

JUNE 17, 2022
Project No. 2020-090A

SELF STORAGE BUILDING
COUNTY ROAD 21 & 18
STORMWATER DESIGN REPORT

TOWNSHIP OF MULMUR



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

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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 construct a 445.9 m² (4,800 ft²) 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. Two 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.

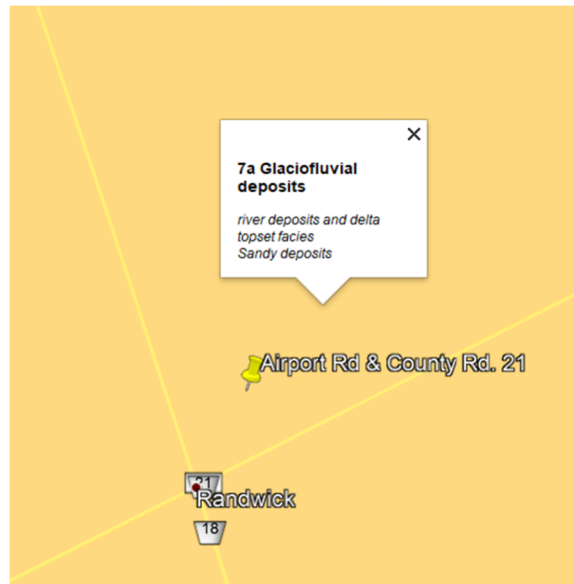
There is a steep 3-4 m high bank located at the north west corner of the lot drops into the site and the entire frontage on County Road 18 is significantly lower than the road centreline. The southeast portion of the site along the County Road 21 frontage is slightly lower than County Road 21 centreline. 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

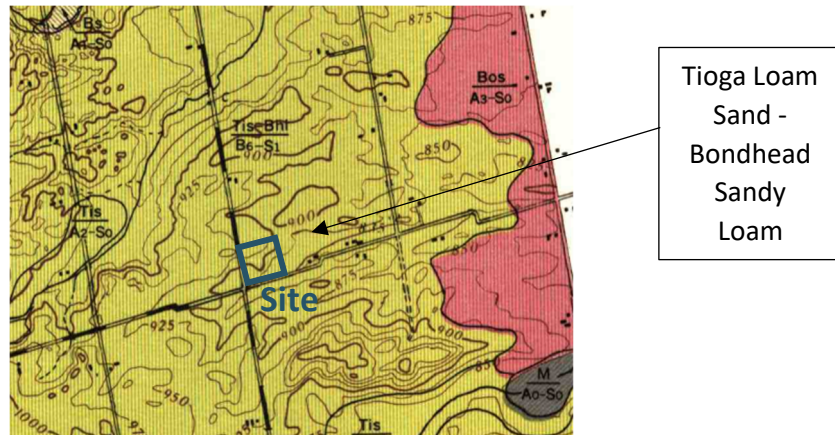
There is currently no geotechnical investigation complete for this Site. The Ontario Geological Survey (OGS) has identified the area as glaciofluvial deposits with river deposits and delta topset facies with sandy deposits. Please see the excerpt from the OGS mapping below.

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 depression 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 onto 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).

There is no requirement to provide either quality or quantity controls for the external runoff entering the site only to convey the flows the outlet which in this case occurs via overland flow route. There are no formal channels or watercourses on the site to the outlet at the eastern property line.

3.0 Proposed Site Plan

The proposed site plan includes one self storage building with slab on grade construction that is 445.91 m² (4,800 ft²) in size. The storage building will be accessed via a minimum 7.3 m wide gravel driveway around the building to provide at least a 6.0 m clear emergency access. Route.

The site will not be staffed or include an office space. The buildings do not require electrical connections or water/sanitary connections but to portable toilets will be provided for the site.

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.

3.1 Proposed Stormwater Management Plan

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 development results in an increase of impervious area from 0% to 10.5% 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. The runoff from the impervious area is proposed to be allowed to sheet flow onto the existing vegetated ground and allowed to infiltrate into the sandy soils. Runoff will be collected into a shallow grassed swale along the perimeter of the impervious area and directed north east via a dissipation pad and allowed to travel an additional 70 m to discharge (if any) to the existing condition discharge point along the eastern property line.

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 or otherwise will continue as per the existing condition with flow travelling east overland.

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 a portion of the County Rd. 18 ROW.

We have created two post development condition models. The first includes the external drainage area which does not require treatment or attenuation, while the second removed the external drainage area to demonstrate the runoff from only the development parcel.

The proposed condition models are divided into 3 subcatchments as follows:

Model 1 (Including External Drainage Area)

A1 – External Drainage Area – 1.91 ha. This subcatchment includes the external area to the north of the site as well as the west (County Rd. 18 ROW). The catchment has been reduced in size from the existing condition by the implementation of the regraded ditch on County Rd. 21 which will prevent runoff from entering the site. The impervious percentage of the site has been reduced to 15% and the other PCSWMM parameters have not changed from the existing condition.

A2 – Development Site – 1.61 ha. This subcatchment includes the entirety of the site and will be 10.5% impervious, all located in the SW part of the site. The existing condition PCSWMM parameters other than the impervious coverage has not been changed for this model. We have assumed that the runoff from the impervious areas flows directly onto the pervious areas.

A3 – Development Site Draining to County Rd. 21 – 0.01 ha – This is a 105 sq. m area at the south edge of the property where it is not possible to grade to discharge onto the development property due to the constraints to meet the County entrance configuration. The runoff from this small area will drain to the County RD. ditch.

Model 2 (Excluding External Drainage Area) – This model only contains A2 and A3 from Model 1 and no other alterations have been made.

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	Ex. Peak Flow onto Site (External Area) (m ³ /s)	Ex. Peak Flow Offsite Including Incoming External Flows Total (m ³ /s)	Post Dev. Peak Flow Onto Site (External Area) (m ³ /s)	Post Dev. Peak Flow Offsite Total (Model 1) (m ³ /s)	Post Dev. Peak Flow Offsite Excluding External Flow (Model 2) (m ³ /s)
24 Hr SCS Type II					
2-year	0.06	0.00	0.05	0.00	0.00
5-year	0.08	0.00	0.07	0.00	0.00
10-year	0.09	0.00	0.08	0.00	0.00
25-year	0.11	0.01	0.09	0.03	0.00
50-year	0.13	0.05	0.12	0.08	0.02
100-year	0.19	0.10	0.17	0.11	0.06
4 Hr Chicago					
2-year	0.11	0.00	0.09	0.00	0.00
5-year	0.14	0.00	0.12	0.00	0.00
10-year	0.16	0.00	0.14	0.00	0.00
25-year	0.19	0.00	0.17	0.00	0.00
50-year	0.22	0.00	0.19	0.00	0.00
100-year	0.24	0.00	0.21	0.01	0.00
25 mm	0.06	0.00	0.06	0.00	0.00
Timmins	0.04	0.00	0.04	0.00	0.00

The results in Model 1 indicate that as was the case in the existing condition model the majority of the external flows are infiltrated by the sandy soils of the development site prior to discharge towards the east. In Model 2 we have removed the external catchments which are not required to be controlled or treated and demonstrated that 100% of the runoff from the development site are infiltrated for all storm events, and therefore meets the criteria for quantity control, detention and infiltration of the 5 mm storm as per the NVCA.

There is no requirement to control the Regional event but the Timmins storm peak flow also decreases to zero and the regional storm is safely conveyed within the site as per the existing via overland sheet flow. The 25mm quality design storm also has no runoff from the site.

We should also note that the peak flow from A3 to the County Rd Ditch is 0.00 m³/s in all storms and therefore meets the existing condition peak flows.

Please refer to **Appendix D** for the PCSWMM output for the 100-year SCS Type II Event for both Model 1 and Model 2.

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 use of the enhanced grass swale and sandy soils will reduce the peak outflow from the 25 mm design storm to 0.00 m³/s, for the proposed development of the site. As the peak outflow is reduced to zero, full treatment is achieved for TSS removal for the quality design storm (25 mm 4-Hour Chicago).

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

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%.

3.2 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 would normally require a 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 does not require fire suppression water storage be provided on the site.

The proposed access route provided around the proposed building is 7.3 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 the disturbed area of the development site as shown in **Drawing C5**. These controls should remain in place and be maintained until the vegetation is re-established on the lot.

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 (enhanced swales and overland flow) and the design ensures an enhanced level of treatment and a reduction in peak flows to below 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:



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



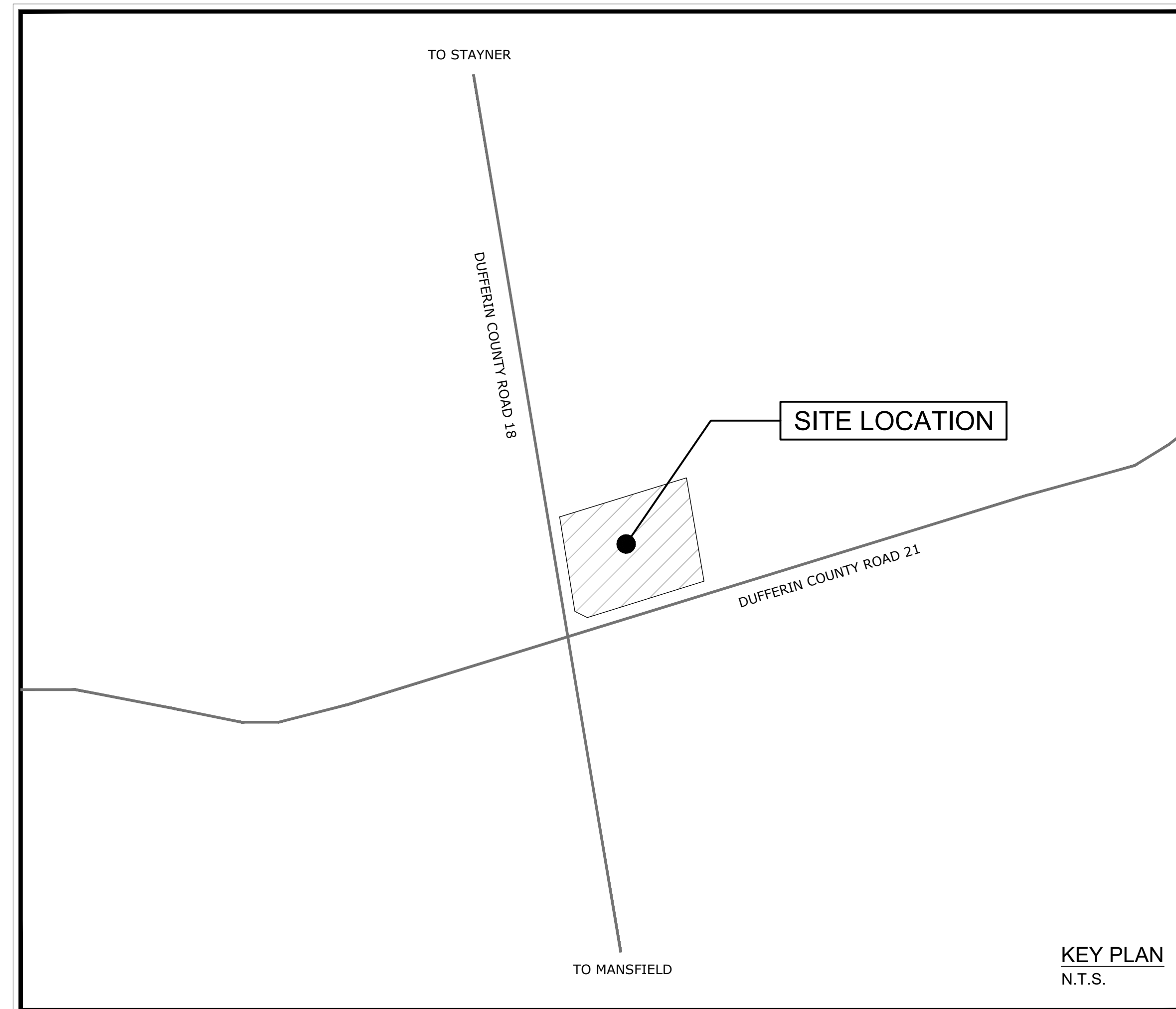
Drawings

ALPHA STORAGE INC.

W PART LOT 26, CONCESSION 7E MINI STORAGE

DRAWING INDEX

C1	EXISTING CONDITION PLAN
C2	GENERAL SITE PLAN
C3	GRADING AND SERVICING PLAN
C4	POST DEVELOPMENT DRAINAGE PLAN
C5	EROSION & SEDIMENT CONTROL PLAN
C6	STANDARD DETAILS

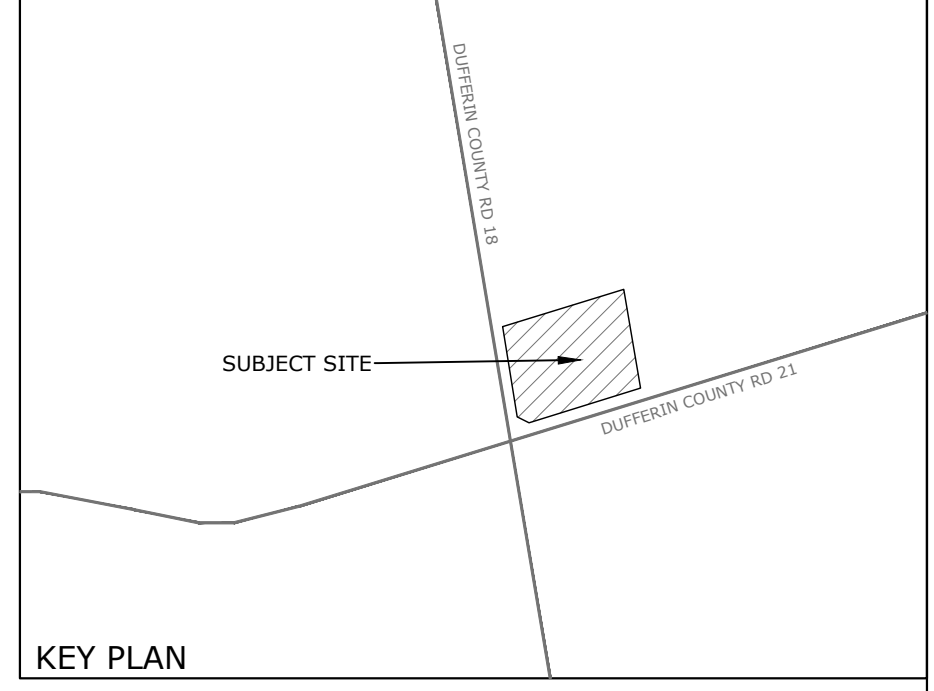


ALPHA STORAGE INC.

Project No. 2020-090A

REISSUED FOR APPROVALS - 22/06/17

CAPE
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ENGINEERING

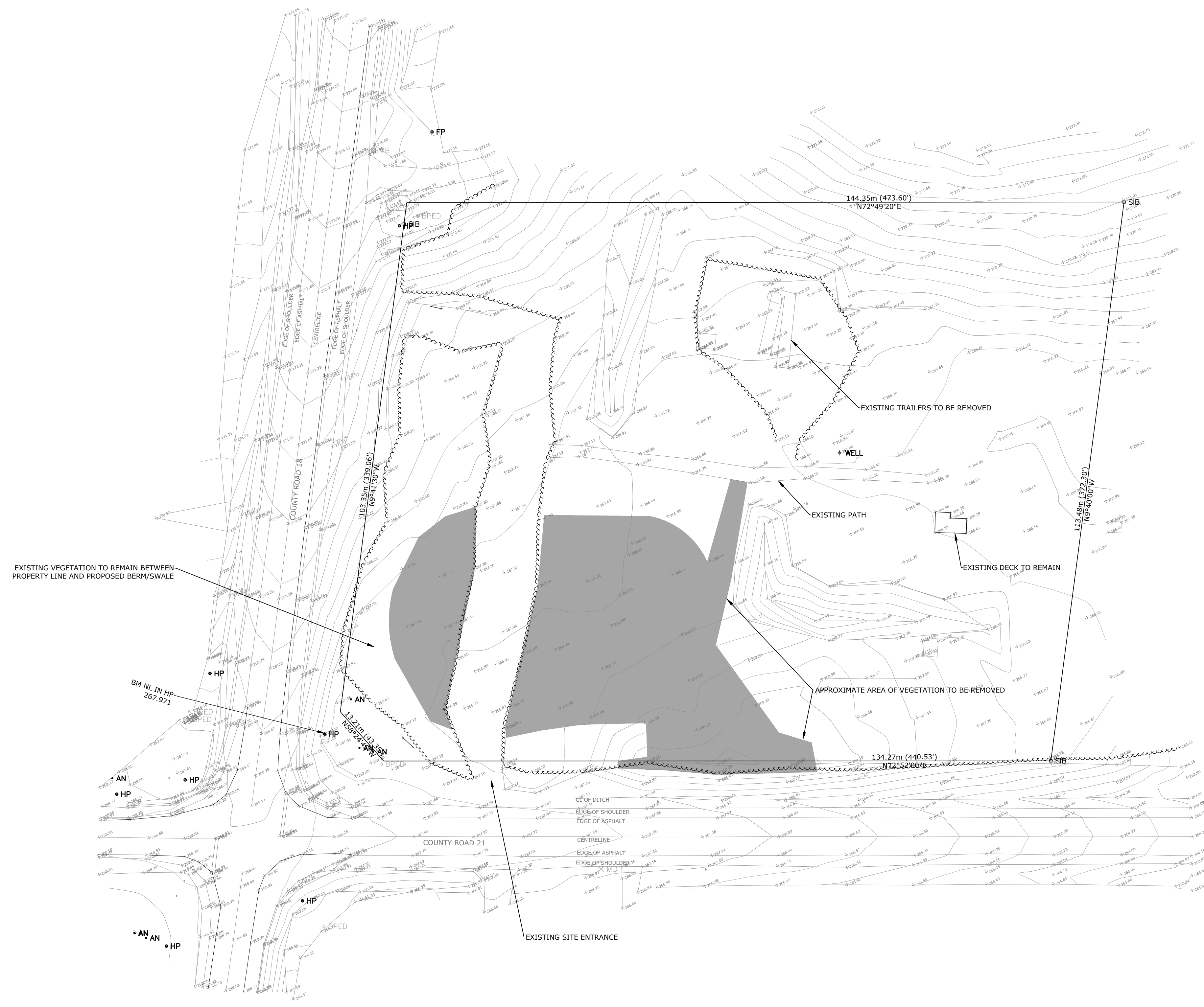


LEGEND

• 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

- 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.
- The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
- 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	REISSUED FOR APPROVALS	22/02/15
5	REISSUED FOR APPROVALS	22/06/17

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

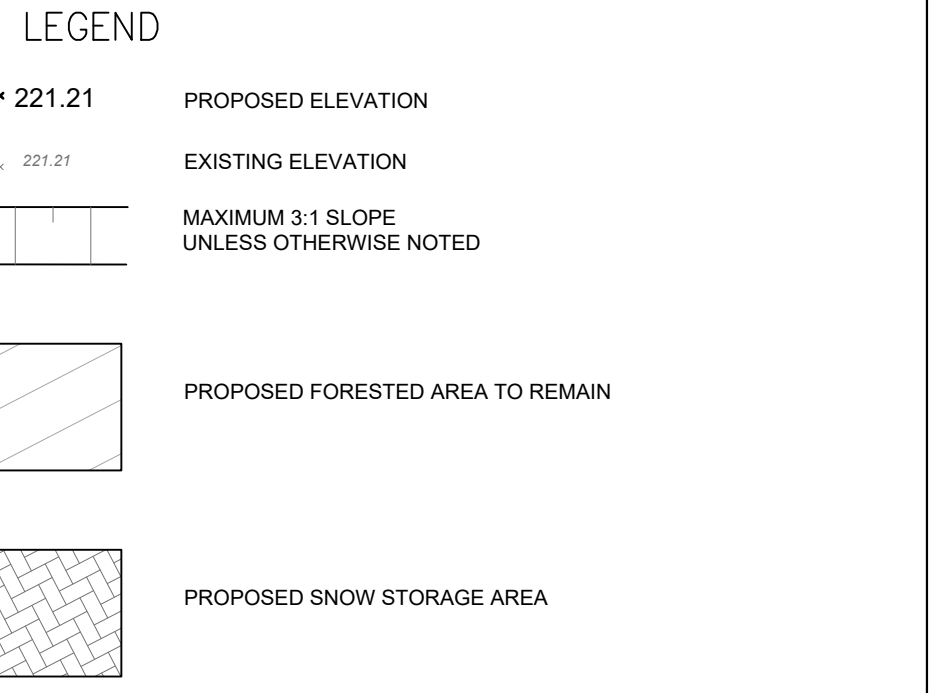
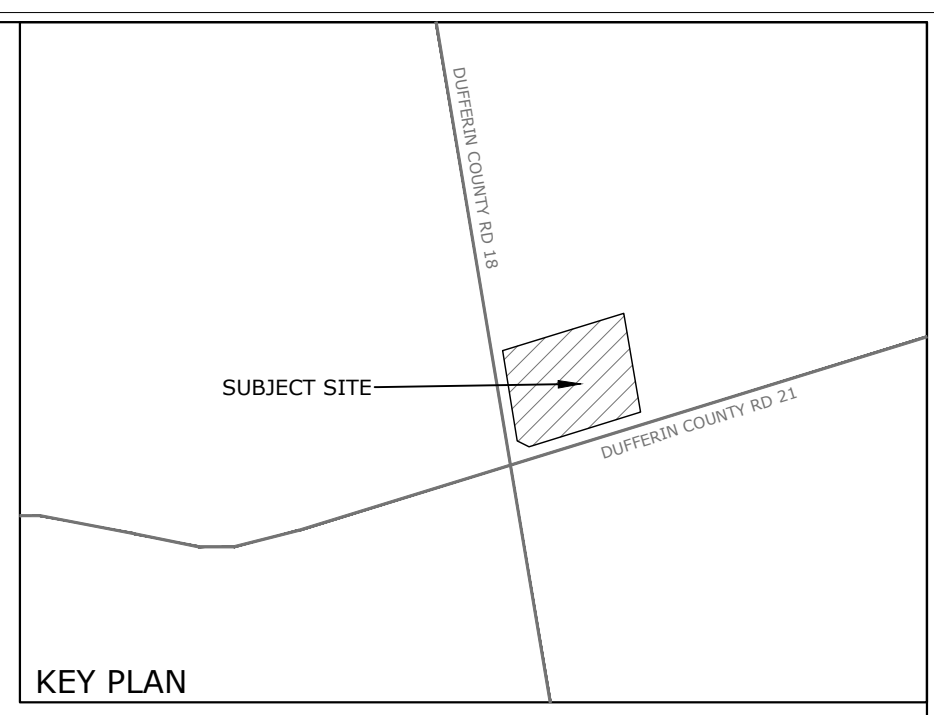


Client
ALPHA STORAGE INC.

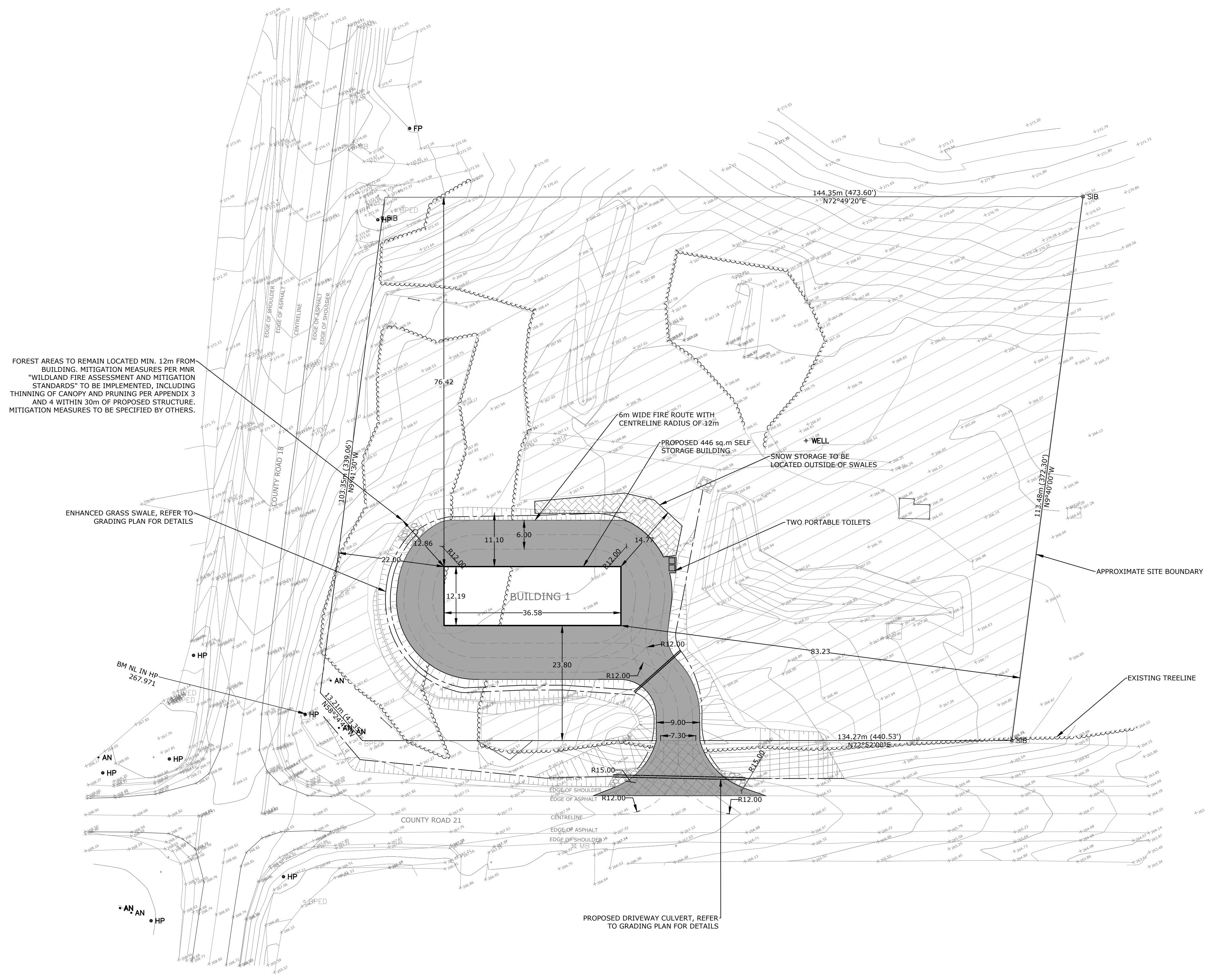
CAPES ENGINEERING

355310 BLUE MOUNTAINS - EUPHRASIA TOWNSHIP
CLARKSBURG, ON N0M 1J0
WWW.CAPSENGINEERING.COM

W PART LOT 26, CONCESSION 7E MINI STORAGE EXISTING CONDITION PLAN		Date 21/01/04	Drawing No. C1
Designed B. COLLINS	Checked C. CAPES	Rev No. 2	
Project No. 2020-090A	Scale 1:500	0 5.0 10.0 20.0 30.0m	



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



FOREST AREAS TO REMAIN LOCATED MIN. 12m FROM BUILDING. MITIGATION MEASURES PER MNR "WILDLAND FIRE ASSESSMENT AND MITIGATION STANDARDS" TO BE IMPLEMENTED, INCLUDING THINNING OF CANOPY AND PRUNING PER APPENDIX 3 AND 4 WITHIN 30m OF PROPOSED STRUCTURE. MITIGATION MEASURES TO BE SPECIFIED BY OTHERS.

ENHANCED GRASS SWALE, REFER TO GRADING PLAN FOR DETAILS

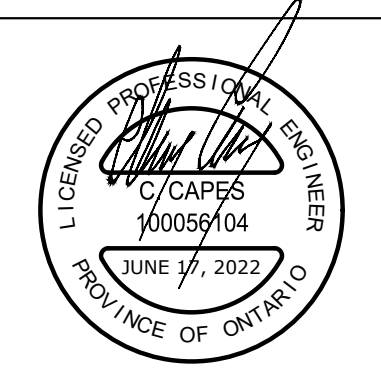
PROPOSED DRIVEWAY CULVERT, REFER TO GRADING PLAN FOR DETAILS

**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
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5	REISSUED FOR APPROVALS	22/06/17

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



Client
ALPHA STORAGE INC.

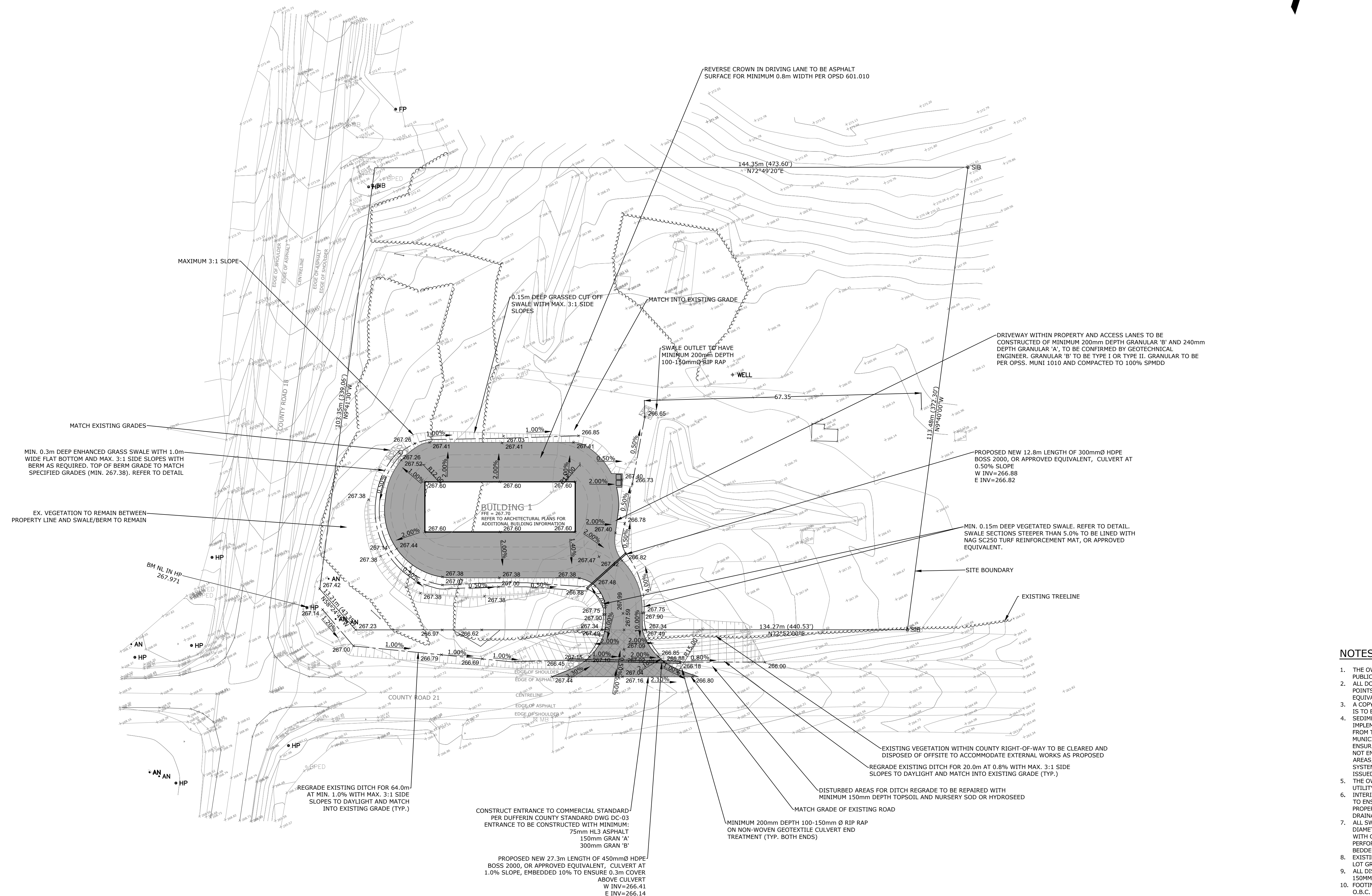
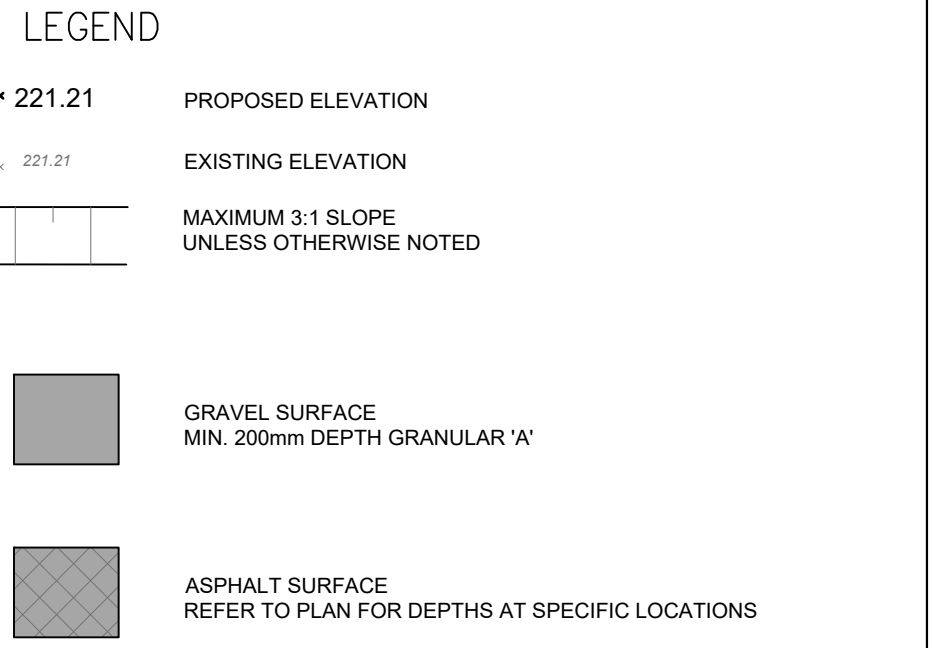
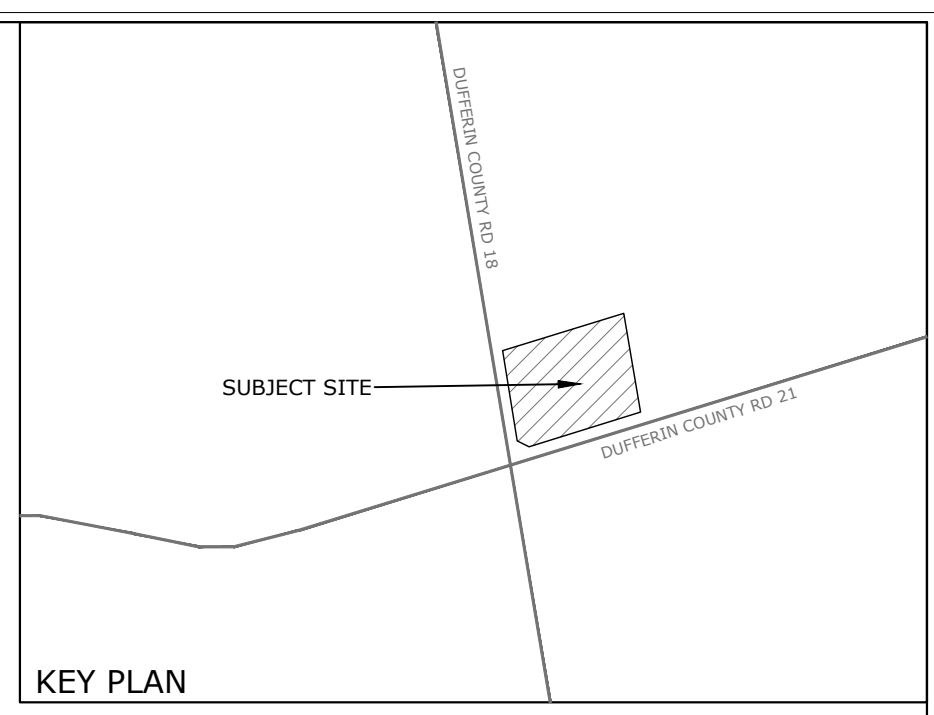
**W PART LOT 26, CONCESSION 7E
MINI STORAGE
GENERAL SITE PLAN**

Designed: B. COLLINS
Checked: C. CAPES
Date: 21/01/04
Project No.: 2020-090A
Rev No.: 2
Scale: 1:500

CAPESE
ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNSHIP
CLARKSBURG, ON. N0M 1J0
WWW.CAPESEENGINEERING.COM

Design No.	Checked	Date	Drawing No.
2020-090A	C. CAPES	21/01/04	C2

File: C:\Users\capes\OneDrive\Projects\2020-090A\090A_07_RP7R-1725_P2&3_Pt26_GenSitePlan.dwg Date: 2022-06-17 10:47 AM



NOTES

- THE OWNER/BUILDER/APPLICANT MUST OBTAIN A ROAD OCCUPANCY PERMIT FROM PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION WORKS.
- ALL DOWNSPOUTS, SUMP PUMP AND OTHER DRAINAGE DISCHARGE POINTS SHALL DISCHARGE ON TO A SPLASH PAD OR APPROVED EQUIVALENT.
- A COPY OF THE "ACCEPTED FOR CONSTRUCTION" LOT GRADING AND DRAINAGE PLAN IS TO BE ON SITE FOR REFERENCE AT ALL TIMES DURING CONSTRUCTION.
- 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.
- THE OWNER/BUILDER/APPLICANT IS RESPONSIBLE FOR OBTAINING UTILITY AND SERVICING LOCATES PRIOR TO ANY WORKS.
- 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.
- 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.
- EXISTING VEGETATION ON SITE TO BE REMOVED AND DISPOSED OF OFF SITE BEFORE LOT GRADING WORK AS SPECIFIED.
- ALL DISTURBED AREAS ARE TO BE SODDED OVER A MINIMUM OF 150mm OF TOPSOIL OR APPROVED ALTERNATIVE GROUND COVER.
- FOOTINGS WITHIN GROUNDWATER SHALL BE A FACTOR OF STANDARD WIDTH AS PER O.B.C. SECTION 9.15.3.4.
- 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**

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

PROPOSED NEW 27.3m LENGTH OF 450mmØ HDPE BOSS 2000, OR APPROVED EQUIVALENT, CULVERT AT 1.0% SLOPE, EMBEDDED 10% TO ENSURE 0.3m COVER ABOVE CULVERT W INV=266.41 E INV=266.14



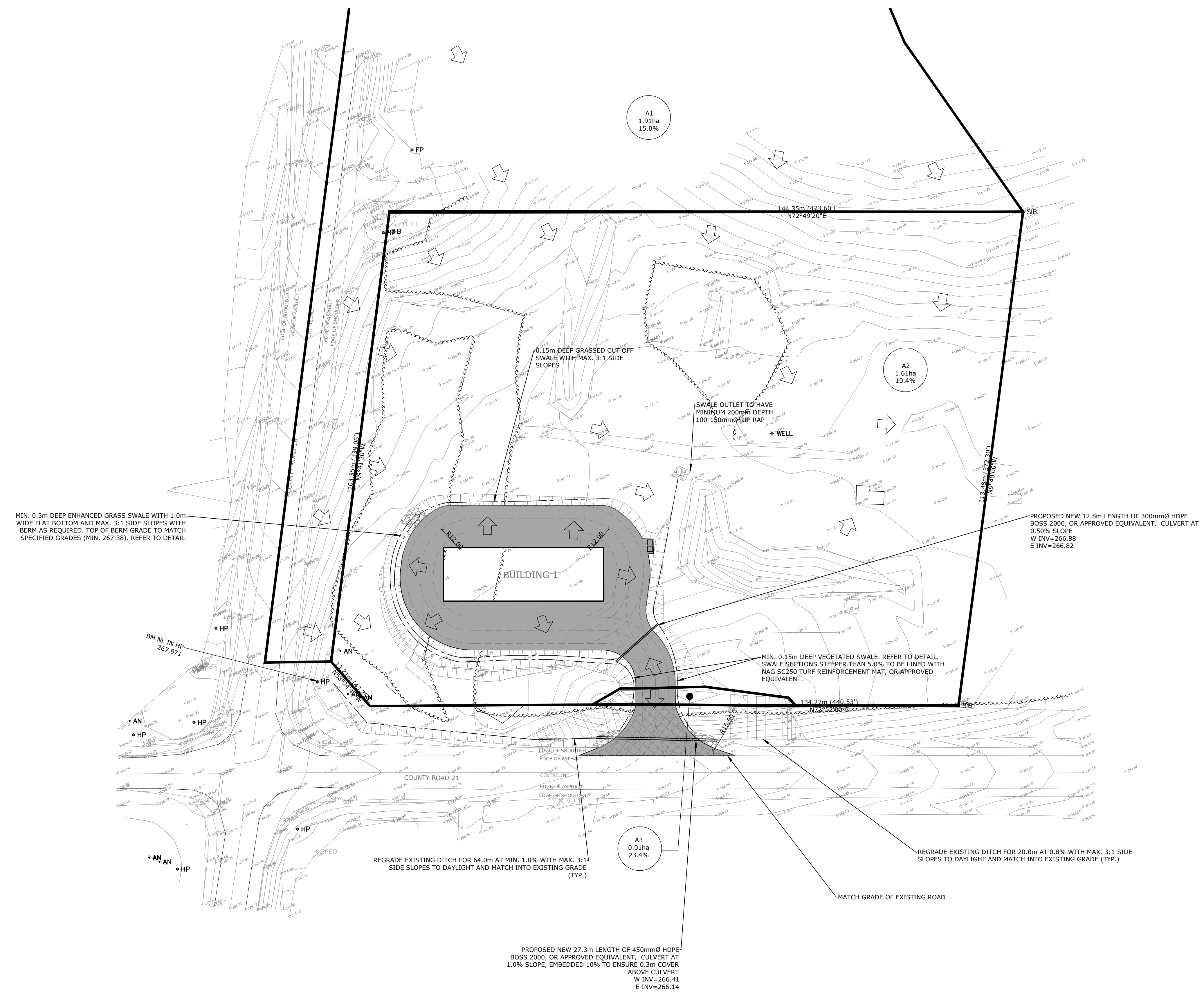
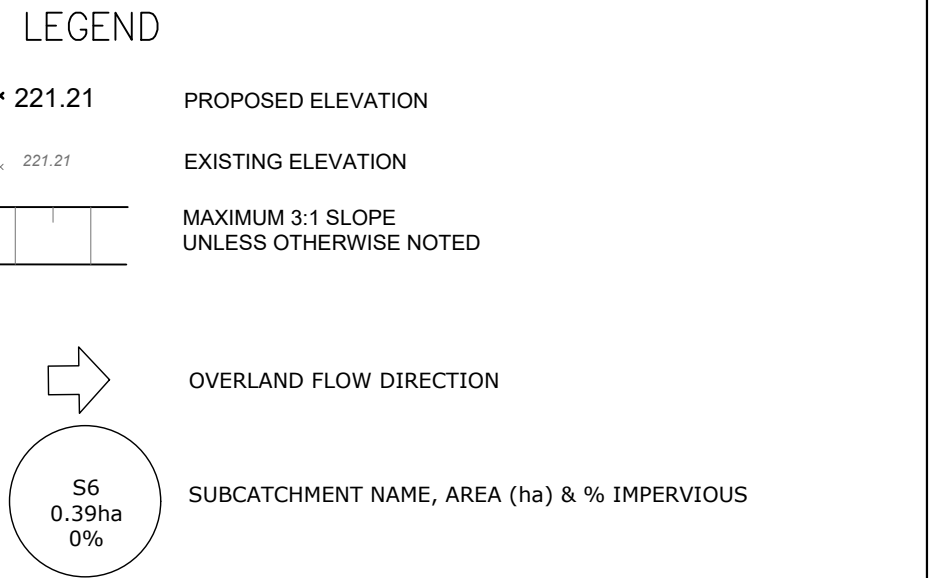
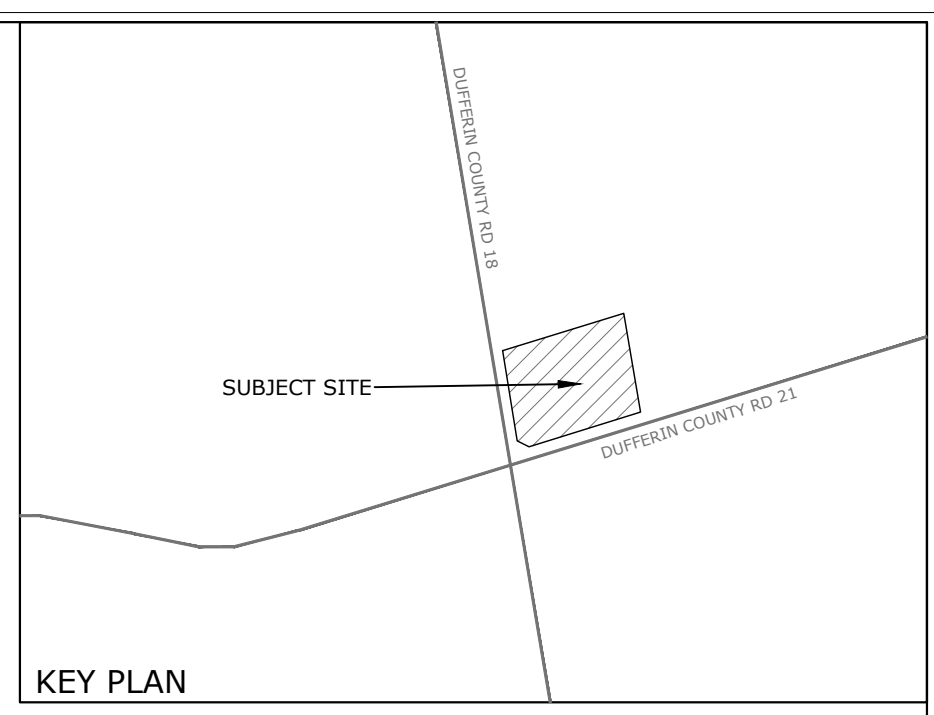
Client
ALPHA STORAGE INC.

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



35510 BLUE MOUNTAINS - EUPHRASIA TOWNSHIP
CLARKSBURG, ON N0N 1J0
WWW.CAPESENGINEERING.COM

Designed B. COLLINS	Checked C. CAPES	Date 21/01/04	Drawing No. C3
Project No. 2020-090A	Rev No. 2	Scale 1:500	



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

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No	Revision	Date

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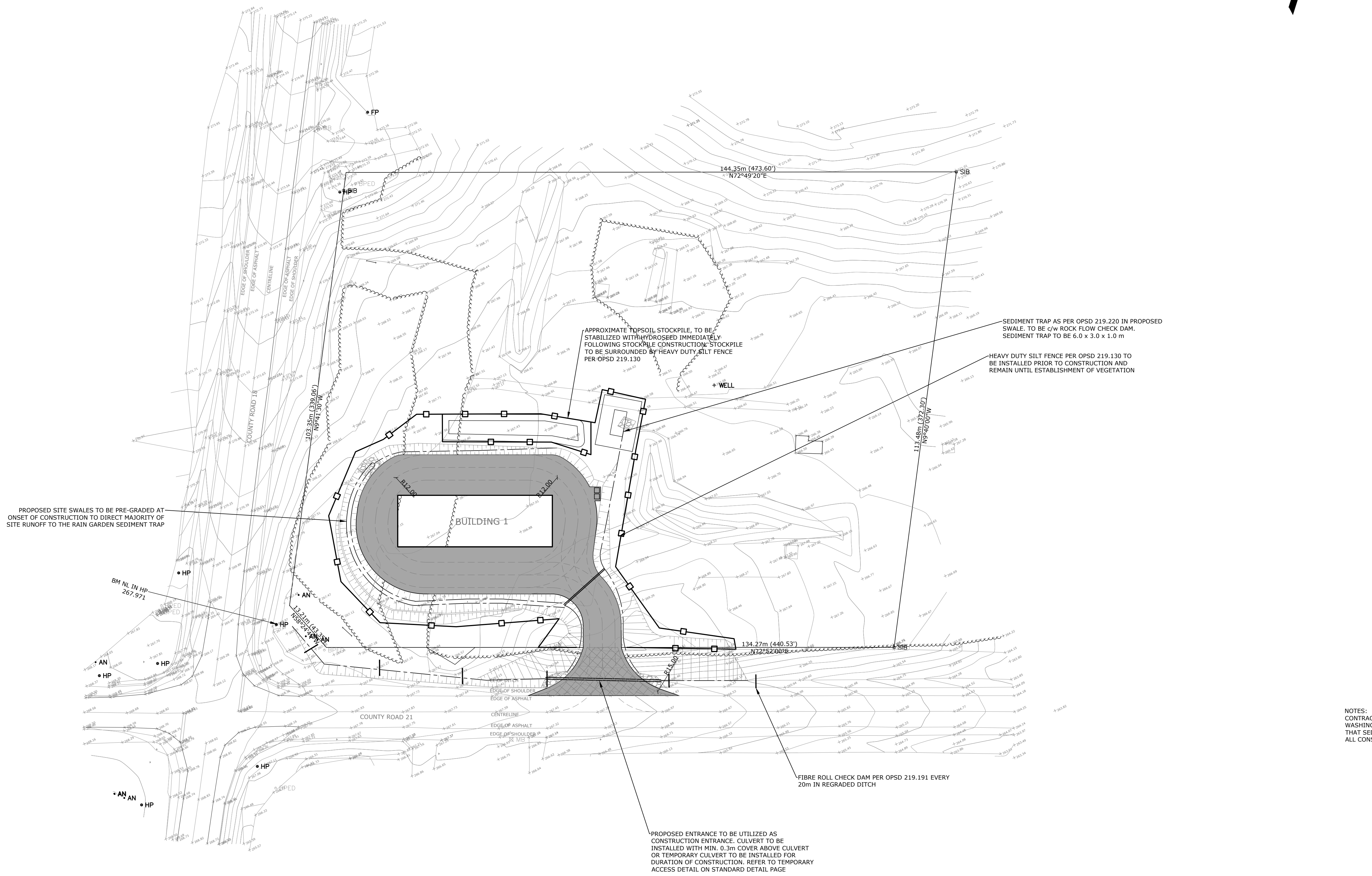
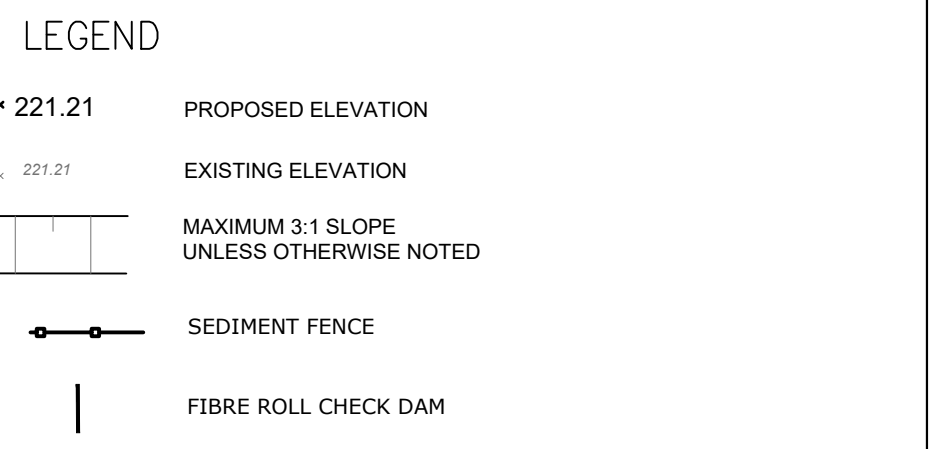
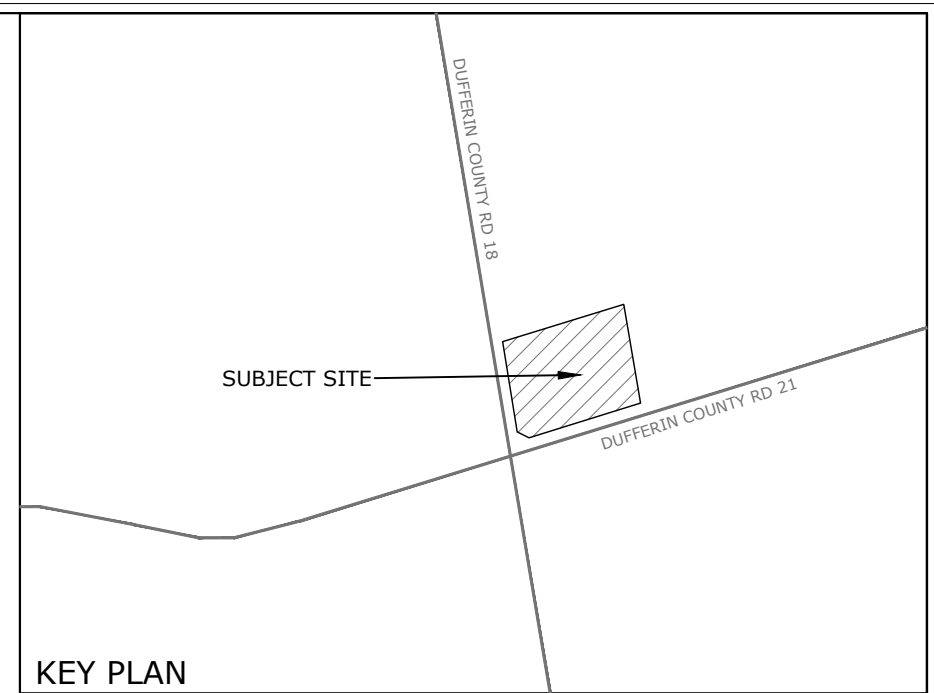
Client
ALPHA STORAGE INC.



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

CAPESE ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNSHIP
CLARKSBURG, ON. N0M 1J0
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Designed B. COLLINS	Checked C. CAPES	Date 21/01/04	Drawing No. C4
Project No. 2020-090A	Rev No. 2	Scale 1:500	



NOTES:
CONTRACTOR RESPONSIBLE FOR STREET SWEEPING AND/OR WASHING OF DUFFERIN COUNTY ROADS 18 AND 21 IN THE EVENT THAT SEDIMENT TRACKING OCCURS AND DUST CONTROL DUE TO ALL CONSTRUCTION ACTIVITIES.

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

Notes

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- The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
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BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97

PROPOSED ENTRANCE TO BE UTILIZED AS CONSTRUCTION ENTRANCE. CULVERT TO BE INSTALLED WITH MIN. 0.3m COVER ABOVE CULVERT OR TEMPORARY CULVERT TO BE INSTALLED FOR DURATION OF CONSTRUCTION. REFER TO TEMPORARY ACCESS DETAIL ON STANDARD DETAIL PAGE



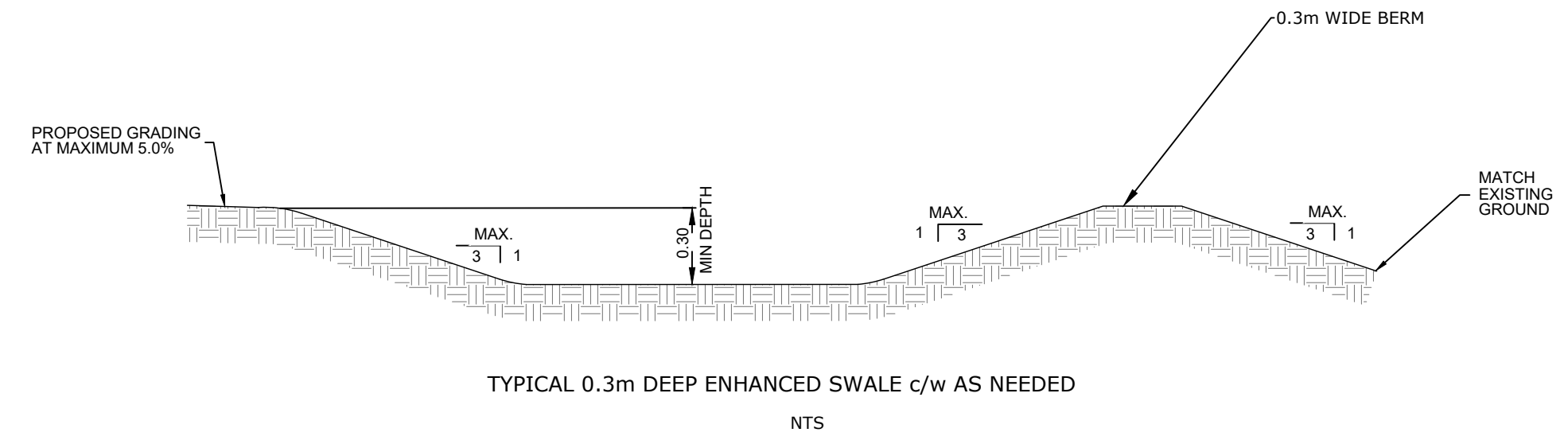
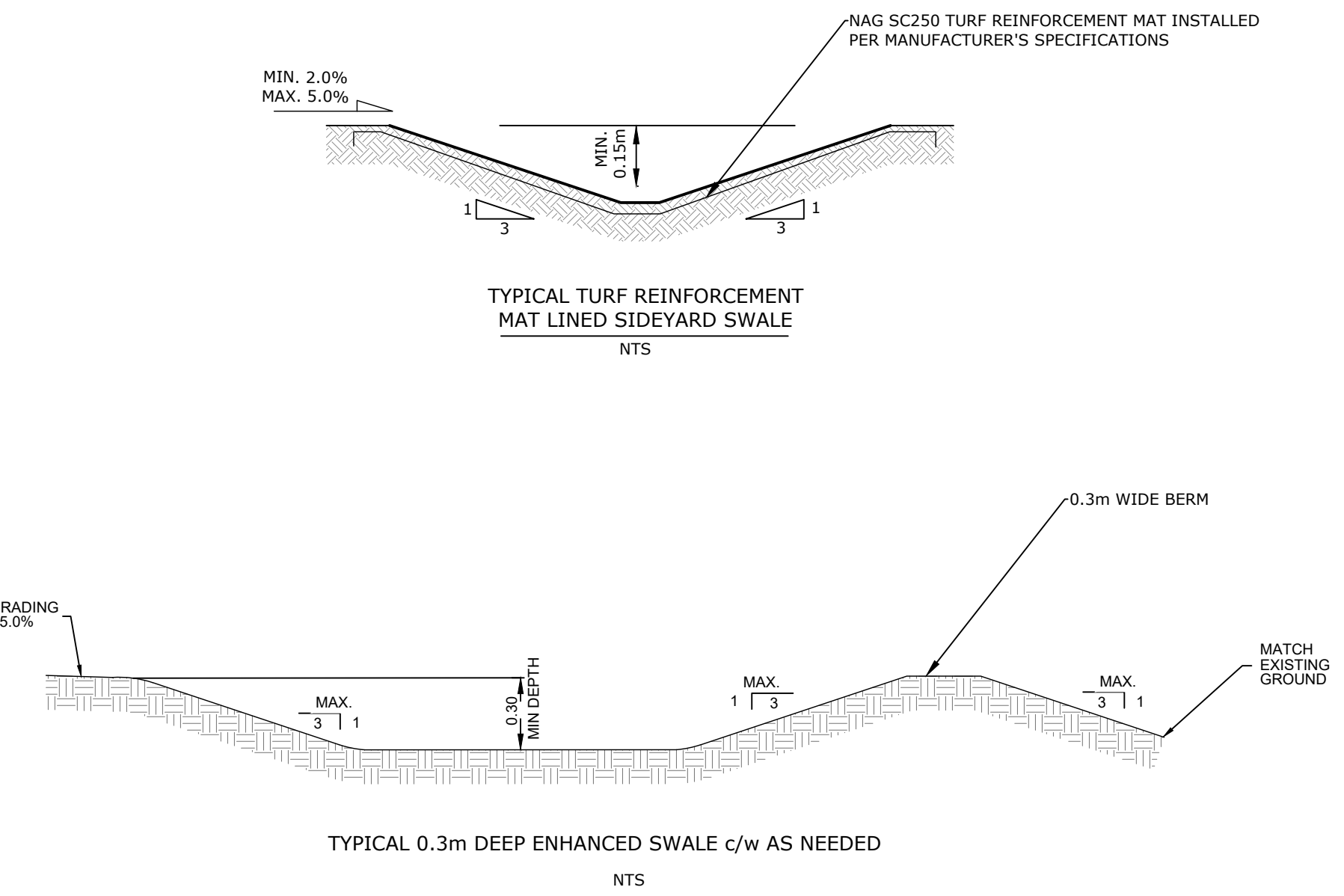
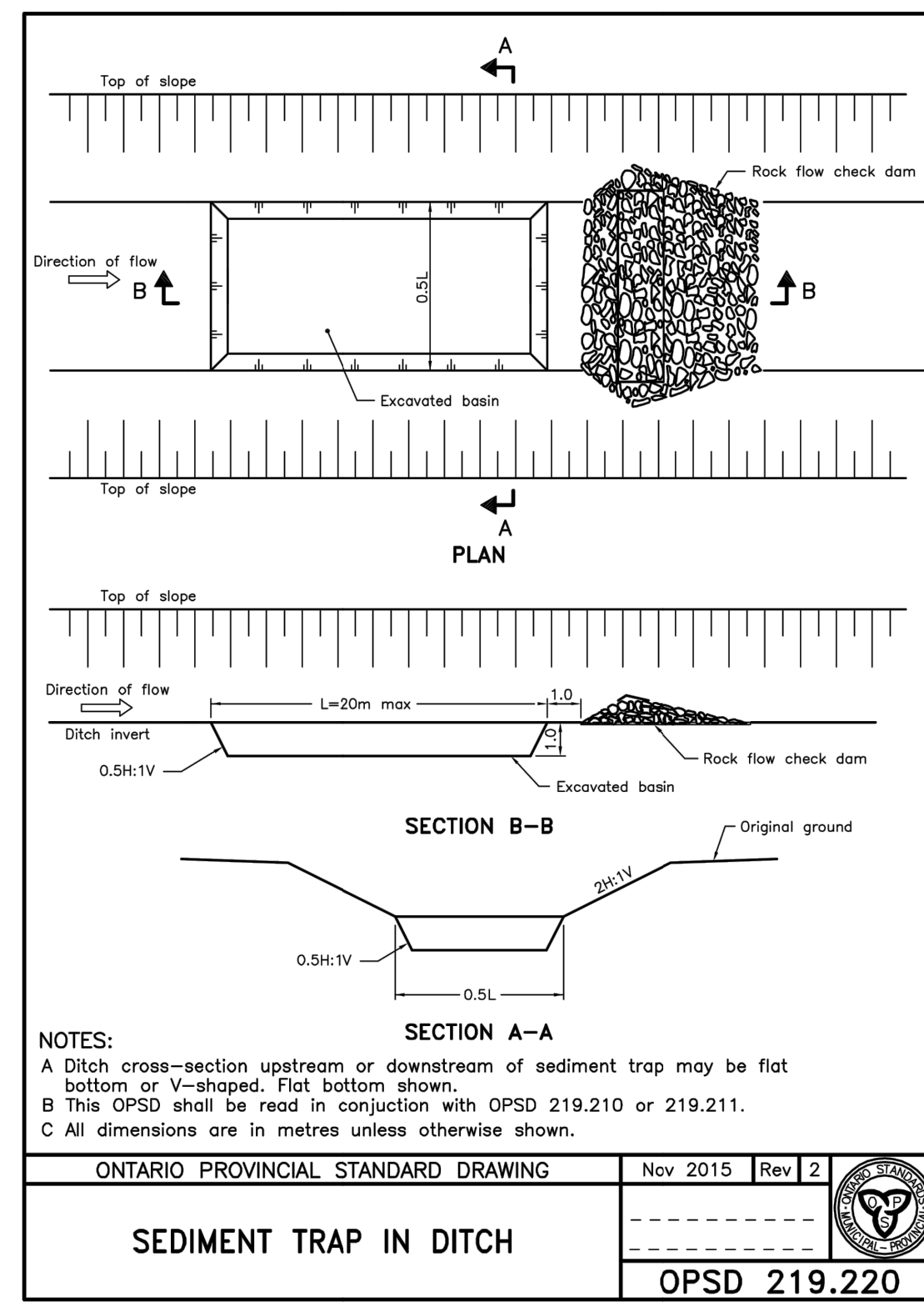
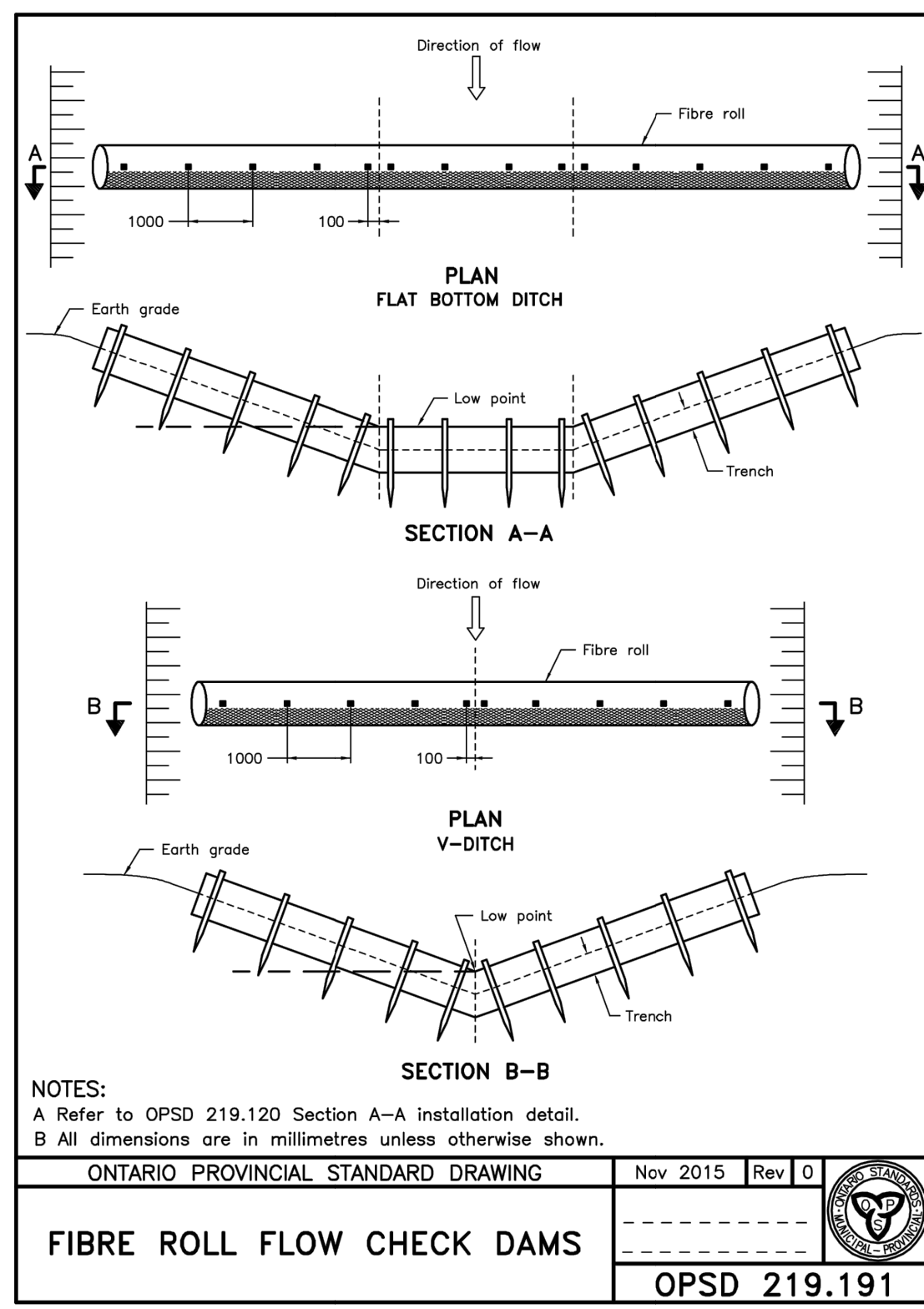
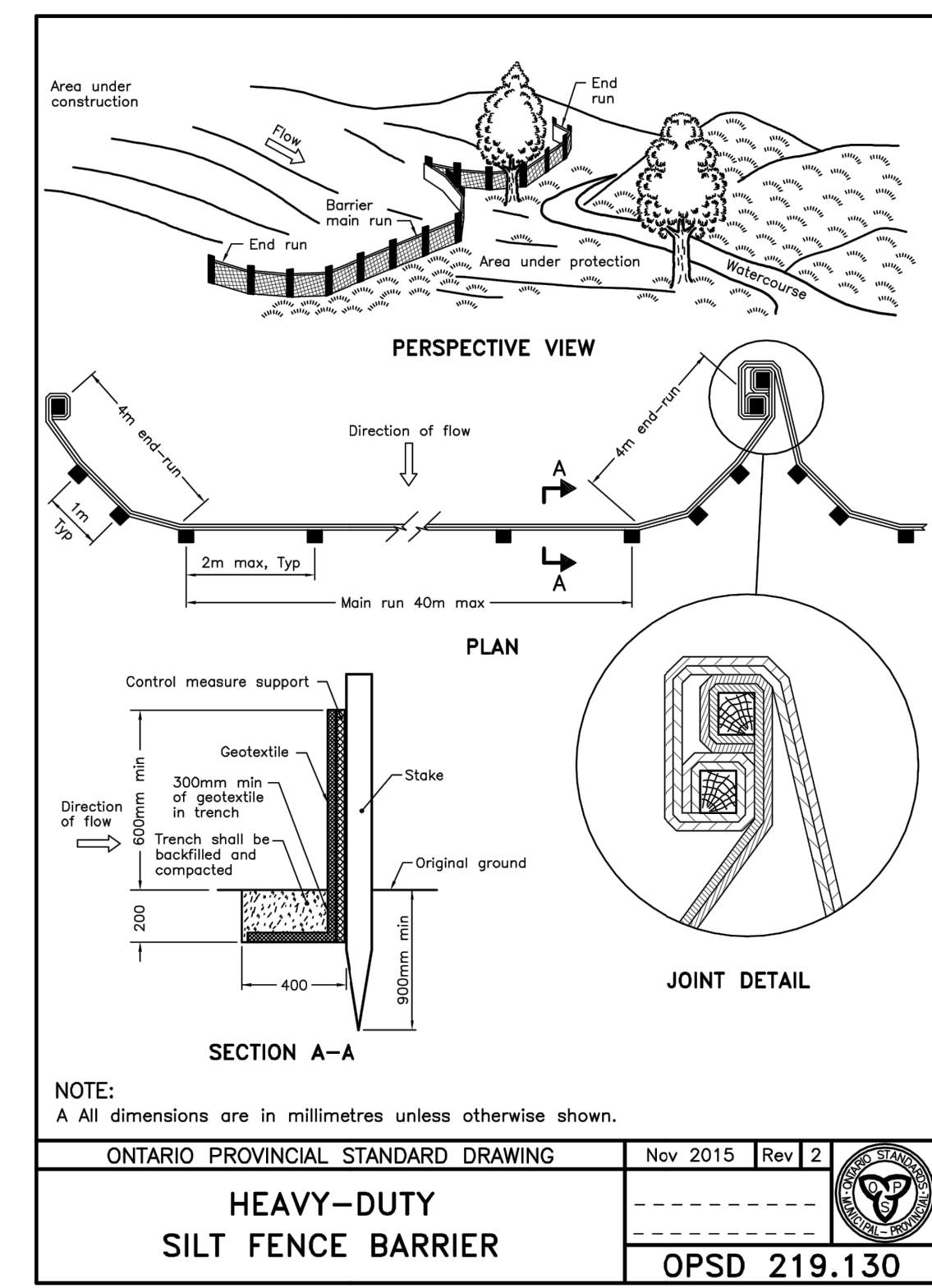
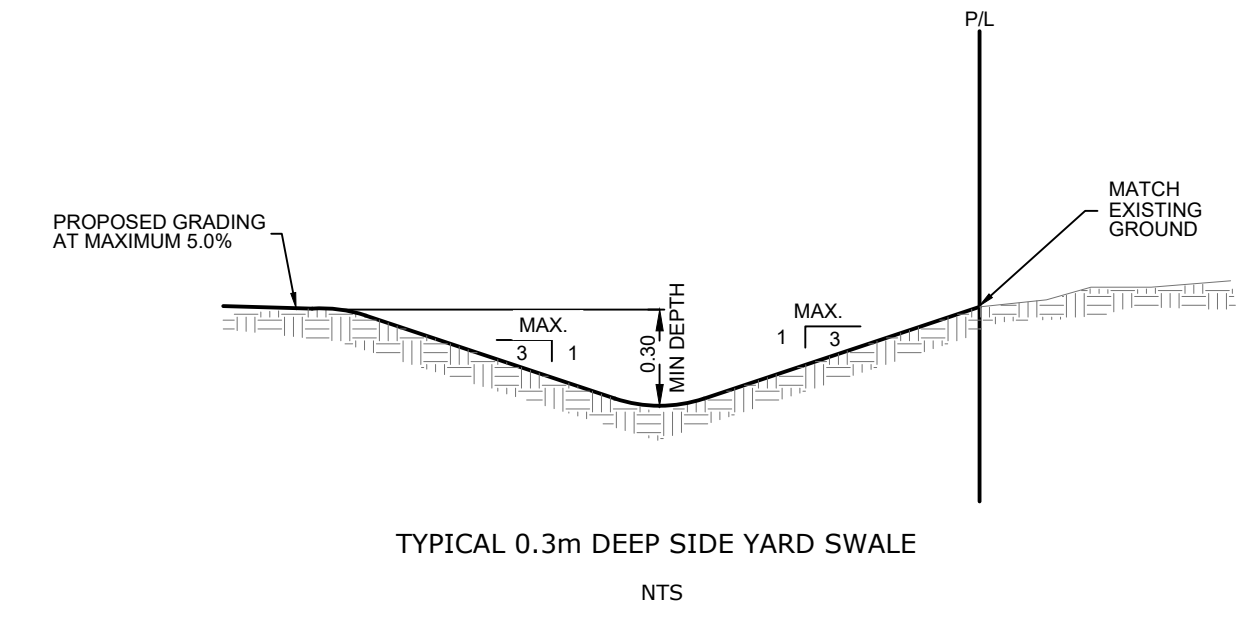
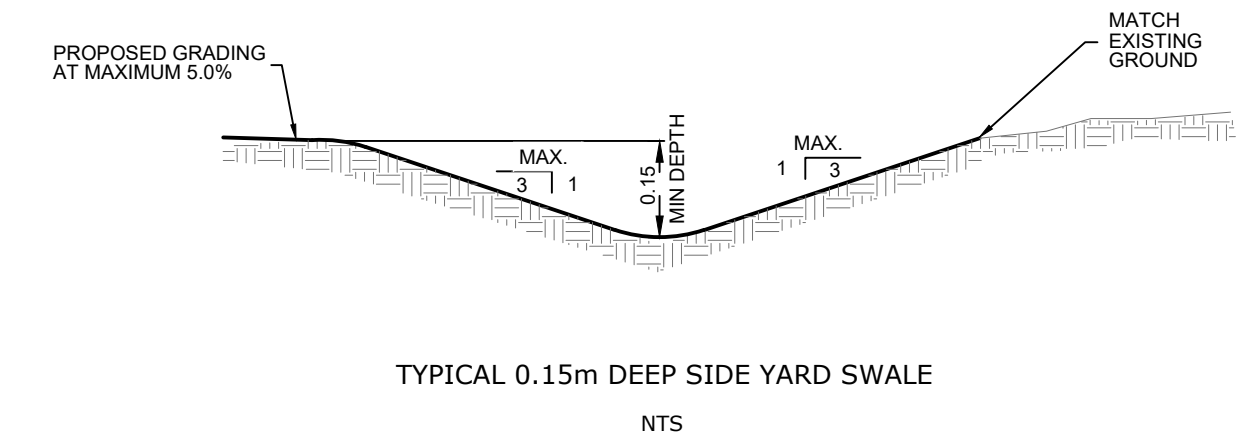
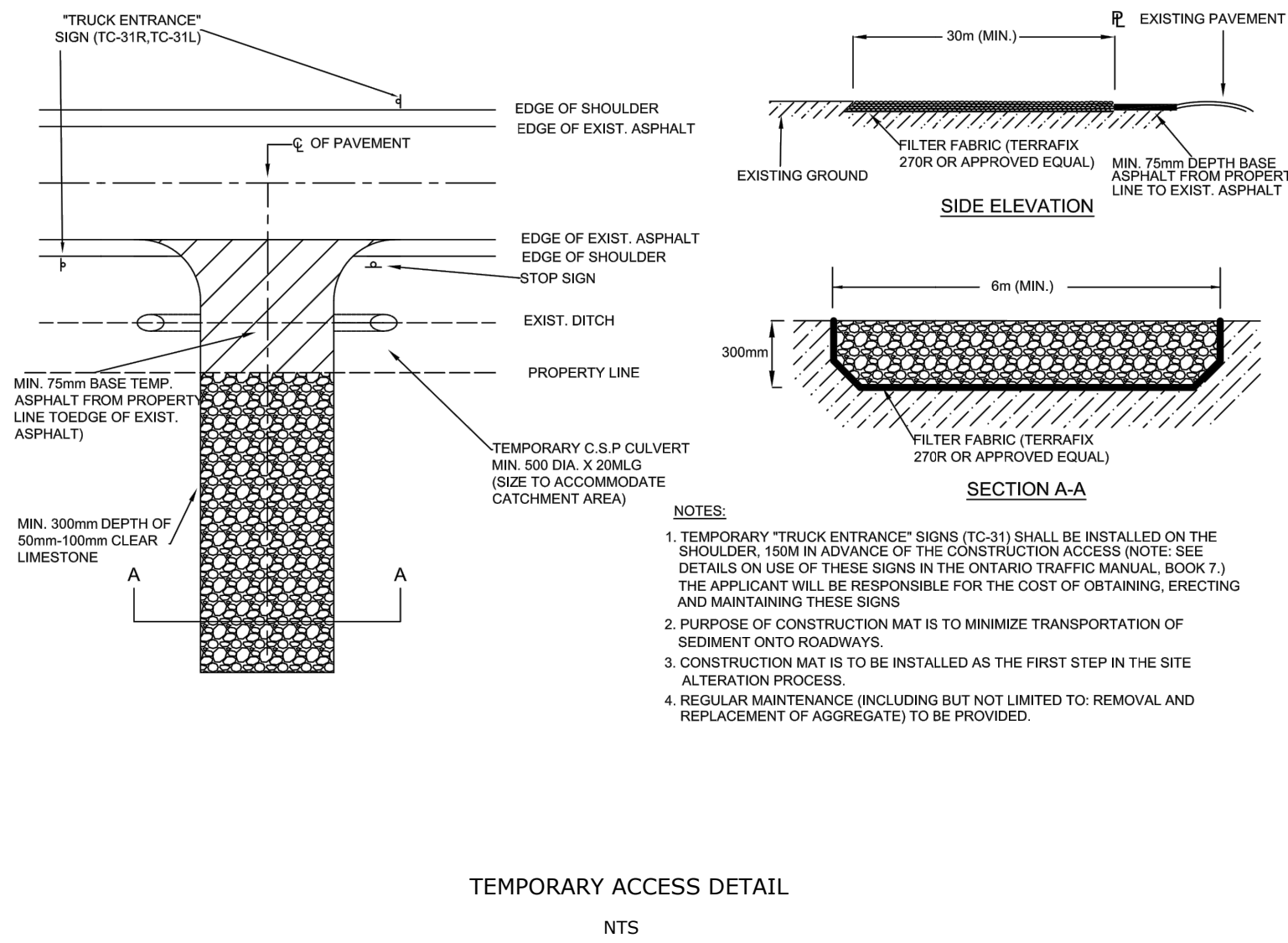
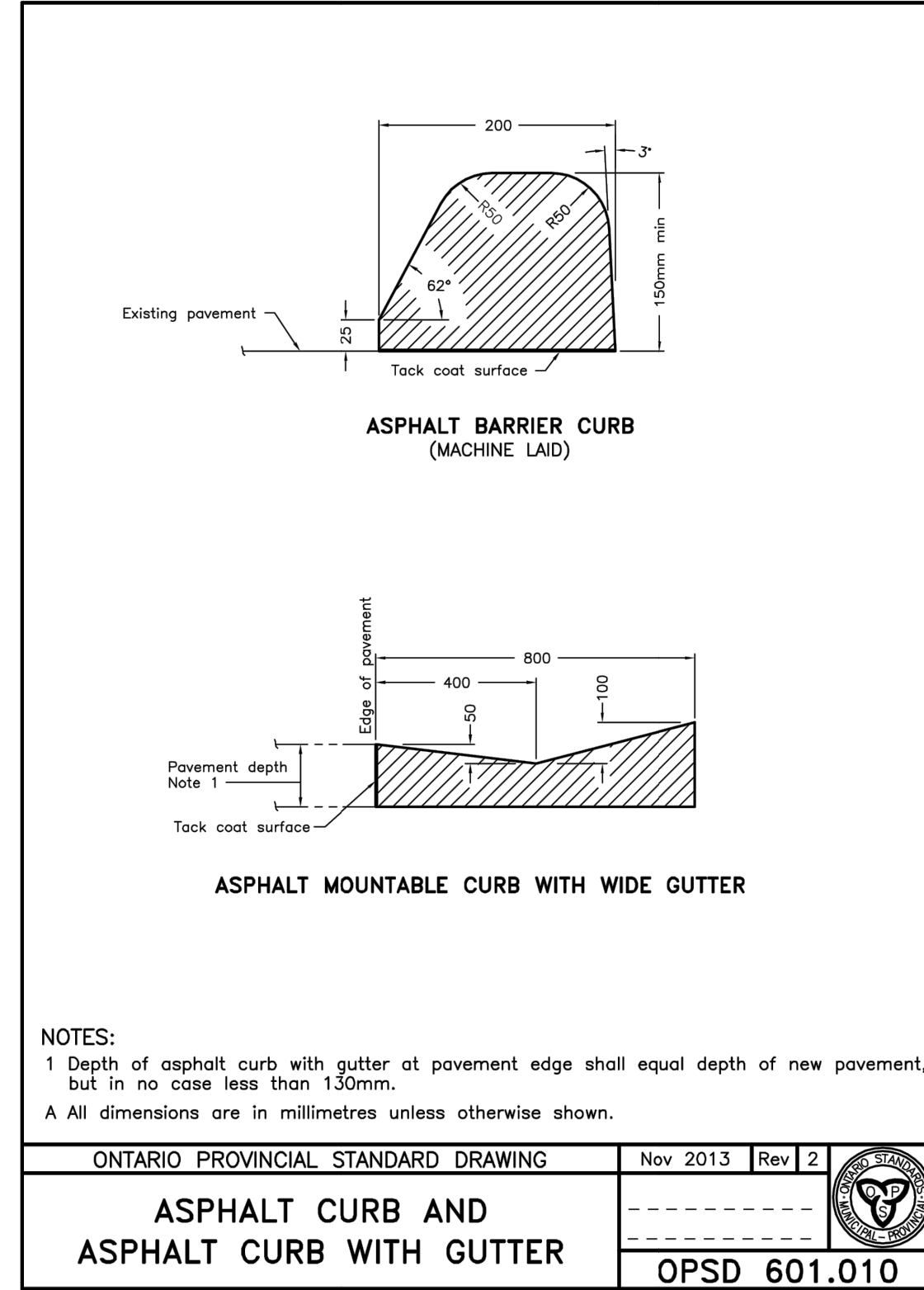
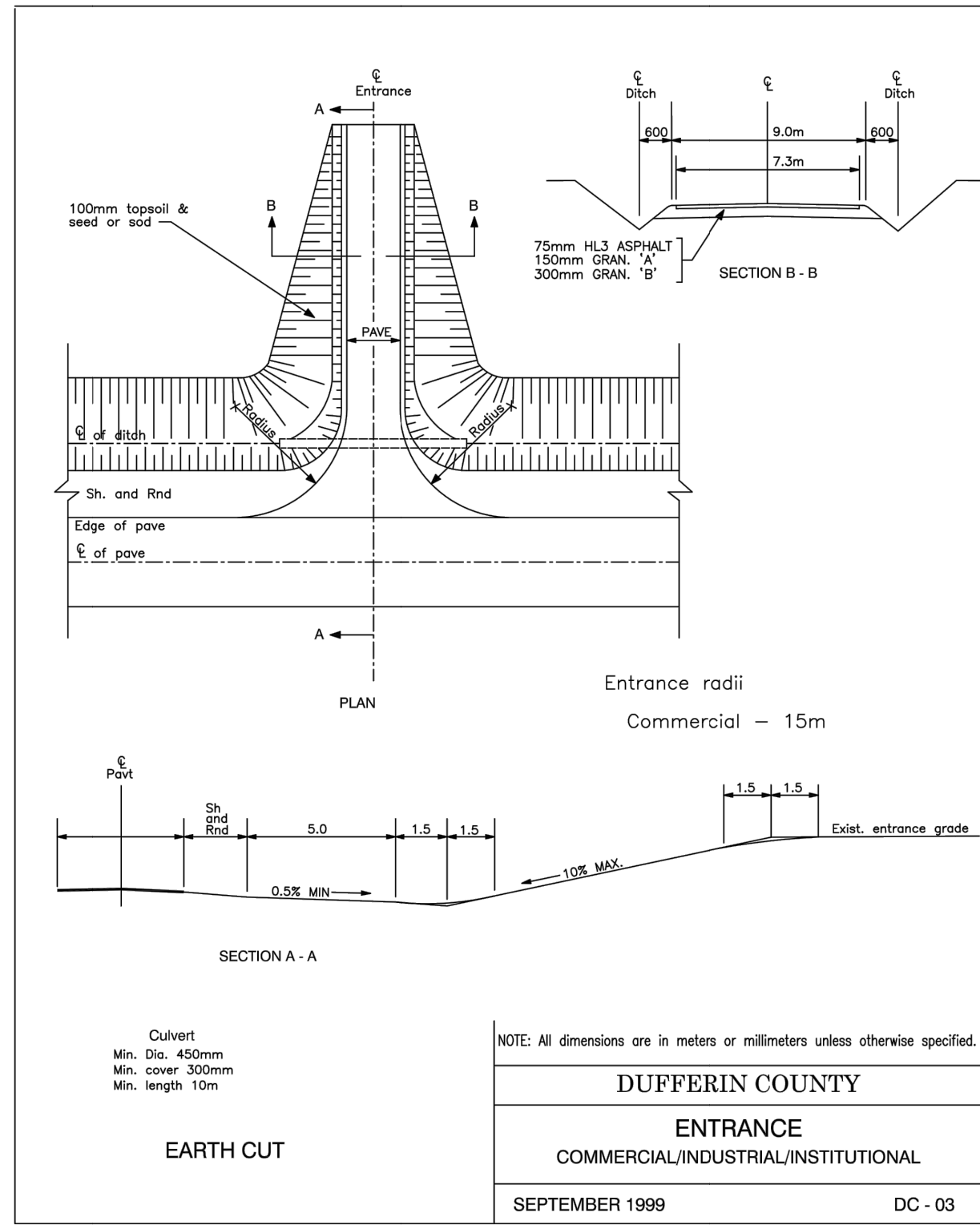
Client
ALPHA STORAGE INC.

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNSHIP
CLARKSBURG, ON N0M 1J0
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W PART LOT 26, CONCESSION 7E
MINI STORAGE
EROSION & SEDIMENT CONTROL PLAN

Designed B. COLLINS	Checked C. CAPES	Date 21/01/04	Drawing No. C5
Project No. 2020-090A	Rev No. 2		

Scale: 1:500
0 5.0 10.0 20.0 30.0m



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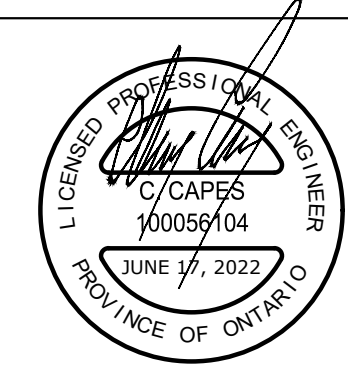
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BENCHMARK:
NAIL IN HYDRO POLE AT SOUTH WEST CORNER OF LOT = 267.97



Client
ALPHA STORAGE INC.

CAPES ENGINEERING

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CLARKSBURG, ON. N0H 1J0
WWW.CAPSENGINEERING.COM

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

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

Appendices

Appendix A – Legal Plan

SURVEY OF
 CONCESSION VII E.H.S.
 COUNTY OF DUFFERIN
 INCH = 100 FEET
 AND PATTEN LTD.
 1978

IS NOT A PLAN OF SUBDIVISION
 MEANING OF THE PLANNING ACT.

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

PART	LOT	CONC.	INST.	AREA
1				6.072 ac.
2	pt.26	VII EHS	M.F. 95745	3.571 ac.
3				0.427 ac.

PLAN 7R-1725

RECEIVED AND DEPOSITED
 (M.F. _____)

JAN 21 1980
 DATE

A.T. Woodland
 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
 RONALD J. EMO

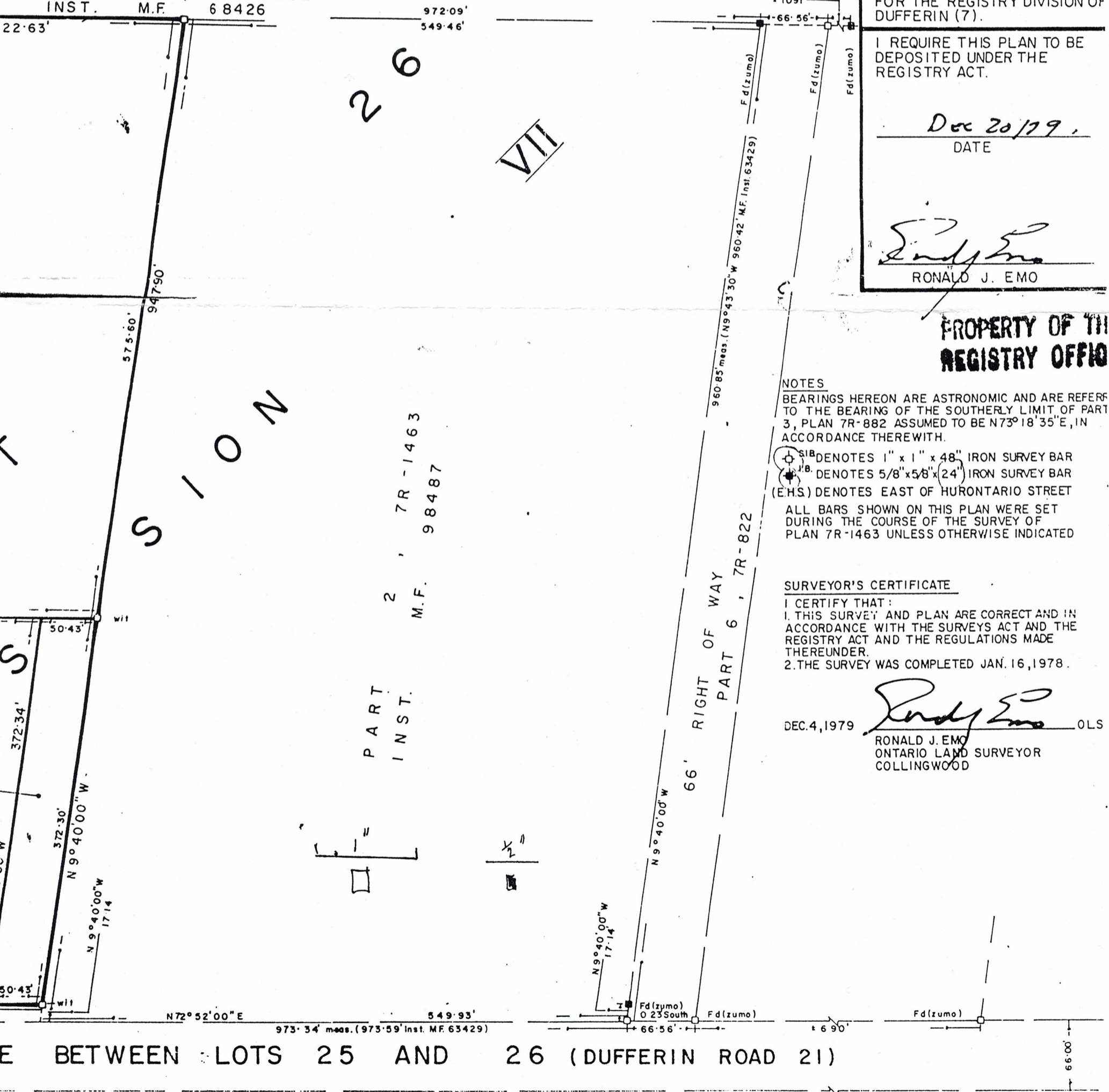
PROPERTY OF THE
 REGISTRY OFFICE

NOTES
 BEARINGS HEREON ARE ASTRONOMIC AND ARE REFERRED
 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
 ⊕ I.B. DENOTES 5/8" x 5/8" 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 *Ronald J. Emo* OLS
 RONALD J. EMO
 ONTARIO LAND SURVEYOR
 COLLINGWOOD



BETWEEN LOTS 25 AND 26 (DUFFERIN ROAD 21)

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
INST. M.F. 7R - 8
68426

CONCESSION VI
E.H.S.
ORIGINAL ROAD ALLOWANCE
(COUNTY ROAD)

CONCESSIONS VI AND VII E.H.S.
18)

PART 1
AREA = 6.072 acres

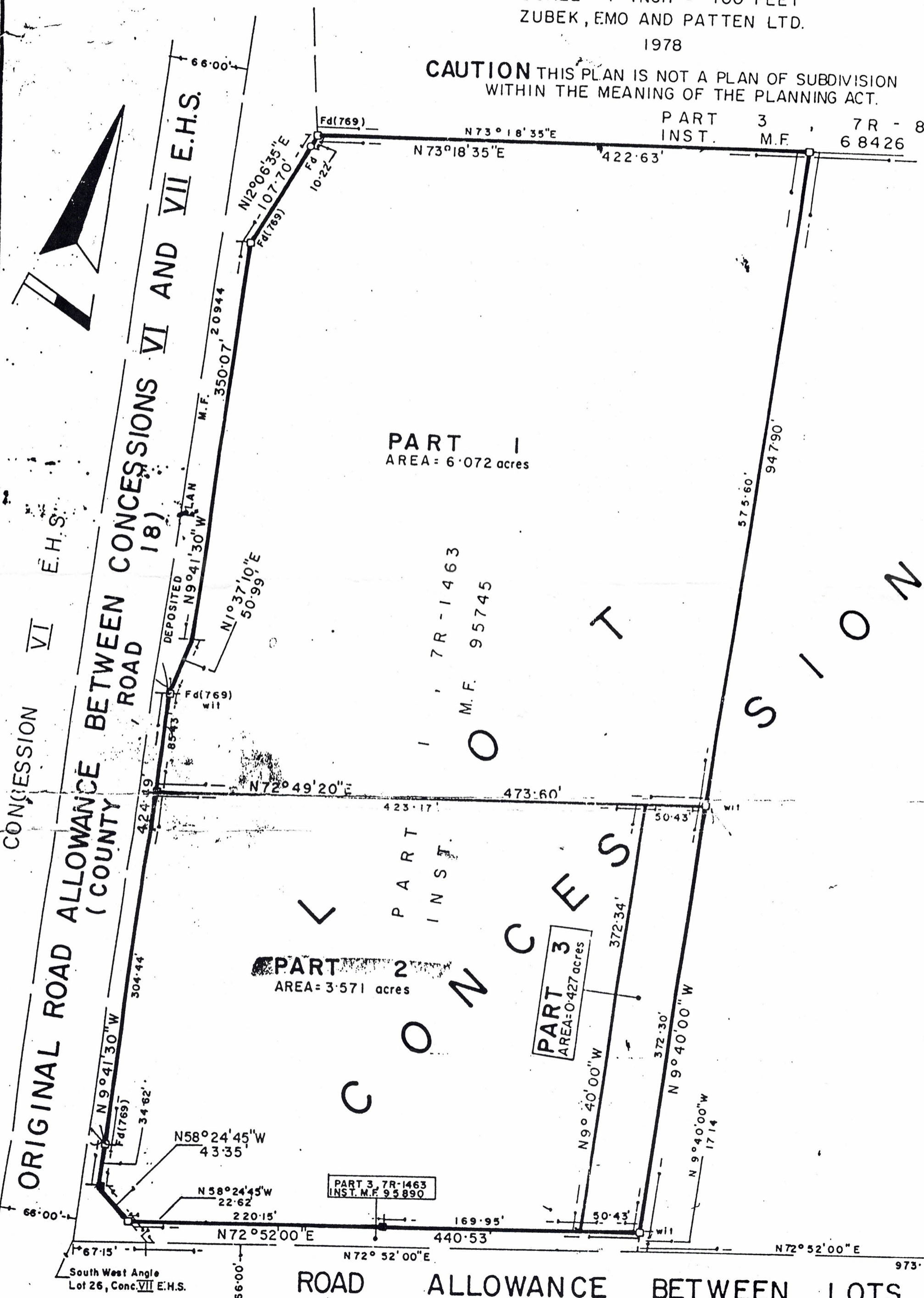
PART 2
INST.

PART 2
AREA = 3.571 acres

PART 3
AREA = 0.427 acres

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

ROAD ALLOWANCE BETWEEN LOTS



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

Appendix B – MECP Well Record

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

1705295

Municipality: 17006 HS. E. D7
Con. 10 15 20 23 24
PART 243 PA 21

County or District: DUFFERIN
Township/Borough/City/Town/Village: MULMUR
Address: RR LISLE
Date completed: 16 04 99

Grid coordinates: 21, 2, 10, 12, 17, 18, 24, 25, 26, 30, 31, 47

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)					
General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
BROWN	SAND	GRAVEL		0	8
BROWN	SAND	CLAY	BROWN SAND LAYERS	8	23
GREY	SAND	CLAY	SANDY CLAY	23	111
BROWN	SAND		CLEAN WATER BEARING SAND	111	121

41 WATER RECORD

Water found at - feet: 111, 121

Kind of water: 1 Fresh, 2 Salty, 3 Sulphur, 4 Minerals, 6 Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
6 7/8	Steel	0.188	115	

SCREEN

Sizes of opening (Slot No.): 8-10
Diameter: 6 inches
Length: 6 feet
Material and type: STAINLESS STEEL

61 PLUGGING & SEALING RECORD

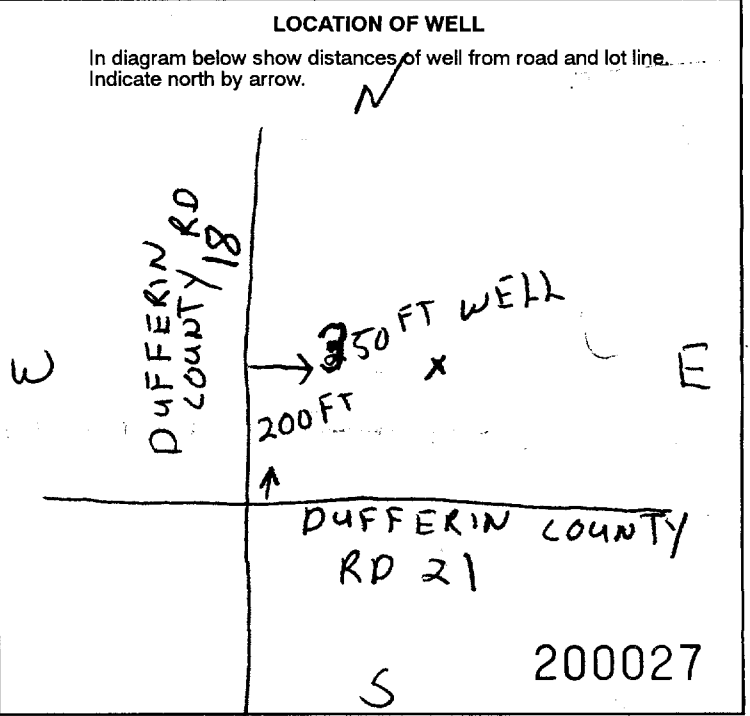
Depth set at - feet: 12
Material and type (Cement grout, bentonite, etc.): BENSEAL

71 PUMPING TEST

Pumping test method: 1 Pump, 2 Bailer
Pumping rate: 15 GPM
Duration of pumping: 2 Hours, 15 Mins

Static level: 34 feet
Water level end of pumping: 60 feet
Water levels during: 15 minutes (60 feet), 30 minutes (60 feet), 45 minutes (60 feet), 60 minutes (60 feet)

Recommended pump type: Deep
Recommended pump setting: 100 feet
Recommended pump rate: 25 GPM



FINAL STATUS OF WELL

1 Water supply, 2 Observation well, 3 Test hole, 4 Recharge well, 5 Abandoned, insufficient supply, 6 Abandoned, poor quality, 7 Abandoned (Other), 8 Dewatering, 9 Unfinished, 10 Replacement well

WATER USE

1 Domestic, 2 Stock, 3 Irrigation, 4 Industrial, 5 Commercial, 6 Municipal, 7 Public supply, 8 Cooling & air conditioning, 9 Not used, 10 Other

METHOD OF CONSTRUCTION

1 Cable tool, 2 Rotary (conventional), 3 Rotary (reverse), 4 Rotary (air), 5 Air percussion, 6 Boring, 7 Diamond, 8 Jetting, 9 Driving, 10 Digging, 11 Other

Name of Well Contractor: MIGHTON'S WELL DRILLING
Address: RR # 2 STAYNER ONT.
Name of Well Technician: TERRY MIGHTON
Signature of Technician/Contractor: Kenneth J. Mighton

Well Contractor's Licence No.: 3602
Well Technician's Licence No.: T-0130
Submission date: 17 mo 5 99

MINISTRY USE ONLY

Data source: 3602
Date of inspection: MAY 21 1999
Inspector: CSS.ES9

Appendix C – PCSWMM Existing Condition Model Output

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.

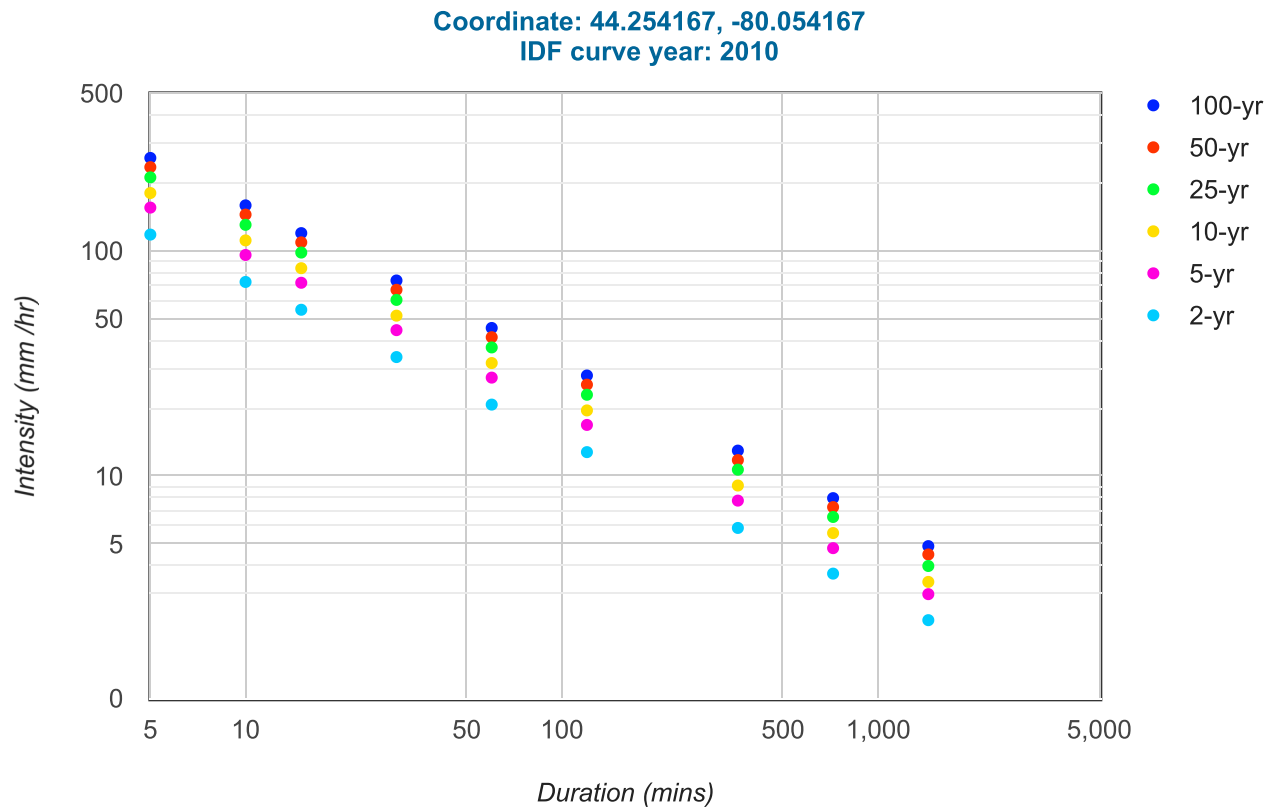
Location summary

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

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Last Modified: September 2016

Existing Condition PCSWMM Model View/Catchment Map



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

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

*****	Volume	Volume
Flow Routing Continuity	hectare-m	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

```

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

```

```

*****
Link Flow Summary
*****

```

```

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

```

```

*****
Flow Classification Summary
*****

```

```

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

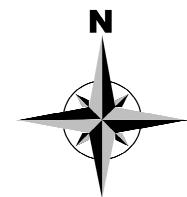
Appendix D – PCSWMM Proposed Condition Model Output

Post Development PCSWMM Model View



Legend

- Junctions
- ▲ Outfalls
- Conduits
- Subcatchments
- ACAD-2020-090B PROPBASE3



100 m

Post Development 100 yr SCS Type II Storm PCSWMM Output - Model 1 (includes external drainage areas)

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

```

*****
Element Count
*****
Number of rain gages ..... 14
Number of subcatchments ... 3
Number of nodes ..... 4
Number of links ..... 2
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
A1	1.91	154.28	15.00	9.1750	SCS_Type_II_24hr_100yr	A2
A2	1.61	99.24	10.50	3.5000	SCS_Type_II_24hr_100yr	J1
A3	0.01	35.00	24.50	10.0000	SCS_Type_II_24hr_100yr	J2

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	264.50	0.50	0.0	
J2	JUNCTION	266.50	1.00	0.0	
OF1	OUTFALL	264.40	0.00	0.0	
OF2	OUTFALL	266.49	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
C2	J2	OF2	CONDUIT	3.1	0.3184	0.0130

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	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

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.418	118.398
Evaporation Loss	0.000	0.000
Infiltration Loss	0.406	115.011
Surface Runoff	0.012	3.333
Final Storage	0.001	0.260
Continuity Error (%)	-0.174	

```

*****
Flow Routing Continuity      Volume      Volume
                             hectare-m    10^6 ltr
*****                      -----
Dry Weather Inflow .....    0.000      0.000
Wet Weather Inflow .....    0.012      0.118
Groundwater Inflow .....    0.000      0.000
RDII Inflow .....           0.000      0.000
External Inflow .....       0.000      0.000
External Outflow .....      0.012      0.118
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
A1	118.40	0.00	0.00	99.76	17.47	1.08	18.55	0.35	0.17	0.157
A2	118.40	22.05	0.00	133.23	14.55	7.21	7.21	0.12	0.11	0.051
A3	118.40	0.00	0.00	101.45	28.53	17.16	17.16	0.00	0.00	0.145

```

*****
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	0.00	266.50	0 00:00	0.00
OF1	OUTFALL	0.00	0.00	264.40	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	266.49	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	0.113	0.113	0 12:00	0.116	0.116	0.000
J2	JUNCTION	0.003	0.003	0 12:00	0.0018	0.0018	0.000
OF1	OUTFALL	0.000	0.113	0 12:00	0	0.116	0.000
OF2	OUTFALL	0.000	0.003	0 12:00	0	0.0018	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
J2	JUNCTION	48.00	0.000	1.000

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	1.46	0.046	0.113	0.116
OF2	0.67	0.002	0.003	0.002

System	1.07	0.047	0.116	0.118

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	0.113	0 12:00			
C2	DUMMY	0.003	0 12:00			

Flow Classification Summary

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

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Fri Jun 17 12:19:48 2022
Analysis ended on: Fri Jun 17 12:19:48 2022
Total elapsed time: < 1 sec

Post Development - 100yr SCS Type II Storm - PCSWMM Output - Model 2 (External Areas Removed)

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

Externnal Drainage Areas Removed

```

*****
Element Count
*****
Number of rain gages ..... 14
Number of subcatchments ... 2
Number of nodes ..... 4
Number of links ..... 2
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
A2	1.61	99.24	10.50	3.5000	SCS_Type_II_24hr_100yr	J1
A3	0.01	35.00	24.50	10.0000	SCS_Type_II_24hr_100yr	J2

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	264.50	0.50	0.0	
J2	JUNCTION	266.50	1.00	0.0	
OF1	OUTFALL	264.40	0.00	0.0	
OF2	OUTFALL	266.49	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
C2	J2	OF2	CONDUIT	3.1	0.3184	0.0130

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	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

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.192	118.398
Evaporation Loss	0.000	0.000
Infiltration Loss	0.188	115.967
Surface Runoff	0.004	2.386
Final Storage	0.000	0.212

Continuity Error (%) -0.142

	Volume hectare-m	Volume 10 ⁶ ltr
	-----	-----

Flow Routing Continuity		

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.004	0.039
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.004	0.039
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
A2	118.40	0.00	0.00	116.06	12.24	2.29	2.29	0.04	0.06	0.019
A3	118.40	0.00	0.00	101.45	28.53	17.16	17.16	0.00	0.00	0.145

```

*****
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	0.00	266.50	0 00:00	0.00
OF1	OUTFALL	0.00	0.00	264.40	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	266.49	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	0.057	0.057	0 12:00	0.0368	0.0368	0.000
J2	JUNCTION	0.003	0.003	0 12:00	0.0018	0.0018	0.000
OF1	OUTFALL	0.000	0.057	0 12:00	0	0.0368	0.000
OF2	OUTFALL	0.000	0.003	0 12:00	0	0.0018	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
J2	JUNCTION	48.00	0.000	1.000

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	1.04	0.021	0.057	0.037
OF2	0.67	0.002	0.003	0.002

System	0.85	0.022	0.060	0.039

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	0.057	0 12:00			
C2	DUMMY	0.003	0 12:00			

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class							
		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: Fri Jun 17 12:38:19 2022
Analysis ended on: Fri Jun 17 12:38:19 2022
Total elapsed time: < 1 sec

Post Development - 25 mm 4 Hr Chicago Storm - PCSWMM Output - Model 2 (excluding external areas)

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

External Drainage Areas Removed

Element Count

Number of rain gages 14
Number of subcatchments ... 2
Number of nodes 4
Number of links 2
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
A2	1.61	99.24	10.50	3.5000	25mmChicago	J1
A3	0.01	35.00	24.50	10.0000	25mmChicago	J2

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	264.50	0.50	0.0	
J2	JUNCTION	266.50	1.00	0.0	
OF1	OUTFALL	264.40	0.00	0.0	
OF2	OUTFALL	266.49	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
C2	J2	OF2	CONDUIT	3.1	0.3184	0.0130

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	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

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.040	24.999
Evaporation Loss	0.000	0.000
Infiltration Loss	0.040	24.796
Surface Runoff	0.000	0.000
Final Storage	0.000	0.212

Continuity Error (%) -0.034

	Volume hectare-m	Volume 10 ⁶ ltr
	-----	-----
***** Flow Routing Continuity *****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.000	0.000
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
A2	25.00	0.00	0.00	24.80	2.42	0.00	0.00	0.00	0.00	0.000
A3	25.00	0.00	0.00	24.56	5.68	0.00	0.00	0.00	0.00	0.000

```

*****
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	0.00	266.50	0 00:00	0.00
OF1	OUTFALL	0.00	0.00	264.40	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	266.49	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	0.000	0.000	0 00:00	0	0	0.000 ltr
J2	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
OF1	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
OF2	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr

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
J2	JUNCTION	48.00	0.000	1.000

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	0.00	0.000	0.000	0.000
OF2	0.00	0.000	0.000	0.000

System	0.00	0.000	0.000	0.000

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	0.000	0 00:00			
C2	DUMMY	0.000	0 00:00			

Flow Classification Summary

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

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Fri Jun 17 12:29:01 2022
Analysis ended on: Fri Jun 17 12:29:01 2022
Total elapsed time: < 1 sec

Appendix E – Fire Flow Calculations and Tank Information

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

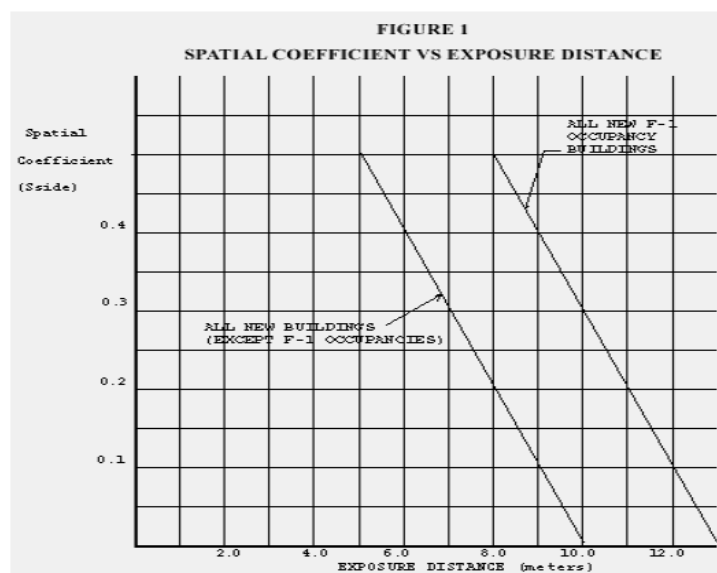
Fire Flow Calculations

Office of the Fire Marshal, OFM Guideline, Fire Protection Water Supply Guideline for Part 3 in the Ontario 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:
 $S_{Tot} = 1.0 + [(S_{Side1}) + (S_{Side2}) + (S_{Side3}) + \dots \text{etc.}]$

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



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
Total			1159

Phase 1

← Total Building Volume

3 Exposure Distances

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

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

