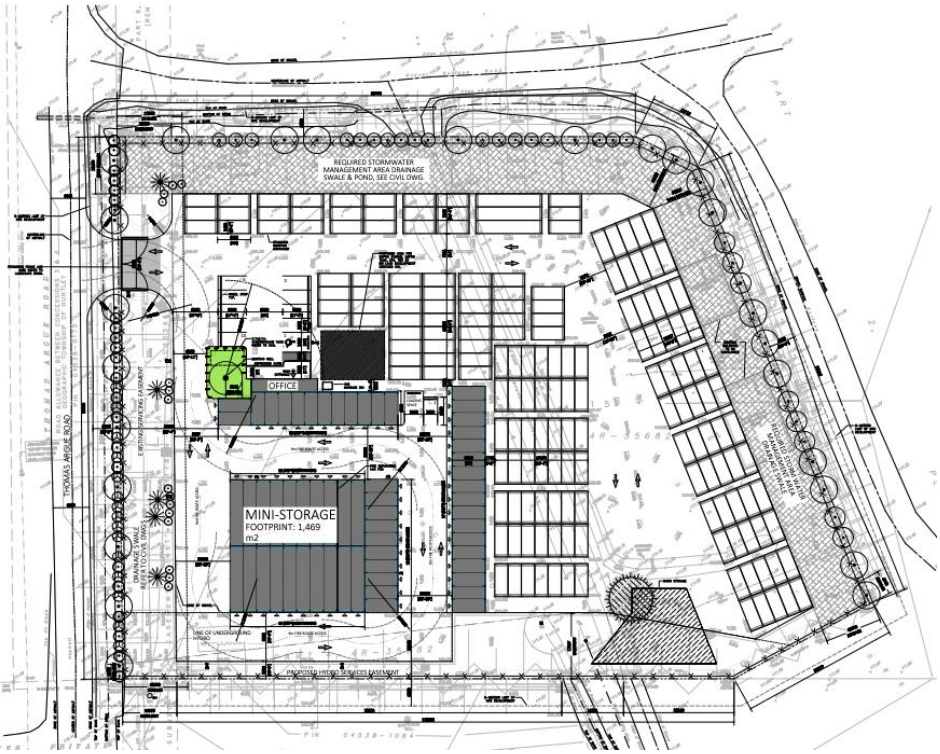
SERVICING & STORMWATER MANAGEMENT REPORT
BIG STEEL BOX – 1508 THOMAS ARGUE ROAD



Project No.: CCO-24-2505

City File No.:D07-12-25-0127

Prepared for:
Big Steel Box
1000-1631 Dickson Ave
Kelowna, BC, V1Y OB5

Prepared by:
Egis Canada Ltd.
750 Palladium Drive, Suite 310
Kanata, ON K2V 1C7

Submitted: Sep. 03, 2025
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egis

Table of Content

1.0 PROJECT DESCRIPTION 1
1.1 Purpose 1
1.2 Site Description 1
1.3 Proposed Development and Statistics 2
1.4 Existing Conditions and Infrastructure 2
1.5 Approvals 2
2.0 BACKGROUND STUDIES, STANDARDS, AND REFERENCES 2
2.1 Background Reports / Reference Information 2
2.2 Applicable Guidelines and Standards 3
3.0 PRE-CONSULTATION SUMMARY 4
4.0 WATER SERVICING 5
4.1 Existing Watermain 5
4.2 Proposed Water Servicing 5
5.0 SANITARY SERVICING 7
5.1 Existing Sanitary Sewers 7
5.2 Proposed Sanitary Servicing 7
6.0 STORM SEWER SERVICING 8
6.1 Existing Storm Sewers 8
6.2 Proposed Storm Servicing 8
7.0 PROPOSED STORMWATER MANAGEMENT 9
7.1 Design Criteria and Methodology 9
7.2 Runoff Calculations 9
7.3 Pre-Development Drainage 10
7.4 Post-Development Drainage 10
7.5 Quality Control 11
7.6 Carp River Watershed 12

8.0 SUMMARY 13

9.0 RECOMMENDATIONS 14

10.0 STATEMENT OF LIMITATIONS 15

Appendices

Appendix A: Site Location Plan

Appendix B: Background Documents

Appendix C: Watermain Calculations

Appendix D: Sanitary Design

Appendix E: Pre-Development Drainage Plan

Appendix F: Post-Development Drainage Plan

Appendix G: Stormwater Management Calculations

1.0 PROJECT DESCRIPTION

1.1 Purpose

Egis Canada (Egis) has been retained by Big Steel Box to prepare this Servicing and Stormwater Management Report in support of the site plan control application for the proposed development located at 1508 Thomas Argue Road within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Mississippi Valley Conservation Authority (MVCA), and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary, and storm sewer servicing for the development, ensuring that existing and proposed services will adequately service the development.

This report should be read in conjunction with the following drawings:

- CCO-24-2505, C101 – Lot Grading, Drainage, Servicing, Erosion & Sediment Control Plan
- CCO-24-2505, PRE – Pre-Development Drainage Area Plan (Appendix 'E'), and
- CCO-24-2505, POST – Post-Development Drainage Area Plan (Appendix 'F').

1.2 Site Description



Figure 1: Site Map

The subject property, herein referred to as the site, is located at 1508 Thomas Argue Road within the West Carleton-March Ward. The property is described as Part of Lot 15, Concession 3, Geographic Township of Huntley, City of Ottawa. The site covers approximately 1.2 ha and is currently zoned T1B (Airport Transportation Facility subzone – Carp Airport).

1.3 Proposed Development and Statistics

The proposed development consists of a shipping container rental and sales service. Stacked shipping containers will be stored throughout the property, and a small office building is proposed. Three outdoor self storage facilities constructed from shipping containers are proposed and will herein be referred to as mini-storage buildings.

1.4 Existing Conditions and Infrastructure

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal rights-of-way (ROW):

- Thomas Argue Road
  - 300 mm diameter privately owned PVC watermain

1.5 Approvals

The proposed development is subject to the City of Ottawa site plan control approval process. Site plan control requires the City to review, provided concurrence and approve the engineering design package. Permits to construct can be requested once the City has issued a site plan agreement.

An Environmental Activity and Sector Registry (EASR) through the Ministry of Environment, Conservation and Parks (MECP) has been noted as a possible requirement as the shipping container storage and self storage is expected to be considered an industrial usage.

2.0 BACKGROUND STUDIES, STANDARDS, AND REFERENCES

2.1 Background Reports / Reference Information

As-built drawings of existing services, provided by the City of Ottawa information centre, within the vicinity of the proposed site were reviewed to identify the infrastructure available to service the proposed development.

A topographic survey (AD10800) of the site was completed by Fairhall Moffatt & Woodland and dated November 18th, 2023.

The Site Plan was prepared by Nicholas Caragianis Architect Inc..

The Geotechnical Report was prepared by Gemtec and dated June 4, 2024.

The following reports have previously been completed and are available under separate cover:

- Carp River Watershed/Subwatershed Study completed by Robinson Consultants, dated December 2004 (Report #00056)
- Hydraulic Network Analysis (R-2013-172) completed by Novatech, dated November 2014.

2.2 Applicable Guidelines and Standards

City of Ottawa:

- Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (***Ottawa Sewer Guidelines***)
  - Technical Bulletin ISTB-2014-01 City of Ottawa, February 2014***. (ISTB-2014-01)***
  - Technical Bulletin PIEDTB-2016-01 City of Ottawa, September 2016. ***(PIEDTB-2016-01)***
  - Technical Bulletin ISTB-2018-01 City of Ottawa, January 2018. ***(ISTB-2018-01)***
  - Technical Bulletin ISTB-2018-04 City of Ottawa, March 2018. ***(ISTB-2018-04)***
  - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. ***(ISTB-2019-02)***
  - Technical Bulletin IWSTB-2024-04 City of Ottawa, September 2024. ***(ISTB-2024-04)***
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (***Ottawa Water Guidelines***)
  - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. ***(ISD-2010-2)***
  - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. **(ISDTB-2014-02)**
  - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. ***(ISTB-2018-02)***
  - Technical Bulletin ISTB-2021-03 City of Ottawa, August 2021. ***(ISTB-2021-03)***
  - Technical Bulletin IWSTB-2024-05 City of Ottawa, November 2024. ***(IWSTB-2024-05)***

Ministry of Environment, Conservation and Parks:

- Design Guidelines for Drinking-Water Systems, Ministry of the Environment, 2008. (***MECP Water Design Guidelines)***
- Stormwater Planning and Design Manual, Ministry of the Environment, March 2003. ***(MECP Stormwater Design Manual)***
- Design Guidelines for Sewage Works, Ministry of the Environment, 2008. (***MECP Sewer Design Guidelines***)

Other:

- Water Supply for Public Fire Protection, Fire Underwriters Survey, 2020. (***FUS Guidelines***)

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on August 22nd, 2023, regarding the proposed site. Specific design parameters to be incorporated within this design include the following:

- Control 2- through 100-year post-development flows to the 2-year pre-development flow with a combined C value to a maximum of 0.50.
- Quality control to be provided up to an enhanced level of treatment (80% TSS removal)

The notes from the City of Ottawa can be found in ***Appendix B.***

4.0 WATER SERVICING

4.1 Existing Watermain

There is an existing privately owned 300mm diameter PVC watermain running southeast to northwest within an easement located along the property frontage. The existing watermain, owned and operated as part of a common element of the adjacent condominium corporation, is intended for exclusive use for the purposes of fire protection and not intended for internal servicing or domestic drinking water supply. There is one existing fire hydrant that will be located within 150m of the proposed office and mini-storage buildings.

4.2 Proposed Water Servicing

A new well has been drilled adjacent to the proposed office building to provide the office with domestic water supply.

For the purposes of this application, the anticipated water demands have been assumed to be directly related to the anticipated sewage flow demands for the development. Based on the septic system design, the calculated sewage flow demand was found to be 375 L/day. For comparison and information purposes only, water demand calculations have also been calculated to adhere to the Ottawa Design Guidelines – Water Distribution manual and can be found in Appendix 'C'. ***Table 1***, below, summarizes the estimated water demands based on City of Ottawa guidelines.

Table 1: Water Supply Design Criteria and Water Demands

Site Area	1.22 ha
Mini-Storage & Office Area:	1,236 m^2
Industrial	35,000 L/gross ha/day
Industrial Peaking Factor (Max Day)	1.5 x avg. day
Industrial Peaking Factor (Peak Hour)	1.8 x max. day
Average Day Demand (L/s)	0.05
Maximum Daily Demand (L/s)	0.08
Peak Hourly Demand (L/s)	0.14
OBC Fire Flow Requirement (L/s) (Max)	45 (2,700 L/min)
OBC Water Storage Requirement (L)	Q = 105,998

Remote fire protection will be required for the office building as well as the mini-storage buildings. As the remaining shipping containers are not generally accessible to the public, and not in a fixed or permanent location, they are not considered buildings and do not require an available water supply for fire protection.

Fire protection is proposed to be provided by on-site water supply. An underground concrete water storage tank is proposed in the landscaped area next to the existing well. Given the proximity to the building, a dry hydrant will be located near the site entrance and connected to the storage tank for OFS access.

Fire protection requirements were determined based on IWSTB-2024-05, as while there is one hydrant available to service the development, it will not be within 90m of any building to satisfy OBC access route requirements. A connection to the existing watermain will also not be permitted as additional connections were not contemplated within the Municipal Responsibility Agreement between the owner of the private watermain and the City. As sprinkler systems are not proposed, the Ontario Building Code method shall be used to determine the required water supply. Should the required fire flow reach 9,000 L/min, the Fire Underwriters Survey and NFPA1142 calculation must also be provided.

The following parameters were used in the OBC calculation:

- Type of construction – Noncombustible without fire resistance ratings.
- Occupancy Type: Group F-2 – Medium-hazard Industrial
- Water Supply Coefficient (K): 27

The results of the calculation yielded a maximum required fire flow of 2,700 L/min, and a maximum volume requirement (Q) of **105,998 litres.**

As Ottawa Fire Services is Superior Tanker Shuttle Service accredited to provide 1,900 L/min for commercial lines, a reduction in the required storage volume of up to **57,000 litres** (1,900 L/min x 30 min) applies per IWSTB-2024-05.

There is also an existing hydrant located southwest of the site, fronting the pump station located at the corner of Thomas Argue Road and Wingover Private. As per the Novatech Hydraulic Analysis (R-2013-172) dated November 2014, an available fire flow of at least 63.08 L/s or 3,784.8 L/min for 30 minutes is provided throughout the entire watermain network. While the existing hydrant has a light blue bonnet that would typically indicate an "A-A" rating, it has been assumed the hydrant has a "B" rating given the available fire flow is less than 3,800 L/min. As per ISTB-2018-02, it is therefore expected that an available fire flow of 1,500 L/min or an available volume of (1,500 L/min * 30 min) = **45,000 litres** can be relied upon from this hydrant.

It is estimated that a total on-site storage volume of (105,998 – 57,000 – 45,000) = **3,998 litres** will be required. As this is below the minimum required tank size of **38,000 litres**, it is proposed to provide fire protection with a single **38,000 litre** concrete water storage tank. Ottawa Fire Services has been contacted to confirm the required storage volume and confirmation has been included within Appendix 'C'.

5.0 SANITARY SERVICING

5.1 Existing Sanitary Sewers

The subject site is currently undeveloped with no access to a municipal sanitary sewer.

5.2 Proposed Sanitary Servicing

A new septic bed located northeast of the proposed office will be installed and sized to accommodate the development.

Total Daily Design Sanitary Sewage Flow (TDDSSF) was calculated by DW Land Development Services as 375 L/day. It is understood that approval of on-site septic treatment will be governed by OBC, as the Daily Design Flow will be less than 10,000 L/day. Refer to the preliminary septic design completed by DW Land Development Services included in Appendix 'D', which will be submitted to the Ottawa Septic System Office (OSSO) for the required permits and approvals once finalized.

In summary, the septic system has been designed using a Class 4 leaching bed, in combination with an Eljen treatment system to treat up to 375 L/day of effluent. The double-chamber septic tank is proposed to hold a minimum 3,600 L and include an effluent filter.

For further design information pertaining to the on-site sewage system, please refer to the preliminary septic design completed by DW Land Development Services included within Appendix 'D'.

6.0 STORM SEWER SERVICING

6.1 Existing Storm Sewers

There are no existing storm sewers within the subject site or the adjacent municipal ROW. A municipal ditch fronts the subject site along Thomas Argue Road and drains northwest. Existing private ditches are located adjacent to the access roads located within the site and northeast of the site.

6.2 Proposed Storm Servicing

Surface drainage will be directed away from the proposed buildings and shipping containers and towards a perimeter swale located along the property boundary. Flow restrictions will be provided at the swale outlet, and the restriction of runoff will result in ponding within the swale

See CCO-24-2505 - *POST* in ***Appendix F*** of this report for more details. The Stormwater Management design for the subject property will be outlined in Section 7.0.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed buildings and towards a perimeter swale. The perimeter swale will convey surface runoff towards an orifice and weir located along the property frontage. The restriction of runoff will result in ponding within the swale.

Based on the geotechnical report prepared by Paterson Group, foundation drainage has not been identified as a requirement for the office or mini-storage buildings.

External drainage currently directed to the site will be intercepted by proposed swales outside of the property limits and directed towards the municipal ditch along Thomas Argue Road.

The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the City:

Quality Control

- Quality control will be provided up to an enhanced level of treatment (80% TSS removal) by a treatment train approach including an oil and grit separator unit

Quantity Control

- Post development 2- to 100-year peak flow will be restricted to match the existing 2-year peak flow with a calculated C-value no greater than 0.50.

7.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where: C = Runoff coefficient
I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)
A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the *City of Ottawa - Sewer Design Guidelines*, the 2/5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

7.3 Pre-Development Drainage

The existing on-site and adjacent off-site drainage limits are demonstrated on the Pre-Development Drainage Area Plan included in ***Appendix E***. It has been assumed that the development area contains no existing stormwater management controls for flow attenuation. In the existing condition, the site is divided by a private road with a roadside ditch that conveys runoff towards the Thomas Argue Road municipal ditch.

Table 2: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (2-Year)	Runoff Coefficient (100-Year)	2-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)
A1	1.22	0.32	0.40	65.08	186.87
Total	**1.22**			**65.08**	**186.87**

7.4 Post-Development Drainage

The proposed on-site and adjacent off-site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-24-2505 - *POST* in ***Appendix F*** of this report for more details. A summary of the Post-Development Runoff Calculations within the site can be found below. For external drainage areas, please refer to Appendix 'G'.

Table 3: Post-Development Uncontrolled Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (2/100-Year)	Tc (min)	2-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)
B1	1.22	0.61 / 0.72	10	157.20	432.19
Total	**1.22**	**-**	**10**	**157.20**	**432.19**

See ***Appendix G*** for calculations.

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from area ***B1*** will be restricted as shown in the table below, and the onsite storage will be provided via surface storage within the proposed swale.

Table 4: Post-Development Controlled Runoff Summary

Drainage Area	Area (ha)	2-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)	100-Year Storage Required (m^3)	100-Year Storage Available (m^3)
B1	1.22	30.61	62.41	288.1	296.5
Total	**1.22**	**-**	**-**	**288.1**	**296.5**

Restriction of runoff for the 2-year event will be provided by a 100 mm diameter orifice. The orifice will be plug style and circular in shape, fastened to the inlet of the 375 mm OGS intake pipe. The orifice will be placed at an elevation of 110.81 m and restrict runoff to a maximum release rate of ***30.61 L/s*** during the 2-year event, resulting in a water surface elevation of 111.01 m and a ponding depth of ***0.20 m***. A storage volume of ***95.2 m^3*** will be provided during the 2-year event.

A rip-rap lined weir is proposed with a crest invert of 111.25 m. Smaller events will be controlled by the orifice alone, however, during larger storm events, the weir will activate to provide additional discharge. Restriction of runoff from the orifice and weir combination will result in a maximum release rate of ***62.41 L/s*** during the 100-year event. The corresponding water surface elevation will be 111.31 m, resulting in a ponding depth of ***0.49 m***. A storage volume of ***296.5 m^3*** will be provided during the 100-year event.

Should runoff exceed the 100-year event, a spill point has been placed along the property line at an elevation of 111.62 m to direct excess runoff towards the City ROW.

Following development of the site, the existing private access that divides 1508 Thomas Argue will be removed along with the private access ditch. This will create the need to redirect runoff that is directed towards 1508 Thomas Argue in the existing condition. A cutoff swale is proposed southeast of the property to convey drainage from 29 Aerostar Private towards Thomas Argue road. Along the northeast and northwest perimeter of 1508 Thomas Argue Road, it is proposed to regrade the existing private roadway ditch to provide a constant slope and ensure adequate capacity. Capacity calculations have been included within Appendix 'G' to demonstrate the capacity of the new cutoff swale, regraded ditch, and municipal ditch along the property frontage. Existing and proposed external drainage patterns can be seen within the Pre- and Post-Development Drainage Area Plans.

7.5 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level MBP's typically include temporary retention of the parking lot runoff, minimizing ground slopes, and maximizing landscapes areas.

Runoff from the drive aisles and parking lot will be directed towards a proposed perimeter grass swale. The grassed swale has been designed with minimal slope to reduce runoff velocity and promote filtration and settlement of suspended solids. The proposed grassed swales will additionally store stormwater up to a maximum depth of 0.49 m, which will provide an extended opportunity for settlement.

To ensure the quality control criteria is met, the perimeter swale will discharge stormwater to an oil and grit separator unit before runoff is conveyed to the municipal ditch.

7.6 Carp River Watershed

As the subject site is located within the Carp River Watershed, the site must conform to the findings of the Carp River Watershed Subwatershed Study. Concurrence with the findings and recommendations of the study are listed below:

- Maintain low flow runoff in Summer

Based on the proposed stormwater management design, runoff will be overcontrolled for all events up to and including the 100-year storm.

- Maintain groundwater recharge

The proposed site is identified as an area of Significant Groundwater Recharge, with a target infiltration rate of 104 mm/year. The feasibility of an infiltration-based design was explored for this site, however, based on the findings of the geotechnical report prepared by Gemtec, the site is heavily constrained by high groundwater and soils with low hydraulic conductivity. As noted within the geotechnical report, native deposits of silty clay were encountered below the topsoil and fill material in all boreholes where shallow refusal did not occur. The fill material itself is variable in composition but generally consists of silty sand with varying amounts of clay to sandy silt with trace clay, to silty clay. The groundwater level was generally measured between 110.5 m and 110.7 m, with outlier readings of 105.3 m and 111.3 m.

Based on the guidelines listed in Technical Bulletin IWSTB-2024-04 – "Screening Criteria – Infiltration-type LIDs for Development", infiltration-type LID practices are not permitted in clay or silt soils, nor in soils that warrant a dual classification with silt or clay as per the Unified Soil Classification System.

As the site is poorly suited for infiltration, the infiltration target of 104 mm/year will not be achievable.

- Preserve thermal regime within stream courses

The site plan proposes no asphalt surfacing, with the drive aisles and parking lot to consist of gravel. The perimeter of the development will contain soft landscaping. Runoff from the gravel surface will be directed towards the landscaped perimeter, where gently sloped swales will direct runoff towards the outlet. Runoff will have an opportunity to cool as it's directed towards the outlet, and also while it is temporarily stored within the storage swale. Runoff leaving the site will then be conveyed within a municipal ditch for approximately 840 metres before discharging to the downstream watercourse, providing further opportunity for runoff to cool. As a result, thermal impacts on the receiving watercourse are not anticipated.

8.0 SUMMARY

- A new self storage facility and shipping container rental and sales business is proposed at 1508 Thomas Argue Road.
- Water servicing will be provided by a new drilled well located northeast of the office building.
- Fire protection will be provided by a single 38,000 litre concrete water storage tank connected to a dry hydrant.
- Sanitary servicing will be provided by a new septic system designed by DW Land Development Services
- Stormwater management will be provided by an orifice and weir combination. Runoff will be restricted to match the existing 2-year release rate.
- Quality control will be provided by a treatment train approach including an oil and grit separator unit.

9.0 RECOMMENDATIONS

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management Report in support of the proposed development at 1508 Thomas Argue Road.

This report is respectfully being submitted for approval.

Regards,

Egis Canada Ltd.



Robert Freel, P.Eng.
Senior Project Manager, Land Development
E: Robert.freel@egis-group.com

Francis Valenti, P.Eng.
Junior Project Engineer, Land Development
E: francis.valenti@egis-group.com

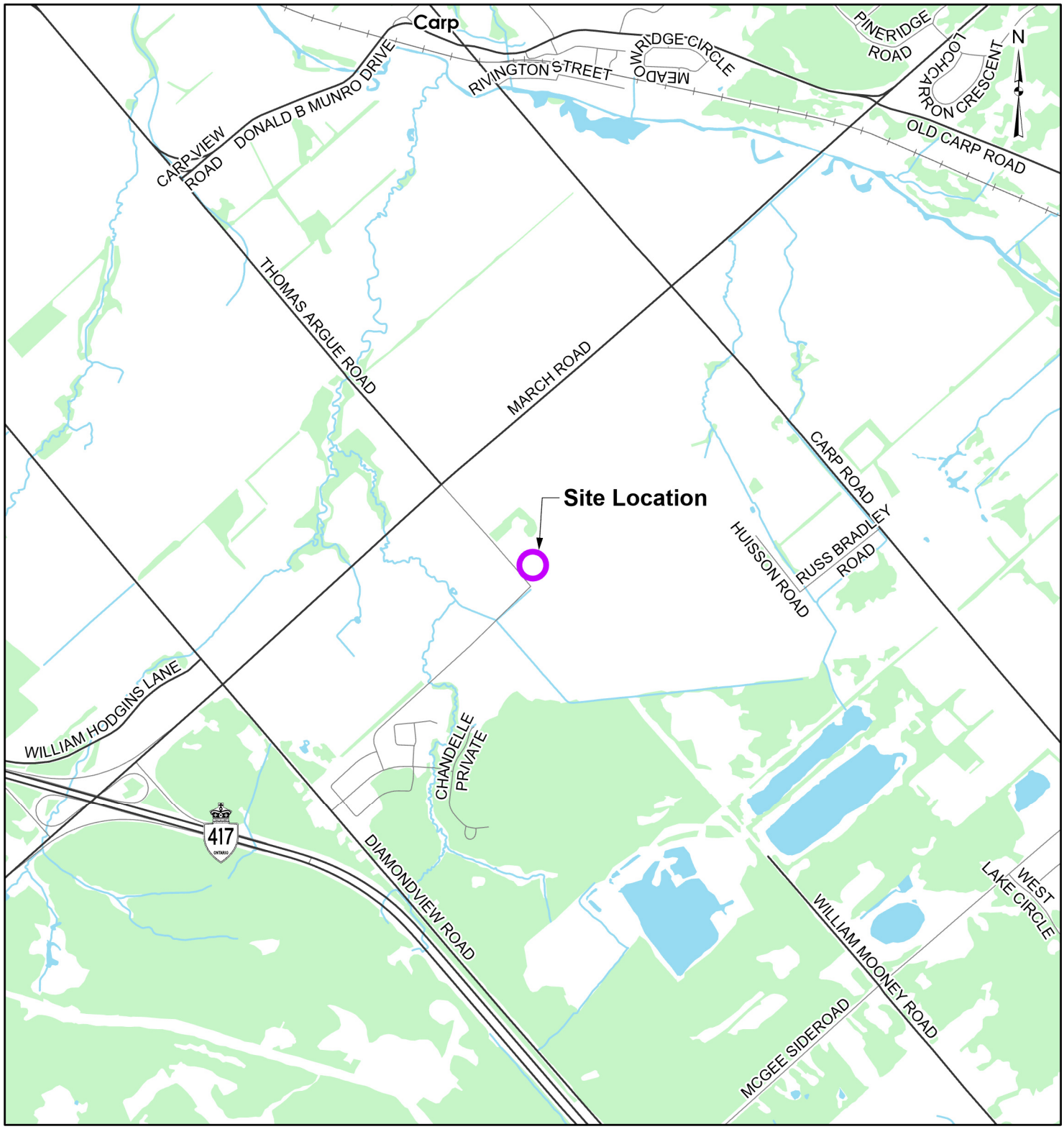
10.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of Big Steel Box. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Conservation and Parks, City of Ottawa and local approval agencies. Egis Canada reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by Egis Canada and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. Egis Canada accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, Egis Canada should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN



800 400 0 800

Scale 1:25,000 Metres

LEGEND

- Site Location
- Local Road
- Major Road
- Railroad
- Watercourse
- Waterbody
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2025.

CLIENT: BIG STEEL BOX

PROJECT: 1508 THOMAS ARGUE ROAD

TITLE: SITE LOCATION

egis
750 Palladium Dr, Suite 310, Kanata, ON K2V 1C7
Tel: 613-836-2184 Fax: 613-836-3742

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APPENDIX B
BACKGROUND DOCUMENTS

File No.: PC2023-0192

Tamara Nahal
Fotenn Planning and Design
Via email: nahal@fotenn.com

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application –1508 Thomas Argue Road

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 22, 2023.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☒	**3** ☐	**4** ☐	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 2 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline

the specific requirements that must be met for each plan or study to be deemed adequate.

b. Additional information regarding fees related to planning applications can be found here.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. The subject site is designated Rural Countryside on Schedule B9 – Rural Transect of the Official Plan.

2. Permitted uses within the Rural Countryside designation include small scale light industrial and commercial uses when certain criteria are met, please refer to Policy 9.2 (2)(b) to review criteria.

3. Area-specific policies are statutory policy documents that form part of the Official Plan.

    a. The subject property is located within the Carp Airport Area under the Area-specific policies – Volume 2C. of the Official Plan, see Area-Specific Policy Plan Area 8 – Volume 2C.

    b. As per Policy 8.7 (a) of the Area-specific policies 2C., permitted land uses on land designated as Carp Airport Area include airport and related facilities; light industrial uses; convenience commercial uses, restaurants, hotel, instructional facilities, institutional uses, professional offices and a dwelling unit limited to occupancy by a caretaker, security guard, or person providing similar onsite service.

4. The site is zoned as T1B Subzone – Carp Airport. Some of the permitted uses include light industrial uses, storage yard, and warehouse.

5. The proposed development requires a Site Plan Control Application.

6. This development is proposing to include an office building. Therefore, a sewage and septic system will be required. As per Policy 4.7.1 (5), this site is required to be privately serviced (private well and private sewage system). The proposed locations should be shown on the Site Plan.

7. The proposed development must comply with the current Transport Canada guidelines as it is in the vicinity of the Carp Airport (Policy 10.2.2 (11)).

8. The City of Ottawa has recently updated their Terms of Reference, which outline submission requirements used to deem an application complete. Please ensure all plans, reports and studies meet the requirements of the new Terms of Reference. Some examples for the Site Plan are as follows:

    a. Provide the gross floor area of the proposed office building.

    b. Provide dimensions of all proposed drive aisles (laneways), private approaches (driveways) and required parking spaces.

    c. Ensure dimensions are shown in metric units.

    d. The Site Plan should list the zoning provisions in a chart which clearly identify the required and provided information for each zoning provision.

    e. Identify the location for the well and septic system.

    f. Provide landscaped areas.

9. The provided business plan suggests the shipping containers will be loaded and unloaded at the customer's own property. Once loaded, the shipping container will be picked up at the owner's property and driven to the Thomas Argue site to be stored. As the shipping containers are intended to be moved on a semi-regular basis, they are not considered buildings therefore, they are not considered a warehouse. The use would be considered a storage yard. Should the shipping containers be stored on a permanent basis for the proposed ministorage facility, they would for zoning purposes, be considered buildings and would be considered part of a warehouse use.

10. Minimum parking space rate must be in accordance with Part 4 – Section 101 of the Zoning By-law. The Rural Area is identified as Area D on Schedule 1A of Table 101.

    The land use of Storage Yard (N88) requires 1 parking space per 100 m^2 of gross floor area. As noted above, storage containers would not be considered as buildings and therefore would not count towards gross floor area. However, the office building will count towards gross floor area, and will need to meet the minimum parking space rate.

11. The Carp Road Corridor Community Design Plan Policy 7.2(2) requires a berm or green landscaped edges to hide more unsightly uses within the Corridor. Please include screening of the storage along the frontage of Thomas Argue.

12. For the purpose of this application, the semi-permanent shipping containers to be used as the mini storage facility would be considered buildings under the Zoning By-law. Each container would be considered its own building, so each would have to adhere to the 10m distance from another building as per the T1B Zone. Otherwise, a Minor Variance or Zoning By-law Amendment would have to be

obtained to permit the structures to be closer than 10m from one another. For initial comments on Minor Variance applications, please contact panel3_planners@ottawa.ca with details of the requested variance.

13. Outdoor storage in the T1B Zone does not have any setback requirements. Buildings on the lot must adhere to the zone's setback requirements.

14. The consent to sever application for the property is currently conditionally approved. The severance application must receive final approval in order to proceed with the Site Plan application.

Engineering

Comments:

15. A topographic plan of survey needs to identify all representative elevation points, currently existing features, including all property lines, bodies of water, vegetation, easements etc. It needs to provide a note that references the horizontal and vertical datums that were used and tied into to complete the project, including the local benchmarks. The survey should show the municipal road ROW and dimension the distance between the road centre line and the site property line.

16. Servicing Study and Report (water/sanitary/SWM)

    a. Servicing Study (and Plans) will need to be submitted to the City for review and it needs to demonstrate that the site can be adequately serviced. It should comprehensively address the available water quality and quantity. It should identify the required projected water demand and the expected well capacity (sustainably to be in excess of demand). It should also address sanitary servicing needs.

    b. The report needs to provide all pertinent calculations and justifications to support any claims made in the report. References to other relevant studies need to be made and clearly stated in order to adequately address the servicing needs and underlying ground conditions.

    c. Proposed septic bed sizing needs to be provided, to demonstrate that it will be able to accommodate the generated flows and there is an adequate lot area to provide required nitrate dilution.

    d. Fire-fighting considerations should also be included in the report to determine potential surface area requirements if water storage tanks need to be implemented As per the clarification provided in Technical Bulletin ISTB-2021-03 the FUS fire-fighting methodology is to be used in Rural Areas in all cases.

    e. Erosion and sediment control measures need to be provided.

17. Stormwater

a. SWM report will be required, and it can be submitted, as part of the Site Servicing Study. This report should be completed exceeding the requirements laid out in the City's Site Servicing Study Terms of Reference.

b. Any existing stormwater runoff from adjacent site(s) that crosses the property must be accommodated by the proposed stormwater management design. No adverse effect can be created to the surrounding properties.
Since it is a commercial/industrial subdivision proposal, on-site SWM measures need to be applied to minimize impact to downstream storm control systems.

c. The quantity criteria will be that the 100-year post development peak flow rate must be controlled the 2-year pre-development peak flow rate.

d. The 2-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

e. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

f. A calculated time of concentration (Cannot be less than 10 minutes).

g. Stormwater flow rates in excess of the 2-year pre-development storm, up to and including the 100-year post-development storm event, must be detained on site.

h. The quality criteria will be enhanced treatment, 80% TSS removal, as per the Carp River Watershed/Subwatershed Study. Reporting of TSS removal shall be extensive and if peer reviewed and published papers are relied on for conclusions, the conclusions shall be patently clear and the report shall show overwhelming agreement.

i. The stormwater management report shall itemize concurrence with the content of the CRWSS and address all Subwatershed criteria pertaining to the SWM site control, such as but not limited to:
    i. Efforts are required to maintain low flow runoff in Summer
    ii. 104 mm/yr infiltration (p.196) – area identified as significant groundwater recharge area
    iii. Runoff shall be provided to achieve cool water thermal regime (p. 159)

j. Runoff will need to be conveyed to a legal and sufficient outlet. If it is proposed to discharge storm water to the existing ditches in the ROW, the ditches will need to be shown to provide continuous flow to an outlet.

k. Capacity of the downstream systems needs to be investigated in detail and concurrence with any existing Drainage Studies or Watershed/Subwatershed Studies needs to be demonstrated. All stormwater management determinations shall have supporting rationale.

l. Low Impact Development (LID) is to be implemented as per the bulletin from the former MOECC (now MECP) titled Expectations RE: Stormwater Management released in February 2015. Note that the City has released a document titled 'Low Impact Development Technical Guidance Report – Implementation in Areas with Potential Hydrogeological Constraints' which aids sites which may have constraints such as low permeability or high groundwater.

m. Note that oil/grit separators, if used, require Environmental Technology Verification (ETV) protocol for ECA approval.

18. An MECP Environmental Compliance Approval is anticipated to be required for the proposed development. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation:

    a. Charlie Primeau at (613) 521-3450, ext. 251 or Charlie.Primeau@ontario.ca

    b. Please note: Once the development application has been submitted, a request can be made to the City to consider a Transfer of Review (ToR) ECA for SWM works (ponds, ditches, culverts, etc.) for private property, instead of the direct submission ECA. This is subject to approval by the City and MECP. Note that the ECA requirements are currently in transition towards the linear ECA process and more details may become available depending on application submission timeline. It is recommended to check with the City when the development application is submitted to confirm the ECA process at that time

19. Grading and Drainage

    a. A Grading and Drainage Plans will be required identifying the existing and proposed drainage patterns and their relationship with the surface runoff control.

    b. Erosion and sediment control plan needs to be provided as well and it will need to show the erosion and sediment control measures.

c. All Civil plans will need to reference the horizontal and vertical datums that were used and tied into to complete the project, including the local benchmarks.

20. Fire Services

a. It is the responsibility of the owner to ensure that an adequate water supply for firefighting is provided. The FUS (Fire Underwriters Survey) methodology, as opposed to the OBC methodology shall be applied for all rural areas. Enhanced review will be invoked should the construction coefficient be chosen less than 1.

b. Fire Routes now require designation with By-law through the Site Plan process by contacting fireroutes@ottawa.ca.

21. Geotechnical (including sensitive marine clay)

a. A Geotechnical Study will be required. The report should provide sufficient soils and engineering information to confirm that the site(s) are suitable or can be made suitable for development based on the requirements of the Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa.

b. Please note that based on available mapping, sensitive marine clays are anticipated on site and enhanced geotechnical investigation and exhaustive analysis will be necessary. Investigation of clays should be undertaken with vane shear testing, Atterberg limits testing (from a number of depths in each column), shrinkage, grain size, grade raise restriction, consolidation, compaction sensitivity, remolded strength and liquefaction analysis - amongst others.

c. Earthquake analysis and potential for seismic liquefaction or rapid lowering of shear strength, of any soil type, analysis is also required to be undertaken and details, with clear conclusions, provided in the report.

d. In sensitive marine clays, trees in proximity to foundations can cause foundation damage. The requirements of the City's Tree Planting in Sensitive Marine Clay Soils – 2017 Guidelines should be contemplated

e. If infiltration measures are proposed onsite (LID), the study should also include infiltration/percolation testing for SWM design.

f. The groundwater level is to be investigated and the level needs to be derived from spring-time investigation. Potential GWT fluctuations need to be identified and their effect on the soil's behaviour needs to be studied and reported. Clear conclusions need to be provided. The foundation drainage needs to be addressed. All conclusions and determinations shall have supporting rationale.

g. City mapping shows unstable slopes within 230 m to the south of the property – potential impacts need to be considered.

22. Hydrogeological and Terrain Analysis

a. A Hydrogeological and Terrain Analysis will be required to establish that there is an adequate quantity and quality of groundwater to support the proposed development(s). The requirements for the Hydrogeological and Terrain Analysis Report are outlined in the City of Ottawa Hydrogeological and Terrain Analysis Guidelines, Section 5.0 titled Site Plans.

b. Note that the expected groundwater in this area has potential to be poor quality and sufficient for domestic use. There are properties in the same bedrock formation to the southwest which had exceedances in colour, fluoride, TDS, sodium, and chloride. Note that mineralized water has been found in nearby wells, O. Reg. 903 states that should mineralized water be present, the well owner shall abandon the well or provide written consent from the Director (MECP approval). If required, a mineralized well approval from the MECP is required prior to site plan approval, as identified in City guidelines.

c. A supply well must be drilled and tested to confirm water quantity and quality suitability prior to site plan approval. Support must be provided for the pump test rate; which should be the maximum day rate. The rate should consider the actual use, or potential uses permitted through zoning if unknown. (MECP Well completed February 16, 2022, received by MOE May 25, 2022)

d. The report is to show that there is a sufficient quantity (in excess of the design demand) and quality of aquifer water for the proposed commercial/industrial development, and it needs to provide assurance of its sustainability. The surficial groundwater level needs to be derived from spring-time investigation.

e. If a SWM pond, infiltration trench or similar stormwater management infrastructure is proposed, it will also need to be included in the Hydrogeological Report and Terrain Analysis.

f. The parameters of water quality that will be tested will be the “subdivision suite” known to local well testing companies, as well as trace metals and VOCs. Requirements are outlined in the City of Ottawa Hydrogeological and Terrain Analysis Guidelines. The report should also provide an assessment of adjacent land uses and concerns and determine if any other parameters need to be tested (e.g. petroleum hydrocarbons, BTEX, Chlorinated solvents, etc.).

g. Bollards, or other means of preventing vehicle access, will need to be provided between areas with vehicle access and the existing or proposed

well(s). The well location should be shown on all plans; the grading plan should indicate that grading around the well meets O.Reg. 903 requirements, i.e. minimum well casing height above ground surface and the land around the well must slope away from the well to prevent pooling.

h. Technical consultation with the hydrogeological report reviewer is encouraged, please provide a detailed work plan to the assigned Infrastructure Project Manager for comment in advance of work on-site.

i. The hydrogeological and terrain analysis report should describe the proposed activities onsite and identify if there are any contamination risks to the aquifer. If proposed activities pose a risk to the aquifer, then mitigation should be recommended (i.e. safe storage of chemicals, spills prevention and response plans, etc.).

j. A Septic System Impact Risk Assessment must be completed as part of the Hydrogeological and Terrain Analysis Report, as per the City's Hydrogeological and Terrain Analysis Report Guidelines and MECP Guideline D-5-4, please refer to the HGTA for the predictive assessment for commercial/industrial developments (not residential developments).

k. If the expected daily design flow is 10,000 L/d or less, the septic permit from the Ottawa Septic System Office must be issued prior to Site Plan Approval being granted.

l. Since this application is a site plan (not lot creation or zoning) septic treatment (i.e. tertiary treatment with nitrate dilution) may be considered as part of the septic impact assessment calculations. A system certified though NSF or BNQ should be recommended if advanced treatment is needed to meet nitrate impact targets.

m. Bollards, or other means of preventing vehicle access, will need to be provided between areas with vehicle access and the proposed septic system(s).

n. It is not clear if there is an existing water well/s and septic bed/s on site. If they need to be decommissioned, the well/s need to be decommissioned in accordance with Well Regulation (O.Reg. 903) under the Ontario Water Resources Act (See O.Reg. 903 - Section 21(3)), and the septic bed/s in accordance to OSSO requirements and to the satisfaction of the OSSO.

23. Construction constraints

a. As shown on the draft 4R plan, there are two easements on the property which must be accounted for, the existing servicing easement along Thomas Argue Road for the private watermain and also the private hydro services easement along the southeast property line.

b. It appears that the property to the south (FBO & Hangar) has a swale which discharges onto this lot. Note that stormwater runoff that enters the site must also be contemplated in the Stormwater Management for the site.

24. Background studies

a. The property is within the Carp River Watershed/Subwatershed Study and Carp Road Corridor Design Plan areas and the proponent should itemize and detail concurrence with the content of these studies and plans.

b. The Carp River Watershed study identifies this property on Figure 3.4.31, the mapping indicates the site has clay soils with groundwater recharge potential of 104 mm/yr.

c. Carp CDP Schedule 2 does not include strict recommendations for groundwater recharge potential.

25. Site Lighting

a. Exterior site lighting will require certification by a licensed professional engineer confirming the design complies with the following:

b. The location of the fixtures, fixture type (make, model, part number and the mounting height) must be shown on one of the approved plans.

i. Lighting must be designed only using fixtures that meet the criteria for Full Cut-off classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and

ii. It must result in minimal light spillage onto adjacent properties. As a guideline, 0.5 foot-candle is normally the maximum allowable spillage.

iii. Lighting Certificate will need to be submitted to the City.

26. Noise Study and a Report will be required, in order to address the noise generated by the Carp Airport activities, directly adjacent to the site. The report needs to investigate noise mitigation measures for the proposed office space, and it needs to provided clear conclusions and recommendations.

27. Environmental Site Assessment (ESA).

A Phase 1 Environmental Site Assessment (ESA) is required, completed in accordance with Ontario Regulation (O.Reg.) 153/04.
A Phase 2 ESA may be required, depending on the outcome of the Phase 1 ESA.

There is an existing structure on site and it is not clear if there is an existing septic bed. Record of site condition might be required.

28. Carp Airport proximity.

    Transport Canada, Carp Airport Authority, Navigation Canada, or other aviation authorities, as required, need to be contacted regarding ponds and lighting or other specific considerations and limitations associated with proposed development in direct proximity to Carp Airport. The City Engineering needs to be copied on the communication. Airport area zoning restrictions imposed by the Airport Vicinity Development Zone need to be considered, as per new OP section 10.2.2.11 (Schedule C14) and current OP, Section 4.8.6.

    a. Noise-sensitive development is not permitted within the 30 NEF/NEP contour lines at the Carp airport.
    b. Proposed development in the vicinity of Carp airport shall comply with current Transport Canada guidelines.
    c. Proposed development in the vicinity of Carp airport will comply with TP 312 Aerodrome Standards, and within runway approach surfaces will be subject to the overall building height provisions of the Federal Airport Zoning Regulations and Recommended Practices affecting building heights.
    d. Prior to Site Plan approval, exterior lighting specifications need to be defined by a qualified Professional Engineer. Confirmation that the defined criteria comply with the requirements, set by the governing airport authority, will need to be presented to the City prior to approval.

29. Easements/ROW.

    Easements and rights-of-ways must be shown on the plans. Information on any existing easements details (who involved parties are, registration number, versions of the document including the latest, related by-laws etc.) with all supporting documentation need to be provided with the application.
    There is a concern of an existing driveway access to the taxi runway and hangar in the middle of the proposal. Solution needs to be provided.

30. Energy conservation.

    Energy conservation is required to be demonstrated throughout design as per section 2.2.3 of the Official Plan (reduction of urban heat, renewable energy, mitigation of climate change impacts) and others.

31. Roads.

    Pease refer to the City of Ottawa Private Approach By-Law 2003-447 for the entrance design and reach out to the City Transportation department for the acceptable entrance locations and distance.

Thomas Argue Road is a local road with a ROW protection of 20 m (10 m from the road centre line to the property limit. Topographic survey will need to confirm the ROW width from the road centre line to the property limit. Road widening might be required, if the ROW width is found to be less than stated above.

32. Special considerations.

    It is not clear if all the conditions of the severance were met.

33. Permits and Approvals

    Please contact the Mississippi Valley Conservation Authority (MVCA), amongst other federal and provincial departments/agencies, to identify all the necessary permits and approvals required to facilitate the development: responsibility rests with the developer and their consultant for determining which approvals are needed and for obtaining all external agency approvals. The address shall be in good standing with all approval agencies, for example MVCA, prior to approval. Copies of confirmation of correspondence will be required by the City of Ottawa from all approval agencies that a form of assent is given. Note that oil/grit separators require Environmental Technology Verification (ETV) protocol for ECA approval. No construction shall commence until after a commence work notification is given by Development Review.

34. Capital Works Projects scheduled

    a. Thomas Argue Road, north of March Rd, is scheduled to be upgraded from gravel to hard surface with a targeted start of 2-3 years.

Feel free to contact Derek Kulyk, Infrastructure Project Manager, for follow-up questions.

Transportation

Comments:

35. A TIA is not required.

36. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16. The ROW protection will then be verified at submission. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

37. A Road Noise Impact Study is required due to the airport.

Feel free to contact Mike Giampa, Transportation Project Manager, for follow-up questions.

Environment and Trees

Comments:

38. A TCR is required; report should include a Species at Risk review to consider potential significant habitat on adjacent property's structures; also looking for recommendations for locally appropriate native species to inform the landscape plan

39. Tree Planting

    a. A Landscape Plan is a required submission of all Site Plan applications. Please provide a Landscape Plan meeting the requirements of the new Landscape Plan Terms of Reference (https://documents.ottawa.ca/sites/documents/files/landscape_tor_en.pdf).

    b. Please provide street trees within the Thomas Argue ROW. It is recommended to avoid planting nut and fruit-producing trees to avoid wildlife impacts on airport operations.

Feel free to contact Sami Rehman, Environmental Planner, or Nancy Young, Forester, for follow-up questions.

Parkland

Comments:

40. Parkland dedication is assumed to have been provided as part of previous planning applications at the site and is therefore exempt from the requirement to provide parkland dedication as part of the development.

41. The applicant should be aware that the City will be constructing a community scale park, kiddy-corner to the site. Efforts to provide landscaping on the south and west site boundaries are appreciated.

Feel free to contact Anissa McAlpine, Parks Planner for follow-up questions.

Other

42. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.

    a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing

timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

b. Please refer to the HPDS information attached and ottawa.ca/HPDS for more information.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,

Jack Graham
Planner I
Development Review Rural

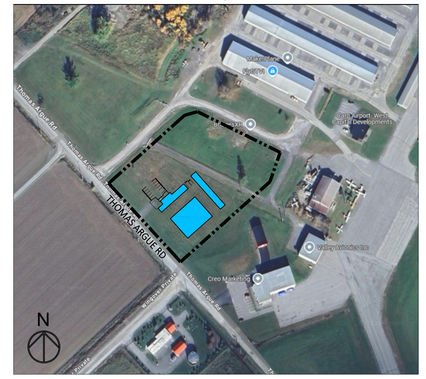
cc.
Erica Ogden-Fedak
Derek Kulyk
Kevin Hall
Sami Rehman
Nancy Young
Anissa McAlpine
Tessa Di Iorio
Mike Giampa

Encl. Study and Plan Identification List
List of Technical Agencies

ARCH E1 (30x42) TITLE BLOCK © 2025, NCA INC.



1 / A101 SITE PLAN
SCALE: 1:250



2 / A101 KEY PLAN
SCALE - 1:150

Zoning Provision	Required		Provided
Lot Width Table 207(a)	No minimum		99.91 m
Lot Area Table 207(b)	No minimum		12,168.7 m^2
Front Yard Set Back* Table 208(b)	12 m		18.1 m
Interior Side Yard Setback* Table 208(b)			North ISY: > 12 m South ISY: 12.2 m
Rear Yard Setback* Table 208(b)			> 12 m
Lot Coverage Floor Space Ind Table 207(g)	1.0		0.1
Building Height	Not specified		3.05 m
Min. Required Loading Spaces Table 113A	For 1000-1999 m^2 of GFA: 1 loading space required Warehouse GFA: 1,206 m^2 1 loading space required		1 loading space provided
Min. Required Parking Spaces Area D, Schedule 1A s. 101 and 103	Storage Yard	0	0
	Warehouse (Mini Storage Units)	10	10
	Office	1	1
Min. Driveway Width s. 107(1)(a)(i)	A driveway providing access to a parking lot or parking garage must have a minimum width of: in the case of a parking lot: 6 m for a double traffic lane:		6m at mini-storage access, and 9m for fire route access
Min. Aisle Width Table 107	Angle of parking: 71-90°: 6.7 m		> 6.7 m
Landscaping Provisions for Parking Lots, Min. % s. 110(1)	15% of the area of any parking lot		> 15% of the area of the parking lot
Minimum Required Width of a Landscaped Buffer of a Parking Lot Table 110	Abutting a street: 3 m Not abutting a street: None		10 m
Outdoor Refuse Collection and Loading Areas, Accessed from Parking Lot s. 110(3)	/ located at least 9 m from a lot line abutting a public street; / located at least 3 m from any other lot line; and / screened from view by an opaque screen with a minimum height of 2 m		4-yard garbage bin to be located outdoors Garbage bin behind office.
Bicycle Parking Rates s. 111	Not required		None
Maximum Lot Coverage (%) Table 208(d)	50%		< 50%
Minimum Distance Between Buildings on the same lot Table 208(e)	10 m		10 m
Minimum Landscaped Buffer abutting Carp Road, an RR zone or any other non-industrial or non-transportation zone Table 208(f)	10 m		10 m

LEGEND

- PROPOSED BUILDING
- LANDSCAPED AREA
- BARRIER FREE PARKING CLEARANCE
- CONCRETE CURB / DEPRESSED CURB
- BARRIER FREE PARKING
- BOLLARD
- FIRE ROUTE SIGN (MAX 25m DISTANCE)
- ENTRANCE AND/OR EXIT DOOR
- MAIN ENTRANCE
- FIRE HYDRANT
- APS BARRIER FREE PARKING SIGNAGE
- EXISTING WELL
- PROPERTY LINE
- MANHOLE (MH)

1508 THOMAS ARGUE RD	SF	m2	Acre
LOT AREA	**130,970**	**12,168**	**3.01**
MINI-STORAGE (*)	**12,984**	**1,206**	
OFFICE	**322**	**30**	
TOTAL GROSS AREA	**13,306**	**1,236**	
(*) 56 (20ft) CONTAINERS + 40 (40ft) CONTAINERS (**) 1 (40ft) CONTAINER			
PARKING	**11 SPACES** (INCLUDING 1 BARRIER FREE)		
LOADING	**1 SPACE**		

GRAPHIC SCALE
5 0 10 metres 20 metres

DRAWING BASED ON SURVEY BY FAIRHALL MOFATT & WOODLAND LIMITED, DATED MARCH 20, 2025, FILE NAMED: TP_AD290-REV2.dwg

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FOR SPA

GENERAL NOTES TYPICAL:

- CONTRACTOR IS RESPONSIBLE TO VERIFY ALL DRAWINGS, DIMENSIONS, DETAILS, SPECIFICATIONS AND DOCUMENTS, AND VERIFY SITE CONDITIONS, AND REPORT ALL ERRORS, OMISSIONS AND DISCREPANCIES TO THE ARCHITECT IN WRITING PRIOR TO PROCEEDING WITH THE WORK.
- DOCUMENTS ARE TO BE READ IN CONJUNCTION WITH ALL CONSULTANTS' DOCUMENTATION.
- DO NOT SCALE DRAWINGS. DO NOT USE DOCUMENTS FOR CONSTRUCTION UNLESS INDICATED AS "FOR CONSTRUCTION" AND STAMPED AND SIGNED BY THE ARCHITECT AND CONSULTANTS.
- CONTRACTOR AND CONSTRUCTION MUST COMPLY WITH PERTINENT CODES, BYLAWS, PROVINCIAL AND FEDERAL REGULATORY REQUIREMENTS.
- ALL DOCUMENTS REMAIN THE PROPERTY OF THE CONSULTANTS AND MAY NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION.

#	YYYY-MM-DD	REVISIONS
10	2026-06-30	FOR COORDINATION
9	2025-08-21	FOR SPA
8	2025-07-18	FOR COORDINATION
7	2025-06-17	FOR DISCUSSION PURPOSES
6	2025-04-04	FOR DISCUSSION PURPOSES
5	2025-02-27	FOR DISCUSSION PURPOSES
4	2025-01-09	FOR DISCUSSION PURPOSES
3	2025-01-06	FOR DISCUSSION PURPOSES
2	2023-12-08	FOR DISCUSSION PURPOSES
1	2023-11-15	FOR DISCUSSION PURPOSES

SURVEY:
FAIRHALL MOFATT & WOODLAND LTD
100-600 TERRY FOX DRIVE
KANATA, ON K2L 4B6
TEL: 613-591-2580

CIVIL:
EGIS
115 WALGREEN RD, R.R.3
CARP, ON K0A 1L0
TEL: 613-836-2184

FIRE PROTECTION:
CODENEXT
20 QUEEN STREET WEST, SUITE 3311
TORONTO, ON M5H 3R3
TEL: 647-350-6672

STRUCTURAL:

MECHANICAL:

ELECTRICAL:
SMITH + ANDERSEN
530, 1600 CARLING AVE
OTTAWA, ON K1Z 1G3
TEL: 613-230-1186

PROJECT MANAGER/CONTRACTOR:

PLANNER + LANDSCAPE:
FOTENN PLANNING + DESIGN
420 O'CONNOR STREET
OTTAWA, ON K2P 1W4
TEL: 613-730-5709

CLIENT LOGOS:
BigSteelBox

CLIENT:
BIG STEEL BOX
1000-1631 DICKSON AVE
KELOWNA, BC V1Y 0B5
TEL: 250-258-1958

PN: PROJECT NORTH
TN: TRUE NORTH
ARCHITECT'S SEAL:

ARCHITECT:
nicholascaragianisarchitect inc.
137 Pamilla Street, Ottawa ON K1S 3K9
t: 613 237 6801 f: 613 237 8289 ncarchitect.ca

PROJECT NAME AND LOCATION:
BIG STEEL BOX
MINI - STORAGE
1508 THOMAS ARGUE RD.
OTTAWA, ONTARIO

NCA PROJECT #:
2023.0122.01

SHEET NAME:
ARCHITECTURAL SITE PLAN

SCALE: 1:250
DATE: 2023.11.07
DRAWN BY: DA/SGM
SHEET #: A101

APPENDIX C
WATERMAIN CALCULATIONS

CCO-24-2505 - 1508 Thomas Argue - Water Demands

Project:	1508 Thomas Argue
Project No.:	CCO-24-2505
Designed By:	FV
Checked By:	RF
Date:	June 26, 2025
Site Area:	1.22 gross ha

Industrial - Light 1236 m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commercial/Industrial/ Institutional	0.05	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commercial/Industrial/ Institutional	0.08	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commercial/Industrial/ Institutional	0.14	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.05	L/s
MAXIMUM DAILY DEMAND	0.08	L/s
MAXIMUM HOUR DEMAND	0.14	L/s

CCO-24-2505 - 1508 Thomas Argue - OBC Fire Calculations - Office & Mini-Storage

Project:	1508 Thomas Argue
Project No.:	CCO-24-2505
Designed By:	FV
Checked By:	RF
Date:	June 26, 2025

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Office and Mini-Storage

Building is classified as Group : F2 - Medium Hazard Industrial
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	27	(from Table 1 pg A-31)
V	590	(Total building volume in m³.)
Stot	2.0	(From figure 1 pg A-32)
Q =	31,878.67 L	

→

From Figure 1 (A-32)

Snorth		m	0.5
Seast	5	m	0.5
Ssouth	5	m	0.5
Swest		m	0.5

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2,700 L/min if Q < 108,000 L
713 gpm

CCO-24-2505 - 1508 Thomas Argue - OBC Fire Calculations - South Mini-Storage

Project:	1508 Thomas Argue
Project No.:	CCO-24-2505
Designed By:	FV
Checked By:	RF
Date:	June 26, 2025

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Mini-Storage

Building is classified as Group : F2 - Medium Hazard Industrial
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	27	(from Table 1 pg A-31)
V	1,963	(Total building volume in m³.)
Stot	2.0	(From figure 1 pg A-32)
Q =	105,997.66 L	

From Figure 1 (A-32)

Snorth	5	m	0.5
Seast	5	m	0.5
Ssouth		m	0.5
Swest		m	0.5

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2,700 L/min if Q < 108,000 L
713 gpm

CCO-24-2505 - 1508 Thomas Argue - OBC Fire Calculations - East Mini-Storage

Project:	1508 Thomas Argue
Project No.:	CCO-24-2505
Designed By:	FV
Checked By:	RF
Date:	June 26, 2025

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Mini-Storage

Building is classified as Group : F2 - Medium Hazard Industrial
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	27	(from Table 1 pg A-31)
V	660	(Total building volume in m³.)
Stot	2.0	(From figure 1 pg A-32)
Q =	35,620.75 L	

→

			From Figure 1 (A-32)
Snorth	5	m	0.5
Seast		m	0.5
Ssouth		m	0.5
Swest	5	m	0.5

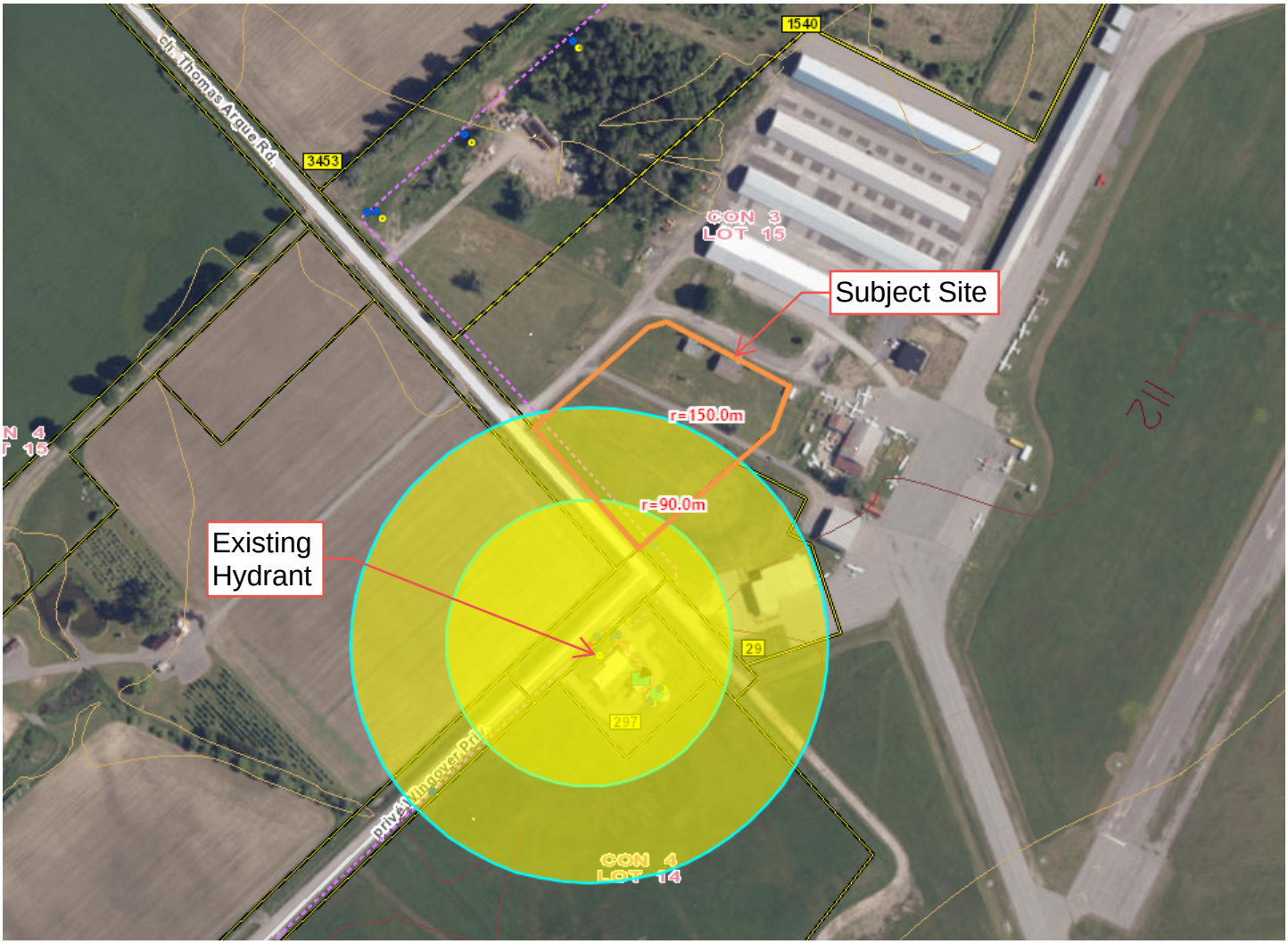
*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2,700 L/min if Q < 108,000 L
713 gpm

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info.north-america@egis-group.com | www.egis-group.com

1508 Thomas Argue Road
Hydrant Figure



VALENTI Francis

From: Evans, Allan <Allan.Evans@ottawa.ca>
Sent: July 8, 2026 5:17 PM
To: VALENTI Francis
Subject: RE: 1508 Thomas Argue Road - Existing Hydrant

/!\ External email - Please be careful with links and attachments /!\ Courriel externe - Merci d'être prudent avec les liens et les pièces jointes /!\

Hi – agreed. Since this address is located within the same industrial park that is a part of that development and the hydrant system is intended for the entire area – OFS is willing to accept the hydrant as providing additional water supply per the bulletin. The primary "hydrant" will be the draft water tank you are installing and with the calculations, a tank built to the minimum size is acceptable (38000L).

Allan Evans

Fire Protection Engineer / Ingénieur de Protection d'Incendies
Prevention Division / Prévention des Incendies
Ottawa Fire Services / Service des Incendies d'Ottawa
1445 Carling Avenue / 1445 Avenue Carling
Ottawa, ON K1Z 7L9
Allan.Evans@Ottawa.ca
☎ (613) 913-2747 | ☎ (613) 580-2424 x24119 | 🖷 (613) 580-2866 | 🖃 Mail Code: 25-102 |
Book time with Evans, Allan



From: VALENTI Francis <Francis.VALENTI@egis-group.com>
Sent: Wednesday, July 8, 2026 5:08 PM
To: Evans, Allan <Allan.Evans@ottawa.ca>
Subject: 1508 Thomas Argue Road - Existing Hydrant

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Allan,

Thank you for meeting with me earlier to discuss fire protection at 1508 Thomas Argue Road. Following up on our meeting, I just wanted to confirm that we can consider supplementary flow contribution from the existing hydrant located at the corner of Wingover Private and Thomas Argue Road in accordance with ISTB-2018-02.

Thank you,

Francis VALENTI
Junior Project Engineer | Sustainable Cities
750 Palladium Drive, Suite 310
Kanata ON K2V 1C7 | CA
Tel. +1 613-714-6895 | Mobile +1 613-808-2123
francis.valenti@egis-group.com | www.egis-group.com

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Data sensitivity - Internal

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'

APPENDIX D
SANITARY DESIGN

TOTAL DAILY DESIGN SANITARY SEWAGE FLOW:
- OFFICE BUILDING WITH 5 EMPLOYEES
- PER EMPLOYEE PER 8HR SHIFT 5*75 = 375 L

OR
- PER EACH 9.3m2 FLOOR 3.3 X 75 = 247.5
- TDDSSF = 375 L/DAY

IMPORTANT AREAS & CALCULATIONS:
SEPTIC TANK:
- MINIMUM CAPACITY = 3 X 375 L/DAY = 1,125 L
- SPECIFIED SEPTIC TANK = 3,600 L

LEACHING BED:
- TYPE: ELJEN GSF A42
- NATIVE T = 20 MIN/CM
- DESIGN T = 6-8 MIN/CM
- CONFIGURATION: 2 ROWS @ 3 MODULES WITH 2.4m BETWEEN ROWS

MINIMUM GSF A42 MODULES
- (Q/95) = 4
- MODULES PROVIDED = 6

MINIMUM SAND CONTACT AREA
- (QT/400)(T=20MIN/CM) = 18.8m2
- SAND AREA PROVIDED = 36m2

CONTRACTOR TO VERIFY ACTUAL LOCATION OF PROPERTY LINES PRIOR TO CONSTRUCTION

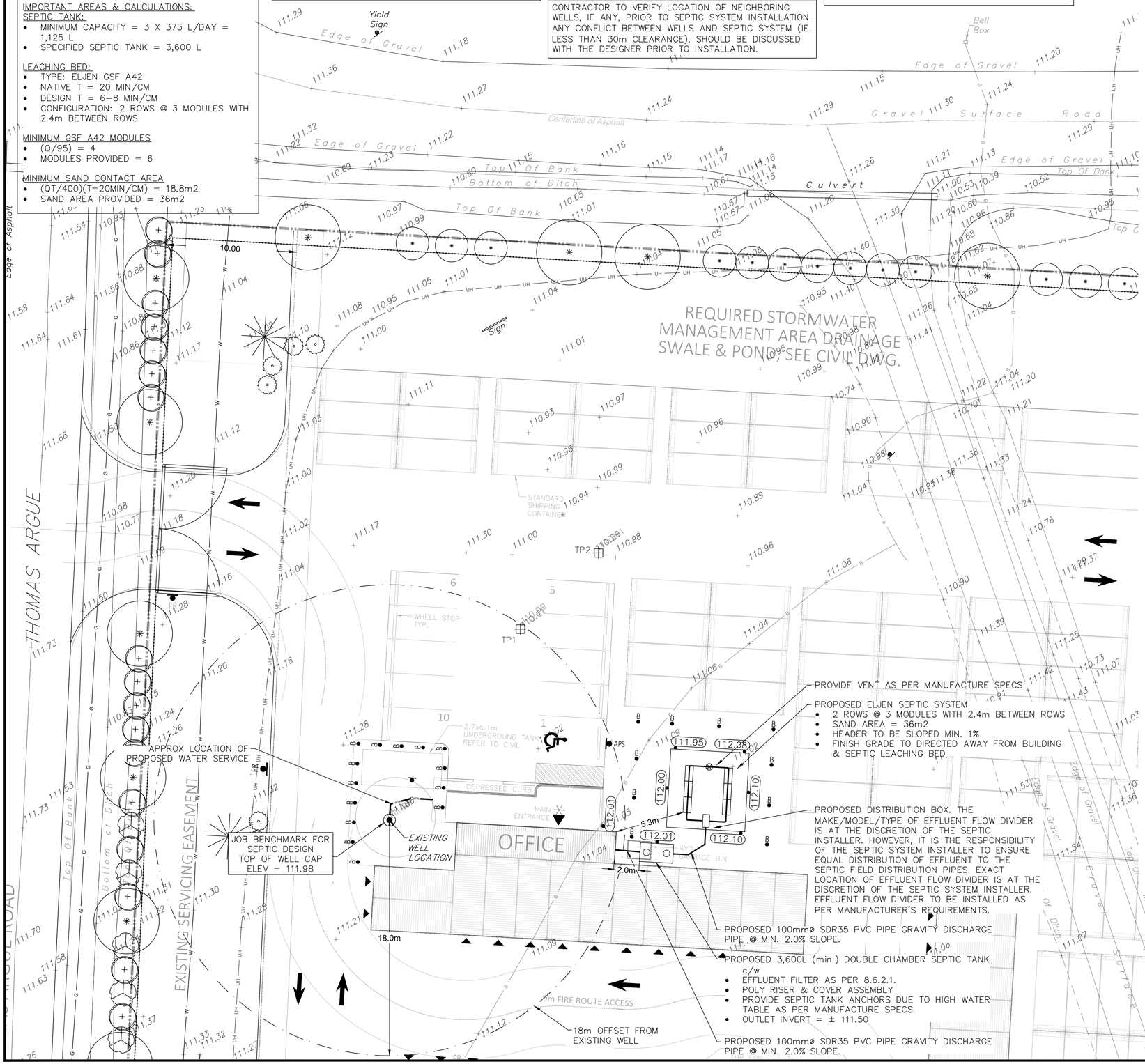
CONTRACTOR TO CONTACT THE DESIGNER IF BEDROCK OR GROUNDWATER IS PRESENT DURING CONSTRUCTION.

CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING GAS & UTILITY SERVICES AND PROTECT THEM DURING CONSTRUCTION.

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

CONTRACTOR TO VERIFY LOCATION OF NEIGHBORING WELLS, IF ANY, PRIOR TO SEPTIC SYSTEM INSTALLATION. ANY CONFLICT BETWEEN WELLS AND SEPTIC SYSTEM (IE. LESS THAN 30m CLEARANCE), SHOULD BE DISCUSSED WITH THE DESIGNER PRIOR TO INSTALLATION.

SOIL AND GROUNDWATER CHARACTERISTICS WERE IDENTIFIED AT BOREHOLE (TEST PIT) LOCATIONS ONLY AND MAY VARY BEYOND THE TEST LOCATIONS. IF SOIL AND UNDERGROUND WATER CONDITIONS, OTHER THAN THOSE USED TO PREPARE THIS DESIGN, ARE ENCOUNTERED DURING INSTALLATION, DW LDS SHOULD BE CONTACTED TO DETERMINE THE EFFECT ON THE PROPOSED SEWAGE SYSTEM.



SCALE: 1:150

0 1 2 3 4 5 10 15 20m

GENERAL NOTES:

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION OBTAINED FROM THEM.
2. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL MUNICIPALITY BEFORE COMMENCING CONSTRUCTION.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
4. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
5. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE LOCAL MUNICIPALITY AUTHORITIES.
6. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
7. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE LOCAL MUNICIPALITY.
8. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE LOCAL MUNICIPALITY STANDARDS AND SPECIFICATIONS.
9. PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
10. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
11. HYDRO, GAS AND BELL SERVICE LOCATIONS SUBJECT TO THE APPROVAL BY THE APPLICABLE AGENCY. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES (BELL, HYDRO) AND THE LOCAL MUNICIPALITY.
12. NO EXCESS DRAINAGE SHALL BE DIRECTED TOWARDS THE NEIGHBORING PROPERTIES DURING AND AFTER CONSTRUCTION.
13. THERE IS TO BE NO ALTERATION OF THE EXISTING GRADE AND DRAINAGE PATTERNS ALONG THE PROPERTY LINES.

SEPTIC NOTES:

1. ALL WORKS TO BE COMPLETED IN ACCORDANCE WITH MUNICIPAL, PROVINCIAL, AND LOCAL AUTHORITY STANDARDS AND REGULATIONS WHERE APPLICABLE, AND IN ACCORDANCE WITH ACCEPTED INDUSTRY STANDARDS.
2. INFORMATION PROVIDED ON THE PLAN IS BASED ON THE INFORMATION REASONABLY AVAILABLE AND/OR TO DW LDS AT THE TIME OF DESIGN. THE CONTRACTOR/OWNER(S) IS TO VERIFY THE ACCURACY OF THE INFORMATION CONTAINED HEREIN REGARDING, BUT NOT LIMITED TO, ELEVATIONS, BECNHMARKS, DIMENSIONS, SETBACKS, EASEMENTS, UTILITY LOCATIONS AND DETAILS, ETC., AND REPORT ANY ERRORS OR OMISSIONS TO DW LDS.
3. THE LOCATION OF ALL OVERHEAD AND UNDERGROUND UTILITIES MAY NOT BE DISPLAYED ON THIS PLAN AND, WHERE SHOWN, THEIR POSITIONS MAY NOT BE ACCURATE. IT IS THE RESPONSIBILITY OF THE OWNER(S)/CONTRACTOR TO LOCATE SUCH UTILITIES PRIOR TO COMMENCING WORKS. DW LDS DOES NOT ASSUME LIABILITY FOR DAMAGE TO SERVICES,UTILITIES, AND STRUCTURES DURING CONSTRUCTION OPERATIONS.
4. IT IS THE RESPONSIBILITY OF THE OWNER(S)/CONTRACTOR TO ENSURE THAT THE PLAN USED FOR CONSTRUCTION IS AN APPROVED AND LATEST VERSION.
5. DIMENSIONS AND ELEVATIONS DISPLAYED ON THIS PLAN ARE IN METRES. THIS IS NOT A PLAN OF SURVEY. THIS PLAN IS NOT TO BE SCALED, ALTERED OR REPRODUCED AND IS INTENDED FOR USE ONLY IN RELATION TO THE PROJECT FOR WHICH IT WAS PREPARED.
6. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH RELEVANT DOCUMENTS, PLANS, AND DETAILS PREPARED BY DW LDS.
7. SOIL AND GROUNDWATER CHARACTERISTICS WERE IDENTIFIED AT BOREHOLE (TEST PIT) LOCATIONS ONLY AND MAY VARY BEYOND THE TEST LOCATIONS.
8. THE APPROVED SEPTIC SYSTEM DESIGN AS PREPARED BY DW LDS MEETS ALL ONTARIO BUILDING CODE REQUIREMENTS AND MANUFACTURER SPECIFICATIONS IN EFFECT AT THE TIME THE DESIGN WAS PREPARED. DW LDS DOES NOT WARRANT THE PERFORMANCE OR DURABILITY OF THE PROPOSED SEPTIC SYSTEM AND ITS COMPONENTS OR ASSUME LIABILITY FOR ANY DEFECTS OR ADVERSE PERFORMANCE CONCERNING THE PROPOSED SEPTIC SYSTEM.
9. MINIMUM REQUIRED SEPTIC SYSTEM SEPARATION DISTANCES:
- SEPTIC TANK TO STRUCTURES = 1.5m (min)
- SEPTIC TANK TO WELL = 15m (min) DRILLED TO A DEPTH OF 6m OR 30m (min) TO ANY OTHER WELL
- SEPTIC TANK TO PROPERTY LINE = 3m (min)
- DISTRIBUTION PIPE TO STRUCTURE = 5m (min)
- DISTRIBUTION PIPE TO PROPERTY LINE = 3m (min)
- DISTRIBUTION PIPE TO RIVER = 15m (min)

SURVEY NOTES:

LEGAL AND TOPOGRAPHIC INFORMATION OBTAINED FROM FAIRHALL, MOFFATT & WOODLAND LIMITED

BENCHMARK FOR SEPTIC SYSTEM: 111.98m

TOP OF WELL CAP

BENCHMARK FOR OVERALL SITE: 112.07m

TOP OF WASHER IN UTILITY POLE

LEGEND

EXISTING GRADE / PROPOSED GRADE	CORNER LOT GRADES
2.0%	PROPOSED DIRECTION OF SURFACE WATER DRAINAGE
	EXISTING DIRECTION OF SURFACE WATER DRAINAGE
×129.83	EXISTING GRADES
(88.03)	EXISTING GRADES TO REMAIN
88.03	PROPOSED GRADES
W	EXISTING WATERMAIN
ST	EXISTING STORM SEWER
S	EXISTING SANITARY SEWER
WV	EXISTING WATER VALVE
	EXISTING PROPERTY LINE
STM	PROPOSED STORM SEWER
S	PROPOSED SANITARY SEWER
WTR	PROPOSED WATER SERVICE
W	PROPOSED WELL
	EXISTING WELL
	PROPOSED ACCESS POINT
	PROPOSED LANDSCAPE WALKWAY
S	PROPOSED SANITARY SUMP PUMP
ST	PROPOSED STORM SUMP PUMP
	PROPOSED ROOF DOWN SPOUT/DRAINS
WV	PROPOSED WATER VALVE
TP	TEST PIT LOCATION
FH	EXISTING FIRE HYDRANT
HP	EXISTING HYDRO POLE
	EXISTING TREE
FF	PROPOSED FINISH FLOOR ELEVATION
TOF	PROPOSED TOP OF FOUNDATION ELEVATION
USF	PROPOSED UNDERSIDE OF FOOTING ELEVATION

ITEM	DESCRIPTION	DATE	BY	APPR'D
1	ISSUED FOR REVIEW	Jul 22/2026	P.W.	P.W.

SCHEDULE OF REVISIONS

NOT VALID UNLESS SIGNED

PROJECT:

Proposed Mini Storage
1508 Thomas Argue Rd
Part of Lot 15, Concession 3
City of Ottawa

TITLE:

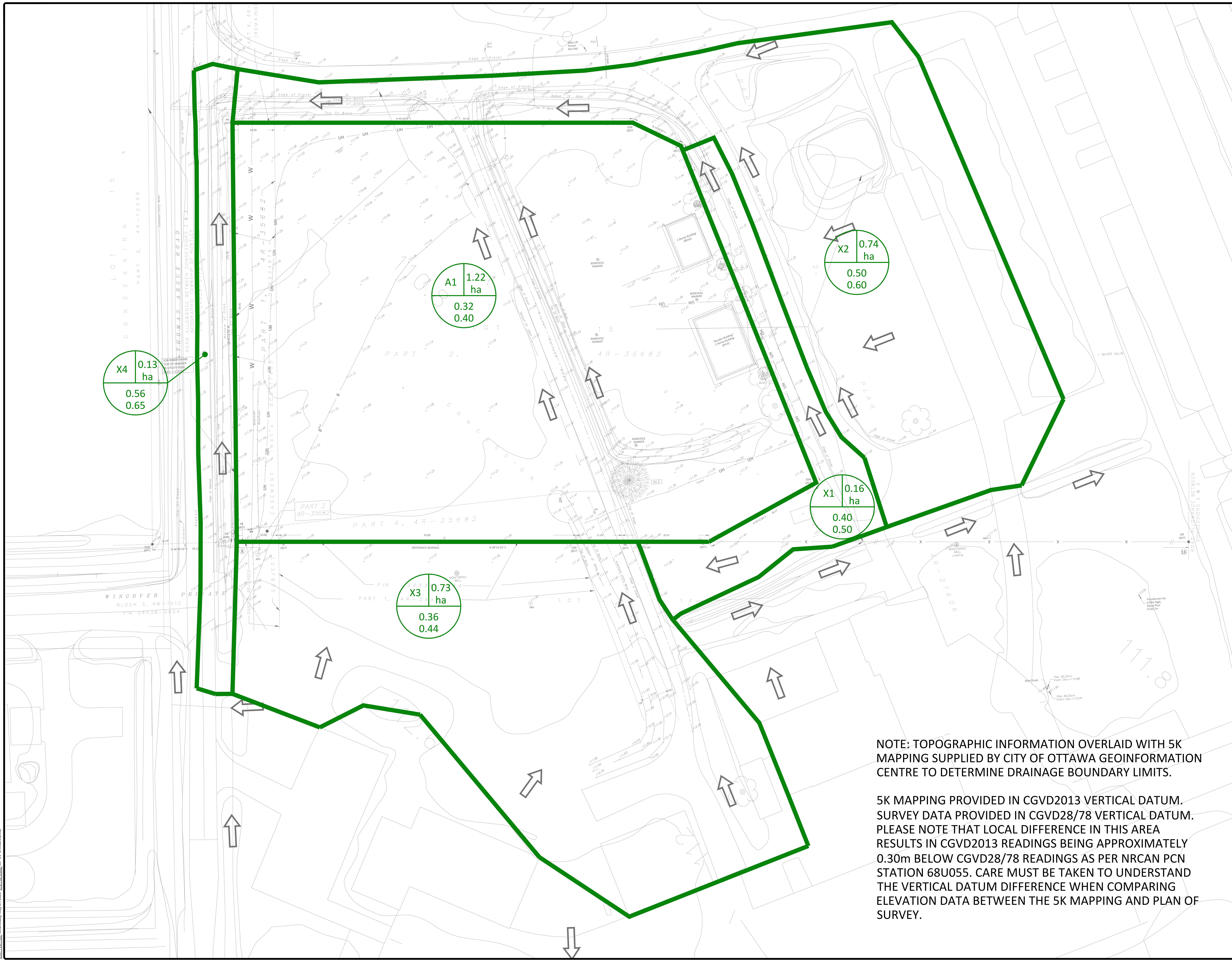
SEPTIC SYSTEM DESIGN PLAN

DW LDS

DW LAND DEVELOPMENT SERVICES INC.

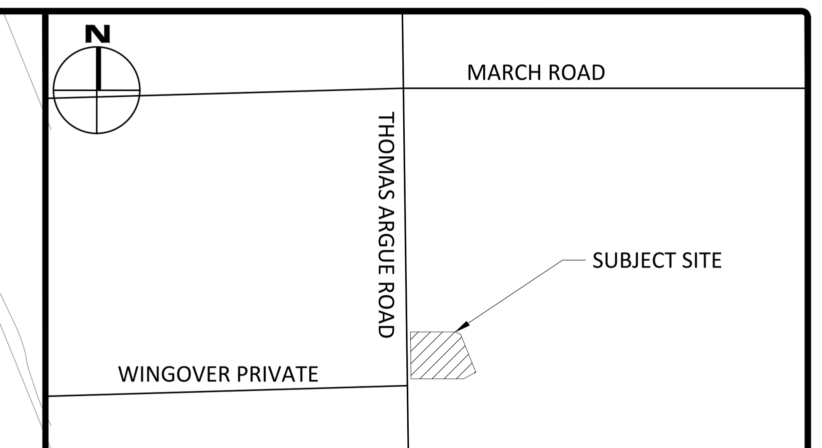
DRAWN: P.W.	SCALE: 1:150	DWG. No.	SSDP
DESIGNED: P.W.			
CHECKED: P.W.			

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN



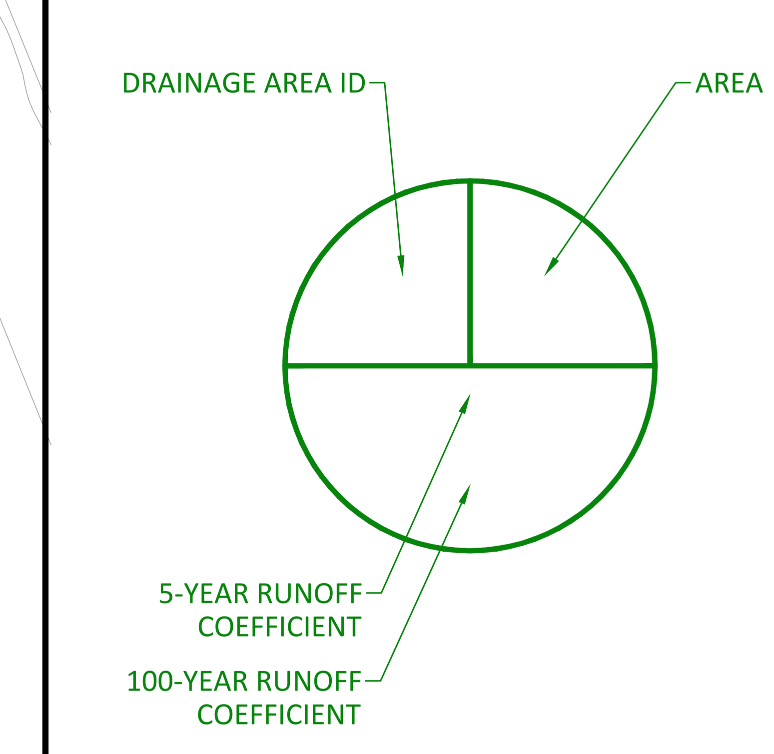
NOTE: TOPOGRAPHIC INFORMATION OVERLAID WITH 5K MAPPING SUPPLIED BY CITY OF OTTAWA GEOINFORMATION CENTRE TO DETERMINE DRAINAGE BOUNDARY LIMITS.

5K MAPPING PROVIDED IN CGVD2013 VERTICAL DATUM. SURVEY DATA PROVIDED IN CGVD28/78 VERTICAL DATUM. PLEASE NOTE THAT LOCAL DIFFERENCE IN THIS AREA RESULTS IN CGVD2013 READINGS BEING APPROXIMATELY 0.30m BELOW CGVD28/78 READINGS AS PER NRCAN PCN STATION 68U055. CARE MUST BE TAKEN TO UNDERSTAND THE VERTICAL DATUM DIFFERENCE WHEN COMPARING ELEVATION DATA BETWEEN THE 5K MAPPING AND PLAN OF SURVEY.



LOCATION PLAN

LEGEND



SUBJECT TO REVIEW

No.	Revisions	Date
2	ISSUED FOR REVIEW	MAY 27, 2026
1	ISSUED FOR REVIEW	JUN. 26, 2025

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 400

0 10 20 30 40 Metres

egis
115 Walgreen Road, R.R.3
Carp, ON K0A 1L0
Tel: 613-836-2184
Fax: 613-836-3742
www.egis-group.com

Stamp:

Client:

BIGSTEELBOX
1000-1631 DICKSON AVENUE,
KELOWNA, BC V1Y 0B5

Project:

BIGSTEELBOX
1508 THOMAS ARGUE ROAD

Drawing Title:

PRE-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:400

Drawn By: FV

Checked By: RF

Designed By: FV

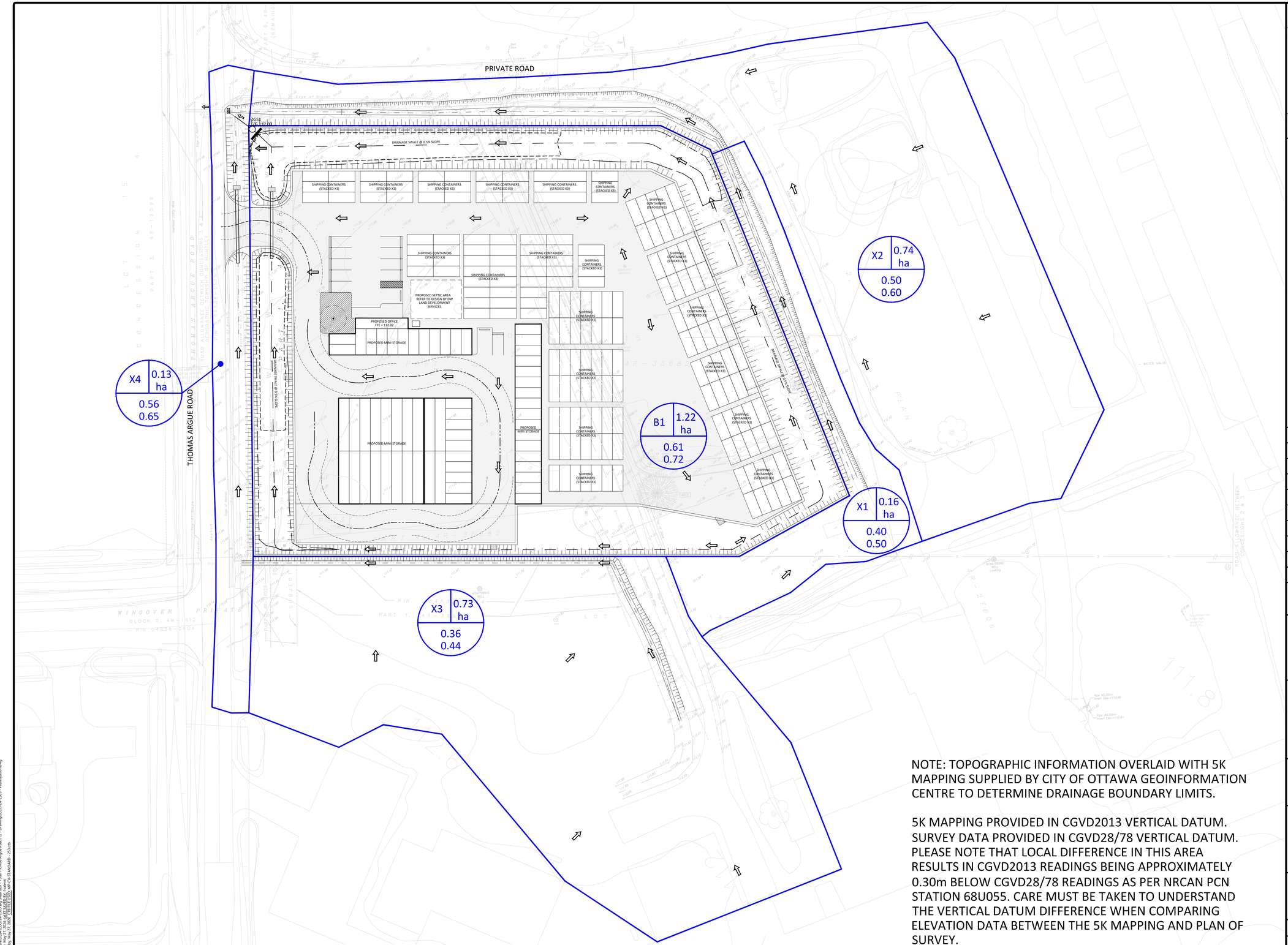
Project Number: CCO-24-2505

Drawing Number: PRE

D07-12-XX-XXXX

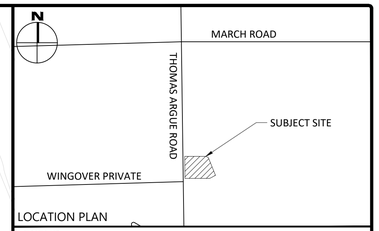
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APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN



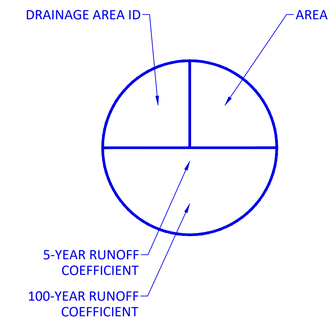
NOTE: TOPOGRAPHIC INFORMATION OVERLAID WITH 5K MAPPING SUPPLIED BY CITY OF OTTAWA GEOINFORMATION CENTRE TO DETERMINE DRAINAGE BOUNDARY LIMITS.

5K MAPPING PROVIDED IN CGVD2013 VERTICAL DATUM. SURVEY DATA PROVIDED IN CGVD28/78 VERTICAL DATUM. PLEASE NOTE THAT LOCAL DIFFERENCE IN THIS AREA RESULTS IN CGVD2013 READINGS BEING APPROXIMATELY 0.30m BELOW CGVD28/78 READINGS AS PER NRCAN PCN STATION 68U055. CARE MUST BE TAKEN TO UNDERSTAND THE VERTICAL DATUM DIFFERENCE WHEN COMPARING ELEVATION DATA BETWEEN THE 5K MAPPING AND PLAN OF SURVEY.



LOCATION PLAN

LEGEND



OVERLAND FLOW ROUTE

STORMWATER FLOW DIRECTION

SUBJECT TO REVIEW

No.	Revisions	Date
2	ISSUED FOR REVIEW	MAY 27, 2026
1	ISSUED FOR REVIEW	AUG. 29, 2025

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 400

0 10 20 30 40 Metres

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Tel: 613-836-2184
Fax: 613-836-3742
www.egis-group.com

Stamp:

Client:
BIGSTEELBOX
1000-1631 DICKSON AVENUE,
KELOWNA, BC V1Y 0B5

Project:
BIGSTEELBOX
1508 THOMAS ARGUE ROAD

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:400	Project Number: CCO-24-2505
Drawn By: FV	
Checked By: RF	Drawing Number: POST
Designed By: FV	

D07-12-XX-XXXX

#XXXXX

FILENAME: I:\Infrastructure\2024\CCO-24-2505 Big Steel Box - 1508 Thomas Argue Road\12 - Drawings\CCO-24-2505 - Presentation.dwg
LAYOUT(S): Wednesday, May 27, 2026 - 11:41:10 AM by Fabian Valencia
USER PROFILE: Wednesday, May 27, 2026 - 11:41:10 AM by FABIAN VALENCIA
CAD STANDARD: MM-CV_STANDARD - 253.ctb

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

Tc (min)	Intensity (mm/hr)	
	2-Year	100-Year
16	59.5	137.5
10	76.8	178.6

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.30

Pre-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (2-Year)	Average C (100-Year)
A1	245	457	11,466	0.32	0.40

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s)	
					2-Year	100-Year
A1	1.22	0.32	0.40	16	65.08	186.87
Total	1.22				65.08	186.87

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (2-year)	Average C (100-year)
B1	3,971	4,431	3,765	0.61	0.72

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2-Year	C 100-Year	Tc (min)	Q (L/s)	
					2-Year	100-Year
B1	1.22	0.61	0.72	10	157.20	432.19
Total	1.22				157.20	432.19

Required Restricted Flow

Drainage Area	Area (ha)	C 2-Year	Tc (min)	Q (L/s)
				2-Year
A1	1.22	0.32	18	65.08

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m^3)		Storage Provided (m^3)	
	2-Year	100-Year	2-Year	100-Year	2-Year	100-Year	2-Year	100-Year
B1	157.20	432.19	30.61	62.41	92.4	288.1	95.2	296.5
Total	157.20	432.19	30.61	62.41	92.43	288.05	95.15	296.53

Storage Requirements for Area B1

2-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	76.8	157.20	30.61	126.59	75.95
20	52.0	106.49	30.61	75.89	91.06
30	40.0	81.96	30.61	51.35	92.43
40	32.9	67.26	30.61	36.66	87.98
50	28.0	57.39	30.61	26.78	80.35
60	24.6	50.26	30.61	19.66	70.76
70	21.9	44.85	30.61	14.24	59.82
80	19.8	40.59	30.61	9.98	47.90
90	18.1	37.13	30.61	6.53	35.24
100	16.7	34.28	30.61	3.67	22.00

Maximum Storage Required 2-year =	92	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	432.28	62.41	369.88	221.93
20	120.0	290.45	62.41	228.04	273.65
30	91.9	222.44	62.41	160.03	288.05
40	75.1	181.77	62.41	119.37	286.48
50	64.0	154.91	62.41	92.50	277.50
60	55.9	135.30	62.41	72.89	262.42
70	49.8	120.54	62.41	58.13	244.14
80	45.0	108.92	62.41	46.51	223.25
90	41.1	99.48	62.41	37.07	200.18
100	37.9	91.73	62.41	29.33	175.96

Maximum Storage Required 100-year =	288	m^3

2-Year Storm Event Storage Summary

Storage Available (m^3) =	95.2 *
Storage Required (m^3) =	92.4

100-Year Storm Event Storage Summary

Storage Available (m^3) =	296.5 *
Storage Required (m^3) =	288.1

*Available Storage calculated from AutoCAD

For Orifice Flow, C= 0.61
For Weir Flow, C= 1.84

	Orifice 1	Orifice 2	Weir 1	Weir 2
invert elevation	110.81	X	111.25	X
center of crest elevation	111.00	X	X	X
orifice width / weir length	203 mm	X	0.50 m	X
weir height			X	X
orifice area (m^2)	0.032	X	X	X

Elevation Discharge Table - Storm Routing - Area B1

Elevation	Orifice 1		Orifice 2		Weir 1		Weir 2		Total	
	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	Q [L/s]	
111.00	0.00	0.004	x	x	x	x	x	x	4.37	
111.01	0.01	0.01	x	x	x	x	x	x	9.78	
111.02	0.02	0.01	x	x	x	x	x	x	13.12	
111.03	0.03	0.02	x	x	x	x	x	x	15.77	
111.04	0.04	0.02	x	x	x	x	x	x	18.03	
111.05	0.05	0.02	x	x	x	x	x	x	20.04	
111.06	0.06	0.02	x	x	x	x	x	x	21.86	
111.07	0.07	0.02	x	x	x	x	x	x	23.55	
111.08	0.08	0.03	x	x	x	x	x	x	25.12	
111.09	0.09	0.03	x	x	x	x	x	x	26.60	
111.10	0.10	0.03	x	x	x	x	x	x	28.00	
111.11	0.11	0.03	x	x	x	x	x	x	29.33	
111.12	0.12	0.03	x	x	x	x	x	x	30.61	2-Year
111.13	0.13	0.03	x	x	x	x	x	x	31.83	
111.14	0.14	0.03	x	x	x	x	x	x	33.01	
111.15	0.15	0.03	x	x	x	x	x	x	34.15	
111.16	0.16	0.04	x	x	x	x	x	x	35.25	
111.17	0.17	0.04	x	x	x	x	x	x	36.32	
111.18	0.18	0.04	x	x	x	x	x	x	37.36	
111.19	0.19	0.04	x	x	x	x	x	x	38.37	
111.20	0.20	0.04	x	x	x	x	x	x	39.35	
111.21	0.21	0.04	x	x	x	x	x	x	40.31	
111.22	0.22	0.04	x	x	x	x	x	x	41.25	
111.23	0.23	0.04	x	x	x	x	x	x	42.17	
111.24	0.24	0.04	x	x	x	x	x	x	43.06	
111.25	0.25	0.04	x	x	x	x	x	x	43.94	
111.26	0.26	0.04	x	x	0.01	0.00	x	x	45.73	
111.27	0.27	0.05	x	x	0.02	0.00	x	x	48.25	
111.28	0.28	0.05	x	x	0.03	0.00	x	x	51.26	
111.29	0.29	0.05	x	x	0.04	0.01	x	x	54.66	
111.30	0.30	0.05	x	x	0.05	0.01	x	x	58.38	
111.31	0.31	0.05	x	x	0.06	0.01	x	x	62.41	100-Year
111.32	0.32	0.05	x	x	0.07	0.02	x	x	66.70	
111.33	0.33	0.05	x	x	0.08	0.02	x	x	71.24	
111.34	0.34	0.05	x	x	0.09	0.02	x	x	76.02	
111.35	0.35	0.05	x	x	0.10	0.03	x	x	81.01	
111.36	0.36	0.05	x	x	0.11	0.03	x	x	86.22	
111.37	0.37	0.05	x	x	0.12	0.04	x	x	91.62	

Notes:
1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir Equation: $Q = CLH^{3/2}$
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (2-Year)	Tc (min) (100-Year)
A1	45	1.14	16	15

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c = Balanced Runoff Coefficient

L = Length of drainage area

S = Average slope of watershed

Tc (min)	Intensity (mm/hr)	
	2-Year	100-Year
20	52.0	120.0
10	76.8	178.6

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.30

Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (2-Year)	Average C (100-Year)
X1	0	523	1,062	0.40	0.50
X2	1,655	1,715	4,014	0.50	0.60
X3	403	614	6,253	0.36	0.44
X4	510	116	690	0.56	0.65

Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s)	
					2-Year	100-Year
X1	0.16	0.40	0.50	10	13.51	39.25
X2	0.74	0.50	0.60	10	79.49	220.72
X3	0.73	0.36	0.44	10	55.66	159.25
X4	0.13	0.56	0.65	10	15.69	42.44
Total	1.76				164.35	461.66

STORM SEWER DESIGN SHEET

PROJECT: CCO-24-2505
LOCATION: 1508 Thomas Argue Road
CLIENT: Big Steel Box

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW										SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Area	AREA ID	FROM MH	TO MH	C-VALUE	AREA	INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
																					DIA	W	H			(L/s)	(%)
X1-X4 + B1(Controlled)	Ex. Outlet Culvert (Municipal 600mm)			0.44	1.76	0.77	0.77	10.00	0.09	10.09	76.81	104.19	178.56	165.35	224.31	384.41	30.61	254.92	580.59	10.20	600			2.80	1.989	325.67	56.09%
X3 + X4	Entrance Culvert (ROW)			0.39	0.86	0.33	0.33	10.00	0.34	10.34	76.81	104.19	178.56	71.45	96.92	166.10		96.92	135.75	17.00	450			0.71	0.827	38.83	28.60%
B1	Entrance Culvert (Within Site)			0.61	1.22	0.74	0.74	10.00	0.19	10.19	76.81	104.19	178.56	158.90	215.56	369.42		215.56	227.84	15.50	450			0.50	1.388	12.28	5.39%
B1	OGS Outlet	OGS1	Ditch	0.61	1.22	0.74	0.74	10.00	0.07	10.07	76.81	104.19	178.56	158.90	215.56	369.42	62.41	62.41	140.12	5.04	375			0.50	1.229	77.71	55.46%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) CSP culvert = 0.024
1. Mannings coefficient (n) pipe / HDPE culvert = 0.012

Designed:
FV

Checked:
RF

Project No.:
CCO-24-2505

No.	Revision	Date
1.	Revision 1	2026.08.21

Date: 2026.08.21

Sheet No: 1 of 1

Runoff Calculations

Ditch	Tc (min)	I (mm/hr) (5-Year)	I (mm/hr) (100-Year)	Area Tributary To Ditch (ha)	Average C (5-Year)	Average C (100-Year)	Runoff (m^3/s) (5-Year)	Runoff (m^3/s) (100-Year)
N/E Ditch	10	104.2	178.6	0.16	0.40	0.50	0.018	0.039

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \left(\frac{A}{Pw}\right)^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Grass channel)
A= Cross sectional Flow Area [m^2]
Pw= Wetted Perimeter [m]
S= Stream Slope [dimensionless]

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
N/E Ditch	Grass	0.025	0.20	2.34	0.0015	0.06	31.5%	67.5%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
N/E Ditch	0.09	0.15	0.018	0.039	0.212	0.265

Runoff Calculations

Ditch	Tc (min)	I (mm/hr) (5-Year)	I (mm/hr) (100-Year)	Area Tributary To Ditch (ha)	Average C (5-Year)	Average C (100-Year)	Runoff (m^3/s) (5-Year)	Runoff (m^3/s) (100-Year)
N/W Ditch	10	104.2	178.6	0.90	0.49	0.58	0.126	0.260

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \frac{A}{Pw}^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Grass channel)
A= Cross sectional Flow Area [m^2]
Pw= Wetted Perimeter [m]
S= Stream Slope [dimensionless]

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
N/W Ditch	Grass	0.025	0.95	4.38	0.0015	0.53	23.6%	48.7%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
N/W Ditch	0.33	0.56	0.126	0.260	0.382	0.464

Runoff Calculations

Ditch	Tc (min)	I (mm/hr) (5-Year)	I (mm/hr) (100-Year)	Area Tributary To Ditch (ha)	Average C (5-Year)	Average C (100-Year)	Runoff (m^3/s) (5-Year)	Runoff (m^3/s) (100-Year)
S/E Ditch	10	104.2	178.6	0.73	0.36	0.44	0.076	0.159

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \frac{A}{Pw}^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Grass channel)
A= Cross sectional Flow Area [m^2]
Pw= Wetted Perimeter [m]
S= Stream Slope [dimensionless]

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
S/E Ditch	Grass	0.025	0.67	7.73	0.0012	0.18	41.5%	87.6%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
S/E Ditch	0.33	0.59	0.076	0.159	0.230	0.272

Runoff Calculations

Ditch	Tc (min)	I (mm/hr) (5-Year)	I (mm/hr) (100-Year)	Area Tributary To Ditch (ha)	Average C (5-Year)	Average C (100-Year)	Runoff (m^3/s) (5-Year)	Runoff (m^3/s) (100-Year)
S/W Ditch 1	10	104.2	178.6	0.86	0.39	0.47	0.097	0.202

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \frac{A}{Pw}^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Grass channel)
A= Cross sectional Flow Area [m^2]
Pw= Wetted Perimeter [m]
S= Stream Slope [dimensionless]

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
S/W Ditch 1	Grass	0.025	0.72	4.43	0.0056	0.64	15.0%	31.3%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
S/W Ditch 1	0.18	0.30	0.097	0.202	0.538	0.668

Runoff Calculations

Ditch	Tc (min)	I (mm/hr) (5-Year)	I (mm/hr) (100-Year)	Area Tributary To Ditch (ha)	Average C (5-Year)	Average C (100-Year)	*Runoff (m^3/s) (5-Year)	*Runoff (m^3/s) (100-Year)
S/W Ditch 2	10	104.2	178.6	0.86	0.39	0.47	0.127	0.264

*Includes fixed flow from 1508 Thomas Argue

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \left(\frac{A}{Pw}\right)^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Grass channel)
A= Cross sectional Flow Area [m^2]
Pw= Wetted Perimeter [m]
S= Stream Slope [dimensionless]

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
S/W Ditch 2	Grass	0.025	0.96	4.37	0.0045	0.94	13.6%	28.1%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
S/W Ditch 2	0.22	0.37	0.127	0.264	0.588	0.716