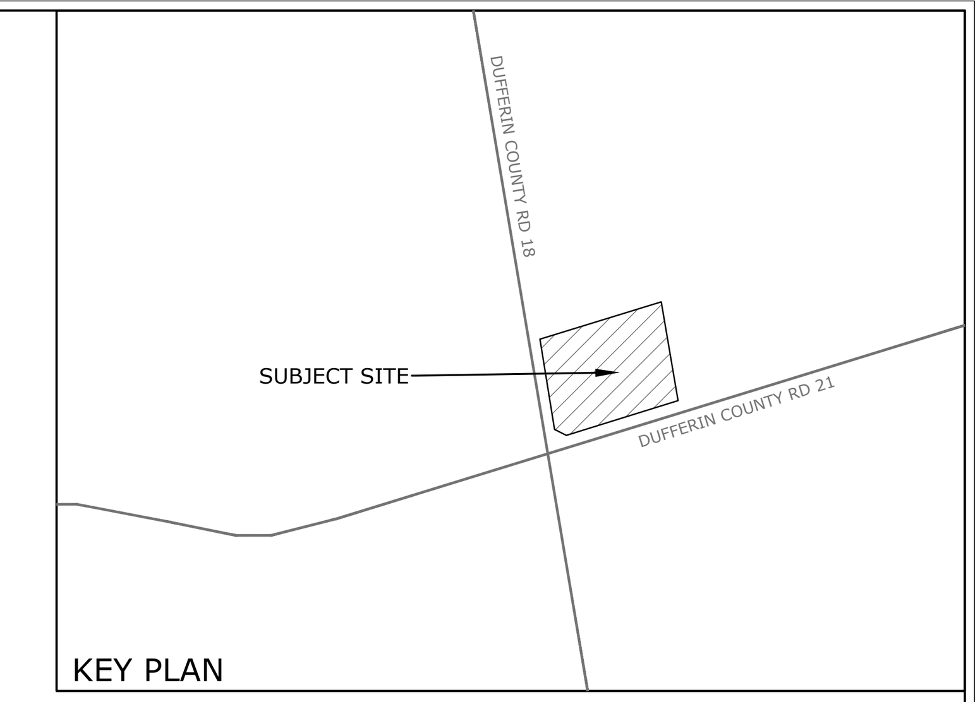
Client
ALPHA STORAGE INC.

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
WWW.CAPESENGINEERING.COM

W PART LOT 26, CONCESSION 7E
MINI STORAGE
EXISTING CONDITION PLAN

Designed	Checked	Date	Drawing No.
B. COLLINS	C. CAPES	21/01/04	C1
Project No. 2020-090		Rev No. 2	
Scale 1:500	0 5.0 10.0 20.0 30.0m		





LEGEND

- • 221.21 — PROPOSED ELEVATION
- 221.21 — EXISTING ELEVATION
- MAXIMUM 3:1 SLOPE UNLESS OTHERWISE NOTED
- PROPOSED FORESTED AREA TO REMAIN
- PROPOSED SNOW STORAGE AREA

TOWNSHIP OF MULMUR ZONING TABLE HIGHWAY COMMERCIAL (CH) LOT PROVISIONS		
	REQUIRED	PROVIDED
MINIMUM LOT AREA (sq.m)	8,000	16,178
MINIMUM LOT FRONTAGE (m)	60.0	134.1
MINIMUM FRONT YARD (m)	15.0	23.8
MINIMUM EXTERIOR SIDE YARD (m)	15.0	22.0
MINIMUM INTERIOR SIDE YARD (m)	6.0	83.2
MINIMUM REAR YARD (m)	7.5	76.4
MAXIMUM HEIGHT (m)	10.5	3.0 (APPROX.)
MAXIMUM LOT COVERAGE (%)	25	2.8
MINIMUM LANDSCAPED OPEN SPACE (%)	15	87

RP 7R-1725 PARTS 2 & 3
CONCESSION 7 PT LOT 26
TOWNSHIP OF MULMUR
COUNTY OF DUFFERIN

Notes

2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

No	Revision	Date
1	ISSUED FOR APPROVALS	21/01/15
2	REISSUED FOR APPROVALS	21/01/27
3	REISSUED FOR APPROVALS	22/02/11
4	REIUSSED FOR APPROVALS	22/02/15

NOTES:

TOPOGRAPHICAL SURVEY COMPLETED BY SMC GEOMATICS INC. HORIZONTAL AND VERTICAL CONTROL ESTABLISHED USING LEICA SMARTNET RTK

LEGAL SURVEY INFORMATION PROVIDED BY OWNER. THE BEARINGS SHOWN ARE FOR REFERENCE ONLY. THIS IS NOT A LEGAL PLAN OF SURVEY AND SHALL NOT BE USED AS SUCH. BOUNDARY IS SHOWN APPROXIMATELY ONLY.

BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
FEB 15, 2022
PROVINCE OF ONTARIO

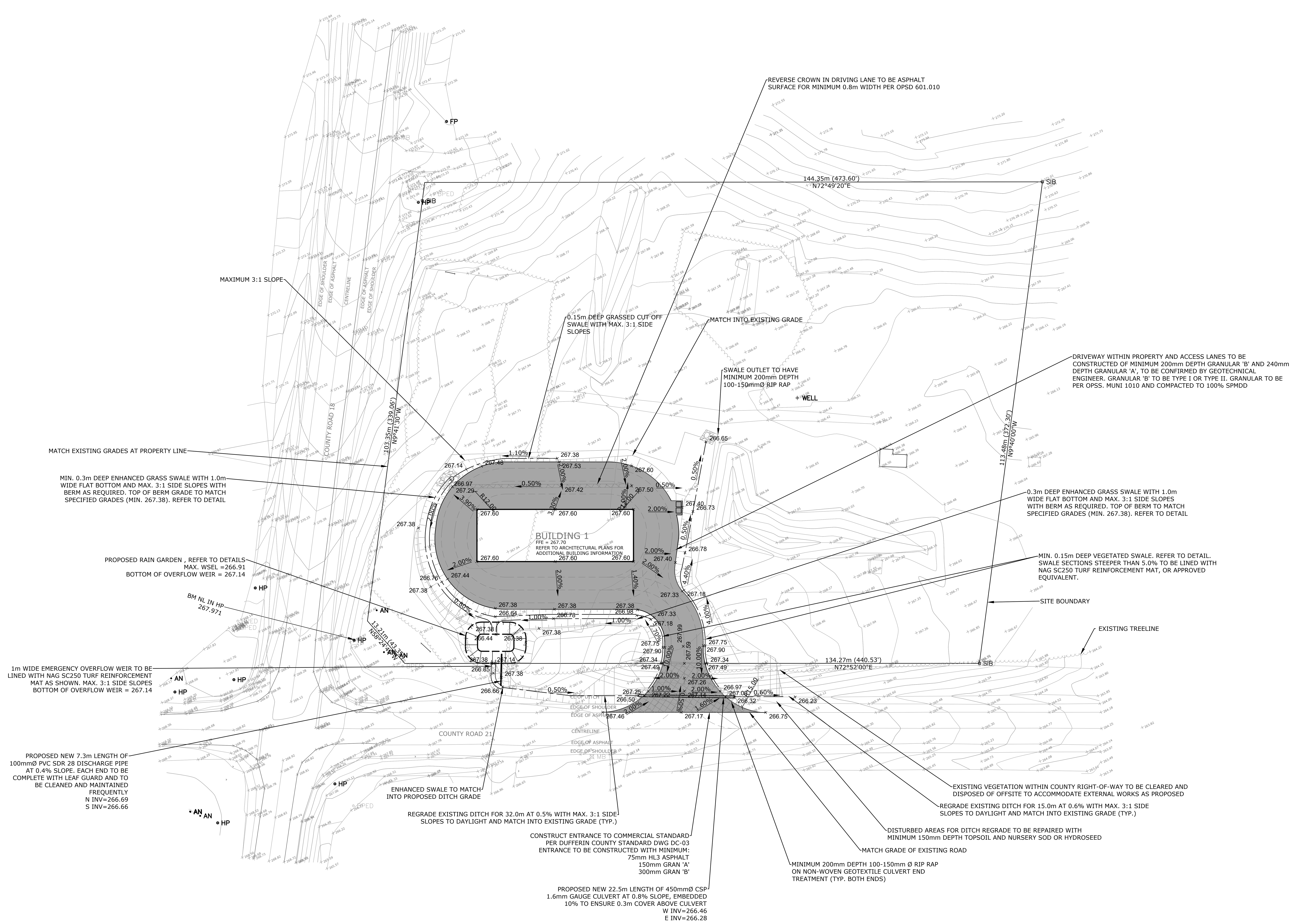
Client
ALPHA STORAGE INC.

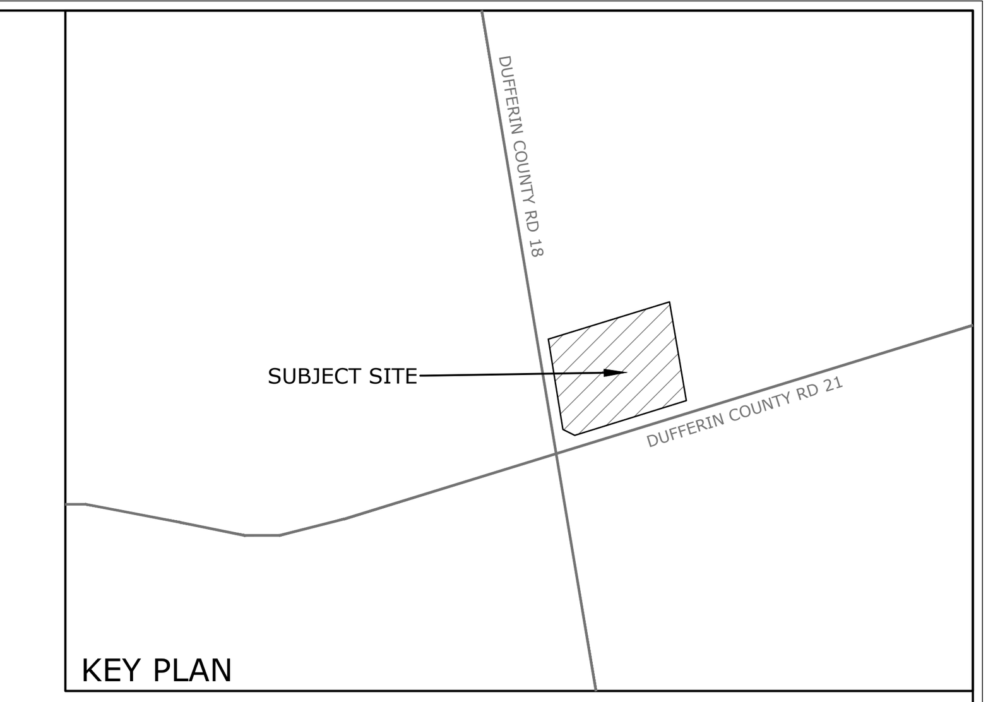
CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
WWW.CAPESENGINEERING.COM

W PART LOT 26, CONCESSION 7E
MINI STORAGE
GENERAL SITE PLAN

Designed	Checked	Date	Drawing No.
B. COLLINS	C. CAPES	21/01/04	C2
Project No. 2020-090		Rev No. 2	
Scale 1:500	0 5.0 10.0 20.0 30.0m		

File: C:\CE\Capes Engineering Dropbox\Projects\2020\2020-090 Piaga Investmen





LEGEND

• 221.21	PROPOSED ELEVATION
221.21	EXISTING ELEVATION
	MAXIMUM 3:1 SLOPE UNLESS OTHERWISE NOTED
	GRAVEL SURFACE MIN. 200mm DEPTH GRANULAR 'A'
	ASPHALT SURFACE REFER TO PLAN FOR DEPTHS AT SPECIFIC LOCATIONS

NOTES

1. THE OWNER/BUILDER/APPLICANT MUST OBTAIN A ROAD OCCUPANCY PERMIT FROM PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION WORKS.
2. ALL DOWNSPOUTS, SUMP PUMP AND OTHER DRAINAGE DISCHARGE POINTS SHALL DISCHARGE ON TO A SPLASH PAD OR APPROVED EQUIVALENT.
3. A COPY OF THE "ACCEPTED FOR CONSTRUCTION" LOT GRADING AND DRAINAGE PLAN IS TO BE ON SITE FOR REFERENCE AT ALL TIMES DURING CONSTRUCTION.
4. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE IMPLEMENTED TO PREVENT MIGRATION OF SILT AND SEDIMENT FROM THE SUBJECT LOT TO ANY ADJACENT LOT, INCLUDING MUNICIPAL RIGHT-OF-WAY. SPECIAL CARE SHALL BE TAKEN TO ENSURE THAT SILT AND SEDIMENT LADEN SURFACE WATER DOES NOT ENTER ANY WATERCOURSES OR ENVIRONMENTALLY SENSITIVE AREAS, EITHER OVERLAND OR THROUGH THE STORM DRAINAGE SYSTEM. THE OWNER/BUILDER/APPLICANT SHALL COMPLY WITH ALL DIRECTIVES ISSUED BY ANY OF THE ENVIRONMENTAL AGENCIES.
5. THE OWNER/BUILDER/APPLICANT IS RESPONSIBLE FOR OBTAINING UTILITY AND SERVICING LOCATES PRIOR TO ANY WORKS.
6. INTERIM GRADING MEASURES MAY BE REQUIRED DURING BUILDING CONSTRUCTION TO ENSURE THAT DRAINAGE DOES NOT ADVERSELY AFFECT THE NEIGHBORING PROPERTIES. ROUGH GRADING OF THE PROPERTY SHALL BE COMPLETED SUCH THAT DRAINAGE IS CONTAINED ON SITE OR CONTROLLED TO A POSITIVE OUTLET.
7. ALL SWALES SHALL HAVE A MINIMUM DEPTH OF 150mm; 150mm DIAMETER SUBDRAINS SHALL BE PROVIDED UNDER ALL SWALES WITH GRADIENTS LESS THAN 1.0%, SUBDRAINS SHALL BE PERFORATED, CORRUGATED PIPE WITH GEOTEXTILE AND BE BEDDED IN A 300mmx300mm CLEAR STONE TRENCH WRAPPED WITH FILTER CLOTH.
8. EXISTING VEGETATION ON SITE TO BE REMOVED AND DISPOSED OF OFF SITE BEFORE LOT GRADING WORK AS SPECIFIED.
9. ALL DISTURBED AREAS ARE TO BE SODDED OVER A MINIMUM OF 150MM OF TOPSOIL OR APPROVED ALTERNATIVE GROUND COVER.
10. FOOTINGS WITHIN GROUNDWATER SHALL BE A FACTOR OF STANDARD WIDTH AS PER O.B.C. SECTION 9.15.3.4.
11. IN LIEU OF GROUNDWATER READINGS, SHOULD GROUNDWATER BE ENCOUNTERED DURING EXCAVATION, THE BASEMENT SLAB SHALL BE SITED MINIMUM 0.50m ABOVE OBSERVED GROUNDWATER LEVEL. ALTERNATIVELY, WATERPROOFING MEASURES AS PER THE OBC TO BE IMPLEMENTED SUBJECT TO THE APPROVAL OF THE CITY OF PICKERING BUILDING DEPARTMENT.

RP 7R-1725 PARTS 2 & 3
CONCESSION 7 PT LOT 26
TOWNSHIP OF MULMUR
COUNTY OF DUFFERIN

No	Revision	Date
1	ISSUED FOR APPROVALS	21/01/15
2	REISSUED FOR APPROVALS	21/01/27
3	REISSUED FOR APPROVALS	22/02/11
4	REIUSSED FOR APPROVALS	22/02/15

NOTES:

TOPOGRAPHICAL SURVEY COMPLETED BY SMC GEOMATICS INC. HORIZONTAL AND VERTICAL CONTROL ESTABLISHED USING LEICA SMARTNET RTK

LEGAL SURVEY INFORMATION PROVIDED BY OWNER. THE BEARINGS SHOWN ARE FOR REFERENCE ONLY. THIS IS NOT A LEGAL PLAN OF SURVEY AND SHALL NOT BE USED AS SUCH. BOUNDARY IS SHOWN APPROXIMATELY ONLY.

BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
FEB 15, 2022
PROVINCE OF ONTARIO

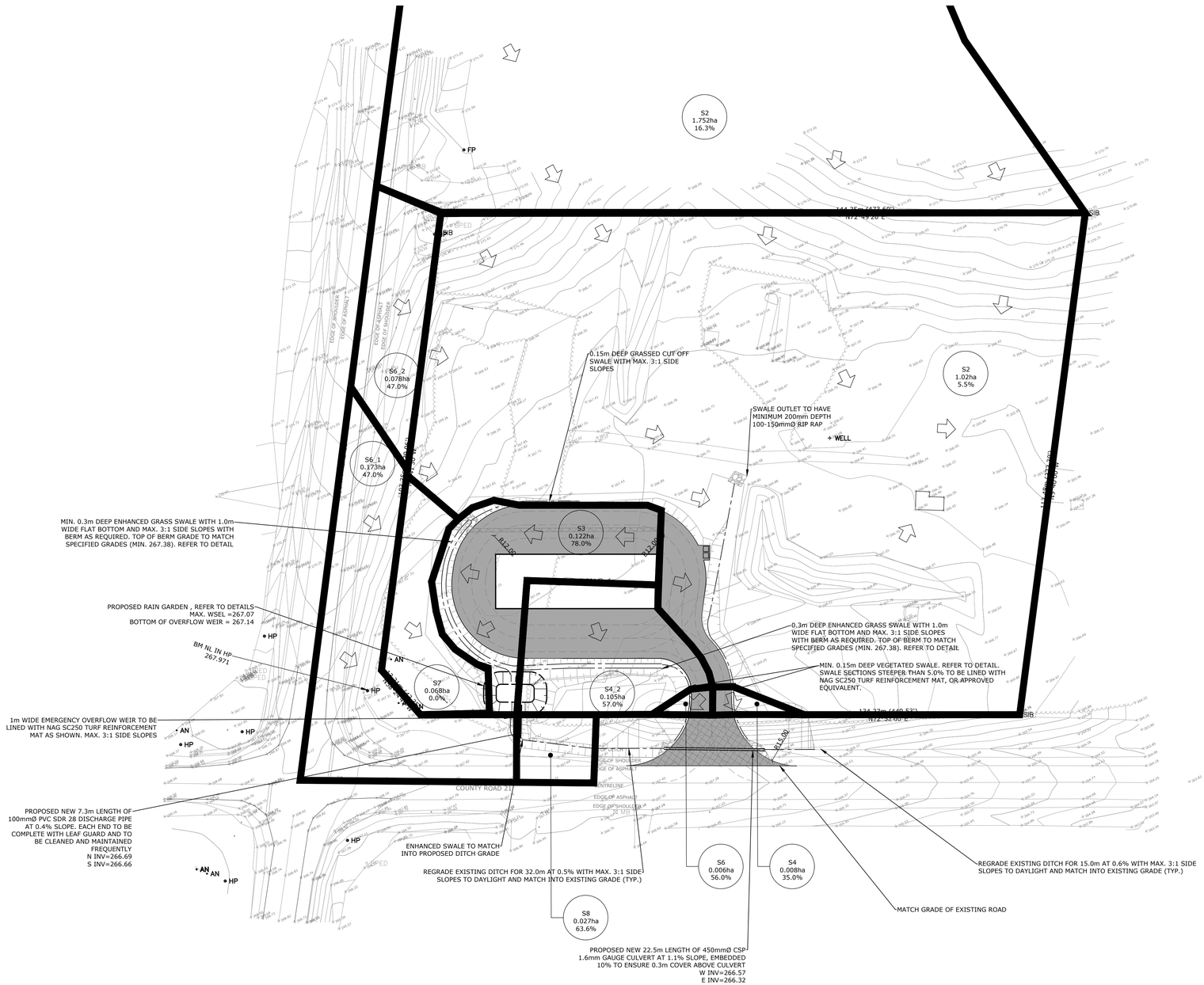
Client
ALPHA STORAGE INC.

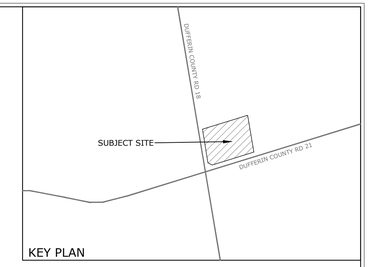
CAPES ENGINEERING

355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
WWW.CAPESENGINEERING.COM

W PART LOT 26, CONCESSION 7E
MINI STORAGE
GRADING AND SERVICING PLAN

Designed	Checked	Date	Drawing No.
B. COLLINS	C. CAPES	21/01/04	C3
Project No. 2020-090		Rev No. 2	
Scale 1:500	0 5.0 10.0 20.0 30.0m		





LEGEND

221.21	PROPOSED ELEVATION
221.21	EXISTING ELEVATION
	MAXIMUM 3:1 SLOPE UNLESS OTHERWISE NOTED
	OVERLAND FLOW DIRECTION
S6 0.39ha 0%	SUBCATCHMENT NAME, AREA (ha) & % IMPERVIOUS

RP 7R-1725 PARTS 2 & 3
CONCESSION 7 PT LOT 26
TOWNSHIP OF MULMUR
COUNTY OF DUFFERIN

Notes
1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

No	Revision	Date
1	ISSUED FOR APPROVALS	21/01/15
2	REISSUED FOR APPROVALS	21/01/27
3	REISSUED FOR APPROVALS	22/02/11
4	REIUSSED FOR APPROVALS	22/02/15

NOTES:

TOPOGRAPHICAL SURVEY COMPLETED BY SMC GEOMATICS INC. HORIZONTAL AND VERTICAL CONTROL ESTABLISHED USING LEICA SMARTNET RTK

LEGAL SURVEY INFORMATION PROVIDED BY OWNER. THE BEARINGS SHOWN ARE FOR REFERENCE ONLY. THIS IS NOT A LEGAL PLAN OF SURVEY AND SHALL NOT BE USED AS SUCH. BOUNDARY IS SHOWN APPROXIMATELY ONLY.

BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

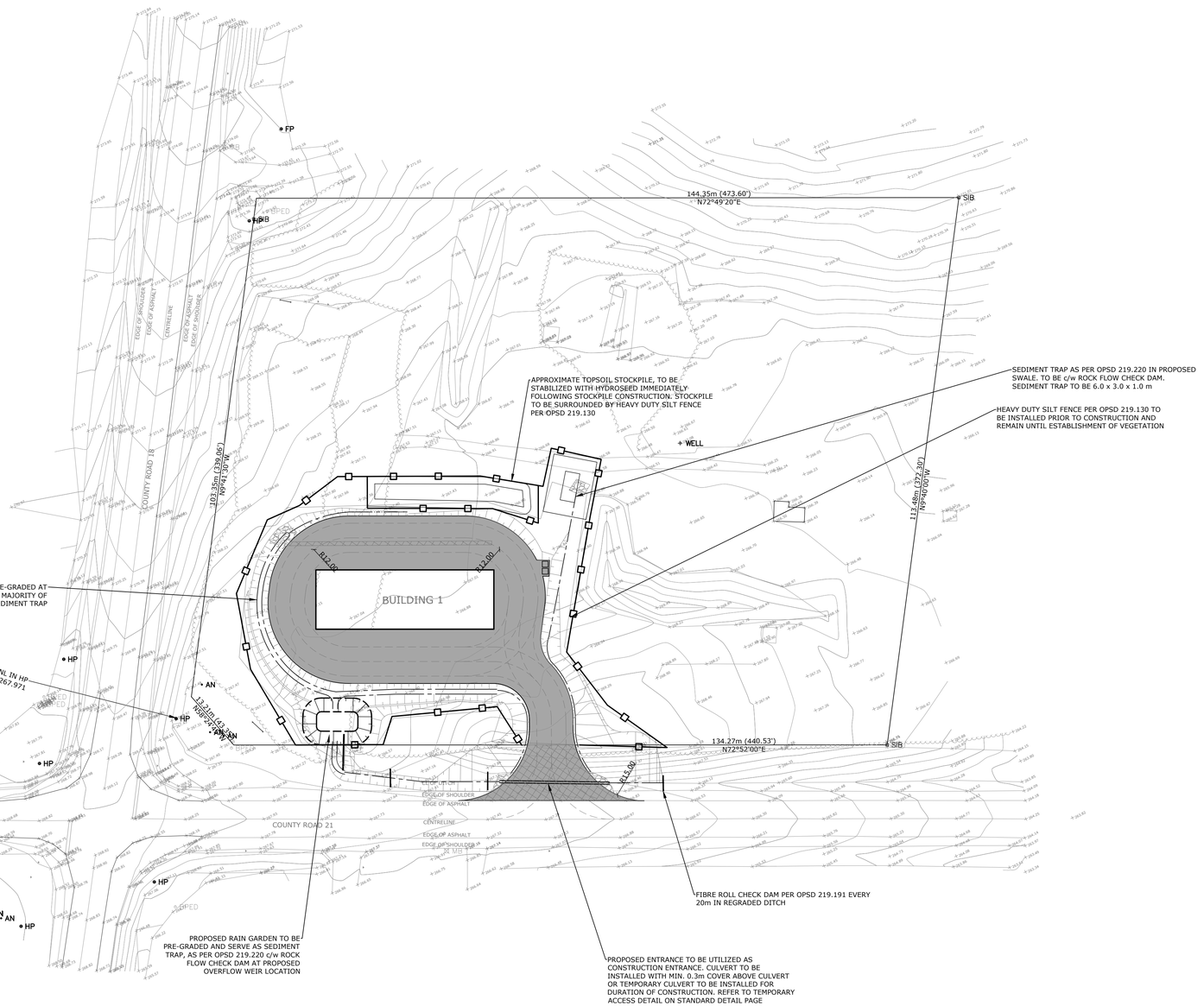
LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
FEB 15, 2022
PROVINCE OF ONTARIO

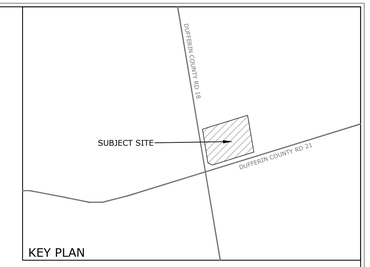
Client
ALPHA STORAGE INC.

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
WWW.CAPESENGINEERING.COM

W PART LOT 26, CONCESSION 7E
MINI STORAGE
POST DEVELOPMENT DRAINAGE PLAN

Designed	Checked	Date	Drawing No.
B. COLLINS	C. CAPES	21/01/04	C4
Project No. 2020-090		Rev No. 2	
Scale 1:500	0 5.0 10.0 20.0 30.0m		





LEGEND

- 221.21 — PROPOSED ELEVATION
- 221.21 — EXISTING ELEVATION
- MAXIMUM 3:1 SLOPE UNLESS OTHERWISE NOTED
- SEDIMENT FENCE
- FIBRE ROLL CHECK DAM

RP 7R-1725 PARTS 2 & 3
CONCESSION 7 PT LOT 26
TOWNSHIP OF MULMUR
COUNTY OF DUFFERIN

Notes
1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

No	Revision	Date
1	ISSUED FOR APPROVALS	21/01/15
2	REISSUED FOR APPROVALS	21/01/27
3	REISSUED FOR APPROVALS	22/02/11
4	REIUSSED FOR APPROVALS	22/02/15

NOTES:

TOPOGRAPHICAL SURVEY COMPLETED BY SMC GEOMATICS INC. HORIZONTAL AND VERTICAL CONTROL ESTABLISHED USING LEICA SMARTNET RTK

LEGAL SURVEY INFORMATION PROVIDED BY OWNER. THE BEARINGS SHOWN ARE FOR REFERENCE ONLY. THIS IS NOT A LEGAL PLAN OF SURVEY AND SHALL NOT BE USED AS SUCH. BOUNDARY IS SHOWN APPROXIMATELY ONLY.

BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
FEB 15, 2022
PROVINCE OF ONTARIO

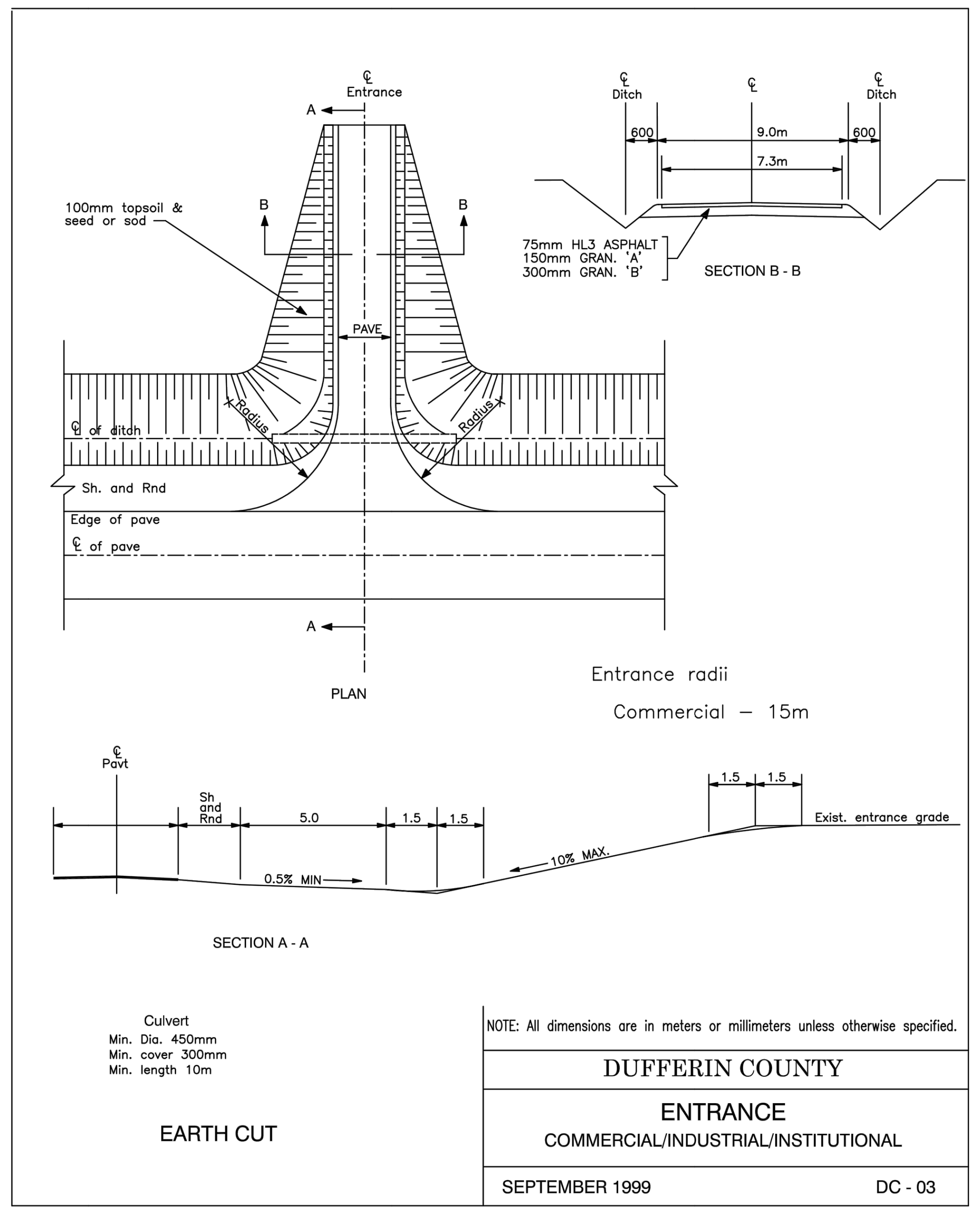
Client
ALPHA STORAGE INC.

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
WWW.CAPESENGINEERING.COM

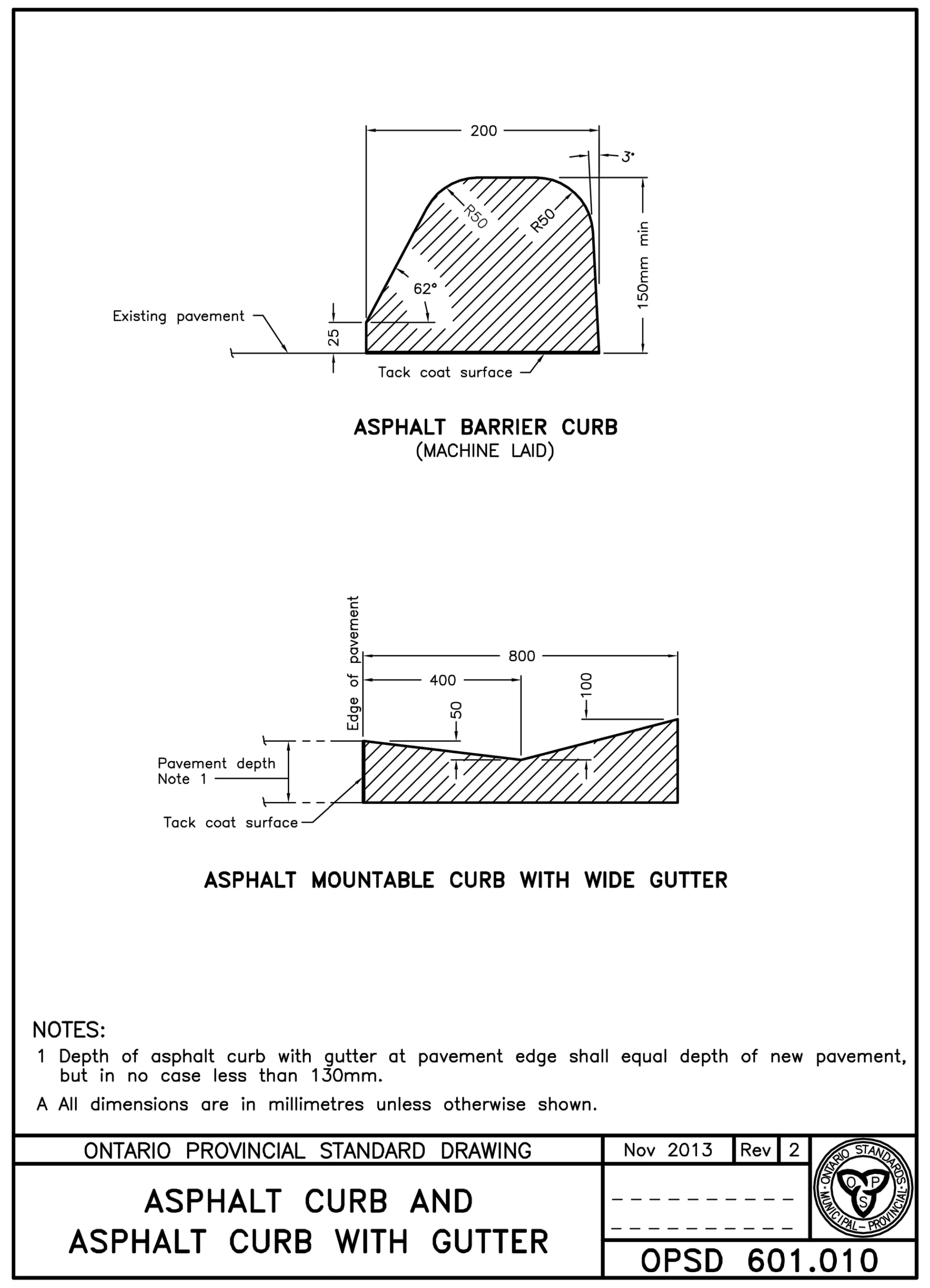
W PART LOT 26, CONCESSION 7E
MINI STORAGE
EROSON & SEDIMENT CONTROL PLAN

Designed	Checked	Date	Drawing No.
B. COLLINS	C. CAPES	21/01/04	C5
Project No.		Rev No.	
2020-090		2	
Scale	0 5.0 10.0 20.0 30.0m		
1:500			

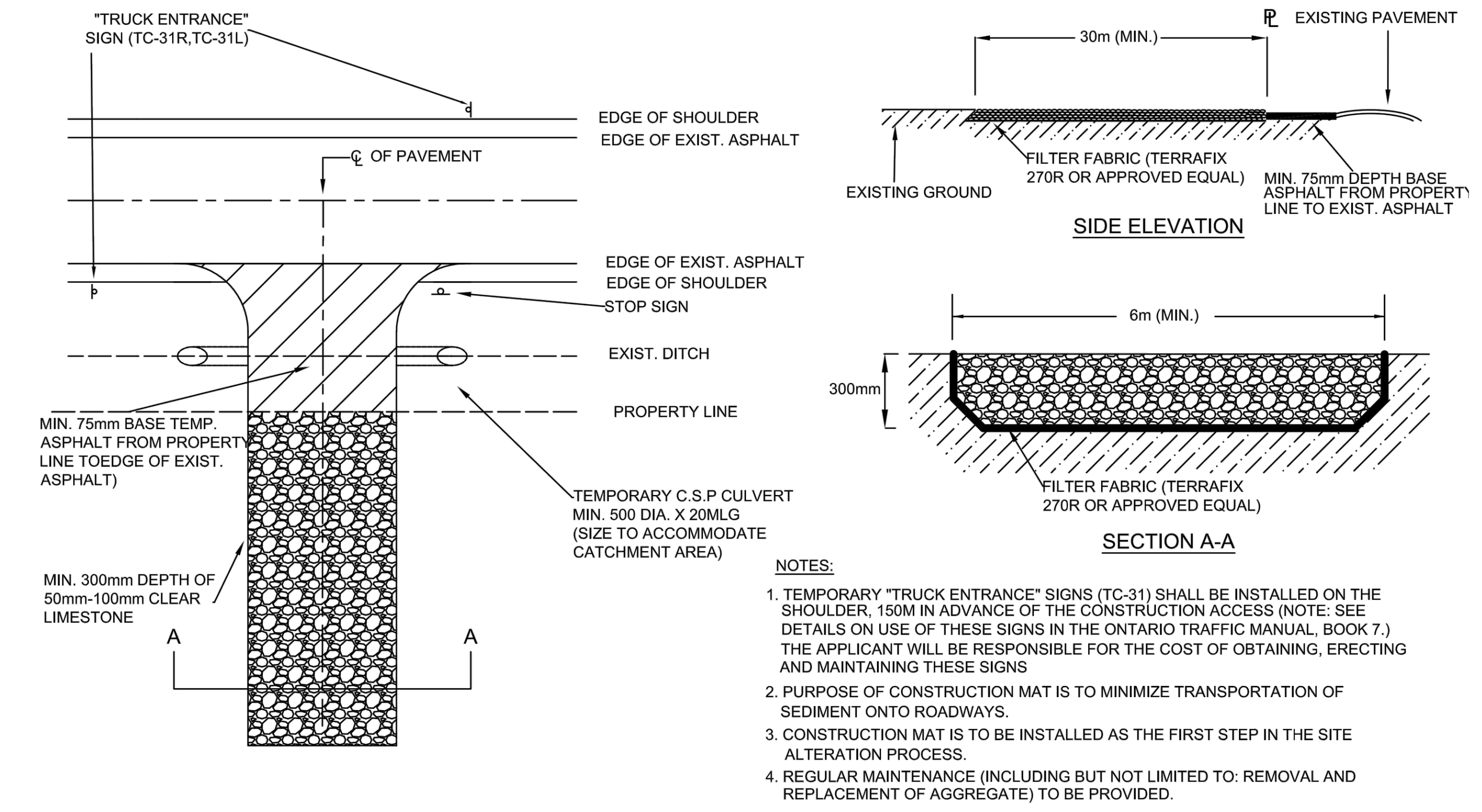
File: C:\CAPES Engineering Dropbox\Projects\2020\2020-090 Mega Storage\Admin\2020-090A Cons. T Ele\Drawings\01 Production\dwg\2020-090A ESC Plan.dwg Data Plotted: February 15, 2022 - 12:15 PM



Entrance
Ditch
9.0m
7.3m
600
100mm topsoil & seed or sod
75mm HL3 ASPHALT
150mm GRAN. "A"
300mm GRAN. "B"
SECTION B - B
PAVE
Sh. and Rnd
Edge of pave
PLAN
Entrance radii
Commercial – 15m
5.0
1.5
Exist. entrance grade
0.5% MIN
10% MAX.
SECTION A - A
Culvert
Min. Dia. 450mm
Min. cover 300mm
Min. length 10m
EARTH CUT
NOTE: All dimensions are in meters or millimeters unless otherwise specified.
DUFFERIN COUNTY
ENTRANCE
COMMERCIAL/INDUSTRIAL/INSTITUTIONAL
SEPTEMBER 1999
DC - 03



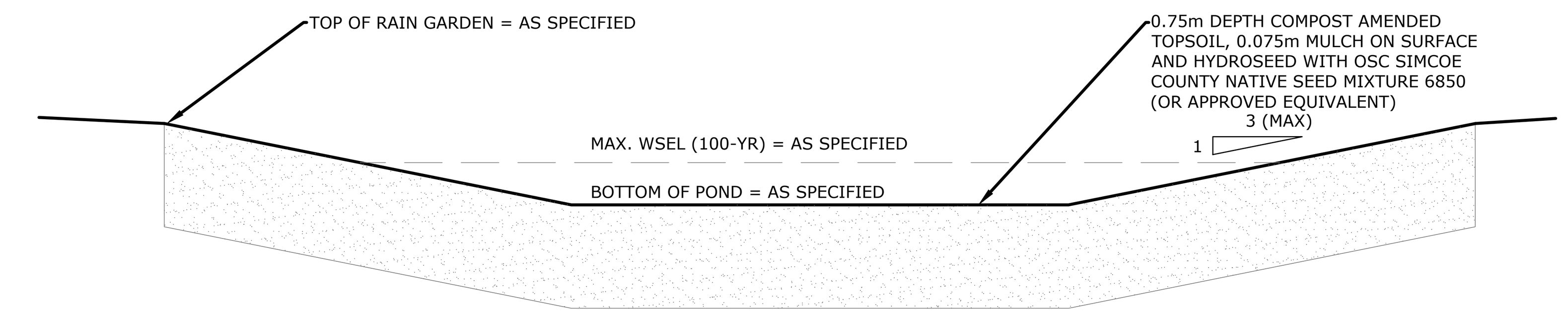
200
Existing pavement
Tack coat surface
150mm min
ASPHALT BARRIER CURB
(MACHINE LAID)
800
400
Edge of pavement
Pavement depth
Note 1
Tack coat surface
ASPHALT MOUNTABLE CURB WITH WIDE GUTTER
NOTES:
1 Depth of asphalt curb with gutter at pavement edge shall equal depth of new pavement, but in no case less than 130mm.
A All dimensions are in millimetres unless otherwise shown.
ONTARIO PROVINCIAL STANDARD DRAWING
Nov 2013
Rev 2
ASPHALT CURB AND
ASPHALT CURB WITH GUTTER
OPSD 601.010



"TRUCK ENTRANCE" SIGN (TC-31R,TC-31L)
EDGE OF SHOULDER
EDGE OF EXIST. ASPHALT
℄ OF PAVEMENT
EDGE OF EXIST. ASPHALT
EDGE OF SHOULDER
STOP SIGN
EXIST. DITCH
PROPERTY LINE
MIN. 75mm BASE TEMP. ASPHALT FROM PROPERTY LINE TOEDGE OF EXIST. ASPHALT)
TEMPORARY C.S.P CULVERT MIN. 500 DIA. X 20MLG (SIZE TO ACCOMMODATE CATCHMENT AREA)
MIN. 300mm DEPTH OF 50mm-100mm CLEAR LIMESTONE
30m (MIN.)
EXISTING PAVEMENT
EXISTING GROUND
FILTER FABRIC (TERRAFIX 270R OR APPROVED EQUAL)
MIN. 75mm DEPTH BASE ASPHALT FROM PROPERTY LINE TO EXIST. ASPHALT
SIDE ELEVATION
6m (MIN.)
300mm
FILTER FABRIC (TERRAFIX 270R OR APPROVED EQUAL)
SECTION A-A
NOTES:
1. TEMPORARY "TRUCK ENTRANCE" SIGNS (TC-31) SHALL BE INSTALLED ON THE SHOULDER, 150M IN ADVANCE OF THE CONSTRUCTION ACCESS (NOTE: SEE DETAILS ON USE OF THESE SIGNS IN THE ONTARIO TRAFFIC MANUAL, BOOK 7.) THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF OBTAINING, ERECTING AND MAINTAINING THESE SIGNS
2. PURPOSE OF CONSTRUCTION MAT IS TO MINIMIZE TRANSPORTATION OF SEDIMENT ONTO ROADWAYS.
3. CONSTRUCTION MAT IS TO BE INSTALLED AS THE FIRST STEP IN THE SITE ALTERATION PROCESS.
4. REGULAR MAINTENANCE (INCLUDING BUT NOT LIMITED TO: REMOVAL AND REPLACEMENT OF AGGREGATE) TO BE PROVIDED.

TEMPORARY ACCESS DETAIL

NTS



RAIN GARDEN DETAIL

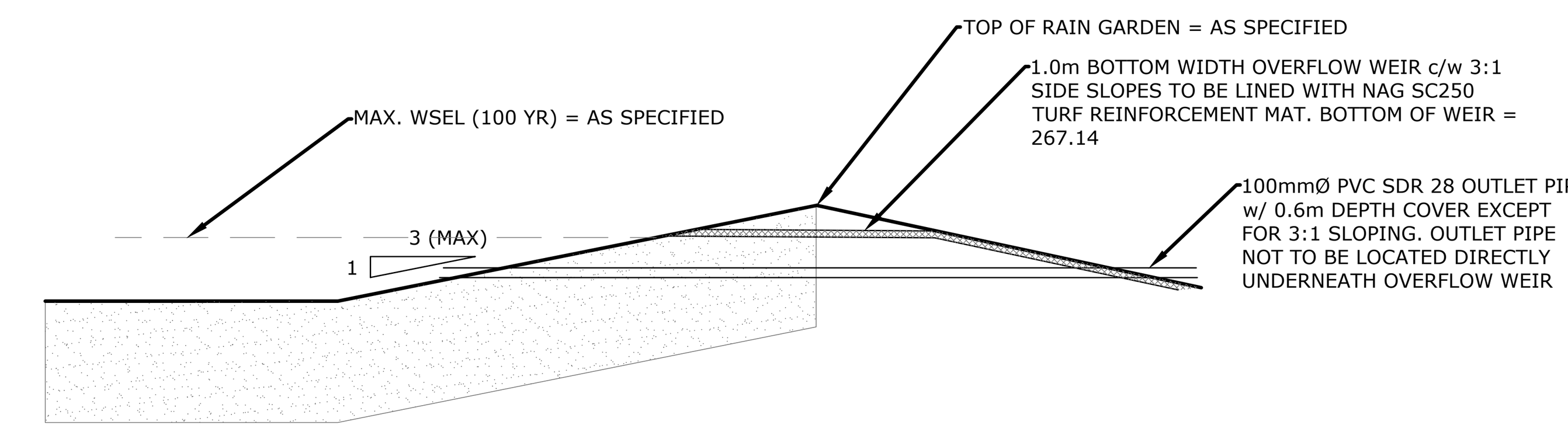
NOT TO SCALE

PROPOSED RAIN GARDEN DETAILS

POND SIDESLOPES TO BE MAXIMUM 3:1 SLOPE

RAIN GARDEN BOTTOM AND SIDESLOPES TO BE CONSTRUCTED WITH
- 0.75m COMPOST AMENDED TOPSOIL
- 0.075mm MULCH ON SURFACE, AND HYDROSEED WITH OSC SIMCOE COUNTY NATIVE SEED MIXTURE 6850 (OR APPROVED EQUIVALENT)

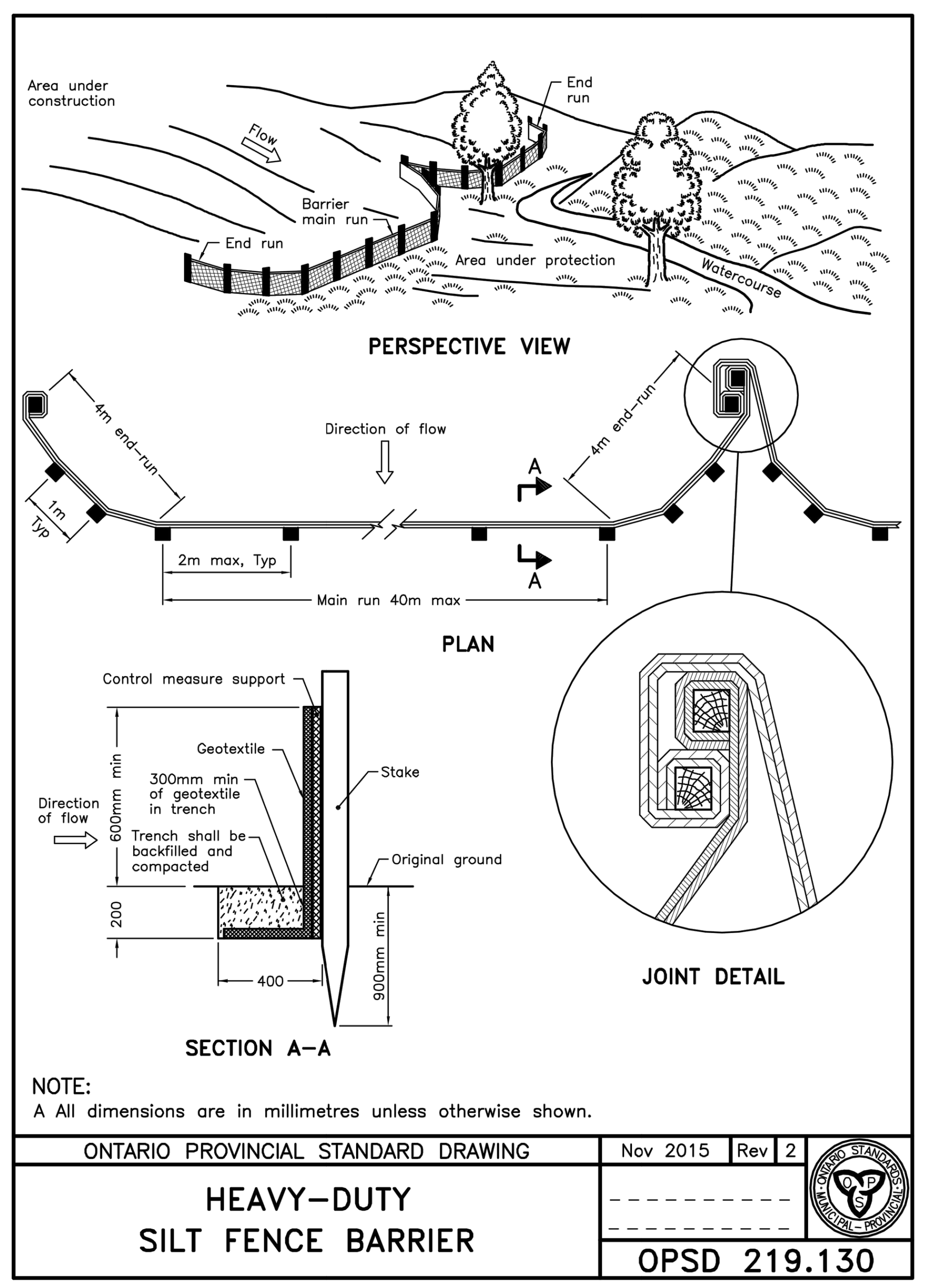
TOP OF POND = 267.38
BOTTOM OF POND = 266.44
MAXIMUM WSEL, 100-YR SCS = 266.91



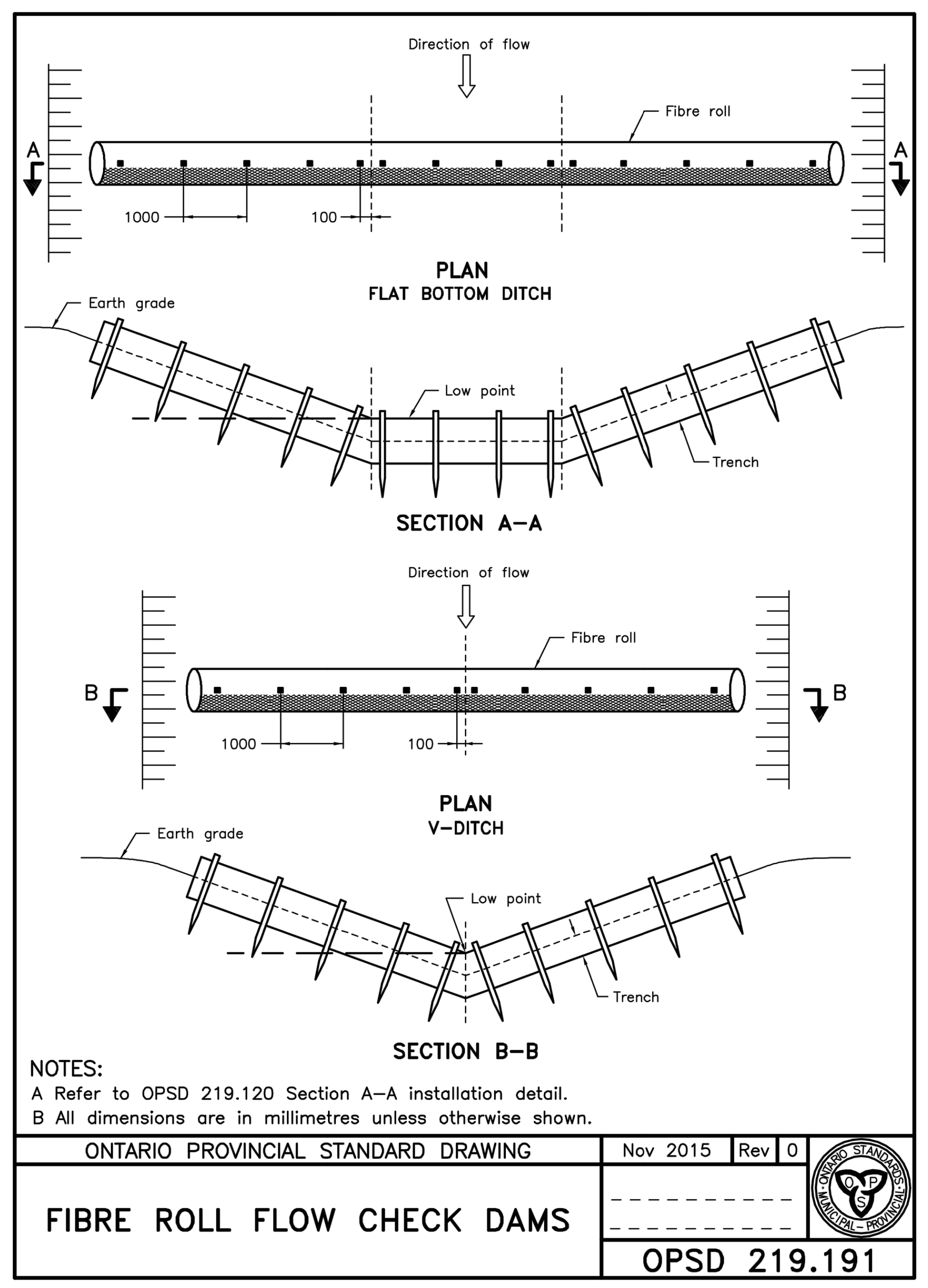
TOP OF RAIN GARDEN = AS SPECIFIED
1.0m BOTTOM WIDTH OVERFLOW WEIR c/w 3:1 SIDE SLOPES TO BE LINED WITH NAG SC250 TURF REINFORCEMENT MAT. BOTTOM OF WEIR = 267.14
MAX. WSEL (100 YR) = AS SPECIFIED
100mmØ PVC SDR 28 OUTLET PIPE w/ 0.6m DEPTH COVER EXCEPT FOR 3:1 SLOPING. OUTLET PIPE NOT TO BE LOCATED DIRECTLY UNDERNEATH OVERFLOW WEIR
3 (MAX)

RAIN GARDEN OUTLET DETAIL

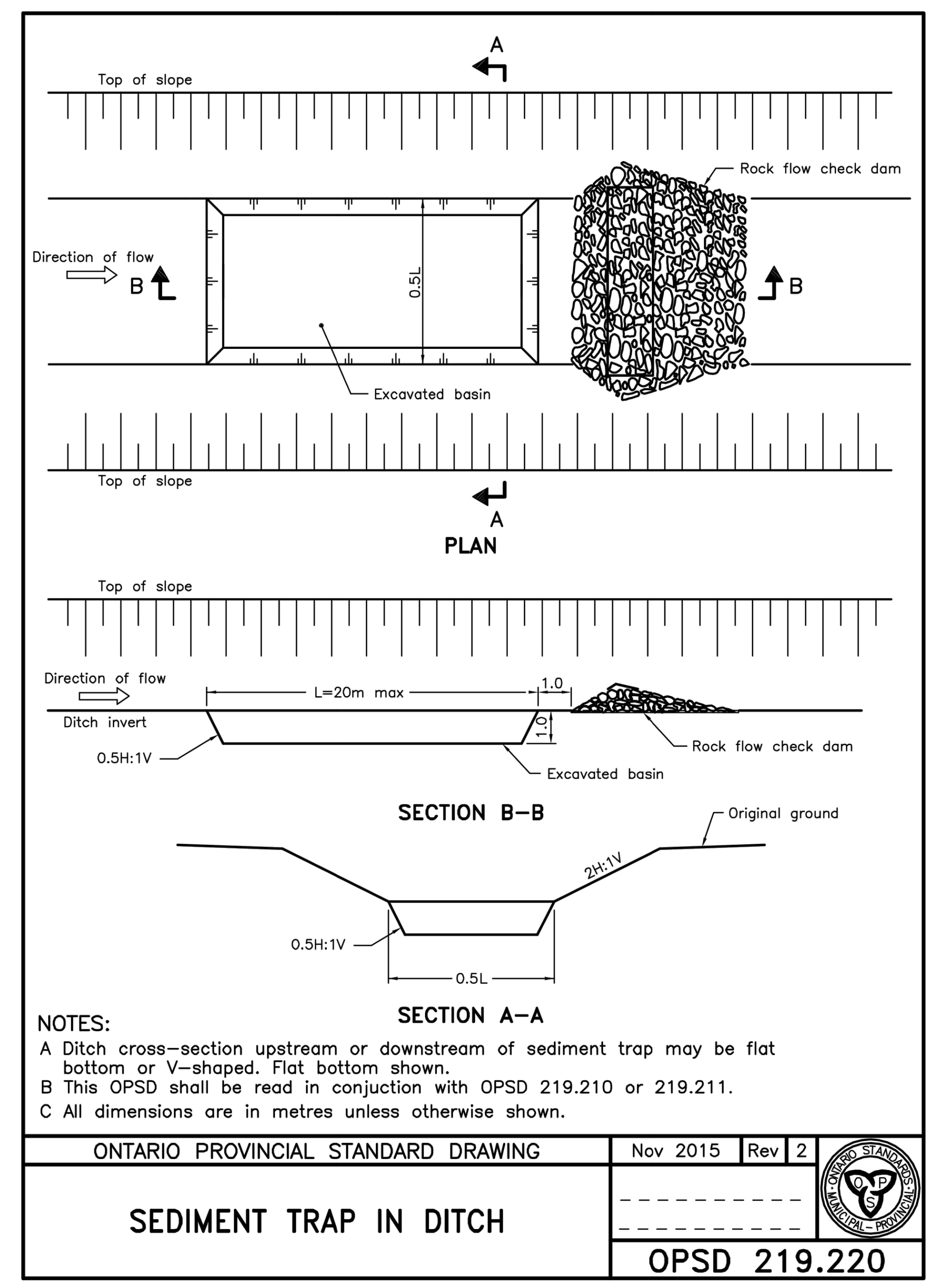
NOT TO SCALE



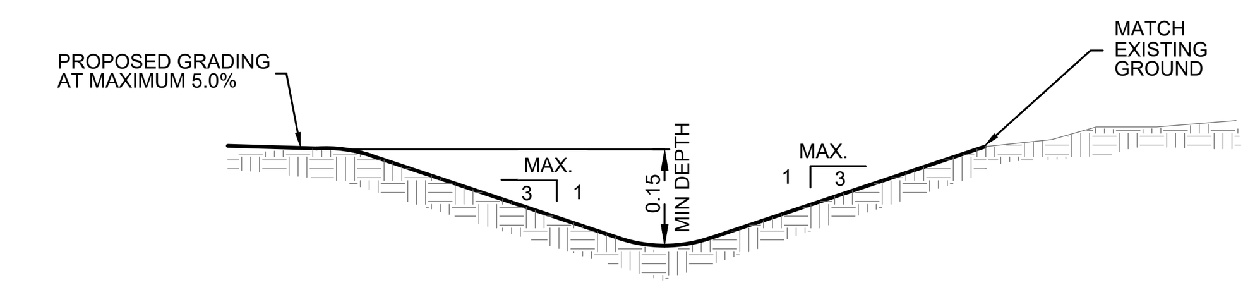
Area under construction
End run
Barrier main run
Area under protection
PERSPECTIVE VIEW
Direction of flow
4m end-run
2m max, Typ
Main run 40m max
PLAN
Control measure support
Geotextile
300mm min of geotextile in trench
Trench shall be backfilled and compacted
Stake
Original ground
400
SECTION A-A
JOINT DETAIL
NOTE:
A All dimensions are in millimetres unless otherwise shown.
ONTARIO PROVINCIAL STANDARD DRAWING
Nov 2015
Rev 2
HEAVY-DUTY
SILT FENCE BARRIER
OPSD 219.130



Direction of flow
Fibre roll
1000
100
PLAN
FLAT BOTTOM DITCH
Earth grade
Low point
Trench
SECTION A-A
PLAN
V-DITCH
SECTION B-B
NOTES:
A Refer to OPSD 219.120 Section A-A installation detail.
B All dimensions are in millimetres unless otherwise shown.
ONTARIO PROVINCIAL STANDARD DRAWING
Nov 2015
Rev 0
FIBRE ROLL FLOW CHECK DAMS
OPSD 219.191

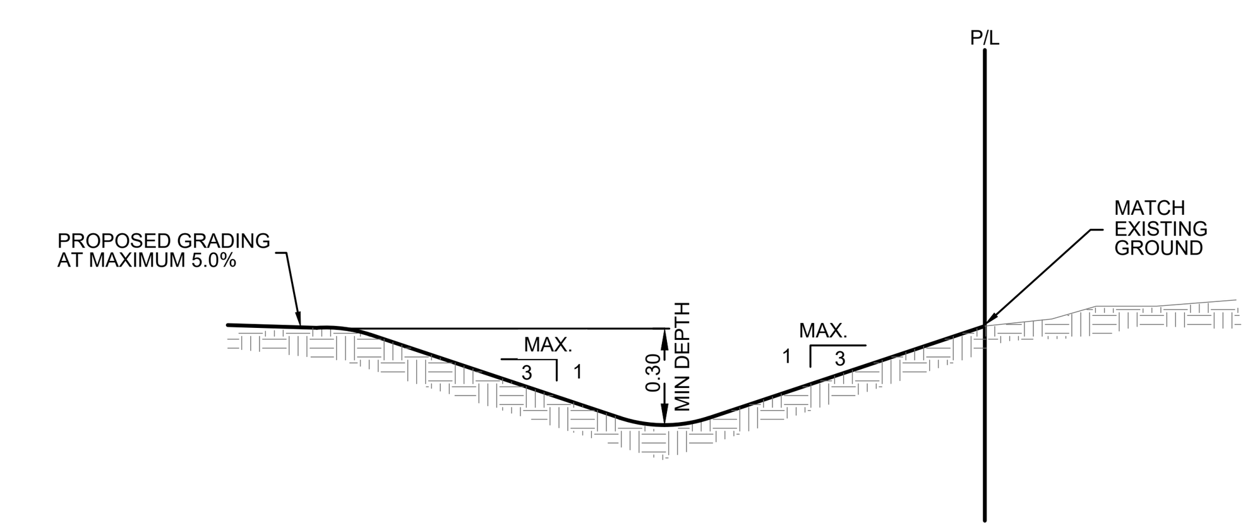


Top of slope
Rock flow check dam
Direction of flow
Excavated basin
PLAN
L=20m max
Ditch invert
0.5H:1V
Rock flow check dam
Excavated basin
SECTION B-B
Original ground
0.5H:1V
0.5L
SECTION A-A
NOTES:
A Ditch cross-section upstream or downstream of sediment trap may be flat bottom or V-shaped. Flat bottom shown.
B This OPSD shall be read in conjuction with OPSD 219.210 or 219.211.
C All dimensions are in metres unless otherwise shown.
ONTARIO PROVINCIAL STANDARD DRAWING
Nov 2015
Rev 2
SEDIMENT TRAP IN DITCH
OPSD 219.220



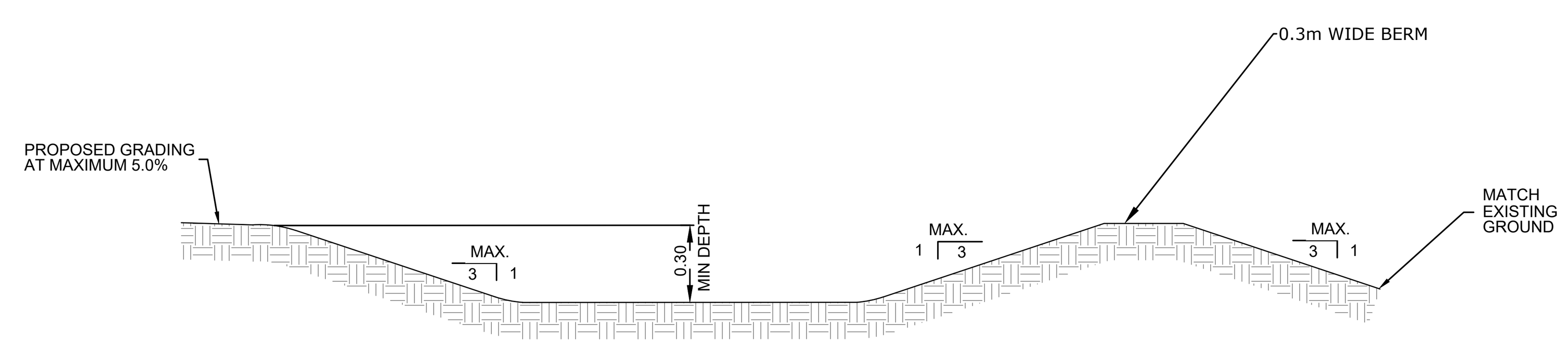
TYPICAL 0.15m DEEP SIDE YARD SWALE

NTS



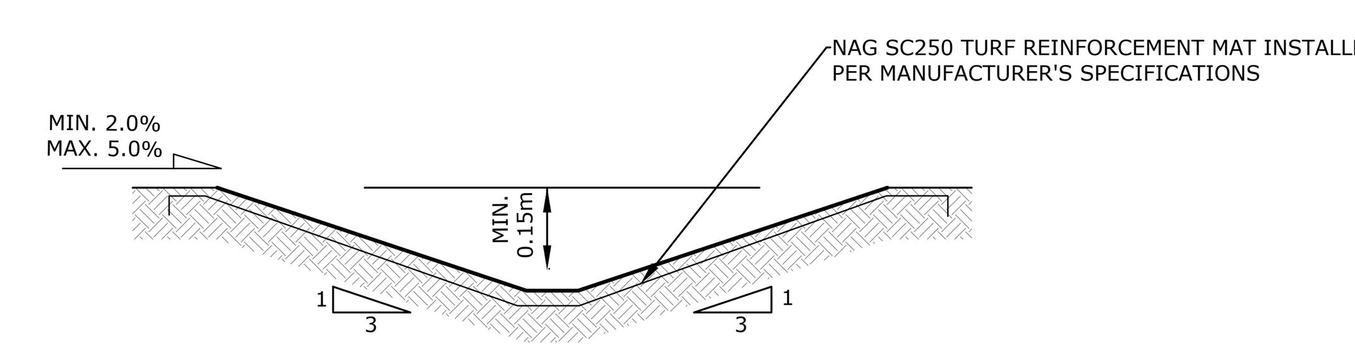
TYPICAL 0.3m DEEP SIDE YARD SWALE

NTS



TYPICAL 0.3m DEEP ENHANCED SWALE c/w AS NEEDED

NTS



TYPICAL TURF REINFORCEMENT
MAT LINED SIDEYARD SWALE

NTS

No	Revision	Date
1	ISSUED FOR APPROVALS	21/01/15
2	REISSUED FOR APPROVALS	21/01/27
3	REISSUED FOR APPROVALS	22/02/11
4	REISSUED FOR APPROVALS	22/02/15

NOTES:

TOPOGRAPHICAL SURVEY COMPLETED BY SMC GEOMATICS INC. HORIZONTAL AND VERTICAL CONTROL ESTABLISHED USING LEICA SMARTNET RTK

LEGAL SURVEY INFORMATION PROVIDED BY OWNER. THE BEARINGS SHOWN ARE FOR REFERENCE ONLY. THIS IS NOT A LEGAL PLAN OF SURVEY AND SHALL NOT BE USED AS SUCH. BOUNDARY IS SHOWN APPROXIMATELY ONLY.

BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
FEB 15, 2022
PROVINCE OF ONTARIO

Client
ALPHA STORAGE INC.

CAPES ENGINEERING

355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
WWW.CAPESENGINEERING.COM

W PART LOT 26, CONCESSION 7E
MINI STORAGE
STANDARD DETAILS

Designed	Checked	Date	Drawing No.
B. COLLINS	C. CAPES	21/01/04	C6
Project No. 2020-090		Rev No. 2	
Scale NOT TO SCALE			

Appendices

Appendix A – Legal Plan

SURVEY OF
S, CONCESSION VII E.H.S.
UR, COUNTY OF DUFFERIN

INCH = 100 FEET
IO AND PATTEN LTD.
1978

N IS NOT A PLAN OF SUBDIVISION
EANING OF THE PLANNING ACT.

PART	LOT	CONC.	INST.	AREA
1	pt.26	VII EHS	M.F. 95745	6·072 ac.
2				3·571 ac.
3				0·427 ac.

PLAN 7R- 1725

RECEIVED AND DEPOSITED

(M.F. _____)

JAN 2 1 1980
DATE

A.T. Woodland LR per
A.T. WOODLAND
LAND REGISTRAR
FOR THE REGISTRY DIVISION OF
DUFFERIN (7).

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE REGISTRY ACT.

Dec 20/79.
DATE

RONALD J. EMO

PROPERTY OF TH
REGISTRY OFFIC

PART 3 7R - 882
INST. M.F. 68426

22·63'

972·09'
549·46'

± 1091'
66·56'

Fd(zumo)
Fd(zumo)
Fd(zumo)

960·85' meas. (N9°43'30"W 960·42' M.F. Inst. 63429)

26

VII

E.H.S.

947·90'

375·60'

SION

7R-1463
98487

7R-822

NOTES

BEARINGS HEREON ARE ASTRONOMIC AND ARE REFERR TO THE BEARING OF THE SOUTHERLY LIMIT OF PART 3, PLAN 7R-882 ASSUMED TO BE N73°18'35"E, IN ACCORDANCE THEREWITH.

SIB DENOTES 1" x 1" x 48" IRON SURVEY BAR
J.B. DENOTES 5/8"x5/8"x(24") IRON SURVEY BAR
(E.H.S.) DENOTES EAST OF HURONTARIO STREET

ALL BARS SHOWN ON THIS PLAN WERE SET DURING THE COURSE OF THE SURVEY OF PLAN 7R-1463 UNLESS OTHERWISE INDICATED

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE REGISTRY ACT AND THE REGULATIONS MADE THEREUNDER.
2. THE SURVEY WAS COMPLETED JAN. 16, 1978.

DEC. 4, 1979 _____ OLS

RONALD J. EMO
ONTARIO LAND SURVEYOR
COLLINGWOOD

PART 2 M.F.
INST.

66' RIGHT OF WAY
PART 6, 7R-

50·43'
wit
372·34'
372·30'
N 9°40'00" W
N 9°40'00"W
17·14
50·43'
wit

N72°52'00"E
549·93'
973·34' meas. (973·59' Inst. MF 63429)

N 9°40'00"W
17·14'
Fd(zumo)
0·23 South
Fd(zumo)
66·56'
± 6·90'
Fd(zumo)
66·00'

E BETWEEN LOTS 25 AND 26 (DUFFERIN ROAD 21)

SURVEY FOR MRS. WILMA KOZUCK JOB Nº 69-115-2

PLAN MATERIALS	
ITEM	DESCRIPTION
MYLAR	TRANSLAR Nº 3
GAUGE	·003"
INK	HIGGINS Nº 4465

PLAN OF SURVEY OF
PART OF LOT 26, CONCESSION VII
TOWNSHIP OF MULMUR, COUNTY OF DUFF

SCALE 1 INCH = 100 FEET

ZUBEK, EMO AND PATTEN LTD.

1978

CAUTION THIS PLAN IS NOT A PLAN OF SUBDIVISION WITHIN THE MEANING OF THE PLANNING ACT.

PART 3, 7R-8 INST. M.F. 68426

66·00'

VI AND VII E.H.S.

CONCESSION VI E.H.S.

ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS VI AND VII E.H.S. (COUNTY ROAD 18)

Fd(769)

N73°18'35"E

N73°18'35"E 422·63'

N12°06'35"E 107·70'

Fd 10·22'

Fd(769)

350·07' 20944

M.F.

DEPOSITED PLAN

N9°41'30"W

N1°37'10"E 50·99'

Fd(769) wit

8543'

424·49'

N72°49'20"E 423·17'

473·60'

50·43'

wit

575·60'

947·90'

PART 1
AREA = 6·072 acres

PART 1, 7R-1463 INST. M.F. 95745

PART 2
AREA = 3·571 acres

PART 3
AREA = 0·427 acres

372·34'

372·30'

N9°40'00"W

N9°40'00"W 17·14

304·44'

N9°41'30"W

Fd(769)

34·62'

N58°24'45"W 43·35'

N58°24'45"W 22·62'

PART 3, 7R-1463 INST. M.F. 95890

66·00'

220·15'

169·95'

50·43'

wit

N72°52'00"E 440·53'

N72°52'00"E

973·

67·15'

66·00'

South West Angle
Lot 26, Conc. VII E.H.S.

ROAD ALLOWANCE BETWEEN LOTS

Appendix B – MECP Well Record

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 | 1705295 | Municipality 17006 | Con. HS E 07

PART 2 & 3 PA 21

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
DUFFERIN	MULMUR	VI EAST	26

[redacted]

Address: RR LISLE

Date completed: 16 (day) 04 (month) 99 (year)

21 | Northing | RC | Elevation | RC | Basin Code | ii | iii | iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	SAND	GRAVEL		0	8
BROWN	SAND	CLAY	BROWN SAND CLAY LAYERS	8	23
GREY	SAND	CLAY	SANDY CLAY	23	111
BROWN	SAND		CLEAN WATER BEARING SAND	111	121

31

32

WATER RECORD (41)

Water found at – feet	Kind of water
111	☑ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
121	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas

CASING & OPEN HOLE RECORD (51)

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6 1/8	☑ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic	.188	+2	115
	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic			
	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter	Length
8-10	6 inches	6' feet

Material and type: STAINLESS STEEL
Depth at top of screen: feet

PLUGGING & SEALING RECORD (61)

☐ Annular space ☐ Abandonment

Depth set at – feet From	To	Material and type (Cement grout, bentonite, etc.)
11	12	BENSEAL

PUMPING TEST (71)

Pumping test method: ☐ Pump ☑ Bailer
Pumping rate: 15 GPM
Duration of pumping: 2 Hours 15 Mins

Static level	Water level end of pumping	15 minutes	30 minutes	45 minutes	60 minutes
34.6 feet	60 feet	60 feet	60 feet	60 feet	60 feet

Water levels during: ☑ Pumping ☐ Recovery
If flowing give rate: GPM
Pump intake set at: feet
Water at end of test: ☑ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump setting: 100 feet
Recommended pump rate: 25 GPM

FINAL STATUS OF WELL

☑ Water supply ☐ Observation well ☐ Test hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Abandoned (Other) ☐ Dewatering ☐ Unfinished ☐ Replacement well

WATER USE

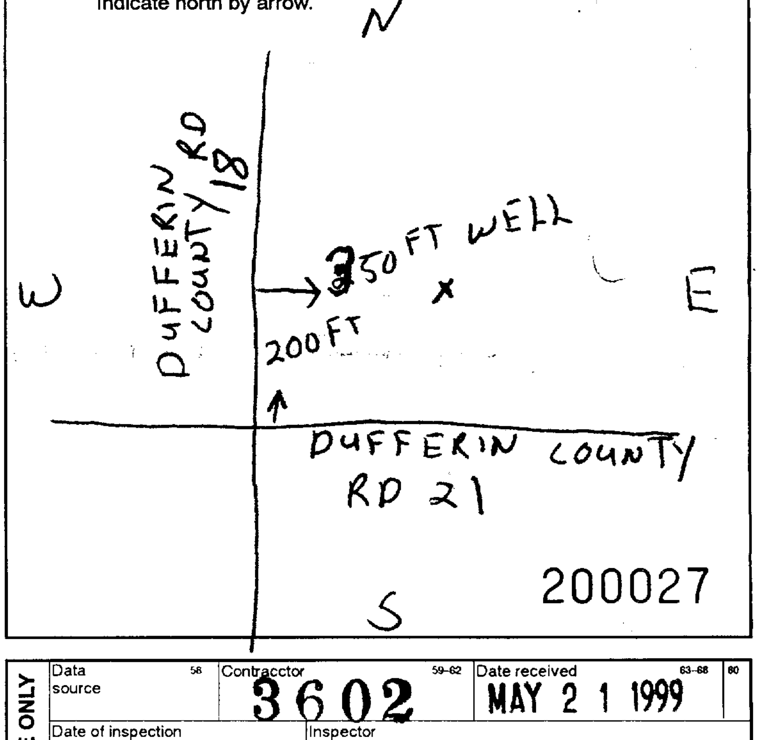
☑ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public supply ☐ Cooling & air conditioning ☐ Not used ☐ Other

METHOD OF CONSTRUCTION

☑ Cable tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☐ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



200027

Name of Well Contractor	Well Contractor's Licence No.
MIGHTON'S WELL DRILLING LTD	3602

Address: RR # 2 STAYNER ONT.

Name of Well Technician	Well Technician's Licence No.
TERRY MIGHTON	T-0130

Signature of Technician/Contractor: Kenneth G Mighton
Submission date: day 17 mo 5 yr 99

MINISTRY USE ONLY

Data source	Contractor	Date received
	3602	MAY 21 1999

Date of inspection | Inspector
Remarks: CSS.ES9

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Appendix C – PCSWMM Existing Condition Model Output

Ontario IDF CURVE LOOKUP

Active coordinate

44° 15' 15" N, 80° 3' 14" W (44.254167,-80.054167)

Retrieved: Sat, 02 Jan 2021 23:27:13 GMT

Oops! Something went wrong.

This page didn't load Google Maps correctly. See the JavaScript console for technical details.

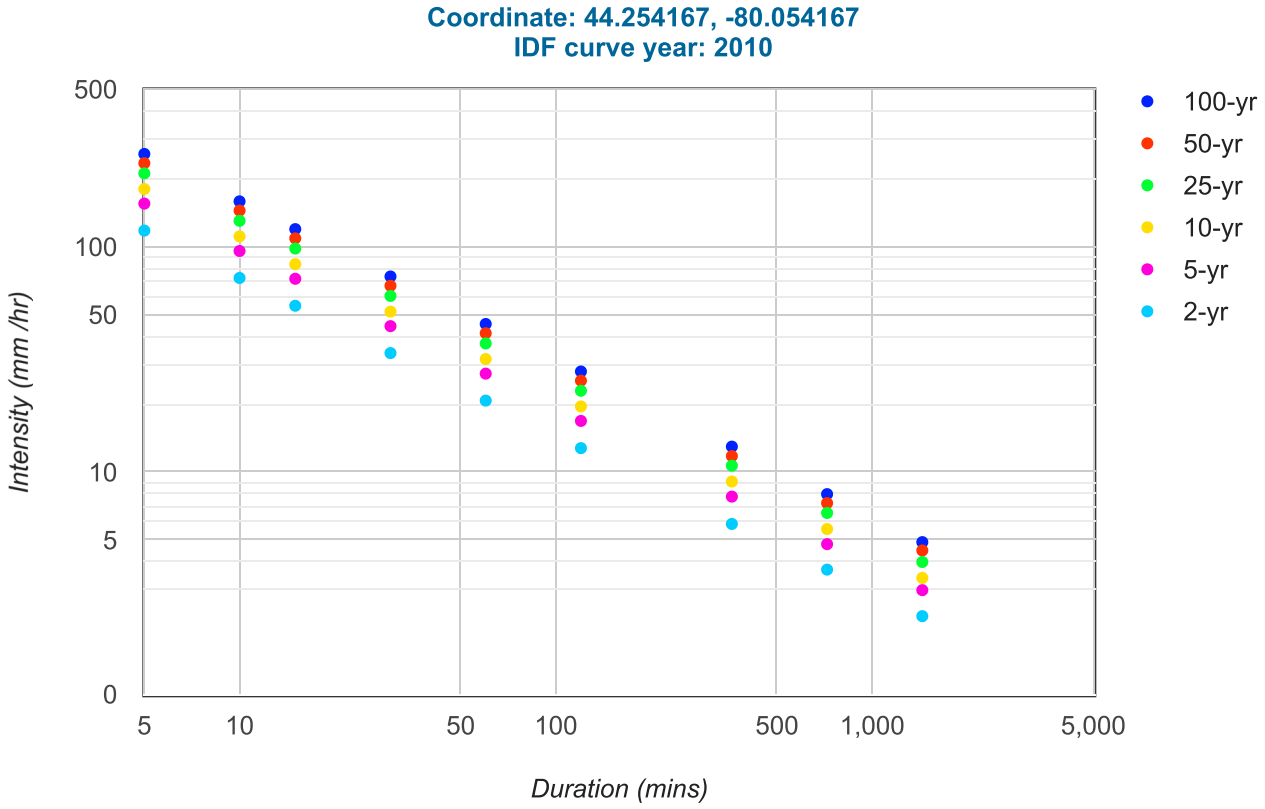
Location summary

These are the locations in the selection.

IDF Curve: 44° 15' 15" N, 80° 3' 14" W (44.254167,-80.054167)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 15' 15" N, 80° 3' 14" W (44.254167,-80.054167)

Retrieved: Sat, 02 Jan 2021 23:27:13 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	20.8	27.4	31.8	37.3	41.4	45.5
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

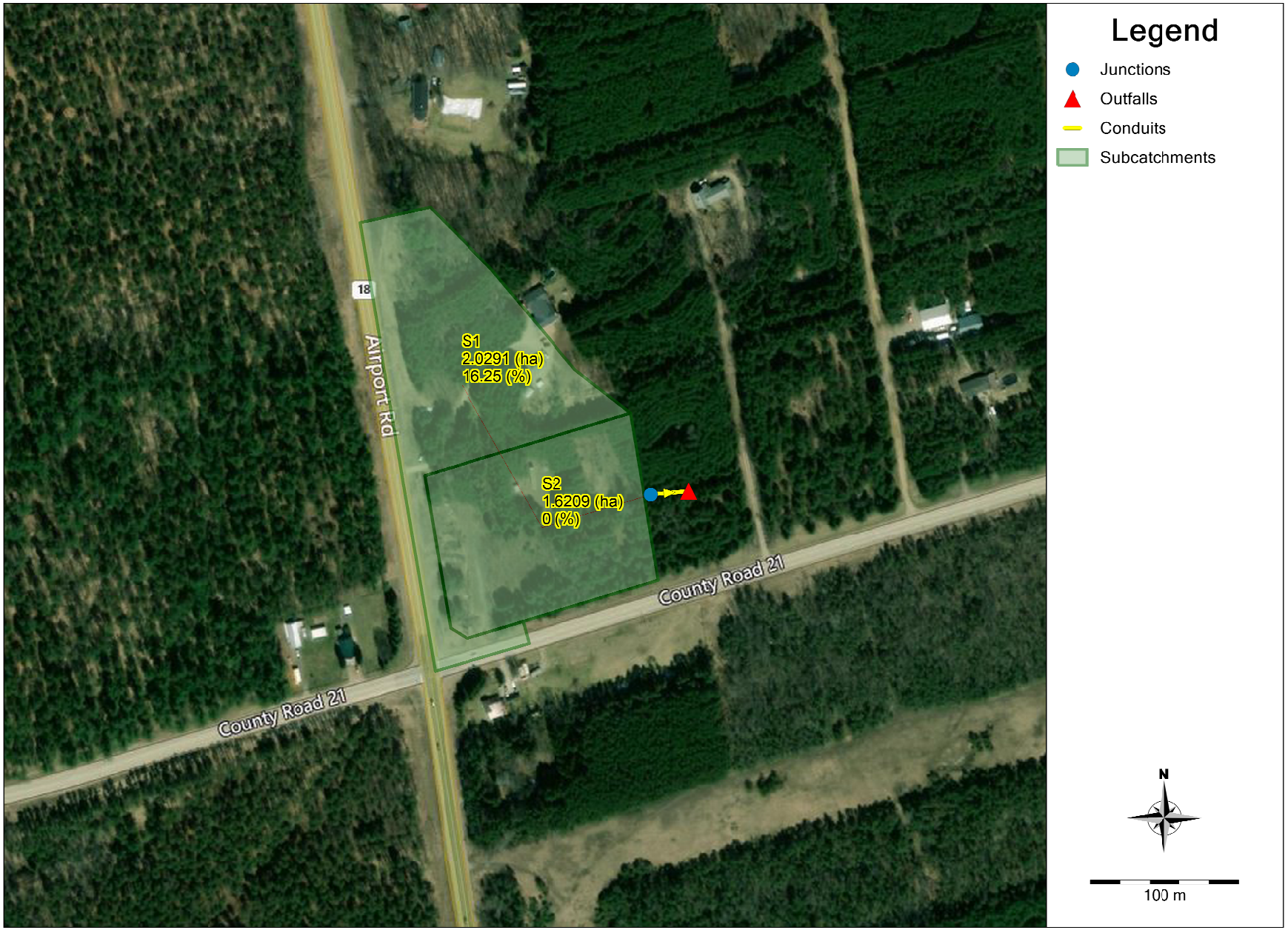
Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	118.1	72.8	54.8	33.8	20.8	12.8	5.9	3.7	2.3
5-yr	155.6	95.9	72.2	44.5	27.4	16.9	7.8	4.8	3.0
10-yr	180.6	111.3	83.8	51.6	31.8	19.6	9.1	5.6	3.4
25-yr	211.9	130.5	98.3	60.6	37.3	23.0	10.7	6.6	4.0
50-yr	235.2	144.9	109.1	67.2	41.4	25.5	11.8	7.3	4.5
100-yr	258.4	159.2	119.9	73.9	45.5	28.0	13.0	8.0	4.9

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	9.8	12.1	13.7	16.9	20.8	25.6	35.7	43.9	54.1
5-yr	13.0	16.0	18.1	22.2	27.4	33.8	47.0	57.9	71.3
10-yr	15.1	18.5	21.0	25.8	31.8	39.2	54.5	67.2	82.8
25-yr	17.7	21.8	24.6	30.3	37.3	46.0	64.0	78.8	97.1
50-yr	19.6	24.1	27.3	33.6	41.4	51.0	71.0	87.5	107.8
100-yr	21.5	26.5	30.0	36.9	45.5	56.1	78.0	96.1	118.4

Terms of Use


Legend
Junctions
Outfalls
Conduits
Subcatchments
18
Airport Rd
S1
2.0291 (ha)
16.25 (%)
S2
1.6209 (ha)
0 (%)
County Road 21
County Road 21
N
100 m

2020-090 Existing Condition - 100 year SCS Type II

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 14
Number of subcatchments ... 2
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mmChicago	25mmChicago	INTENSITY	5 min.
Chicago_4h_100yr	Chicago_4h_100yr	INTENSITY	5 min.
Chicago_4h_10yr	Chicago_4h_10yr	INTENSITY	5 min.
Chicago_4h_25yr	Chicago_4h_25yr	INTENSITY	5 min.
Chicago_4h_2yr	Chicago_4h_2yr	INTENSITY	5 min.
Chicago_4h_50yr	Chicago_4h_50yr	INTENSITY	5 min.
Chicago_4h_5yr	Chicago_4h_5yr	INTENSITY	5 min.
SCS_Type_II_24hr_100yr	SCS_Type_II_24hr_100yr	INTENSITY	15 min.
SCS_Type_II_24hr_10yr	SCS_Type_II_24hr_10yr	INTENSITY	15 min.
SCS_Type_II_24hr_25yr	SCS_Type_II_24hr_25yr	INTENSITY	15 min.
SCS_Type_II_24hr_50yr	SCS_Type_II_24hr_50yr	INTENSITY	15 min.
SCS_Type_II_24hr_5yr	SCS_Type_II_24hr_5yr	INTENSITY	15 min.
SCS_Type_II_24r_2yr	SCS_Type_II_24r_2yr	INTENSITY	15 min.
Timmins	Timmins	CUMULATIVE	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	2.03	152.08	16.25	9.1000	SCS_Type_II_24hr_100yr	S2
S2	1.62	100.06	0.00	4.1000	SCS_Type_II_24hr_100yr	J1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	264.50	0.50	0.0	
OF1	OUTFALL	264.40	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF1	CONDUIT	25.7	0.3896	0.0100

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	DUMMY	0.00	0.00	0.00	0.00	1	0.00

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES

```
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 01/02/2021 00:00:00
Ending Date ..... 01/04/2021 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:05:00
Dry Time Step ..... 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.432	118.398
Evaporation Loss	0.000	0.000
Infiltration Loss	0.423	115.970
Surface Runoff	0.009	2.438
Final Storage	0.001	0.181
Continuity Error (%)	-0.161	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.009	0.089
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.009	0.089
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step : 4.50 sec
Average Time Step : 5.00 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
5.000 - 3.155 sec : 100.00 %
3.155 - 1.991 sec : 0.00 %
1.991 - 1.256 sec : 0.00 %
1.256 - 0.792 sec : 0.00 %
0.792 - 0.500 sec : 0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S1	118.40	0.00	0.00	98.34	18.93	1.01	19.94	0.40	0.19	0.168
S2	118.40	24.96	0.00	138.04	0.00	5.49	5.49	0.09	0.10	0.038

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.00	0.00	264.50	0 00:00	0.00
OF1	OUTFALL	0.00	0.00	264.40	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.099	0.099	0 12:00	0.089	0.089	0.000
OF1	OUTFALL	0.000	0.099	0 12:00	0	0.089	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	48.00	0.000	0.500

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	1.37	0.037	0.099	0.089
System	1.37	0.037	0.099	0.089

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	DUMMY	0.099	0 12:00			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Jan 27 09:33:53 2021
Analysis ended on: Wed Jan 27 09:33:54 2021
Total elapsed time: 00:00:01

Appendix D – PCSWMM Proposed Condition Model Output

Project Name: Alpha Storage Inc.
Project No.: 2020-090
Location: Township of Mulmur
Created By: BC
Checked By: CC
Date Created: 13-Jan-21
Date Modified: 11-Feb-22

Rain Garden Outlet

Outlet Type	Elevation (m)	Head (m)	h (dm)	Cd	δ h (m)	H (m)	Outlet from Rain Garden: Orifice (m^3/s)	Orifice m^3/s	Overflow Weir m^3/s	Total m^3/s	Storm Event	Max WSEL
Infiltration	266.44	0.00								0.000		
Infiltration	266.49	0.05								0.000		
Infiltration	266.54	0.10								0.000		
Infiltration	266.59	0.15								0.000		
Infiltration	266.64	0.20								0.000		
Infiltration	266.69	0.25	0.0		0.00		0.000			0.000		
Infiltration	266.74	0.30	0.5	0.57	0.00		0.002			0.002		
Infiltration	266.79	0.35			0.05			0.020		0.020		
Infiltration	266.84	0.40			0.10			0.028		0.028		
Infiltration + Orifice	266.89	0.45			0.15			0.034		0.034		
Infiltration + Orifice	266.94	0.50			0.20			0.039		0.039	100 yr Chicago	266.94
Infiltration + Orifice	266.99	0.55			0.23			0.042		0.042		
Infiltration + Orifice	267.04	0.60			0.28			0.046		0.046		
Infiltration + Orifice	267.09	0.65			0.32			0.050		0.050	100 yr SCS	267.07
Infiltration + Orifice	267.14	0.70			0.36	0.00		0.053	0.000	0.053		
Infiltration, Orifice + BCW	267.19	0.75			0.40	0.05		0.056	0.032	0.088		
Infiltration, Orifice + BCW	267.24	0.80			0.45	0.10		0.059	0.100	0.158		
Infiltration, Orifice + BCW	267.29	0.85			0.32	0.15		0.050	0.201	0.251		
Infiltration, Orifice + BCW	267.34	0.90			0.36	0.20		0.053	0.337	0.390		
Infiltration, Orifice + BCW	267.39	0.95			0.40	0.25		0.056	0.509	0.565		

Orifice

Q = Cd((10.12(h/d)^1.975 - 2.66(h/d)^3.78))d^(5/2) - Flow below the centroid of the Orifice

Q = Peak Runoff (L/s)
Cd = coefficient of discharge = 0.555 + (1/110(h/d)) + 0.041(h/d)
h = height of water over weir (decometres)
d = diamter of cicular orifice (decimeters)

Orifice Dia. (dm)	**1.00**

Addision (1941)

Q = Cd*Ao*SQRT(2g*δh) - Flow above the centroid of the Orifice

Q = Peak Runoff (m^3/s)
Cd = Constant (0.63 orifice, 0.8 for orifice tube)
Ao = Cross sectional Area of Orifice (m^2)
g = gravity, 9.8 m/s^2
δ h = change in elevation between middle of the discharge pipe and the water surface (m)

Cd	**0.63**
Orifice Dia. (m)	**0.20**

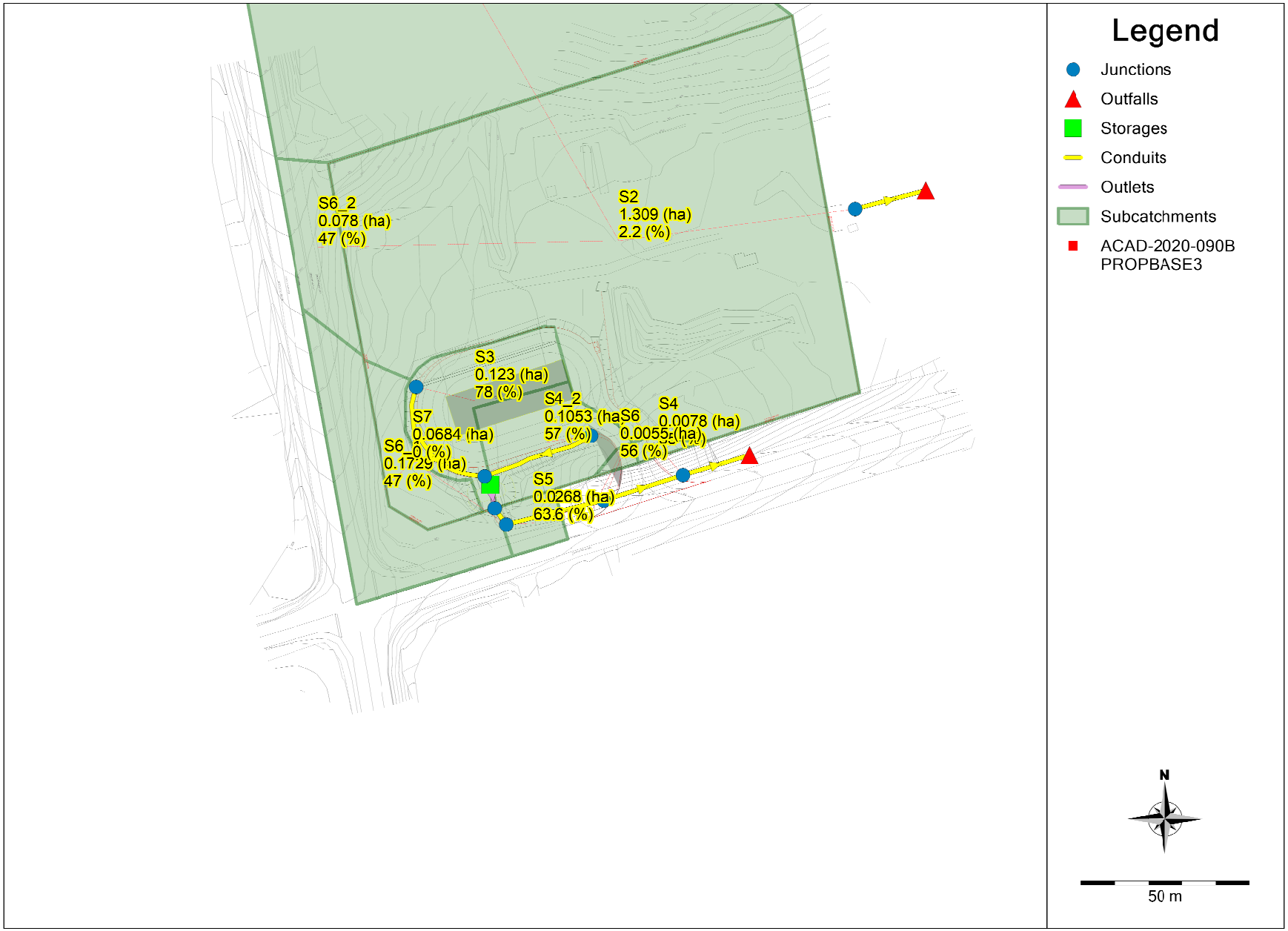
Broad Crested

Q = C x (2g)^(1/2) x (2/3x L x H^(3/2) + 8/15 (Tan A) x H^(5/2))
Q = discharge over weir in cu.m /s
C = 0.86
g = gravity, 9.8 m/s^2
H = height of flow over weir (depth of flow over weir)
L = Width of weir normal to flow
A = Angle of the weir channel banks

C	**0.86**
L	**1**
A (degrees)	**71.56**
A (radians)	1.24893668

Slope (H:V)	Angle Degrees
3:1	71.56
4:1	75.96
5:1	78.69
6:1	80.54
10:1	84.29
20:1	87.14

(Vol. III - Hydrologic Analysis and Flow Control BMP's, 2001, trapezoidal broad crested weir (emergency overflow spillway)


S6_2
0.078 (ha)
47 (%)
S2
1.309 (ha)
2.2 (%)
S3
0.123 (ha)
78 (%)
S7
0.0684 (ha)
0 (%)
S6_0
0.1725 (ha)
47 (%)
S4_2
0.1053 (ha)
57 (%)
S6
0.0055 (ha)
56 (%)
S4
0.0078 (ha)
S5
0.0268 (ha)
63.6 (%)
Legend
Junctions
Outfalls
Storages
Conduits
Outlets
Subcatchments
ACAD-2020-090B PROPBASE3
N
50 m

2020-090 Post Development - 24 hour 100-year SCS Type II (Includes incoming external flows)

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 10
Number of nodes ........... 11
Number of links ........... 9
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
------------------------------------------------------------------------
25mmChicago          25mmChicago                  INTENSITY    5 min.
Chicago_4h_100yr     Chicago_4h_100yr             INTENSITY    5 min.
Chicago_4h_10yr      Chicago_4h_10yr              INTENSITY    5 min.
Chicago_4h_25yr      Chicago_4h_25yr              INTENSITY    5 min.
Chicago_4h_2yr       Chicago_4h_2yr               INTENSITY    5 min.
Chicago_4h_50yr      Chicago_4h_50yr              INTENSITY    5 min.
Chicago_4h_5yr       Chicago_4h_5yr               INTENSITY    5 min.
SCS_Type_II_24hr_100yr SCS_Type_II_24hr_100yr       INTENSITY   15 min.
SCS_Type_II_24hr_10yr SCS_Type_II_24hr_10yr        INTENSITY   15 min.
SCS_Type_II_24hr_25yr SCS_Type_II_24hr_25yr        INTENSITY   15 min.
SCS_Type_II_24hr_50yr SCS_Type_II_24hr_50yr        INTENSITY   15 min.
SCS_Type_II_24hr_5yr SCS_Type_II_24hr_5yr          INTENSITY   15 min.
SCS_Type_II_24r_2yr  SCS_Type_II_24r_2yr           INTENSITY   15 min.
Timmins              Timmins                       CUMULATIVE  60 min.


********************
Subcatchment Summary
********************
```

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	1.75	131.27	16.25	9.1000	SCS_Type_II_24hr_100yr	S2
S2	1.31	113.83	2.20	3.5000	SCS_Type_II_24hr_100yr	J1
S3	0.12	30.52	78.00	1.0000	SCS_Type_II_24hr_100yr	J2
S4	0.01	12.38	35.00	25.0000	SCS_Type_II_24hr_100yr	J5
S4_2	0.11	30.09	57.00	2.0000	SCS_Type_II_24hr_100yr	J8
S5	0.03	19.14	63.60	2.0000	SCS_Type_II_24hr_100yr	J4
S6	0.01	8.73	56.00	25.0000	SCS_Type_II_24hr_100yr	J3
S6_1	0.17	89.12	47.00	10.0000	SCS_Type_II_24hr_100yr	S7
S6_2	0.08	40.21	47.00	10.0000	SCS_Type_II_24hr_100yr	S2
S7	0.07	13.08	0.00	1.0000	SCS_Type_II_24hr_100yr	J4

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
S2	DrySwale	1	46.80	1.80	0.36	100.00	5.40

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	264.50	0.50	0.0	
J2	JUNCTION	266.98	0.30	0.0	
J3	JUNCTION	266.50	1.23	0.0	
J4	JUNCTION	266.66	0.89	0.0	
J5	JUNCTION	266.32	1.30	0.0	
J6	JUNCTION	266.69	0.85	0.0	
J8	JUNCTION	266.98	0.40	0.0	
J9	JUNCTION	266.64	0.74	0.0	
OF1	OUTFALL	264.40	0.00	0.0	
OF2	OUTFALL	266.25	0.00	0.0	
J7	STORAGE	266.44	0.94	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF1	CONDUIT	25.7	0.3896	0.0100
C2	J9	J7	CONDUIT	3.1	1.6204	0.0270
C2_1	J6	J4	CONDUIT	5.8	0.5137	0.0270
C2_3	J2	J9	CONDUIT	39.5	0.8603	0.0270
C2_5	J4	J3	CONDUIT	29.8	0.5370	0.0270
C3_2	J8	J9	CONDUIT	34.0	1.0015	0.0270
C4	J5	OF2	CONDUIT	20.7	0.3384	0.0100
C5	J3	J5	CONDUIT	24.6	0.7327	0.0130
C2_4	J7	J6	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	DUMMY	0.00	0.00	0.00	0.00	1	0.00
C2	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	0.91
C2_1	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	0.51
C2_3	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	0.66
C2_5	TRIANGULAR	0.30	0.27	0.14	1.80	1	0.20
C3_2	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	0.71
C4	DUMMY	0.00	0.00	0.00	0.00	1	0.00
C5	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****

Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 01/02/2021 00:00:00
Ending Date 01/04/2021 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

**********	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
**********	---	---
Total Precipitation	0.432	118.398
Evaporation Loss	0.000	0.000
Infiltration Loss	0.412	112.983
Surface Runoff	0.025	6.920
Final Storage	0.001	0.334
Continuity Error (%)	-1.553	

**********	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
**********	---	---

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.025	0.252
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.021	0.214
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.004	0.038
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Highest Continuity Errors
****
Node J6 (-1.13%)

****
Time-Step Critical Elements
****
Link C2 (6.79%)

****
Highest Flow Instability Indexes
****
Link C2_4 (3)
Link C2_1 (2)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.66 sec
Average Time Step	:	4.83 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	2.01

```
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      5.000 -  3.155 sec      :    95.18 %
      3.155 -  1.991 sec      :     1.86 %
      1.991 -  1.256 sec      :     2.95 %
      1.256 -  0.792 sec      :     0.01 %
      0.792 -  0.500 sec      :     0.00 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------------
-------------
                           Total      Total      Total      Total     Imperv       Perv      Total       Total
Peak  Runoff
                          Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff
Runoff   Coeff
  Subcatchment               mm         mm         mm         mm         mm         mm         mm    10^6 ltr
CMS
  ---------------------------------------------------------------------------------------------------------
-------------
  S1                      118.40       0.00       0.00      98.34      18.93       1.01      19.94        0.35
0.16   0.168
  S2                      118.40      30.12       0.00     143.75       3.22       9.71       9.19        0.12
0.11   0.062
  S3                      118.40       0.00       0.00      79.19      91.16      38.63      38.63        0.05
0.04   0.326
  S4                      118.40       0.00       0.00      98.85      40.91      20.14      20.14        0.00
0.00   0.170
  S4_2                    118.40       0.00       0.00      92.19      66.48      26.12      26.12        0.03
0.03   0.221
  S5                      118.40       0.00       0.00      41.53      74.08       2.01      76.09        0.02
0.01   0.643
  S6                      118.40       0.00       0.00      90.14      65.20      29.49      29.49        0.00
0.00   0.249
  S6_1                    118.40       0.00       0.00      60.38      54.72       3.06      57.78        0.10
0.05   0.488
  S6_2                    118.40       0.00       0.00      60.38      54.72       3.06      57.78        0.05
0.02   0.488
  S7                      118.40     146.06       0.00     216.34       0.00      49.05      49.05        0.03
0.03   0.185
```

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
S2	DrySwale	265.11	0.00	75.34	1366.12	0.00	0.00	0.00	-443.73

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.00	0.00	264.50	0 00:00	0.00
J2	JUNCTION	0.00	0.07	267.05	0 12:00	0.07
J3	JUNCTION	0.01	0.17	266.67	0 12:05	0.17
J4	JUNCTION	0.02	0.21	266.87	0 12:05	0.21
J5	JUNCTION	0.00	0.00	266.32	0 12:05	0.00
J6	JUNCTION	0.01	0.18	266.87	0 12:05	0.18
J8	JUNCTION	0.00	0.05	267.03	0 12:00	0.05
J9	JUNCTION	0.01	0.27	266.91	0 12:07	0.27
OF1	OUTFALL	0.00	0.00	264.40	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	266.25	0 00:00	0.00
J7	STORAGE	0.03	0.47	266.91	0 12:07	0.47

****

Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.114	0.114	0	12:05	0.12	0.12	0.000
J2	JUNCTION	0.045	0.045	0	12:00	0.0475	0.0475	-0.862
J3	JUNCTION	0.002	0.066	0	12:05	0.00162	0.0924	0.029
J4	JUNCTION	0.033	0.069	0	12:01	0.0539	0.102	-0.028
J5	JUNCTION	0.002	0.067	0	12:05	0.00157	0.0939	-0.002
J6	JUNCTION	0.000	0.036	0	12:07	0	0.0529	-1.120
J8	JUNCTION	0.033	0.033	0	12:00	0.0275	0.0275	-0.954
J9	JUNCTION	0.000	0.077	0	11:57	0	0.0706	1.008
OF1	OUTFALL	0.000	0.114	0	12:05	0	0.12	0.000
OF2	OUTFALL	0.000	0.067	0	12:05	0	0.0939	0.000
J7	STORAGE	0.000	0.096	0	11:57	0	0.0743	0.813

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	48.00	0.000	0.500

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J7	0.002	2	0	35	0.026	36	0 12:07	0.040

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	3.96	0.050	0.114	0.120
OF2	47.67	0.003	0.067	0.094
System	25.82	0.053	0.181	0.214

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	DUMMY	0.114	0 12:05			
C2	CONDUIT	0.076	0 11:57	0.68	0.08	0.95
C2_1	CONDUIT	0.036	0 12:07	0.13	0.07	0.64
C2_3	CONDUIT	0.043	0 12:00	0.48	0.06	0.54

C2_5	CONDUIT	0.065	0	12:05	0.61	0.33	0.63
C3_2	CONDUIT	0.031	0	12:00	0.35	0.04	0.52
C4	DUMMY	0.067	0	12:05			
C5	CONDUIT	0.066	0	12:05	3.02	0.27	0.20
C2_4	DUMMY	0.036	0	12:07			

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class ----------								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.88	0.00	0.00	0.10	0.00	0.00	0.02	0.02	0.00
C2_1	1.00	0.03	0.86	0.00	0.11	0.00	0.00	0.00	0.71	0.00
C2_3	1.00	0.88	0.04	0.00	0.08	0.00	0.00	0.00	0.75	0.00
C2_5	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C3_2	1.00	0.88	0.06	0.00	0.06	0.00	0.00	0.00	0.76	0.00
C5	1.00	0.03	0.00	0.00	0.48	0.49	0.00	0.00	0.05	0.00

****
Conduit Surcharge Summary
****

	--------- Hours Full --------			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C2	0.01	0.01	0.13	0.01	0.01

Analysis begun on: Mon Feb 14 14:46:14 2022
Analysis ended on: Mon Feb 14 14:46:14 2022
Total elapsed time: < 1 sec

Appendix E – Fire Flow Calculations and Tank Information

CAPES ENGINEERING

Domestic & Fire Protection Water Supply/Storage

Project: **Alpha Storage Inc.**
W Part Lot 26 Con. 7E

Prepared by:	C. Capes
Checked by:	C. Capes
Project No:	2020-090A
Date:	February 11, 2022

Fire Flow Calculations

Office of the Fire Marshal, OFM Guideline, Fire Protection Water Supply Guideline for Part 3 in the Ontarion Building Code (Oct 1999)
Subsection 3.2.2 of the Ontario Building Code, 2012

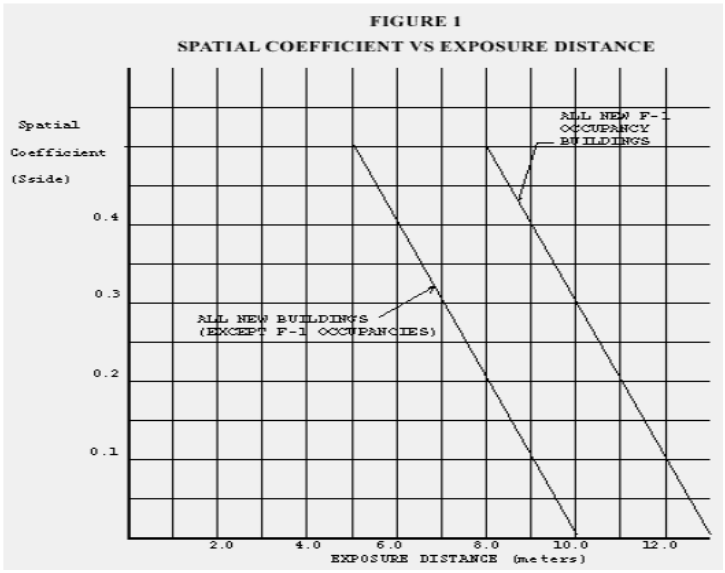
$Q=KVS_{Total}$ where

Q = Minimum supply of water in Litres (L)
K = water supply coefficient from Table 1
V = total building volume in cubic meters
S_{Tot} = total of the spacial coefficient values from the property line exposures on all sides as obtained from the formula:

$$S_{Tot} = 1.0 + [(S_{Side1}) + (S_{Side2}) + (S_{Side3}) + \ldots etc.]$$

where S_{Side} values are obtained from Figure 1, as modified by Sections 6.39(e) and 6.3(f) of the OBC Guideline
S_{Tot} need not exceed 2.0

FIGURE 1
SPATIAL COEFFICIENT VS EXPOSURE DISTANCE



1 Building Classification:

Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2. of the OBC, including loadbearing walls, columns and arches.

Water Supply Coefficient - K — Table 1 of OBC A.3.2.5.7

K = 17 — Type F2, OBC Table 3.1.2.1

2 Building Volumes

Bldg.	Area (m^2)	Height (m)	Volume (m^3)	
Bldg. 1	446	2.60	1159	Phase 1
Total			**1159**	← Total Building Volume

3 Exposure Distances $S_{Tot} = 1.0 + [(S_{Side1}) + (S_{Side2}) + (S_{Side3}) + \ldots etc.]$

Bldg.	North (m)	S_{Side} (N)	East (m)	S_{Side} (E)	South (m)	S_{Side} (S)	West (m)	S_{Side} (W)	S_{Tot}	
Bldg. 1	>10 m	0.00	>10m	0	>10 m	0	>10 m	0	**0**	← Max S_{Tot}

S_{Tot} = 1.00 — Max. Value = 2.0

4 **Minimum Fire Water Supply**

$Q=KVS_{Total}$ = **19708.78** Litres

5 **Fire Water Supply Flow Rate** = **1800** L/min — Table 2 Required Minimum Water Supply Flow Rate (L/min), provided in the OBC A.3.2.5.7

= **30.00** L/s

6 **Min. Tank Size @ 30 min. of Flow** = **54,000** L