

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

**WHELAN TRUCKING
158 CARDEVCO ROAD, OTTAWA**



PREPARED FOR

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REVISIONS & SUBMISSIONS

Revision #	Comments	Date
00	60% Design Issued for Review and Comment	December 2, 2022

EXECUTIVE SUMMARY

Shade Group Inc. (SGI) was retained by Pri-Tec Construction Ltd. (Pri-Tec) on behalf of Whelan Truck Repair to provide civil engineering design services pertaining to the proposed development at 158 Cardevco Road, Ottawa. The development is understood to include construction of an addition to the existing structure which is to consist of a new 50' by 100' pre-engineered building that is to be connected to the existing 50' by 100' structure by way of a new 14' x 100' breezeway.

The subject property is located at 158 Cardevco Road; approximately 400m north of Richardson Side Road and approximately 300m west of Carp Road. The site is located within a development adopted by way of Plan of Subdivision known as the Cardevco Industrial Park. Cardevco Industrial Park was adopted by Plan of Subdivision 4M-356.

The primary objective of this report is to provide stormwater management details in accordance with the recommendations and guidelines provided by the Ministry of the Environment, Conservation and Parks (MECP), the City of Ottawa and the Mississippi Valley Conservation Authority (MVCA). As this property is encompassed within a formerly adopted Plan of Subdivision, this report has also been prepared in reference to the specifications as outlined in the Subdivision Agreement for 4M-356, as applicable.

The site is rural in nature and serviced by private well and septic. For further information pertaining to the well and septic, and any changes (if applicable) required to these to accommodate the development, refer to the Hydrogeological Report prepared by others. (This report was not available to SGI at the time of this report).

The site has been designed to restrict post-development peak flow rates for the 2-, 5- and 10-year storm to the 2-year pre-development level; and the 100-year post-development peak flow rate has been controlled to the 10-year pre-development level.

The proposed stormwater management system is to be comprised of clearstone filled trenches along much of the perimeter of the site. These trenches are intended to intercept overland sheet flow, offer particle filtration through the clearstone, offer groundwater recharge opportunity through infiltration, and offer temporary retention storage for runoff. There are two trench networks which are each to be equipped with an outlet control structure comprised of an 178mm orifice, that will outlet to the Cardevco Road roadside ditch. This system is anticipated to provide both quantity and quality control for the site.

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1.0 INTRODUCTION

Shade Group Inc. (SGI) was retained by Pri-Tec Construction Ltd. (Pri-Tec) on behalf of Whelan Truck Repair to provide civil engineering design services pertaining to the proposed development at 158 Cardevco Road, Ottawa. The development is understood to include construction of an addition to the existing structure which is to consist of a new 50' by 100' pre-engineered building that is to be connected to the existing 50' by 100' structure by way of a new 14' x 100' breezeway. We understand that the proposed development is subject to Site Plan Control under the *Planning Act*.

This report reflects a 60% design submission, intended to outline the general intent of the proposed civil engineering design for the subject property. Pending input from approval agency staff, additional details and cross-sections are expected to be provided as part of the next design submission.

2.0 OBJECTIVE

SGI was retained to prepare the civil engineering design works associated with the subject property. Our scope of work included preparation of the following:

- Servicing, Grading and Drainage Plan (**Appendix H**);
- Site Servicing & Stormwater Management Report.

The primary objective of this report is to provide stormwater management details in accordance with the recommendations and guidelines provided by the Ministry of the Environment, Conservation and Parks (MECP), the City of Ottawa and the Mississippi Valley Conservation Authority (MVCA). As this property is encompassed within a formerly adopted Plan of Subdivision, this report has also been prepared in reference to the specifications as outlined in the Subdivision Agreement for 4M-356 (as applicable).

3.0 BACKGROUND INFORMATION

The following guides, standards and supporting reports were referenced in the preparation of this report:

3.1 GUIDELINES & STANDARDS & WATERSHED STUDIES

- **City of Ottawa Sewer Design Guidelines**, Second Edition, City of Ottawa, October 2012;
- **Technical Bulletin ISDTB-2014-01**, City of Ottawa, February 5, 2014;
- **Technical Bulletin PIDTB-2016-01**, City of Ottawa, September 6, 2016;
- **Stormwater Management Planning and Design Manual**, Ministry of the Environment, March 2003;

- **Interpretation Bulletin: Ontario Ministry of Environment and Climate Change Expectations Re: Stormwater Management**, Ministry of the Environment and Climate Change (Now Ministry of the Environment, Conservation and Parks), February 2015;
- **Carp River Watershed/Subwatershed Study**, Robinson Consultants Inc., December 2004;
- **Huntley Creek 2017 Catchment Report**, Mississippi Valley Conservation Authority, 2017.

3.2 SUPPORTING STUDIES

- **Geotechnical Investigation** Proposed Building Addition 158 Cardevco Road, Paterson Group, June 2, 2022.

3.3 OTHER

- **Pre-application Consultation Meeting Notes**, City File No PC2022-0012, February 11, 2022;
- **Preliminary Structural Engineering Drawing Package**, S0-S8, Daido Group Inc, November 14, 2021;
- **Site Plan + Architectural Drawing Package**, A0-A6, Chris A. Leggett Architect Inc, November 12, 2021;
- Former **Site Plan**, Pri-Tec Construction Ltd., January 1991;
- **Subdivision Agreement**, November 15, 1982;
- **Site Grading Plan Cardevco Industrial Park**, R. W. Connelly Associates Ltd, March 1990 (Drawing No. 88-1370-SGP);
- **Input from Pri-Tec Staff**.

4.0 PROJECT DESCRIPTION

The subject property is located at 158 Cardevco Road; approximately 400m north of Richardson Side Road and approximately 300m west of Carp Road. The site is located within a development adopted by Plan of Subdivision and is known as the Cardevco Industrial Park. Cardevco Industrial Park was adopted by Plan of Subdivision 4M-356.

The legal description of the subject property is Part of Block 11, Registered Plan 4M-356. The PIN for the subject property is 04536-0142.

The property is a corner lot and is bounded by Cardevco Road to the north and west; a (currently) vacant gravel storage yard to the south (154 Cardevco Road); and R&R Auto Repairs to the east (164 Cardevco Road). The subdivision is comprised of rural industrial lots; including R&R Auto Repairs, Akman Construction, Harris Rebar, Virtucom Metals, Carp and Cardevco West End Self Storage; just to name a few.

The subdivision is rural in nature, with roadside ditches used for stormwater conveyance, and each lot is on private well and septic. There are no public services (sewer or water).

An aerial photograph of the subject property has been provided in Figure 1, while a Location Plan is available in **Appendix A**.



Figure 1: Map of subject property location. Source: GeoOttawa (accessed 2022-10-25)

4.1 SITE TOPOGRAPHY

A topographic survey was completed by Annis, O'Sullivan, Vollebekk Ltd. on July 12, 2022 and supplied SGI by Pri-Tec for preparation of the civil engineering design.

The subject property ranges in elevation from approximately 117.00m to 117.20m at the property line adjacent Cardevco Road, to approximately 118.00m at the highest point of the property adjacent the existing structure. The existing structure is located at the highpoint of the property, with runoff directed away in either a southwesterly or northeasterly manner towards the surrounding ditches. These drainage patterns are consistent with the Site Grading Plan for the Cardevco Industrial Park (R.W. Connelly Associates Ltd, March 1990).

4.2 RECEIVING WATERSHED

The entirety of the property drains either indirectly (by way of a side yard swale located along the northeast property boundary) or directly (via overland sheet flow) to the Cardevco Road roadside ditch. The Cardevco Road roadside ditch flows in a north and easterly manner from the subject property – outletting to the roadside ditch at Carp Road.

The subject property is located within the subwatershed of Huntley Creek, which is a tributary to the Carp River.

4.3 SOURCE PROTECTION

The subject property is located within an Intake Protection Zone 3 within a Groundwater Recharge Area. The property is also identified as located within a Highly Vulnerable Aquifer. (Source Protection Information Atlas, Ministry of the Environment, Conservation and Parks).

4.4 SUBSURFACE CONDITIONS

A geotechnical investigation was performed by Paterson Group. As part of their works, three test pits were advanced on the site.

The Geotechnical Investigation Report describes the subsurface conditions as *“2 to 2.2m thick fill layer underlain by a native silty sand deposit. The fill material was generally observed to consist of compact to very dense brown silty sand with gravel, crushed stone, brick fragments, asphalt and concrete....A compact, brown native silty sand with gravel and traces of cobbles was encountered underlying the fill.”*

Practical refusal is noted as being approximately 2.1-3.1m below grade on inferred bedrock surface. (Geotechnical Investigation, Section 4.2, Paterson Group, June 2022)

Groundwater infiltration was noted at depths of approximately 1.6 to 1.8m. (Geotechnical Investigation, Section 4.3, Paterson Group, June 2022).

5.0 SITE SERVICING

5.1 WATER SUPPLY

The existing site is serviced by an existing private well located at the south corner of the site. For more information pertaining to the water supply, please refer to the Hydrogeological Report prepared by others (a copy of the report was not available at the time of this report).

5.2 SANITARY SERVICING

The site is serviced by an existing private septic system located along the northwest side of the existing building. For more information pertaining to the septic system, please refer to the Hydrogeological Report prepared by others (a copy of the report was not available at the time of this report).

6.0 UTILITIES

The site is understood to be serviced by overhead utilities as well as natural gas. No changes to utilities or services are proposed as part of the proposed addition. Any servicing extensions would be handled internally as part of the build; with design to be provided by the electrical or mechanical designer (i.e. by others), as applicable.

7.0 GRADING AND DRAINAGE

A Site Servicing, Grading and Drainage Plan has been prepared as part of the scope of work undertaken by SGI. The Site Servicing, Grading and Drainage Plan includes such details as existing and proposed spot elevations; overland flow routes; location of existing well and septic; location of proposed stormwater measures, etc. A copy of the plan has been provided in **Appendix H**.

8.0 STORMWATER MANAGEMENT DESIGN

8.1 METHODOLOGY

The stormwater peak flow calculations were completed using the Rational Method.

$$Q = 2.78CIA$$

Where

Q	=	Flow Rate (L/s)
C	=	Runoff coefficient
I	=	Rainfall intensity (mm/hr)
A	=	Drainage area (ha)

The use of the Rational Method is permitted per the City of Ottawa Sewer Design Guidelines – as the subject development is less than 40 hectares (City Guidelines - Section 3.5.1.1).

8.2 DESIGN CRITERIA AND CONSTRAINTS

Stormwater design criteria have been established in reference to current design practices as outlined in the City of Ottawa Sewer Design Guidelines, through consultation with City of Ottawa Staff (pre-application consultation, February 2022), through input from the Mississippi Valley Conservation Authority (pre-consultation completed by others), and through specifications provided by the client (Pri-Tec).

8.2.1 QUANTITY CONTROL

- Post-development peak flow conditions for the 2, 5 and 10-year storm events have been controlled to not exceed the 2-year pre-development peak flow rate;
- The 100-year post-development peak flow rate has been restricted to not exceed the 10-year pre-development peak flow rate (Pri-Tec);
 - *It's worth noting that design to a 10-year storm event is consistent with the design standards as used to size the roadside ditches under the Subdivision Agreement for the subdivision; and consistent with design practices used on nearby adjacent projects (e.g. Akman Construction, 127 Cardevco Road, Site Servicing and Stormwater Management Report, November 1, 2021).*
- Peak flow rates have been calculated using a time of concentration (T_c) of 10 minutes (City of Ottawa – Section 5.4.5.2);

- Pre-development conditions have been determined using the smaller of a runoff coefficient of 0.5 or the actual site runoff coefficient (City of Ottawa – Section 8.3.7.3).

8.2.2 QUALITY CONTROL

- The site has been designed to ensure a minimum 80% Total Suspended Solids (TSS) removal rate (pre-application consultation, February 2022).

8.2.3 RUNOFF COEFFICIENTS

The following coefficients were used to develop a weighted runoff coefficient for each area in post-development conditions:

Paved and Roof Areas	0.90
Grass	0.20
Off-Site Areas	0.50
Gravel Surfaces	0.60

The runoff coefficients have been increased by 25% for the 100-year storm (up to a maximum value of C=1.0), as per City of Ottawa Sewer Design Guidelines, Section 5.4.5.2.1.

8.2.4 TIME OF CONCENTRATION

The time of concentration used to calculate peak flow rates was 10 minutes as per City of Ottawa Sewer Design Guidelines, Section 5.4.5.2 (*“an inlet time of 10 minutes is to be used for all land uses and lot grading configurations”*).

8.2.5 RAINFALL INTENSITY

Rainfall intensities were derived from City of Ottawa Sewer Design Guidelines (City Guidelines - Section 5.4.2), where

$$\text{2-Year Intensity} = 732.951 / (\text{Time in min} + 6.199)^{0.810}$$

$$\text{5-Year Intensity} = 998.071 / (\text{Time in min} + 6.053)^{0.814}$$

$$\text{10-Year Intensity} = 1174.184 / (\text{Time in min} + 6.014)^{0.816}$$

$$\text{100-Year intensity} = 1735.688 / (\text{Time in min} + 6.014)^{0.820}$$

8.3 PRE-DEVELOPMENT DRAINAGE PATTERNS

Under pre-development conditions the site has been assessed as a single drainage area measuring approximately 0.56 hectares. The majority of the site consists of impervious or relatively impervious (gravel) surfaces. A small grass area on-site is located at the northwest corner, encompassing the existing septic system. The property houses an approximately 466m² building that includes truck and auto repair shop bays and a small office.

The existing building is located at the highest point of the property at an elevation of approximately 118.00. Runoff is conveyed by overland sheet flow in a north, west or easterly direction, towards the Cardevco Road roadside ditch.

Under pre-development conditions, the site has a calculated runoff coefficient of 0.59; however as per the City Design Standards (Section 8.3.7.3), a runoff coefficient of 0.50 was used to calculate the pre-development allowable release rates.

Under pre-development conditions, the property is estimated to have peak flow rates of 60 L/s, 81 L/s and 95 L/s for the 2-, 5- and 10-year storm events respectively.

A Pre-Development Drainage Area Plan and associated calculations have been enclosed in **Appendix B**.

8.4 POST-DEVELOPMENT DRAINAGE PATTERNS

Under post-development conditions, the site has been split into three sub-drainage areas: B1, B2 and B3.

Post-development drainage area B1 encompasses the southern half of the property; part of the existing structure, and approximately half of the new proposed addition. Runoff from B1 is to be conveyed by overland sheet flow towards a proposed stormwater retention trench along the perimeter of the site. B1 encompasses an area of approximately 0.25 hectares and has a weighted runoff coefficient of approximately 0.62 (2-10 year) and 0.75 (100-year). The peak flow rate under uncontrolled post-development conditions is estimated to be 33 L/s, 44 L/s, 52 L/s and 91 L/s for the 2-, 5-, 10- and 100-year storm events respectively.

Post-development drainage area B2 encompasses the northern half of the property; part of the existing structure, and approximately half of the new proposed addition. Runoff from B2 is to be conveyed by overland sheet flow towards a proposed stormwater retention trench along the perimeter of the site. B2 encompasses an area of approximately 0.25 hectares and has a weighted runoff coefficient of approximately 0.62 (2-10 year) and 0.75 (100-year). The peak flow rate under uncontrolled post-development conditions is estimated to be 34 L/s, 46 L/s, 54 L/s and 95 L/s for the 2-, 5-, 10- and 100-year storm events respectively.

Post-development drainage area B3 encompasses a small section at the northwest corner and a stretch along the northeast length of the property, representing flow that would be uncontrolled and not captured within a stormwater facility. Runoff would flow uncontrolled via overland sheet flow, over grassed surfaces, towards the Cardevco Road roadside ditch. B3 encompasses a total area of approximately 0.06 hectares and has a weighted runoff coefficient of approximately 0.34 (2-10 year) and 0.40 (100-year). The peak flow rate under uncontrolled post-development conditions is estimated to be 4 L/s, 6 L/s, 7 L/s and 12 L/s for the 2-, 5-, 10- and 100-year storm events respectively.

A Post-Development Drainage Area Plan and associated calculations have been enclosed in **Appendix C**.

8.5 PEAK FLOW RESULTS

The following tables provide a summary of the peak flow results for both pre- and post-development (uncontrolled) conditions. These results can also be found in **Appendix B and C** along with their associated supporting calculations.

Table 1: Pre-development peak flow results

Peak Flow (L/s) - 2-Year	60
Peak Flow (L/s) - 5-Year	81
Peak Flow (L/s) - 10-Year	95

Table 2: Post-development (uncontrolled) peak flow results

	B1	B2	B3
Peak Flow (L/s) - 2-Year	33	34	4
Peak Flow (L/s) - 5-Year	44	46	6
Peak Flow (L/s) - 10-Year	52	54	7
Peak Flow (L/s) - 100-Year	91	95	12

8.6 QUANTITY CONTROL

Quantity control measures have been proposed to limit post-development peak flow rates to either the 2-year (2-10-year post-development); or the 10-year (100-year post-development). This is proposed to be achieved through the implementation of a clearstone filled trench that would be constructed along most of the perimeter of the site.

QUANTITY CONTROL B1

For post-development drainage area B1, the proposed trench would be approximately 108m in length; stretching along the west and south sides of the property. The proposed trench is to be 1.5m wide, and the bottom of the clearstone is to be at an elevation of 116.50m. The maximum allowable ponding depth has been designed as 117.10m (or 0.60m), based on the existing ground elevation along the southwest property limit. As the top of the trench would be constructed to generally match the existing ground elevations, the actual depth of the trench will vary; ranging from a minimum of 0.60m; to approximately 1.1m along the central south side of the property.

The trench is proposed to be equipped with an outlet control structure comprised of an orifice outlet measuring 178mm, which will result in temporary ponding behind the outlet (within the trench); and offer control of peak flow rates. The proposed orifice is to outlet to the Cardevco Road roadside ditch. Given the noted soil conditions as described in Section 4.4, it is anticipated that this trench will also offer the opportunity for infiltration; further reducing the post-development peak flows from those that have been calculated. As infiltration rates were not available at the time of this report, the rate of infiltration has not been incorporated into the

design, and instead, it has been assumed that the only available outflow would be by way of the orifice. This approach is considered conservative.

QUANTITY CONTROL B2

For post-development drainage area B2, the proposed trench would be approximately 104m in length; stretching along the north and east sides of the property. The proposed trench is to be 1.5m wide, and the bottom of the clearstone is to be at an elevation of 116.35m. The maximum allowable ponding depth has been designed as 116.95m (or 0.60m), based on a low point along the northeast property limit. As the top of the trench would be constructed to generally match the existing ground elevations, the actual depth of the trench will vary; ranging from a minimum of 0.60m; to approximately 1.1m along the central northwest side of the property.

The trench is proposed to be equipped with an outlet control structure comprised of an orifice outlet measuring 178mm, which will result in temporary ponding behind the outlet (within the trench); and offer control of peak flow rates. The proposed orifice is to outlet to the Cardevco Road roadside ditch. Given the noted soil conditions as described in Section 4.4, it is anticipated that this trench will also offer the opportunity for infiltration; further reducing the post-development peak flows from those that have been calculated. As infiltration rates were not available at the time of this report, the rate of infiltration has not been incorporated into the design, and instead, it has been assumed that the only available outflow would be by way of the orifice. This approach is considered conservative.

SUMMARY – CONTROLLED PEAK FLOW RATES

The following table provides a summary of the peak flow results under post-development controlled conditions. These results can also be found in **Appendix D**.

Table 3: Post-development (controlled) peak flow results

	B1 Controlled	B2 Controlled	B3 Uncontrolled	Total Outflow	Pre/ Allowable	Δ *
Peak Flow (L/s) - 2-Year	16	18	4	38	60	-22
Peak Flow (L/s) - 5-Year	22	23	6	51	60	-8
Peak Flow (L/s) - 10-Year	26	27	7	60	60	0
Peak Flow (L/s) - 100-Year	41	42	12	95	95	0

8.7 QUALITY CONTROL

The employment of Best Management Practices (BMPs) serves as the primary method of quality control for the site. Stormwater BMPs are present at the conveyance and end-of-pipe levels.

The proposed clearstone filled trenches will offer a means of temporary storage (end-of-pipe) and conveyance. Runoff is to enter the trenches through overland sheet flow, where water will percolate down through the clearstone. Given the retention storage, these trenches will offer an opportunity for particle settlement, filtration, and groundwater recharge through infiltration.

Calculations pertaining to the quality control storage volumes as per MECP Table 3.2 have been provided in **Appendix E**. The storage volumes required per Table 3.2 are anticipated to be approximately 22m³ for the site; while approximately 38m³ of quality storage volume is available per MECP Equation 4.17.

8.8 DOWNSTREAM SYSTEM REVIEW

A review of the receiving Cardevco Road roadside ditch has been completed as part of this report and the results have been enclosed in **Appendix F**. In summary, based on the existing cross-section of the ditch as surveyed in front of 164 Cardevco Road, and an assumed runoff coefficient of 0.50 for the upstream properties, the available capacity of the roadside ditch is greater than the anticipated 100-year peak flow rate of the upstream contributing area.

9.0 CONCLUSIONS

9.1 SERVICES (WATER + SANITARY)

The site will continue to be serviced by private on-site well and septic.

9.2 UTILITIES

The site is understood to be serviced by overhead utilities as well as natural gas. No changes to utilities or services are proposed as part of the proposed addition.

9.3 STORMWATER MANAGEMENT

The site is proposed to address stormwater management quantity and quality objectives through the implementation of clearstone filled trenches constructed along the majority of the perimeter of the site. The trenches are designed as two systems, with two outlets, each to be comprised of a 178mm diameter orifice opening that will restrict post-development peak flow rates to pre-development levels.

Quality control objectives are expected to be achieved through the same trenches, by way of percolation through the clearstone and the settlement of particles during the temporary storage that results due to the restricted outlet.

9.4 GRADING AND DRAINAGE

Grading and drainage changes are anticipated to be minimal given this is an existing developed site. Grading has been limited to that as required to accommodate the proposed addition. A copy of the Grading and Drainage Plan has been enclosed in **Appendix H**. The engineering design drawings have been prepared in reference to a Site Plan prepared by others. For ease of reference, a copy of the Site Plan has been enclosed in **Appendix G**.

10.0 CLOSING

This report is submitted for consideration in support of the proposed Site Plan Control Application for the subject property noted herein.

Should you have any questions or concerns, please do not hesitate to contact the undersigned at your earliest convenience.

Monica Shade, P. Eng.

Shade Group Inc.

T: 613-889-9733

E: monica@shadegroup.ca

11.0 LIMITATIONS

This report was prepared exclusively for Pri-Tec Construction Limited and Whelan Truck Repair in support of the proposed Site Plan Approval Application associated with the proposed building addition at 158 Cardevco Road, Ottawa. This report has been prepared to review, assess and provide recommendation relating to stormwater management on the site, in conformance with the guidelines from the Ministry of the Environment, Conservation and Parks, the City of Ottawa, and the Subdivision Agreement associated with the development in which the site is located.

This report has been prepared in reference to information and data prepared by others, including those reports as outlined in Section 3.0 of this Report. Conclusions, calculations and assessments have been made in this report in reliance to the information provided by others (Section 3.0); no field measurements or conformance testing has been performed to confirm the results concluded by others.

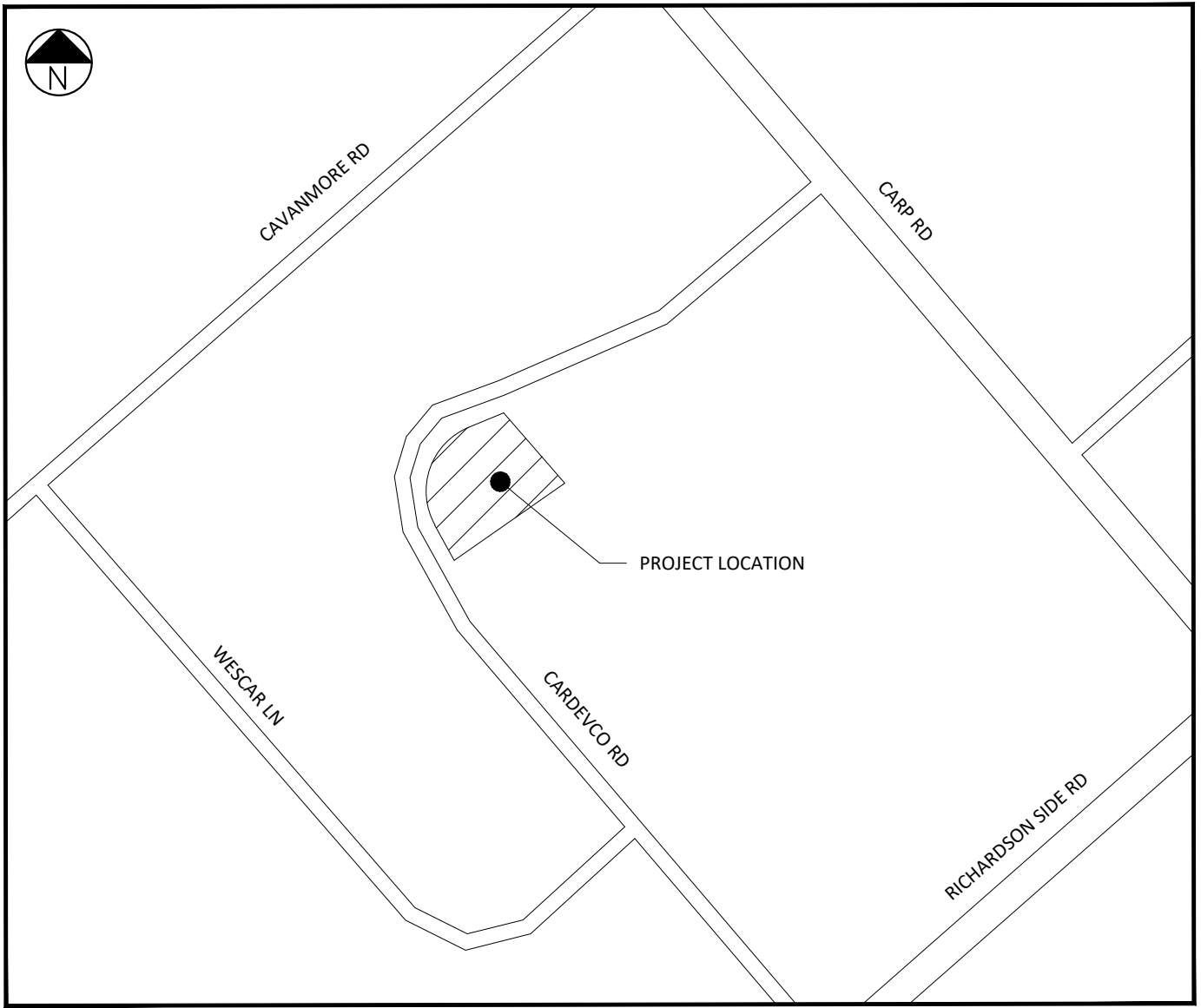
Any reliance on this report by a third party is strictly prohibited. This report reflects Shade Group Inc.'s professional judgement with respect to the scope, schedule and other limitations as noted in this document. The opinions formed in this report are based on data, conditions and information that was existing at the time of the document preparation.

The findings, conclusions and recommendations of this report are only valid as of the date of this report. No assurance can be made with respect to the changes in site conditions following the date of this report. If additional information is discovered or becomes available Shade Group Inc. shall be contacted to review and re-evaluate the conclusions presented; and provide amendments, if required.

Any use which a third party makes of this document remains the responsibility and liability of such third party. Shade Group Inc. shall not be responsible for damages of any kind suffered by a third party as a result of decisions made or actions taken based on the findings of this report.

APPENDIX A

LOCATION PLAN



LOCATION PLAN
N.T.S.

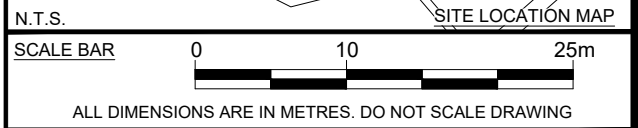
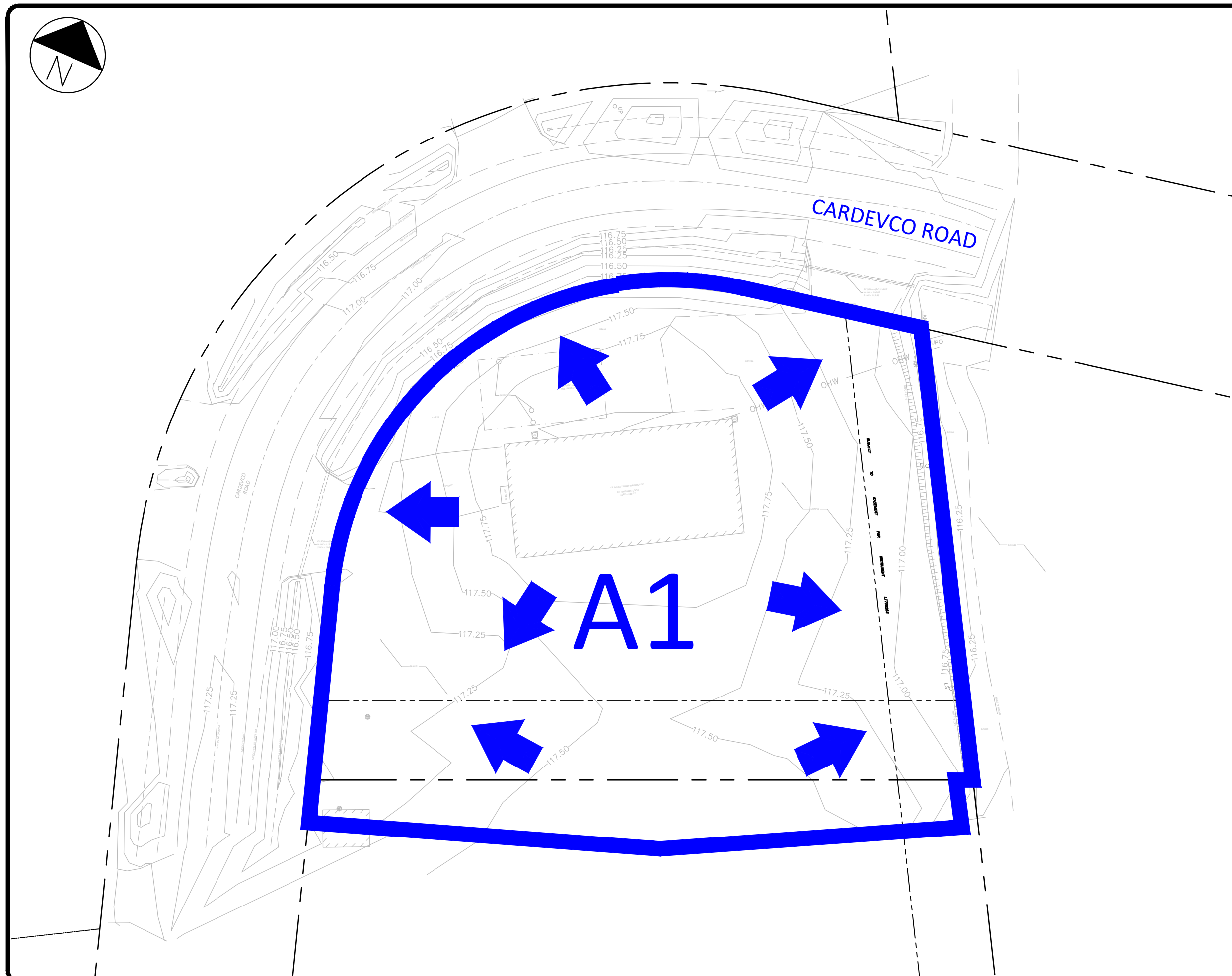
158 CARDEVCO ROAD
WHELAN TRUCK REPAIR

PROPOSED ADDITION

SHADE
GROUP INC

APPENDIX B

PRE-DEVELOPMENT DRAINAGE PLAN & CALCULATIONS



SHADE GROUP INC.
PO BOX 1716
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SHADE
GROUP INC.

00	60% DESIGN ISSUED FOR REVIEW	DEC 2, 2022
REV.	DESCRIPTION	DATE

CLIENT	WHELAN TRUCKING
PROJECT ADDRESS	158 CARDEVCO ROAD CARP, ON K0A 1L0
PROJECT TITLE	PROPOSED BUILDING ADDITION
DRAWING TITLE	PRE-DEVELOPMENT DRAINAGE PLAN

Stormwater Management Calculations

Whelan Trucking Pre-Development

Pre-Development - Runoff Coefficient

	Area ID
	A1
Total Area (m ²)	5598
Grass (m ²)	586
Runoff Coefficient (C)	0.20
Gravel (m ²)	4415
Runoff Coefficient (C)	0.60
Asphalt/Roof (m ²)	596
Runoff Coefficient (C)	0.90
Weighted Runoff Coefficient (C)*	0.59

**Pre-development conditions will be determined using the smaller of a runoff coefficient of 0.5 or the actual site runoff coefficient (City of Ottawa – Section 8.3.7.3)*

Therefor the pre-development conditions will be calculated using a runoff coefficient of 0.5.

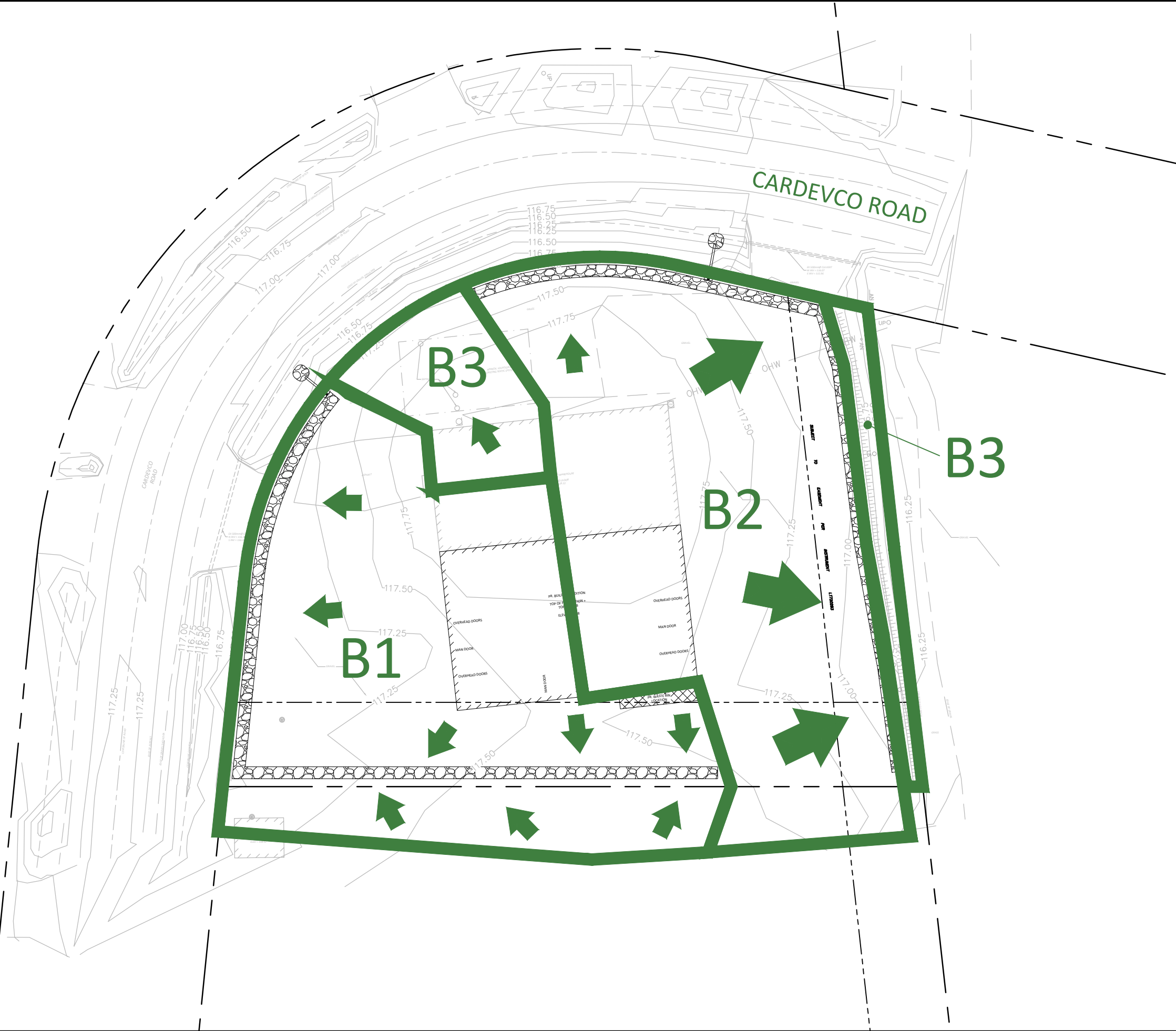
Post-Development - Peak Flow

	Area ID
	B1
Weighted Runoff Coefficient (C)	0.50
Total Area (ha)	0.56
Time of Concentration (min)	10
Intensity (mm/hr) - 2-Year	77
Intensity (mm/hr) - 5-Year	104
Intensity (mm/hr) - 10-Year	122
Peak Flow (L/s) - 2-Year	60
Peak Flow (L/s) - 5-Year	81
Peak Flow (L/s) - 10-Year	95

Max Allowable Outflow

APPENDIX C

POST-DEVELOPMENT DRAINAGE PLAN & CALCULATIONS



PROJECT LOCATION

Cavanmore Rd
Carp Rd
Richardson Side Rd
Wescar Ln
Cardevco Rd

N.T.S.

SCALE BAR 0 10 25m

ALL DIMENSIONS ARE IN METRES. DO NOT SCALE DRAWING

PAGE SIZE 11" x 17" SCALE 1:500

SHADE GROUP INC.
PO BOX 1716
ALMONTE, ON
K0A 1A0

t: 613-889-9733 e:monica@shadegroup.ca

SHADE GROUP INC.

LEGEND

- PROPERTY LINE
- - - EASEMENT
- - - EX. CENTERLINE
- - - EX. EDGE OF ASPHALT
- - - EX. EDGE OF GRAVEL
- - - EX. OVERHEAD WIRES
- EX. WELL
- ➔ POST-DEVELOPMENT OVERLAND FLOW ROUTE

00	60% DESIGN ISSUED FOR REVIEW	DEC 2, 2022
REV.	DESCRIPTION	DATE

CLIENT WHELAN TRUCKING

PROJECT ADDRESS 158 CARDEVCO ROAD
CARP, ON K0A 1L0

PROJECT TITLE PROPOSED BUILDING ADDITION

DRAWING TITLE POST-DEVELOPMENT DRAINAGE PLAN

Stormwater Management Calculations

Whelan Trucking

Post-Development

Post-Development - Runoff Coefficient

	Area ID					
	B1		B2		B3	
	2-10 Year	100-Year	2-10 Year	100-Year	2-10 Year	100-Year
Total Area (m ²)	2460		2542		596	
Grass (m ²)	166		218		479	
Runoff Coefficient (C)	0.20	0.25	0.20	0.25	0.20	0.25
Gravel (m ²)	1248		1600		0	
Runoff Coefficient (C)	0.60	0.75	0.60	0.75	0.60	0.75
Offsite Area (m ²)	492		184		0	
Runoff Coefficient (C)	0.50	0.63	0.50	0.63	0.50	0.63
Asphalt/Roof (m ²)	554		540		117	
Runoff Coefficient (C)	0.90	1.00	0.90	1.00	0.90	1.00
Weighted Runoff Coefficient (C)	0.62	0.75	0.62	0.75	0.34	0.40

Post-Development - Peak Flow - Input Data

	Area ID					
	B1		B2		B3	
	2-10 Year	100-Year	2-10 Year	100-Year	2-10 Year	100-Year
Weighted Runoff Coefficient (C)	0.62	0.75	0.62	0.75	0.34	0.40
Total Area (ha)	0.25		0.25		0.06	
Time of Concentration (min)	10		10		10	
Intensity (mm/hr) - 2-Year	77		77		77	
Intensity (mm/hr) - 5-Year	104		104		104	
Intensity (mm/hr) - 10-Year	122		122		122	
Intensity (mm/hr) - 100-Year	179		179		179	

Post-Development - Peak Flow - Results

	B1	B2	B3
Peak Flow (L/s) - 2-Year	33	34	4
Peak Flow (L/s) - 5-Year	44	46	6
Peak Flow (L/s) - 10-Year	52	54	7
Peak Flow (L/s) - 100-Year	91	95	12

APPENDIX D

QUANTITY CONTROL CALCULATIONS

Stormwater Management Calculations
Whelan Trucking
Quantity Control Summary

Pre-Development - Peak Flow

Peak Flow (L/s) - 2-Year	60	Max Allowable Outflow
Peak Flow (L/s) - 5-Year	81	
Peak Flow (L/s) - 10-Year	95	

Post-Development - Peak Flow

Uncontrollable Flow

	B3
Peak Flow (L/s) - 2-Year	4
Peak Flow (L/s) - 5-Year	6
Peak Flow (L/s) - 10-Year	7
Peak Flow (L/s) - 100-Year	12

Controllable Flow
(Without Restriction)

	B1+B2
Peak Flow (L/s) - 2-Year	66
Peak Flow (L/s) - 5-Year	90
Peak Flow (L/s) - 10-Year	106
Peak Flow (L/s) - 100-Year	186

Controlled Flow
(With Restriction)

	B1 Contrld	B2 Contrld	B3 Unctrlld	Total Outflow	Pre/Allowable	Δ *
Peak Flow (L/s) - 2-Year	16	18	4	38	60	-22
Peak Flow (L/s) - 5-Year	22	23	6	51	60	-8
Peak Flow (L/s) - 10-Year	26	27	7	60	60	0
Peak Flow (L/s) - 100-Year	41	42	12	95	95	0

*A negative number suggests the post-development peak flow is less than pre-development or allowable levels for the applicable storm event.

Stormwater Management Calculations
Whelan Trucking
Storage Requirements - B1

2-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	77	33	16	16	10
15	62	26	16	10	9
20	52	22	16	6	7
25	45	19	16	3	4
40	33	14	16	-2	-6
55	26	11	16	-5	-17
70	22	9	16	-7	-30
85	19	8	16	-8	-42
100	17	7	16	-9	-55
115	15	6	16	-10	-69

Peak Storage Requirement - 2-Year (m³)	10
--	----

5-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	104	44	22	22	13
15	84	35	22	13	12
20	70	30	22	8	9
25	61	26	22	4	6
40	44	19	22	-3	-8
55	35	15	22	-7	-24
70	29	12	22	-10	-40
85	25	11	22	-11	-57
100	22	10	22	-13	-75
115	20	9	22	-13	-93

Peak Storage Requirement - 5-Year (m³)	13
--	----

Stormwater Management Calculations
Whelan Trucking
Storage Requirements - B1

10-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	122	52	26	26	16
15	98	42	26	16	14
20	82	35	26	9	11
25	71	30	26	5	7
40	52	22	26	-4	-9
55	41	17	26	-8	-27
70	34	15	26	-11	-47
85	30	13	26	-13	-67
100	26	11	26	-15	-88
115	23	10	26	-16	-109

Peak Storage Requirement - 10-Year (m³)	16
---	-----------

100-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	179	91	41	50	30
15	143	73	41	32	29
30	92	47	41	6	11
45	69	35	41	-6	-15
60	56	29	41	-12	-44
75	47	24	41	-17	-75
90	41	21	41	-20	-107
105	36	19	41	-22	-140
120	33	17	41	-24	-173
135	30	15	41	-25	-206

Peak Storage Requirement - 100-Year (m³)	30
--	-----------

Stormwater Management Calculations
Whelan Trucking
Stage-Storage-Discharge - B1

Storage

Minimum Bottom of Trench Elevation (m)	116.50
Trench Width (m)	1.5
Trench Length (m)	108
Porosity	0.40

Elevation (m)	Trench Depth (m)	Trench Volume (m ³)	Storage Volume (m ³)	
116.50	0.00	0	0	
116.60	0.10	16	6	
116.65	0.15	24	10	2-Year
116.70	0.20	32	13	5-Year
116.74	0.24	39	16	10-Year
116.97	0.47	76	30	100-Year
117.10	0.60	97	39	

Discharge through an Orifice

$$Q = cA(2gh)^{1/2} \text{ (m}^3\text{/s)}$$

Invert Elevation (m)	116.50
Centroid Elevation (m)	116.59
Orifice Size (m)	0.178
Orifice Area (m ²)	0.025
C	0.60

Elevation (m)	Head (m)	Q (l/s)	
116.50	0.00	0	
116.60	0.01	7	
116.65	0.06	16	2-Year
116.70	0.11	22	5-Year
116.74	0.15	26	10-Year
116.97	0.38	41	100-Year
117.10	0.51	47	

Stormwater Management Calculations
Whelan Trucking
Stage-Storage-Discharge - B1

Stage-Storage-Discharge

Elevation (m)	Storage Volume (m ³)	Q (l/s)	
116.50	0	0	
116.60	6	7	
116.65	10	16	2-Year
116.70	13	22	5-Year
116.74	16	26	10-Year
116.97	30	41	100-Year
117.10	39	47	

Stormwater Management Calculations
Whelan Trucking
Storage Requirements - B2

2-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	77	34	18	16.1	9.7
15	62	27	18	9.5	8.6
20	52	23	18	5.3	6.3
25	45	20	18	2.2	3.4
40	33	14	18	-3.2	-7.6
55	26	12	18	-6.1	-20.2
70	22	10	18	-8.0	-33.6
85	19	8	18	-9.3	-47.4
100	17	7	18	-10.3	-61.6
115	15	7	18	-11.0	-75.9

Peak Storage Requirement - 2-Year (m³)	10
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5-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	104	46	23	22.3	13.4
15	84	37	23	13.3	11.9
20	70	31	23	7.4	8.9
25	61	27	23	3.3	4.9
40	44	19	23	-4.0	-9.7
55	35	15	23	-8.0	-26.5
70	29	13	23	-10.6	-44.4
85	25	11	23	-12.3	-62.8
100	22	10	23	-13.6	-81.7
115	20	9	23	-14.6	-100.9

Peak Storage Requirement - 5-Year (m³)	13
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Stormwater Management Calculations

Whelan Trucking

Storage Requirements - B2

10-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	122	54	27	26.4	16
15	98	43	27	15.7	14
20	82	36	27	8.8	11
25	71	31	27	4.0	6
40	52	23	27	-4.7	-11
55	41	18	27	-9.3	-31
70	34	15	27	-12.3	-52
85	30	13	27	-14.3	-73
100	26	11	27	-15.9	-95
115	23	10	27	-17.0	-118

Peak Storage Requirement - 10-Year (m ³)	16
--	----

100-Year Storm Event

Tc (min)	Intensity (mm/hr)	Flow (L/s)	Controlled Outflow (L/s)	Peak Flow to be Stored (L/s)	Volume of Storage Required (m ³)
10	179	95	42	52.4	31.4
15	143	76	42	33.4	30.1
20	120	64	42	21.3	25.5
30	92	49	42	6.4	11.5
45	69	37	42	-5.7	-15.5
60	56	30	42	-12.7	-45.8
75	47	25	42	-17.3	-77.9
90	41	22	42	-20.6	-111.1
105	36	19	42	-23.0	-145.1
120	33	17	42	-24.9	-179.6

Peak Storage Requirement - 100-Year (m ³)	31
---	----

Stormwater Management Calculations
Whelan Trucking
Stage-Storage-Dischage - B2

Storage

Bottom of Trench Elevation (m)	116.35
Trench Width (m)	1.5
Trench Length (m)	104
Porosity	0.40

Elevation (m)	Trench Depth (m)	Trench Volume (m³)	Storage Volume (m³)	
116.35	0.00	0	0	
116.51	0.16	25	10	2-Year
116.57	0.22	34	13	5-Year
116.61	0.26	41	16	10-Year
116.65	0.30	47	19	
116.85	0.50	78	31	100-Year
116.95	0.60	94	37	

Discharge through an Orifice

$$Q = cA(2gh)^{1/2} \text{ (m}^3\text{/s)}$$

Invert Elevation (m)	116.35
Centroid Elevation (m)	116.44
Orifice Size (m)	0.178
Orifice Area (m²)	0.025
C	0.60

Elevation (m)	Head (m)	Q (l/s)	
116.35	0.00	0	
116.51	0.07	18	2-Year
116.57	0.13	23	5-Year
116.61	0.17	27	10-Year
116.65	0.21	30	
116.85	0.41	42	100-Year
116.95	0.51	47	

Stormwater Management Calculations
Whelan Trucking
Stage-Storage-Dischage - B2

Stage-Storage-Discharge

Elevation (m)	Storage Volume (m ³)	Q (l/s)	
116.35	0	0	
116.51	10	18	2-Year
116.57	13	23	5-Year
116.61	16	27	10-Year
116.65	19	30	
116.85	31	42	100-Year
116.95	37	47	

APPENDIX E

QUALITY CONTROL CALCULATIONS

Stormwater Management Calculations
Whelan Trucking
Quality Control - B1

	B1
Total Area (m ²)	2460
Impervious Area (m ²)	2294
% Impervious	93%

**For quality purposes - gravel area has been included in the impervious calculation in an effort to be conservative

Table 3.2 Water Quality Storage Requirements based on Receiving Waters

Storage Volume (m³/ha) for Impervious Levels			
35%	55%	70%	85%
Normal - 70% TSS			
20	20	25	30
Enhanced - 80% TSS			
25	30	35	40

Water Quality Storage Requirements	42.7 m ³ /ha	*Extropolated
Area	0.25 ha	
Storage Requirements	10.50 m ³	

Storage Provided

$$V = LWD \times n \times f$$

MECP Equation 4.17

V =	m ³	Volume of water in trench
L =	108 m	Length of trench
W =	1.5 m	Width of trench
D =	0.60 m	Depth of water in trench
n =	0.4	Void Space in Trench
f =	0.5	Longevity Factor (Table 4.12)
V =	19 m ³	

As the volume of storage provided exceeds the volume of storage required, the proposed design is expected to provided the required enhanced level of quality control.

Stormwater Management Calculations
Whelan Trucking
Quality Control - B2

	B2
Total Area (m ²)	2542
Impervious Area (m ²)	2324
% Impervious	91%

**For quality purposes - gravel area has been included in the impervious calculation in an effort to be conservative

Table 3.2 Water Quality Storage Requirements based on Receiving Waters

Storage Volume (m ³ /ha) for Impervious Levels			
35%	55%	70%	85%
Normal - 70% TSS			
20	20	25	30
Enhanced - 80% TSS			
25	30	35	40

Water Quality Storage Requirements	42 m ³ /ha	*Extropolated
Area	0.25 ha	
Storage Requirements	10.68 m ³	

Storage Provided

$$V = LWD \times n \times f$$

MECP Equation 4.17

V =	m ³	Volume of water in trench
L =	104 m	Length of trench
W =	1.5 m	Width of trench
D =	0.60 m	Depth of water in trench
n =	0.4	Void Space in Trench
f =	0.5	Longevity Factor (Table 4.12)
V =	19 m ³	

As the volume of storage provided exceeds the volume of storage required, the proposed design is expected to provided the required enhanced level of quality control.

APPENDIX F

DOWNSTREAM DITCH CAPACITY REVIEW

Downstream Ditch Capacity Review

Whelan Trucking

Runoff Coefficient

Total Area (m ²)	22092	
Industrial Lots (m ²)	17092	
Runoff Coefficient (C)	0.50	
Road (m ²)	2000	*500m x 4m wide
Runoff Coefficient (C)	0.90	
Gravel Shoulder (m ²)	750	*500m x 1.5m wide
Runoff Coefficient (C)	0.60	
Grass Lined Ditch (m ²)	2250	*500m x (10m - 4m - 1.5m)
Runoff Coefficient (C)	0.20	
Weighted Runoff Coefficient (C)*	0.51	

Time of Concentration

Overland Flow Length	57	m	
Overland Slope	2	%	(Assumed)
Time of Concentration (Tc)	12	min	(Airport Formula)

Ditch Flow Length	500	m	
Ditch Slope	0.5	%	(Assumed)
Velocity	0.35	m/s	
Time of Concentration (Tc)	24	min	

Cumulative Tc	36	min	
----------------------	-----------	------------	--

Peak Flow

Weighted Runoff Coefficient (C)	0.51	
Total Area (ha)	2.21	
Time of Concentration (min)	36	
Intensity (mm/hr) - 100-Year	82	
Peak Flow (L/s) - 100-Year	350	*Includes restricted runoff rate for 158 Cardevco

Downstream Ditch Capacity Review
Whelan Trucking

Ditch Capacity - Front of 164 Cardevco Road

Ditch Invert =	116.06	m	
Edge of Shoulder Elev =	116.82	m	
Top of Slope Elev =	116.35	m	*backslope at PL
Max available ponding =	0.29	m	*Per backslope elevation at PL
Fore Slope =	21	%	
Back Slope =	6	%	*Calculated to PL

Roughness Coeff	0.03	
Channel Slope	0.52	%
Area	0.92	m ²
Wetted Perimeter	6.41	m
R	0.14	m
Q	610.67	L/s

As the maximum available capacity of the ditch in front of 164 Cardevco Road is greater than the anticipated 100-year peak flow, capacity of the immediate downstream system is not anticipated to be a concern

APPENDIX G

SITE PLAN

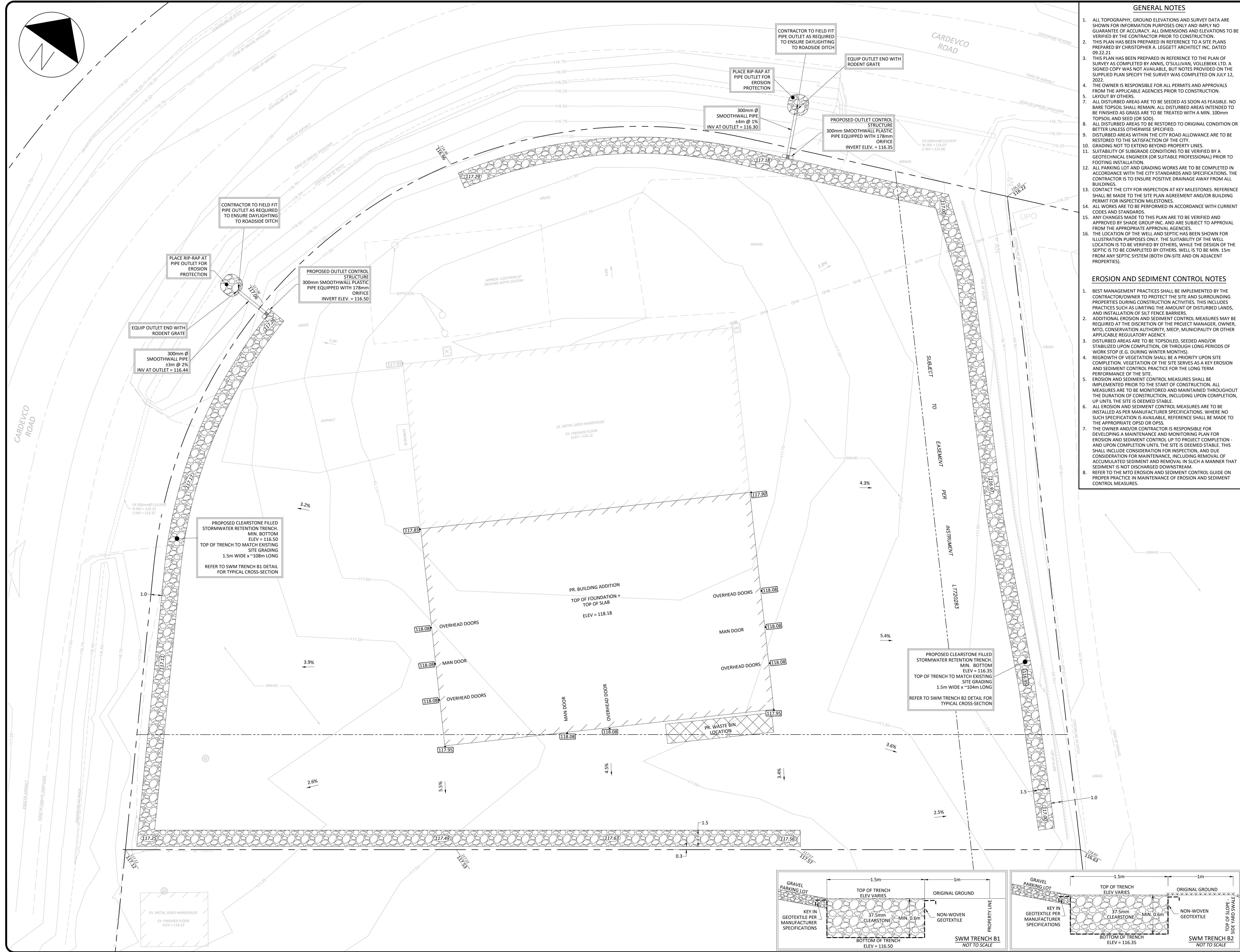
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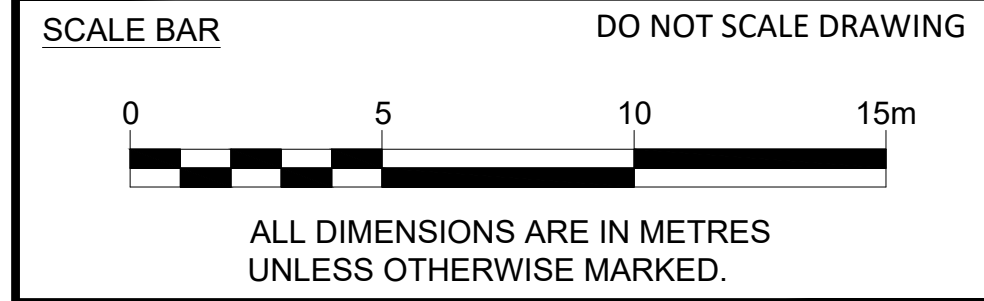
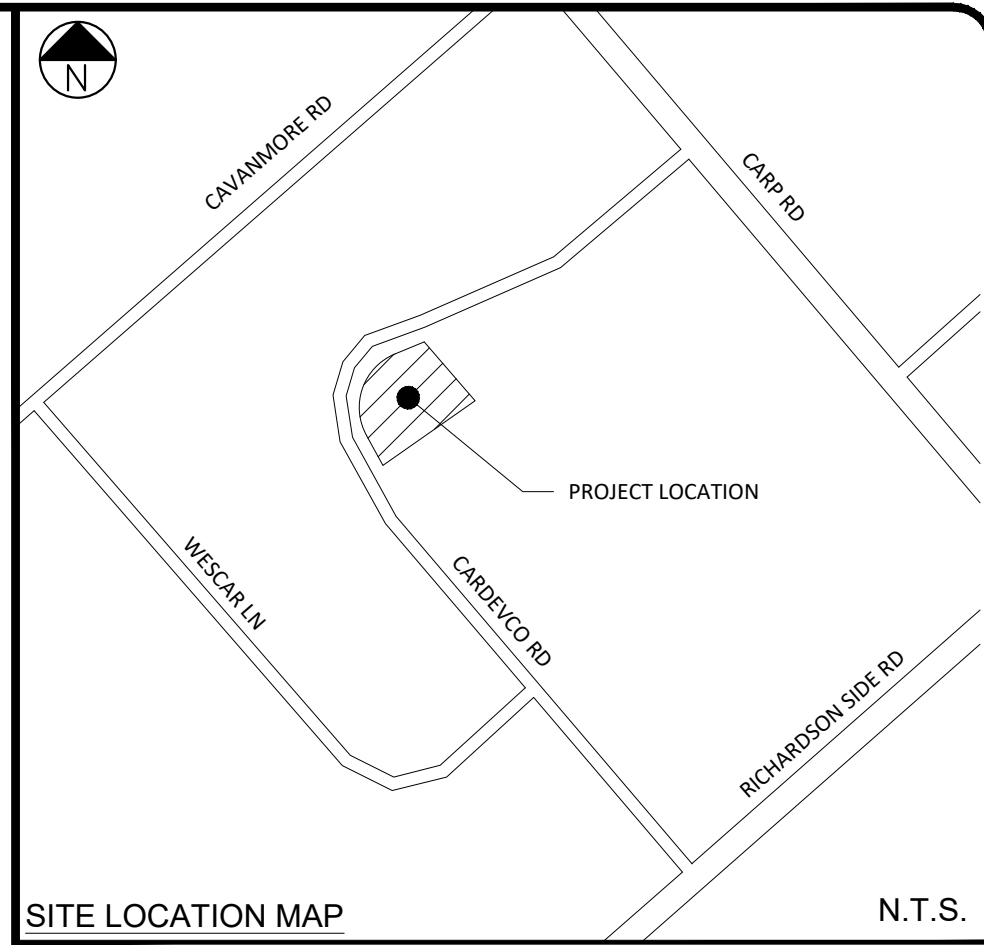
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DRAWN BY	SC	
DATE	09.22.21	
CHECKED BY	CL	
APPROVED BY	CL	
PROJECT NO.	DH-221-32	

APPENDIX H

ENGINEERING DESIGN DRAWINGS



- ### GENERAL NOTES
1. ALL TOPOGRAPHY, GROUND ELEVATIONS AND SURVEY DATA ARE SHOWN FOR INFORMATION PURPOSES ONLY AND IMPLY NO GUARANTEE OF ACCURACY. ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
 2. THIS PLAN HAS BEEN PREPARED IN REFERENCE TO A SITE PLANS PREPARED BY CHRISTOPHER A. LEGGETT ARCHITECT INC. DATED 09.22.21.
 3. THIS PLAN HAS BEEN PREPARED IN REFERENCE TO THE PLAN OF SURVEY AS COMPLETED BY ANNIS, O'SULLIVAN, VOLLEBEK LTD. A SIGNED COPY WAS NOT AVAILABLE, BUT NOTES PROVIDED ON THE SUPPLIED PLAN SPECIFY THE SURVEY WAS COMPLETED ON JULY 12, 2022.
 4. THE OWNER IS RESPONSIBLE FOR ALL PERMITS AND APPROVALS FROM THE APPLICABLE AGENCIES PRIOR TO CONSTRUCTION.
 5. LAYOUT BY OTHERS.
 6. ALL DISTURBED AREAS ARE TO BE SEED AS SOON AS FEASIBLE. NO BARE TOPSOIL SHALL REMAIN. ALL DISTURBED AREAS INTENDED TO BE FINISHED AS GRASS ARE TO BE TREATED WITH A MIN. 100mm TOPSOIL AND SEED (OR SOD).
 7. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
 8. DISTURBED AREAS WITHIN THE CITY ROAD ALLOWANCE ARE TO BE RESTORED TO THE SATISFACTION OF THE CITY.
 9. GRADING NOT TO EXTEND BEYOND PROPERTY LINES.
 10. SUITABILITY OF SUBGRADE CONDITIONS TO BE VERIFIED BY A GEOTECHNICAL ENGINEER (OR SUITABLE PROFESSIONAL) PRIOR TO FOOTING INSTALLATION.
 11. ALL PARKING LOT AND GRADING WORKS ARE TO BE COMPLETED IN ACCORDANCE WITH THE CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO ENSURE POSITIVE DRAINAGE AWAY FROM ALL BUILDINGS.
 12. CONTACT THE CITY FOR INSPECTION AT KEY MILESTONES. REFERENCE SHALL BE MADE TO THE SITE PLAN AGREEMENT AND/OR BUILDING PERMIT FOR INSPECTION MILESTONES.
 13. ALL WORKS ARE TO BE PERFORMED IN ACCORDANCE WITH CURRENT CODES AND STANDARDS.
 14. ANY CHANGES MADE TO THIS PLAN ARE TO BE VERIFIED AND APPROVED BY SHADE GROUP INC. AND ARE SUBJECT TO APPROVAL FROM THE APPROPRIATE APPROVAL AGENCIES.
 15. THE LOCATION OF THE WELL AND SEPTIC HAS BEEN SHOWN FOR ILLUSTRATION PURPOSES ONLY. THE SUITABILITY OF THE WELL LOCATION IS TO BE VERIFIED BY OTHERS. WHILE THE DESIGN OF THE SEPTIC IS TO BE COMPLETED BY OTHERS, WELL IS TO BE MIN. 15m FROM ANY SEPTIC SYSTEM (BOTH ON-SITE AND ON ADJACENT PROPERTIES).
- ### EROSION AND SEDIMENT CONTROL NOTES
1. BEST MANAGEMENT PRACTICES SHALL BE IMPLEMENTED BY THE CONTRACTOR/OWNER TO PROTECT THE SITE AND SURROUNDING PROPERTIES DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES PRACTICES SUCH AS LIMITING THE AMOUNT OF DISTURBED LANDS, AND INSTALLATION OF SILT FENCE BARRIERS.
 2. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED AT THE DISCRETION OF THE PROJECT MANAGER, OWNER, MTO, CONSERVATION AUTHORITY, MCEP, MUNICIPALITY OR OTHER APPLICABLE REGULATORY AGENCY.
 3. DISTURBED AREAS ARE TO BE TOPSOILED, SEED AND/OR STABILIZED UPON COMPLETION, OR THROUGH LONG PERIODS OF WORK STOP (E.G. DURING WINTER MONTHS).
 4. REGROWTH OF VEGETATION SHALL BE A PRIORITY UPON SITE COMPLETION. VEGETATION OF THE SITE SERVES AS A KEY EROSION AND SEDIMENT CONTROL PRACTICE FOR THE LONG TERM PERFORMANCE OF THE SITE.
 5. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO THE START OF CONSTRUCTION. ALL MEASURES ARE TO BE MONITORED AND MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION, INCLUDING UPON COMPLETION, UP UNTIL THE SITE IS DEEMED STABLE.
 6. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED AS PER MANUFACTURER SPECIFICATIONS. WHERE NO SUCH SPECIFICATION IS AVAILABLE, REFERENCE SHALL BE MADE TO THE APPROPRIATE OPSD OR OPS.
 7. THE OWNER AND/OR CONTRACTOR IS RESPONSIBLE FOR DEVELOPING A MAINTENANCE AND MONITORING PLAN FOR EROSION AND SEDIMENT CONTROL UP TO PROJECT COMPLETION - AND UPON COMPLETION UNTIL THE SITE IS DEEMED STABLE. THIS SHALL INCLUDE CONSIDERATION FOR INSPECTION, AND DUE CONSIDERATION FOR MAINTENANCE, INCLUDING REMOVAL OF ACCUMULATED SEDIMENT AND REMOVAL IN SUCH A MANNER THAT SEDIMENT IS NOT DISCHARGED DOWNSTREAM.
 8. REFER TO THE MTO EROSION AND SEDIMENT CONTROL GUIDE ON PROPER PRACTICE IN MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES.



PAGE SIZE	24" x 36"	SCALE	1:150
SHADE GROUP INC. PO BOX 1716 ALMONTE, ON K0A 1A0			

SITE BENCHMARK	MAG NAIL AND WASHER IN UTILITY POLE ON NORTH SIDE OF CARDEVCO ROAD, DIRECTLY EAST OF ENTRANCE TO HARRIS REBAR. ELEVATION=117.72
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LEGEND (IF APPLICABLE)	
---	PROPERTY BOUNDARY
---	EASEMENT
---	EX. ROAD CENTRE LINE
---	EX. EDGE OF ASPHALT
---	EX. EDGE OF SHOULDER
---	EX. DITCH
---	EX. OVERHEAD UTILITIES
---	EX. CONTOUR AND ELEVATION
---	EX. BUILDING
---	EX. SPOT ELEVATION
---	EX. DRAINAGE DIRECTION & SLOPE
---	EX. UTILITY POLE
---	PR. BUILDING
---	PR. DESIGN ELEVATION
---	PR. DRAINAGE DIRECTION & SLOPE
---	MATCH EXISTING SPOT ELEVATION
---	LOT CORNER GRADES
---	PR. STORMWATER TRENCH
---	PR. OUTLET CONTROL STRUCTURE

00	60% DESIGN ISSUED FOR REVIEW AND COMMENT	DEC 2, 2022
REV. #	REVISION DESCRIPTION	DATE

STAMP		
NOT FOR CONSTRUCTION		

PROJECT TITLE	WHELAN TRUCKING - BUILDING ADDITION	
DRAWING TITLE	SITE SERVICING, GRADING AND DRAINAGE PLAN	
DRAWING NO.	1 OF 1	