Planning Department Development Application Form

Complete Application

A complete development application consists of the following:

1. A properly completed and signed application form (signature must be original in planners file);
2. Supporting information adequate to illustrate your proposal as indicated in **Section H** of this application form (plans are required in paper copy and digital PDF format);
3. Written authorization from the registered owner of the subject lands where the applicant is not the owner as per Section N; and,
4. Cash, debit or cheque payable to Norfolk County in the amount set out in the user fees By-Law.

The above information is required to ensure that your application is given full consideration. An incomplete or improperly prepared application will not be accepted and may result in delays during the processing of the application. This application must be typed or printed in ink and completed in full.

Pre-Submission Consultation "Pre-consultation":

A pre-consultation meeting with staff is required for all applications; however, minor applications may be exempted depending on the nature of the proposal, with approval from the Director of Planning or delegate. The purpose of a pre-consultation meeting is to provide the applicant with an opportunity to present the proposed application, discuss potential issues, and for the County and Agency staff to identify the required information and materials to be submitted with the application in order for it to be considered complete. The applicant has the opportunity to make revisions to the application prior to submission, without the additional costs of recirculation fees. It may be necessary to seek the assistance of independent professional help (for example, a planning consultant or engineer) for complex applications. If a pre-consultation meeting has been held to discuss your development, please **include a copy of the Pre-consultation minutes with your application** as part of the submission package. It should be noted **that pre-consultation minutes are valid for one year after the meeting date**.

Development Application Process

Once an application has been deemed complete by a planner, it will be circulated to public agencies and County departments for review and comments. Notice of the application is also provided to adjacent land owners. The comments received assist the planner with the review and recommendation/approval of your application. The time involved in processing an application varies depending upon its complexity and its

acceptability to the other agencies and is subject to statutory *Planning Act* decision timeframes.

An additional fee will be required if a review by the Long Point Region Conservation Authority or by the Grand River Conservation Authority is deemed necessary by planning staff and/or by the Authority. A separate cheque payable to the Long Point Region Conservation Authority or the Grand River Conservation Authority is required in accordance with their fee schedule at the same time your application is submitted.

Additional studies required as part of the complete application shall be at the sole expense of the applicant. It should also be noted that in some instances peer reviews may be necessary to review particular studies and that the cost shall be at the expense of the applicant. The company to complete the peer review shall be selected by the County.

If the application is withdrawn prior to the circulation to commenting agencies, the entire original fee will be refunded. If withdrawn after the circulation to agencies, half the original fee will be refunded. If your drawings are required to be recirculated there will be an additional fee. Also, please note that if your engineering drawings require more than three reviews due to revisions by the owner or failure to revise your engineering drawings as requested, an additional fee will be charged. No refund is available after the public meeting and/or after approval of application.

Notification Sign Requirements

For the purpose of public notification and in order for staff to locate your lands for appropriate applications (zoning, subdivision, condominium or official plan) you will be given a sign to indicate the intent and purpose of your development application. It is your responsibility to:

1. Post one sign per frontage in a conspicuous location on the subject lands;
2. Ensure one sign is posted at the front of the subject lands at least three feet above ground level, not on a tree;
3. Notify the Planner when the sign is in place in order to avoid processing delays; and
4. Maintain the sign until the development application is finalized and thereafter removed.

Contact Us

For additional information or assistance in completing this application, please contact a planner at 519-426-5870 or 519-875-4485 extension 1842 or planning@norfolkcounty.ca. Please submit the completed application and fees to the attention of the Planning Department at 185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6.

For Office Use Only:

File Number	_____	Public Notice Sign	_____
Related File Number	_____	Application Fee	_____
Pre-consultation Meeting	_____	Conservation Authority Fee	_____
Application Submitted	_____	Well & Septic Info Provided	_____
Complete Application	_____	Planner	_____

Check the type of planning application(s) you are submitting.

- ☐ Official Plan Amendment
- ☐ Zoning By-Law Amendment
- ☐ Temporary Use By-law
- ☐ Draft Plan of Subdivision/Vacant Land Condominium
- ☐ Condominium Exemption
- ☒ Site Plan Application
- ☐ Extension of a Temporary Use By-law
- ☐ Part Lot Control
- ☐ Cash-in-Lieu of Parking
- ☐ Renewable Energy Project or Radio Communication Tower

Please summarize the desired end result of this application (for example: a special zoning provision on the subject lands to include additional use(s), changing the zone and/or official plan designation of the subject lands, creating a certain number of lots, or similar)

This application seeks site plan approval for a 128-bed long-term care facility in Delhi. The subject lands, occupying an area of approx. 25,020 sq.m, are currently known by the municipal address of 750 Gibralter Street. The proposed development will require two consent applications (to be submitted under separate cover): one for the purpose of severing approx. 6,100 sq.m of land from the adjacent parcel at 169 Dalton Road and merging it with the subject property, and the other for the purpose of severing the northerly portion of the subject property (approx. 19,000 sq.m). The proposed long-term care facility will be constructed on the portion retained (approx. 12,270 sq.m), while the portion severed is to be sold.

Property Assessment Roll Number: 49200836800

A. Applicant Information

Name of Owner Delhi Nursing Home Ltd.

It is the responsibility of the owner or applicant to notify the planner of any changes in ownership within 30 days of such a change.

Address [redacted]

Town and Postal Code [redacted]

Phone Number

Cell Number

Email

Name of Applicant Wade Stever (peopleCare Inc.)

Address [redacted]

Town and Postal Code [redacted]

Phone Number [redacted]

Cell Number

Email [redacted]

Name of Agent Heather Price (GSP Group Inc.)

Address 72 Victoria Street South, Suite 201

Town and Postal Code Kitchener, ON N2G 4Y9

Phone Number 226-243-7320

Cell Number

Email hprice@gspgroup.ca

Please specify to whom all communications should be sent. Unless otherwise directed, all correspondence and notices in respect of this application will be forwarded to both owner and agent noted above.

☐ Owner ☒ Agent ☒ Applicant

Names and addresses of any holder of any mortgagees, charges or other encumbrances on the subject lands:

N/A

B. Location, Legal Description and Property Information

1. Legal Description (include Geographic Township, Concession Number, Lot Number, Block Number and Urban Area or Hamlet):

   Lots 49–55 of Registered Plan 216, Part of Block 28 of Registered Plan 189 (Part 1, 37R-706) &

   Parts 1–3 of Registered Plan 37R-2809

   Municipal Civic Address: 750 Gibralter Street, Delhi

   Present Official Plan Designation(s): Urban Residential

   Present Zoning: Community Institutional Zone (IC)

2. Is there a special provision or site specific zone on the subject lands?

   ☐ Yes ☒ No If yes, please specify corresponding number:

3. Present use of the subject lands:

   Long-term care facility.

4. Please describe **all existing** buildings or structures on the subject lands and whether they are to be retained, demolished or removed. If retaining the buildings or structures, please describe the type of buildings or structures, and illustrate the setback, in metric units, from front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   The existing building on the subject lands is a one-storey brick building occupying an area of approx. 1,900 sq.m. The building is located on the portion of the subject lands that will be severed (through a separate consent application).

5. If an addition to an existing building is being proposed, please explain what it will be used for (for example: bedroom, kitchen, or bathroom). If new fixtures are proposed, please describe.

   N/A

6. Please describe **all proposed** buildings or structures/additions on the subject lands. Describe the type of buildings or structures/additions, and illustrate the setback, in metric units, from front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   The proposed building, to be erected on the portion of the lot that will be retained, is a two-storey long-term care facility with 128 beds. The building features a landscaped courtyard and other outdoor amenity areas. Please see attached drawings for further details.

7. Are any existing buildings on the subject lands designated under the *Ontario Heritage Act* as being architecturally and/or historically significant? Yes ☐ No ☒

   If yes, identify and provide details of the building:

8. If known, the length of time the existing uses have continued on the subject lands:

   The existing building was constructed in the mid-1980s.

9. Existing use of abutting properties:

   Residential (4), retirement home, hotel/motel, medical/dental office, transportation terminal, vacant (2).

10. Are there any easements or restrictive covenants affecting the subject lands?

    ☒ Yes ☐ No If yes, describe the easement or restrictive covenant and its effect:

    Instrument No. NR415600Z (restrictive covenant) affecting Lots 54 & 55 in RP 216; expires in April 2023.

C. Purpose of Development Application

Note: Please complete all that apply.

1. Please explain what you propose to do on the subject lands/premises which makes this development application necessary:

   This application proposes development in an area that is subject to Site Plan Control.

2. Please explain why it is not possible to comply with the provision(s) of the Zoning By-law/and or Official Plan:

   N/A (The proposed development complies with the Official Plan and Zoning By-law.)

3. Does the requested amendment alter all or any part of the boundary of an area of settlement in the municipality or implement a new area of settlement in the municipality? ☐ Yes ☐ No If yes, describe its effect:

   N/A (No amendment requested.)

4. Does the requested amendment remove the subject land from an area of employment? ☐ Yes ☐ No If yes, describe its effect:

   N/A (No amendment requested.)

5. Does the requested amendment alter, replace, or delete a policy of the Official Plan? ☐ Yes ☐ No If yes, identify the policy, and also include a proposed text of the policy amendment (if additional space is required, please attach a separate sheet):
   N/A (No amendment requested.)

6. Description of land intended to be severed in metric units:
   Frontage: _____
   Depth: _____
   Width: _____
   Lot Area: _____
   Present Use: _____
   Proposed Use: _____
   Proposed final lot size (if boundary adjustment): _____
   If a boundary adjustment, identify the assessment roll number and property owner of the lands to which the parcel will be added: _____

   Description of land intended to be retained in metric units:
   Frontage: _____
   Depth: _____
   Width: _____
   Lot Area: _____
   Present Use: _____
   Proposed Use: _____
   Buildings on retained land: _____

7. Description of proposed right-of-way/easement:
   Frontage: _____
   Depth: _____
   Width: _____
   Area: _____
   Proposed use: _____

8. Name of person(s), if known, to whom lands or interest in lands to be transferred, leased or charged (if known):

9. **Site Information**	**Zoning**	**Proposed**
Please indicate unit of measurement, for example: m, m^2 or %		
Lot frontage	15 m	20.1 m
Lot depth	N/A	127.5 m
Lot width	N/A	173.5 m
Lot area	450 sq.m	12,268 sq.m
Lot coverage	N/A	26.3%
Front yard	6 m	68.2 m
Rear yard	9 m	9.0 m
Left Interior side yard	3 m	3.1 m
Right Interior side yard	3 m	37.9 m
Exterior side yard (corner lot)	6 m	N/A
Landscaped open space	N/A	5,440 sq.m (44.2%)
Entrance access width	N/A	7.3 m
Exit access width	N/A	7.3 m
Size of fencing or screening	N/A	N/A
Type of fencing	N/A	N/A

10. Building Size

Number of storeys	N/A	2
Building height	11 m	6.8 m
Total ground floor area	N/A	3,195 sq.m
Total gross floor area	N/A	6,314 sq.m
Total useable floor area	N/A	6,044 sq.m

11. Off Street Parking and Loading Facilities

Number of off street parking spaces	32	64
Number of visitor parking spaces	N/A	0
Number of accessible parking spaces	2	2
Number of off street loading facilities	N/A	1

12. Residential (if applicable)

Number of buildings existing: _____

Number of buildings proposed: _____

Is this a conversion or addition to an existing building? ☐ Yes ☐ No

If yes, describe: _____

Type	Number of Units	Floor Area per Unit in m2
Single Detached	_____	_____
Semi-Detached	_____	_____
Duplex	_____	_____
Triplex	_____	_____
Four-plex	_____	_____
Street Townhouse	_____	_____
Stacked Townhouse	_____	_____
Apartment - Bachelor	_____	_____
Apartment - One bedroom	_____	_____
Apartment - Two bedroom	_____	_____
Apartment - Three bedroom	_____	_____

Other facilities provided (for example: play facilities, underground parking, games room, or swimming pool):

13. Commercial/Industrial Uses (if applicable)

Number of buildings existing: _____

Number of buildings proposed: _____

Is this a conversion or addition to an existing building? ☐ Yes ☐ No

If yes, describe:

_____

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

_____

_____

_____

Seating Capacity (for assembly halls or similar): _____

Total number of fixed seats: _____

Describe the type of business(es) proposed: _____

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

Is open storage required: ☐ Yes ☐ No

Is a residential use proposed as part of, or accessory to commercial/industrial use?

☐ Yes ☐ No If yes please describe:

_____

_____

14. Institutional (if applicable)

Describe the type of use proposed: Long-term care facility

Seating capacity (if applicable): N/A

Number of beds (if applicable): 128 beds

Total number of staff proposed initially: 93

Total number of staff proposed in five years: 100

Maximum number of staff on the largest shift: 40

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

LTC suites: 1,572.9 sq.m • Family stay suite: 31.5 sq.m • Public assembly areas: 1,840.0 sq.m • Office / administrative: 96.1 sq.m • Nursing workspace & medical offices: 173.1 sq.m • Personal care: 167.5 sq.m • Utility: 976.6 sq.m • Storage: 217.1 sq.m • Elevators & mechanical: 38.8 sq.m • Stairwells: 192.5 sq.m

15. Describe Recreational or Other Use(s) (if applicable)

_____

_____

_____

_____

_____

D. Previous Use of the Property

1. Has there been an industrial or commercial use on the subject lands or adjacent lands? ☒ Yes ☐ No ☐ Unknown
   If yes, specify the uses (for example: gas station or petroleum storage):
   One building on an adjacent site (724 James Street) was formerly operated as an auto maintenance shop.
2. Is there reason to believe the subject lands may have been contaminated by former uses on the site or adjacent sites? ☐ Yes ☐ No ☒ Unknown
3. Provide the information you used to determine the answers to the above questions:
   A Phase II Environmental Site Assessment found that soil samples taken from the property report concentrations below applicable standards. Samples from one borehole on the adjacent property found a lead concentration that exceeded applicable standards.
4. If you answered yes to any of the above questions in Section D, a previous use inventory showing all known former uses of the subject lands, or if appropriate, the adjacent lands, is needed. Is the previous use inventory attached? ☐ Yes ☐ No

E. Provincial Policy

1. Is the requested amendment consistent with the provincial policy statements issued under subsection 3(1) of the *Planning Act, R.S.O. 1990, c. P. 13*? ☒ Yes ☐ No

   If no, please explain:

2. It is owner's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals, including the Endangered Species Act, 2007. Have the subject lands been screened to ensure that development or site alteration will not have any impact on the habitat for endangered or threatened species further to the provincial policy statement subsection 2.1.7? ☐ Yes ☒ No

   If no, please explain:

   A review of potential endangered or threatened species or species at risk is underway but has not yet been completed. Details for this review require confirmation from MECP.

3. Have the subject lands been screened to ensure that development or site alteration will not have any impact on source water protection? ☒ Yes ☐ No

   If no, please explain:

   _____

   _____

   Note: If in an area of source water Wellhead Protection Area (WHPA) A, B or C please attach relevant information and approved mitigation measures from the Risk Manager Official.

4. Are any of the following uses or features on the subject lands or within 500 metres of the subject lands, unless otherwise specified? Please check boxes, if applicable.

   Livestock facility or stockyard (submit MDS Calculation with application)

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Wooded area

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Municipal Landfill

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Sewage treatment plant or waste stabilization plant

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Provincially significant wetland (class 1, 2 or 3) or other environmental feature

   ☐ On the subject lands or ☒ within 500 meters – distance 400 m

   Floodplain

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Rehabilitated mine site

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Non-operating mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Active mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Industrial or commercial use (specify the use(s))

   ☐ On the subject lands or ☒ within 500 meters – distance 0 m (adjacent) Please see cover letter accompanying this application.

   Active railway line

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Seasonal wetness of lands

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Erosion

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Abandoned gas wells

   ☐ On the subject lands or ☐ within 500 meters – distance _____

F. Servicing and Access

1. Indicate what services are available or proposed:

Water Supply

- ☒ Municipal piped water
- ☐ Communal wells
- ☐ Individual wells
- ☐ Other (describe below)

Sewage Treatment

- ☒ Municipal sewers
- ☐ Communal system
- ☐ Septic tank and tile bed in good working order
- ☐ Other (describe below)

Storm Drainage

- ☐ Storm sewers
- ☐ Open ditches
- ☒ Other (describe below)

Infiltration galleries (please see attached report for further details).

2. Existing or proposed access to subject lands:

- ☒ Municipal road
- ☐ Provincial highway
- ☐ Unopened road
- ☐ Other (describe below)

Name of road/street: Dalton Road

G. Other Information

1. Does the application involve a local business? ☒ Yes ☐ No
   If yes, how many people are employed on the subject lands?
   There are currently 80 employed staff.
2. Is there any other information that you think may be useful in the review of this application? If so, explain below or attach on a separate page.
   Please see cover letter accompanying this application.

H. Supporting Material to be submitted by Applicant

In order for your application to be considered complete, **folded** hard copies (number of paper copies as directed by the planner) and an **electronic version (PDF) of the properly named site plan drawings, additional plans, studies and reports** will be required, including but not limited to the following details:

1. Concept/Layout Plan
2. All measurements in metric
3. Key map
4. Scale, legend and north arrow
5. Legal description and municipal address
6. Development name
7. Drawing title, number, original date and revision dates
8. Owner's name, address and telephone number
9. Engineer's name, address and telephone number
10. Professional engineer's stamp
11. Existing and proposed easements and right of ways
12. Zoning compliance table – required versus proposed
13. Parking space totals – required and proposed
14. All entrances to parking areas marked with directional arrows
15. Loading spaces, facilities and routes (for commercial developments)
16. All dimensions of the subject lands
17. Dimensions and setbacks of all buildings and structures
18. Location and setbacks of septic system and well from all existing and proposed lot lines, and all existing and proposed structures
19. Gross, ground and useable floor area
20. Lot coverage
21. Floor area ratio
22. Building entrances, building type, height, grades and extent of overhangs
23. Names, dimensions and location of adjacent streets including daylighting triangles
24. Driveways, curbs, drop curbs, pavement markings, widths, radii and traffic directional signs
25. All exterior stairways and ramps with dimensions and setbacks
26. Retaining walls including materials proposed
27. Fire access and routes
28. Location, dimensions and number of parking spaces (including visitor and accessible) and drive aisles
29. Location of mechanical room, and other building services (e.g. A/C, HRV)
30. Refuse disposal and storage areas including any related screening (if indoors, need notation on site plan)
31. Winter snow storage location

32. Landscape areas with dimensions
33. Natural features, watercourses and trees
34. Fire hydrants and utilities location
35. Fencing, screening and buffering – size, type and location
36. All hard surface materials
37. Light standards and wall mounted lights (plus a note on the site plan that all outdoor lighting is to be dark sky compliant)
38. Business signs (make sure they are not in sight lines)
39. Sidewalks and walkways with dimensions
40. Pedestrian access routes into site and around site
41. Bicycle parking
42. Architectural elevations of all building sides
43. All other requirements as per the pre-consultation meeting

In addition, the following additional plans, studies and reports, including but not limited to, **may** also be required as part of the complete application submission:

☐ Zoning Deficiency Form

☐ On-Site Sewage Disposal System Evaluation Form (to verify location and condition)

☒ Architectural Plan

☒ Buildings Elevation Plan

☐ Cut and Fill Plan

☒ Erosion and Sediment Control Plan

☒ Grading and Drainage Control Plan (around perimeter and within site) (existing and proposed)

☐ Landscape Plan

☒ Photometric (Lighting) Plan

☐ Plan and Profile Drawings

☒ Site Servicing Plan

☒ Storm water Management Plan

☐ Street Sign and Traffic Plan

☐ Street Tree Planting Plan

☐ Tree Preservation Plan

☐ Archaeological Assessment

☐ Environmental Impact Study

☒ Functional Servicing Report

☒ Geotechnical Study / Hydrogeological Review

☐ Minimum Distance Separation Schedule

☐ Noise or Vibration Study

☐ Record of Site Condition

☒ Storm water Management Report

☐ Traffic Impact Study – please contact the Planner to verify the scope required

Site Plan applications will require the following supporting materials:

1. Two (2) complete sets of the site plan drawings folded to 8½ x 11 and an electronic version in PDF format
2. Letter requesting that the Holding be removed (if applicable)
3. A cost estimate prepared by the applicant's engineer
4. An estimate for Parkland dedication by a certified land appraiser
5. Property Identification Number (PIN) printout

Standard condominium exemptions will require the following supporting materials:

☐ Plan of standard condominium (2 paper copies and 1 electronic copy)

☐ Draft condominium declaration

☐ Property Identification Number (PIN) printout

Your development approval might also be dependent on Ministry of Environment and Climate Change, Ministry of Transportation or other relevant federal or provincial legislation, municipal by-laws or other agency approvals.

All final plans must include the owner's signature as well as the engineer's signature and seal.

I. Development Agreements

A development agreement may be required prior to approval for site plan, subdivision and condominium applications. Should this be necessary for your development, you will be contacted by the agreement administrator with further details of the requirements including but not limited to insurance coverage, professional liability for your engineer, additional fees and securities.

J. Transfers, Easements and Postponement of Interest

The owner acknowledges and agrees that if required it is their solicitor's responsibility on behalf of the owner for the registration of all transfer(s) of land to the County, and/or transfer(s) of easement in favour of the County and/or utilities. Also, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges in favour of the County.

K. Permission to Enter Subject Lands

Permission is hereby granted to Norfolk County officers, employees or agents, to enter the premises subject to this application for the purposes of making inspections associated with this application, during normal and reasonable working hours.

L. Freedom of Information

For the purposes of the *Municipal Freedom of Information and Protection of Privacy Act*, I authorize and consent to the use by or the disclosure to any person or public body any information that is collected under the authority of the *Planning Act, R.S.O. 1990, c. P. 13* for the purposes of processing this application.



03 / 17 / 2023

Owner/Applicant Signature | Date

M. Owner's Authorization

If the applicant/agent is not the registered owner of the lands that is the subject of this application, the owner(s) must complete the authorization set out below.

I/We _____ am/are the registered owner(s) of the lands that is the subject of this application.

I/We authorize _____to make this application on my/our behalf and to provide any of my/our personal information necessary for the processing of this application. Moreover, this shall be your good and sufficient authorization for so doing.

_____ _____

Owner | Date

_____ _____

Owner | Date

N. Declaration

I, Wade Stever of peopleCare Inc.

solemnly declare that:

all of the above statements and the statements contained in all of the exhibits transmitted herewith are true and I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of *The Canada Evidence Act*.

Declared before me at:

City of Hamilton

In Province of Ontario

This 17th day of March

A.D., 2023

Owner/Applicant Signature

A Commissioner, etc.

Sarah Frances Knoll, a Commissioner, etc.,
Province of Ontario, for GSP Group Inc.
Expires June 25, 2024.

SHAPING GREAT COMMUNITIES

March 17, 2023 File No. 22267

Norfolk County, Planning & Development Division
Robinson Administration Building
185 Robinson Street, Suite 200
Simcoe, ON
N3Y 5L6

Attn: Mohammad Alam
Principal Planner

Re: Site Plan Application – 750 Gibralter Street, Delhi
peopleCare Inc.

Dear Mr. Alam:

On behalf of our client, peopleCare Inc., GSP Group is pleased to submit the enclosed Site Plan Application for development proposed on the property currently known by the municipal address of 750 Gibralter Street in Delhi (the "Subject Property"). A pre-submission consultation meeting regarding this application was held on March 1, 2023.

peopleCare Inc. is proposing the development of a two-storey building for a new 128-bed long-term care facility. The proposed development will be facilitated by two consents, which will be the subject of further applications to the Committee of Adjustment. The first consent will be for the purpose of severing part of an adjacent lot, known municipally as 169 Dalton Road, and adding that severed portion to the Subject Property. The second will be for the purpose of severing the northerly portion of the Subject Property, which contains an existing long-term care facility that was constructed in the mid-1980s. The proposed new long-term care facility will be located on the retained southerly portion, which will be known by the municipal address of 173 Dalton Road.

The proposed development will be provided with municipal water services and municipal sewage services, as described in the Servicing & Stormwater Management Report prepared by WalterFedy and included as part of this application. Stormwater management will be provided through on-site infiltration galleries, ultimately draining to the northwest and southwest. Site grading will respect the existing grades along all property lines and will comply with Norfolk County standards.

The land uses abutting the Subject Property comprise four detached dwellings (Nos. 718 & 740 James Street and Nos. 175 & 179 Dalton Road), a retirement home (725 Gibralter Street), a vacant lot (696 James Street), a former auto maintenance shop (724 James Street), a motel (760 James Street), a transportation-related use (161 Dalton Road), and a medical/dental office (169 Dalton

Road). As noted in Section “E” of the Site Plan Application form, there is a Provincially Significant Wetland located approximately 400 metres to the southeast of the Subject Property (east of James Street / Highway 3 and south of Wilson Avenue).

As mentioned above, a pre-submission consultation meeting regarding this application and the related consent applications was held on March 1, 2023. As requested during that meeting, please find the following items enclosed with this covering letter:

- one completed copy of the Planning Department Development Application Form, signed by the applicant as authorized by the registered owner of the subject property;
- a letter from the registered owner of the subject land, dated January 10, 2023, authorizing the applicant to act on the owner’s behalf;
- Parcel Registers (abbreviated) for PIN 50165-0171 (known as 750 Gibralter Street) and for PIN 50165-0172 (known as 169 Dalton Road) (one copy each);
- one cheque in the amount of $4,000, payable to Norfolk County;
- one copy of the Pre-Submission Consultation Meeting Notes regarding this application (not including Appendix A: Planning Reference Materials);
- a Topographic Plan of Survey (2 copies), provided by Stantec Geomatics Ltd.;
- Site Plan, Section, and Elevation drawings (2 copies each), prepared by SRM Architects Inc.;
- a set of five drawings prepared by WalterFedy (2 copies), which includes a Grading Plan (Dwg. No. C2-1), a Servicing Plan (Dwg. No. C3-1), and an Erosion and Sediment Control Plan (Dwg. No. C4-1);
- a set of eight electrical drawings prepared by Hubbert EME Engineering (2 copies), which includes a Lighting Plan (Dwg. No. E-005) and Lighting Calculations (Dwg. No. E-006);
- a Geotechnical Investigation & Preliminary Hydrogeological Assessment (2 copies), prepared by Chung & Vander Doelen Engineering Ltd. (“CVD”); and
- a Servicing & Stormwater Management Report (2 copies), prepared by WalterFedy.

There remain two items identified during pre-submission consultation that are still outstanding: (1) a Traffic Impact Study, which is being prepared by Paradigm Transportation Solutions; and (2) a review of potential endangered species and species at risk on the subject property, details regarding which require confirmation from the Ontario Ministry of the Environment, Conservation and Parks.

In addition to the above, the “General Comments” made by Development Engineering during pre-submission consultation include a requirement for securities, to be provided in the form of a schedule. As the cost estimate template needed to complete this schedule has not yet been received from the County, this requirement will be fulfilled later in the application process. Similarly, the Agreement Services information form typically required with the submission of a Site Plan Application will also be provided at a later date, once the ownership of the subject property has been finalized subsequent to the aforementioned consent applications.

The application being submitted, which proposes development within an existing settlement area, is consistent with the Provincial Policy Statement, 2020, particularly with regard to the efficient use of land and infrastructure and with respect to the provision of a full range of housing options “to meet

the social, health, economic and well-being requirements of current and future residents, including special needs requirements," as directed in Policy No. 1.4.3.b.

We therefore respectfully request that this Site Plan Application be accepted and circulated for review. Should you have any questions about this submission, or should you require anything further, please do not hesitate to contact me.

Yours truly,
GSP Group Inc.



Heather Price, MCIP, RPP
Vice President / Development Planning Manager

cc. Wade Stever – Project Manager, peopleCare Inc.

Encl.: Planning Department Application Form
Authorization Letter from Registered Owner
Parcel Register (Abbreviated) for Property Identifier 50165-0171 (LT)
Parcel Register (Abbreviated) for Property Identifier 50165-0172 (LT)
Cheque
Pre-Submission Consultation Meeting Notes
Topographical Plan of Survey (Stantec: 2 × 1 p.)
Architectural Drawings (SRM Architects: 2 × 4 pp.)
Civil Engineering Drawings (WalterFedy: 2 × 5 pp.)
Electrical Drawings (Hubbert EME Engineering: 2 × 8 pp.)
Geotechnical Investigation & Preliminary Hydrogeological Assessment (×2)
Servicing & Stormwater Management Report (×2)

DELHI NURSING HOME LTD.

750 GIBRALTER STREET | DELHI ON N4B 3B3

January 10, 2023

County of Norfolk
Robinson Administration Building
185 Robinson Street, Suite 100
Simcoe, ON
N3Y 5L6

Attn: Mr. Brandon Sloan, BES, MCIP, RPP
General Manager
Community Development Division

Dear Mr. Sloan:

RE: Authorization for PeopleCare Inc.
750 Gibralter Street, Delhi, ON

I, William Gheysen, confirm that I am the Registered Owner of 750 Gibralter Street, Delhi, ON under the companies, Delhi Nursing Home Ltd. and 384088 Ontario Limited.

I hereby authorize PeopleCare Inc. and its employees and agents to take full carriage of all planning related matters with respect to the above referenced property. This is your sole and irrevocable direction with respect to such authorization.

Yours truly,

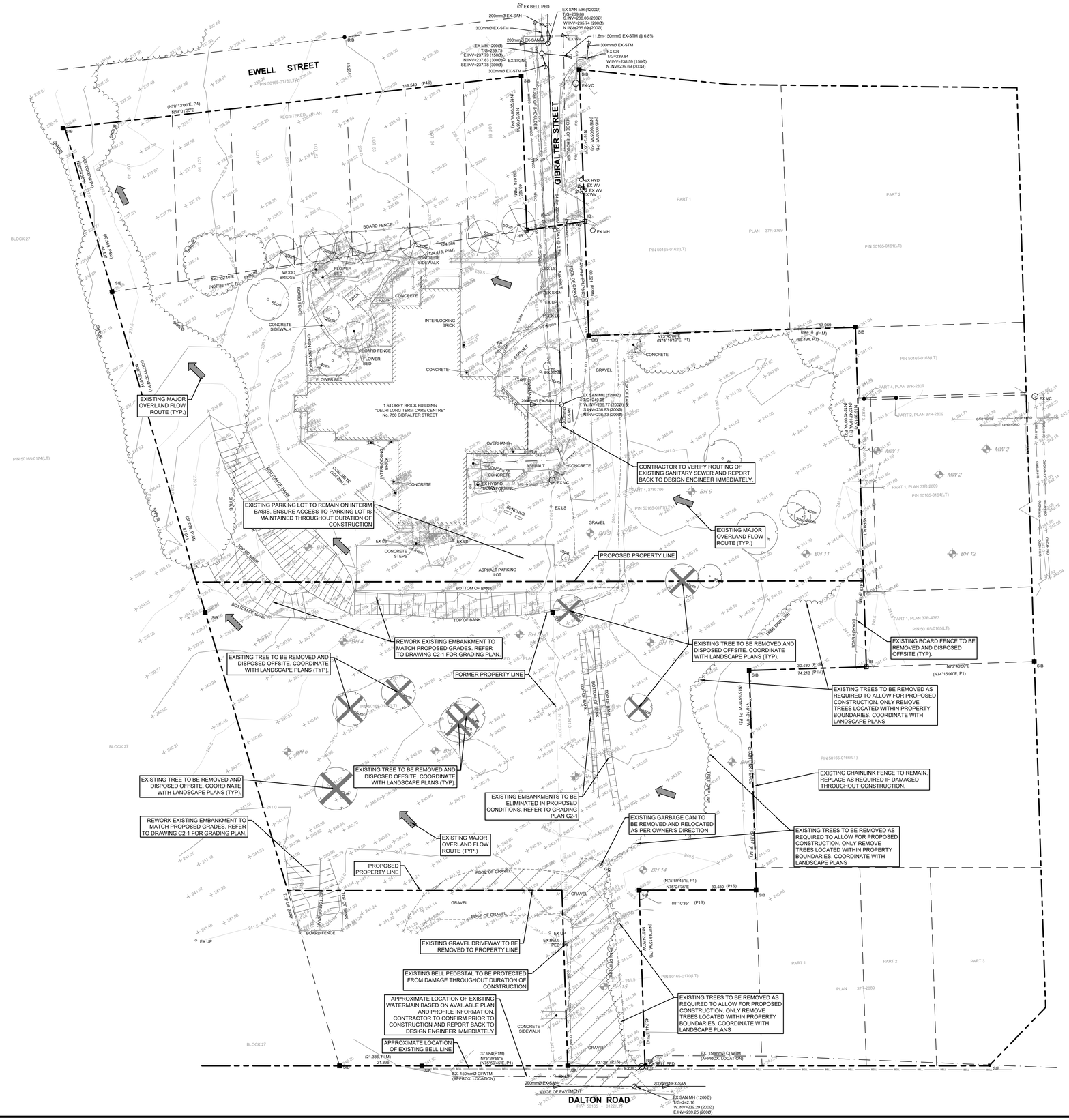
DELHI NURSING HOME LTD and 384088 ONTARIO LIMITED

Signatory

"I have the authority to bind the Corporations"

LEGEND

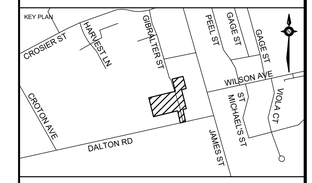
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- EXISTING UNDERGROUND HYDRO LINE
- EXISTING COMMUNICATION LINE
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- EXISTING BOARD FENCE
- EXISTING CHAINLINK FENCE
- EXISTING ASPHALT
- EXISTING CONCRETE
- EXISTING CURB
- EXISTING GRAVEL
- REMOVAL CROSS
- GRAVEL SURFACE REMOVAL



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THE KING'S HIGHWAY No. 3 (JAMES STREET)



PROJECT NORTH — TRUE NORTH

DATE	ISSUANCE	NO.
2023.03.03	25% DRAWING SET	
2023.03.16	ISSUED FOR SITE PLAN APPROVAL	

CLIENT

PEOPLECARE INC.

PROJECT

PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

TITLE

EXISTING CONDITIONS AND REMOVALS

WALTERFEDY

KITCHENER | HAMILTON | TORONTO

800.685.1378 walterfedy.com

LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
T. B. KELLER
100529026
2023.03.16

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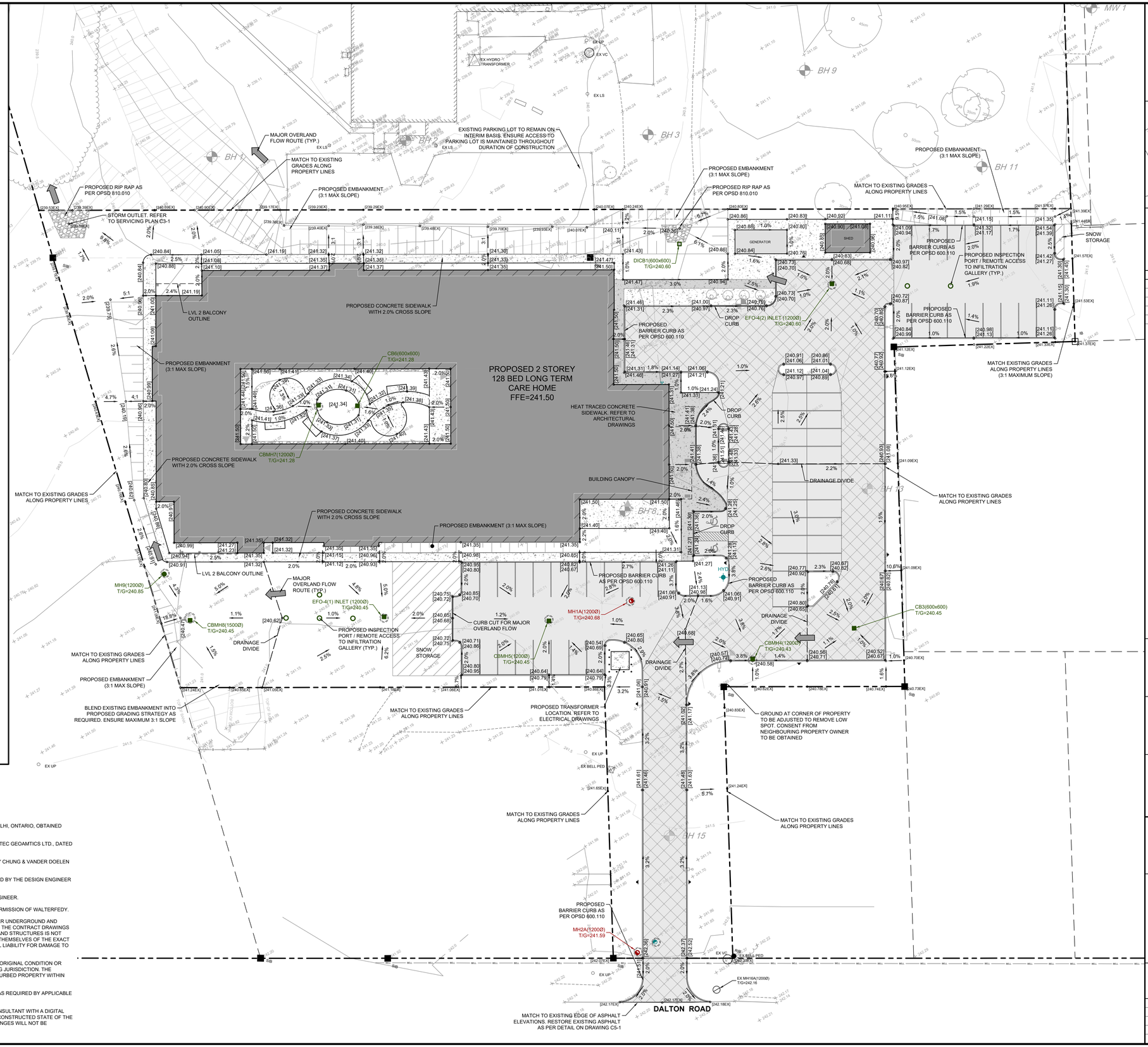
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CHECKED BY:	TK

SHEET NO.: C1-1

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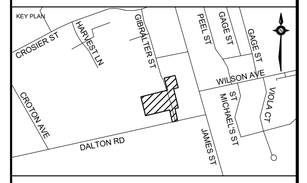
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- PROPOSED FIRE DEPARTMENT CONNECTION
- [123.45] — PROPOSED GRADE
- 2.0% 2.0% — PROPOSED DRAINAGE ARROW/SLOPE
- PROPOSED OVERLAND FLOW ROUTE
- PROPOSED EMBANKMENT (3:1 MAX UNLESS OTHERWISE NOTED)
- PROPOSED CURB
- PROPOSED DROP CURB
- PROPOSED BUILDING
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CLIENT
PEOPLECARE INC.

PROJECT
PEOPLECARE DELHI
173 DALTON ROAD, DELHI, ON

TITLE
GRADING PLAN

WALTERFEDY
KITCHENER | HAMILTON | TORONTO
800.685.1378 walterfedy.com

LICENSED PROFESSIONAL ENGINEER
T. B. KELLER
100529026
2023.03.16
PROVINCE OF ONTARIO

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PROJECT NO.:	2022-0672-11
DRAWN BY:	CC
CHECKED BY:	TK

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C2-1

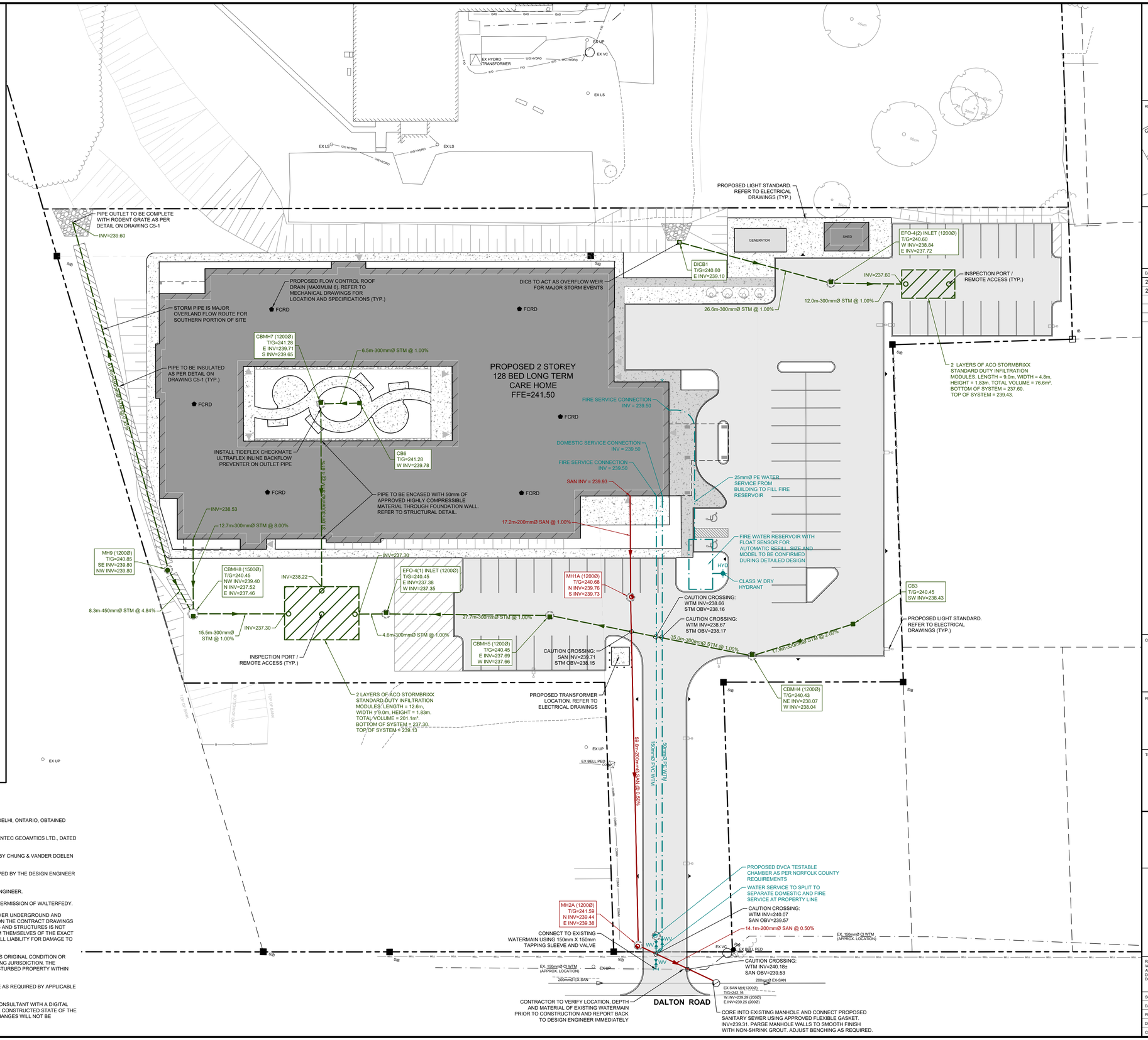
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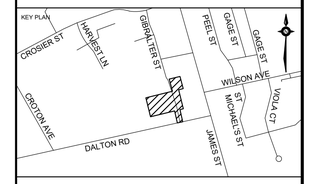
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- PROPOSED WATERMAIN/SERVICE
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CLIENT
PEOPLECARE INC.

PROJECT
PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

TITLE
SERVICING PLAN

WALTERFEDY
KITCHENER | HAMILTON | TORONTO
800.685.1378 walterfedy.com

LICENSED PROFESSIONAL ENGINEER
T. B. KELLER
100529026
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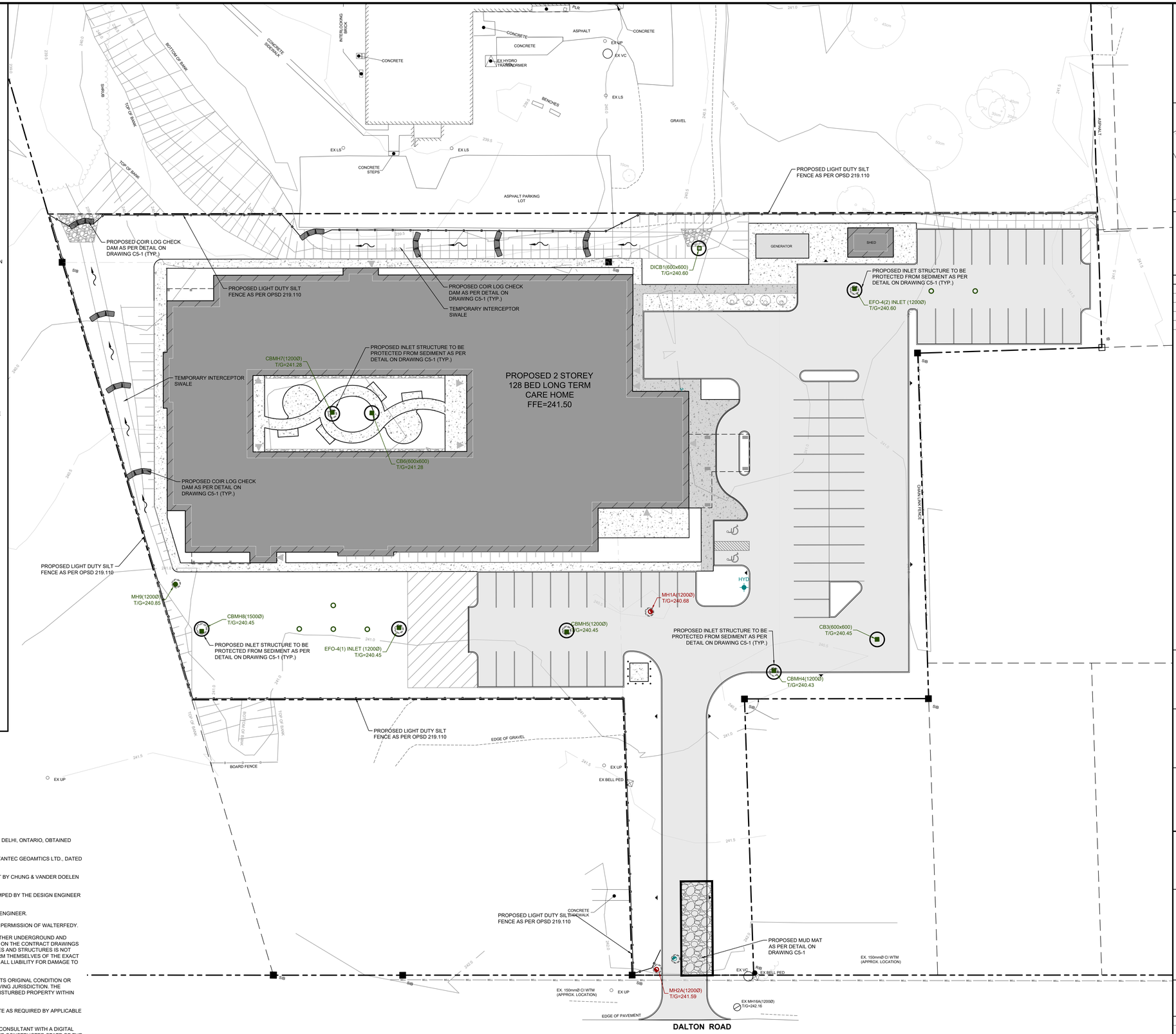
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CHECKED BY:	TK

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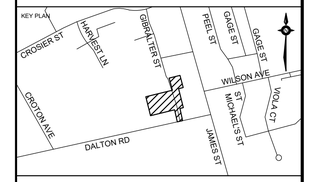
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- LIGHT DUTY SILT FENCE
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- PROPOSED CATCHBASIN TO BE PROTECTED
- ACCESS ROAD CONSTRUCTION



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3. BOREHOLE LOCATIONS AND GEOTECHNICAL INFORMATION FROM REPORT BY CHUNG & VANDER DOELEN ENGINEERING LTD. DATED DECEMBER 16, 2022.
4. THIS SET OF PLANS SHALL NOT BE USED FOR CONSTRUCTION UNTIL STAMPED BY THE DESIGN ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.
5. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
6. THIS PLAN NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF WALTERFEDY.
7. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM AND THOSE NOT LOCATED PRIOR TO CONSTRUCTION.
8. ANY AREA DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ITS ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CONSULTANT AND AUTHORITY HAVING JURISDICTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO MUNICIPAL STANDARDS.
9. ALL HEALTH AND SAFETY RELATED SIGNAGE MUST BE POSTED AT THE SITE AS REQUIRED BY APPLICABLE LAW AND BEST MANAGEMENT PRACTICES.
10. AT THE END OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE THE CONSULTANT WITH A DIGITAL FILE OF AS-CONSTRUCTED DRAWINGS. THE DRAWINGS MUST REFLECT THE CONSTRUCTED STATE OF THE WORK. SUBMISSION OF UNALTERED DESIGN DRAWINGS AND CONTRACT CHANGES WILL NOT BE ACCEPTED.



PROJECT NORTH

TRUE NORTH

DATE	ISSUANCE	NO.
2023.03.03	25% DRAWING SET	
2023.03.16	ISSUED FOR SITE PLAN APPROVAL	

CLIENT
PEOPLECARE INC.

PROJECT
PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

TITLE
EROSION AND SEDIMENT CONTROL PLAN

WALTERFEDY
KITCHENER | HAMILTON | TORONTO
800.685.1378 walterfedy.com

LICENSED PROFESSIONAL ENGINEER
T. B. KELLER
100529026
2023.03.16
PROVINCE OF ONTARIO

REPRODUCTION OR DISTRIBUTION FOR PURPOSES OTHER THAN AUTHORIZED BY WALTERFEDY IS FORBIDDEN. CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND REPORT ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON DRAWINGS TO WALTERFEDY. DO NOT SCALE THIS DRAWING.

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SCALE:	1:300
DATE:	2023-02-16
PROJECT NO.:	2022-0672-11
DRAWN BY:	CC
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SHEET NO.:
C4-1

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GENERAL NOTES

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EROSION CONTROL NOTES

1. ALL EROSION CONTROL FENCING, TEMPORARY FILTRATION, MUD MATS MUST BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY THE CONSULTANT PRIOR TO COMMENCEMENT OF ANY AREA GRADING, EXCAVATING, OR DEMOLITION. CONTRACTOR TO NOTIFY CONSULTANT FOR INSPECTION.
2. ATTACH EROSION CONTROL FENCE TO EXISTING FENCE WITHIN THE LIMITS OF THE SITE WHERE POSSIBLE.
3. EROSION CONTROL FENCING TO BE PLACED AROUND THE BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT A MINIMUM OF 2.5m FROM PROPERTY LINES.
4. FILTER FABRIC TO BE TERRAFIX 270R OR APPROVED EQUIVALENT.
5. MUD MATS TO BE PROVIDED ON SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. MUD MATS SHALL BE SUPPLIED AS INSTALLED AS PER THE DETAIL ON THIS SHEET. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE ITS EFFECTIVENESS AT ALL TIMES.
6. ALL DITCH INLET CATCHBASINS, CATCHBASINS AND CATCHBASIN MANHOLES TO HAVE TEMPORARY FILTRATION INSTALLED AND MAINTAINED AS PER THE DETAIL ON THIS SHEET.
7. NO ALTERNATE METHODS OF EROSION CONTROL PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY WALTERFEDY AND THE AUTHORITY HAVING JURISDICTION.
8. ALL EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RE-STABILIZED EITHER BY PAVING OR RESTORATION WITH VEGETATIVE GROUND COVER.
9. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING SEDIMENTS FROM THE PUBLIC ROADWAY AND SIDEWALKS AT THE END OF EACH WORK DAY OR AS DIRECTED BY THE CONSULTANT.
10. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED BY THE CONTRACTOR AFTER MAJOR RAINFALL EVENTS AND CLEANED OR REPLACED AS REQUIRED TO MEET THEIR INTENDED FUNCTION. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF ONE THIRD (1/3) THE STRUCTURE CAPACITY.
11. WALTERFEDY SHALL MONITOR SITE DEVELOPMENT TO ENSURE ALL EROSION CONTROLS ARE INSTALLED AND MAINTAINED TO NORFOLK COUNTY REQUIREMENTS. CONTRACTOR TO COMPLY WITH WALTEREDY'S INSTRUCTIONS TO INSTALL, MODIFY, OR MAINTAIN EROSION CONTROL WORKS.
12. THIS PLAN TO BE READ IN CONJUNCTION WITH THE EXISTING CONDITIONS PLAN, SITE SERVICING PLAN, GRADING PLAN, LANDSCAPING PLAN, AND THE STORM WATER MANAGEMENT REPORT DATED MARCH 2023.

GRADING NOTES

1. MATCH EXISTING GRADES AT ALL PROPERTY LINES AND/OR LIMITS OF CONSTRUCTION EXCEPT WHERE PROPOSED GRADES ARE NOTED.
2. MANAGEMENT OF EXCESS MATERIALS SHALL BE IN ACCORDANCE WITH OPSS 180. ENVIRONMENTALLY IMPACTED SOILS, WHERE AND WHEN ENCOUNTERED, SHALL BE MANAGED ON SITE AS REQUIRED UNTIL SUCH TIME THAT LABORATORY TESTING RESULTS HAVE CONFIRMED THE NATURE OF THE IMPACTS AND A SUITABLE DISPOSAL METHOD.
3. SURPLUS MATERIAL OF ALL TYPES NOT REQUIRED FOR BACKFILL, GRADING OR LANDSCAPING SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM THE SITE AS DIRECTED BY THE CONSULTANT. THE COSTS OF ALL OFFSITE DISPOSAL SHALL BE BORNE BY THE CONTRACTOR UNLESS A SPECIFIC PROVISION IS MADE IN THE CONTRACT DOCUMENTS FOR PAYMENT FROM DISPOSAL OF A SPECIFIC SURPLUS MATERIAL.
4. MATERIALS TO BE REMOVED SHALL BE NEATLY SAW-CUT ALONG ITS LIMITS, IN ADVANCE OF THE REMOVAL. THE LIMITS OF REMOVAL SHALL BE AS NOTED ON THE PLANS UNLESS AN EXTENSION OR REDUCTION OF THE MATERIAL TO BE REMOVED IS APPROVED IN ADVANCE BY THE WALTERFEDY. AS SUCH, THE COSTS OF ANY OVER-EXCAVATION NOT APPROVED IN ADVANCE SHALL BE THE FINANCIAL RESPONSIBILITY OF THE CONTRACTOR. THIS RESPONSIBILITY SHALL ALSO EXTEND TO RESTORATION OR REPLACEMENT OF DISTURBED FEATURES AND SURFACES DUE TO UNAUTHORIZED EXCAVATION.
5. ALL FILL PLACED ON SITE SHALL BE COMPACTED TO A MINIMUM 95% SPMDD (UNLESS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL ENGINEER OR ON THE DRAWINGS AND IN THE SPECIFICATIONS). ALL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm LIFTS EXCEPT WHERE UNDER PAVING, AND WALKS WHEN LAYERS SHALL BE 150mm MAX.
6. MAXIMUM SLOPE IN GRASSED AREAS TO BE 3:1. SLOPES GREATER THAN 3:1 TO BE LANDSCAPED WITH LOW MAINTENANCE GROUND COVER. MINIMUM SLOPE IN GRASSED AREAS TO BE 1%. GRASS SWALES WITH A SLOPE LESS THAN 1% TO BE UNDERLAIN WITH A FRENCH DRAIN.
7. FINISH GRADE AT FOUNDATION WALLS TO BE MINIMUM 150mm BELOW THE TOP OF FOUNDATION WALL/BRICK LINE UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
8. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE ON ALL SURFACES TO THE APPROPRIATE OUTLET STRUCTURE. AREAS OF PONDING CAUSED BY CONSTRUCTION ERROR WILL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF WALTERFEDY AT THE CONTRACTORS EXPENSE.
9. SHOULD THE NATURE OF THE SOIL AT THE DEPTH INDICATED PROVE UNSATISFACTORY AS DETERMINED BY THE GEOTECHNICAL ENGINEER, THE EXCAVATION SHALL BE CARRIED DOWN TO SUCH A DEEPER LEVEL AS THE GEOTECHNICAL ENGINEER MAY REQUIRE UNTIL A SATISFACTORY BEARING STRATUM IS REACHED.
   - 9.1. THIS CONTRACTOR SHALL BE PAID THE COST OF SUCH EXTRA EXCAVATION AT THE UNIT PRICE ESTABLISHED IN THE CONTRACT.
   - 9.2. ALL EXTRA DEPTHS OF EXCAVATION AND FILLING MUST HAVE THEIR AREA AND VOLUME DOCUMENTED BY AN INDEPENDENT INSPECTION AND TESTING COMPANY OR WALTERFEDY TO QUALIFY FOR PAYMENT.
   - 9.3. QUANTITIES USED FOR PAYMENT OF EXCAVATION AND FILLING AT EXTRA DEPTHS TO BE DETERMINED BY WALTERFEDY.

GENERAL SERVICING

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE REGULATIONS SET OUT BY THE MUNICIPALITY HAVING JURISDICTION.
2. RIGID PIPE BEDDING: CLASS 'B' AS PER OPSD 802.030 (EARTH EXCAVATION, TYPE 1 OR 2 SOIL), OPSD 802.031 (EARTH EXCAVATION, TYPE 3 SOIL), OPSD 802.032 (EARTH EXCAVATION, TYPE 4 SOIL)
3. FLEXIBLE PIPE BEDDING: AS PER OPSD 802.010 (EARTH) AND OPSD 802.014 (IN EMBANKMENT).
4. NATIVE FILL MATERIAL SHALL BE DEPOSITED IN THE TRENCH, FOR THE FULL WIDTH OF THE TRENCH, COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY IN LAYERS NOT OVER 300mm DEPTH, EXCEPT WHERE UNDER PAVING, AND WALKS WHEN LAYERS SHALL BE 150mm MAX.
5. SITE SERVICING CONTRACTOR TO TERMINATE ALL SERVICES 1.0m FROM FOUNDATION WALL AND COORDINATE WITH THE GENERAL OR MECHANICAL CONTRACTOR AS REQUIRED TO FACILITATE THE CONNECTION.
6. WHEN BELL AND SPIGOT PIPE IS LAID, THE BELL END OF THE PIPE SHALL BE LAID UPGRADE.
7. PIPE SHALL BE KEPT CLEAN AND DRY AS WORK PROGRESSES. THE TRENCH SHALL BE KEPT DRY.
8. A REMOVABLE WATERTIGHT BULKHEAD SHALL BE INSTALLED DAILY AT THE OPEN END OF THE LAST PIPE LAID.
9. PIPE SHALL NOT BE LAID UNTIL THE PRECEDING PIPE JOINT HAS BEEN COMPLETED AND THE PIPE IS BEDDED AND SECURED IN PLACE.
10. ALL PIPE ENDS SHALL BE THOROUGHLY CLEANED PRIOR TO THE INSTALLATION OF GASKETS. ALL GASKETS TO BE LUBRICATED PRIOR TO BEING INSTALLED OR AS RECOMMENDED BY THE PIPE MANUFACTURER.
11. A TEMPORARY LOCATION MARKER 50x75mm SHALL BE PLACED AT THE END OF ALL CAPPED SERVICE CONNECTIONS. THE MARKER SHALL BE PLACED 300mm ABOVE THE PLUGGED END OF THE SERVICE PIPE, CUT AT LEAST 500mm ABOVE THE FINISHED GRADE, AND MARKED WITH BRIGHT PAINT.
12. ALL MANHOLES, BASINS, CHAMBERS ETC. TO BE INSTALLED LEVEL AND PLUMB TO THE SATISFACTION OF WALTERFEDY.

STORM AND SANITARY SEWER

1. POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS: SMOOTH PROFILES, TO OPSS 1841 AND CSA B182.2, WITH SEPARATE GASKET AND INTEGRAL BELL SYSTEM, IN 6.0m NOMINAL LENGTHS AS FOLLOWS:
   - 1.1. 100-150mm OD: SDR28 PVC, WITH 625 kPa STIFFNESS.
   - 1.2. 200mm OD AND LARGER: SDR35 PVC WITH 320 kPa STIFFNESS.
2. SUBSURFACE DRAINAGE PIPE AND FITTINGS: TO OPSS 405, PERFORATED PVC PIPE TO OPSS 1841 OR PE PIPE TO OPSS.MUNI 1840, TO CAN/CSA-B182.1; COMPLETE WITH KNITTED SOCK GEOTEXTILE AS REQUIRED (TERRAFIX 270R OR EQUIVALENT).
3. CORRUGATED STEEL PIPE (CSP): TO OPSS 1801 AND CSA G401, COMPLETE WITH COUPLINGS, NEOPRENE GASKETS, BENDS AND OTHER FITTINGS; JOINTING TO BE 2-PIECE BAND WITH ANGLES COMPLETE WITH NEOPRENE GASKETS FOR NON-PERFORATED PIPE.
4. MANHOLES AND CATCHBASIN MANHOLES TO BE PRECAST 1200mm DIAMETER WITH ALUMINUM STEPS AT 300mm SPACING AS PER OPSD 701.010 UNLESS SPECIFIED OTHERWISE.
5. CATCHBASINS TO BE 600mm SQUARE PRECAST AS PER OPSD 705.010. DOUBLE CATCHBASINS TO BE 600x1450mm PRECAST AS PER OPSD 705.020.
6. CATCHBASIN MANHOLES, CATCHBASINS, AND DOUBLE CATCHBASINS TO HAVE A MINIMUM 600mm DEEP SUMP.
7. MANHOLE AND CATCHBASIN, FRAMES, GRATES, CASTINGS, LIDS TO BE AS PER OPSS 1850.
8. CAST IRON FRAMES AND COVERS OR GRATES- STORM SEWERS: TO OPSS 1850 AND OPSD 400.110, OPSD 401.010 (B, OPEN).
9. CAST IRON FRAMES AND COVERS OR GRATES - SANITARY SEWERS: TO OPSS 1850, OPSD 401.010 (A, CLOSED).
10. ALL SANITARY MANHOLES LOCATED IN STORM WATER PONDING AREAS TO HAVE WATERTIGHT FRAME AND COVERS AS PER OPSD 401.030
11. STORM SEWERS AND SERVICES TO HAVE MINIMUM 1.2m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEWER PIPE IN ACCORDANCE WITH APPLICABLE 'SEWER PIPE INSULATION DETAIL' INDICATED IN DRAWING DETAILS.
12. SANITARY SEWERS AND SERVICES TO HAVE A MINIMUM 1.5m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEWER PIPE IN ACCORDANCE WITH APPLICABLE 'SEWER PIPE INSULATION DETAIL' INDICATED IN DRAWING DETAILS.
13. ALL PIPES, TO BE INSTALLED FLUSH WITH THE INSIDE WALLS OF THE STRUCTURE AND PARGED TO A SMOOTH FINISH.
14. ALL MANHOLES TO BE PRE-BENCHED OR BENCHED WITH 30MPa CONCRETE AS PER OPSD 701.021. BENCHING SHALL EXTEND TO THE SPRING LINE OF LARGEST PIPE IN THE MANHOLE AND SHALL HAVE A SLOPE OF 1:8.
15. CONTRACTOR TO SUPPLY AND PAY FOR CCTV INSPECTION OF ALL SEWER LINES AND STRUCTURES.
16. ACCEPTANCE OF SEWER LINES AND STRUCTURES SHALL BE MADE AFTER THE CONSULTANT HAS REVIEWED THE CCTV DOCUMENTATION AND VIDEOS, AND EXPRESSED IN WRITING THAT THE SEWER LINES AND STRUCTURES ARE ACCEPTABLE.
17. IF CCTV INSPECTIONS SHOW ADDITIONAL CLEANING IS REQUIRED, CLEAN AND RE-INSPECT THE SEWER UNTIL ACCEPTED BY THE CONSULTANT.
18. A MINIMUM OF ONE (1) AND MAXIMUM OF THREE (3) ADJUSTMENT UNITS SHALL BE INSTALLED ON EACH STRUCTURE TO A MINIMUM HEIGHT OF 75mm AND MAXIMUM OF 300mm. THE FIRST ADJUSTMENT UNIT SHALL BE LAID IN A FULL BED OF MORTAR AND ALIGNED WITH THE OPENING IN THE STRUCTURE. SUCCESSIVE ADJUSTMENT UNITS SHALL BE LAID PLUMB TO THE FIRST ADJUSTMENT UNIT AND SEALED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. FRAMES WITH GRATES OR COVERS SHALL BE SET IN A FULL BED OF MORTAR ON THE ADJUSTMENT UNITS AND SUPPORTED USING SHIMS. ROCKS, STONES AND DEBRIS WILL NOT BE PERMITTED FOR USE AS SHIMS.

WATERMAINS

1. POLYVINYL CHLORIDE (PVC) PIPE: MANUFACTURED TO CAST IRON OD (CIOD); COLOUR CODED BLUE, WITH INTEGRAL WALL THICKENED BELL DESIGNED FOR JOINT ASSEMBLY USING AN ELASTOMERIC GASKET CONFORMING TO ASTM D3139 AND CSA B137.3., TO CSA B137.3, COMPLETE WITH TRACER WIRE.
   - 1.1. 100 TO 300mm: TO AWWA C900, DR 18, IPEX OR APPROVED EQUAL.
2. MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PIPE: MANUFACTURED TO CIOD; COLOUR CODED BLUE, BIAXIALLY ORIENTED, WITH INTEGRAL WALL THICKENED BELL DESIGNED FOR JOINT ASSEMBLY USING AN ELASTOMERIC GASKET CONFORMING TO ASTM D3139 AND CSA B137.3.1, COMPLETE WITH TRACER WIRE.
   - 2.1. 100 TO 300mm: TO AWWA C909, PC 1620 kPa, BIONAX OR APPROVED EQUAL.
3. ALL WATER SERVICING TO HAVE MINIMUM 1.7m COVER.
4. ALL WATER SERVICING PROVIDING FIRE FLOWS MUST BE PRESSURE TESTED TO 200 PSI AS PER THE OBC PLUMBING CODE.
5. FITTINGS: FOR POLYVINYL CHLORIDE (PVC) AND MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PIPE SHALL BE EITHER:
   - 5.1. GRAY IRON ACCORDING TO AWWA C110/A21.10.
   - 5.2. DUCTILE IRON ACCORDING TO C110/A21.10 OR AWWA C153 AND SHALL BE CEMENT LINED ACCORDING TO AWWA C104/A21.4.
   - 5.3. INJECTION MOULDED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORDING TO AWWA C907 AND CSA B137.2.
   - 5.4. PREFABRICATED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORDING TO AWWA C905 AND CSA B137.3.
6. JOINT RESTRAINTS:
   - 6.1. FOR PVC PIPE AND FITTINGS: TO ASTM F1674 AND AWWA C111, SERRATED RING TYPE; FOR PUSH ON JOINTS UNIFLANGE (SERIES 1300, 1350 & 1360), EBAA (SERIES 1600, 2500 & 2800) OR CLOW (SERIES 300 & 350); OR WEDGE ACTION TYPE AS MANUFACTURED BY EBAA (SERIES 2000PV), OR UNIFLANGE (SERIES 1500) AND STAR STARGRIP 4000, 4100P.
   - 6.2. FOR PVCO PIPE (AWWA C909) AND FITTINGS: SERRATED RING TYPE; FOR PUSH ON JOINTS UNIFLANGE (SERIES 1360), EBAA (SERIES 2500); WEDGE ACTION TYPE AS MANUFACTURED BY CLOW (SERIES 2000 TUF GRIP), STAR (STARGRIP 3500).
   - 6.3. ALL MECHANICAL JOINTS IN TEMPORARY AND PERMANENT CONNECTIONS TO INCLUDE MECHANICAL JOINT RESTRAINTS.
   - 6.4. WATERMAIN FITTINGS WHICH CHANGE DIRECTIONS VERTICALLY OR HORIZONTALLY TO BE FULLY RESTRAINED BY MECHANICAL JOINT RESTRAINT OR THRUST BLOCKS (OPSD 1103.01 AND 1103.02). THREADED ROD WILL NOT BE PERMITTED.
   - 6.5. WATERMAIN FITTINGS TO BE SUPPLIED WITH MECHANICAL JOINT RESTRAINTS. FOR WATERMAIN PIPE SIZES 150mmØ OR LESS ALL PIPE JOINTS TO BE RESTRAINED WITHIN 5.0m FROM ALL FITTINGS, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTRACT DRAWINGS. FOR WATERMAIN PIPE SIZES GREATER THAN 150mmØ ALL PIPE JOINTS TO BE RESTRAINED WITHIN 10.0m FROM ALL FITTING, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTRACT DRAWINGS. ALL TEES TO HAVE MINIMUM 2.0m SOLID PIPE LENGTH ON EACH RUN OF THE TEE, OR PROVIDE A THRUST BLOCK PER OPSD 1103.010.
7. TRACER WIRE:
   - 7.1. T.W.U. #10 GAUGE STRANDED AND INSULATED COPPER WIRE WITH 60mm OF BLACK, CROSS-LINKED POLYETHYLENE (XLPE) INSULATION.
   - 7.2. PVC WATERMAIN SHALL HAVE TRACER WIRE STRAPPED TO TOP AT 5.0m INTERVALS. TRACER WIRE SHALL BE BROUGHT TO THE SURFACE AT ALL HYDRANTS AND CONNECTED TO THE LOWER FLANGE OF THE HYDRANT.
   - 7.3. DO NOT CONNECT THE TRACER WIRE ON NON-METALLIC SYSTEMS TO NEW OR EXISTING METALLIC WATERMAIN PIPING AND/OR ASSOCIATED FITTINGS.
8. WATERMAIN VALVES, 100mm AND LARGER, SHALL BE AS PER AWWA C509-MUELLER A2360-23 OR APPROVED EQUIVALENT (OPEN LEFT) INCLUDING VALVE BOX AND 2.3kg ANODE.
9. HYDRANTS: CONFORM TO AWWA C502 FOR DRY-BARREL HYDRANTS, WITH TWO 63.5mm HOSE NOZZLES AT 180 DEGREES AND A 114.3mm PUMPER NOZZLE WITH A 100mm ULC APPROVED STORTZ CONNECTION; 32mm SQUARE OPERATING NUT, OPEN COUNTER-CLOCKWISE AND HAVE MECHANICAL JOINT END; COMPLETE WITH 150mm LEAD, 150mm GATE VALVE, ANCHOR TEE, VALVE AND BOX PROVIDED IN ACCORDANCE WITH NORFOLK COUNTY.
10. SERVICE PIPE:
    - 10.1. SERVICES LESS THAN 100mm: TYPE K SOFT COPPER, TO ASTM B88 OR POLYETHYLENE TO CSA B137.1 WITH INSERTS (STIFFENER) USED AT CONNECTIONS. COPPER SERVICE SHALL HAVE 5.5Kg ANODE.
    - 10.2. SERVICES 100mm OR GREATER: PVC CLASS 150 TO CSA B137.3.
11. ANODES TO BE PROVIDED AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
12. CHAMBERS FOR VALVES AND METERS TO BE PROVIDED IN ACCORDANCE WITH OPSS 407 AND 408.
    - 12.1. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR CHAMBER AND METER ASSEMBLY TO THE CONSULTANT FOR REVIEW.
    - 12.2. COMPLETE WITH FACTORY INSTALLED GALVANIZED OR ALUMINUM MANHOLE LADDER RUNGS.
    - 12.3. PROVIDE AND INSTALL ACCESS HATCH FRAME AND COVERS TO OPSD 402.030 AND NORFOLK COUNTY REQUIREMENTS. ACCESS HATCH SHALL BE LOCKABLE.
13. PETROLATUM TAPE SYSTEMS: TO BE COMPRISED OF THREE COMPONENTS; PASTE, MASTIC, AND TAPE THAT MEET AWWA C217-09, SUPPLIED BY DENSO NORTH AMERICA INC. OR PETRO COATING SYSTEMS LTD. OR RUSTROL SYSTEMS (INTERPROVINCIAL CORROSION CONTROL COMPANY LTD.). ONLY MATERIAL FROM SUPPLIERS LISTED SHALL BE USED. AT NO TIME SHALL MATERIALS FROM EITHER SYSTEM BE UTILISED WITH ONE AND OTHER.
    - 13.1. ALL MECHANICAL JOINT RESTRAINTS TO BE WRAPPED WITH APPROVED PETROLEUM TAPE SYSTEM.
14. PROVIDE ADEQUATE SUMP BELOW CONNECTION, AND PUMPING IF REQUIRED, TO PREVENT CONTAMINATION OF NEW WATERMAIN WITH TRENCH GROUND WATER OR ANY OTHER FOREIGN MATTER.
15. ALL WATERMAIN AND SERVICE COMMISSIONING, PRESSURE/LEAKAGE TESTING, DISINFECTION, BACTERIOLOGICAL ANALYSIS AND FLUSHING TO BE SUCCESSFULLY COMPLETED BY THE CONTRACTOR AND ACCEPTED BY NORFOLK COUNTY AND WALTERFEDY PRIOR TO PERMANENT CONNECTION TO WATER DISTRIBUTION SYSTEM. REFER TO CONTRACT SPECIFICATIONS FOR REQUIREMENTS.
    - 15.1. CONTRACTOR TO SUBMIT A WATERMAIN COMMISSIONING PLAN TO NORFOLK COUNTY AND WALTERFEDY AT LEAST 48 HOURS PRIOR TO CHLORINE RESIDUAL & BACTERIOLOGICAL TESTING.

CONSTRUCTION NOTES

GENERAL

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST:
   - 1.1. CHECK AND VERIFY ALL DIMENSIONS AND EXISTING ELEVATIONS WHICH INCLUDES, BUT IS NOT LIMITED TO, THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS.
   - 1.2. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.
   - 1.3. VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND EXISTING FLOOR ELEVATIONS (WHICH MAY APPEAR ON THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.
   - 1.4. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.
   - 1.5. REPORT DISCREPANCIES IN EXISTING CONDITION INFORMATION IMMEDIATELY TO THE CONSULTANT.
2. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR DAMAGE TO EXISTING WORKS. DAMAGE SHALL BE RECTIFIED TO THE SATISFACTION OF WALTERFEDY AND THE OWNER.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY SUPPORT AND/OR RELOCATION OF EXISTING UTILITIES DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE AND COMPLY WITH THE REQUIREMENTS OF ALL UTILITY COMPANIES WHEN CROSSING OR WORKING NEAR THEIR PLANT.
4. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL TEMPORARY BENCHMARKS ESTABLISHED FOR DESIGN PURPOSES, PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE COMMENCING WORK.
5. THE CONTRACTOR SHALL CONTACT THE CONSULTANT 48 HOURS PRIOR TO COMMENCING WORK TO DETERMINE THE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION.
6. THE RIGHT-OF-WAY (INCLUDING THE BOULEVARD) IS NOT TO BE USED FOR ANY CONSTRUCTION ACTIVITY UNTIL A WORK PERMIT, ROAD ENTRANCE PERMIT, ETC HAS BEEN OBTAINED AS PER THE TOWNSHIP OF DELHI, REGIONAL MUNICIPALITY OF HALDIMAND-NORFOLK REQUIREMENTS.
7. ALL WORK ON THE MUNICIPAL RIGHT-OF-WAY WILL BE INSTALLED BY THE SITE CONTRACTOR UPON SUCCESSFUL APPLICATION FOR A WORK PERMIT BY THE OWNER.
8. LIMIT CONSTRUCTION TO ACCEPTABLE TIMES WITHIN THE NORFOLK COUNTY NOISE BYLAW. CONSTRUCTION HOURS ARE 7AM TO 9PM MONDAY TO SATURDAY WITHOUT EXCEPTION.
9. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR THEIR REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, THEY MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO THE NORFOLK COUNTY ENGINEERING DEVELOPMENT DIVISION, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNER'S & CONTRACTOR'S OWN RISK.

TRAFFIC, ACCESS, SAFETY

1. PEDESTRIANS MUST BE ASSURED SAFE PASSAGE ALONG DALTON ROAD AT ALL TIMES. ALL PEDESTRIAN WALKWAYS MUST BE MAINTAINED AS LONG AS POSSIBLE AFTER WHICH TIME IT IS TEMPORARILY REPLACED BY A SUITABLE GRANULAR MATERIAL TO THE SATISFACTION OF WALTERFEDY AND/OR NORFOLK COUNTY.
2. ON STREET PARKING WILL NOT BE PERMITTED FOR ANY CONSTRUCTION VEHICLES OR CONSTRUCTION STAFF. THE CONTRACTOR SHALL PROVIDE ADEQUATE PARKING FACILITIES ON SITE TO SUIT THE NATURE AND LOCATION OF THE WORK.
3. FOR EMERGENCY RESPONSE, CONTRACTOR MUST MAINTAIN CONSTRUCTION ACCESS FREE AND CLEAR OF DEBRIS, MATERIALS, VEHICLES, AND EQUIPMENT.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF NORFOLK COUNTY AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

REMOVALS

1. ALL REMOVALS TO BE IN ACCORDANCE WITH OPSS.MUNI 510.

ASPHALT

1. ASPHALT MATERIAL TO BE PROVIDED AS PER OPSS 1150 AND INSTALLED AS PER OPSS 310.
2. WHERE NEW ASPHALT ABUTS EXISTING ASPHALT, EXISTING ASPHALT SHALL BE SAW CUT AND HAVE TACK COAT APPLIED AS PER OPSS 308 TO A CLEAN DRY FACE BEFORE NEW ASPHALT IS PLACED.
3. SUBMIT ONE COPY OF THE PROPOSED ASPHALT MIX DESIGN FOR ANY PAVING MATERIALS DIRECTLY TO THE CONSULTANT A MINIMUM OF TWO WEEKS IN ADVANCE OF SCHEDULED ASPHALT PAVING.

CONCRETE

1. CONCRETE BARRIER CURB TO BE AS PER OPSD 600.110, - 32MPa @ 28 DAYS CONCRETE TO OPSS 353, 7±1.5% AIR ENTRAINMENT, 19mm MAX COURSE AGGREGATE, 60mm MAX SLUMP.
2. CONCRETE SIDEWALK TO BE AS PER DETAIL ON SHEET C5-1 32MPa @ 28 DAYS CONCRETE TO OPSS 351, 7±1.5% AIR ENTRAINMENT, 19mm MAX COURSE AGGREGATE, 70±20mm SLUMP.
3. UNSHRINKABLE FILL: TO OPSS 1359, 28-DAY COMPRESSIVE STRENGTH: 0.4 - 0.7 MPa, MAXIMUM 25mm COURSE AGGREGATE SIZE.
4. SUBMIT ONE COPY OF ALL PROPOSED CONCRETE MIX DESIGNS DIRECTLY TO THE CONSULTANT A MINIMUM OF TWO WEEKS IN ADVANCE OF SCHEDULED CONCRETE POURING.

GRANULAR

1. ALL GRANULAR BASE, SUBBASE, SUBGRADE AND BACKFILL TO BE PROVIDED AS PER OPSS.MUNI 1010 AND INSTALLED AS PER OPSS.MUNI 314.
2. COARSE GRANULAR FILL: MATERIAL AS SPECIFIED BELOW; COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS SPECIFIED OTHERWISE, IN LIFTS NOT EXCEEDING 300mm IN COMPACTED THICKNESS; MOISTURE CONTENT WITHIN PLUS OR MINUS 2% OF THE REQUIREMENTS OF ASTM D698.
3. FINE GRANULAR FILL: MATERIAL AS SPECIFIED BELOW; COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS SPECIFIED OTHERWISE, IN LIFTS NOT EXCEEDING 150mm IN COMPACTED THICKNESS; MOISTURE CONTENT WITHIN PLUS OR MINUS 2% OF THE REQUIREMENTS OF ASTM D698.
   - 3.1. GRANULAR 'A' TO OPSS.MUNI 1010.

EARTHWORK

1. IN ACCORDANCE WITH THE TOWNSHIP OF DELHI SITE ALTERATION BY-LAW; NO FILLING, PRE-GRADING OR TREE REMOVAL SHALL OCCUR, IN ADVANCE OF THE FINAL SITE PLAN ENGINEERING ACCEPTANCE. WITHIN THAT PERMIT, SHOULD THE DEVELOPER OR CONTRACTOR WISH TO PREPARE THE SITE FOR CONSTRUCTION PRIOR TO ENGINEERING ACCEPTANCE, AN APPLICATION FOR A SITE ALTERATION PERMIT MUST BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER



2 OVERALL SITE PLAN
1 : 400



A1.1 - Key Map
N.T.S.

SITE DATA

173 DALTON ROAD, DELHI, ONTARIO

DATA		REQUIRED	PROVIDED
ZONING		ZONING - IC	
LOT AREA (m²)		450 m²	12,268 m²
LOT COVERAGE (m²)		NONE	3,280 m²
LOT COVERAGE (%)		NONE	26.32 %
LOT FRONTAGE (m)		15 m	20.1 m
SETBACKS	FRONT YARD (m)	6 m	68.23 m
	INTERIOR SIDE YARD (m)	3 m	4.98 m
		3 m	37.89 m
	REAR YARD (m)	9 m	9.00 m

BUILDING DATA

DATA	REQUIRED	PROVIDED
TOTAL DENSITY (# of beds)	N/A	128 beds
PROPOSED BUILDING AREA (m²)	N/A	3,195 m²
PROPOSED GROSS FLOOR AREA (m²)	N/A	6,314 m²
PROPOSED UNDERGROUND AREA (m²)	N/A	1,005 m²
NUMBER OF STOREYS	--	2
BUILDING HEIGHT (m)	11m MAX.	6.8 m
INDOOR AMENITY AREA (m²) (activity and lounge spaces)	56 m² each RHA	RHA 1= 70.59 m² RHA 2 = 73.98 m² RHA 3 = 70.68 m² RHA 4 = 73.69 m²

*HEIGHT, MEAN THE VERTICAL DISTANCE BETWEEN THE AVERAGE FINISHED GRADE OF THE GROUND AT THE FRONT WALL OF A BUILDING AND IN THE CASE OF A FLAT ROOF OR A MANSARD ROOF, THE HIGHEST POINT OF THE ROOF SURFACE

LANDSCAPING DATA

DATA	REQUIRED	PROVIDED
LANDSCAPE AREA (percentage)	N/A	44.22 %
LANDSCAPE AREA (m²)	N/A	5,440 m²
ASPHALT AREA (m²)	N/A	3,633 m²

LANDSCAPE OPEN SPACE: MEAN AN AREA OF LAND COMPRISED OF TREES, SHRUBS, FLOWERS, GRASS OR OTHER HORTICULTURAL ELEMENTS. LANDSCAPING MAY INCLUDE PERVIOUS PATHS, PATIOS, WALKWAYS, OR ELEMENTS DESIGNED TO ENHANCE THE VISUAL AMENITY OF A PROPERTY BUT DOES NOT INCLUDE OPEN STORAGE DISPLAY AREAS, PARKING OR LOADING AREAS, OR AREAS COVERED BY DRIVEWAYS.

NOTE:

PROPERTY BOUNDARY AND EXISTING CONDITIONS HAVE BEEN TAKEN FROM: TOPOGRAPHIC PLAN OF SURVEY OF PART OF BLOCK 28, REGISTERED PLAN 189 AND LOTS 49 TO 55, REGISTERED PLAN 216 CREATED BY STANTEC GEOMATICS LTD. DATED OCTOBER 13, 2022

VEHICLE PARKING DATA

DATA	REQUIRED	PROVIDED
RESIDENTIAL PARKING (1 PER 4 BEDS)	128 beds/4 = 32	64
BARRIER FREE PARKING (26-50 PARKING SPACES= 1 TYPE A, 1 TYPE B)	2 Inclusive	2 (Inclusive) TYPE A= 1 TYPE B= 1

* PERPENDICULAR STALLS = 3.0m X 5.8m
B.F. STALL TYPE A = 3.4m X 5.8m, 1.5 AISLE
B.F. STALL TYPE B = 2.4m X 5.8m + 1.5 AISLE
DRIVE AISLE REQUIRED 7.3m

BUILDING CODE REVIEW SUMMARY

Firm Name:
SRM Architects Inc.
279 King Street West
Suite 200
Kitchener, Ontario, N2G 1B2
T: 519.885.5600
Certificate of Practice Number: 4273

Name of Project:
PeopleCare Delhi

Location:
173 Dalton Road, Delhi,Ontario

The Architect noted above has exercised responsible control with respect to design activities. The Architects seal number is the Architect's BCDN.

Item	Ontario Building Code Matrix Parts 3 & 9			OBC Section Reference	
1	Project Description: ■ New Construction ☐ Addition ☐ Alteration ☐ Change of Use		☐ Part 11 11.1 to 11.4	■ Part 3 1.1.2.[A]	☐ Part 9 1.1.2.[A] and 9.10.1.3.
2	Major Occupancy (s)	Group B Division 2		3.1.2.1(1)	9.10.2
3	Building Area (m²)	Existing - New 3,195.0 Total 3,195.0		1.4.1.2.[A]	1.4.1.2.[A]
4	Gross Area (m²)	Existing - New 6,314.0 Total 6,314.0		1.4.1.2.[A]	1.4.1.2.[A]
5	Number of Storeys	Above Grade 2	Below Grade 1	1.4.1.2.[A] & 3.2.1.1.	1.4.1.2.[A] & 9.10.4.
6	Height of Building	6.80m (finished grade to floor level of top storey)			
7	Number of Streets / Access Routes	1		3.2.2.10 & 3.2.5.	9.10.20
8	Building Classification	Group B Division 2 or 3, up to 3 storeys, sprinklered	3.2.2.39	3.2.2.20 - 83	9.10.2
9	Sprinkler System Proposed ■ Entire Building ☐ Basement Only ☐ In lieu of roof rating ☐ Not required ☐ Selected Compartments ☐ Selected Floor Areas			3.2.2.20 - 83 3.2.1.5 3.2.2.17 Index	9.10.8.2. Index
10	Standpipe required	☐ Yes	■ No	3.2.9	N/A
11	Fire Alarm required	■ Yes	☐ No	3.2.4	9.10.18.
12	Water Service Supply is Adequate	■ Yes	☐ No	3.2.5.7	N/A
13	High Building	☐ Yes (refer to High Building Summary)	■ No	3.2.6	N/A
14	Construction Restrictions ☐ Combustible permitted ■ Non-combustible required ☐ Both Actual Construction ☐ Combustible ■ Non-combustible ☐ Both			3.2.2.20 - 83	9.10.6
15	Mezzanine (s) Area (m²)	N/A		3.2.1.1.(3)-(8)	9.10.4.1
16	Occupant Load Based on ☐ m² / person (Public) ■ Design of building Basement: Occupancy__B2__ Load ____98____ persons First Floor: Occupancy__B2__ Load _64+18+50 = 132_ persons Second Floor: Occupancy__B2__ Load _64+18+50 = 132_ persons			3.1.17 98 based on washroom count. 64 RHA, 18 staff, 50 public based on washroom count	9.9.1.3
17	Barrier Free Design	■ Yes	☐ No (Explain)	3.8	9.5.2
18	Hazardous Substances	☐ Yes	■ No	3.3.1.2. & 3.3.1.19.	9.10.1.3(4)
19	Required Fire Resistance Rating (FRR)	Horizontal Assemblies Fire Resistance Rating (hours) / Listed Design No. or Description (SB-2) Floors 1 Hours xx Roof NONE Hours xx Mezzanine N/A Hours xx Fire Resistance Rating of Supporting Members / Listed Design No. or Description (SB-2) Floors 1 Hours xx Roof NONE Hours xx Mezzanine N/A Hours xx		3.2.2.20 - 83 & 3.2.1.4.	9.10.8 & 9.10.9
20	Washroom Requirements:			3.7.4. 1 stall = 25 persons x 2 = 50 public 1 stall = 9 persons x 2 = 18 staff	9.31.
21	Exits Basement: Occupancy__B2__ Exits Required__2__ Exits Provided__2__ First Floor: Occupancy__B2__ Exits Required__3__ Exits Provided__4__ Second Floor: Occupancy__B2__ Exits Required__3__ Exits Provided__3__			3.4.	9.9
22	Fire Separations: Sleeping rooms: [0 HR within 1HR fire compartments max 1,000sq.m] 3.3.3.5.(2) Janitor's Room: [0HR if sprinklered] Service Rooms: [1 HR] Vertical Service Spaces: [3/4 HR] Elevator Hoistway: [1 HR] Elevator Machine Room: [1 HR] Exits: [1 HR] Stairwell: [1 HR] Horizontal Service Space: [3/4 HR] Fire Compartments: [1 HR] Sleeping Rooms: [0 HR] Garbage Rooms: [2 HR]WHERE CHUTE DISCHARGES INTO ROOM [1HR] ELSEWHERE Garbage Chutes: [2 HR]			3.3.1.20. 3.6.2. 3.6.3 3.5.3.1. 3.5.3.3. 3.4.4. 3.4.4. 3.1.8.3.	9.10.10. 9.10.1.3. 9.9.4. 9.9.4. 9.10.9.10.
23	Barrier Free Entrances: Number of Entrances required to be Barrier Free = 1 Power Door Operators Required		■ Yes ☐ No	3.8.1.2. 3.8.3.3.	9.5.2
24	Roof Anchors: ☐ Required ■ Not Required			4.4.4	
25	Spatial Separation - Construction of Exterior Walls			3.2.3.	9.10.14.

Wall Face	Area of E.B.F.	Limiting Distance	Ratio L/H to H/L	Permitted Max % of Openings	Proposed Max % of Openings	Required F.R.R. of Wall	Listed Design or Description	Non-Combustible Cladding	Non-Combustible Construction
North	471 sq.m.	9m	N/A	100%	-	NONE	N/A	NO	NO
South	586 sq.m.	22.6m	N/A	100%	-	NONE	N/A	NO	NO
East	301 sq.m.	37.9m	N/A	100%	-	NONE	N/A	NO	NO
West	283 sq.m.	4.98m	N/A	30%	18.4%	NONE	N/A	NO	NO

Project North **True North**

GENERAL NOTES

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2. ALL WORK SHALL COMPLY WITH THE 2012 ONTARIO BUILDING CODE AND AMENDMENTS.
3. CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND SPECIFICATIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
4. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL HAVE A SET OF APPROVED CONSTRUCTION DOCUMENTS ON SITE AT ALL TIMES.
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6. THE MATERIAL CONTAINED HEREIN REFLECTS THE CONSULTANTS BEST JUDGEMENT IN LIGHT OF THE INFORMATION AVAILABLE TO HIM AT THE TIME OF PREPARATION. ANY USE WHICH A THIRD PARTY MAKES OF THE CONTRACT DOCUMENTS, OR ANY RELIANCE ON/OR DECISIONS TO BE MADE BASED ON THEM ARE THE RESPONSIBILITY OF SUCH THIRD PARTIES.
7. THE CONSULTANT ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THE CONTRACT DOCUMENTS.

SITE LEGEND

	WALTER FEDY - SANITARY LINE
	EXIT
	EMERGENCY EXIT
U.P.	UTILITY POLE
L.S.	LIGHT STANDARD
x——x	FENCE
D.C.	DROP CURB
HB	HOSE BIB
FDC	FIRE DEPARTMENT CONNECTION
CSW	CONCRETE SIDEWALK
	SNOW MELT AREA
	REMAINING AREA OF CURRENT PROPERTY PARCEL
MH	MAN HOLE

0 1 2 3 4m
1:100

No.	Date	Revision
6	2023-03-15	ISSUED FOR SPA SUBMISSION 1
5	2023-03-14	REISSUED FOR MINISTRY SUBMISSION 2
4	2023-03-04	ISSUED FOR 25% WD REVIEW
3	2023-01-30	ISSUED FOR CLIENT REVIEW
2	2023-01-16	ISSUED FOR PRE-CONSULT APPLICATION
1	2023-01-16	ISSUED FOR MINISTRY SUBMISSION 1

srm ARCHITECTS INC.
279 KING STREET WEST, SUITE 200, KITCHENER ON N2G 1B1

Project No 23031
Project Date
Drawn by SKK
Checked by JLH/SRW
Plot Date / Time 2023-03-16 12:08:35 PM

PEOPLECARE LTC 173 DALTON ROAD, DELHI

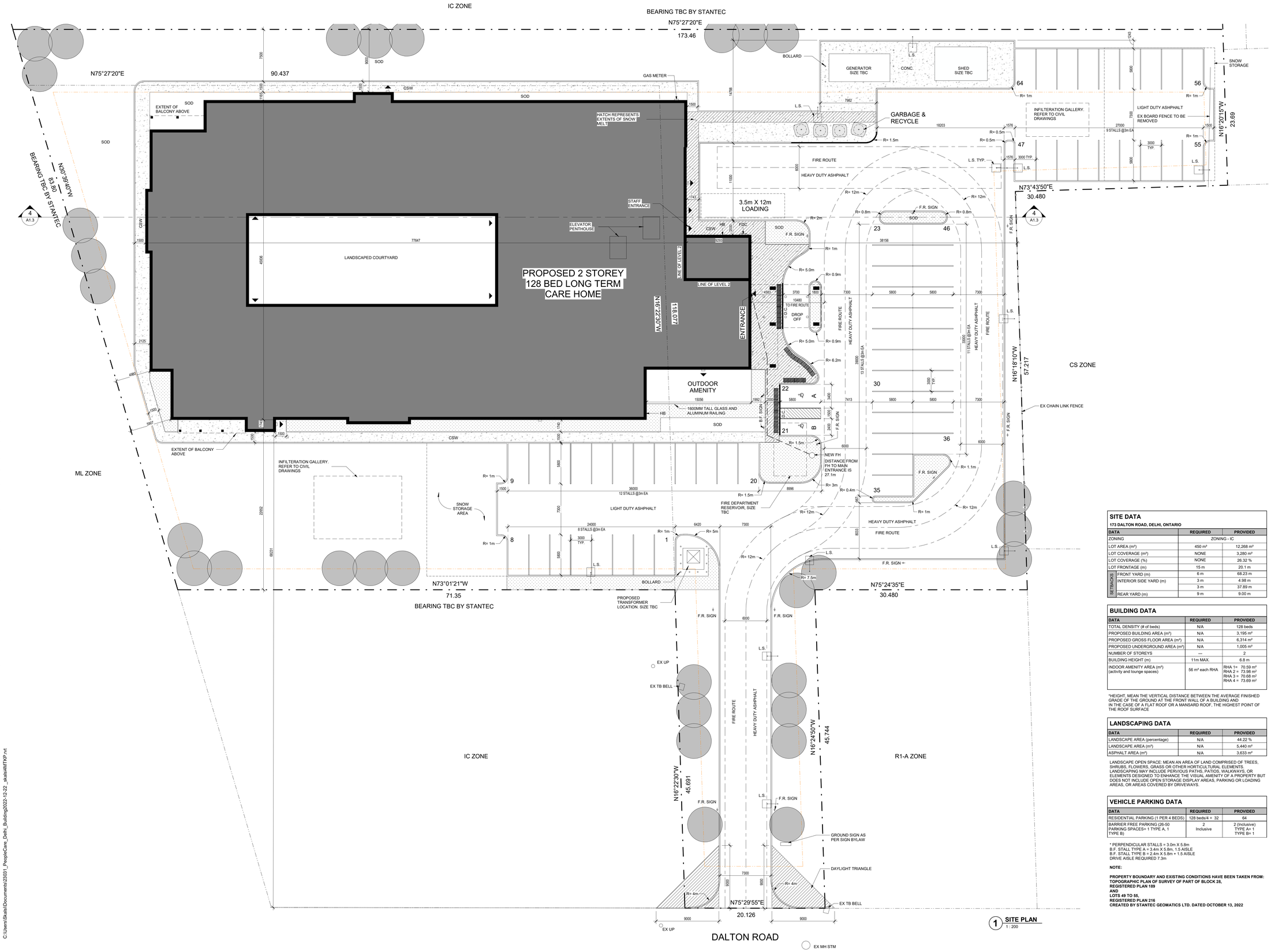
OVERALL SITE PLAN

ONTARIO ASSOCIATION OF ARCHITECTS
JENNIFER HALIBURTON
LICENCE 8158

Drawing Scale As indicated
Status ISSUED FOR SPA
Drawing No. **A1.1**

Do not scale drawing. Contractors must check and verify all dimensions and report any discrepancies to the Architect before proceeding with the work. All documents remain the property of the Architect. Unauthorized use, modification, and/or reproduction of these documents is prohibited without written permission. The Contract Documents were prepared by the Consultant for the account of the Owner. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the Contract Documents. The material contained herein reflects the Consultants best judgement in light of the information available to him at the time of preparation Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the Contract Documents.

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Project North

True North

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SITE DATA

173 DALTON ROAD, DELHI, ONTARIO

DATA		REQUIRED	PROVIDED
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LOT COVERAGE (%)		NONE	26.32 %
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SETBACKS	FRONT YARD (m)	6 m	68.23 m
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LANDSCAPING DATA

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DATA	REQUIRED	PROVIDED
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B.F. STALL TYPE A = 3.4m X 5.8m, 1.5 AISLE
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DRIVE AISLE REQUIRED 7.3m

NOTE:

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srm ARCHITECTS INC.
279 KING STREET WEST, SUITE 200, KITCHENER ON N2G 1B1

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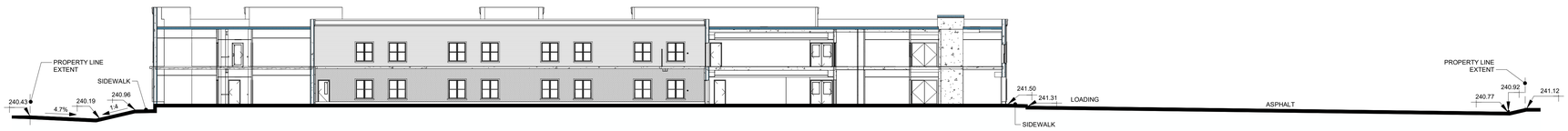
PEOPLECARE LTC
173 DALTON ROAD, DELHI

SITE PLAN

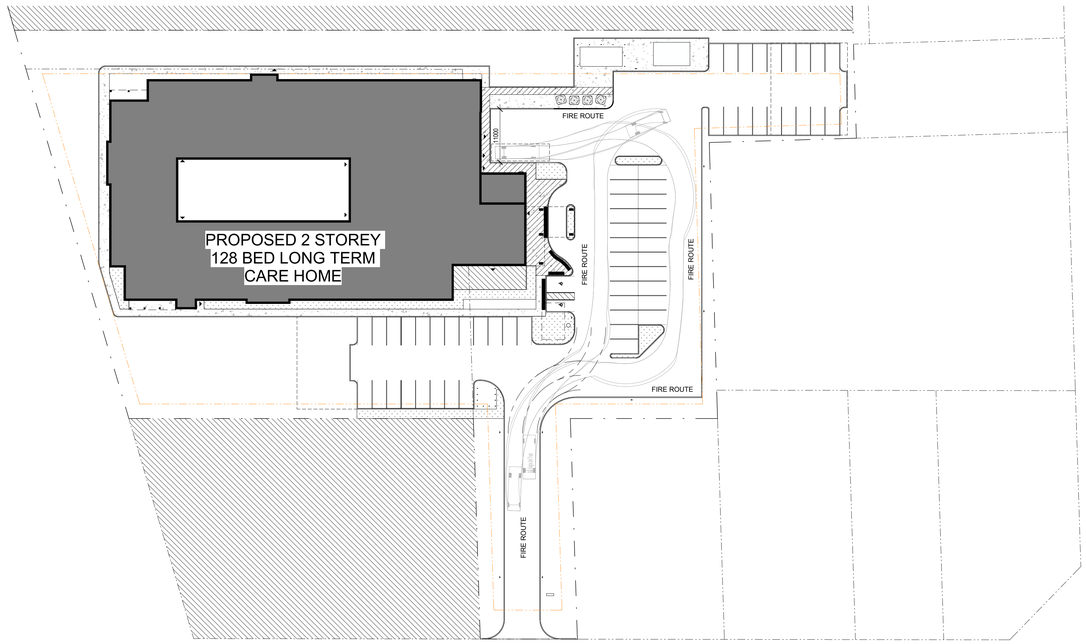
ONTARIO ASSOCIATION OF ARCHITECTS
JENNIFER HALIBURTON
LICENCE 8158

Drawing Scale: As indicated
Status: ISSUED FOR SPA
Drawing No.: **A1.2**

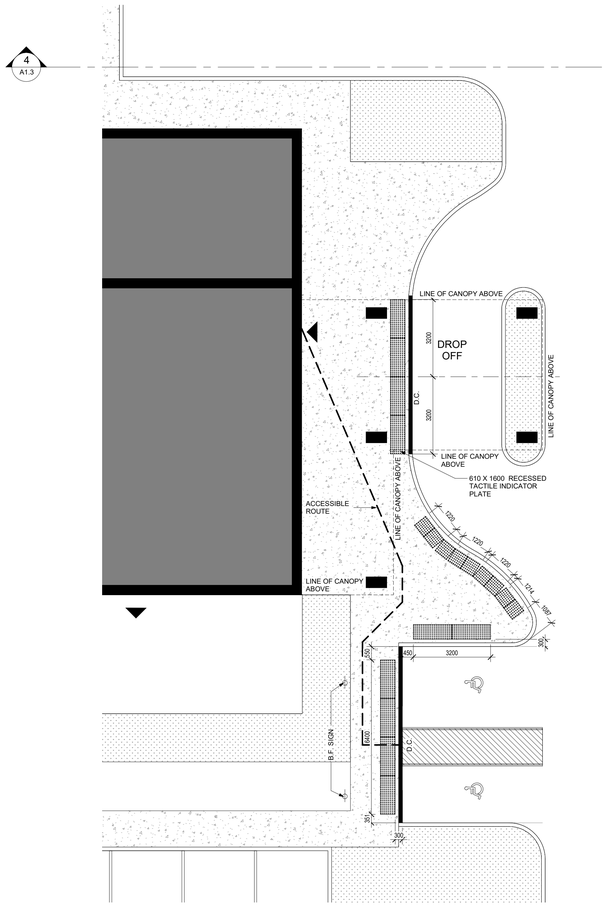
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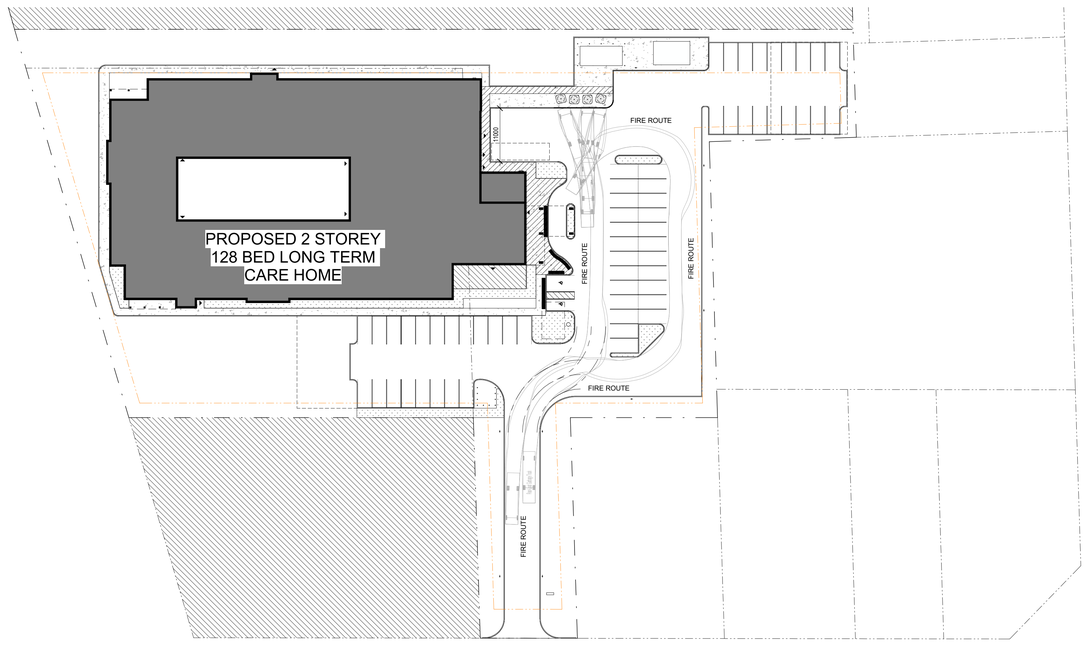
4 Site Section
1 : 200



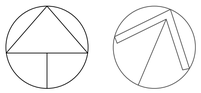
2 SITE PLAN LOADING AREA TRUCK MOVEMENT
1 : 500



3 SITE PLAN ACCESSIBLE ROUTE
1 : 100



1 SITE PLAN GARBAGE TRUCK MOVEMENT
1 : 500



GENERAL NOTES

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4. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL HAVE A SET OF APPROVED CONSTRUCTION DOCUMENTS ON SITE AT ALL TIMES.
5. ALL DOCUMENTS REMAIN THE PROPERTY OF THE ARCHITECT. UNAUTHORIZED USE, MODIFICATION, AND/OR REPRODUCTION OF THESE DOCUMENTS IS PROHIBITED WITHOUT WRITTEN PERMISSION. THE CONTRACT DOCUMENTS WERE PREPARED BY THE CONSULTANT FOR THE ACCOUNT OF THE OWNER.
6. THE MATERIAL CONTAINED HEREIN REFLECTS THE CONSULTANTS BEST JUDGEMENT IN LIGHT OF THE INFORMATION AVAILABLE TO HIM AT THE TIME OF PREPARATION. ANY USE WHICH A THIRD PARTY MAKES OF THE CONTRACT DOCUMENTS, OR ANY RELIANCE ON/OR DECISIONS TO BE MADE BASED ON THEM ARE THE RESPONSIBILITY OF SUCH THIRD PARTIES.
7. THE CONSULTANT ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THE CONTRACT DOCUMENTS.

No.	Date	Revision
2	2023-03-15	ISSUED FOR SPA SUBMISSION 1
1	2023-03-04	ISSUED FOR 25% WD REVIEW

srm ARCHITECTS INC.
279 KING STREET WEST, SUITE 200, KITCHENER ON N2G 1B1

Project No	23031
Project Date	
Drawn by	SKK
Checked by	JLH/SRW
Plot Date / Time	2023-03-16 12:08:38 PM

PEOPLECARE LTC
173 DALTON ROAD, DELHI

SITE PLAN AND SECTION

ONTARIO ASSOCIATION OF ARCHITECTS
JENNIFER HALIBURTON
LICENCE 8158

Drawing Scale	As indicated
Status	ISSUED FOR SPA
Drawing No.	A1.3

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EXTERIOR MATERIALS LEGEND

1. BRICK MASONRY - WESTMONT
TYPE / MANUFACTURER : BRAMPTON BRICK

2. STONE - VIVACE SERIES - MILANO
TYPE / MANUFACTURER : BRAMPTON BRICK

3. SIDING - HARDIEPANEL VERTICAL SIDING & HARDIETRIM BATTEN BOARDS
PAINT COLOUR : AGED PEWTER
TYPE / MANUFACTURER : JAMES HARDIE

4. VINYL WINDOWS
COLOUR : DARK GREY
TYPE / MANUFACTURER : TO BE DETERMINED

5. THERMALLY BROKEN PREFINISHED ALUMINIUM FRAMED ENTRANCE/ WINDOW
GLAZING : CLEAR GLASS, DOUBLE GLAZED SEALED INSULATED GLAZING UNIT
FRAME COLOR - WINDSWEPT SMOKE
TYPE / MANUFACTURER : STRASSBURGER

6. HARDIEBOARD TRIMS AND MOULDINGS
COLOUR : DARK GREY
TYPE / MANUFACTURER : JAMES HARDIE

7. GUARDRAILS
COLOUR : PERMARAIL SABLE
TYPE / MANUFACTURER : PERMACORP OR EQUIVALENT

8. PARAPET FLASHING
COLOUR TO MATCH TRIM

9. ROYAL TRIM AND MOULDINGS 6X6 COLUMN WRAP - CONTRACTOR SERIES - WOOD GRAIN TEXTURE - WHITE
COLOUR : VINYL SAFE 100% ARYLIC LATEX PAINT - COLOUR TBD

10. RESERVED

11. CONCRETE BANDING

12. RESERVED

13. HOLLOW METAL DOOR AND FRAME
COLOUR : DARK GREY

14. WALL MOUNTED LIGHT FIXTURE

15. CONCRETE SILL



4 **WEST ELEVATION**
1 : 125



3 **EAST ELEVATION**
1 : 125



2 **SOUTH ELEVATION**
1 : 125



1 **NORTH ELEVATION**
1 : 125

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No.	Date	Revision
6	2023-03-15	ISSUED FOR SPA SUBMISSION 1
5	2023-03-14	REISSUED FOR MINISTRY SUBMISSION 2
4	2023-03-04	ISSUED FOR 25% WD REVIEW
3	2023-01-30	ISSUED FOR CLIENT REVIEW
2	2023-01-16	ISSUED FOR PRE-CONSULT APPLICATION
1	2023-01-16	ISSUED FOR MINISTRY SUBMISSION 1

srm ARCHITECTS INC.
279 KING STREET WEST, SUITE 200, KITCHENER ON N2G 1B1

Project No 23031
Project Date
Drawn by SKK
Checked by JLH/SRW
Plot Date / Time 2023-03-16 12:08:42 PM

PEOPLECARE LTC
173 DALTON ROAD, DELHI

ELEVATIONS

ONTARIO ASSOCIATION OF ARCHITECTS
JENNIFER HALIBURTON
LICENCE
8158

Drawing Scale As indicated
Status ISSUED FOR SPA
Drawing No. **A3.1**

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Stantec

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300W-675 Cochrane Drive
Markham ON
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www.stantec.com

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TOPOGRAPHIC PLAN OF SURVEY OF

PART OF BLOCK 28, REGISTERED PLAN 189 AND LOTS 49 TO 55, REGISTERED PLAN 216

TOWNSHIP OF DELHI

REGIONAL MUNICIPALITY OF HALDIMAND-NORFOLK

Scale 1:500

10 0 0 10 20 30 METRES

Stantec Geomatics Ltd.
ONTARIO LAND SURVEYORS

CAUTION
UTILITIES SHOWN ARE FOR DISCUSSION PURPOSES ONLY AND PRIOR TO CONSTRUCTION SHOULD BE CONFIRMED BY A CONTRACTOR.

METRIC CONVERSION
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

BEARING NOTE
BEARINGS ARE UTM GRID, DERIVED FROM GPS OBSERVATIONS FROM MONUMENT A TO B, SHOWN HEREON, HAVING A BEARING OF N51°47'15"E REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 17 (81° WEST LONGITUDE) NAD83 (CSRS) (2010.0).

P1, P2, P3 & P4 - COMPARISONS SHOWN ARE WITH ASTRONOMIC BEARINGS ON UNDERLYING PLANS

VERTICAL DATUM NOTE
ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978).

HORIZONTAL DATUM NOTE
PROJECTION: UNIVERSAL TRANSVERSE MERCATOR (UTM, ZONE 17, CM81°00'W)
DATUM: NAD 83 (CSRS)(2010.0)

THIS PLAN MAY BE CONVERTED TO GROUND BY DIVIDING BY A COMBINED SCALE FACTOR OF 0.999589.

OBSERVED REFERENCE POINTS DERIVED FROM GPS OBSERVATIONS USING THE CAN-NET VIRTUAL REFERENCE STATION NETWORK:
UTM ZONE 17, NAD83 (CSRS)(2010.0).
COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
A	4,743,317.9430	541,544.6870
B	4,743,432.2170	541,689.8380

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

LEGAL LEGEND

■	DENOTES	FOUND MONUMENTS
□	DENOTES	SET MONUMENTS
IB	DENOTES	IRON BAR
IBØ	DENOTES	ROUND IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
CC	DENOTES	CUT CROSS
CP	DENOTES	CONCRETE PIN
WIT	DENOTES	WITNESS
PIN	DENOTES	PROPERTY IDENTIFICATION NUMBER
M	DENOTES	MEASURED
S	DENOTES	SET
OU	DENOTES	ORIGIN UNKNOWN
STANTEC	DENOTES	STANTEC GEOMATICS LTD.
700	DENOTES	H.V. JEWITT, O.L.S.
P1	DENOTES	PLAN 37R-706
P2	DENOTES	PLAN 37R-2889
P3	DENOTES	PLAN 37R-3769
P4	DENOTES	REGISTERED PLAN 216

TOPOGRAPHIC LEGEND

AN	DENOTES	ANCHOR
BENCH	DENOTES	BENCH
CB	DENOTES	CATCH BASIN
GV	DENOTES	GAS VALVE
HTN	DENOTES	HYDRO TRANSFORMER
LS	DENOTES	LIGHT STANDARD
MH	DENOTES	MAINTENANCE HOLE UNIDENTIFIED
SAN	DENOTES	SANITARY
STM	DENOTES	STORM
PLR	DENOTES	PILLAR
SN	DENOTES	SIGN
UP	DENOTES	UTILITY POLE
VC	DENOTES	VALVE CHAMBER
WV	DENOTES	WATER VALVE
	DENOTES	TREE CONIFEROUS (DIAMETER AT BREAST HEIGHT SHOWN)
	DENOTES	TREE DECIDUOUS (DIAMETER AT BREAST HEIGHT SHOWN)

OHW OHW OHW — OVERHEAD WIRES
T T T — UNDERGROUND BELL
P P P — UNDERGROUND HYDRO
WTM WTM WTM — WATERMAIN
G G G — GASMAIN
F/O F/O F/O — UNDERGROUND FIBRE OPTIC

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.

THE SURVEY WAS COMPLETED ON THE 12th DAY OF OCTOBER, 2022

October 13, 2022
DATE

JEREMY C.E. MATTHEWS
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2197868
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

DRAWN: DP/DL CHECKED: JM DATE: OCT 12 2022 PROJECT No.: 161630112

12 January 2023 3:19 PM

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ELECTRICAL NOTES AND SPECIFICATIONS

GENERAL REQUIREMENTS FOR ELECTRICAL WORK

1. GENERAL CONDITIONS

(a) The General Requirements of the Contract Documents, and the Supplementary Requirements for Electrical Work, shall form an integral part of this Specification.

(b) The Electrical Contractor (herein referred to as "Contractor") shall review the project drawings (all disciplines) and plans prior to any construction, and shall report in writing potential conflicts that will obstruct or impede the construction to the Engineer of Record. Wherein indicated to "provide", contractor shall "furnish and install".

2. SCOPE OF WORK

(a) Conform to the applicable provisions of the General conditions of the Contract.

(b) This General Specification shall apply to and form a part of each of the sections covering Mechanical and Electrical trades work.

3. EXAMINATION OF SITE AND INFORMATION

(a) Before tendering, Contractor shall examine the site, the Architectural, Structural, Mechanical, Electrical and any other relevant documents, and fully familiarize himself with the designer's intent, so that the tender price will include everything necessary for the proper completion of the work in accordance with the intent of the documents. Obtain the approval of the Engineer, Architect and Project Manager before any alterations to the work indicated.

(b) It is the Contractor's responsibility to review the work site noting all existing conditions that may affect construction.

(c) Contractor to ensure that all products and materials necessary for the execution of the contract can be brought into the spaces where they are to be located, either through specified openings or partially assembled equipment. Failure to verify space limitations will not absolve the Contractor from the responsibility to provide any additional cutting and restoration work as required.

4. RELATIONSHIP TO OTHER TRADES

(a) Contractor shall confer with other trades working in the area, to ensure that his installation will be the result of co-operation between all parties. All devices must be accessible for service. The recommendations of the equipment suppliers shall govern.

(b) Ensure that all work will be installed within the prescribed limits of the building, such as ceiling heights, and notify the General trade of any requirements for inserts, sleeves, openings, curbs and bases in sufficient time to have the items completed in the normal course of construction.

(c) Confirm with the Mechanical trade, shop drawings and nameplate data that the intended electrical supply will match the required electrical equipment characteristics (i.e. Volts, overcurrent protection, phase, etc.) before finalizing orders. No compensation will be allowed to change any device due to the Contractor's failure to verify the supply with the characteristics.

(d) Any cutting or patching required, for whatever reason, shall be done by qualified trades people in the required trade.

(e) Structural members shall not be cut without the written consent of the structural engineers on the project.

(f) All newly installed conduit, lighting, or wiring devices must have a minimum clearance of 3" from underside of roof decking.

5. ADDITIONAL REQUIREMENTS

(a) Prior to the procurement of any new electrical equipment, the Contractor shall retain an independent Professional Engineer (P. Eng.) to complete a Fault Current and Coordination Study of all electrical equipment based on trip settings and cable lengths. Cable lengths shall be provided by the electrical contractor to the independent Engineer.

(b) Contractor to provide a copy of the Fault Current and Coordination Study to the Engineer for review.

(c) All new equipment provided by the contractor shall be fault-current rated higher than the minimum withstand ratings indicated on the drawings or as indicated by the Fault Current and Coordination Study whichever is greater.

6. SUBMITTAL / SHOP DRAWINGS AND ALTERNATIVE EQUIPMENT

(a) This review is for general conformity only and does not relieve the supplier and/or subcontractor from providing the necessary product(s) to meet the design intent.

(b) Provide to the Engineer electronic copies of submittals / shop drawings for each piece of equipment to used in the construction for review. Verify that the submittals / shop drawings correctly identify the equipment that will be supplied, that the equipment will fit the space allotted, and perform the service intended.

(c) Before submission, all submittals / shop drawings must be checked for accuracy and the inclusion of all necessary details such as: project identification, item labels (tags), clear indication of which item is being submitted (e.g. Model) and all associated accessories or features associated with the submission. Submittals / shop drawings without this information or that are confusing, unclear, or ambiguous will be rejected and returned as not approved.

(d) Equipment described either generically or by brand name is to establish the minimum standard required for the installation. Alternative equipment may be suggested by the bidder, but the equivalence shall be determined by the Engineer. Bidders must tender on the basis of the specified equipment. If alternatives are proposed, they will be considered on their own merits, after the close of tenders. Any lowering of the price based on alternative suppliers will be permitted with the savings being passed to the Owner.

(e) All Contractor supplied materials and equipment shall be approved and labeled specifically for use in Canada.

(f) Review of submittal / shop drawings by the Engineer is not intended to be the final review. Contractor is still required thereafter to verify that the intended product is correct and that it satisfies the design intent.

7. REQUIREMENTS OF INSPECTIONS

(a) All work shall comply with the governing codes and local requirements. Contractor to provide any items required to accomplish this, whether explicitly noted or not on the drawings.

(b) Where the Inspecting person requests items not deemed to be included, the matter shall be immediately referred to the Engineer for a ruling. No extra will be considered if the work done by the Contractor to satisfy such a request, could have been avoided by discussion between the Inspector and the Engineer.

(c) Provide notice to Inspectors as required for the progress of the project, and ensure that such inspections are carried out, before work is concealed.

(d) Any changes or alterations required by inspectors shall be rectified at the Contractor's cost.

8. CERTIFICATES, PERMITS AND FEES

(a) Obtain and pay all required permits and all inspections fees, except where specifically noted to the contrary.

(b) Furnish to the Owner any certificates that may be necessary as evidence that the work as installed conforms to all the laws and regulations of those authorities having jurisdiction. Prior to issuing any final certificates, Contractor shall make all alterations required by the authority having jurisdiction, by the Engineer as a law, or by any regulation that should have been followed by the Contractor.

9. GUARANTEE

(a) The Contractor shall provide a written 1-year guarantee covering all work from defects of workmanship and materials from the date of project substantial completion.

(b) Any repairs within the warranty period, the Contractor will repair and replace in a timely manner (within 30 days after notice) without cost to the owner. The cost of repair of damage to any work, caused by the failure of either material or workmanship within the period covered by the guarantee noted in (a) shall be included in this warranty.

(c) Where equipment is put into operation prior to completion of the work the period of guarantee covering such equipment shall still commence as noted in item (a) above. The putting into operation of any equipment prior to completion of the work shall only be with written approval of the Engineer and Owner. No equipment shall be started up without first ascertaining that all systems and services associated with its operation are functioning and that responsibilities for equipment maintenance have been arranged.

(d) At the completion of the project and prior to final acceptance, the Contractor shall provide to the Engineer the results of the following electrical tests: (1) Electrical Wiring Continuity Testing, (2) Electrical Insulation Resistance Testing for feeders and service conductors, (3) Electrical Earth Continuity Path Testing for all feeders, (4) Electrical Performance Testing of newly installed equipment as per the manufacturer's instructions.

10. DRAWINGS

(a) The drawings produced by the Engineer are generally schematic and diagrammatic in nature and are issued for the express purpose of obtaining tenders for the work and for the erection of the systems described in the scope of work to be done. Unless specifically shown, the responsibility for the installation and workability of the system(s) rests with the Contractor.

(b) The design contained in the drawings is based on the 2021 Ontario Electrical Safety Code, 28th edition, and its associated bulletins.

(c) Where necessary, the Contractor shall prepare interference drawings to ensure that the installation will be coordinated with all services to be installed in the area. The Engineer of Record or other Professionals may be required to approve these proposals.

(d) The Contractor shall refer to the architectural edge of slab drawings for the exact location of equipment, fixtures and penetrations. Engineering drawings provide the general design intent and are therefore not dimensioned. Refer to architectural drawings for dimensions.

(e) These drawings are not intended to describe every detail which may be necessary to complete the installation. Anything currently existing but not shown on the plans but is within the specified scope of work shall be removed and demolished.

(f) Contractor shall be responsible to maintain a set of record drawings by using red lines on the construction drawings where any deviation from the drawings has occurred. The Contractor shall convert the record drawings to electronic AutoCAD (latest version) drawing format and provide electronic copies to the Engineer and Owner.

11. RESPONSIBILITY AND LIABILITY

(a) This Contractor is responsible for the laying-out his work, and it shall be done in cooperation with all other trades working in the area. Prior to any electrical work performed by the Contractor, the work of other trades shall be protected from any possible damage and restitution made for any damage caused by the Contractor's work.

(b) Notify the Engineer of any discrepancies or inconsistencies and abide by the decision of the Engineer. Contractor is responsible to provide a fully working system whether or not details are explicitly on drawings.

(c) The Contractor shall correct any deficiencies noted by the Owner or the Engineer of Record at the Contractor's cost.

12. CLEAN-UP AND PROTECTION

(a) Maintain a clean working area to minimize danger to others on site, and protect all work in progress from damage due to construction work, weather, or from dirt entry.

(b) The Contractor shall complete all work in a neat and tidy manner and shall maintain a well-kept site for the duration of construction.

(c) Recyclables and waste shall legally be disposed of off-site at the Contractor's cost.

13. OPERATOR TRAINING AND INSTRUCTIONS

(a) Contractor to provide complete operating and Maintenance instructions for all equipment supplied, complete with parts lists and the names of the suppliers to Owner.

(b) Touch up or repaint as necessary, all scratches or other finish defects, that have occurred on any devices supplied under this contract.

14. FIRE SEPARATIONS AND FIRE STOPPING

(a) Adjacent devices in fire separations shall not be closer than 300mm.

(b) Fire stop shall be of a type to suit the use and purpose.

(c) Fire stop all sleeves passing through fire separations with an approved fire stopping material, and make waterproof. Provide escutcheons for all exposed penetrations through walls, and floors as directed.

15. WORKMANSHIP

(a) Only first class workmanship will be accepted, not only with regards to safety, efficiency, durability, etc., but also with regards to the neatness of detail. All conduit work shall be lined up parallel, or at right angles to the building walls where possible. Equipment must be accurately set, plumb and level, and all hangers must be in true vertical alignment. In general, the entire work shall be first class and workman like and present a neat and clean appearance upon completion.

(b) Contractor shall complete all cutting and patching as required to complete the electrical installation. See 4 (e).

GENERAL ELECTRICAL AND POWER

1. INSTALLATION

(a) All electrical equipment shall be installed in accordance with any specific manufacturer's instructions in addition to the minimum Code requirements. Rule 2-034

2. EQUIPMENT PROTECTION

(a) Contractor shall protect existing equipment during construction.

(b) Existing equipment to be reused shall be checked by the Contractor for proper operation.

(c) All new electrical equipment shall be delivered to the site and shall be completely protected with a plastic covering. Additional on-site protection must be provided to keep the equipment protected from the elements and other trades. If there is any indication of rusting or corrosion or significant physical abuse on the equipment, the affected parts shall be replaced at no cost to the owner.

(d) The Contractor shall ensure all products and equipment to be used is safely stored prior to installation. The Contractor shall be responsible for any theft of equipment prior to installation.

(e) Floor mounted electrical equipment (switchgear, transformers, etc) shall be mounted on housekeeping pad (minimum 4") supplied by the Contractor. It is the responsibility of the Contractor to provide structural drawings.

(f) Roof sleeves shall be complete with roof flashing and rain shields.

3. EQUIPMENT IDENTIFICATION GENERAL

(a) Provide all nameplates for electrical equipment (such as but not limited to panels, disconnect switches, transformers, etc.) nameplates must indicate equipment name and electrical characteristics (ampacity, voltage, phases, number of conductors), i.e.: 'Panel A', 200A, 120/208V, 3-Phase, 4-Wire.

(b) Nameplates must be white with black lettering lamacoid 1.5mm thick minimum. Nameplate engraving shall be as follows:
-Electrical Equipment Name: 0.5" (13mm) in height.
-Electrical Equipment Characteristics: 0.25" (6mm) in height.

(c) Provide typed directory cards in all new and revised distribution panels. Hand written directory cards are not acceptable.

(d) All empty or spare conduit shall be identified with black permanent marker clearly indicating the source and the destination.

(e) All junction boxes shall be identified with black permanent marker indicating the source panel, circuit number and system (i.e., lighting, receptacles, fire alarm, etc.).

(f) Where applicable, Contractor to comply with but not limited to the following:
- At each distribution point, circuit breakers, fuses and switches shall be marked, adjacent thereto, in a conspicuous and legible manner to indicate clearly which installation or portion of installation they protect or control and the maximum rating of overcurrent device that is permitted. Rule 2-100 3)
- A warning sign shall be located beside the switches controlling circuits electrically protected by Class A ground fault circuit interrupters, advising that the circuits have this protection and that the equipment shall be tested regularly. Rule 68-068 5)
- Permanent, legible signs shall be installed at the point of connection of the electric vehicle supply equipment to the branch circuit wiring, warning against operation of the equipment without sufficient ventilation as recommended by the manufacturer's installation instructions. Rule 86-200
- All equipment must be labeled and approved by an accredited Certification Body, or accepted through field evaluation, or accepted by an Inspector under the provisions of Rule 2-024 of the current Ontario Electrical Safety Code. Rule 2-022, Rule 2-024, Bulletin 2-7-*

4. CONDUIT WIRE & CABLE

(a) All wiring and cables below grade and outside of building envelope must be installed in PVC Schedule 40 unless otherwise noted. All wiring and cables above grade or within building envelope must be installed in EMT conduit unless otherwise noted on drawings. Armored flexible cable may be used where not visible (within walls and ceiling spaces that are not return air plenums).

(b) All empty conduit and raceway systems shall be installed complete with nylon pull string which shall be securely fastened at each end of the conduit.

(c) All conduits installed in accessible spaces (e.g. above dropped T-bar ceilings) or where exposed shall be run in straight lines parallel to building structure. Diagonal runs are not permitted.

(d) Conduit wire & cable shall not be run near the top of transformer enclosures due to higher ambient temperatures.

(e) No more than (3) 90° bends in a conduit run are allowed between pull boxes.

(f) If the conduit lengths/bends exceed that listed below, a pull box shall be installed.
- 65' (20m) maximum - three 90° bends.
- 100' (30m) maximum - two 90° bends.
- 150' (45m) maximum - one 90° bend.
- 200' (60m) maximum - no bends.

5. ELECTRICAL HEATERS

(a) Supply and install all heaters as listed, in coordination with the Mechanical trade, at the rated size and voltage indicated on the drawings.

(b) Supply and install all controls and wiring as necessary to provide a complete and operating heating system.

(c) Supply and install all conduit for thermostat of unit heaters as required by Mechanical trade.

6. DISTRIBUTION EQUIPMENT

(a) All distribution equipment must be rated for use within the space. All electrical equipment must be complete with drip shields at a minimum or otherwise listed as suitable for use if in a sprinklered environment.

7. PANELBOARDS

(a) Provide surface or recessed panels as indicated adhering to type, voltage, ampere capacity, number of poles/branch circuits, withstand fault current, etc. Breakers shall be bolt-on type (slash rated breakers are not acceptable).

(b) Provide electrical panels with a steel door, flush mounted locks, and concealed hinges.

(c) The Contractor must balance all panels to give as near as possible equal current on all phases under typical operating conditions (adjust to be within 15%).

8. DISCONNECT SWITCHES

(a) The main service switch must meet the requirements of the local utility, including lockable, visible window type, etc.

(b) All disconnects must be lockable in off position by one lock. The switch must be mechanically interlocked with switch door, containing defeat to prevent opening when switch is in the closed position.

9. FUSES & BREAKERS

(a) Fuses within the main service switch shall be Class J (600A and under). Fuse rating shall be as noted or as required for proper protection. fuses shall be rated for 200kAIC.

(b) Fuses serving as over current protection on the primary side of a transformer feeding a panel board shall be RK5 (time delay).

(c) Circuit breakers shall be rated for the voltage of the system to which they are connected.

10. WIRING DEVICES

(a) Devices must be white colour unless otherwise noted.

(b) Devices for general purpose shall be of heavy duty specification grade.

(c) All receptacle devices shall be Tamper-Resistant type as per OESC C22.1-18 rule 26-720.

(d) Install switches with handle in the "up" position when the switch is in the "on" or closed position.

(e) Remove plastic protective film on stainless steel plates only after painting and other work has been completed in that area.

(f) Do not use cover plates designed for flush outlet boxes on surface mounted boxes.

(g) Do not use outlet boxes designed for recessed mounting in surface mount applications.

(h) All devices shall have permanent labels affixed clearly indicating the source circuit number and panel name. Text on the label shall be 1/4" (6mm) in height.

(i) Contactors shall be of the voltage, ampacity and number of poles as indicated on the drawings. Contacts shall have mixed load ratings (lighting and motor) and a withstand rating of 100kA. Contacts shall be electrically held unless otherwise noted.

(j) Where applicable, Contractor to comply with but not limited to the following:
- Each 125V, single-phase receptacle installed in pits, hoistways, elevator and enclosed vertical platform lift car tops, and escalator or moving walk wellways shall be of the Class A ground fault circuit interrupter type. Rule 38-085 1)
- Where exposed to the weather, receptacles of configurations 5-15R, 5-20R, 5-20RA, 6-15R, 6-20R and 6-20RA shall be provided wit cover plates suitable for wet locations whether or not a plug is inserted into the receptacle, and marked "Extra Duty". Rule 26-708 2)
- Each branch circuit in a dwelling unit supplying 125V receptacles rated 20 amps or less shall be protected by a combination-type arc-fault circuit interrupter, except for receptacles installed in accordance with OESC Rule 26-656 1) a) and b). Bulletin 26-18-*
- A separate disconnecting means shall be provided for electric vehicle supply equipment. Rule 86-304 1)
- Electric vehicle supply equipment shall be mechanically protected from damage either by location or other means. Rule 2-200
- Where applicable and whether or not indicated on drawings, single dwellings of the detached, semi-detached, and row housing types shall have at least one outdoor receptacle at both front and rear of the house controlled by interior switch per Rule 26-726 a)
- Where applicable and whether or not indicated on drawings, dwelling units with garage or carport shall have at least one receptacle and an additional receptacle within 1m of garage door opener apparatus. Rule 26-726

11. DEVICE MOUNTING HEIGHTS AND INSTALLATION

(a) Mounting heights to center of device above finished floor (AFF), unless otherwise noted.

(b) Contractor shall coordinate device mounting heights with other disciplines prior to installation.

(c) The Contractor shall refer to the architectural for the exact location of devices and penetrations.

(d) Light Switches: To be mounted not less than 35.4" (900mm) and not more than 43.3" (1100mm) AFF.

(e) Receptacle Heights: To be mounted 16" (400mm) AFF. When above a countertop, to be mounted 4" (100mm). When provided for mechanical equipment, coordinate with final mechanical equipment location.

(f) Roof Receptacles: Provide dedicated branch circuit to each roof receptacle required per OESC 26-710. Roof receptacles shall be 5-20R GFCI (Class A type) within 25' (7.5 m) of all rooftop equipment.

(g) Kitchen Receptacles: Where residential dwellings are included in these plans Contractor shall ensure that the requirements of OESC 26-724 d) are met. Whether or not shown explicitly on these drawings, provide additional receptacles as needed so that no location along any kitchen counter space is more than 900mm from a kitchen counter receptacle. Counters longer than 300mm must have no less than one receptacle. Island counters or peninsulas larger than 600mm long and 300mm wide must have no less than one receptacle. No receptacles may be mounted in the back splash area of a sink.

(h) Receptacles in Dwelling Areas: Where residential dwellings are included in these plans Contractor shall ensure that the requirements of OESC 26-724 a) b) c) are met. Whether or not shown explicitly on these drawings, provide duplex receptacles in all finished walls (greater than 900mm) of every room or area (including balcony or porch but not including washrooms, hallways, laundry rooms, utility rooms, or closets) so that no point along the floor line of any usable wall space is more than 1.8 m horizontally from a receptacle in that or an adjoining space.

(i) Hallway Receptacles: Where residential dwellings are included in these plans Contractor shall ensure that the requirements of OESC 26-724 f) and 26-720 m) are met. Whether or not shown explicitly on these drawings, provide duplex receptacles in hallways of public corridors of residential occupancies such that at least one duplex receptacle is located in each 10 m of wall length or fraction thereof. Additionally within dwelling units, provide duplex receptacles in hallways along the floor line of any usable wall space such that there is no point along the wall that is further than 4.5 m from the nearest duplex receptacle within that hallway.

(j) Where a conflict of device mounting occurs, the Contractor shall contact the Engineer for clarification.

(k) Receptacles installed in a dwelling unit shall be tamper resistant as required in the OESC section 26, with exception of receptacles dedicated for stationary appliances such that the receptacle is rendered inaccessible.

(l) Branch circuits in dwellings rated for 125V and 20A or less shall be protected by a combination type arc-fault circuit interrupter, in accordance with OESC 26-656.

(m) Where receptacles are exposed to weather, provide in suitable receptacle housing designed for wet locations whether or not a plug is inserted into the receptacle, in accordance with OESC 26-708.

12. TRANSFORMERS

(a) Unless otherwise noted on drawings, transformers shall be dry-type, 115 deg c temp rise, less than 4.5% regulation at unity power factor, less than 5% total losses at full load, 3.5% minimum impedance, aluminum or copper wound. the transformer must be of the voltage and kVA as shown on the drawings.

(b) Transformers specified must not be replaced with an alternative T-wound or auto-transformer unless directly reviewed and approved by the Engineer.

(c) Dry-type transformers shall have internal vibration absorbing pads and optional external molded neoprene and steel vibration isolators.

(d) When wye-wound step-up/down transformers are used, a wye winding shall not face a wye service winding.

(e) Transformers shall have four (4) 2.5% full capacity taps. Connections on HV and LV sides shall be flexible conduit or equivalent.

(f) Where transformers are mounted on combustible floors or above pedestrian traffic, Contractor shall provide protection plates, such that in the event of a failure there is no hazard of molten metal.

13. GROUNDING & BONDING

(a) The Contractor shall include in his tender grounding and bonding as required by Electrical Safety Authority inspection department. Where applicable, Contractor to comply with but not limited to the following:
- The grounded conductor of a solidly grounded separately derived ac system shall be connected to the equipment bonding terminal by a system bonding jumper, sized per Table 16, at the source, at the first switch controlling the system, or by the system bonding jumper that is connected to the bonding conductor included in the primary supply. Rule 10-212, Rule 10-614
- Any metal (i.e. metal fences, bollards, protective barrier, etc) located within 2.4 m of the outdoor pad mounted equipment enclosure shall be bonded to the station ground electrode with No. 2/0 AWG copper conductors. Rule 36-308 and Bulletin 36-10-*
- Bonding conductors for pools shall be not smaller than No. 6 AWG for permanently installed pools and for all in-ground pools, o as required by Table 16 for all other pools. Rule 68-058 4)

ELEVATORS

1. COORDINATION & POWER REQUIREMENTS

(a) Main power feeds and associated disconnects shall be provided by the electrical contractor as noted in the elevator shop drawings and the power single line diagram. All power shall be provided to the elevator as indicated on the elevator shop drawings. Provide feeder with equipment grounding conductors sized according to OESC requirements.

(b) When a fire alarm system is not provided within the building, all devices required by CSA B44 shall be wired to an appropriately labelled "Dedicated Fire Function Panel" that will initiate elevator recall. When a fire alarm system is provided within the building, all devices required by CSA B44 shall be wired to the fire alarm system. Provide dual contact devices where required to allow for the elevator controller to initiate elevator recall.

(c) When the building has a CACF room (Central Alarm and Control Facilities) the electrical contractor shall provide wiring and conduit between the CACF room and each elevator machine room as required by the elevator shop drawings.

(d) When emergency power is available within the building, the elevator car lighting, pit lighting and machine room lighting shall be on a dedicated emergency power circuit.

(e) When emergency power is available within the building, one or more elevators may be on the emergency power system, coordination with all professionals, contractors and equipment providers is required

2. PIT

(a) Whether or not explicitly indicated on drawings, elevator pit lighting shall be provided to achieve 200lux within the pit at the floor level. Provide control from light switch within the machine room.

(b) Whether or not explicitly indicated on drawings, provide a GFCI-type receptacle on a dedicated 20A, 120VAC circuit within the elevator pit at 18" AFF when required (refer to elevator shop drawings elevator machine room layout).

3. ANCILLARY CONTROL DEVICES

(a) Provide devices in elevator lobbies to initiate elevator recall via the elevator controller (unless the elevating device is exempt from this requirement by design).

(b) Provide a GFCI-type receptacle on a dedicated 20A, 120VAC circuit next to each control cabinet (refer to elevator shop drawings machine room layout).

4. MACHINE ROOM

(a) Provide lighting in elevator machine room to achieve 200lux within the machine room at the floor level, provided control via light switch within the machine room (the switch shall also control the elevator pit lighting).

(b) Provide a general purpose GFCI-type receptacle on a dedicated 20A, 120VAC circuit within the elevator machine room (may also be required at the top of the hoistway, consult the elevator shop drawings).

LIGHTING

1. INSTALLATION

(a) Supply and install lighting fixtures with all accessories and lamps as shown in lighting fixture schedule, and as noted on drawings. This Contractor shall also obtain a copy of the latest Architectural and Interior Design plans for exact type and quantity of lighting fixtures. Any discrepancies between the plans are to be reported to Engineer at once.

(b) The Contractor must endeavour to provide a mounting solution that is visually appealing to the Owner when not directly specified in this drawing package, at no additional cost to the Owner.

(c) Alternative lighting fixtures may be suggested by the bidder; however, this contractor must provide photometric calculations/simulation to confirm adequate substitution.

(d) The Contractor shall submit shop drawings containing a minimum of the following information:
- fixture manufacturer (include address and telephone number)
- image of the fixture
- fixture model number
- fixture colour
- mounting details
- photometric data
- highlighted selectable options

2. EXTERIOR LIGHTING TIME CONTROLS & SIGN CONTROL

(a) The Contractor must provide an electronic programmable timer with the minimum requirements of 7 day, 2 circuit, 1 to 70 on/off operations/week, 120V, 30A rated contacts.

(b) The Contractor must program time clock for independent control of two exterior lighting zones on a seven day schedule as noted by the Owner and Engineer. Schedules and instruction sheets shall be provided to the Owner.

LIFE SAFETY

1. EXITS

(a) All new exit fixtures must be internally illuminated or a photoluminescence type as specified on drawings. Contractor to confirm type with client prior to purchase.

(b) New exit signs shall be the green running man type.

(c) Exit fixtures must be wall or ceiling mounted. Final exit fixture location and mounting arrangements must be coordinated on-site. Each exit fixture must be visible from the exit approach.

(d) Wall mounted exits shall be mounted at 96" (2430mm) above finished floor or 12" (300mm) above doors.

(e) Exit fixtures may be ceiling mounted if the ceiling height does not exceed 144" (3658mm).

2. EMERGENCY LIGHTING (BATTERY SYSTEM)

(a) The emergency lighting must activate upon loss of power to the lighting circuit servicing the space. The battery must automatically recharge after normal power is restored.

(b) The Contractor must supply and install an emergency lighting system consisting of 24VDC battery unit(s), lighting heads, conduit, wiring, etc.

(c) The Contractor shall test the emergency lighting system and repair any non-conforming fixtures or deficiencies to ensure that minimum lighting levels are maintained.

(d) Dedicated battery units must be wall mounted at 84" (2250mm). power feed for battery packs shall be mounted at 96" (2450mm) where possible.

(e) Wall mounted remote heads shall be mounted at 96" (2450mm) AFF. Contractor to verify locations on site as required.

(f) The Contractor shall confirm that the wire size and length of each emergency lighting circuit will allow at the most a voltage drop limit of five percent to the most remote fixtures.

(g) All emergency lighting wiring shall be in dedicated conduits and not mixed with other wiring.

COMMUNICATION AND DATA

1. CONDUITS

(a) The Contractor shall supply and install all empty conduits and conduit components to allow for installation of data and phone cables as shown in the drawings.

(b) All conduit for the purpose of communications within ceiling spaces, rooms or closets must stub into the space a minimum of 3" (75mm) without a bend.

2. CABLES

(a) Supply and install Cat6 Cables, RJ45 Connectors required for Data and VOIP, RJ11 Connectors required for Phone.

CIVIL WORKS

1. GENERAL

(a) The Contractor shall coordinate all civil works with the General Contractor including but not limited to the excavation, backfill, compaction, restoration, etc.

(b) The Contractor shall be responsible for obtaining all locates to ensure that the new installation will not interfere with existing services.

(c) The Contractor shall be responsible for the restoration of grass area, sidewalks, roadways, landscaped areas, etc. to the original condition. Grass areas shall be re-sodded, not seeded.

(d) The Contractor shall coordinate inspection of all underground installations by the local utility and Electrical Safety Authority prior to pouring concrete or backfilling.

CONDUIT/FEEDER SCHEDULE

DESCRIPTION		CONDUIT				CABLES IN EA			BOND		NOTES
ID	AMPS	CNT	INCH	mm	TYPE	CNT	SIZE	TYPE	CNT	SIZE	
60S	60	1	1"	27	EMT	3	#6	RW90	1	#10	SINGLE PHASE
60	60	1	1"	27	EMT	4	#6	RW90	1	#10	
70	70	1	1.25"	35	EMT	4	#4	RW90	1	#8	
90	90	1	1.5"	41	EMT	4	#2	RW90	1	#8	
100S	100	1	1.25"	35	EMT	4	#2	RW90	1	#8	SINGLE PHASE
100	100	1	1.5"	41	EMT	4	#2	RW90	1	#8	
125S	125	1	1.25"	35	EMT	3	#1	RW90	1	#6	SINGLE PHASE
125	125	1	1.5"	41	EMT	4	#1	RW90	1	#6	
150S	150	1	1.5"	41	EMT	4	1/0	RW90	1	#6	SINGLE PHASE
150	150	1	2"	53	EMT	4	1/0	RW90	1	#6	
200S	200	1	2"	53	EMT	3	3/0	RW90	1	#6	SINGLE PHASE
200	200	1	2"	53	EMT	4	3/0	RW90	1	#6	
225	225	1	2.5"	63	EMT	4	4/0	RW90	1	#4	
300	300	1	3"	75	EMT	4	300KCMIL	RWU90	1	#4	
400	400	1	4"	75	EMT	4	500KCMIL	RWU90	1	#3	
600	600	2	2.5"	63	EMT	4	350KCMIL	RWU90	1	#1	EQUIPMENT BOND IN EACH
800	800	2	4"	75	EMT	4	500KCMIL	RWU90	1	1/0	EQUIPMENT BOND IN EACH
1200	1200	4	3"	75	PVC	4	350KCMIL	RWU90	1	3/0	EQUIPMENT BOND IN EACH
1600	1600	5	3"	75	PVC	4	400KCMIL	RWU90	1	4/0	EQUIPMENT BOND IN EACH

ALL CONDUCTORS TO BE COPPER (CU) UNLESS OTHERWISE NOTED.

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DATE	NO.	DESCRIPTION	BY
MAR 15/23	—	ISSUED FOR SPA	AN
MAR 09/23	—	ISSUED FOR 25% SUBMISSION	AN

MARK VOID ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE

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DRAWING TITLE:

ELECTRICAL SPECIFICATIONS

DRAWN BY:	CHECKED BY:	SCALE:
AN	CL	NONE
DATE:	PROJECT NUMBER:	DRAWING NUMBER:
FEB/2023	23-6337	E-001

ELECTRICAL SYMBOLS

POWER

SYMBOL	DESCRIPTION
	120V-15A,1Ø-3W GROUNDED DUPLEX RECEPTACLE, WALL MOUNTED UON
GFI	120V-15A,1Ø-3W GFCI GROUNDED DUPLEX RECEPTACLE, WALL MOUNTED UON
USB	120V-15A,1Ø-3W GROUNDED DUPLEX RECEPTACLE C/W 2 USB CONNECTION, WALL MOUNTED UON
WP	120V-15A,1Ø-3W WEATHER PROOF GROUNDED DUPLEX RECEPTACLE, WALL MOUNTED UON
	120V-15A,1Ø-3W GROUNDED DUPLEX RECEPTACLE, CEILING MOUNTED UON
	120V-15A,1Ø-3W GROUNDED DUPLEX RECEPTACLE ON DED. CCT. WALL MOUNTED UON
	120V-15A,1Ø-3W GROUNDED DUPLEX RECEPTACLE. MOUNTED ABOVE COUNTER FOR GENERAL POWER CONNECTION.
	120V-15A,2P-3W GROUNDED SPLIT WIRED RECEPTACLE, WALL MOUNTED UON
	120V-15A,1Ø-3W GROUNDED QUAD RECEPTACLE IN COMMON BOX, WALL MOUNTED UON
	120V-15,2P-3W DOUBLE DUPLEX SPLIT WIRE GROUNDED QUAD RECEPTACLE IN COMMON BOX, WALL MOUNTED UON
	120V-15A 1Ø-3W GROUNDED DUPLEX RECEPTACLE MOUNTED IN FLUSH FLOOR BOX UON
	120V-15A 1Ø-3W GROUNDED QUAD RECEPTACLE MOUNTED IN FLUSH FLOOR BOX UON
	240V-20A,2P-3W GROUNDED RECEPTACLE, WALL MOUNTED UON
	240V-30A,2P-3W GROUNDED RECEPTACLE, WALL MOUNTED UON
	240V-40A,2P-3W GROUNDED RECEPTACLE, WALL MOUNTED UON
	120V-15A 1Ø-3W GROUNDED DUPLEX RECEPTACLE C/W DATA/PHONE COMBO MOUNTED IN FLUSH FLOOR BOX UON
	DATA OUTLET C/W 3/4"C HOME RUN TO ACCESSIBLE CEILING SPACE
	TELEPHONE WALL OUTLET C/W 3/4"C HOME RUN TO ACCESSIBLE CEILING SPACE
	COMBINATION DATA & TELEPHONE OUTLET - WALL MOUNTED C/W 3/4"C HOME RUN TO ACCESSIBLE CEILING SPACE. MAXIMUM 4 DROPS PER WALLBOX - IF MORE, THAN CONTRACTOR TO PROVIDE MULTI-GANG BOX AND FACEPLATE TO ACCOMMODATE AS REQUIRED
	POWER DIRECT CONNECTION TO EQUIPMENT AS INDICATED.
	TV DATA OUTLET
	PUSH BUTTON
	CALL FOR HELP INDICATOR LIGHT
SM	CONTROL SWITCH, MOTOR RATED
	POWER PANEL, FLUSH MOUNTED
	TELECOM PANEL, FLUSH MOUNTED
	POWER PANEL SURFACE MOUNTED
	DISTRIBUTION BOARD
	DISCONNECT, NON-FUSED
	DISCONNECT, FUSED
	SWITCH, NON-FUSED
	SWITCH, FUSED
	CIRCUIT BREAKER
	TRANSFORMER
M	POWER METER
HP	MOTOR WITH HORSEPOWER INDICATED
J	JUNCTION BOX
	CONDUIT RUN TO PANEL
	GROUNDING

FIRE ALARM

SYMBOL	DESCRIPTION
	HEAT DETECTOR
	SMOKE DETECTOR
F	HORN & STROBE COMBINATION DEVICE
	MANUAL PULL STATION
	SMOKE ALARM
	SMOKE / CO COMBINATION DETECTOR
H	HORN
S	STROBE ONLY DEVICE - WALL MOUNTED
DT	DUCT - TYPE SMOKE DETECTOR
	REMOTE SAMPLING - TYPE SMOKE DETECTOR
F	STROBE - CEILING MOUNTED
FACP	FIRE ALARM CONTROL PANEL
ANN	FIRE ALARM ANNUNCIATOR PANEL C/W GRAPHIC
	CARD READER
	SIGNAL SILENCE
ISO	FAULT ISOLATION MODULE
EOL	END OF LINE DEVICE
S	STAIRWELL SPEAKER
S	SPEAKER
	FIREMAN'S PHONE
R	FIRE ALARM RELAY
AM	ADDRESSABLE MODULE
MM	ADDRESSABLE MONITOR MODULE
CM	ADDRESSABLE CONTROL MODULE
CR	CONTROL RELAY
FS	WATER-FLOW SWITCH
PS	SPRINKLER PRESSURE SWITCH
ES	ELECTRICAL SUPERVISION
EL	ELECTRONIC STRIKE
ML	MAGNETIC LOCK
SV	SUPERVISED VALVE
	EXHAUST DAMPER
ATS	AUTOMATIC TRANSFER SWITCH
J	JUNCTION BOX
DCLC	DATA COMMUNICATION LINK STYLE C
	BEAM SMOKE DETECTOR
	BELL

SECURITY

SYMBOL	DESCRIPTION
ES	ELECTRONIC STRIKE
CR	CARD READER
DC	DOOR CONTACT
OH	OVERHEAD DOOR CONTACT
KP	SECURITY KEYPAD
EB	EXIT/ENTRACE BUTTON (COMBO PUSH/WAVE TO INTIATE)
	DUAL TECHNOLOGY MOTION DETECTOR
	SECURITY CAMERA

LIGHTING

SYMBOL	DESCRIPTION
	SINGLE POLE, SINGLE THROW TOGGLE SWITCH (`3' DENOTES 3-WAY, `4' DENOTES 4-WAY, `PL' DENOTES PILOT LIGHT, 'LV' DENOTES LOW VOLTAGE, 'K' DENOTES KEY OPERATED) 120 OR 347V AS APPLICABLE.
	GANGED SWITCHES
O	TOGGLE SWITCH WITH OCCUPANCY SENSOR, WALL MOUNTED
D	TOGGLE SWITCH WITH DIMMING
OS	OCCUPANCY SENSOR CEILING MTD
	RECESSED ROUND FIXTURE
	WALL MOUNTED FIXTURE / WALLPACK
	LOW-BAY FIXTURE
	PENDANT CYLINDER FIXTURE
	SHOWER FIXTURE
	CORRIDOR SURFACE FIXTURE
	LINEAR SURFACE WALL FIXTURE
	1' x 4' RECESSED CEILING FIXTURE
	2' x 2' RECESSED CEILING FIXTURE
	2' x 4' RECESSED CEILING FIXTURE
	4' SURFACE LINEAR STRIP FIXTURE
	1' x 4' HIGH-BAY FIXTURE
	LINEAR TRACK LIGHTING FIXTURE
	SINGLE HEAD LIGHTING STANDARD
	DOUBLE HEAD LIGHTING STANDARD

NOTES:
1. SHADED FIXTURES ARE CONNECTED TO EMERGENCY CIRCUIT
2. REFER TO LIGHTING FIXTURES SCHEDULE & SPECIFICATIONS
3. SHADED FIXTURES WITH THE SUFFIX 'N' INDICATE FIXTURES CONNECTED TO UN-SWITCHED EMERGENCY CIRCUIT (NIGHT LIGHTS)
4. HALF SHADING INDICATES NL OR EM

LIFE SAFETY

SYMBOL	DESCRIPTION
	EMERGENCY LIGHTING BATTERY UNIT C/W UNIT MOUNTED QUARTZ HEADS
	EMERGENCY SURFACE MOUNTED DOUBLE HEAD LED REMOTE HEAD
	EMERGENCY SURFACE MOUNTED SINGLE HEAD LED REMOTE HEAD
	PICTOGRAM EXIT SIGN C/W TWO EMERGENCY BATTERY HEADS AND BATTERY UNIT
	SUSPENDED CEILING MOUNTED PICTOGRAM GREEN RUNNING MAN EXIT LIGHT, ARROW(S) INDICATE DIRECTION. PROVIDE REQUIRED CONDUIT LENGTH TO SUIT SITE CONDITIONS
	WALL MOUNTED PICTOGRAM GREEN RUNNING MAN EXIT LIGHT, ARROW(S) INDICATE DIRECTION. PROVIDE REQUIRED CONDUIT LENGTH TO SUIT SITE CONDITIONS

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	MODEL	COLOR TEMP	WATTS	VOLTS	LAMP
A1	LED FLAT PANEL, 2X4, 4000L ***	LITHONIA LIGHTING	CPANL 2X4 AL06 SWW7 M2 40LM	3500K	33	120	LED
A2	LED FLAT PANEL, 2X4, 5000L ***	LITHONIA LIGHTING	CPANL 2X4 AL06 SWW7 M2 50LM	3500K	44	120	LED
A4	LED FLAT PANEL, 2X2 GRID, 3300L ***	LITHONIA LIGHTING	CPANL 2X2 AL01 SWW7 M4 33LM	3500K	27	120	LED
E	BATTERY PACK, FIELD INSTALLABLE FOR 'A1/2/4' ****	LITHONIA LIGHTING	ILBP CP10 HE SD A	---	10	120	---
A6	RECESSED WET LOCATION TROFFER, 2X2, 3000L	LITHONIA LIGHTING	2WRTL G L24 3000LM OAW AR, MVOLT GZ1 35K 80CRI WH	3500K	27	120	LED
A6E	SAME AS A6 BUT WITH EMERGENCY OPTION	LITHONIA LIGHTING	SAME AS A6 BUT WITH OPTION E10WLCP	---	---	---	---
B1	6" POTLIGHT, 1500L	LITHONIA LIGHTING	LDN6 15LM 35K L06 AR TRW LSS MVOLT UGZ	3500K	19	120	LED
B3	10" SURFACE CANOPY, 2523L	LITHONIA LIGHTING	SN110OC L1L25 K35 347 SGT	3500K	29	347	LED
B4	6" SHOWER LIGHT DOWNLIGHT, 1500L	GOTHAM LIGHTING	EV06SH 35/15 DFF SOL MVOLT EZ10	3500K	14	120	LED
D1	LED STRIP	LITHONIA LIGHTING	ZL1D L48 7000LM FST MVOLT 35K 80CRI WH ZACVH M100	3500K	59	120	LED
D2	LED STRIP	LITHONIA LIGHTING	TZL1D L96 10000LM FST MVOLT 35K 80CRI WH ZACVH M100	3500K	81	120	LED
F1	DELETED FIXTURE						
F2	DELETED FIXTURE						
G1	BOLLARD, LED, 980L, TYPE III DISTRIB	LUMINIS LIGHTING	BVA11B-L1L10-TYPE3-K35-347V-BZT	3500K	11	347	LED
K1	RECESSED FOOD PROCESS TROFFER, 2X2, 3000L	LITHONIA LIGHTING	2WRTL G L24 3000LM OAW AR, MVOLT GZ1 35K 80CRI FPA DWAM	3500K	27	120	LED
K1E	SAME AS K1 BUT WITH EMERGENCY OPTION	LITHONIA LIGHTING	SAME AS K1 BUT WITH OPTION E10WLCP	---	---	---	---
K2	RECESSED FOOD PROCESS TROFFER, 2X4, 5000L	LITHONIA LIGHTING	2WRTL G L48 5000LM OAW AR, MVOLT GZ1 35K 80CRI FPA DWAM	3500K	42	120	LED
K2E	SAME AS K2 BUT WITH EMERGENCY OPTION	LITHONIA LIGHTING	SAME AS K2 BUT WITH OPTION E10WLCP	---	---	---	---
V1	SQUARE VANITY, 1800L	LITHONIA LIGHTING	FMVCSLS 24IN MVOLT 35K 90CRI KR*	3500K	18	120	LED
N1	NIGHT LIGHT WITH AUTO SENSOR CONTROL	LEGRAND	NTLFULLWCC6	---	5	120	LED
U1	UTILITY LIGHT (ELEV PIT) VAPORPROOF	RAB LIGHTING	VXBRLED26DG	4900K	27	120	LED
P1	UP-DOWN PATIENT LIGHT	HEALTHCARE LIGHTING	HPW348 120 LED35 2U1D ** RW	3500K	60	120	LED
S1	6" DIMMABLE POTLIGHT, 1800 LUMEN	LITHONIA LIGHTING	FMML 13835 - 1800LM, 80CRI	3000K	27	120	LED
W1	QUARTER SPHERE WALL LIGHT	LITHONIA LIGHTING	P1 30K SR2 120 PE DDBXD	3000K	20	120	LED
EQUAL FIXTURES MUST BE APPROVED PRIOR TO PROCUREMENT. *VERIFY FINISH COLORS WITH OWNER PRIOR TO PROCUREMENT. ** PULL CHAIN TO BE LOCATED AT SIDE OF NURSE CALL STATION. SEE PLANS WITH BED LAYOUTS FOR RIGHT VS LEFT-HAND ORIENTATION. *** FIXTURE C/W SWITCHABLE OUTPUTS, CONFIGURE AT INSTALLATION TO LUMENS SPECIFIED. ****INSTALL TEST SWITCH IN ADJACENT CEILING TILE.							

ABBREVIATIONS

SYMBOL	DESCRIPTION
A	AMPERE
AAF	ABOVE ACCESS FLOOR
AF	AMPS FUSED
AS	AMPS SWITCH
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMP INTERRUPTING CAPACITY
ALT	ALTERNATE
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BAT	BATTERY
BD	BOARD
BFG	BELOW FINISHED GRADE
BR	BRANCH
BRKR	BREAKER
C/C	CENTER TO CENETER
CAB	CABINET
CAP	CAPACITY
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CF	CUBIC FEET
CKT	CIRCUIT
CLG	CEILING
CP	CONTROL PANEL
CT	CURRENT TRANSFORMER
CU	COPPER
CU FT	CUBIC FOOT
DC	DIRECT CURRENT
DDC	DIRECT DIGITAL CONTROL
DISC	DISCONNECT
DP	DUSTPROOF
DPDT	DOUBLE POLE, DOUBLE THROW
DPST	DOUBLE POLE, SINGLE THROW
DX	DIRECT EXPANSION
EBBR	ELECTRIC BASEBOARD RADIATION
EC	EMPTY CONDUIT
EGC	EQUIPMENT GROUNDING CONDUCTOR
EIFS	EXTERIOR INSULATION FINISH SYSTEM
ELEV	ELEVATOR
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EOR	ENGINEER ON RECORD
EPRF	EXPLOSION PROOF
EQUIP	EQUIPMENT
ER	EXISTING TO REMAIN
ES	ENERGY SAVER

SYMBOL	DESCRIPTION
ESA	ELECTRICAL SAFETY AUTHORITY
EST	ESTIMATED
EP	ELECTRIC PANEL
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EXP	EXPOSED
EXR	EXISTING RELOCATION
EXT	EXTERIOR
EX	EXISTING
FA	FIRE ALARM
F	FLOOR MOUNTED
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FD	FUSED DISCONNECT
FDR	FEEDER
FIXT	FIXTURE
FLA	FULL LOAD AMPS
FLUOR	FLUORESCENT
FM	FREQUENCY MODULATION
FPM	FEET PER MINUTE
FR	FIRE RATING
FVNR	FULL VOLTAGE NON-REVERSING
GA	GAUGE
GAL	GALLON
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GFP	GROUND FAULT PROTECTOR
G	GROUND
HSKPG	HOUSEKEEPING
HIC	HIGH INTERRUPTING CAPACITY
HOA	HAND-OFF-AUTOMATIC
HV	HIGH VOLTAGE
HZ	HERTZ
IAF	IN ACCESS FLOOR
IC	INTERRUPTING CAPACITY
IG	ISOLATED GROUND
J	JOULE
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
KHZ	KILOHERTZ
KP	KEYPAD
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVOLT AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT-HOUR
LED	LIGHT EMITTING DIODE

SYMBOL	DESCRIPTION
LF	LINEAR FOOT
LLD	LAMP LUMEN DEPRECIATION
LM	LUMEN
LO	LOCKOUT
LP	LIGHTING PANEL
LT	LIQUID TIGHT
LV	LOW VOLTAGE
MA	MILLIAMPERE
MAG STR	MAGNETIC STARTER
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCM	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MCS	MOTOR CIRCUIT SWITCH
MDF	MAIN DISTRIBUTION FRAME
MDP	MAIN DISTRIBUTION PANELBOARD
MH	MOUNTING HEIGHT
MHZ	MEGAHERTZ
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
MVA	MEGAVOLT AMPERES
MVAR	MEGAVOLT AMPERES REACTIVE
MW	MEGAWATT
N/A	NOT APPLICABLE
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFSD	NON-FUSED
NFD	NON-FUSED DISCONNECT
NIC	NOT IN CONTRACT
NL	UNSWITCHED LIGHT (NIGHT LIGHT)
NM	NON-METALLIC SHEATHED CABLE
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OESC	ONTARIO ELECTRICAL SAFETY CODE
OC	OVER CURRENT
OD	OUTSIDE DIAMETER
ODS	OVERHEAD DISTRIBUTION SYSTEM
OH	OVERHEAD
OHD	OVERHEAD DOOR
OL	OVERLOAD
OPGP	OFFICE PRINCIPLE GROUND POINT
P	POLE
PB	PUSH BUTTON

SYMBOL	DESCRIPTION
PC	PHOTOCELL
PD	PROTECTIVE DEVICE
PH	PHASE
PIV	POST INDICATOR VALVE
PKG	PACKAGE
PL	PILOT LIGHT
PM	PEDESTAL MOUNTED
PNL	PANEL
LBL/FT	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	POTENTIAL TRANSFORMER
PWR	POWER
QC	QUALITY CONTROL
QTY	QUANTITY
R	RESISTANCE
RCPT	RECEPTACLE
RCS	RELAY CONTROL STATION
RECIRC	RECIRCULATING
REQ'D	REQUIRED
RLA	RUNNING LOAD AMPS
RP	RAINPROOF
RPM	REVOLUTIONS PER MINUTE
RR	RESTROOM
R&P	REMOVE & REPLACE
RT	RAINTTIGHT
SCHED	SCHEDULE
SCR	SHORT CIRCUIT RATING
SD	SERVICE DROP
SE	SERVICE ENTERANCE
SP	SINGLE POLE
SPD	SURGE PROTECTIVE DEVICE
SPDT	SINGLE POLE, DOUBLE THROW
SPKR	SPEAKER
SPST	SINGLE POLE, SINGLE THROW
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SR	SURFACE RACEWAY
STR	STARTER
SV	SOLENOID VALVE
SW	SWITCH
SWBRD	SWITCHBOARD
SYN	SYNTHETIC
T	TRANSFORMER
TB	TERMINCAL BLOCK
TC	TIME CLOCK
TCC	TEMPERATURE CONTROL CONTRACTOR
TD	TIME DELAY
TFF	TOP OF FINISHED FLOOR
THD	TOTAL HARMONIC DISTORTION

SYMBOL	DESCRIPTION
TL	TWIST LOCK
TR	TAMPER RESISTANT
TS	TRIGGER START
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UC	UNDER COUNTER
UHF	ULTRA HIGH FREQUENCY
UNFIN	UNFINISHED
UTIL	UTILITY
UTP	UNSHEILDED TWISTED PAIR
UVR	UNDERVOLTAGE RELAY (RELEASE)
UON	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT AMPERES
VAR	VOLT-AMPERES REACTIVE
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
VHF	VERU HIGH FREQUENCY
VHO	VERY HIGH OUTPUT
VP	VAPOUR PROOF
VT	VAPOURTIGHT
W	WATT
WAP	WIRELESS ACCESS POINT
WG	WIRE GUARD
WM	"WIRE MOLD" (SURFACE RACEWAY)
WO	WELDER OUTLET
WP	WEATHERPROOF
WT	WEATHER TIGHT
XHD	EXTRA HEAVY DUTY
XFER	TRANSFER

PANEL AND CIRCUIT ABBREVIATION DESIGNATION

TYPICAL PANEL NOMENCLATURE DESCRIPTION ARE AS FOLLOWS:

EP 1 A – 1,2,3

- 1,2,3 — CIRCUIT NUMBER(S) WHERE APPLICABLE
- A — SEQUENTIAL DESIGNATION OF MULTIPLE PANELS ON SAME LEVEL (E.G. A,B,C...)
- 1 — LOCATION / FLOOR NUMBER (E.G. P1,B,1,2,3,...)
- EP — PANEL DESIGNATOR
  - 'P' DENOTES POWER PANEL
  - 'L' DENOTES PANEL OF LOWER VOLTAGE
  - 'H' DENOTES PANEL OF HIGHER VOLTAGE
  - 'DP' DENOTES DISTRIBUTION PANELBOARD
  - 'SB' DENOTES SWITCHBOARD
  - 'MCC' DENOTES MOTOR CONTROL CENTRE
  - 'MS' DENOTES MAIN SWITCHBOARD
  - 'TX' DENOTES TRANSFORMER
  - 'E' PREFIX E REPRESENTS EMERGENCY

FLOOR MOUNTED ELECTRICAL EQUIPMENT COMPLETE WITH 103MM HIGH HOUSEKEEPING PAD.

NOTE

ALL SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY NOT BE APPLICABLE TO THIS PROJECT

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G-004	GAS PLAN - SITE
E-005	LIGHTING - SITE
E-006	LIGHTING CALCULATIONS - SITE
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E-008	POWER SPECIFICATIONS - SITE
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E-202	LIGHTING PLANS - LEVEL 1
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E-302	LIFE SAFETY, FIRE ALARM, NURSE CALL, - LEVEL 1
E-303	LIFE SAFETY, FIRE ALARM, NURSE CALL, - LEVEL 2
E-401	SECURITY - LOWER LEVEL 1
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E-501	ENLARGED PLANS
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E-603	DETAILS
E-604	DETAILS
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E-702	ELECTRICAL SCHEDULES 2

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MAR 09/23	ISSUED FOR 25% SUBMISSION	AN

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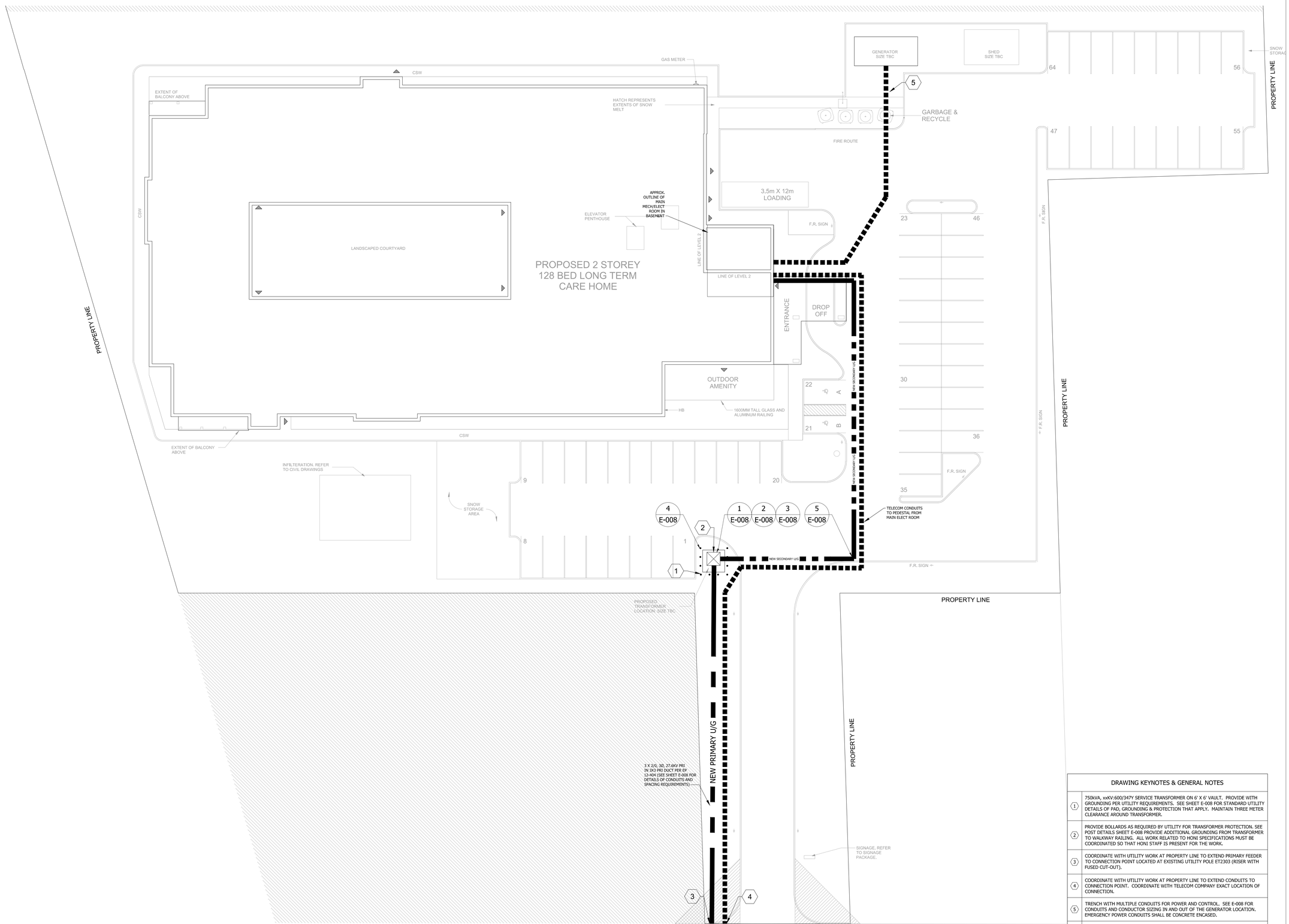
PROJECT:

PEOPLE CARE
DELHI LTC
173 DALTON RD
DELHI, ON
N4B 2E1

DRAWING TITLE:

SYMBOLS & ABBREVIATIONS

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AN	CL	NONE
DATE:	PROJECT NUMBER:	DRAWING NUMBER:
FEB/2023	23-6337	E-002



1 SITE - POWER
SCALE: 1:200

DRAWING KEYNOTES & GENERAL NOTES

1	750kVA, xxKV:600/347Y SERVICE TRANSFORMER ON 6' X 6' VAULT. PROVIDE WITH GROUNDING PER UTILITY REQUIREMENTS. SEE SHEET E-008 FOR STANDARD UTILITY DETAILS OF PAD, GROUNDING & PROTECTION THAT APPLY. MAINTAIN THREE METER CLEARANCE AROUND TRANSFORMER.
2	PROVIDE BOLLARDS AS REQUIRED BY UTILITY FOR TRANSFORMER PROTECTION. SEE POST DETAILS SHEET E-008 PROVIDE ADDITIONAL GROUNDING FROM TRANSFORMER TO WALKWAY RAILING. ALL WORK RELATED TO HONI SPECIFICATIONS MUST BE COORDINATED SO THAT HONI STAFF IS PRESENT FOR THE WORK.
3	COORDINATE WITH UTILITY WORK AT PROPERTY LINE TO EXTEND PRIMARY FEEDER TO CONNECTION POINT LOCATED AT EXISTING UTILITY POLE ET2303 (RISER WITH FUSED CUT-OUT).
4	COORDINATE WITH UTILITY WORK AT PROPERTY LINE TO EXTEND CONDUITS TO CONNECTION POINT. COORDINATE WITH TELECOM COMPANY EXACT LOCATION OF CONNECTION.
5	TRENCH WITH MULTIPLE CONDUITS FOR POWER AND CONTROL. SEE E-008 FOR CONDUITS AND CONDUCTOR SIZING IN AND OUT OF THE GENERATOR LOCATION. EMERGENCY POWER CONDUITS SHALL BE CONCRETE ENCASED.
1	ALL PRIMARY POWER CONDUITS TO BE ENCASED IN CONCRETE.

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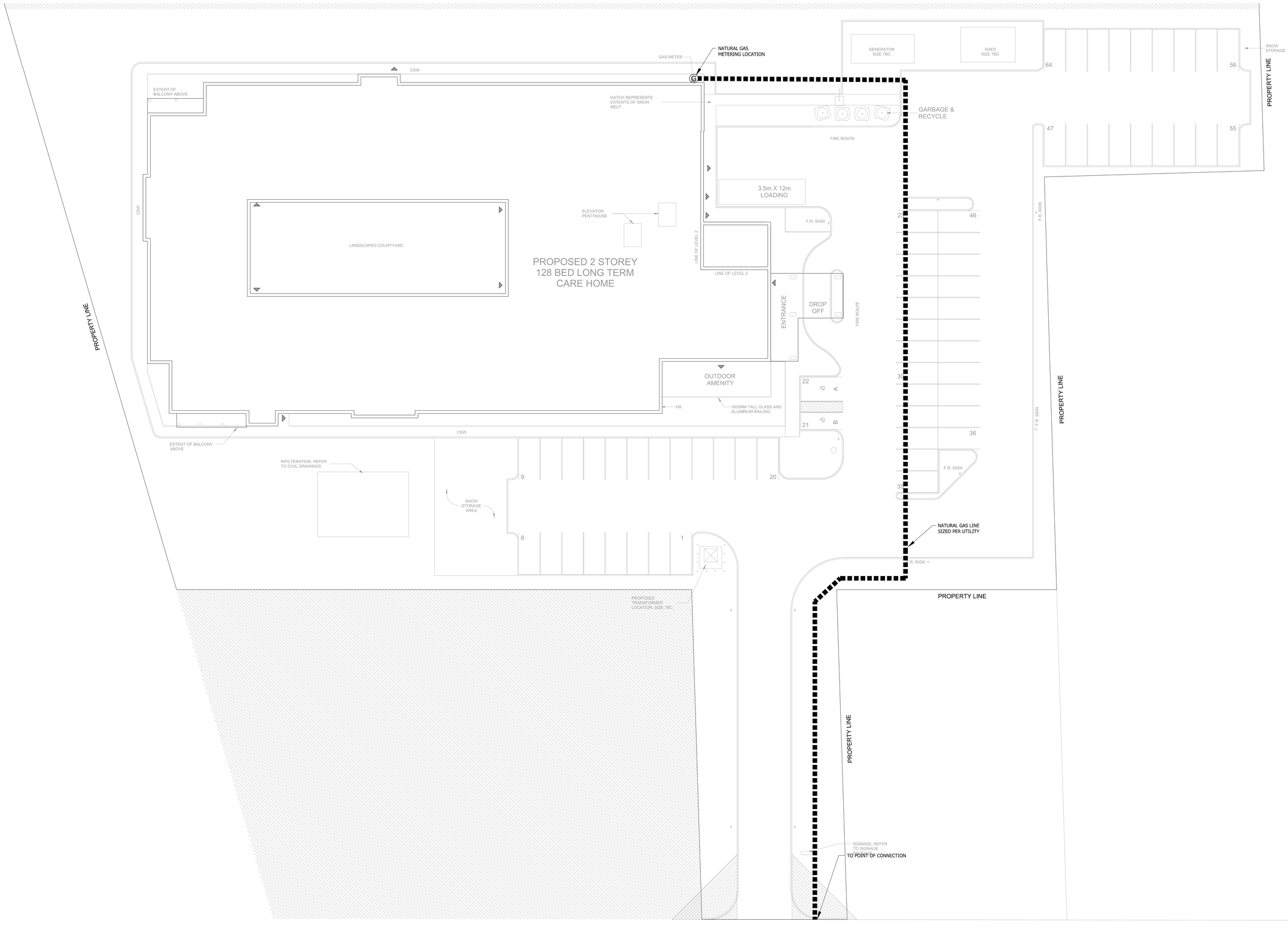
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DRAWING TITLE:
POWER PLAN
SITE

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1 SITE - GAS
SCALE: 1:200

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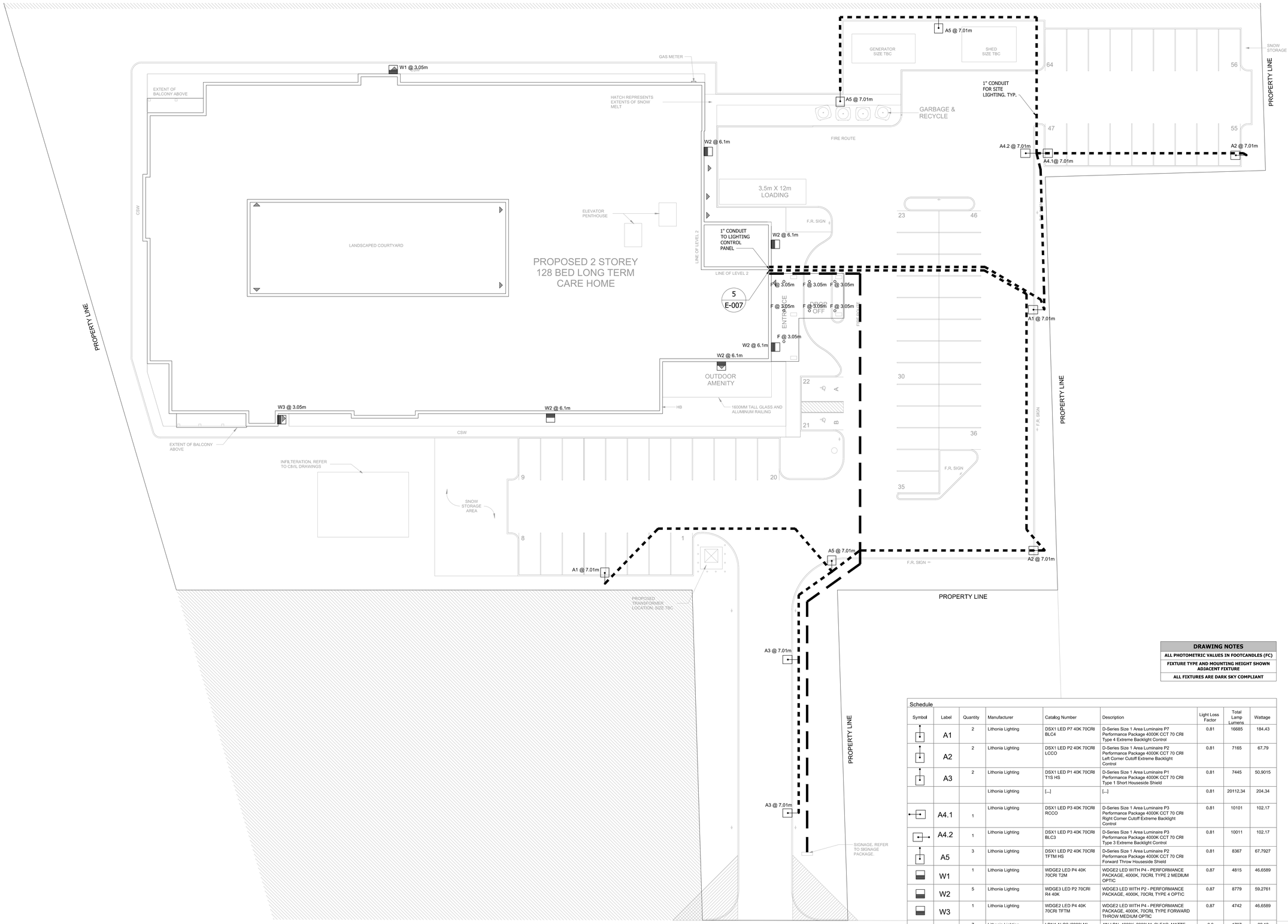
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PROJECT:
PEOPLE CARE
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DELHI, ON
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DRAWING TITLE:
GAS PLAN
SITE

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DATE:	PROJECT NUMBER:	DRAWING NUMBER:
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DRAWING NOTES

ALL PHOTOMETRIC VALUES IN FOOTCANDLES (FC)
FIXTURE TYPE AND MOUNTING HEIGHT SHOWN ADJACENT FIXTURE
ALL FIXTURES ARE DARK SKY COMPLIANT

Schedule

Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Light Loss Factor	Total Lamp Lumens	Wattage
	A1	2	Lithonia Lighting	DSX1 LED P7 40K 70CRI BLC4	D-Series Size 1 Area Luminaire P7 Performance Package 4000K CCT 70 CRI Type 4 Extreme Backlight Control	0.81	16685	184.43
	A2	2	Lithonia Lighting	DSX1 LED P2 40K 70CRI LCCO	D-Series Size 1 Area Luminaire P2 Performance Package 4000K CCT 70 CRI Left Corner Cutoff Extreme Backlight Control	0.81	7165	67.79
	A3	2	Lithonia Lighting	DSX1 LED P1 40K 70CRI T1S HS	D-Series Size 1 Area Luminaire P1 Performance Package 4000K CCT 70 CRI Type 1 Short Houseside Shield	0.81	7445	50.9015
			Lithonia Lighting	[...]	[...]	0.81	20112.34	204.34
	A4.1	1	Lithonia Lighting	DSX1 LED P3 40K 70CRI RCCO	D-Series Size 1 Area Luminaire P3 Performance Package 4000K CCT 70 CRI Right Corner Cutoff Extreme Backlight Control	0.81	10101	102.17
	A4.2	1	Lithonia Lighting	DSX1 LED P3 40K 70CRI BLC3	D-Series Size 1 Area Luminaire P3 Performance Package 4000K CCT 70 CRI Type 3 Extreme Backlight Control	0.81	10011	102.17
	A5	3	Lithonia Lighting	DSX1 LED P2 40K 70CRI TFTM HS	D-Series Size 1 Area Luminaire P2 Performance Package 4000K CCT 70 CRI Forward Throw Houseside Shield	0.81	8367	67.7927
	W1	1	Lithonia Lighting	WDGE2 LED P4 40K 70CRI T2M	WDGE2 LED WITH P4 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 2 MEDIUM OPTIC	0.87	4815	46.6589
	W2	5	Lithonia Lighting	WDGE3 LED P2 70CRI R4 40K	WDGE3 LED WITH P2 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 4 OPTIC	0.87	8779	59.2761
	W3	1	Lithonia Lighting	WDGE2 LED P4 40K 70CRI TFTM	WDGE2 LED WITH P4 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE FORWARD THROW MEDIUM OPTIC	0.87	4742	46.6589
	F	7	Lithonia Lighting	LDN4 ALO2 (2000LM) SWW1 (4000K) LO4AR LD	4IN LDN, 4000K, 2000LM, CLEAR, MATTE DIFFUSE REFLECTOR, 80CRI	0.9	1797	22.12

1 SITE - LIGHTING
SCALE: 1:200

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MAR 15/23 — MAR 09/23

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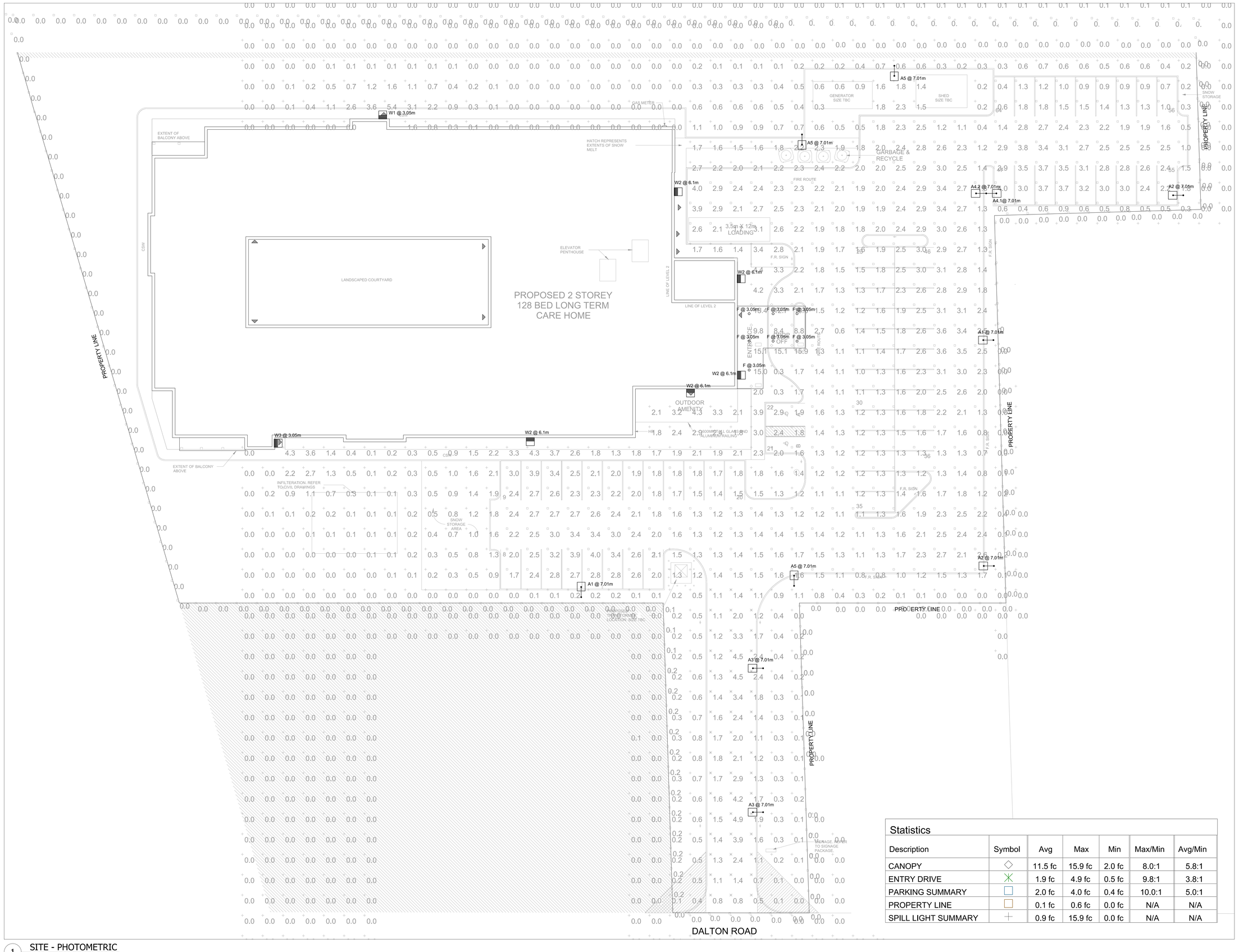
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N4B 2E1

DRAWING TITLE:
LIGHTING PLAN
SITE

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AN	CL	1:200

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FEB/2023	23-6337	E-005



1 SITE - PHOTOMETRIC
SCALE: 1:200

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
CANOPY	◇	11.5 fc	15.9 fc	2.0 fc	8.0:1	5.8:1
ENTRY DRIVE	✳	1.9 fc	4.9 fc	0.5 fc	9.8:1	3.8:1
PARKING SUMMARY	□	2.0 fc	4.0 fc	0.4 fc	10.0:1	5.0:1
PROPERTY LINE	□	0.1 fc	0.6 fc	0.0 fc	N/A	N/A
SPILL LIGHT SUMMARY	+	0.9 fc	15.9 fc	0.0 fc	N/A	N/A

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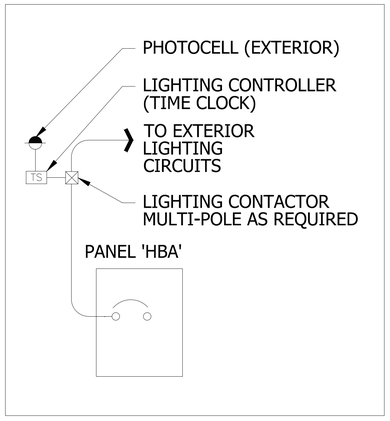
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Hubbert EME Engineering
90 WINGES ROAD, SUITE 201
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67 HIGH STREET
BARRIE, ON L4N 1W5
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info@EMEeng.com

PROJECT:
PEOPLE CARE
DELHI LTC
173 DALTON RD
DELHI, ON
N4B 2E1

DRAWING TITLE:
LIGHTING CALCULATIONS
SITE

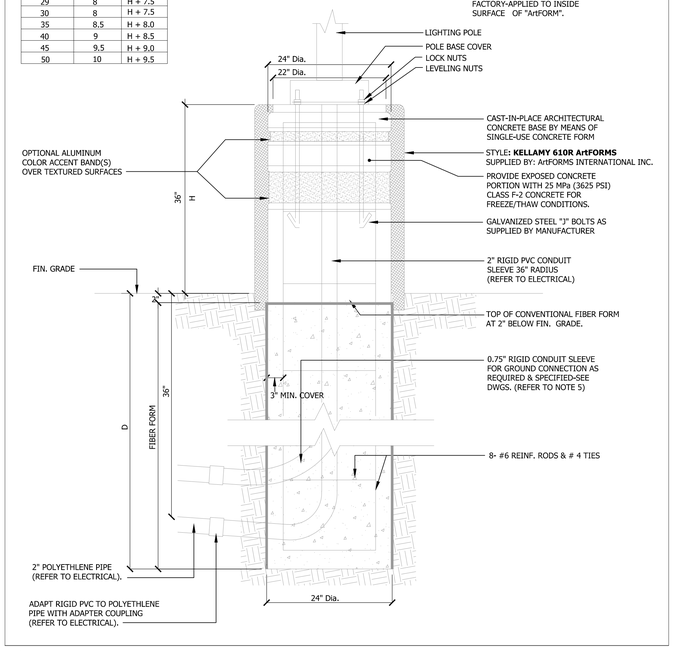
DRAWN BY:	CHECKED BY:	SCALE:
AN	CL	1:200
DATE:	PROJECT NUMBER:	DRAWING NUMBER:
FEB/2023	23-6337	E-006



5 SITE — LIGHTING CONTROL
SCALE: NONE

POLE LENGTH (ft.)	BASE BURIAL DEPTH (D) (ft.)	REINF. ROD LENGTH (ft.)
10	5	H + 4.5
19	7	H + 6.5
23	7	H + 6.5
25	7	H + 6.5
29	8	H + 7.5
30	8	H + 7.5
35	8.5	H + 8.0
40	9	H + 8.5
45	9.5	H + 9.0
50	10	H + 9.5

NOTES:
1. ALL DIMENSIONS ARE IN NOMINAL FEET OR INCHES
2. TOP OF FOUNDATION SHALL BE TROWELLED SMOOTH & LEVEL.
3. CLASS OF CONCRETE SHALL BE 3000 P.S.I. CONCRETE SHALL BE VIBRATED.
4. MINIMUM OF TWO SLEEVES REQUIRED FOR EACH CONC. FOUNDATION UNLESS OTHERWISE SHOWN.
5. PROVIDE A 0.75" DIA. 10' STEEL COPPER COATED GROUND ROD ADJACENT TO POLES AS SPECIFIED ON PLAN AND CONNECT TO METAL POLE WITH BARE COPPER CONDUCTOR.
6. CONTRACTOR TO VERIFY OPENING SIZE IN POLE BASE PLATE PRIOR TO SETTING CONDUIT SLEEVES.
7. SUBJECT TO SOIL CONDITIONS, REFER TO SOIL REPORT.
8. FORM RELEASE AGENT HAS BEEN FACTORY-APPLIED TO INSIDE SURFACE OF "ArtFORM".



6 POLE BASE DETAIL
NONE



D-Series Size 1
LED Area Luminaire

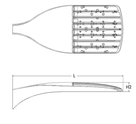
d-series

Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

EPA:	0.69 ft² (0.06 m²)
Length:	32.71" (83.1 cm)
Width:	14.26" (36.2 cm)
Height H1:	7.88" (20.0 cm)
Height H2:	2.73" (6.9 cm)
Weight:	34 lbs (15.4 kg)



Introduction

The modern stylling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series offers outstanding photometry aids in reducing the number of poles required in area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX1 LED P7 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX1 LED

Series	LEDs	Color temperature [1]	Color Rendering Index [1]	Distribution		Voltage	Mounting
DSX1 LED	**Forward optics**	(thin section 70CRI only)		AFR Automotive front row	T5M Type V medium	MVOLT (120V-277V) [4]	**Shipped included**
	P1 P6	30K 3000K	70CRI	T1S Type I short	T6LG Type V low glare	HVOLT (347V-480V) [4]	SPA Square pole mounting (#8 drilling)
	P2 P7	40K 4000K	70CRI	T2M Type II medium	T5W Type V wide	XVOLT (277V - 480V) [5]	RPA Round pole mounting (#8 drilling)
	P3 P8	50K 5000K	70CRI	T3M Type III medium	BLC3 Type III backlight control [2]		SPA5 Square pole mounting (#5 drilling) [3]
	P4 P9	(thin section 80CRI only, extended lead times apply)		T3LG Type III low glare [1]	BLC4 Type IV backlight control [2]		RPA5 Round pole mounting (#5 drilling) [3]
	P5	27K 2700K	80CRI	T4M Type IV medium	LCCO Left corner cutoff [2]		SPABN Square narrow pole mounting (#8 drilling)
	Rotated optics	30K 3000K	80CRI	T4LG Type IV low glare [1]	RCCO Right corner cutoff [2]		WBA Wall bracket [6]
	P1R [1] P12R [1]	35K 3500K	80CRI	TFTM Forward throw medium			
	P11R [1] P13R [1]	40K 4000K	80CRI				
		50K 5000K	80CRI				

Control options		Other options		Finish (required)	
Shipped installed	PER7 Seven-pin receptacle only (controls ordered separately) [4,7]	**Shipped installed**		DDBXD Dark bronze	
NLTAIR2 PIRHN nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 8-40' mounting height, ambient sensor enabled at 2fc [4,5,6,7,8]	FAO Field adjustable output [4,7]	SPD20KV 20kV surge protection		DBLXD Black	
PIR High/low, motion/ambient sensor, 8-40' mounting height, ambient sensor enabled at 2fc [4,6,7]	BL30 Bi-level switched dimming, 30% [4,7]	HS Houseside shield (black finish standard) [2]		DNAXD Natural Aluminum	
PER NEMA twist-lock receptacle only (controls ordered separately) [4]	BL50 Bi-level switched dimming, 50% [4,7]	L90 Left rotated optics [1]		DWHXD White	
PER5 Five-pin receptacle only (controls ordered separately) [4,7]	DMG 0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately) [4]	R90 Right rotated optics [1]		DBTXD Textured dark bronze	
	DS Dual switching [4,7,9,7]	CCE Coastal Construction [2]		DBLBXD Textured black	
		Shipped separately		DNATXD Textured natural aluminum	
		EGSR External Glare Shield (reversible, field install required, matches housing finish)		DWHXD Textured white	
		BSDB Bird Spikes (field install required)		DSTXD Textured sandstone	

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1 FIXTURE TYPE A1, A2, A3, A4, A5
NONE



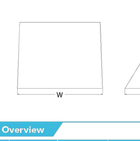
WDGE2 LED
Architectural Wall Sconce
Precision Refractive Optic

Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

Depth (D1):	7"
Depth (D2):	1.5"
Height:	9"
Width:	11.5"
Weight: (without options)	13.5 lbs



Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE2 with industry leading precision refractive optics provides great uniform distribution and optical control. When combined with multiple integrated emergency battery backup options, including an 18W cold temperature option, the WDGE2 becomes the ideal wall-mounted lighting solution for pedestrian scale applications in any environment.

WDGE LED Family Overview

Luminaire	Optic	Standard EM, 0°C	Cold EM, -20°C	Sensor	Approximate Lumens (4000K, 80CRI)					
					P1	P2	P3	P4	P5	P6
WDGE1 LED	Visual Comfort	4W		--	750	1,200	2,000	--	--	--
WDGE2 LED	Visual Comfort	10W	18W	Standalone / nLight	--	1,200	2,000	3,000	4,500	6,000
WDGE2 LED	Precision Refractive	10W	18W	Standalone / nLight	700	1,200	2,000	3,200	4,200	--
WDGE3 LED	Precision Refractive	15W	18W	Standalone / nLight	--	2,500	8,500	10,000	12,000	--
WDGE4 LED	Precision Refractive			Standalone / nLight	--	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE2 LED P3 40K 80CRI VF MVOLT SRM DDBXD

Series	Package	Color Temperature	CRI	Distribution	Voltage	Mounting
WDGE2 LED	P1 [1]	27K 2700K	70CRI [2]	T1S Type I Short	MVOLT 347 [1]	**Shipped included**
	P2 [1]	30K 3000K	80CRI	T2M Type II Medium	480 [1]	SRM Surface mounting bracket
	P3 [1]	40K 4000K	LW* Limited Wavelength	T3M Type III Medium		ICW Indirect Canopy/Ceiling Washer bracket (ship w/ damp locations only)
	P4 [1]	50K 5000K		T4M Type IV Medium		
		AMB [3] Amber		TFTM Forward Throw Medium		

Shipped separately
AWS 3.0inch Architectural wall spacer
PBBW Surface-mounted back box (top, left, right conduit entry). Use when there is no junction box available.

Options		Finish
E10WH Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 0°C min)	**Standalone e Sensors/Controls**	DDBXD Dark bronze
E20WC Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, -20°C min)	PIR Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.	DBLXD Black
PE [4] Photocell, Button Type	PIRH Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.	DNAXD Natural aluminum
DMG [5] 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)	PIRTFCIV Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.	DWHXD White
BCE Bottom conduit entry for back box (PIRHN). Total of 4 entry points.	PIRHTFCIV Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.	DSSTD Sandstone
SPD10KV 10kV Surge pack	**Networked Sensors/Controls**	DDBTXD Textured dark bronze
BAA Buy America(n) Act Compliant	NLTAIR2 PIR nLight AIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.	DBLBXD Textured black
	NLTAIR2 PIRH nLight AIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.	DNATXD Textured natural aluminum
	See page 4 for out of box functionality	DWHXD Textured white
		DSSTXD Textured sandstone

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2 FIXTURE TYPE W2
NONE



WDGE3 LED
Architectural Wall Sconce

Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

Depth (D1):	8"
Depth (D2):	1.5"
Height:	9"
Width:	18"
Weight: (without options)	19.5 lbs



Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE3 has been designed to deliver up to 12,000 lumens through a precision refractive lens with wide distribution, perfect for augmenting the lighting from pole mounted luminaires.

WDGE LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C	Sensor	Lumens (4000K)					
				P1	P2	P3	P4	P5	P6
WDGE1 LED	4W	--	--	1,200	2,000	--	--	--	--
WDGE2 LED	10W	18W	Standalone / nLight	1,200	2,000	3,000	4,500	6,000	--
WDGE3 LED	15W	18W	Standalone / nLight	7,500	8,500	10,000	12,000	--	--
WDGE4 LED	--	--	Standalone / nLight	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE3 LED P3 40K 70CRI R3 MVOLT SRM DDBXD

Series	Package	Color Temperature	CRI	Distribution	Voltage	Mounting
WDGE3 LED	P1	30K 3000K	70CRI	R2 Type 2	MVOLT 347 [1]	**Shipped included**
	P2	40K 4000K	80CRI	R3 Type 3	480 [1]	SRM Surface mounting bracket
	P3	50K 5000K		R4 Type 4		ICW Indirect Canopy/Ceiling Washer bracket (ship w/ damp locations only)
	P4			RFT Forward Throw		

Shipped separately
AWS 3.0inch Architectural wall spacer
PBBW Surface-mounted back box (top, left, right conduit entry). Use when there is no junction box available.

Options		Finish
E10WH Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 0°C min)	**Standalone e Sensors/Controls**	DDBXD Dark bronze
E20WC Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, -20°C min)	PIR Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.	DBLXD Black
PE [2] Photocell, Button Type	PIRH Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.	DNAXD Natural aluminum
DMG [3] 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)	PIRTFCIV Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.	DWHXD White
BCE Bottom conduit entry for back box (PIRHN). Total of 4 entry points.	PIRHTFCIV Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.	DSSTD Sandstone
SPD10KV 10kV Surge pack	**Networked Sensors/Controls**	DDBTXD Textured dark bronze
BAA Buy America(n) Act Compliant	NLTAIR2 PIR nLight AIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.	DBLBXD Textured black
	NLTAIR2 PIRH nLight AIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.	DNATXD Textured natural aluminum
	See page 4 for out of box functionality	DWHXD Textured white
		DSSTXD Textured sandstone

Accessories
Ordered and shipped separately.
WDGEWS DDBXD WDGE 3 Inch Architectural Wall Spacer (specify finish)
WDGEPBBW DDBXD WDGE3 surface-mounted back box (specify finish)

NOTES
1. 347V and 480V not available with E10WH and E20WC.
2. PE not available in 480V and with sensors/controls.
3. DMG option not available with sensors/controls.
4. Not qualified for DLC. Not available with emergency battery backup or sensors/controls.

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3 FIXTURE TYPE W1, W3
NONE

LITHONIA LIGHTING®

Catalog Number
Notes
Type

LDN4 SWITCHABLE

4" OPEN
New Construction Downlight



FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches. Reflectors are retained by torsion springs. Vertically adjustable mounting brackets with commercial bar hangers provide 3-1/4" total adjustment. Two-conbination 1/2"-3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (#14 awg), 6 no. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard. Light engine and drivers are accessible from above or below ceiling.

Ceiling thickness range 1/2" to 1-1/2".

OPTICS — 55° cutoff

80CRI standard (90CRI optional)

ELECTRICAL — Adjustable lumen output with four module options.

MVOLT 120/277V (50/60Hz driver (5-30V & 120V Phase Dimming to 10% or 1% min dimming level). DALI driver dimming to 1% also available

FCC CFR Title 47 Part 15 Class A for 277V. FCC CFR Title 47 Part 15 Class B for 120V.

L80 @ 60,000 hours

3 SDCM

LISTINGS — Certified to US and Canadian safety standards. Wet location, requires covered ceiling. Title 24 compliant (90CRI, up to 1000lm). Wallwash suitable for damp locations only. Some configurations are Energy Star certified, please visit www.energystar.gov for specific products.

WARRANTY — 5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at:
www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.
All values are design or typical values, measured under laboratory conditions at 25 °C.
Specifications subject to change without notice.

LDN4 AR LS		80CRI							
Lumen Output	Wattage	30K/90CRI		35K/90CRI		40K/90CRI		50K/90CRI	
		Delivered Lumens	LPW	Delivered Lumens	LPW	Delivered Lumens	LPW	Delivered Lumens	LPW
ALO1 (500LM)	4	578	99	584	101	597	102	616	105
ALO1 (750LM)	9	903	102	924	103	966	105	975	108
ALO1 (1000LM)	13	1368	98	1297	100	1328	102	1369	104
ALO1 (1000LM)	13	1344	108	1375	110	1408	112	1451	115
ALO2 (1500LM)	19	1961	105	2007	106	2055	108	2118	111
ALO2 (2000LM)	25	2471	99	2526	101	2586	103	2668	105
ALO3 (2000LM)	25	2542	103	2601	104	2663	106	2745	109
ALO3 (2500LM)	32	3069	98	3140	99	3214	101	3314	103
ALO3 (3000LM)	38	3485	93	3566	94	3651	96	3764	98
ALO4 (4000LM)	39	4094	106	4178	108	4262	110	4303	111
ALO4 (4500LM)	44	4319	155	4611	165	4783	187	4758	108
ALO4 (5000LM)	49	4914	100	5015	102	5115	104	5365	105

Options		Finish
E10WH Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 0°C min)	**Standalone e Sensors/Controls**	DDBXD Dark bronze
E20WC Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, -20°C min)	PIR Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.	DBLXD Black
PIRTFCIV Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.	PIRH Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.	DNAXD Natural aluminum
PIRHTFCIV Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.	PIRTFCIV Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.	DWHXD White
Networked Sensors/Controls	PIRHTFCIV Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.	DSSTD Sandstone
NLTAIR2 PIR nLight AIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.	**Networked Sensors/Controls**	DDBTXD Textured dark bronze
NLTAIR2 PIRH nLight AIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.	NLTAIR2 PIR nLight AIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.	DBLBXD Textured black
See page 4 for out of box functionality	NLTAIR2 PIRH nLight AIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.	DNATXD Textured natural aluminum
	See page 4 for out of box functionality	DWHXD Textured white
		DSSTXD Textured sandstone

Capable Luminaire
This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.
- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded backgrounds*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

4 FIXTURE TYPE F
NONE

MAR 15/23	—	ISSUED FOR SPA	AN
MAR 09/23	—	ISSUED FOR 25% SUBMISSION	AN
DATE	NO.	DESCRIPTION	BY

MARK VOID ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE

REVISIONS

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DRAWINGS ARE PREPARED FOR PRINTING ON ARCH E1 PAPER (30"x42"). DRAWINGS ARE NOT TO BE SCALED.

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67 HIGH STREET
BARRIE, ON L4N 1W5
TEL: (705) 735-1133

PROJECT:
PEOPLE CARE
DELHI LTC
173 DALTON RD
DELHI, ON
N4B 2E1

DRAWING TITLE:
LIGHTING SPECIFICATIONS
SITE

DRAWN BY:	CHECKED BY:	SCALE:
AN	CL	NONE
DATE:	PROJECT NUMBER:	DRAWING NUMBER:
FEB/2023	23-6337	E-007

UNDERGROUND DISTRIBUTION STANDARDS – INTERIM — SINGLE PHASE DISTRIBUTION

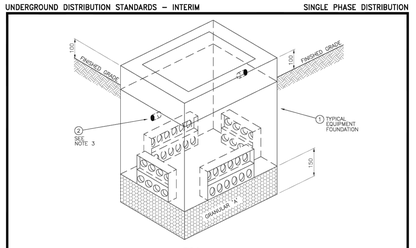


FIG.1
ISOMETRIC VIEW

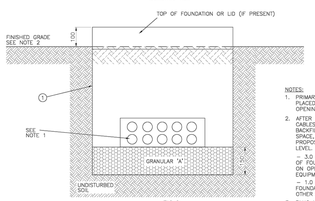


FIG.2
ELEVATION VIEW

NOTES:
1. PRIMARY CABLES SHALL BE PLACED THRU THE LOWER OPENINGS.
2. AFTER INSTALLATION OF CABLES AND GROUNDING, SPARE CABLES ARE TO BE SPACED AS FOLLOWS TO THE PROPOSED FINISHED GRADE LEVEL.
   – 3.0 m SPACE IN FRONT OF FOUNDATION EDGE(S) ON OPERATION SIDE(S) OF EQUIPMENT.
   – 1.0 m IN FRONT OF FOUNDATION EDGES FOR OTHER SIDES.
3. PLUG LIFTING HOLES WITH DUCT SEALING COMPOUND.

PARTS LIST

PART No.	MM No.	DESCRIPTION	QTY.
1	MM#	DISTRIBUTION EQUIPMENT FOUNDATION, CONCRETE	1
2	3000500157	SEALANT, DUCT SEALING	A/R
MM# = REFER TO SECTION 16 ONLY/A/R = AS REQUIRED			

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE STATED

Rev. No.	Issue Date	Revision	Init.	Approved By
03	SEP 2018	GENERAL UPDATES, CHANGED TO NEW DWG. & TB BLOCK FORMAT. FOR PREVIOUS REVISIONS REFER TO REVISED 270-10.	SO	PC
02	OCT 2011	MM# ADDED	W.B.	

Hydro One Networks Inc.

EQUIPMENT FOUNDATION INSTALLATION

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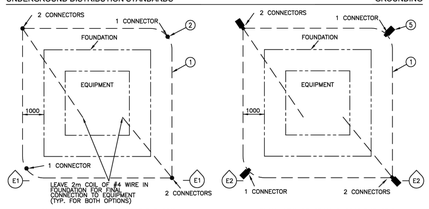
Drawing No. DU-03-210-0500 — Rev. No. 03

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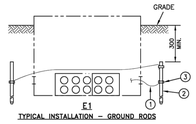
TITLE BLOCK REV 02 – AUGUST 2014

1 SERVICE TRANSFORMER DETAIL
NONE

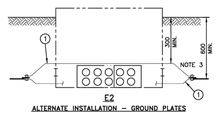
UNDERGROUND DISTRIBUTION STANDARDS — GROUNDING



PLAN VIEW OF GROUND GRADIENT GRID



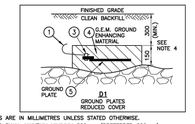
TYPICAL INSTALLATION – GROUND RODS



ALTERNATE INSTALLATION – GROUND PLATES

PARTS LIST

PART No.	MM No.	DESCRIPTION	QTY.
1	3001144881	BARE CONDUCTOR, COPPER, #4 AWG	A/R
2	3001141476	ROD, GROUND, 19mm x 3m, GALV	4
3	3000666481	CONNECTOR, GRD, WEDGE, GROUND ROD TO COPPER WIRE	6
4	3000540378	GROUNDING MATERIAL (G.E.M.)	A/R
5	3000540170	GROUND PLATE	4
MM# = REFER TO SECTION 16 ONLY/A/R = AS REQUIRED			



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. GAS PIPE LINES SHALL MAINTAIN MINIMUM 300mm. (PREFERRED 600mm) SEPARATION FROM HYDRO ONE EQUIPMENT GROUND GRID.
3. GROUND RODS MAY BE SUBSTITUTED WITH GROUND PLATES ONLY IF GROUND RODS CANNOT BE DRIVEN DUE TO ROCKY GROUND CONDITIONS. MAINTAIN 600mm MINIMUM NATIVE SOIL COVER OVER PLATES AND 300mm) OVER GROUND WIRE(S). PLATES INSTALLED AT REDUCED DEPTH MUST BE INSTALLED PER INSET '01'.
4. MECHANICAL PROTECTION (75mm) 21 MPa CONCRETE IS REQUIRED OVER PLATES AND GROUND WIRES FOR BURIAL DEPTHS LESS THAN 500mm.

REFERENCES:
SECTION 1 – DEFINITIONS
SECTION 15 – CONSTRUCTION GUIDE
SECTION 16 – MATERIALS

Rev. No.	Issue Date	Revision	Drawn	Approved By Checked Date
*	*	*	*	*

Hydro One Networks Inc.

Drawn: LS — Approved: * — Date: NOV.26,2013

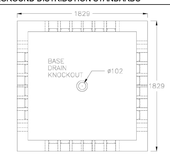
PAD-MOUNTED EQUIPMENT GROUNDING DETAILS - TYPICAL (CONCRETE FOUNDATION)

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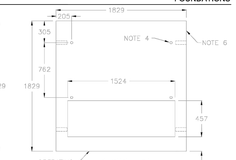
Dwg. No. DU-14-101 — Rev. 00

2 SERVICE TRANSFORMER GROUNDING DETAILS
NONE

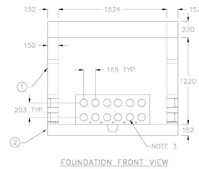
UNDERGROUND DISTRIBUTION STANDARDS — FOUNDATIONS



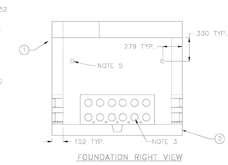
FOUNDATION TOP VIEW



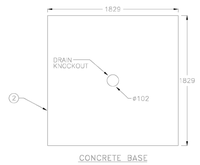
LID TOP VIEW



FOUNDATION FRONT VIEW



FOUNDATION RIGHT VIEW



CONCRETE BASE

NOTES:
1. ALL DIMENSIONS ARE IN mm UNLESS STATED OTHERWISE.
2. APPROXIMATE MASS OF FOUNDATION IS 3385 kG.
3. CABLE ENTRY OPENINGS: PVC SEALS FOR 100mm DUCTS.
4. 3/4" x 2" UNC DIAL-THREADED INSERT TYP.
5. 50mm LIFTING HOLE OR SWIFT LIFT SYSTEM.
6. LID THICKNESS = 230mm, LID MASS = 1320 kG.
7. DUE TO THE WEIGHT OF THIS EQUIPMENT, THE BASE UNIT (PART #2) MUST BE USED IN ALL INSTALLATIONS, IRRESPECTIVE OF SOIL CLASS.

PARTS LIST

PART No.	MM No.	DESCRIPTION	QTY.
1	3033140B	CONCRETE FOUNDATION WITH LID (TWO PIECES) – FOR THREE PHASE TRANSFORMER (501–1000kVA)	A/R
2	3033140Y	CONCRETE BASE – FOR THREE PHASE TRANSFORMER	A/R
MM# = REFER TO SECTION 16 ONLY/A/R = AS REQUIRED			

Rev. No.	Issue Date	Revision	Drawn	Approved By Checked Date
*	*	*	*	*
01	JULY 2014	UPDATED PARTS LIST	SO	

Hydro One Networks Inc.

Drawn: S.OORT — Approved: * — Date: NOV.08,2011

TYPICAL CONCRETE FOUNDATION - THREE PHASE PAD-MOUNTED TRANSFORMER (501 - 1000kVA)

Dwg. No. DU-09-203 — Rev. 01

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3 TRANSFORMER PAD MOUNT DETAIL
NONE

UNDERGROUND DISTRIBUTION STANDARDS – INTERIM — SINGLE PHASE DISTRIBUTION

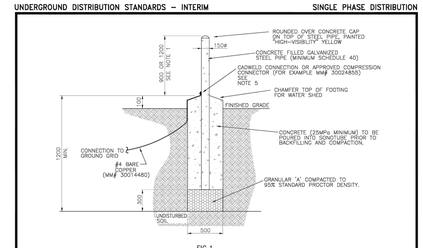


FIG.1
SECTION A–A
ELEVATION VIEW

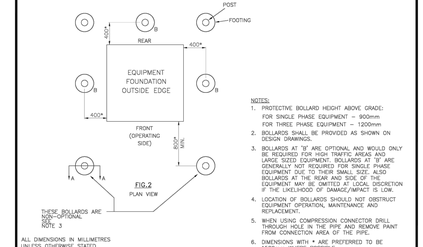


FIG.2
PLAN VIEW

THESE BOLLARDS ARE NON-OPTIONAL SEE NOTE 3

NOTES:
1. PROTECTIVE BOLLARD HEIGHT ABOVE GRADE:
   FOR SINGLE PHASE EQUIPMENT – 900mm
   FOR THREE PHASE EQUIPMENT – 1200mm
2. BOLLARDS SHALL BE PROVIDED AS SHOWN ON DESIGN DRAWINGS.
3. BOLLARDS AT "B" ARE OPTIONAL AND WOULD ONLY BE REQUIRED FOR HIGH TRAFFIC AREAS AND LARGER SIZED EQUIPMENT. BOLLARDS AT "A" ARE LANDING GEAR FOR THE LARGER SIZED EQUIPMENT DUE TO THEIR SMALL SIZE. ALSO BOLLARDS AT THE REAR AND SIDE OF THE EQUIPMENT MAY BE OMITTED AT LOCAL DISCRETION IF THE LIKELIHOOD OF DAMAGE/IMPACT IS LOW.
4. LOCATION OF BOLLARDS SHOULD NOT OBSTRUCT EQUIPMENT OPERATION, MAINTENANCE AND REPLACEMENT.
5. WHEN USING COMPRESSION CONNECTOR DRILL THROUGH HOLE IN THE PIPE AND REMOVE PAINT FROM CONNECTION AREA OF THE PIPE.
6. DIMENSIONS WITH * ARE PREFERRED TO BE 150mm WHERE POSSIBLE.

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE STATED

Rev. No.	Issue Date	Revision	Init.	Approved By
04	SEP 2018	GENERAL UPDATES & NOTE 3 CHANGED. TO NEW DWG. & TB BLOCK FORMAT. FOR PREVIOUS REVISIONS REFER TO 210-03.	SO	PC
03	NOV 2007	NOTE 4 ADDED PREFERRED DIMENSIONS SPECIFIED. COMPRESSION CONNECTOR ADDED.	AS	

Hydro One Networks Inc.

PROTECTIVE BOLLARDS INSTALLATION

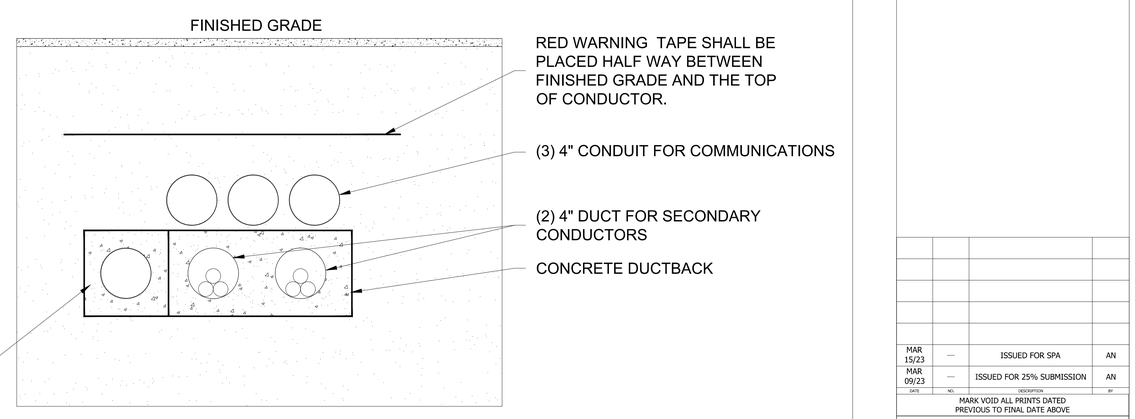
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A4 (210 x 297) — Scale: N.T.S. — Date Printed: 2011/11/04 — File ID:

TITLE BLOCK REV 02 – AUGUST 2014

4 GUARD POST INSTALLATION & GROUNDING DETAIL
NONE



SERVICE CONDUCTOR ARRANGEMENT DESIGNED TO OESC DIAGRAM D11 DETAIL 2. VERIFY WITH LOCAL UTILITY; SERVICE CONDUCTOR SIZING TO BE CONFIRMED

5 SECONDARY DUCT BANK TRENCH DETAIL
NONE

NO.	DESCRIPTION	BY
MAR 15/23	ISSUED FOR SPA	AN
MAR 09/23	ISSUED FOR 25% SUBMISSION	AN

MARK VOID ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE

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DRAWING TITLE:
POWER SPECIFICATIONS
SITE

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DATE:	PROJECT NUMBER:	DRAWING NUMBER:
FEB/2023	23-6337	E-007

SERVICING & STORMWATER MANAGEMENT REPORT

PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

Project No.: 2022-0672-11

March 16, 2023

WALTERFEDY

Kitchener | Hamilton | Toronto | walterfedy.com

PEOPLECARE DELHI

SERVICING & STORMWATER MANAGEMENT REPORT

173 Dalton Road, Delhi, ON

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Appendix C Stormwater Management

1.0 INTRODUCTION

WalterFedy was retained by peopleCare Inc. to complete a Servicing and Stormwater Management Report in support of the Site Plan Application for the proposed long-term care facility located at 173 Dalton Road in Delhi, Ontario. The development is proposed to include a two-storey building with 128 long-term care beds, along with associated surface parking and amenity space. The proposed building will be constructed on newly-acquired land by peopleCare. There is a 60-bed long-term care facility north of the proposed site boundaries, at 750 Gibralter Street. Once the new facility is constructed, it is expected to be severed from the overall site. The residents in the existing facility will be transferred to the new facility once occupancy is granted.

The purpose of this Servicing and Stormwater Management Report is to identify how the development will be serviced, including water and sanitary connections to the existing municipal infrastructure, as well as the proposed storm outlet. The report will discuss existing servicing conditions surrounding the site and the available capacity in the municipal system to determine how it will accommodate the development. The stormwater management design has been presented, demonstrating consistency with Norfolk County design criteria.

1.1 Background

The site is located in the southern portion of Delhi, with an approximate overall site area of 3.2 ha, which includes the existing long-term care facility and newly-acquired land. The proposed long-term care facility will constitute a site area of 1.23 ha and will be constructed on the southern portion of the overall site. The remainder of the site is expected to be severed after occupancy is granted. The existing facility has a site area of 1.38 ha. The site is accessed from Gibralter Street to the north. The site is bound by residential and commercial properties to the north, east, and south, and agricultural land to the west. The proposed site will be accessed from Dalton Road to the south. The neighbouring properties to the east are accessed off James Street.

The site is currently zoned IC (Community Institutional) and will remain as such. The site is occupied by the 60-bed long-term care facility and associated surface parking and amenity space. The remainder of the site is open grass fields.

1.2 Reference Reports and Drawings

In preparation of this report, the following background information was referenced:

1. *Geotechnical Investigation & Preliminary Hydrogeological Assessment – Proposed Long-Term Care Facility – 750 Gibralter Street & 724 James Street, Delhi, Ontario*, Chung & Vander Doelen Engineering Ltd., December 16, 2023.
2. *Norfolk County - Integrated Sustainable Master Plan (ISMP)*, MMM Group, R.V. Anderson Associates Limited, XCG Consulting Limited, September 2016
3. *Plan and Profile Drawings*, provided by Norfolk County

The following guidance documents were also referenced in preparation of this report:

1. *Design Criteria*, Corporation of Norfolk County, August 2017.
2. *Design Guidelines for Sewage Works*, Ministry of the Environment, Conservation and Parks, March 2019
3. *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation and Parks, May 2019
4. *Water Supply for Public Fire Protection – A Guide to Recommended Practise in Canada*, Fire Underwriters Survey, 2019
5. Ontario Building Code (current).

2.0 EXISTING INFORMATION

2.1 Existing Topography

A topographic and legal survey of the site was completed by Stantec Geomatics Ltd. in September 2022. The overall property owned by peopleCare primarily consists of the existing building and associated surface parking, as well as some amenity space and open, grassed fields. The long-term care building is accessed off Gibralter Street. The parcel of land is irregularly shaped, with the southern portion extending south to Dalton Road.

The site drains from southeast-to-northwest, with no apparent stormwater quantity control devices or catch basins. There is a berm west of the building that directs stormwater runoff from the site to the northwest into a treed area. The elevation at the Dalton Road frontage is approximately 242.0 m. The finished floor of the building is approximately 239.80 m. The bottom of the berm elevation is approximately 238.5 m, which acts as a swale between the building and the top side of the berm. The top of the berm is at an elevation of 240.5 m. The low point of the site is towards the northwestern corner, which sits at an elevation of approximately 237.0 within the treed area.

The southern area of the site where the new building will be constructed also drains from southeast-to-northwest, with drainage appearing to split around the berm west of the building.

2.2 Geotechnical Report

A geotechnical investigation was completed by Chung & Vander Doelen Engineering Ltd. (CVD), with field work being carried out in September 2022; Their Assessment Report was completed in December 2022. 15 boreholes were advanced within the site boundaries, and three monitoring wells were installed to establish groundwater depths and to allow for groundwater sampling. It is understood that a Phase II Environmental Site Assessment (ESA) is also being completed by CVD at this time.

Topsoil or pavement structure was encountered at the surface of all boreholes. The topsoil thickness ranged between 175 mm and 225 mm. The asphalt pavement structure was approximately 25 mm to 50 mm thick, with a 275 mm to 425 mm granular base. Gravel surface pavement was also encountered at three boreholes, with a thickness between 80 mm and 300 mm. Fill material consisting of fine granular soils was encountered beneath the surface material at boreholes 8 and 14. The fill material ranged between 0.7 m and 1.35 m below grade. These boreholes are located towards the southern portion of the property.

An upper sand layer was encountered within the western and southern portions of the site (boreholes 1, 2, 4, 5, 6, 10, 14, and 15) underlying the surface and fill materials. Boreholes 2 and 14 were terminated within this sand deposit to a depth between 3.5 m and 6.6 m. The sand deposit extended to depths between 1.4 m and 2.9 m below ground surface for the other boreholes.

Underneath the surface or sand layers, fine granular deposits were encountered at all boreholes, except boreholes 2 and 14. Boreholes 10 through 13 and 15 were terminated within this granular deposit approximately 3.5 m below grade. The granular material encountered by the other boreholes extended to a depth between 2.9 m and 3.7 m below grade. The material consists primarily of silty sand to silt material, with trace sand. A 0.7 m layer of clay was encountered at Borehole 11 approximately 1.5 m below grade (eastern portion of the site). Topsoil pockets were encountered at Borehole 7.

A lower sand layer was encountered beneath the granular deposits at 8 boreholes (Boreholes 1 and 3 through 9). These boreholes were terminated within this sand layer between 3.5 m and 8.1 m below surface grade.

Infiltration rates for the site range between 3 and 50 mm/hr. The sand layers have an infiltration rate of 50 mm/hr, the silty sand layers have an infiltration rate between 15 and 30 mm/hr, and the silt layers have an infiltration rate between 3 and 10 mm/hr. Any proposed infiltration galleries will be constructed within the silty sand layer.

Groundwater levels measured from the three monitoring wells ranged between 10.34 m and 10.53 m below the surface. Groundwater was not encountered during the drilling operations. Dry cave-in was experienced at Boreholes 1 through 8, between 4.9 m and 6.7 m below the surface. The report assumes that actual groundwater elevations range between 8.0 m and 10.5 m below the surface. Groundwater levels are expected to fluctuate seasonally and in response to weather events.

The report by CVD also provides design recommendations for foundations, grading operations, floor slab construction, excavations for site services, and pavement structure.

2.3 Existing Servicing and Utilities

Services within and surrounding the site were documented by Stantec as part of the topographical survey. Additional servicing information for areas surrounding the site was documented from plan and profile drawings from Norfolk County as well as the Integrated Sustainable Master Plan (ISMP).

There is a sanitary manhole in front of the existing long-term care facility. The sanitary service from the building is connected to this manhole, which then conveys the flows north towards Gibralter Street via a 200-mm-diameter sewer. This manhole also has a 200-mm-diameter pipe connected from the south, but it is unknown where this sanitary sewer commences. The Contractor will verify routing prior to construction and report back to WalterFedy.

There is a 150-mm-diameter watermain on Gibralter Street which services the existing long-term care facility. There is also a municipal hydrant on Gibralter Street.

A 200-mm-diameter sanitary sewer and a 150-mm-diameter cast iron watermain run south of the site on Dalton Road. It is proposed that the new long-term care facility connect to these municipal services. Modelling of these systems is to be completed and provided by Norfolk County. Results will be included in this report once received.

There is no piped storm sewer outlet for the site. Runoff generated on site is conveyed via sheet flow to the northwest, using existing drainage patterns. The closest storm sewer to the site is at the Ewell Street and Gibralter Street intersection, approximately 50 m north of the building, and 150 m north of where the proposed building will be located.

Hydro, gas, and telecommunications services are provided to the site from Gibralter Street.

3.0 REVIEW AGENCIES

3.1 Norfolk County

Norfolk County will be responsible for the review and approval of the Site Plan Application, as well as site servicing, grading, and stormwater management designs for the overall development.

3.2 Ministry of Transportation Ontario (MTO)

Since the site falls within an MTO Permit Control Area; they will be responsible for the review and approval of the overall development, including the servicing and grading designs.

3.3 Other Agencies

Bell, Rogers, and Hydro One will all be circulated on design drawings to evaluate the impact of the development on their plants.

4.0 SANITARY SERVICING

Norfolk County's Design Criteria state that the per-capita sanitary demand for residential developments shall be taken as 450 L/cap/day, peaked using the Harmon Formula. Alternatively, the Ontario Building Code (OBC) states that average flows from long-term care facilities can be estimated at 450 L/bed/day and the peak sanitary demand is to be coupled with an extraneous flow allowance of 0.28 L/s/ha.

Through correspondence with Norfolk County, it was instructed that long-term care facilities be treated as hospitals, and the Ministry of the Environment, Conservation and Parks (MECP) guidelines state that the sanitary demand for hospitals is 900-1800 L/bed/day. However, water bills for the existing site over the past 2 years indicate an average water usage of approximately 712 m^3 per 30-day billing cycle. This correlates to daily use of 23.39 m^3/day, and approximately 390 L/bed. Therefore, the 450 L/bed/day demand stipulated by the OBC can still be considered conservative. Refer to Appendix A for a summary of the water billing records over the past 2 years.

The existing long-term care facility has 60 beds with a site area of approximately 1.38 ha. The proposed facility will have 128 beds and a site area of 1.23 ha. Once the new facility is open, the residents in the existing facility will be transferred to the new building, and the old building will be decommissioned. The number of beds was used as the design population. Table I displays the existing sanitary flow rate for the site based on existing water records. Table II displays the sanitary demand for the proposed development based on the OBC criteria.

Table I: Existing Sanitary Flow

Site Area	1.38 ha
Long-Term Care Beds	60
Average Daily Flow (OBC)	390 L/bed/day
Peaking Factor (Harmon)	4.30
Total Domestic Flow	**1.16 L/s**
Extraneous Flow Allowance	0.28 L/s/ha
Total Extraneous Flow	**0.39 L/s**
Total Sanitary Flow	**1.55 L/s**

The existing peak sanitary flow for the site is 1.55 L/s. The sanitary demand from the building is conveyed north through the 200-mm-diameter sanitary sewer on Gibralter Street. Refer to Appendix A for the sanitary calculations.

Table II: Proposed Sanitary Flow from Proposed Development

Site Area	1.23 ha
Long-Term Care Beds	128
Average Daily Flow (OBC)	450 L/bed/day
Peaking Factor (Harmon)	4.21
Total Domestic Flow	**2.81 L/s**
Extraneous Flow Allowance	0.28 L/s/ha
Total Extraneous Flow	**0.34 L/s**
Total Sanitary Flow	**3.15 L/s**

A total sanitary flow of 3.15 L/s is anticipated for the proposed development. The increase in peak flow from existing conditions is 1.60 L/s. The proposed sanitary service will convey the flow to the 200-mm-diameter sanitary sewer on Dalton Road. Using the County's recommended demand of 1800 L/bed/day would result in an existing sanitary demand of 5.76 L/s, and a proposed demand of 11.58 L/s. Refer to the sanitary design sheet in Appendix A for detailed calculations.

5.0 WATER SERVICING

5.1 Design Criteria

The County of Norfolk's Design Criteria state that the minimum pressure under normal scenarios shall not be below 275 kPa (40 psi) and shall not exceed 690 kPa (100 psi). Under fire scenarios, the pressure shall not be less than 140 kPa (20 psi). Pressure-reducing valves are required in any localized areas with design pressures in excess of 690 kPa.

5.2 Domestic Water Demand

The average daily water demand of 390 L/bed/day (as per the historical water bills for the existing site) was used for existing peak domestic water demand calculations. The OBC sanitary demand of 450 L/bed/day was used for the peak domestic water demand for the proposed development. The domestic demand was peaked using the Norfolk County Design Criteria requirements, with a maximum daily demand factor of 2.25 and a maximum hour factor of 4.0 for residential developments. Refer to Table III for the existing domestic water demand for the site, and Table IV for the proposed domestic water demand for the site.

Table III: Existing Domestic Water Demand

Long-Term Care Beds	60
Average Demand (Historical)	390 L/bed/day
Peaking Factors (Norfolk County)	
Max Day	2.25
Max Hour	4.0
Total Max Day Demand	**0.61 L/s**
Total Max Hour Demand	**1.08 L/s**

Table IV: Proposed Domestic Water Demand

Long-Term Care Beds	128
Average Demand (OBC)	450 L/bed/day
Peaking Factors (Norfolk County)	
Max Day	2.25
Max Hour	4.0
Total Max Day Demand	**1.50 L/s**
Total Max Hour Demand	**2.67 L/s**

The existing maximum day demand is 0.61 L/s, and the existing maximum hour demand is 1.08 L/s. The proposed maximum day demand is 1.50 L/s and then proposed maximum hour demand is 2.67 L/s. This results in an increase of 0.89 L/s for the maximum day demand, and 1.59 L/s for the maximum hour demand. This increase in domestic demand can be considered negligible. Refer to Appendix B for the domestic design calculations.

5.3 Fire Flow Demand

Norfolk County specifies that all fire flow requirements shall be determined in accordance with the current issue of *Water Supply for Public Fire Protection* published by the Fire Underwriters Survey (FUS), and the Ontario Building Code. Due to the nature of the site, the 2020 version of the *Water Supply for Public Fire Protection* was utilized. To facilitate calculations, it is necessary to determine whether buildings are to be protected by a sprinkler system, as the resulting requirement for fire flow is calculated differently for buildings with or without sprinkler systems. Based on the Building Code Analysis, it is noted that the proposed building will be fitted with a sprinkler system. As such, the fire flow for the site will need to be designed per NFPA 13 *Standard for Installation of Sprinkler Systems* (2013), which stipulates the criteria used for determining fire flow for buildings with sprinklers. It is assumed that the existing building is fitted with a sprinkler system. Table V summarizes the fire demand for the proposed building.

Table V: Fire Flow Demand

Type of Construction	Non-Combustible Construction (C=0.8)
Effective Floor Space	6400 m^2
Occupancy Charge	Non-Combustible Contents (-25%)
Automated Sprinkler Protection	Yes
Designed to NFPA 13 Standard	Yes (-30%)
Standard Water Supply to Sprinklers and Standpipes	Yes (-10%)
Fully Supervised System	Yes (-10%)
Exposure Charges	Surrounding Buildings (+10%)
Fire Flow Demand	**100 L/s (1585 usgpm)**

The proposed fire demand for the subject site is 100 L/s. The existing fire demand for the subject site is 50 L/s based on these same FUS stipulations. Refer to Appendix B for detailed fire flow calculations.

5.4 Service Design

The water service shall be sized to convey the combination of the Maximum Day Demand and the Fire Demand, within the pressure and velocity ranges as specified. For the proposed development, this combined flow rate is approximately 101.5 L/s. The combined demand can be serviced via a 150-mm-diameter watermain within the specified pressure ranges. The Norfolk County Fire Department has stated in Pre-Consultation comments that there must be adequate water supply available on site for fire suppression systems.

The ISMP states that Delhi is in a water storage deficiency of approximately 1959 m^3, with this value increasing to 1994 m^3 by 2041. The ISMP also provides short-term, medium-term, and long-term recommendations on how to increase water supply to Delhi. Based on the date of the report, the medium-term recommendations should reflect present day. These medium-term recommendations include an interconnection with Simcoe. The long-term recommendations include replacing undersized watermains to improve fire protection. It is currently not known if any of these recommendations have been or are planned to be implemented.

The ISMP also includes a figure showing the available fire flow during the maximum day demand in 2015 throughout Delhi. At the municipal hydrant on Dalton Street near the site entrance, there is less than 57 L/s available for fire protection. Norfolk County is in the process of confirming the available fire flow available for the site.

Assuming that the available flow is approximately 30 L/s, a private underground water reservoir could provide the additional volume required for fire protection. In order to provide the additional 70 L/s for 30 minutes, a volume of 126 m^3 would need to be stored on site. An underground fire water reservoir is proposed for the site. The size and model will be detailed once the County confirms the available fire flow. The reservoir will be equipped with a float sensor for automatic refill.

The proposed service for the site will connect to the watermain on Dalton Road. A valve and meter chamber designed to Norfolk County standards will be installed at property line, with separate fire and domestic services branching off within the chamber.

Refer to Drawing C3-1 for the proposed servicing design.

6.0 STORM SERVICING AND STORMWATER MANAGEMENT

6.1 Stormwater Management Objectives and Design Criteria

As per Norfolk County regulations, the following stormwater management criteria are applicable:

- 'Enhanced' water quality control with 80% long-term average-annual total suspended solids (TSS) removal; and

- Post-to-pre-development peak flow control for the 2-year through the 100-year return period design storms.

- Limit surface ponding in hardscaped areas to 30 cm.

Drainage areas were delineated, and catchment parameters were determined for inclusion in pre- and post-development hydraulic modelling. The stormwater management design was completed using MIDUSS. Storm parameters were provided by Norfolk County. Storm catchment areas for pre- and post-development conditions are shown in Figures 1 and 2, respectively.

6.2 Existing Stormwater Control Rates

The existing conditions were modeled to determine the peak allowable release rate for post-development conditions. The development area was divided into two catchments, with Catchment 101 representing area that drains west of the berm, and Catchment 102 representing the area that drains east of the berm. Both catchments ultimately drain to the same offsite location northwest of the site.

The pre-development peak runoff rates for the 2-year, 5-year, and 100-year storm events are summarized in Table VI.

Table VI: Pre-Development Peak Flow Rates

Catchment ID	Description	Area (ha)	Percent Impervious	2-year Peak Flow (L/s)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
101	West of Berm	0.58	15%	16	23	57
102	East of Berm	0.65	5%	7	14	57

6.3 Storm Servicing and Stormwater Management Strategy

On-site controls are required in order to match pre-development peak flow rates. The proposed storm sewer has been divided into two separate systems to allow for separate major overland flow routes around the proposed building to maintain existing drainage patterns.

The northern portion of the site will be directed to an infiltration gallery underneath the northeastern parking lot. The system is designed to allow for any overflow to spill over the grate of a ditch-inlet catch basin within a swale. The swale directs the overflow towards the west, north of the proposed building and east of the existing berm, combining with an existing swale west of the existing building, and ultimately allowing it to drain to the northwest of the overall site.

The proposed roof will be designed with flow control drains that that will allow for up to 15 cm of rooftop storage. The MIDUSS model has accounted for six roof drains, but the actual number (maximum six) and locations will be determined by the mechanical engineer. The roof outlet and the courtyard for the site will be directed to an infiltration gallery south of the proposed building. The southern area of the site, which includes some of the parking lot and greenspace, will also be conveyed to this infiltration gallery. The overflow for this infiltration gallery will be through a manhole near the southwestern corner of the site. The outlet pipe from this manhole is a 450-mm-diameter pipe sized to convey the major overflow, that is set at a higher elevation than the infiltration gallery to promote infiltration. Both infiltration galleries for the site are proposed to be ACO STORMBRIXX standard-duty, geo-cellular systems, or an approved equivalent.

The geotechnical report by CVD states that the soil where the infiltration galleries are proposed is primality silty sand to sand and silt. The corresponding infiltration rate for this material is 15 to 30 mm/hr. To be conservative, the lower range of 15 mm/hr and a safety factor of 2.5 was used to design the infiltration galleries. The resulting infiltration rate that was used is 6 mm/hr.

The outlet for the courtyard has been sized to convey the 100-year storm event towards the southern infiltration gallery and is equipped with a backflow preventer to prevent the infiltration gallery from backing up into the courtyard.

The proposed development has been divided into six catchments which were modelled using MIDUSS. These catchments and the peak flow results for the 2-year, 5-year and 100-year storm events are summarized in Table VII and depicted in Figure 2.

Table VII: Post-Development Peak Flow Rates

Catchment ID	Description	Area (ha)	Percent Impervious	2-year Peak Flow (L/s)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
201	Proposed Building	0.32	100%	8	9	12
202	Courtyard	0.05	50%	5	8	15
203	South Parking Lot / Greenspace	0.46	50%	40	59	115
Controlled by Infiltration Gallery		-	-	**0**	**9**	**42**
204	Uncontrolled to West	0.08	10%	2	3	14
Outlet West of Berm		-	-	**2**	**10**	**45**
205	North Parking Lot	0.23	90%	41	58	108
Controlled by Infiltration Gallery		-	-	**0**	**3**	**35**
206	Uncontrolled to East	0.09	5%	3	5	19
Outlet East of Berm		-	-	**3**	**5**	**43**

Proposed stormwater peak flow rates are controlled to a flow rate which is lower than in pre-development conditions for both stormwater outlets.

The infiltration galleries are designed to fully infiltrate the 2-year storm event, and 80% of the 5-year storm event. The overflows for each system are also designed to prevent ponding within the parking lot. Overland flow routes are designed to direct runoff from the parking lot to the overall storm outlets in the emergency event that the storm sewer systems are not operating at full capacity.

A Stormceptor EFO-4 oil-grit separator (OGS) is located prior to the inlets of both infiltration galleries that convey runoff from the parking lot. The other inlets to the southern infiltration gallery can be considered clean water and do not require quality control.

As detailed in the MIDUSS output included in Appendix C, the controlled peak flows have different lag times, thus the peaks of each catchment do not align and the total peak flow calculations towards each outlet is lower than the additive sum obtained from simply adding the flows together. Refer to drawing C3-1 for the proposed servicing strategy for the site.

7.0 SITE GRADING

The grading of the site will respect the existing grades along all property lines. The site will also be graded to comply with Norfolk County standards, as well as the Accessibility for Ontarians with Disabilities Act (AODA).

Grading of the site will allow for major overland flow from the northern portion of the site to drain north of the proposed building and east of the existing berm and follow existing major overland flow drainage patterns. The southern portion of the site is graded to allow for major overland flow to drain west of the proposed building and west of the existing berm, which matches the existing drainage pattern.

No surface ponding is to occur within the parking lot for all storm events through the 100-year event. In the event of an emergency where the storm sewer systems are not operating at full capacity, maximum ponding depth is limited to 25 cm or less in the parking lot.

Refer to Drawing C2-1 for the grading design of the site.

7.1 Compliance with On-Site and Excess Soil Management Provincial Regulations

The MECP regulation O.Reg. 406/19 "On-Site and Excess Soil Management" under the Environmental Protection Act states that the excavation of excess material, and subsequent off-site disposal of excess soils from this site, will require testing and reporting in the MECP's Environmental Activity and Sector Registry (EASR). The Owner and Contractor will be responsible for complying with all of the noted requirements.

8.0 EROSION AND SEDIMENT CONTROL

Any sediment tracked onto the roadway during the course of construction will be cleaned by the Contractor. To help minimize the amount of mud being tracked onto the roadway, a mud mat will be installed at the primary construction access. Additionally, silt fence will be installed around the development limits to eliminate any sediment from leaving the site and will remain in place and be maintained until landscaping has been completed and soil has been vegetated. Silt fence will also be installed around any stockpiles on site, with the stockpiles kept a minimum 2.5 m from the property boundary.

Silt sacs in catchbasins will be installed to prevent silt or sediment-laden water from entering inlets. These will be inspected to ensure that they have been properly installed and function as designed throughout construction.

The controls will be maintained, and accumulated sediments removed once their capture capacity has been decreased by one third. It is proposed that, during construction activities, visual monitoring will be conducted bi-weekly and within 24 hours of any rainfall event of 25 mm or greater. During the construction period, monitoring will consist of visual observation for the effectiveness of the sediment and erosion controls and sediment migration off site. Construction inspections will be conducted until such time as the construction activities are complete, the site has been stabilized and all vegetation has achieved a minimum 70% density.

9.0 CONCLUSIONS

Based on the analysis presented in this report it is concluded that:

- The proposed sanitary service for the site will be a 200-mm-diameter sewer that conveys flows towards the 200-mm-diameter municipal sanitary sewer on Dalton Road. The increase in peaked sanitary demand from existing conditions is 1.60 L/s.
- There is not expected to be sufficient fire flow available for the site from the municipal watermain on Dalton Road. A fire water reservoir will be provided onsite to account for the additional volume required for fire protection.

- Post-development peak flow rates are controlled to pre-development levels for the 2-year through the 100-year storm events through the use of flow control roof drains and infiltration galleries.
- Stormwater quality control is not required for the eastern portion of the site since the post-development peak flow rates are controlled top pre-development levels.
- Two Stormceptor EFO-4 OGS units are proposed to provide stormwater quality control for the site. The units will be installed to treat the runoff from the parking lot prior to entering the infiltration galleries.
- Site grading will allow for major overland flow paths around the proposed building to match existing drainage patterns. The site grading also ensures surface ponding does not exceed 30 cm in hardscaped areas.
- Perimeter silt fence, silt fence at the base of all stockpiles, silt sacs in catchbasins, and construction entrance mud mats can provide erosion and sediment control. These will be included in detailed design in coordination with the proposed construction staging plan.

All of which is respectfully submitted,

WALTERFEDY

Tyler Keller, P.Eng.
Engineer, Civil

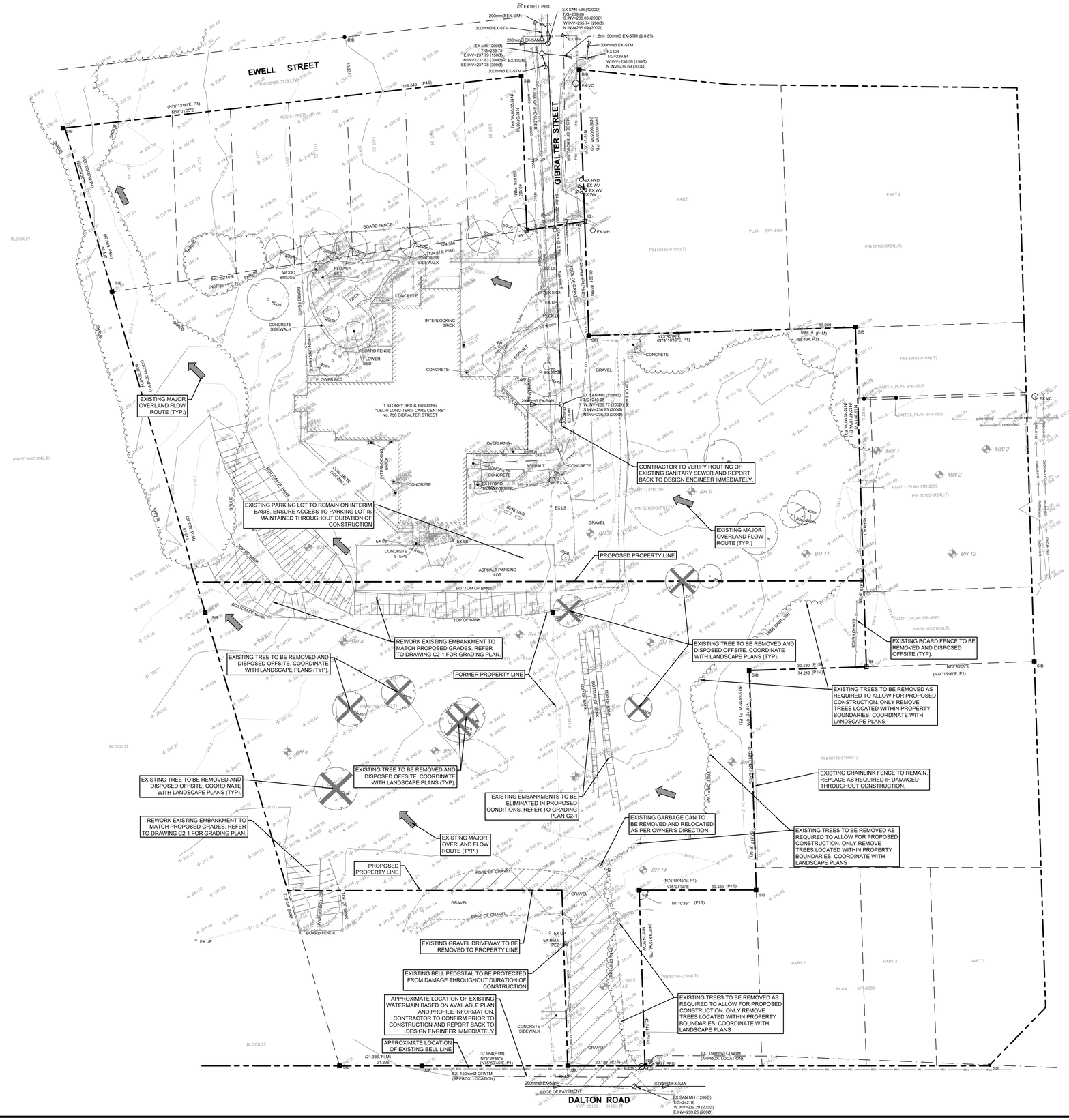
tkeller@walterfedy.com
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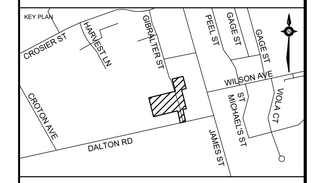
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- EXISTING UNDERGROUND HYDRO LINE
- EXISTING COMMUNICATION LINE
- EXISTING FIBER OPTIC LINE
- EXISTING BOARD FENCE
- EXISTING CHAINLINK FENCE
- EXISTING ASPHALT
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THE KING'S HIGHWAY No. 3 (JAMES STREET)



PROJECT NORTH — TRUE NORTH

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CLIENT

PEOPLECARE INC.

PROJECT

PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

TITLE

EXISTING CONDITIONS AND REMOVALS

WALTERFEDY

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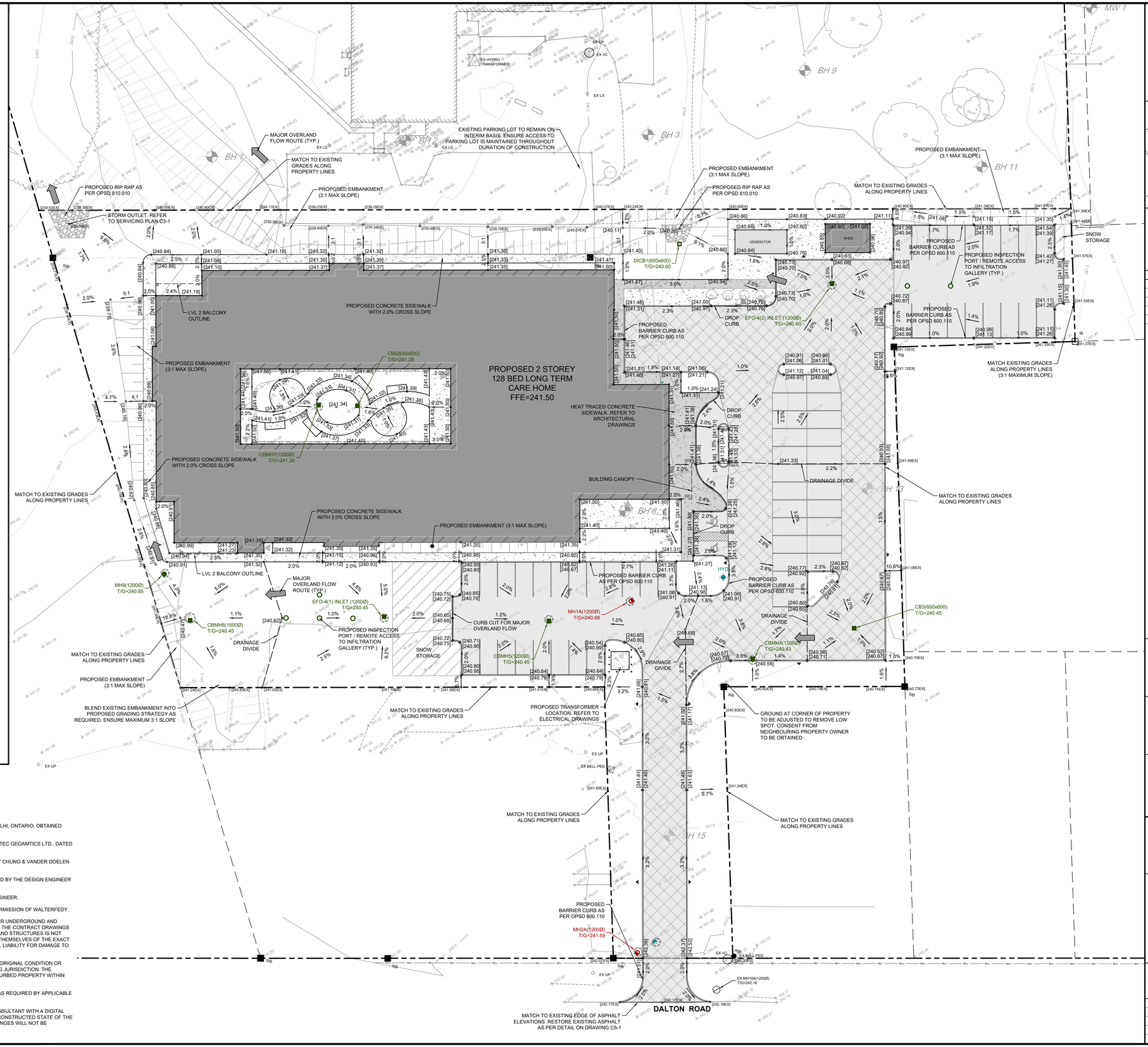
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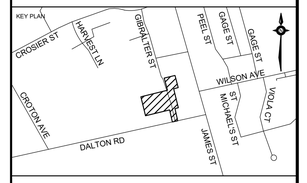
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- CBMH — PROPOSED CATCHBASIN MANHOLE
- MH — PROPOSED STORM MANHOLE
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- HYD — PROPOSED FIRE HYDRANT
- PROPOSED FIRE DEPARTMENT CONNECTION
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- PROPOSED OVERLAND FLOW ROUTE
- PROPOSED EMBANKMENT (3:1 MAX UNLESS OTHERWISE NOTED)
- PROPOSED CURB
- PROPOSED DROP CURB
- PROPOSED BUILDING
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- PROPOSED HEAVY DUTY ASPHALT SURFACE
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PEOPLECARE INC.

PROJECT
PEOPLECARE DELHI
173 DALTON ROAD, DELHI, ON

TITLE
GRADING PLAN

WALTERFEDY
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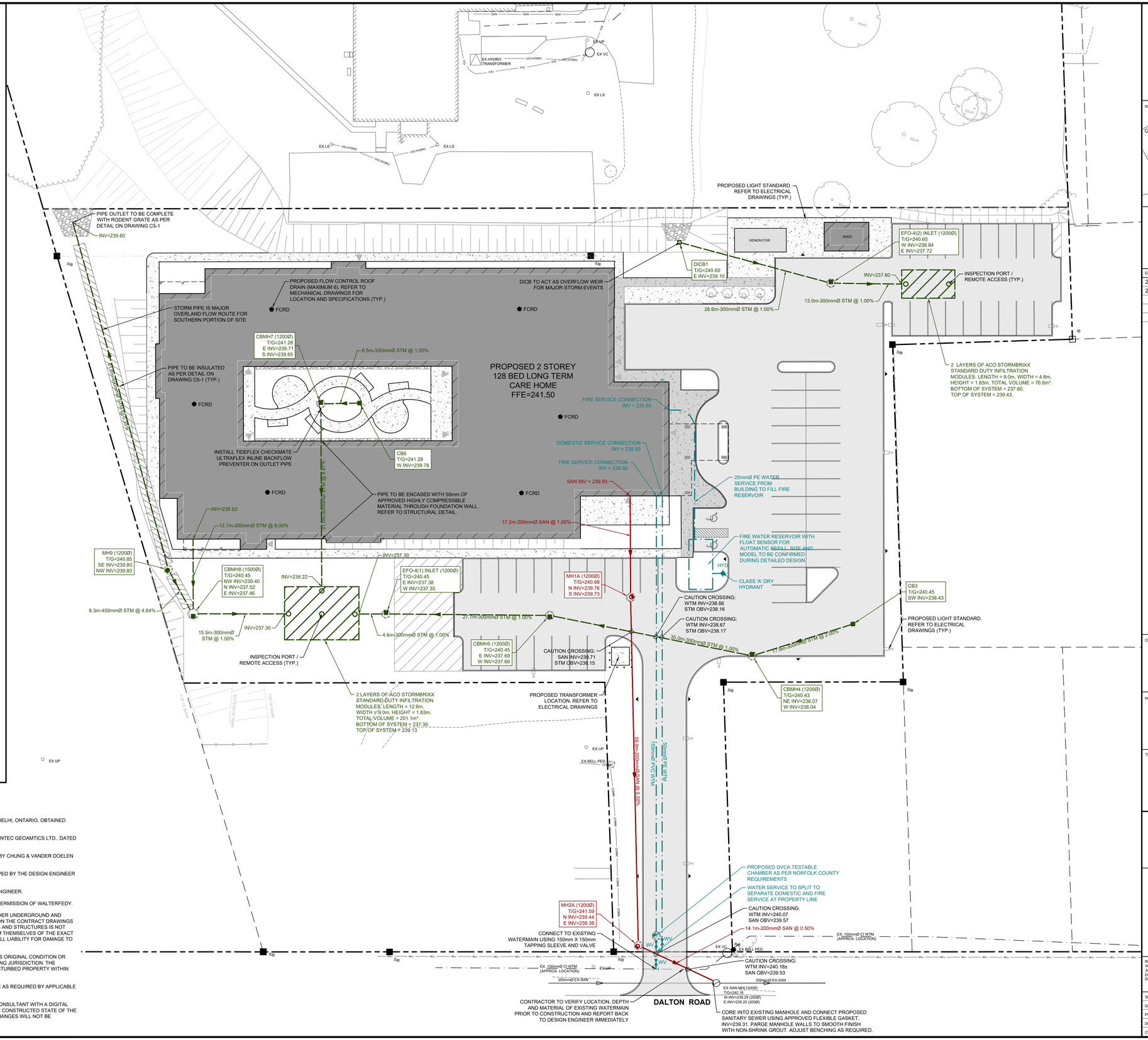
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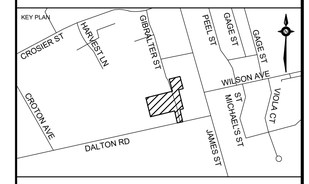
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- EX SAN MH — EXISTING SANITARY MANHOLE
- EX HYD — EXISTING FIRE HYDRANT
- EX WV — EXISTING WATERMAIN VALVE
- EX VC — EXISTING VALVE CHAMBER
- BH / MH — EXISTING BOREHOLE / MONITORING WELL LOCATION
- EXISTING EMBANKMENT
- EXISTING VEGETATION
- EXISTING DECIDUOUS TREE
- 0.2m DIA — EXISTING CONIFEROUS TREE
- EXISTING SHRUB
- EXISTING TREE DRIPLINE AND/OR VEGETATION LINE
- EXISTING SANITARY SERVICE
- EXISTING STORM SERVICE
- EXISTING WATERMAIN
- EXISTING GASMAIN
- EXISTING UNDERGROUND HYDRO LINE
- EXISTING COMMUNICATION LINE
- EXISTING FIBER OPTIC LINE
- EXISTING BOARD FENCE
- EXISTING CHAINLINK FENCE
- EXISTING ASPHALT
- EXISTING CONCRETE
- EXISTING CURB
- EXISTING GRAVEL
- SIGN — PROPOSED SIGN
- PROPOSED LAMP STANDARD
- CB — PROPOSED CATCHBASIN
- DICB — PROPOSED DITCH INLET CATCHBASIN
- CBMH — PROPOSED CATCHBASIN MANHOLE
- MH — PROPOSED STORM MANHOLE
- MH — PROPOSED SANITARY MANHOLE
- HYD — PROPOSED FIRE HYDRANT
- WV — PROPOSED WATERMAIN VALVE
- PROPOSED FIRE DEPARTMENT CONNECTION
- PROPOSED OVERLAND FLOW ROUTE
- PROPOSED EMBANKMENT (3:1 MAX UNLESS OTHERWISE NOTED)
- PROPOSED SANITARY SEWER/SERVICE
- PROPOSED STORM SEWER/SERVICE
- PROPOSED WATERMAIN/SERVICE
- PROPOSED PIPE INSULATION
- PROPOSED CURB
- PROPOSED DROP CURB
- PROPOSED ASPHALT SURFACE
- PROPOSED CONCRETE SURFACE
- PROPOSED HEAT TRACED SIDEWALK

GENERAL NOTES

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PROJECT NORTH

TRUE NORTH

DATE	ISSUANCE	NO.
2023.03.03	25% DRAWING SET	
2023.03.16	ISSUED FOR SITE PLAN APPROVAL	

CLIENT
PEOPLECARE INC.

PROJECT
PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

TITLE
SERVICING PLAN

WALTERFEDY
KITCHENER | HAMILTON | TORONTO
800.685.1378 walterfedy.com

LICENSED PROFESSIONAL ENGINEER
T. B. KELLER
100529026
2023.03.16
PROVINCE OF ONTARIO

REPRODUCTION OR DISTRIBUTION FOR PURPOSES OTHER THAN AUTHORIZED BY WALTERFEDY IS FORBIDDEN. CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND REPORT ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON DRAWINGS TO WALTERFEDY. DO NOT SCALE THIS DRAWING.
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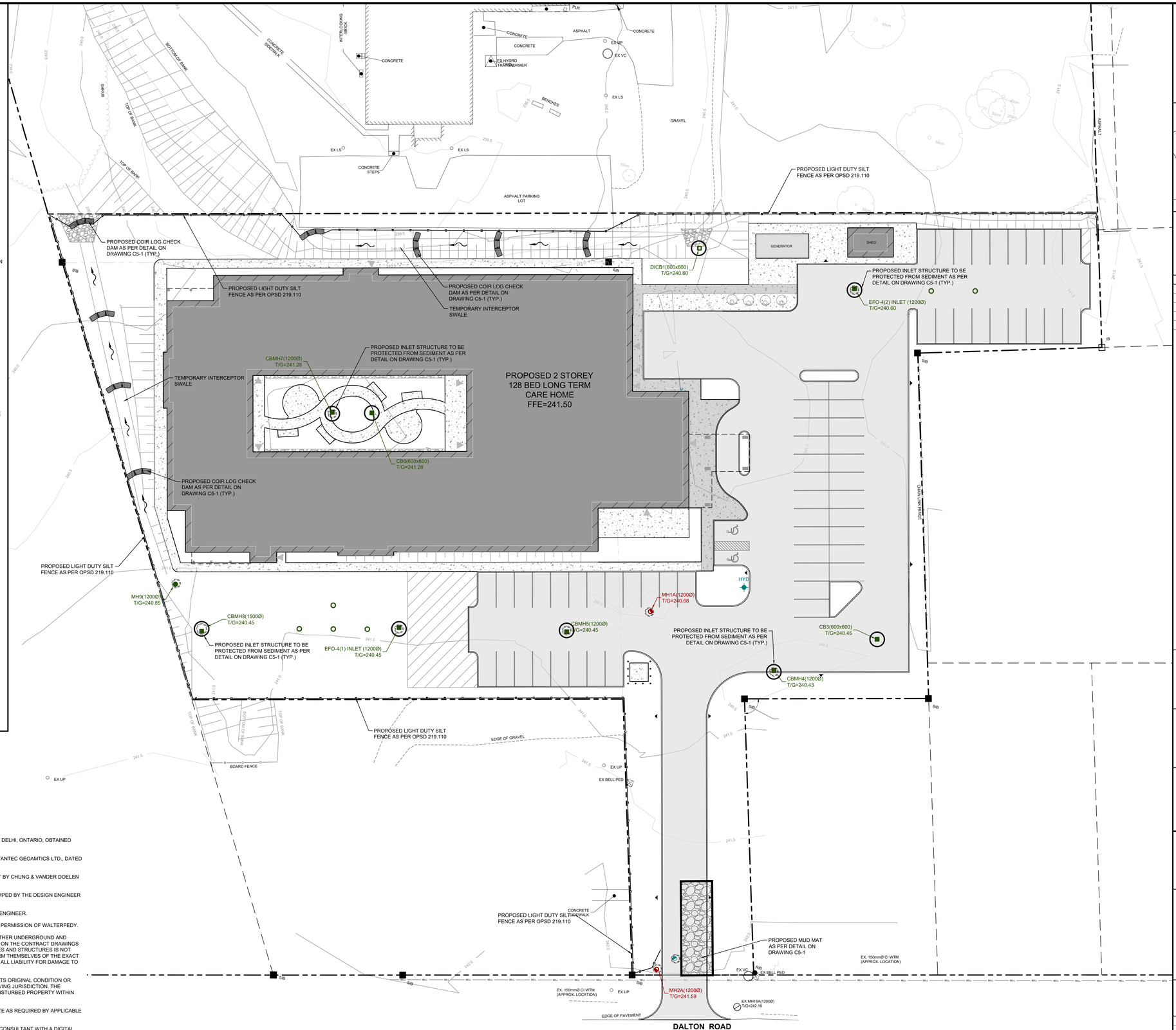
SCALE:	1:300
DATE:	2023-03-14
PROJECT NO:	2022-0672-11
DRAWN BY:	CC
CHECKED BY:	TK

SHEET NO.:
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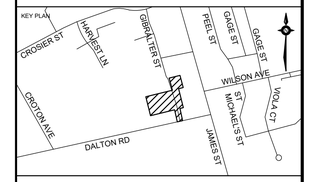
LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING BUILDING
- IB — IRON BAR
- SIB — STANDARD IRON BAR
- RIB — ROUND IRON BAR
- EX LS — EXISTING LAMP STANDARD
- EX UP — EXISTING UTILITY POLE
- EX HP — EXISTING HYDRO POLE
- EXISTING GUY WIRE
- EX SIGN — EXISTING SIGN
- EX BELL MH — EXISTING BELL MANHOLE
- EX BELL PED — EXISTING BELL PEDESTAL
- EX HYDRO TRANSFORMER — EXISTING HYDRO TRANSFORMER
- EX GV — EXISTING GAS VALVE
- EX CB — EXISTING CATCHBASIN
- EX MH — EXISTING STORM MANHOLE
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- EX WV — EXISTING WATERMAIN VALVE
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- BH / MH — EXISTING BOREHOLE / MONITORING WELL LOCATION
- +ELEV — EXISTING SPOT ELEVATION
- 325.0 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING EMBANKMENT
- EXISTING VEGETATION
- EXISTING DECIDUOUS TREE (0.2m DIA)
- EXISTING CONIFEROUS TREE
- EXISTING SHRUB
- EXISTING TREE DRIPLINE AND/OR VEGETATION LINE
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- PROPOSED OVERLAND FLOW ROUTE
- PROPOSED EMBANKMENT (3:1 MAX UNLESS OTHERWISE NOTED)
- PROPOSED CURB
- PROPOSED DROP CURB
- PROPOSED BUILDING
- LIGHT DUTY SILT FENCE
- EXISTING CATCHBASIN TO BE PROTECTED
- PROPOSED CATCHBASIN TO BE PROTECTED
- ACCESS ROAD CONSTRUCTION



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PROJECT NORTH

TRUE NORTH

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2023.03.16	ISSUED FOR SITE PLAN APPROVAL	

CLIENT
PEOPLECARE INC.

PROJECT
PEOPLECARE DELHI

173 DALTON ROAD, DELHI, ON

TITLE
EROSION AND SEDIMENT CONTROL PLAN

WALTERFEDY
KITCHENER | HAMILTON | TORONTO
800.685.1378 walterfedy.com

LICENSED PROFESSIONAL ENGINEER
T. B. KELLER
100529026
2023.03.16
PROVINCE OF ONTARIO

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SCALE:	1:300
DATE:	2023-02-16
PROJECT NO.:	2022-0672-11
DRAWN BY:	CC
CHECKED BY:	TK

SHEET NO.:
C4-1

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EROSION CONTROL NOTES

1. ALL EROSION CONTROL FENCING, TEMPORARY FILTRATION, MUD MATS MUST BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY THE CONSULTANT PRIOR TO COMMENCEMENT OF ANY AREA GRADING, EXCAVATING, OR DEMOLITION. CONTRACTOR TO NOTIFY CONSULTANT FOR INSPECTION.
2. ATTACH EROSION CONTROL FENCE TO EXISTING FENCE WITHIN THE LIMITS OF THE SITE WHERE POSSIBLE.
3. EROSION CONTROL FENCING TO BE PLACED AROUND THE BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT A MINIMUM OF 2.5m FROM PROPERTY LINES.
4. FILTER FABRIC TO BE TERRAFIX 270R OR APPROVED EQUIVALENT.
5. MUD MATS TO BE PROVIDED ON SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. MUD MATS SHALL BE SUPPLIED AS INSTALLED AS PER THE DETAIL ON THIS SHEET. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE ITS EFFECTIVENESS AT ALL TIMES.
6. ALL DITCH INLET CATCHBASINS, CATCHBASINS AND CATCHBASIN MANHOLES TO HAVE TEMPORARY FILTRATION INSTALLED AND MAINTAINED AS PER THE DETAIL ON THIS SHEET.
7. NO ALTERNATE METHODS OF EROSION CONTROL PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY WALTERFEDY AND THE AUTHORITY HAVING JURISDICTION.
8. ALL EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RE-STABILIZED EITHER BY PAVING OR RESTORATION WITH VEGETATIVE GROUND COVER.
9. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING SEDIMENTS FROM THE PUBLIC ROADWAY AND SIDEWALKS AT THE END OF EACH WORK DAY OR AS DIRECTED BY THE CONSULTANT.
10. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED BY THE CONTRACTOR AFTER MAJOR RAINFALL EVENTS AND CLEANED OR REPLACED AS REQUIRED TO MEET THEIR INTENDED FUNCTION. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF ONE THIRD (1/3) THE STRUCTURE CAPACITY.
11. WALTERFEDY SHALL MONITOR SITE DEVELOPMENT TO ENSURE ALL EROSION CONTROLS ARE INSTALLED AND MAINTAINED TO NORFOLK COUNTY REQUIREMENTS. CONTRACTOR TO COMPLY WITH WALTEREDY'S INSTRUCTIONS TO INSTALL, MODIFY, OR MAINTAIN EROSION CONTROL WORKS.
12. THIS PLAN TO BE READ IN CONJUNCTION WITH THE EXISTING CONDITIONS PLAN, SITE SERVICING PLAN, GRADING PLAN, LANDSCAPING PLAN, AND THE STORM WATER MANAGEMENT REPORT DATED MARCH 2023.

GRADING NOTES

1. MATCH EXISTING GRADES AT ALL PROPERTY LINES AND/OR LIMITS OF CONSTRUCTION EXCEPT WHERE PROPOSED GRADES ARE NOTED.
2. MANAGEMENT OF EXCESS MATERIALS SHALL BE IN ACCORDANCE WITH OPSS 180. ENVIRONMENTALLY IMPACTED SOILS, WHERE AND WHEN ENCOUNTERED, SHALL BE MANAGED ON SITE AS REQUIRED UNTIL SUCH TIME THAT LABORATORY TESTING RESULTS HAVE CONFIRMED THE NATURE OF THE IMPACTS AND A SUITABLE DISPOSAL METHOD.
3. SURPLUS MATERIAL OF ALL TYPES NOT REQUIRED FOR BACKFILL, GRADING OR LANDSCAPING SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM THE SITE AS DIRECTED BY THE CONSULTANT. THE COSTS OF ALL OFFSITE DISPOSAL SHALL BE BORNE BY THE CONTRACTOR UNLESS A SPECIFIC PROVISION IS MADE IN THE CONTRACT DOCUMENTS FOR PAYMENT FROM DISPOSAL OF A SPECIFIC SURPLUS MATERIAL.
4. MATERIALS TO BE REMOVED SHALL BE NEATLY SAW-CUT ALONG ITS LIMITS, IN ADVANCE OF THE REMOVAL. THE LIMITS OF REMOVAL SHALL BE AS NOTED ON THE PLANS UNLESS AN EXTENSION OR REDUCTION OF THE MATERIAL TO BE REMOVED IS APPROVED IN ADVANCE BY THE WALTERFEDY. AS SUCH, THE COSTS OF ANY OVER-EXCAVATION NOT APPROVED IN ADVANCE SHALL BE THE FINANCIAL RESPONSIBILITY OF THE CONTRACTOR. THIS RESPONSIBILITY SHALL ALSO EXTEND TO RESTORATION OR REPLACEMENT OF DISTURBED FEATURES AND SURFACES DUE TO UNAUTHORIZED EXCAVATION.
5. ALL FILL PLACED ON SITE SHALL BE COMPACTED TO A MINIMUM 95% SPMDD (UNLESS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL ENGINEER OR ON THE DRAWINGS AND IN THE SPECIFICATIONS). ALL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm LIFTS EXCEPT WHERE UNDER PAVING, AND WALKS WHEN LAYERS SHALL BE 150mm MAX.
6. MAXIMUM SLOPE IN GRASSED AREAS TO BE 3:1. SLOPES GREATER THAN 3:1 TO BE LANDSCAPED WITH LOW MAINTENANCE GROUND COVER. MINIMUM SLOPE IN GRASSED AREAS TO BE 1%. GRASS SWALES WITH A SLOPE LESS THAN 1% TO BE UNDERLAIN WITH A FRENCH DRAIN.
7. FINISH GRADE AT FOUNDATION WALLS TO BE MINIMUM 150mm BELOW THE TOP OF FOUNDATION WALL/BRICK LINE UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
8. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE ON ALL SURFACES TO THE APPROPRIATE OUTLET STRUCTURE. AREAS OF PONDING CAUSED BY CONSTRUCTION ERROR WILL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF WALTERFEDY AT THE CONTRACTORS EXPENSE.
9. SHOULD THE NATURE OF THE SOIL AT THE DEPTH INDICATED PROVE UNSATISFACTORY AS DETERMINED BY THE GEOTECHNICAL ENGINEER, THE EXCAVATION SHALL BE CARRIED DOWN TO SUCH A DEEPER LEVEL AS THE GEOTECHNICAL ENGINEER MAY REQUIRE UNTIL A SATISFACTORY BEARING STRATUM IS REACHED.
   - 9.1. THIS CONTRACTOR SHALL BE PAID THE COST OF SUCH EXTRA EXCAVATION AT THE UNIT PRICE ESTABLISHED IN THE CONTRACT.
   - 9.2. ALL EXTRA DEPTHS OF EXCAVATION AND FILLING MUST HAVE THEIR AREA AND VOLUME DOCUMENTED BY AN INDEPENDENT INSPECTION AND TESTING COMPANY OR WALTERFEDY TO QUALIFY FOR PAYMENT.
   - 9.3. QUANTITIES USED FOR PAYMENT OF EXCAVATION AND FILLING AT EXTRA DEPTHS TO BE DETERMINED BY WALTERFEDY.

GENERAL SERVICING

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE REGULATIONS SET OUT BY THE MUNICIPALITY HAVING JURISDICTION.
2. RIGID PIPE BEDDING: CLASS 'B' AS PER OPSD 802.030 (EARTH EXCAVATION, TYPE 1 OR 2 SOIL), OPSD 802.031 (EARTH EXCAVATION, TYPE 3 SOIL), OPSD 802.032 (EARTH EXCAVATION, TYPE 4 SOIL)
3. FLEXIBLE PIPE BEDDING: AS PER OPSD 802.010 (EARTH) AND OPSD 802.014 (IN EMBANKMENT).
4. NATIVE FILL MATERIAL SHALL BE DEPOSITED IN THE TRENCH, FOR THE FULL WIDTH OF THE TRENCH, COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY IN LAYERS NOT OVER 300mm DEPTH, EXCEPT WHERE UNDER PAVING, AND WALKS WHEN LAYERS SHALL BE 150mm MAX.
5. SITE SERVICING CONTRACTOR TO TERMINATE ALL SERVICES 1.0m FROM FOUNDATION WALL AND COORDINATE WITH THE GENERAL OR MECHANICAL CONTRACTOR AS REQUIRED TO FACILITATE THE CONNECTION.
6. WHEN BELL AND SPIGOT PIPE IS LAID, THE BELL END OF THE PIPE SHALL BE LAID UPGRADE.
7. PIPE SHALL BE KEPT CLEAN AND DRY AS WORK PROGRESSES. THE TRENCH SHALL BE KEPT DRY.
8. A REMOVABLE WATERTIGHT BULKHEAD SHALL BE INSTALLED DAILY AT THE OPEN END OF THE LAST PIPE LAID.
9. PIPE SHALL NOT BE LAID UNTIL THE PRECEDING PIPE JOINT HAS BEEN COMPLETED AND THE PIPE IS BEDDED AND SECURED IN PLACE.
10. ALL PIPE ENDS SHALL BE THOROUGHLY CLEANED PRIOR TO THE INSTALLATION OF GASKETS. ALL GASKETS TO BE LUBRICATED PRIOR TO BEING INSTALLED OR AS RECOMMENDED BY THE PIPE MANUFACTURER.
11. A TEMPORARY LOCATION MARKER 50x75mm SHALL BE PLACED AT THE END OF ALL CAPPED SERVICE CONNECTIONS. THE MARKER SHALL BE PLACED 300mm ABOVE THE PLUGGED END OF THE SERVICE PIPE, CUT AT LEAST 500mm ABOVE THE FINISHED GRADE, AND MARKED WITH BRIGHT PAINT.
12. ALL MANHOLES, BASINS, CHAMBERS ETC. TO BE INSTALLED LEVEL AND PLUMB TO THE SATISFACTION OF WALTERFEDY.

STORM AND SANITARY SEWER

1. POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS: SMOOTH PROFILES, TO OPSS 1841 AND CSA B182.2, WITH SEPARATE GASKET AND INTEGRAL BELL SYSTEM, IN 6.0m NOMINAL LENGTHS AS FOLLOWS:
   - 1.1. 100-150mm OD: SDR28 PVC, WITH 625 kPa STIFFNESS.
   - 1.2. 200mm OD AND LARGER: SDR35 PVC WITH 320 kPa STIFFNESS.
2. SUBSURFACE DRAINAGE PIPE AND FITTINGS: TO OPSS 405, PERFORATED PVC PIPE TO OPSS 1841 OR PE PIPE TO OPSS.MUNI 1840, TO CAN/CSA-B182.1; COMPLETE WITH KNITTED SOCK GEOTEXTILE AS REQUIRED (TERRAFIX 270R OR EQUIVALENT).
3. CORRUGATED STEEL PIPE (CSP): TO OPSS 1801 AND CSA G401, COMPLETE WITH COUPLINGS, NEOPRENE GASKETS, BENDS AND OTHER FITTINGS; JOINTING TO BE 2-PIECE BAND WITH ANGLES COMPLETE WITH NEOPRENE GASKETS FOR NON-PERFORATED PIPE.
4. MANHOLES AND CATCHBASIN MANHOLES TO BE PRECAST 1200mm DIAMETER WITH ALUMINUM STEPS AT 300mm SPACING AS PER OPSD 701.010 UNLESS SPECIFIED OTHERWISE.
5. CATCHBASINS TO BE 600mm SQUARE PRECAST AS PER OPSD 705.010. DOUBLE CATCHBASINS TO BE 600x1450mm PRECAST AS PER OPSD 705.020.
6. CATCHBASIN MANHOLES, CATCHBASINS, AND DOUBLE CATCHBASINS TO HAVE A MINIMUM 600mm DEEP SUMP.
7. MANHOLE AND CATCHBASIN, FRAMES, GRATES, CASTINGS, LIDS TO BE AS PER OPSS 1850.
8. CAST IRON FRAMES AND COVERS OR GRATES- STORM SEWERS: TO OPSS 1850 AND OPSD 400.110, OPSD 401.010 (B, OPEN).
9. CAST IRON FRAMES AND COVERS OR GRATES - SANITARY SEWERS: TO OPSS 1850, OPSD 401.010 (A, CLOSED).
10. ALL SANITARY MANHOLES LOCATED IN STORM WATER PONDING AREAS TO HAVE WATERTIGHT FRAME AND COVERS AS PER OPSD 401.030
11. STORM SEWERS AND SERVICES TO HAVE MINIMUM 1.2m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEWER PIPE IN ACCORDANCE WITH APPLICABLE 'SEWER PIPE INSULATION DETAIL' INDICATED IN DRAWING DETAILS.
12. SANITARY SEWERS AND SERVICES TO HAVE A MINIMUM 1.5m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEWER PIPE IN ACCORDANCE WITH APPLICABLE 'SEWER PIPE INSULATION DETAIL' INDICATED IN DRAWING DETAILS.
13. ALL PIPES, TO BE INSTALLED FLUSH WITH THE INSIDE WALLS OF THE STRUCTURE AND PARGED TO A SMOOTH FINISH.
14. ALL MANHOLES TO BE PRE-BENCHED OR BENCHED WITH 30MPa CONCRETE AS PER OPSD 701.021. BENCHING SHALL EXTEND TO THE SPRING LINE OF LARGEST PIPE IN THE MANHOLE AND SHALL HAVE A SLOPE OF 1:8.
15. CONTRACTOR TO SUPPLY AND PAY FOR CCTV INSPECTION OF ALL SEWER LINES AND STRUCTURES.
16. ACCEPTANCE OF SEWER LINES AND STRUCTURES SHALL BE MADE AFTER THE CONSULTANT HAS REVIEWED THE CCTV DOCUMENTATION AND VIDEOS, AND EXPRESSED IN WRITING THAT THE SEWER LINES AND STRUCTURES ARE ACCEPTABLE.
17. IF CCTV INSPECTIONS SHOW ADDITIONAL CLEANING IS REQUIRED, CLEAN AND RE-INSPECT THE SEWER UNTIL ACCEPTED BY THE CONSULTANT.
18. A MINIMUM OF ONE (1) AND MAXIMUM OF THREE (3) ADJUSTMENT UNITS SHALL BE INSTALLED ON EACH STRUCTURE TO A MINIMUM HEIGHT OF 75mm AND MAXIMUM OF 300mm. THE FIRST ADJUSTMENT UNIT SHALL BE LAID IN A FULL BED OF MORTAR AND ALIGNED WITH THE OPENING IN THE STRUCTURE. SUCCESSIVE ADJUSTMENT UNITS SHALL BE LAID PLUMB TO THE FIRST ADJUSTMENT UNIT AND SEALED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. FRAMES WITH GRATES OR COVERS SHALL BE SET IN A FULL BED OF MORTAR ON THE ADJUSTMENT UNITS AND SUPPORTED USING SHIMS. ROCKS, STONES AND DEBRIS WILL NOT BE PERMITTED FOR USE AS SHIMS.

WATERMAINS

1. POLYVINYL CHLORIDE (PVC) PIPE: MANUFACTURED TO CAST IRON OD (CIOD); COLOUR CODED BLUE, WITH INTEGRAL WALL THICKENED BELL DESIGNED FOR JOINT ASSEMBLY USING AN ELASTOMERIC GASKET CONFORMING TO ASTM D3139 AND CSA B137.3., TO CSA B137.3, COMPLETE WITH TRACER WIRE.
   - 1.1. 100 TO 300mm: TO AWWA C900, DR 18, IPEX OR APPROVED EQUAL.
2. MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PIPE: MANUFACTURED TO CIOD; COLOUR CODED BLUE, BIAXIALLY ORIENTED, WITH INTEGRAL WALL THICKENED BELL DESIGNED FOR JOINT ASSEMBLY USING AN ELASTOMERIC GASKET CONFORMING TO ASTM D3139 AND CSA B137.3.1, COMPLETE WITH TRACER WIRE.
   - 2.1. 100 TO 300mm: TO AWWA C909, PC 1620 kPa, BIONAX OR APPROVED EQUAL.
3. ALL WATER SERVICING TO HAVE MINIMUM 1.7m COVER.
4. ALL WATER SERVICING PROVIDING FIRE FLOWS MUST BE PRESSURE TESTED TO 200 PSI AS PER THE OBC PLUMBING CODE.
5. FITTINGS: FOR POLYVINYL CHLORIDE (PVC) AND MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PIPE SHALL BE EITHER:
   - 5.1. GRAY IRON ACCORDING TO AWWA C110/A21.10.
   - 5.2. DUCTILE IRON ACCORDING TO C110/A21.10 OR AWWA C153 AND SHALL BE CEMENT LINED ACCORDING TO AWWA C104/A21.4.
   - 5.3. INJECTION MOULDED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORDING TO AWWA C907 AND CSA B137.2.
   - 5.4. PREFABRICATED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORDING TO AWWA C905 AND CSA B137.3.
6. JOINT RESTRAINTS:
   - 6.1. FOR PVC PIPE AND FITTINGS: TO ASTM F1674 AND AWWA C111, SERRATED RING TYPE; FOR PUSH ON JOINTS UNIFLANGE (SERIES 1300, 1350 & 1360), EBAA (SERIES 1600, 2500 & 2800) OR CLOW (SERIES 300 & 350); OR WEDGE ACTION TYPE AS MANUFACTURED BY EBAA (SERIES 2000PV), OR UNIFLANGE (SERIES 1500) AND STAR STARGRIP 4000, 4100P.
   - 6.2. FOR PVCO PIPE (AWWA C909) AND FITTINGS: SERRATED RING TYPE; FOR PUSH ON JOINTS UNIFLANGE (SERIES 1360), EBAA (SERIES 2500); WEDGE ACTION TYPE AS MANUFACTURED BY CLOW (SERIES 2000 TUF GRIP), STAR (STARGRIP 3500).
   - 6.3. ALL MECHANICAL JOINTS IN TEMPORARY AND PERMANENT CONNECTIONS TO INCLUDE MECHANICAL JOINT RESTRAINTS.
   - 6.4. WATERMAIN FITTINGS WHICH CHANGE DIRECTIONS VERTICALLY OR HORIZONTALLY TO BE FULLY RESTRAINED BY MECHANICAL JOINT RESTRAINT OR THRUST BLOCKS (OPSD 1103.01 AND 1103.02). THREADED ROD WILL NOT BE PERMITTED.
   - 6.5. WATERMAIN FITTINGS TO BE SUPPLIED WITH MECHANICAL JOINT RESTRAINTS. FOR WATERMAIN PIPE SIZES 150mmØ OR LESS ALL PIPE JOINTS TO BE RESTRAINED WITHIN 5.0m FROM ALL FITTINGS, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTRACT DRAWINGS. FOR WATERMAIN PIPE SIZES GREATER THAN 150mmØ ALL PIPE JOINTS TO BE RESTRAINED WITHIN 10.0m FROM ALL FITTING, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTRACT DRAWINGS. ALL TEES TO HAVE MINIMUM 2.0m SOLID PIPE LENGTH ON EACH RUN OF THE TEE, OR PROVIDE A THRUST BLOCK PER OPSD 1103.010.
7. TRACER WIRE:
   - 7.1. T.W.U. #10 GAUGE STRANDED AND INSULATED COPPER WIRE WITH 60mm OF BLACK, CROSS-LINKED POLYETHYLENE (XLPE) INSULATION.
   - 7.2. PVC WATERMAIN SHALL HAVE TRACER WIRE STRAPPED TO TOP AT 5.0m INTERVALS. TRACER WIRE SHALL BE BROUGHT TO THE SURFACE AT ALL HYDRANTS AND CONNECTED TO THE LOWER FLANGE OF THE HYDRANT.
   - 7.3. DO NOT CONNECT THE TRACER WIRE ON NON-METALLIC SYSTEMS TO NEW OR EXISTING METALLIC WATERMAIN PIPING AND/OR ASSOCIATED FITTINGS.
8. WATERMAIN VALVES, 100mm AND LARGER, SHALL BE AS PER AWWA C509-MUELLER A2360-23 OR APPROVED EQUIVALENT (OPEN LEFT) INCLUDING VALVE BOX AND 2.3kg ANODE.
9. HYDRANTS: CONFORM TO AWWA C502 FOR DRY-BARREL HYDRANTS, WITH TWO 63.5mm HOSE NOZZLES AT 180 DEGREES AND A 114.3mm PUMPER NOZZLE WITH A 100mm ULC APPROVED STORTZ CONNECTION; 32mm SQUARE OPERATING NUT, OPEN COUNTER-CLOCKWISE AND HAVE MECHANICAL JOINT END; COMPLETE WITH 150mm LEAD, 150mm GATE VALVE, ANCHOR TEE, VALVE AND BOX PROVIDED IN ACCORDANCE WITH NORFOLK COUNTY.
10. SERVICE PIPE:
    - 10.1. SERVICES LESS THAN 100mm: TYPE K SOFT COPPER, TO ASTM B88 OR POLYETHYLENE TO CSA B137.1 WITH INSERTS (STIFFENER) USED AT CONNECTIONS. COPPER SERVICE SHALL HAVE 5.5Kg ANODE.
    - 10.2. SERVICES 100mm OR GREATER: PVC CLASS 150 TO CSA B137.3.
11. ANODES TO BE PROVIDED AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
12. CHAMBERS FOR VALVES AND METERS TO BE PROVIDED IN ACCORDANCE WITH OPSS 407 AND 408.
    - 12.1. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR CHAMBER AND METER ASSEMBLY TO THE CONSULTANT FOR REVIEW.
    - 12.2. COMPLETE WITH FACTORY INSTALLED GALVANIZED OR ALUMINUM MANHOLE LADDER RUNGS.
    - 12.3. PROVIDE AND INSTALL ACCESS HATCH FRAME AND COVERS TO OPSD 402.030 AND NORFOLK COUNTY REQUIREMENTS. ACCESS HATCH SHALL BE LOCKABLE.
13. PETROLATUM TAPE SYSTEMS: TO BE COMPRISED OF THREE COMPONENTS; PASTE, MASTIC, AND TAPE THAT MEET AWWA C217-09, SUPPLIED BY DENSO NORTH AMERICA INC. OR PETRO COATING SYSTEMS LTD. OR RUSTROL SYSTEMS (INTERPROVINCIAL CORROSION CONTROL COMPANY LTD.). ONLY MATERIAL FROM SUPPLIERS LISTED SHALL BE USED. AT NO TIME SHALL MATERIALS FROM EITHER SYSTEM BE UTILISED WITH ONE AND OTHER.
    - 13.1. ALL MECHANICAL JOINT RESTRAINTS TO BE WRAPPED WITH APPROVED PETROLEUM TAPE SYSTEM.
14. PROVIDE ADEQUATE SUMP BELOW CONNECTION, AND PUMPING IF REQUIRED, TO PREVENT CONTAMINATION OF NEW WATERMAIN WITH TRENCH GROUND WATER OR ANY OTHER FOREIGN MATTER.
15. ALL WATERMAIN AND SERVICE COMMISSIONING, PRESSURE/LEAKAGE TESTING, DISINFECTION, BACTERIOLOGICAL ANALYSIS AND FLUSHING TO BE SUCCESSFULLY COMPLETED BY THE CONTRACTOR AND ACCEPTED BY NORFOLK COUNTY AND WALTERFEDY PRIOR TO PERMANENT CONNECTION TO WATER DISTRIBUTION SYSTEM. REFER TO CONTRACT SPECIFICATIONS FOR REQUIREMENTS.
    - 15.1. CONTRACTOR TO SUBMIT A WATERMAIN COMMISSIONING PLAN TO NORFOLK COUNTY AND WALTERFEDY AT LEAST 48 HOURS PRIOR TO CHLORINE RESIDUAL & BACTERIOLOGICAL TESTING.

CONSTRUCTION NOTES

GENERAL

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST:
   - 1.1. CHECK AND VERIFY ALL DIMENSIONS AND EXISTING ELEVATIONS WHICH INCLUDES, BUT IS NOT LIMITED TO, THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS.
   - 1.2. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.
   - 1.3. VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND EXISTING FLOOR ELEVATIONS (WHICH MAY APPEAR ON THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.
   - 1.4. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.
   - 1.5. REPORT DISCREPANCIES IN EXISTING CONDITION INFORMATION IMMEDIATELY TO THE CONSULTANT.
2. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR DAMAGE TO EXISTING WORKS. DAMAGE SHALL BE RECTIFIED TO THE SATISFACTION OF WALTERFEDY AND THE OWNER.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY SUPPORT AND/OR RELOCATION OF EXISTING UTILITIES DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE AND COMPLY WITH THE REQUIREMENTS OF ALL UTILITY COMPANIES WHEN CROSSING OR WORKING NEAR THEIR PLANT.
4. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL TEMPORARY BENCHMARKS ESTABLISHED FOR DESIGN PURPOSES, PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE COMMENCING WORK.
5. THE CONTRACTOR SHALL CONTACT THE CONSULTANT 48 HOURS PRIOR TO COMMENCING WORK TO DETERMINE THE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION.
6. THE RIGHT-OF-WAY (INCLUDING THE BOULEVARD) IS NOT TO BE USED FOR ANY CONSTRUCTION ACTIVITY UNTIL A WORK PERMIT, ROAD ENTRANCE PERMIT, ETC HAS BEEN OBTAINED AS PER THE TOWNSHIP OF DELHI, REGIONAL MUNICIPALITY OF HALDIMAND-NORFOLK REQUIREMENTS.
7. ALL WORK ON THE MUNICIPAL RIGHT-OF-WAY WILL BE INSTALLED BY THE SITE CONTRACTOR UPON SUCCESSFUL APPLICATION FOR A WORK PERMIT BY THE OWNER.
8. LIMIT CONSTRUCTION TO ACCEPTABLE TIMES WITHIN THE NORFOLK COUNTY NOISE BYLAW. CONSTRUCTION HOURS ARE 7AM TO 9PM MONDAY TO SATURDAY WITHOUT EXCEPTION.
9. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR THEIR REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, THEY MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO THE NORFOLK COUNTY ENGINEERING DEVELOPMENT DIVISION, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNER'S & CONTRACTOR'S OWN RISK.

TRAFFIC, ACCESS, SAFETY

1. PEDESTRIANS MUST BE ASSURED SAFE PASSAGE ALONG DALTON ROAD AT ALL TIMES. ALL PEDESTRIAN WALKWAYS MUST BE MAINTAINED AS LONG AS POSSIBLE AFTER WHICH TIME IT IS TEMPORARILY REPLACED BY A SUITABLE GRANULAR MATERIAL TO THE SATISFACTION OF WALTERFEDY AND/OR NORFOLK COUNTY.
2. ON STREET PARKING WILL NOT BE PERMITTED FOR ANY CONSTRUCTION VEHICLES OR CONSTRUCTION STAFF. THE CONTRACTOR SHALL PROVIDE ADEQUATE PARKING FACILITIES ON SITE TO SUIT THE NATURE AND LOCATION OF THE WORK.
3. FOR EMERGENCY RESPONSE, CONTRACTOR MUST MAINTAIN CONSTRUCTION ACCESS FREE AND CLEAR OF DEBRIS, MATERIALS, VEHICLES, AND EQUIPMENT.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF NORFOLK COUNTY AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

REMOVALS

1. ALL REMOVALS TO BE IN ACCORDANCE WITH OPSS.MUNI 510.

ASPHALT

1. ASPHALT MATERIAL TO BE PROVIDED AS PER OPSS 1150 AND INSTALLED AS PER OPSS 310.
2. WHERE NEW ASPHALT ABUTS EXISTING ASPHALT, EXISTING ASPHALT SHALL BE SAW CUT AND HAVE TACK COAT APPLIED AS PER OPSS 308 TO A CLEAN DRY FACE BEFORE NEW ASPHALT IS PLACED.
3. SUBMIT ONE COPY OF THE PROPOSED ASPHALT MIX DESIGN FOR ANY PAVING MATERIALS DIRECTLY TO THE CONSULTANT A MINIMUM OF TWO WEEKS IN ADVANCE OF SCHEDULED ASPHALT PAVING.

CONCRETE

1. CONCRETE BARRIER CURB TO BE AS PER OPSD 600.110, - 32MPa @ 28 DAYS CONCRETE TO OPSS 353, 7±1.5% AIR ENTRAINMENT, 19mm MAX COURSE AGGREGATE, 60mm MAX SLUMP.
2. CONCRETE SIDEWALK TO BE AS PER DETAIL ON SHEET C5-1 32MPa @ 28 DAYS CONCRETE TO OPSS 351, 7±1.5% AIR ENTRAINMENT, 19mm MAX COURSE AGGREGATE, 70±20mm SLUMP.
3. UNSHRINKABLE FILL: TO OPSS 1359, 28-DAY COMPRESSIVE STRENGTH: 0.4 - 0.7 MPa, MAXIMUM 25mm COURSE AGGREGATE SIZE.
4. SUBMIT ONE COPY OF ALL PROPOSED CONCRETE MIX DESIGNS DIRECTLY TO THE CONSULTANT A MINIMUM OF TWO WEEKS IN ADVANCE OF SCHEDULED CONCRETE POURING.

GRANULAR

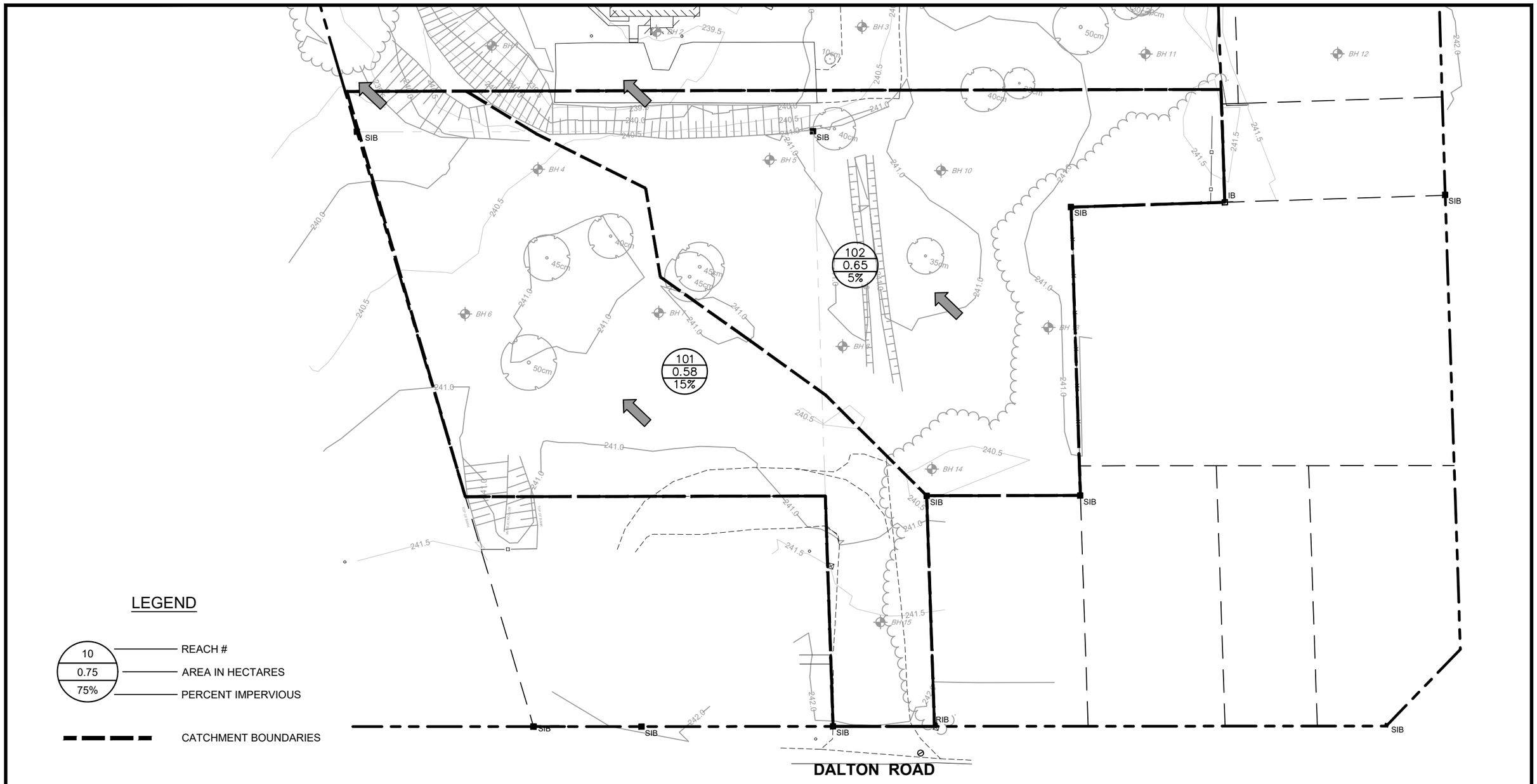
1. ALL GRANULAR BASE, SUBBASE, SUBGRADE AND BACKFILL TO BE PROVIDED AS PER OPSS.MUNI 1010 AND INSTALLED AS PER OPSS.MUNI 314.
2. COARSE GRANULAR FILL: MATERIAL AS SPECIFIED BELOW; COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS SPECIFIED OTHERWISE, IN LIFTS NOT EXCEEDING 300mm IN COMPACTED THICKNESS; MOISTURE CONTENT WITHIN PLUS OR MINUS 2% OF THE REQUIREMENTS OF ASTM D698.
3. FINE GRANULAR FILL: MATERIAL AS SPECIFIED BELOW; COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS SPECIFIED OTHERWISE, IN LIFTS NOT EXCEEDING 150mm IN COMPACTED THICKNESS; MOISTURE CONTENT WITHIN PLUS OR MINUS 2% OF THE REQUIREMENTS OF ASTM D698.
   - 3.1. GRANULAR 'A' TO OPSS.MUNI 1010.

EARTHWORK

1. IN ACCORDANCE WITH THE TOWNSHIP OF DELHI SITE ALTERATION BY-LAW; NO FILLING, PRE-GRADING OR TREE REMOVAL SHALL OCCUR, IN ADVANCE OF THE FINAL SITE PLAN ENGINEERING ACCEPTANCE. WITHIN THAT PERMIT, SHOULD THE DEVELOPER OR CONTRACTOR WISH TO PREPARE THE SITE FOR CONSTRUCTION PRIOR TO ENGINEERING ACCEPTANCE, AN APPLICATION FOR A SITE ALTERATION PERMIT MUST BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER

FIGURES

Figure 1 – Existing Catchment Areas
Figure 2 – Proposed Catchment Areas



LEGEND

10 — REACH #

0.75 — AREA IN HECTARES

75% — PERCENT IMPERVIOUS

CATCHMENT BOUNDARIES

PROJECT:
peopleCare DELHI

TITLE:
EXISTING CATCHMENT AREAS

REPRODUCTION OR DISTRIBUTION FOR PURPOSES OTHER THAN AUTHORIZED BY WALTERFEDY IS FORBIDDEN.
CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND
REPORT ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON DRAWINGS TO WALTERFEDY.
DO NOT SCALE THIS DRAWING.

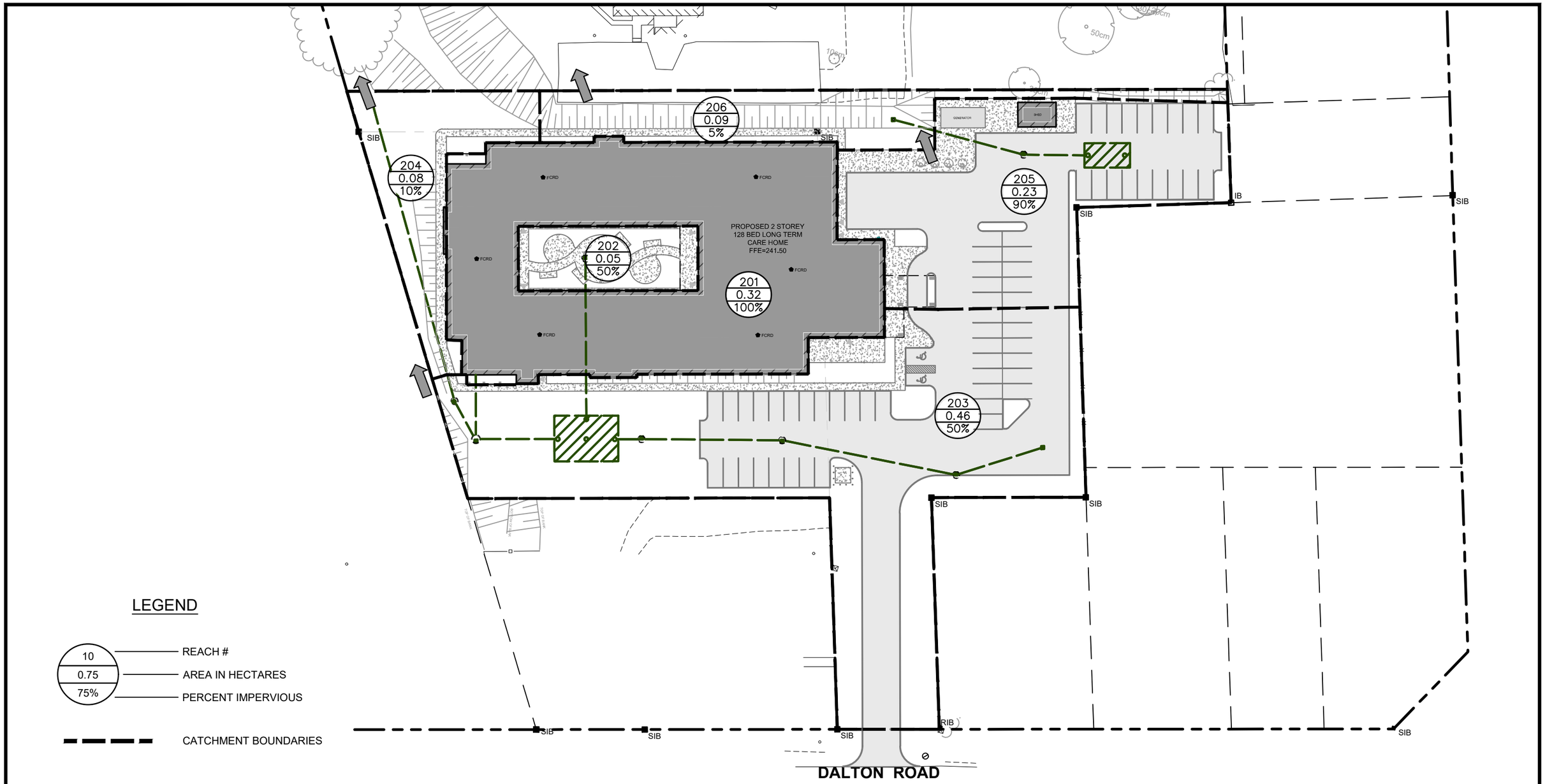
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WALTERFEDY
KITCHENER OFFICE
675 Queen Street South, Suite 111, Kitchener, Ontario N2M 1A1
T: 519.576.2150 F: 519.576.5499 walterfedy.com

SCALE:	1:750	DATE:	2023-03-08
DRAWN BY:	TK	PROJECT NO.:	2022-0672-11
CHECKED BY:	TK	FILE:	2022-0672-11 - SWM
SHEET NO.:			

FIG-1

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PROJECT:
peopleCare DELHI

TITLE:
PROPOSED CATCHMENT AREAS

REPRODUCTION OR DISTRIBUTION FOR PURPOSES OTHER THAN AUTHORIZED BY WALTERFEDY IS FORBIDDEN.
CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND
REPORT ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON DRAWINGS TO WALTERFEDY.
DO NOT SCALE THIS DRAWING.

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DRAWN BY:	TK	PROJECT NO.:	2022-0672-11
CHECKED BY:	TK	FILE:	2022-0672-11 - SWM

SHEET NO.:
FIG-2

\\BEL1\Job_Files\2022\0672\11\06-DWGS\CIVIL\2022-0672-11 - SWM; FIG-2; None; Tyler Keller; 2023-03-14 4:52:17 PM

APPENDIX A

Sanitary Design Calculations
Norfolk County Modelling Results (Once Received)

| | | |

APPENDIX B

Water Design Criteria
Fire Demand Calculations (FUS 2020)
Service Sizing Calculations
Norfolk County Modelling Results (Once Received)
Historical Water Usage Records

REQUIRED DOMESTIC FLOW

ONTARIO BUILDING CODE

WALTERFEDY

Project	peopleCare - Delhi
Project #	2022-0672-10
Designer	TK
Address	750 Gibralter Street, Delhi
Description	Domestic Water Demand

Building Description (Existing Conditions)	Area (ha)	Units	Persons/Unit	Population	Beds	Demand	Max Daily Peak Factor	Max Hourly Peak Factor	Max Daily Demand (L/s)	Max Hourly Demand (L/s)
Existing Long Term Care Facility	N/A	N/A	N/A	N/A	60	390 L/bed/day	2.25	4.0	0.61	1.08
							TOTAL		**0.61**	**1.08**

Building Description (Proposed Conditions)	Area (ha)	Units	Persons/Unit	Population	Beds	Demand	Max Daily Peak Factor	Max Hourly Peak Factor	Max Daily Demand (L/s)	Max Hourly Demand (L/s)
Proposed Long Term Care Facility	N/A	N/A	N/A	N/A	128	450 L/bed/day	2.25	4.0	1.50	2.67
							TOTAL		**1.50**	**2.67**

REQUIRED FIRE FLOW

Water Supply for Public Fire Protection (FUS 2019 DRAFT)

WALTERFEDY

Project	peopleCare - Delhi
Project #	2022-0672-11
Designer	TK
Address	Gibralter Street, Delhi
Description	Existing Fire Demand

$$F = 220 \times C \times \sqrt{A}$$

F = Required fire flow (LPM)
C = Coefficient related to type of construction
A = Total floor area (including all storeys but excluding any basement levels at least 50% below grade)

Type of Construction	Non-Combustible Construction	**C =**	0.8
Description	Unprotected Metal Structural Components, Masonry or Metal Walls. All Structural Members are Non-Combustible but does not qualify as Fire-Resisitive		

Total Floor Area	1670	m^2
# Storeys	1	
Fire Resistant Building?	NO	

Vertical Openings and Exterior Vertical Communications protected with minimum one (1) hr rating? NO

Area	1670	m^2
Description		
Required Fire Flow	7000	L/min

Occupancy Charge	Non-Combustible Contents			
Fire Flow Reduction	-25%	**OR**	-1750	L/min
Required Fire Flow	5250	L/min		

Automated Sprinker Protection	YES		
Designed to NFPA 13 Standard	YES	-30%	
Standard Water Supply to Sprinklers and Standpipes	YES	-10%	
Fully Supervised System	YES	-10%	
Fire Flow Adjustment		-2625	L/min

Exposure 1 (Northeast)	**Distance**	25	m	**Charge**	10%
Description	Existing Building				
Exposure 2 (South)	**Distance**	100	m	**Charge**	0%
Description	Existing Dwelling				
Exposure 3 (East)	**Distance**	100	m	**Charge**	0%
Description	Existing Building				
Exposure 4 (West)	**Distance**	70	m	**Charge**	0%
Description	Existing Shed				

Total Exposure Charge	10%	
Fire Flow Adjustment	525	L/min

Total Required Fire Flow	3000	L/min
Total Required Fire Flow	793	U.S. GPM
Total Required Fire Flow	50	L/s

REQUIRED FIRE FLOW

Water Supply for Public Fire Protection (FUS 2020)

WALTERFEDY

Project	peopleCare - Delhi
Project #	2022-0672-11
Designer	TK
Address	Gibralter Street, Delhi
Description	Proposed Fire Demand

$$F = 220 \times C \times \sqrt{A}$$

F = Required fire flow (LPM)
C = Coefficient related to type of construction
A = Total floor area (including all storeys but excluding any basement levels at least 50% below grade)

Type of Construction	Non-Combustible Construction	**C =**	0.8
Description	**Unprotected Metal Structural Components, Masonry or Metal Walls. All Structural Members are Non-Combustible but does not qualify as Fire-Resisitive**		

Total Floor Area	3200	m^2
# Storeys	2	
Fire Resistant Building?	NO	
Vertical Openings and Exterior Vertical Communications protected with minimum one (1) hr rating?	NO	
Area	6400	m^2
Description	Area of two largest floors + 50% of each of the floors above it	
Required Fire Flow	14000	L/min

Occupancy Charge	Non-Combustible Contents			
Fire Flow Reduction	-25%	**OR**	-3500	L/min
Required Fire Flow	10500	L/min		

Automated Sprinker Protection	YES		
Designed to NFPA 13 Standard	YES	-30%	
Standard Water Supply to Sprinklers and Standpipes	YES	-10%	
Fully Supervised System	YES	-10%	
Fire Flow Adjustment		-5250	L/min

Exposure 1 (North)	**Distance**	22	m	**Charge**	10%	
Description	Existing Building					
Exposure 2 (South)	**Distance**	35	m	**Charge**	0%	
Description	Existing Dwelling					
Exposure 3 (East)	**Distance**	35	m	**Charge**	0%	
Description	Existing Building					
Exposure 4 (West)	**Distance**	40	m	**Charge**	0%	
Description	Existing Shed					
Total Exposure Charge					10%	
Fire Flow Adjustment					1050	L/min

Total Required Fire Flow	6000	L/min
Total Required Fire Flow	1585	U.S. GPM
Total Required Fire Flow	100	L/s

Historial Water Billing

2021

	Read Dates			
Invoice Date	Current	Previous	# Days Invoiced	Volume of Water Used (m^3)
21-Dec-20	14-Dec-20	13-Nov-20	31	700
20-Jan-21	13-Jan-21	14-Dec-20	30	700
22-Feb-21	13-Feb-21	13-Jan-21	31	700
19-Mar-21	15-Mar-21	13-Feb-21	30	650
20-Apr-21	15-Apr-21	15-Mar-21	31	700
21-May-21	16-May-21	15-Apr-21	31	725
21-Jun-21	17-Jun-21	16-May-21	32	750
21-Jul-21	16-Jul-21	17-Jun-21	29	675
18-Aug-21	13-Aug-21	16-Jul-21	28	750
20-Sep-21	13-Sep-21	13-Aug-21	31	750
19-Oct-21	14-Oct-21	13-Sep-21	31	723.85
17-Nov-21	12-Nov-21	14-Oct-21	29	677.15
17-Dec-21	12-Dec-21	12-Nov-21	30	700
Average Usage			30.30769231	707.7692308

2022

Missing Info: April through August

	Read Dates				
Invoice Date	Current	Previous	# Days Invoiced	Volume of Water Used (m^3)	
17-Dec-21	12-Dec-21	12-Nov-21	30	700	LISTED IN 2021
18-Jan-22	11-Jan-22	12-Dec-21	30	700	
16-Feb-22	11-Feb-22	11-Jan-22	31	723.85	
21-Mar-22	15-Mar-22	11-Feb-22	32	747.2	
GAP					
19-Sep-22	13-Sep-22	13-Aug-22	31	730	
19-Oct-22	14-Oct-22	13-Sep-22	31	727.88	
18-Nov-22	12-Nov-22	14-Oct-22	29	681.21	
19-Dec-22	12-Dec-22	12-Nov-22	30	704.4	
Average Usage			30.57142857	716.3628571	
Average over 2 years			30.43956044	712.066044	

Average Per Day Usage		**23.39**
Conversion to L/day		23392.78339
Per Bed (L/bed/day)	60 beds	**389.88**

APPENDIX C

Storm Sewer Design Sheets
MIDUSS Outputs
Stormceptor OGS Sizing
ACO STORMBRIXX Design Summaries

WALTERFEDY

Project:	peopleCare Delhi								Storm Parameters					**5-YEAR STORM SEWER DESIGN CALCULATIONS**						
Project No:	2022-0672-11								A	583.017										
Date:	15-Mar-23								B	3.007	Design Frequency	5-year	Maximum Permitted Full Flow Velocity (m/s)						6	
Designed By:	TK	Checked By:	JZ						C	0.703	Manning's 'n'	0.013	Minimum Permitted Full Flow Velocity (m/s)						0.6	

	Pipe Data			Drainage Area				Time		Design Flow		Pipe Flow								
	From	To	Length	Area	C	AC	∑AC	Inlet	System	I	Q	Diameter	Slope	Q_{FULL}	Q/Q_{FULL}	V_{FULL}	V	Flow Time	Remarks
			(m)	*(ha)*				*(min)*	*(min)*	*(mm/hr)*	*(L/s)*	*(mm)*	*(%)*	*(L/s)*		*(m/s)*	*(m/s)*	*(min)*	
	DICB1	EFO-4(2)	26.6	0	0	**0.000**	**0.000**	10	**10**	**96.03**	**0.00**	300	1.00%	**96.70**	**0.00**	**1.37**	**0.00**	**0.00**	**No Surcharge**
	EFO-4(2)	NORTH INFILTRATION	12.0	0.23	0.9	**0.207**	**0.207**		**10.00**	**96.03**	**55.22**	300	1.00%	**96.70**	**0.57**	**1.37**	**1.41**	**0.14**	**No Surcharge**
	CB3	CBMH4	17.9	0.063	0.8	**0.050**	**0.050**	10	**10.00**	**96.03**	**13.44**	300	2.00%	**136.76**	**0.10**	**1.93**	**1.23**	**0.24**	**No Surcharge**
	CBMH4	CBMH5	35.0	0.078	0.85	**0.066**	**0.117**		**10.24**	**94.79**	**30.73**	300	1.00%	**96.70**	**0.32**	**1.37**	**1.21**	**0.48**	**No Surcharge**
	CBMH5	EFO-4(1)	27.7	0.19	0.75	**0.143**	**0.259**		**10.72**	**92.45**	**66.56**	300	1.00%	**96.70**	**0.69**	**1.37**	**1.47**	**0.31**	**No Surcharge**
	EFO-4(1)	SOUTH INFILTRATION	4.6	0.075	0.3	**0.023**	**0.282**		**11.04**	**91.00**	**71.20**	300	1.00%	**96.70**	**0.74**	**1.37**	**1.50**	**0.05**	**No Surcharge**
	CB6	CBMH7	6.5	0.025	0.5	**0.013**	**0.013**	10	**10.00**	**96.03**	**3.33**	300	1.00%	**96.70**	**0.03**	**1.37**	**0.64**	**0.17**	**No Surcharge**
	CBMH7	SOUTH INFILTRATION	31.0	0.025	0.5	**0.013**	**0.013**		**10.17**	**95.16**	**3.30**	300	4.61%	**207.63**	**0.02**	**2.94**	**1.09**	**0.48**	**No Surcharge**
***CONTROLLED**	ROOF	CBMH8	12.7	0.32	1	**0.320**	**0.320**	10	**10.00**	**96.03**	**9.00**	300	8.00%	**273.51**	**0.03**	**3.87**	**1.78**	**0.12**	**No Surcharge**
	CBMH8	SOUTH INFILTRATION	15.5	0.045	0.3	**0.014**	**0.014**		**10.12**	**95.42**	**12.58**	300	1.00%	**96.70**	**0.13**	**1.37**	**0.94**	**0.27**	**No Surcharge**

*Controlled by Flow Control Roof Drains - flow from 5-year storm event is 9 L/s

WALTERFEDY

Project:	peopleCare Delhi								Storm Parameters					# 100-YEAR STORM SEWER DESIGN CALCULATIONS					
Project No:	2022-0672-11								A	801.041									
Date:	15-Mar-23								B	1.501	Design Frequency	100-year	Maximum Permitted Full Flow Velocity (m/s)					6	
Designed By:	TK	Checked By:	JZ						C	0.657	Manning's 'n'	0.013	Minimum Permitted Full Flow Velocity (m/s)					0.6	

	Pipe Data			Drainage Area				Time		Design Flow		Pipe Flow							
	From	To	Length (m)	Area (ha)	C	AC	∑AC	Inlet (min)	System (min)	I (mm/hr)	Q (L/s)	Diameter (mm)	Slope (%)	Q_{FULL} (L/s)	Q/Q_{FULL}	V_{FULL} (m/s)	V (m/s)	Flow Time (min)	Remarks
***NOTE 1**	COURTYARD	SOUTH INFILTRATION	31.0	0.05	0.5	**0.025**	**0.025**	10	**10.00**	**160.97**	**11.18**	300	4.61%	**207.63**	**0.05**	**2.94**	**1.56**	**0.33**	**No Surcharge**
***NOTE 2**	ROOF	CBMH8 / INFILTRATION	12.7	-	-	**-**	**-**	10	**10.00**	**160.97**	**12.00**	300	8.00%	**273.51**	**0.04**	**3.87**	**1.94**	**0.11**	**No Surcharge**
***NOTE 3**	SOUTH INFILTATION / MH 9	OUTLET	61	-	-	**-**	**-**	10	**10.00**	**160.97**	**42.00**	450	0.33%	**163.78**	**0.26**	**1.03**	**0.86**	**1.18**	**No Surcharge**
***NOTE 4**	MH9	OUTLET	61	0.46	0.5	**0.230**	**0.230**	10	**10.00**	**160.97**	**126.02**	450	0.33%	**163.78**	**0.77**	**1.03**	**1.14**	**0.90**	**No Surcharge**

*NOTE 1 - Courtyard designed to convey 100-year storm event through storm sewer
*NOTE 2 - Controlled by Flow Control Roof Drains - flow from 100-year storm event is 12 L/s
*NOTE 3 - 100-year outflow from infiltration gallery is 42 L/s
*NOTE 4 - Outlet Pipe designed to convey 100-year storm event from southern parking lot area, courtyard and building in case of emergency

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 467"
"                MIDUSS created                                    July 6, 2008"
"           10   Units used:                                         ie METRIC"
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"                Company                                             WalterFedy"
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" 32          STORM Chicago storm"
"            1   Chicago storm"
"      529.711   Coefficient A"
"        4.501   Constant B"
"        0.745   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity            98.992    mm/hr"
"             Total depth                  32.583    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   West Catchment"
"       15.000   % Impervious"
"        0.580   Total Area"
"       70.000   Flow length"
"        3.000   Overland Slope"
"        0.493   Pervious Area"
"       70.000   Pervious length"
"        3.000   Pervious slope"
"        0.087   Impervious Area"
"       70.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.164   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.832   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.016     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.493      0.087      0.580      hectare"
"             Time of concentration  42.233     3.394      23.889     minutes"
"             Time to Centroid       157.071    94.562     127.547    minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        160.63     28.35      188.98     c.m"
"             Rainfall losses        27.238     5.472      23.973     mm"
"             Runoff depth           5.345      27.111     8.610      mm"
"             Runoff volume          26.35      23.59      49.94      c.m"
"             Runoff coefficient     0.164      0.832      0.264      "
"             Maximum flow           0.004      0.015      0.016      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.016     0.016     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.016     0.016     0.016     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                West Outlet"
"             Maximum flow                 0.016    c.m/sec"
"             Hydrograph volume           49.939    c.m"
"                    0.016     0.016     0.016     0.016"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.016     0.000     0.016     0.016"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   East Catchment"
"        5.000   % Impervious"
"        0.650   Total Area"
"       65.000   Flow length"
"        2.000   Overland Slope"
"        0.617   Pervious Area"
"       65.000   Pervious length"
"        2.000   Pervious slope"
"        0.032   Impervious Area"
"       65.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.164   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
```

```
"        0.829   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.007     0.000     0.016     0.016 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.617      0.032      0.650      hectare"
"             Time of concentration  45.622     3.666      36.808     minutes"
"             Time to Centroid       161.112    95.047     147.233    minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        201.20     10.59      211.79     c.m"
"             Rainfall losses        27.238     5.575      26.155     mm"
"             Runoff depth           5.345      27.008     6.428      mm"
"             Runoff volume          33.00      8.78       41.78      c.m"
"             Runoff coefficient     0.164      0.829      0.197      "
"             Maximum flow           0.005      0.006      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.007     0.007     0.016     0.016"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.007     0.007     0.007     0.016"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                East Outlet"
"             Maximum flow                  0.007    c.m/sec"
"             Hydrograph volume            41.781    c.m"
"                     0.007     0.007     0.007     0.007"
" 38          START/RE-START TOTALS 102"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        1.230    hectare"
"             Total Impervious area                       0.119    hectare"
"             Total % impervious                          9.715"
" 19          EXIT"
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"                MIDUSS created                                    July 6, 2008"
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"                Company                                             WalterFedy"
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"     1500.000   Max. Hydrograph"
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"            1   Chicago storm"
"      583.017   Coefficient A"
"        3.007   Constant B"
"        0.703   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           135.065    mm/hr"
"             Total depth                  44.904    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   West Catchment"
"       15.000   % Impervious"
"        0.580   Total Area"
"       70.000   Flow length"
"        3.000   Overland Slope"
"        0.493   Pervious Area"
"       70.000   Pervious length"
"        3.000   Pervious slope"
"        0.087   Impervious Area"
"       70.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.244   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.873   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.023     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.493      0.087      0.580      hectare"
"             Time of concentration  29.369     2.956      19.146     minutes"
"             Time to Centroid       143.178    93.615     123.995    minutes"
"             Rainfall depth         44.904     44.904     44.904     mm"
"             Rainfall volume        221.38     39.07      260.44     c.m"
"             Rainfall losses        33.945     5.693      29.707     mm"
"             Runoff depth           10.959     39.211     15.197     mm"
"             Runoff volume          54.03      34.11      88.14      c.m"
"             Runoff coefficient     0.244      0.873      0.338      "
"             Maximum flow           0.011      0.022      0.023      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.023     0.023     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.023     0.023     0.023     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                West Outlet"
"             Maximum flow                 0.023    c.m/sec"
"             Hydrograph volume           88.142    c.m"
"                    0.023     0.023     0.023     0.023"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.023     0.000     0.023     0.023"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   East Catchment"
"        5.000   % Impervious"
"        0.650   Total Area"
"       65.000   Flow length"
"        2.000   Overland Slope"
"        0.617   Pervious Area"
"       65.000   Pervious length"
"        2.000   Pervious slope"
"        0.032   Impervious Area"
"       65.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.244   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
```

```
"        0.871   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.014     0.000     0.023     0.023 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.617      0.032      0.650      hectare"
"             Time of concentration  31.725     3.194      27.209     minutes"
"             Time to Centroid       146.241    94.056     137.981    minutes"
"             Rainfall depth         44.904     44.904     44.904     mm"
"             Rainfall volume        277.28     14.59      291.88     c.m"
"             Rainfall losses        33.951     5.772      32.542     mm"
"             Runoff depth           10.953     39.132     12.362     mm"
"             Runoff volume          67.64      12.72      80.35      c.m"
"             Runoff coefficient     0.244      0.871      0.275      "
"             Maximum flow           0.013      0.008      0.014      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.014     0.014     0.023     0.023"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.014     0.014     0.014     0.023"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                East Outlet"
"             Maximum flow                  0.014    c.m/sec"
"             Hydrograph volume            80.355    c.m"
"                    0.014     0.014     0.014     0.014"
" 38          START/RE-START TOTALS 102"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                       1.230    hectare"
"             Total Impervious area                      0.119    hectare"
"             Total % impervious                         9.715"
" 19          EXIT"
```

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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 467"
"                MIDUSS created                                    July 6, 2008"
"           10   Units used:                                         ie METRIC"
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"                Company                                              WalterFedy"
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"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      801.041   Coefficient A"
"        1.501   Constant B"
"        0.657   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           234.168    mm/hr"
"             Total depth                  78.830    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   West Catchment"
"       15.000   % Impervious"
"        0.580   Total Area"
"       70.000   Flow length"
"        3.000   Overland Slope"
"        0.493   Pervious Area"
"       70.000   Pervious length"
"        3.000   Pervious slope"
"        0.087   Impervious Area"
"       70.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.405   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.918   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.057     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.493      0.087      0.580      hectare"
"             Time of concentration  18.144     2.342      13.628     minutes"
"             Time to Centroid       127.667    91.881     117.440    minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        388.63     68.58      457.21     c.m"
"             Rainfall losses        46.920     6.472      40.853     mm"
"             Runoff depth           31.910     72.358     37.977     mm"
"             Runoff volume          157.32     62.95      220.27     c.m"
"             Runoff coefficient     0.405      0.918      0.482      "
"             Maximum flow           0.045      0.041      0.057      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.057     0.057     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.057     0.057     0.057     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                West Outlet"
"             Maximum flow                 0.057    c.m/sec"
"             Hydrograph volume          220.269    c.m"
"                    0.057     0.057     0.057     0.057"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.057     0.000     0.057     0.057"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   East Catchment"
"        5.000   % Impervious"
"        0.650   Total Area"
"       65.000   Flow length"
"        2.000   Overland Slope"
"        0.617   Pervious Area"
"       65.000   Pervious length"
"        2.000   Pervious slope"
"        0.032   Impervious Area"
"       65.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.405   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
```

```
"        0.920   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.057     0.000     0.057     0.057 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.617      0.032      0.650      hectare"
"             Time of concentration  19.600     2.530      17.774     minutes"
"             Time to Centroid       129.739    92.193     125.724    minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        486.78     25.62      512.40     c.m"
"             Rainfall losses        46.937     6.267      44.904     mm"
"             Runoff depth           31.893     72.563     33.926     mm"
"             Runoff volume          196.94     23.58      220.52     c.m"
"             Runoff coefficient     0.405      0.920      0.430      "
"             Maximum flow           0.053      0.015      0.057      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.057     0.057     0.057     0.057"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.057     0.057     0.057     0.057"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                East Outlet"
"             Maximum flow                  0.057    c.m/sec"
"             Hydrograph volume           220.521    c.m"
"                    0.057     0.057     0.057     0.057"
" 38          START/RE-START TOTALS 102"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                       1.230    hectare"
"             Total Impervious area                      0.119    hectare"
"             Total % impervious                         9.715"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 467"
"                MIDUSS created                                    July 6, 2008"
"           10   Units used:                                         ie METRIC"
"                Job folder:        \\BEL1\Job_Files\2022\0672\11\05-DSGN\CIVL\"
"                                                                     SWM\MIDUSS"
"                Output filename:                                  2-YR POST.out"
"                Licensee name:                                     Tyler Keller"
"                Company                                              WalterFedy"
"                Date & Time last used:                2023-03-08 at 8:35:44 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      529.710   Coefficient A"
"        4.501   Constant B"
"        0.745   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity            98.992    mm/hr"
"             Total depth                  32.583    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Building"
"      100.000   % Impervious"
"        0.320   Total Area"
"       20.000   Flow length"
"        1.000   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        1.000   Pervious slope"
"        0.320   Impervious Area"
"       20.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.834   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.062     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.320      0.320      hectare"
"             Time of concentration  27.692     2.225      2.225      minutes"
"             Time to Centroid       139.711    92.722     92.722     minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        0.00       104.27     104.27     c.m"
"             Rainfall losses        27.239     5.399      5.399      mm"
"             Runoff depth           5.344      27.184     27.184     mm"
"             Runoff volume          0.00       86.99      86.99      c.m"
"             Runoff coefficient     0.000      0.834      0.834      "
"             Maximum flow           0.000      0.062      0.062      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.062     0.062     0.000     0.000"
" 54          POND DESIGN"
"        0.062   Current peak flow    c.m/sec"
"        0.031   Target outflow    c.m/sec"
"         87.0   Hydrograph volume    c.m"
"          11.   Number of stages"
"        0.000   Minimum water level    metre"
"        0.200   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                  0.000     0.000     0.000"
"                0.02000   0.00192    0.6400"
"                0.04000   0.00384     5.120"
"                0.06000   0.00576    17.280"
"                0.08000   0.00768    40.960"
"                 0.1000   0.00960    80.000"
"                 0.1200   0.01152   128.000"
"                 0.1400   0.01344   176.000"
"                 0.1600   0.01536   224.000"
"                 0.1800   0.01728   272.000"
"                 0.2000   0.01920   320.000"
"           1.   ROOFTOP"
"                Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                  hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                    0.320       0.240     400.000      24.000     100.000"
"             Using 6 roofdrains on roofstorage area of 2400. square metre"
"             Peak outflow                  0.008    c.m/sec"
"             Maximum level                 0.083    metre"
"             Maximum storage              46.518    c.m"
"             Centroidal lag                2.681   hours"
"                  0.062     0.062     0.008     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
```

```
"             Maximum flow                  0.008    c.m/sec"
"             Hydrograph volume            86.994    c.m"
"                    0.062     0.062     0.008     0.008"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.062     0.000     0.008     0.008"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Courtyard"
"       50.000   % Impervious"
"        0.050   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.025   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.025   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.164   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.826   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.005     0.000     0.008     0.008 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.025      0.025      0.050      hectare"
"             Time of concentration  14.840     1.193      3.451      minutes"
"             Time to Centroid       124.395    90.956     96.490     minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        8.15       8.15       16.29      c.m"
"             Rainfall losses        27.247     5.673      16.460     mm"
"             Runoff depth           5.336      26.910     16.123     mm"
"             Runoff volume          1.33       6.73       8.06       c.m"
"             Runoff coefficient     0.164      0.826      0.495      "
"             Maximum flow           0.000      0.005      0.005      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.005     0.005     0.008     0.008"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.005     0.005     0.005     0.008"
" 40          HYDROGRAPH   Combine    3"
```

```
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.011    c.m/sec"
"             Hydrograph volume            95.056    c.m"
"                    0.005     0.005     0.005     0.011"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.005     0.000     0.005     0.011"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   South Parking Lot"
"       50.000   % Impervious"
"        0.460   Total Area"
"       50.000   Flow length"
"        2.000   Overland Slope"
"        0.230   Pervious Area"
"       50.000   Pervious length"
"        2.000   Pervious slope"
"        0.230   Impervious Area"
"       50.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.164   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.834   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.040     0.000     0.005     0.011 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.230      0.230      0.460      hectare"
"             Time of concentration  38.977     3.132      9.022      minutes"
"             Time to Centroid       153.182    94.164     103.862    minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        74.94      74.94      149.88     c.m"
"             Rainfall losses        27.238     5.401      16.319     mm"
"             Runoff depth           5.345      27.182     16.264     mm"
"             Runoff volume          12.29      62.52      74.81      c.m"
"             Runoff coefficient     0.164      0.834      0.499      "
"             Maximum flow           0.002      0.040      0.040      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.040     0.040     0.005     0.011"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                    0.040     0.040     0.040     0.011"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.051    c.m/sec"
"             Hydrograph volume           169.869    c.m"
"                    0.040     0.040     0.040     0.051"
" 40          HYDROGRAPH   Confluence    3"
"            7   Confluence "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.051    c.m/sec"
"             Hydrograph volume           169.869    c.m"
"                    0.040     0.051     0.040     0.000"
" 57          TRENCH Design d/s of 3"
"         0.051   Peak inflow"
"       169.869   Hydrograph volume"
"       240.800   Ground elevation"
"       237.300   Downstream trench invert"
"         1.830   Trench height"
"       230.000   Water table elevation"
"         9.000   Trench top width"
"         9.000   Trench bottom width"
"        96.000   Voids ratio (%)"
"         6.000   Hydraulic conductivity"
"         0.000   Trench gradient (%)"
"        12.600   Trench length"
"         0.000   Include base width"
"           21.   Number of stages"
"                   Level Discharge    Volume"
"                 237.300     0.000       0.0"
"                 237.475     0.000      19.1"
"                 237.650     0.000      38.1"
"                 237.825     0.000      57.2"
"                 238.000     0.000      76.2"
"                 238.175     0.000      95.3"
"                 238.350     0.000     114.3"
"                 238.525     0.000     133.4"
"                 238.700     0.000     152.4"
"                 238.875     0.000     171.5"
"                 239.050     0.000     190.5"
"                 239.225     0.000     199.3"
"                 239.400     0.000     199.5"
"                 239.575     0.000     199.7"
"                 239.750     0.000     199.9"
"                 239.925     0.015     200.1"
"                 240.100     0.079     200.3"
"                 240.275     0.164     200.5"
```

```
"               240.450     0.278     200.7"
"               240.625     0.314     200.9"
"               240.800     0.345     201.1"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"               239.800    60.000     0.000     0.333     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"               239.800   239.600    60.000     0.450     0.013     0.500"
"             Peak outflow                  0.000    c.m/sec"
"             Outflow volume                0.009    c.m"
"             Peak exfiltration             0.000    c.m/sec"
"             Exfiltration volume           5.840    c.m"
"             Maximum level               238.853    metre"
"             Maximum storage             169.066    c.m"
"             Centroidal lag               13.043   hours"
"             Infiltration area 2 sides   39.136   sq.metre"
"             Infiltration Base area      .000   sq.metre"
"                  0.040     0.051     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Proposed West Outlet"
"             Maximum flow                  0.000    c.m/sec"
"             Hydrograph volume             0.009    c.m"
"                     0.040     0.051     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.040     0.000     0.000     0.000"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to West"
"       10.000   % Impervious"
"        0.080   Total Area"
"       20.000   Flow length"
"        4.000   Overland Slope"
"        0.072   Pervious Area"
"       20.000   Pervious length"
"        4.000   Pervious slope"
"        0.008   Impervious Area"
"       20.000   Impervious length"
```

```
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.164   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.833   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.002     0.000     0.000     0.000 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.072      0.008      0.080      hectare"
"             Time of concentration  18.270     1.468      12.208     minutes"
"             Time to Centroid       128.458    91.512     115.127    minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        23.46      2.61       26.07      c.m"
"             Rainfall losses        27.241     5.442      25.061     mm"
"             Runoff depth           5.342      27.141     7.522      mm"
"             Runoff volume          3.85       2.17       6.02       c.m"
"             Runoff coefficient     0.164      0.833      0.231      "
"             Maximum flow           0.001      0.002      0.002      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.002     0.002     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.002     0.002     0.002     0.000"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Proposed West Outlet"
"             Maximum flow                  0.002    c.m/sec"
"             Hydrograph volume             6.026    c.m"
"                     0.002     0.002     0.002     0.002"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.002     0.000     0.002     0.002"
" 33          CATCHMENT 205"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          205   North Parking"
"       90.000   % Impervious"
"        0.230   Total Area"
"       25.000   Flow length"
"        2.000   Overland Slope"
"        0.023   Pervious Area"
"       25.000   Pervious length"
```

```
"        2.000   Pervious slope"
"        0.207   Impervious Area"
"       25.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.164   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.835   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.041     0.000     0.002     0.002 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.023      0.207      0.230      hectare"
"             Time of concentration  25.715     2.066      2.571      minutes"
"             Time to Centroid       137.357    92.413     93.373     minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        7.49       67.45      74.94      c.m"
"             Rainfall losses        27.244     5.387      7.573      mm"
"             Runoff depth           5.339      27.196     25.010     mm"
"             Runoff volume          1.23       56.29      57.52      c.m"
"             Runoff coefficient     0.164      0.835      0.768      "
"             Maximum flow           0.000      0.041      0.041      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.041     0.041     0.002     0.002"
" 57          TRENCH Design d/s of 205"
"        0.041   Peak inflow"
"       57.523   Hydrograph volume"
"      240.800   Ground elevation"
"      237.600   Downstream trench invert"
"        1.830   Trench height"
"      230.000   Water table elevation"
"        4.800   Trench top width"
"        4.800   Trench bottom width"
"       95.700   Voids ratio (%)"
"        6.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"        9.000   Trench length"
"        0.000   Include base width"
"          21.   Number of stages"
"                  Level Discharge    Volume"
"                237.600     0.000       0.0"
"                237.760     0.000       6.6"
"                237.920     0.000      13.2"
"                238.080     0.000      19.8"
"                238.240     0.000      26.5"
```

```
"               238.400     0.000      33.1"
"               238.560     0.000      39.7"
"               238.720     0.000      46.3"
"               238.880     0.000      52.9"
"               239.040     0.000      59.5"
"               239.200     0.000      66.1"
"               239.360     0.000      72.3"
"               239.520     0.000      75.2"
"               239.680     0.000      75.4"
"               239.840     0.000      75.5"
"               240.000     0.000      75.7"
"               240.160     0.000      75.9"
"               240.320     0.000      76.1"
"               240.480     0.000      76.3"
"               240.640     0.007      76.4"
"               240.800     0.082      76.6"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"               240.600     0.900     0.600     0.000     0.000"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"               239.200    13.000     0.250     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"             Peak outflow                  0.000    c.m/sec"
"             Outflow volume                0.009    c.m"
"             Peak exfiltration             0.000    c.m/sec"
"             Exfiltration volume           3.713    c.m"
"             Maximum level               238.982    metre"
"             Maximum storage              57.119    c.m"
"             Centroidal lag               13.000   hours"
"             Infiltration area 2 sides   24.869   sq.metre"
"             Infiltration Base area       .000   sq.metre"
"                  0.041     0.041     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                North Infiltration"
"             Maximum flow                  0.000    c.m/sec"
"             Hydrograph volume             0.009    c.m"
"                     0.041     0.041     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.041     0.000     0.000     0.000"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          206   Uncontrolled to East"
"        5.000   % Impervious"
"        0.090   Total Area"
"        3.000   Flow length"
"       20.000   Overland Slope"
"        0.086   Pervious Area"
"        3.000   Pervious length"
"       20.000   Pervious slope"
"        0.005   Impervious Area"
"        3.000   Impervious length"
"       20.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.161   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.737   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.003     0.000     0.000     0.000 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.086      0.005      0.090      hectare"
"             Time of concentration  3.612      0.290      2.965      minutes"
"             Time to Centroid       111.375    89.771     107.171    minutes"
"             Rainfall depth         32.583     32.583     32.583     mm"
"             Rainfall volume        27.86      1.47       29.32      c.m"
"             Rainfall losses        27.349     8.560      26.410     mm"
"             Runoff depth           5.234      24.023     6.173      mm"
"             Runoff volume          4.47       1.08       5.56       c.m"
"             Runoff coefficient     0.161      0.737      0.189      "
"             Maximum flow           0.002      0.001      0.003      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.003     0.003     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.003     0.003     0.003     0.000"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                North Infiltration"
"             Maximum flow                 0.003    c.m/sec"
"             Hydrograph volume            5.564    c.m"
"                    0.003     0.003     0.003     0.003"
" 38          START/RE-START TOTALS 206"
"            3   Runoff Totals on EXIT"
```

```
"             Total Catchment area                      1.230    hectare"
"             Total Impervious area                     0.794    hectare"
"             Total % impervious                       64.593"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 467"
"                MIDUSS created                                    July 6, 2008"
"           10   Units used:                                         ie METRIC"
"                Job folder:        \\BEL1\Job_Files\2022\0672\11\05-DSGN\CIVL\"
"                                                                     SWM\MIDUSS"
"                Output filename:                                  5-YR POST.out"
"                Licensee name:                                     Tyler Keller"
"                Company                                              WalterFedy"
"                Date & Time last used:                2023-03-08 at 8:42:16 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      583.020   Coefficient A"
"        3.007   Constant B"
"        0.703   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           135.065    mm/hr"
"             Total depth                  44.905    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Building"
"      100.000   % Impervious"
"        0.320   Total Area"
"       20.000   Flow length"
"        1.000   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        1.000   Pervious slope"
"        0.320   Impervious Area"
"       20.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.872   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.089     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.320      0.320      hectare"
"             Time of concentration  19.257     1.938      1.939      minutes"
"             Time to Centroid       130.071    91.894     91.894     minutes"
"             Rainfall depth         44.905     44.905     44.905     mm"
"             Rainfall volume        0.00       143.69     143.69     c.m"
"             Rainfall losses        33.966     5.754      5.754      mm"
"             Runoff depth           10.939     39.151     39.151     mm"
"             Runoff volume          0.00       125.28     125.28     c.m"
"             Runoff coefficient     0.000      0.872      0.872      "
"             Maximum flow           0.000      0.089      0.089      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.089     0.089     0.000     0.000"
" 54          POND DESIGN"
"        0.089   Current peak flow    c.m/sec"
"        0.031   Target outflow    c.m/sec"
"        125.3   Hydrograph volume    c.m"
"          11.   Number of stages"
"        0.000   Minimum water level    metre"
"        0.200   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                  0.000     0.000     0.000"
"                0.02000   0.00192    0.6400"
"                0.04000   0.00384     5.120"
"                0.06000   0.00576    17.280"
"                0.08000   0.00768    40.960"
"                 0.1000   0.00960    80.000"
"                 0.1200   0.01152   128.000"
"                 0.1400   0.01344   176.000"
"                 0.1600   0.01536   224.000"
"                 0.1800   0.01728   272.000"
"                 0.2000   0.01920   320.000"
"           1.   ROOFTOP"
"                Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                  hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                    0.320       0.240     400.000      24.000     100.000"
"             Using 6 roofdrains on roofstorage area of 2400. square metre"
"             Peak outflow                  0.009    c.m/sec"
"             Maximum level                 0.095    metre"
"             Maximum storage              70.487    c.m"
"             Centroidal lag                3.031   hours"
"                  0.089     0.089     0.009     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
```

```
"             Maximum flow                  0.009    c.m/sec"
"             Hydrograph volume           125.273    c.m"
"                    0.089     0.089     0.009     0.009"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.089     0.000     0.009     0.009"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Courtyard"
"       50.000   % Impervious"
"        0.050   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.025   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.025   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.243   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.857   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.008     0.000     0.009     0.009 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.025      0.025      0.050      hectare"
"             Time of concentration  10.319     1.039      3.089      minutes"
"             Time to Centroid       118.501    90.319     96.545     minutes"
"             Rainfall depth         44.905     44.905     44.905     mm"
"             Rainfall volume        11.23      11.23      22.45      c.m"
"             Rainfall losses        33.992     6.426      20.209     mm"
"             Runoff depth           10.912     38.479     24.695     mm"
"             Runoff volume          2.73       9.62       12.35      c.m"
"             Runoff coefficient     0.243      0.857      0.550      "
"             Maximum flow           0.001      0.008      0.008      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.008     0.008     0.009     0.009"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.008     0.008     0.008     0.009"
" 40          HYDROGRAPH   Combine    3"
```

```
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.014    c.m/sec"
"             Hydrograph volume           137.621    c.m"
"                    0.008     0.008     0.008     0.014"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.008     0.000     0.008     0.014"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   South Parking Lot"
"       50.000   % Impervious"
"        0.460   Total Area"
"       50.000   Flow length"
"        2.000   Overland Slope"
"        0.230   Pervious Area"
"       50.000   Pervious length"
"        2.000   Pervious slope"
"        0.230   Impervious Area"
"       50.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.244   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.873   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.059     0.000     0.008     0.014 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.230      0.230      0.460      hectare"
"             Time of concentration  27.104     2.728      8.053      minutes"
"             Time to Centroid       140.231    93.232     103.499    minutes"
"             Rainfall depth         44.905     44.905     44.905     mm"
"             Rainfall volume        103.28     103.28     206.56     c.m"
"             Rainfall losses        33.944     5.693      19.819     mm"
"             Runoff depth           10.960     39.212     25.086     mm"
"             Runoff volume          25.21      90.19      115.40     c.m"
"             Runoff coefficient     0.244      0.873      0.559      "
"             Maximum flow           0.005      0.059      0.059      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.059     0.059     0.008     0.014"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                    0.059     0.059     0.059     0.014"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.074    c.m/sec"
"             Hydrograph volume           253.016    c.m"
"                    0.059     0.059     0.059     0.074"
" 40          HYDROGRAPH   Confluence    3"
"            7   Confluence "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.074    c.m/sec"
"             Hydrograph volume           253.016    c.m"
"                    0.059     0.074     0.059     0.000"
" 57          TRENCH Design d/s of 3"
"         0.074   Peak inflow"
"       253.016   Hydrograph volume"
"       240.800   Ground elevation"
"       237.300   Downstream trench invert"
"         1.830   Trench height"
"       230.000   Water table elevation"
"         9.000   Trench top width"
"         9.000   Trench bottom width"
"        96.000   Voids ratio (%)"
"         6.000   Hydraulic conductivity"
"         0.000   Trench gradient (%)"
"        12.600   Trench length"
"         0.000   Include base width"
"           21.   Number of stages"
"                   Level Discharge    Volume"
"                 237.300     0.000       0.0"
"                 237.475     0.000      19.1"
"                 237.650     0.000      38.1"
"                 237.825     0.000      57.2"
"                 238.000     0.000      76.2"
"                 238.175     0.000      95.3"
"                 238.350     0.000     114.3"
"                 238.525     0.000     133.4"
"                 238.700     0.000     152.4"
"                 238.875     0.000     171.5"
"                 239.050     0.000     190.5"
"                 239.225     0.000     199.3"
"                 239.400     0.000     199.5"
"                 239.575     0.000     199.7"
"                 239.750     0.000     199.9"
"                 239.925     0.015     200.1"
"                 240.100     0.079     200.3"
"                 240.275     0.164     200.5"
```

```
"               240.450     0.278     200.7"
"               240.625     0.314     200.9"
"               240.800     0.345     201.1"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"               239.800    60.000     0.000     0.333     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"               239.800   239.600    60.000     0.450     0.013     0.500"
"             Peak outflow                  0.009    c.m/sec"
"             Outflow volume               51.650    c.m"
"             Peak exfiltration             0.000    c.m/sec"
"             Exfiltration volume           7.208    c.m"
"             Maximum level               239.858    metre"
"             Maximum storage             200.045    c.m"
"             Centroidal lag                4.355   hours"
"             Infiltration area 2 sides    46.116   sq.metre"
"             Infiltration Base area        .000   sq.metre"
"                  0.059     0.074     0.009     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Proposed West Outlet"
"             Maximum flow                  0.009    c.m/sec"
"             Hydrograph volume            51.650    c.m"
"                     0.059     0.074     0.009     0.009"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.059     0.000     0.009     0.009"
" 33          CATCHMENT 4"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"            4   Uncontrolled to West"
"         10.000   % Impervious"
"          0.080   Total Area"
"         20.000   Flow length"
"          4.000   Overland Slope"
"          0.072   Pervious Area"
"         20.000   Pervious length"
"          4.000   Pervious slope"
"          0.008   Impervious Area"
"         20.000   Impervious length"
```

```
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.243   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.865   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.003     0.000     0.009     0.009 c.m/sec"
"             Catchment 4            Pervious   Impervious Total Area "
"             Surface Area           0.072      0.008      0.080      hectare"
"             Time of concentration  12.705     1.279      9.470      minutes"
"             Time to Centroid       121.593    90.847     112.889    minutes"
"             Rainfall depth         44.905     44.905     44.905     mm"
"             Rainfall volume        32.33      3.59       35.92      c.m"
"             Rainfall losses        33.981     6.084      31.192     mm"
"             Runoff depth           10.923     38.820     13.713     mm"
"             Runoff volume          7.86       3.11       10.97      c.m"
"             Runoff coefficient     0.243      0.865      0.305      "
"             Maximum flow           0.003      0.002      0.003      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.003     0.003     0.009     0.009"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.003     0.003     0.003     0.009"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Proposed West Outlet"
"             Maximum flow                  0.010    c.m/sec"
"             Hydrograph volume            62.620    c.m"
"                    0.003     0.003     0.003     0.010"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.003     0.000     0.003     0.010"
" 33          CATCHMENT 205"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          205   North Parking"
"       90.000   % Impervious"
"        0.230   Total Area"
"       25.000   Flow length"
"        2.000   Overland Slope"
"        0.023   Pervious Area"
"       25.000   Pervious length"
```

```
"        2.000   Pervious slope"
"        0.207   Impervious Area"
"       25.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.244   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.872   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.058     0.000     0.003     0.010 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.023      0.207      0.230      hectare"
"             Time of concentration  17.882     1.800      2.285      minutes"
"             Time to Centroid       128.259    91.699     92.801     minutes"
"             Rainfall depth         44.905     44.905     44.905     mm"
"             Rainfall volume        10.33      92.95      103.28     c.m"
"             Rainfall losses        33.953     5.749      8.569      mm"
"             Runoff depth           10.951     39.156     36.335     mm"
"             Runoff volume          2.52       81.05      83.57      c.m"
"             Runoff coefficient     0.244      0.872      0.809      "
"             Maximum flow           0.001      0.058      0.058      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.058     0.058     0.003     0.010"
" 57          TRENCH Design d/s of 205"
"        0.058   Peak inflow"
"       83.571   Hydrograph volume"
"      240.800   Ground elevation"
"      237.600   Downstream trench invert"
"        1.830   Trench height"
"      230.000   Water table elevation"
"        4.800   Trench top width"
"        4.800   Trench bottom width"
"       95.700   Voids ratio (%)"
"        6.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"        9.000   Trench length"
"        0.000   Include base width"
"          21.   Number of stages"
"                  Level Discharge    Volume"
"                237.600     0.000       0.0"
"                237.760     0.000       6.6"
"                237.920     0.000      13.2"
"                238.080     0.000      19.8"
"                238.240     0.000      26.5"
```

```
"               238.400     0.000      33.1"
"               238.560     0.000      39.7"
"               238.720     0.000      46.3"
"               238.880     0.000      52.9"
"               239.040     0.000      59.5"
"               239.200     0.000      66.1"
"               239.360     0.000      72.3"
"               239.520     0.000      75.2"
"               239.680     0.000      75.4"
"               239.840     0.000      75.5"
"               240.000     0.000      75.7"
"               240.160     0.000      75.9"
"               240.320     0.000      76.1"
"               240.480     0.000      76.3"
"               240.640     0.007      76.4"
"               240.800     0.082      76.6"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"               240.600     0.900     0.600     0.000     0.000"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"               239.200    13.000     0.250     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"             Peak outflow                  0.003    c.m/sec"
"             Outflow volume                6.654    c.m"
"             Peak exfiltration             0.000    c.m/sec"
"             Exfiltration volume           5.191    c.m"
"             Maximum level               240.556    metre"
"             Maximum storage              76.342    c.m"
"             Centroidal lag                2.849   hours"
"             Infiltration area 2 sides    32.940   sq.metre"
"             Infiltration Base area        .000   sq.metre"
"                  0.058     0.058     0.003     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                North Infiltration"
"             Maximum flow                  0.003    c.m/sec"
"             Hydrograph volume             6.654    c.m"
"                     0.058     0.058     0.003     0.003"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.058     0.000     0.003     0.003"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          206   Uncontrolled to East"
"        5.000   % Impervious"
"        0.090   Total Area"
"        3.000   Flow length"
"       20.000   Overland Slope"
"        0.086   Pervious Area"
"        3.000   Pervious length"
"       20.000   Pervious slope"
"        0.005   Impervious Area"
"        3.000   Impervious length"
"       20.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.240   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.765   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.005     0.000     0.003     0.003 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.086      0.005      0.090      hectare"
"             Time of concentration  2.511      0.253      2.187      minutes"
"             Time to Centroid       108.261    89.096     105.510    minutes"
"             Rainfall depth         44.905     44.905     44.905     mm"
"             Rainfall volume        38.39      2.02       40.41      c.m"
"             Rainfall losses        34.122     10.568     32.944     mm"
"             Runoff depth           10.783     34.336     11.960     mm"
"             Runoff volume          9.22       1.55       10.76      c.m"
"             Runoff coefficient     0.240      0.765      0.266      "
"             Maximum flow           0.005      0.001      0.005      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.005     0.005     0.003     0.003"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.005     0.005     0.005     0.003"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                North Infiltration"
"             Maximum flow                 0.005    c.m/sec"
"             Hydrograph volume           17.418    c.m"
"                     0.005     0.005     0.005     0.005"
" 38          START/RE-START TOTALS 206"
"            3   Runoff Totals on EXIT"
```

```
"             Total Catchment area                      1.230    hectare"
"             Total Impervious area                     0.794    hectare"
"             Total % impervious                       64.593"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 467"
"                MIDUSS created                                    July 6, 2008"
"           10   Units used:                                         ie METRIC"
"                Job folder:        \\BEL1\Job_Files\2022\0672\11\05-DSGN\CIVL\"
"                                                                      SWM\MIDUSS"
"                Output filename:                                 100-YR POST.out"
"                Licensee name:                                      Tyler Keller"
"                Company                                               WalterFedy"
"                Date & Time last used:                2023-03-08 at 8:43:53 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      801.041   Coefficient A"
"        1.501   Constant B"
"        0.657   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           234.168    mm/hr"
"             Total depth                  78.830    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Building"
"      100.000   % Impervious"
"        0.320   Total Area"
"       20.000   Flow length"
"        1.000   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        1.000   Pervious slope"
"        0.320   Impervious Area"
"       20.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.915   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.163     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.320      0.320      hectare"
"             Time of concentration  11.897     1.536      1.536      minutes"
"             Time to Centroid       118.869    90.579     90.579     minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        0.00       252.26     252.26     c.m"
"             Rainfall losses        46.945     6.698      6.698      mm"
"             Runoff depth           31.885     72.132     72.132     mm"
"             Runoff volume          0.00       230.82     230.82     c.m"
"             Runoff coefficient     0.000      0.915      0.915      "
"             Maximum flow           0.000      0.163      0.163      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.163     0.163     0.000     0.000"
" 54          POND DESIGN"
"        0.163   Current peak flow    c.m/sec"
"        0.031   Target outflow    c.m/sec"
"        230.8   Hydrograph volume    c.m"
"          11.   Number of stages"
"        0.000   Minimum water level    metre"
"        0.200   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                  0.000     0.000     0.000"
"                0.02000   0.00192    0.6400"
"                0.04000   0.00384     5.120"
"                0.06000   0.00576    17.280"
"                0.08000   0.00768    40.960"
"                 0.1000   0.00960    80.000"
"                 0.1200   0.01152   128.000"
"                 0.1400   0.01344   176.000"
"                 0.1600   0.01536   224.000"
"                 0.1800   0.01728   272.000"
"                 0.2000   0.01920   320.000"
"           1.   ROOFTOP"
"                Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                  hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                    0.320       0.240     400.000      24.000     100.000"
"             Using 6 roofdrains on roofstorage area of 2400. square metre"
"             Peak outflow                   0.012    c.m/sec"
"             Maximum level                  0.126    metre"
"             Maximum storage              143.026    c.m"
"             Centroidal lag                 3.816   hours"
"                  0.163     0.163     0.012     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
```

```
"             Maximum flow                  0.012    c.m/sec"
"             Hydrograph volume           230.823    c.m"
"                    0.163     0.163     0.012     0.012"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.163     0.000     0.012     0.012"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Courtyard"
"       50.000   % Impervious"
"        0.050   Total Area"
"       10.000   Flow length"
"        2.000   Overland Slope"
"        0.025   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.025   Impervious Area"
"       10.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.402   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.897   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.015     0.000     0.012     0.012 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.025      0.025      0.050      hectare"
"             Time of concentration  6.375      0.823      2.541      minutes"
"             Time to Centroid       111.198    89.638     96.309     minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        19.71      19.71      39.42      c.m"
"             Rainfall losses        47.136     8.081      27.608     mm"
"             Runoff depth           31.694     70.750     51.222     mm"
"             Runoff volume          7.92       17.69      25.61      c.m"
"             Runoff coefficient     0.402      0.897      0.650      "
"             Maximum flow           0.004      0.014      0.015      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.015     0.015     0.012     0.012"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.015     0.015     0.015     0.012"
" 40          HYDROGRAPH   Combine    3"
```

```
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.024    c.m/sec"
"             Hydrograph volume           256.434    c.m"
"                    0.015     0.015     0.015     0.024"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.015     0.000     0.015     0.024"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   South Parking Lot"
"       50.000   % Impervious"
"        0.460   Total Area"
"       50.000   Flow length"
"        2.000   Overland Slope"
"        0.230   Pervious Area"
"       50.000   Pervious length"
"        2.000   Pervious slope"
"        0.230   Impervious Area"
"       50.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.405   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.918   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.115     0.000     0.015     0.024 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.230      0.230      0.460      hectare"
"             Time of concentration  16.745     2.162      6.624      minutes"
"             Time to Centroid       125.710    91.519     101.982    minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        181.31     181.31     362.62     c.m"
"             Rainfall losses        46.937     6.501      26.719     mm"
"             Runoff depth           31.893     72.329     52.111     mm"
"             Runoff volume          73.35      166.36     239.71     c.m"
"             Runoff coefficient     0.405      0.918      0.661      "
"             Maximum flow           0.022      0.111      0.115      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.115     0.115     0.015     0.024"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                    0.115     0.115     0.115     0.024"
" 40          HYDROGRAPH   Combine    3"
"            6   Combine "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.139    c.m/sec"
"             Hydrograph volume           496.145    c.m"
"                    0.115     0.115     0.115     0.139"
" 40          HYDROGRAPH   Confluence    3"
"            7   Confluence "
"            3   Node #"
"                West Infiltrate"
"             Maximum flow                  0.139    c.m/sec"
"             Hydrograph volume           496.145    c.m"
"                    0.115     0.139     0.115     0.000"
" 57          TRENCH Design d/s of 3"
"         0.139   Peak inflow"
"       496.145   Hydrograph volume"
"       240.800   Ground elevation"
"       237.300   Downstream trench invert"
"         1.830   Trench height"
"       230.000   Water table elevation"
"         9.000   Trench top width"
"         9.000   Trench bottom width"
"        96.000   Voids ratio (%)"
"         6.000   Hydraulic conductivity"
"         0.000   Trench gradient (%)"
"        12.600   Trench length"
"         0.000   Include base width"
"           21.   Number of stages"
"                   Level Discharge    Volume"
"                 237.300     0.000       0.0"
"                 237.475     0.000      19.1"
"                 237.650     0.000      38.1"
"                 237.825     0.000      57.2"
"                 238.000     0.000      76.2"
"                 238.175     0.000      95.3"
"                 238.350     0.000     114.3"
"                 238.525     0.000     133.4"
"                 238.700     0.000     152.4"
"                 238.875     0.000     171.5"
"                 239.050     0.000     190.5"
"                 239.225     0.000     199.3"
"                 239.400     0.000     199.5"
"                 239.575     0.000     199.7"
"                 239.750     0.000     199.9"
"                 239.925     0.015     200.1"
"                 240.100     0.079     200.3"
"                 240.275     0.164     200.5"
```

```
"               240.450     0.278     200.7"
"               240.625     0.314     200.9"
"               240.800     0.345     201.1"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"               239.800    60.000     0.000     0.333     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"               239.800   239.600    60.000     0.450     0.013     0.500"
"             Peak outflow                  0.042    c.m/sec"
"             Outflow volume              292.340    c.m"
"             Peak exfiltration             0.000    c.m/sec"
"             Exfiltration volume           7.467    c.m"
"             Maximum level               240.007    metre"
"             Maximum storage             200.213    c.m"
"             Centroidal lag                3.638   hours"
"             Infiltration area 2 sides    46.116   sq.metre"
"             Infiltration Base area        .000   sq.metre"
"                  0.115     0.139     0.042     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Proposed West Outlet"
"             Maximum flow                  0.042    c.m/sec"
"             Hydrograph volume           292.340    c.m"
"                     0.115     0.139     0.042     0.042"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.115     0.000     0.042     0.042"
" 33          CATCHMENT 4"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"            4   Uncontrolled to West"
"         10.000   % Impervious"
"          0.080   Total Area"
"         20.000   Flow length"
"          4.000   Overland Slope"
"          0.072   Pervious Area"
"         20.000   Pervious length"
"          4.000   Pervious slope"
"          0.008   Impervious Area"
"         20.000   Impervious length"
```

```
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.404   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.902   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.014     0.000     0.042     0.042 c.m/sec"
"             Catchment 4            Pervious   Impervious Total Area "
"             Surface Area           0.072      0.008      0.080      hectare"
"             Time of concentration  7.849      1.013      6.490      minutes"
"             Time to Centroid       113.214    89.472     108.493    minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        56.76      6.31       63.06      c.m"
"             Rainfall losses        46.994     7.712      43.066     mm"
"             Runoff depth           31.836     71.119     35.764     mm"
"             Runoff volume          22.92      5.69       28.61      c.m"
"             Runoff coefficient     0.404      0.902      0.454      "
"             Maximum flow           0.012      0.004      0.014      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.014     0.014     0.042     0.042"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.014     0.014     0.014     0.042"
" 40          HYDROGRAPH   Combine    4"
"            6   Combine "
"            4   Node #"
"                Proposed West Outlet"
"             Maximum flow                  0.045    c.m/sec"
"             Hydrograph volume           320.952    c.m"
"                    0.014     0.014     0.014     0.045"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.014     0.000     0.014     0.045"
" 33          CATCHMENT 205"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          205   North Parking"
"       90.000   % Impervious"
"        0.230   Total Area"
"       25.000   Flow length"
"        2.000   Overland Slope"
"        0.023   Pervious Area"
"       25.000   Pervious length"
```

```
"        2.000   Pervious slope"
"        0.207   Impervious Area"
"       25.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.404   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.913   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.108     0.000     0.014     0.045 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.023      0.207      0.230      hectare"
"             Time of concentration  11.048     1.426      1.878      minutes"
"             Time to Centroid       117.659    90.340     91.622     minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        18.13      163.18     181.31     c.m"
"             Rainfall losses        46.946     6.892      10.898     mm"
"             Runoff depth           31.885     71.938     67.932     mm"
"             Runoff volume          7.33       148.91     156.24     c.m"
"             Runoff coefficient     0.404      0.913      0.862      "
"             Maximum flow           0.003      0.107      0.108      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.108     0.108     0.014     0.045"
" 57          TRENCH Design d/s of 205"
"        0.108   Peak inflow"
"      156.245   Hydrograph volume"
"      240.800   Ground elevation"
"      237.600   Downstream trench invert"
"        1.830   Trench height"
"      230.000   Water table elevation"
"        4.800   Trench top width"
"        4.800   Trench bottom width"
"       95.700   Voids ratio (%)"
"        6.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"        9.000   Trench length"
"        0.000   Include base width"
"          21.   Number of stages"
"                  Level Discharge    Volume"
"                237.600     0.000       0.0"
"                237.760     0.000       6.6"
"                237.920     0.000      13.2"
"                238.080     0.000      19.8"
"                238.240     0.000      26.5"
```

```
"               238.400     0.000      33.1"
"               238.560     0.000      39.7"
"               238.720     0.000      46.3"
"               238.880     0.000      52.9"
"               239.040     0.000      59.5"
"               239.200     0.000      66.1"
"               239.360     0.000      72.3"
"               239.520     0.000      75.2"
"               239.680     0.000      75.4"
"               239.840     0.000      75.5"
"               240.000     0.000      75.7"
"               240.160     0.000      75.9"
"               240.320     0.000      76.1"
"               240.480     0.000      76.3"
"               240.640     0.007      76.4"
"               240.800     0.082      76.6"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"               240.600     0.900     0.600     0.000     0.000"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"               239.200    13.000     0.250     0.000     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"             Peak outflow                  0.035    c.m/sec"
"             Outflow volume               70.073    c.m"
"             Peak exfiltration             0.000    c.m/sec"
"             Exfiltration volume           5.277    c.m"
"             Maximum level               240.761    metre"
"             Maximum storage              76.574    c.m"
"             Centroidal lag                1.999   hours"
"             Infiltration area 2 sides    32.940   sq.metre"
"             Infiltration Base area        .000   sq.metre"
"                  0.108     0.108     0.035     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                North Infiltration"
"             Maximum flow                  0.035    c.m/sec"
"             Hydrograph volume            70.073    c.m"
"                    0.108     0.108     0.035     0.035"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.108     0.000     0.035     0.035"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          206   Uncontrolled to East"
"        5.000   % Impervious"
"        0.090   Total Area"
"        3.000   Flow length"
"       20.000   Overland Slope"
"        0.086   Pervious Area"
"        3.000   Pervious length"
"       20.000   Pervious slope"
"        0.005   Impervious Area"
"        3.000   Impervious length"
"       20.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.396   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.795   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.019     0.000     0.035     0.035 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.086      0.005      0.090      hectare"
"             Time of concentration  1.552      0.200      1.422      minutes"
"             Time to Centroid       103.903    87.661     102.350    minutes"
"             Rainfall depth         78.830     78.830     78.830     mm"
"             Rainfall volume        67.40      3.55       70.95      c.m"
"             Rainfall losses        47.633     16.135     46.058     mm"
"             Runoff depth           31.197     62.695     32.772     mm"
"             Runoff volume          26.67      2.82       29.49      c.m"
"             Runoff coefficient     0.396      0.795      0.416      "
"             Maximum flow           0.017      0.002      0.019      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.019     0.019     0.035     0.035"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.019     0.019     0.019     0.035"
" 40          HYDROGRAPH   Combine    5"
"            6   Combine "
"            5   Node #"
"                North Infiltration"
"             Maximum flow                 0.043    c.m/sec"
"             Hydrograph volume           99.566    c.m"
"                    0.019     0.019     0.019     0.043"
" 38          START/RE-START TOTALS 206"
"            3   Runoff Totals on EXIT"
```

```
"             Total Catchment area                      1.230    hectare"
"             Total Impervious area                     0.794    hectare"
"             Total % impervious                       64.593"
" 19          EXIT"
```

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

02/15/2023

Province:	Ontario
City:	Delhi
Nearest Rainfall Station:	BRANTFORD MOE
Climate Station Id:	6140954
Years of Rainfall Data:	41

Site Name:	

Drainage Area (ha):	0.22
% Imperviousness:	90.00

Runoff Coefficient 'c': 0.84

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Project Name:	peopleCare Delhi - North
Project Number:	60739
Designer Name:	Tyler Keller
Designer Company:	WalterFedy
Designer Email:	tkeller@walterfedy.com
Designer Phone:	519-576-2150
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	6.72
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	93
EFO6	98
EFO8	99
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 93

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

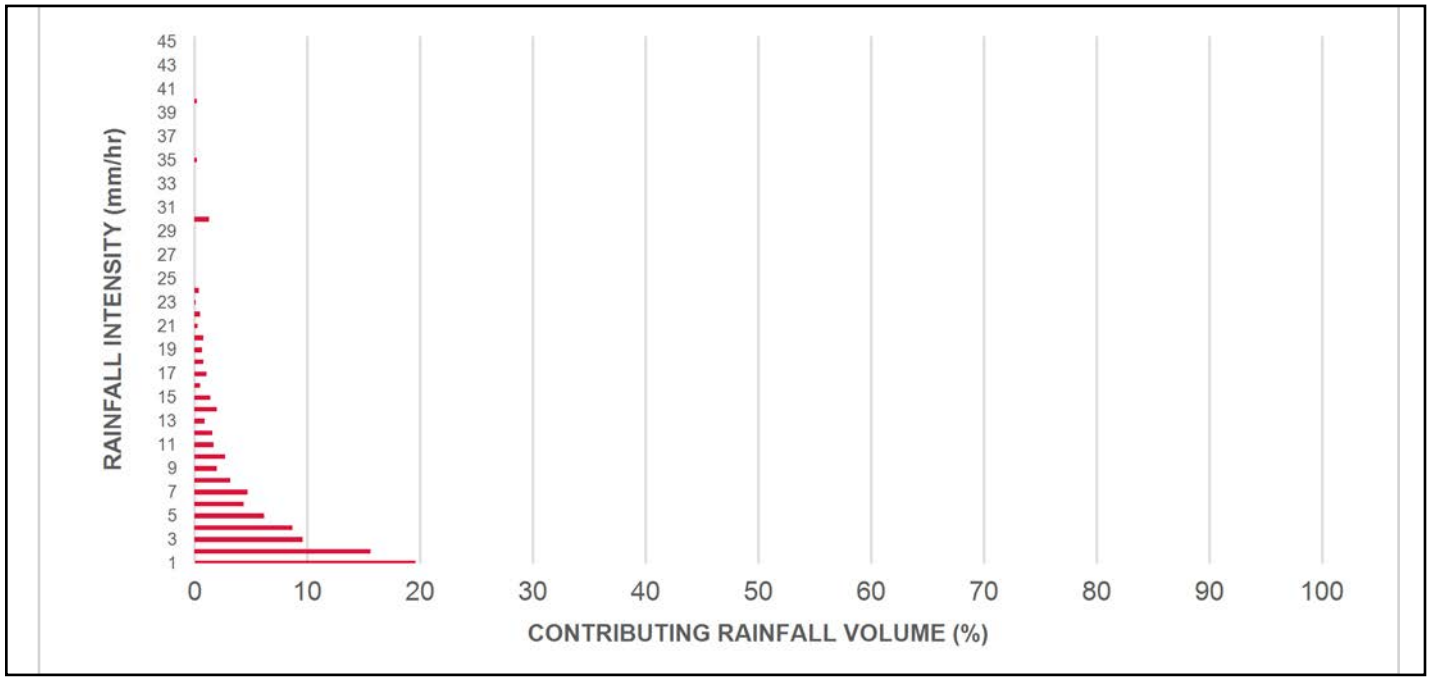
Stormceptor® EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	9.1	9.1	0.26	15.0	13.0	100	9.1	9.1
1	19.6	28.8	0.51	31.0	26.0	100	19.6	28.8
2	15.6	44.4	1.03	62.0	51.0	100	15.6	44.4
3	9.6	54.0	1.54	92.0	77.0	100	9.6	54.0
4	8.7	62.7	2.05	123.0	103.0	96	8.3	62.3
5	6.2	68.9	2.57	154.0	128.0	93	5.8	68.1
6	4.4	73.3	3.08	185.0	154.0	89	3.9	72.0
7	4.7	77.9	3.60	216.0	180.0	86	4.0	76.0
8	3.2	81.1	4.11	247.0	205.0	83	2.6	78.7
9	2.0	83.1	4.62	277.0	231.0	82	1.6	80.3
10	2.7	85.7	5.14	308.0	257.0	81	2.2	82.4
11	1.7	87.4	5.65	339.0	283.0	79	1.3	83.7
12	1.6	89.0	6.16	370.0	308.0	78	1.2	85.0
13	0.9	89.8	6.68	401.0	334.0	77	0.7	85.6
14	2.0	91.8	7.19	432.0	360.0	76	1.5	87.1
15	1.4	93.2	7.71	462.0	385.0	75	1.0	88.2
16	0.5	93.7	8.22	493.0	411.0	73	0.4	88.5
17	1.1	94.8	8.73	524.0	437.0	72	0.8	89.3
18	0.8	95.5	9.25	555.0	462.0	71	0.5	89.9
19	0.7	96.2	9.76	586.0	488.0	70	0.5	90.3
20	0.8	97.0	10.27	616.0	514.0	69	0.6	90.9
21	0.3	97.4	10.79	647.0	539.0	67	0.2	91.1
22	0.5	97.8	11.30	678.0	565.0	66	0.3	91.4
23	0.1	97.9	11.82	709.0	591.0	65	0.1	91.5
24	0.4	98.3	12.33	740.0	616.0	65	0.2	91.7
25	0.0	98.3	12.84	771.0	642.0	64	0.0	91.7
30	1.3	99.6	15.41	925.0	771.0	63	0.8	92.6
35	0.2	99.8	17.98	1079.0	899.0	62	0.1	92.7
40	0.2	100.0	20.55	1233.0	1027.0	61	0.1	92.8
45	0.0	100.0	23.12	1387.0	1156.0	58	0.0	92.8
Estimated Net Annual Sediment (TSS) Load Reduction =								**93 %**

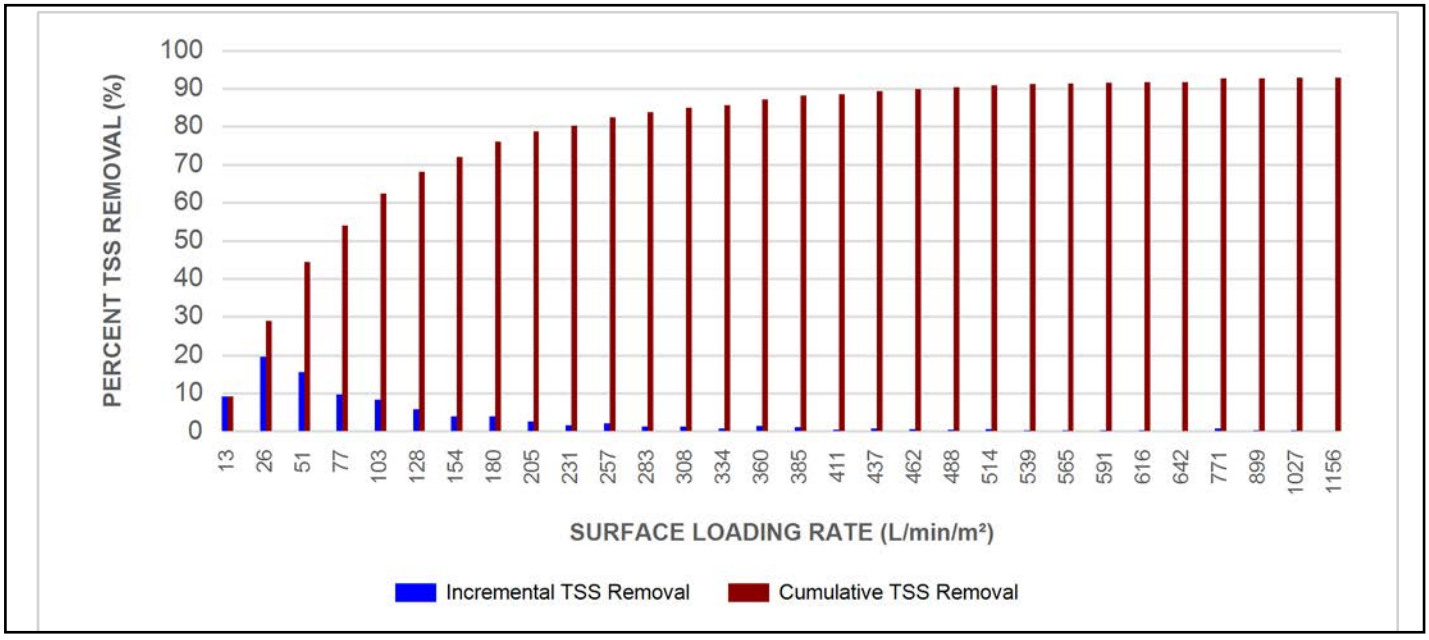
Climate Station ID: 6140954 *Years of Rainfall Data*: 41

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RAINFALL DATA FROM BRANTFORD MOE RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

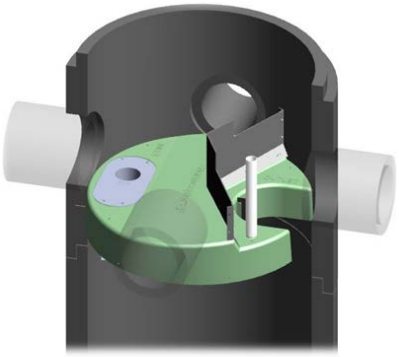
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

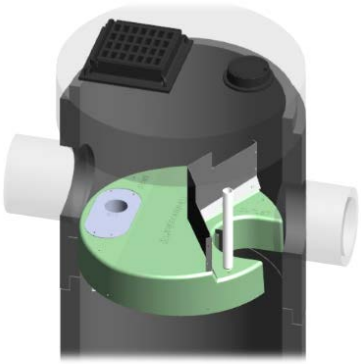
DESIGN FLEXIBILITY

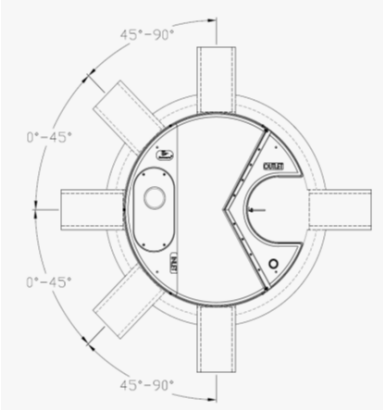
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

02/15/2023

Province:	Ontario
City:	Delhi
Nearest Rainfall Station:	BRANTFORD MOE
Climate Station Id:	6140954
Years of Rainfall Data:	41

Site Name:	

Drainage Area (ha):	0.33
% Imperviousness:	70.00

Runoff Coefficient 'c': 0.72

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Project Name:	peopleCare Delhi - South
Project Number:	60738
Designer Name:	Tyler Keller
Designer Company:	WalterFedy
Designer Email:	tkeller@walterfedy.com
Designer Phone:	519-576-2150
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	8.64
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	90
EFO6	96
EFO8	99
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 90

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

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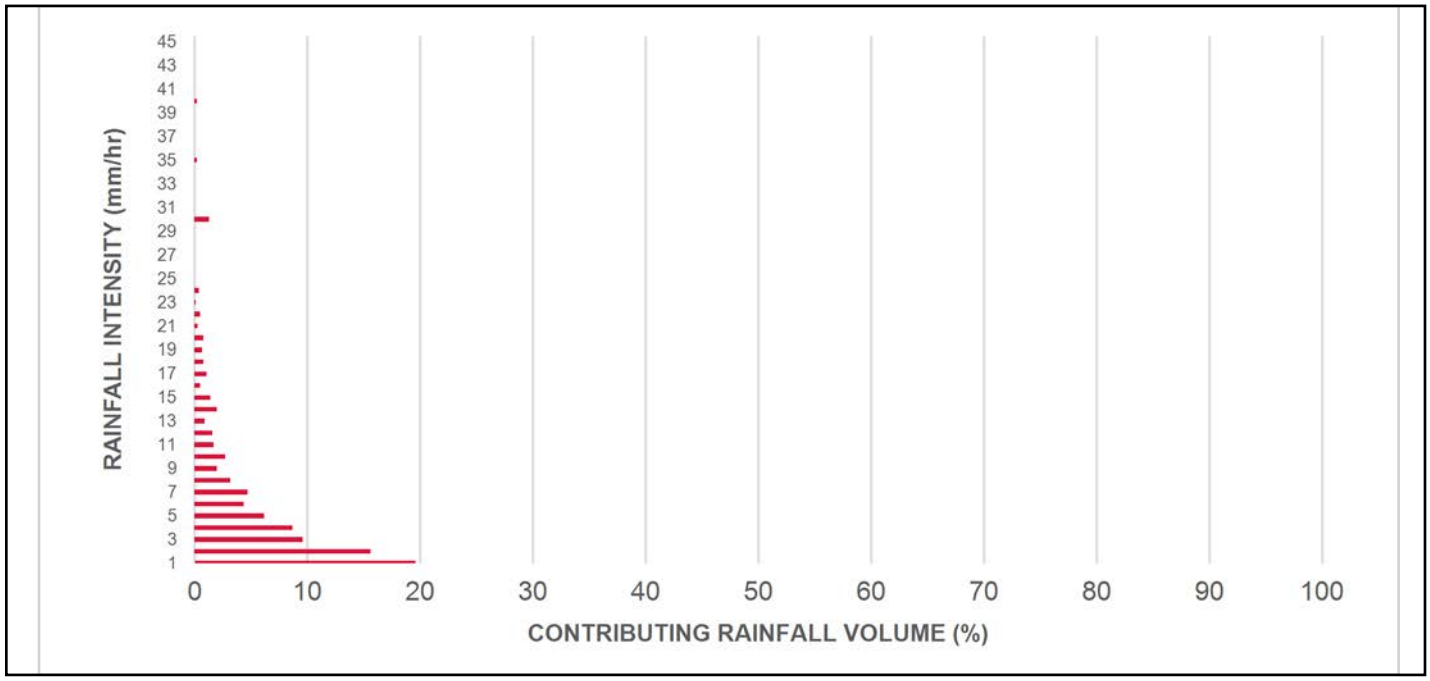
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

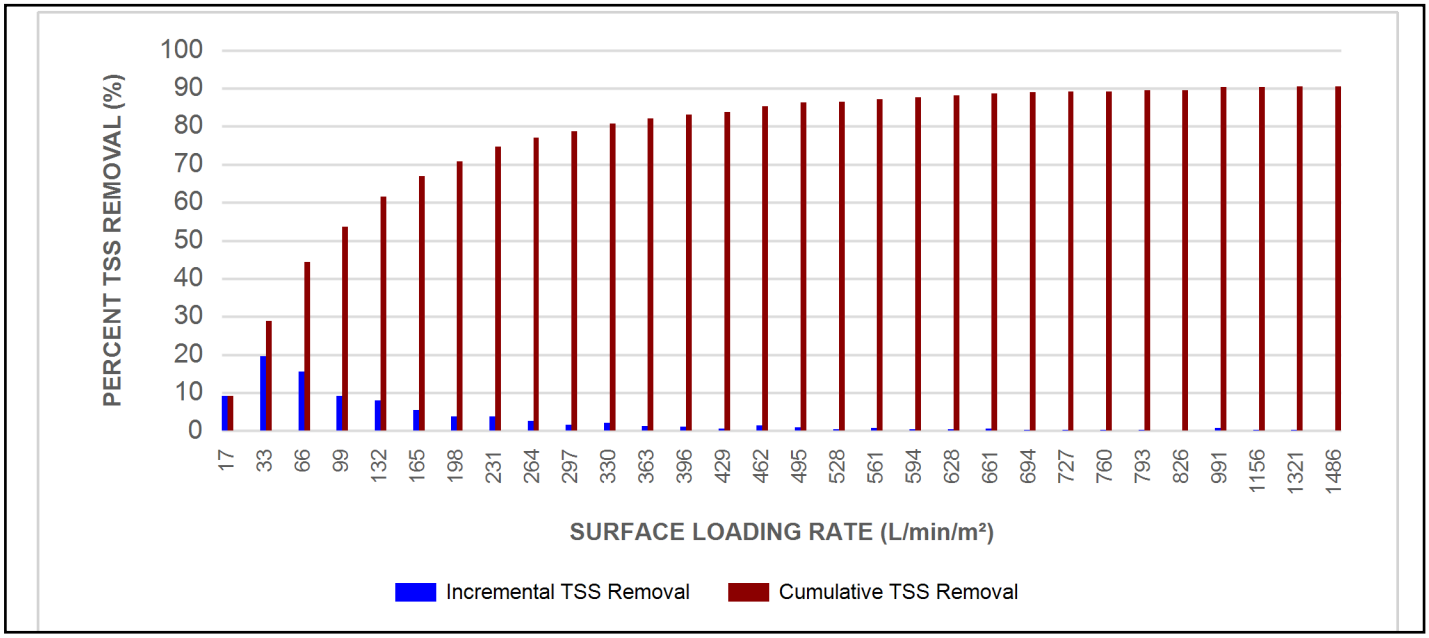
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	9.1	9.1	0.33	20.0	17.0	100	9.1	9.1
1	19.6	28.8	0.66	40.0	33.0	100	19.6	28.8
2	15.6	44.4	1.32	79.0	66.0	100	15.6	44.4
3	9.6	54.0	1.98	119.0	99.0	96	9.2	53.6
4	8.7	62.7	2.64	159.0	132.0	92	8.0	61.6
5	6.2	68.9	3.30	198.0	165.0	88	5.4	67.0
6	4.4	73.3	3.96	238.0	198.0	84	3.7	70.8
7	4.7	77.9	4.62	277.0	231.0	82	3.8	74.6
8	3.2	81.1	5.28	317.0	264.0	80	2.6	77.1
9	2.0	83.1	5.94	357.0	297.0	79	1.5	78.7
10	2.7	85.7	6.61	396.0	330.0	77	2.1	80.7
11	1.7	87.4	7.27	436.0	363.0	76	1.3	82.0
12	1.6	89.0	7.93	476.0	396.0	74	1.2	83.1
13	0.9	89.8	8.59	515.0	429.0	72	0.6	83.8
14	2.0	91.8	9.25	555.0	462.0	71	1.4	85.2
15	1.4	93.2	9.91	594.0	495.0	70	1.0	86.2
16	0.5	93.7	10.57	634.0	528.0	68	0.3	86.5
17	1.1	94.8	11.23	674.0	561.0	66	0.7	87.2
18	0.8	95.5	11.89	713.0	594.0	65	0.5	87.7
19	0.7	96.2	12.55	753.0	628.0	64	0.4	88.1
20	0.8	97.0	13.21	793.0	661.0	64	0.5	88.7
21	0.3	97.4	13.87	832.0	694.0	64	0.2	88.9
22	0.5	97.8	14.53	872.0	727.0	64	0.3	89.2
23	0.1	97.9	15.19	912.0	760.0	63	0.1	89.2
24	0.4	98.3	15.85	951.0	793.0	63	0.2	89.5
25	0.0	98.3	16.51	991.0	826.0	63	0.0	89.5
30	1.3	99.6	19.82	1189.0	991.0	62	0.8	90.3
35	0.2	99.8	23.12	1387.0	1156.0	58	0.1	90.4
40	0.2	100.0	26.42	1585.0	1321.0	54	0.1	90.5
45	0.0	100.0	29.72	1783.0	1486.0	49	0.0	90.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**91 %**

Climate Station ID: 6140954 *Years of Rainfall Data*: 41

RAINFALL DATA FROM BRANTFORD MOE RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

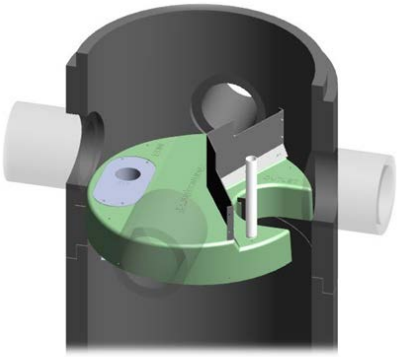
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

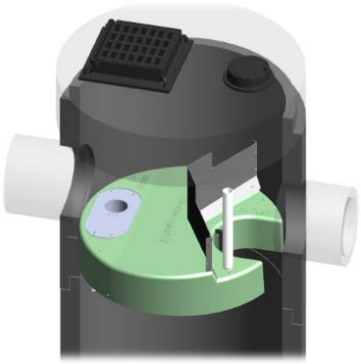
DESIGN FLEXIBILITY

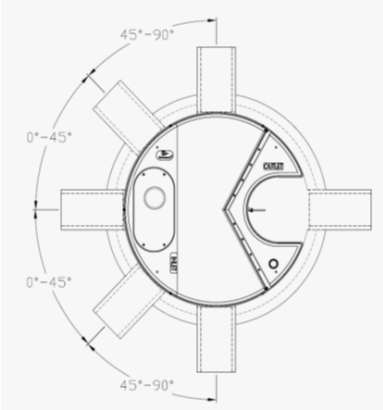
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

ACO StormBrixx®

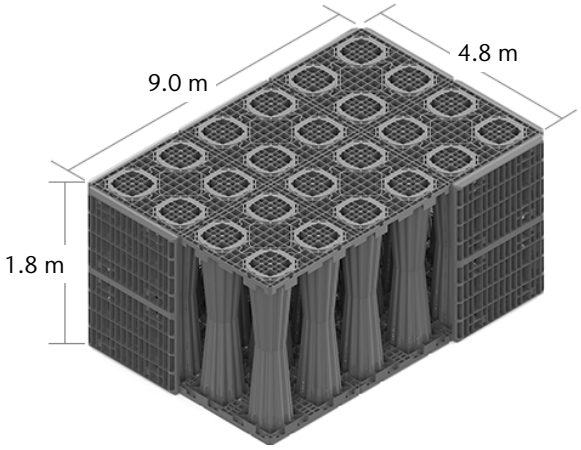
Online Project Configuration

Project Details
Description : peopleCare Delhi
Date : 02-14-2023
City : Delhi
State : Ontario
Zip Code : N4B 3B3
Country : CANADA

Customer Details
Contact : Tyler Keller
Email : tkeller@walterfedy.com

Tank Configuration

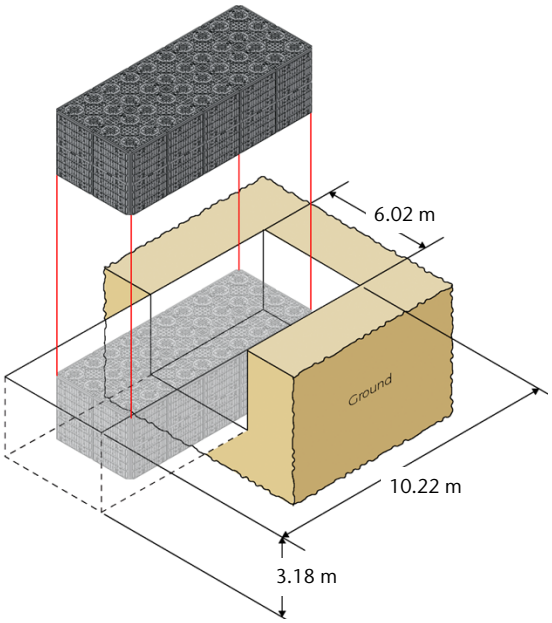
Tank Function	Infiltration
Product	Standard Duty (SD)
Number of Layers	2.0
Total Net Volume (m^3)	76.6 m^3
Total Gross Volume (m^3)	79.0 m^3
Length of Tank (m)	9.0 m
Width of Tank (m)	4.8 m
Depth of Tank (m)	1.8 m



Cavity & Excavation Details

Length of Cavity (m)	10.2 m
Width of Cavity (m)	6.0 m
Depth of Cavity (m)	3.2 m
Volume of Material to be Excavated (m^3)	195.6 m^3
*Membrane Quantity (m^2)	157.4 m^2
Cover Dimension (m)	1.2 m
**Backfill Material (m^3)	116.7 m^3

* Calculation includes a 15% overlap
** Pavement not accounted for



* Diagram shows cavity size rounded to nearest foot

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Project Configuration Inlets, Outlets, and Access

Inlets

		Qty
	Inlets	**1**
	Remote Access Unit	1
	Side Panels	0
	Horizontal Pipe Connector	0

Outlets

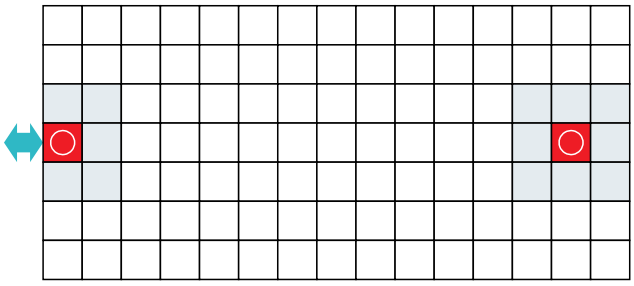
		Qty
	Outlets	**1**
	Remote Access Unit	0
	Side Panels	1
	Horizontal Pipe Connector	0

Access

		Qty
	Access Points	**1**
	Remote Access Unit	1
	Remote Access Plate	0

Grid Note

The grids below do not represent accurate dimensions or proportions they just give a general guide to both inlet / outlet and access placement on your StormBrixx scheme.



Inlet/Outlet Grid Key

Inlet/Outlet Pipe

Inlet/Outlet using Remote Access Unit

Access Grid Key

Remote Access Unit with maintenance access

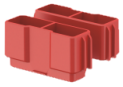
Remote Access Plate with maintenance access

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Bill of Materials

Pt No.		Description	Qty	Price Each ($)	Extended Price ($)	Weight Each (lbs)	Extended Weight (lbs)
314090		SD Half-Module	240			21.60	5,184.0
314091		SD Side Panel	92			7.20	662.4
314092		SD Top Cover	120			1.60	192.0
314093		SD Layer Connectors	180			0.03	5.4
138141		SD Remote Access Unit	8			40.00	320.0
314038		Extension Shaft	10			4.84	48.4
314053		Remote Access Vented Cover - Ductile Iron	2			83.60	167.2
27018		Vertical Inspection Point Connector	2			5.52	11.0
314044		Inspection Point Cover - Ductile Iron	2			34.54	69.1
Totals				**Price**		**Weight**	**6,659.5**

Notes:
1) These prices are the manufacturer's suggested retail price (MSRP). Please contact your local dealer or ACO Customer Service for more information.

2) You should have received an email with your output results from: no-reply@acosbconfigurator.com If you do not receive the confirmation within a few minutes, please check your spam folder.

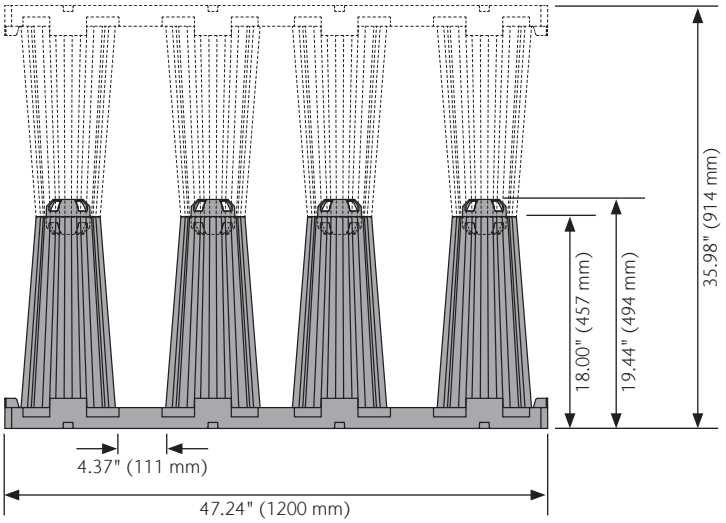
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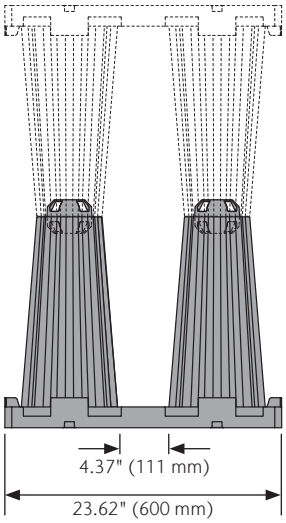
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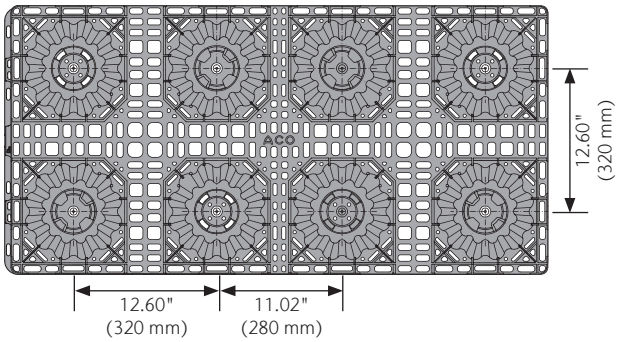
Stormwater Detention/Infiltration/Retention System

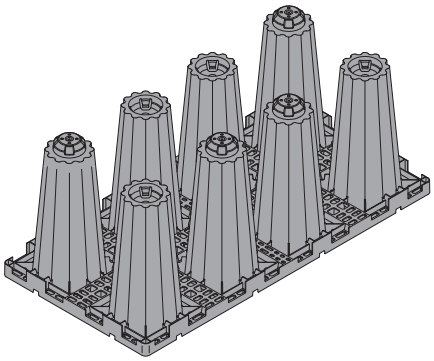
ACO Specification Information

SD Half-Module
part no. 314090

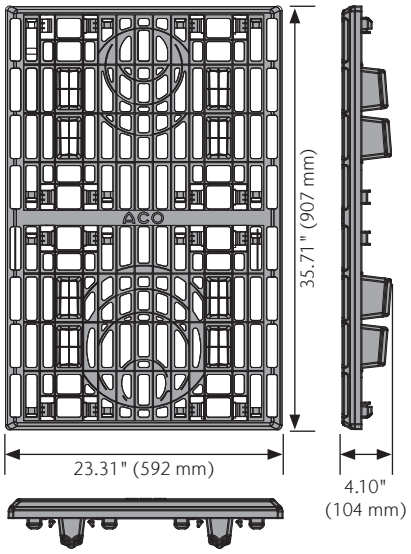




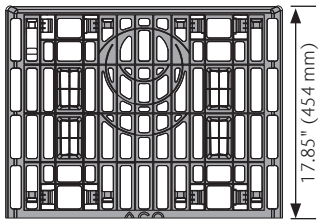




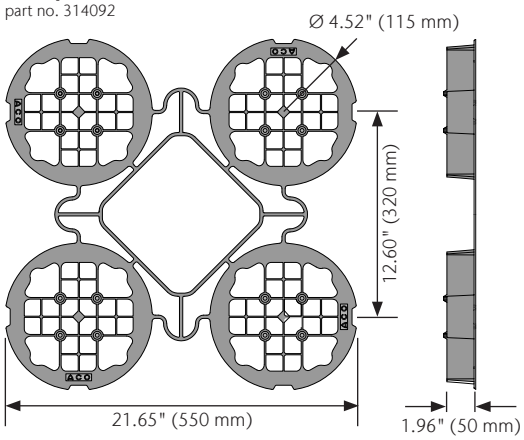
SD Side Panel
part no. 314091



SD Half-Layer Side Panel
part no. 314098



SD Top Cover
part no. 314092



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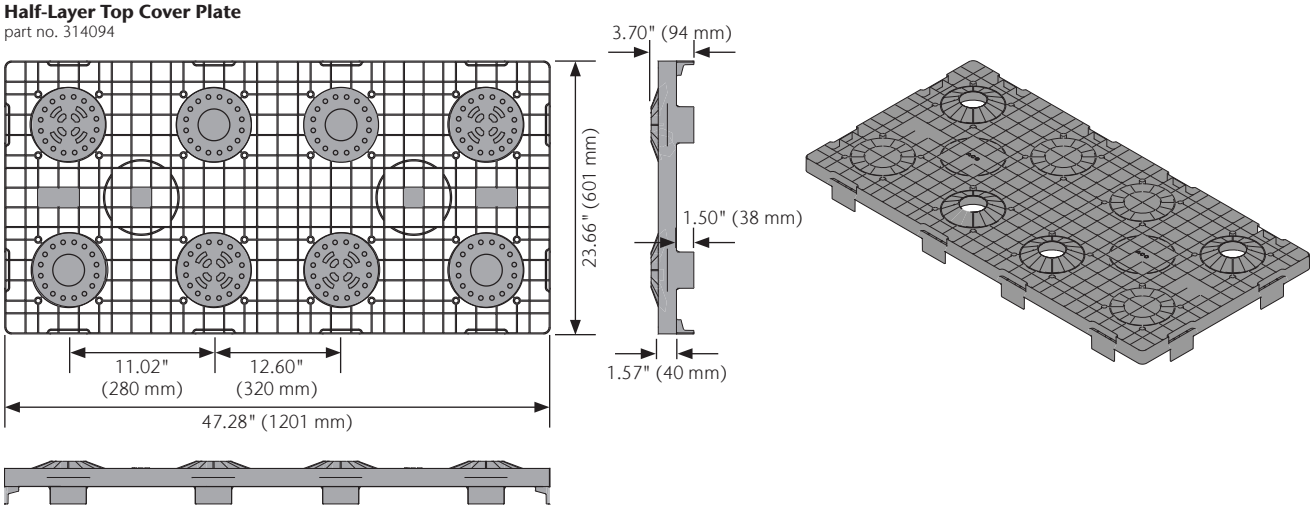
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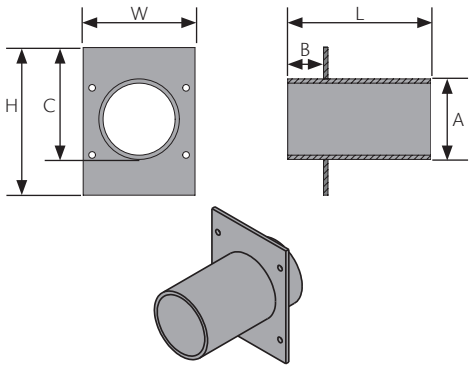
Stormwater Detention/Infiltration/Retention System

ACO Specification Information

Half-Layer Top Cover Plate
part no. 314094

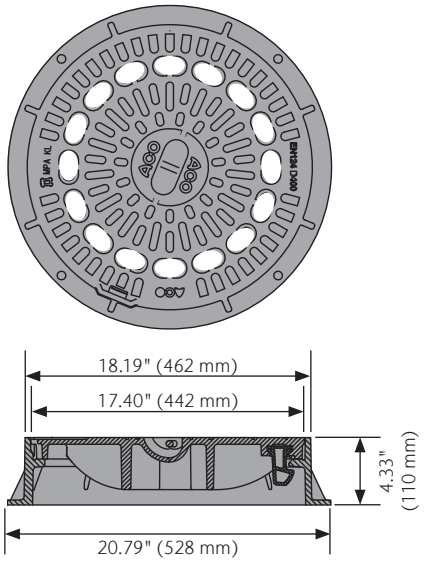


Horizontal Pipe Connector
part no.: see chart

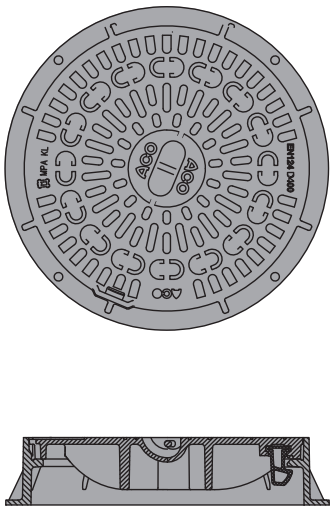


Part No.	A in (mm)	B in (mm)	C in (mm)	H in (mm)	W in (mm)	L in (mm)
93139	SDR 35 - 4"	2.00 (51)	6.25 (158)	8.25 (209)	6.70 (170)	8.00 (203)
93145	SCH 40 - 4"	2.00 (51)	7.47 (189)	8.29 (210)	6.70 (170)	8.00 (203)
93140	SDR 35 - 6"	2.00 (51)	8.95 (227)	9.93 (252)	10.22 (259)	8.00 (203)
93146	SCH 40 - 6"	2.00 (51)	9.11 (231)	9.93 (252)	10.22 (259)	8.00 (203)
93141	SDR 35 - 8"	2.00 (51)	10.46 (265)	11.39 (289)	11.64 (295)	8.00 (203)
93147	SCH 40 - 8"	2.00 (51)	10.57 (268)	11.39 (289)	11.64 (295)	8.00 (203)
93142	SDR 35 - 12"	2.00 (51)	13.48 (342)	14.30 (363)	16.66 (423)	8.00 (203)
93144	SCH 35 - 15"	2.00 (51)	17.28 (439)	19.25 (489)	19.25 (489)	8.00 (203)

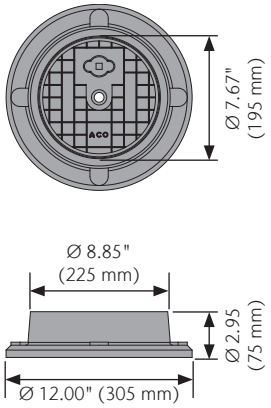
Remote Access Cover (Vented)
part no. 314053



Remote Access Cover (Non-Vented)
part no. 314043



Inspection Point Cover
part no. 314044



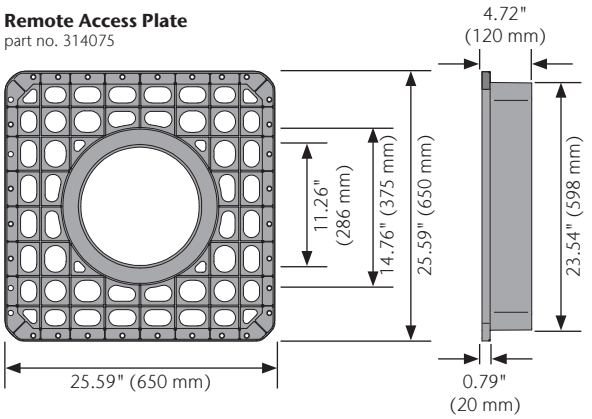
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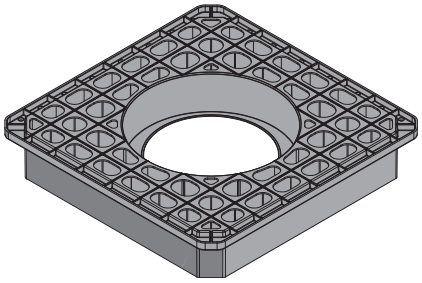
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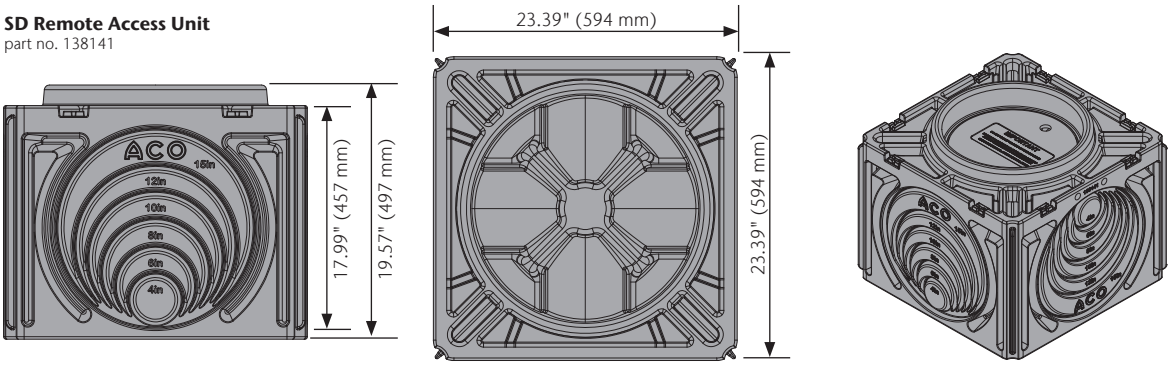
Stormwater Detention/Infiltration/Retention System

Remote Access Plate
part no. 314075

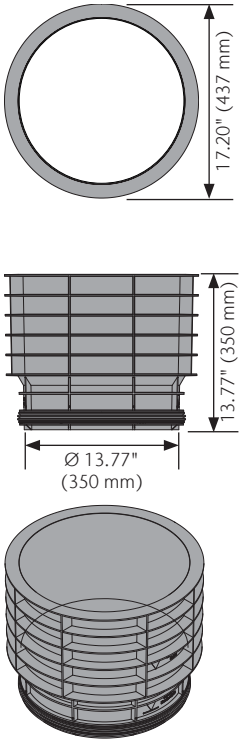




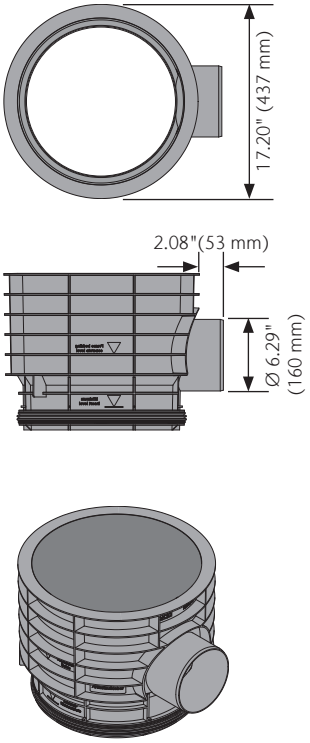
SD Remote Access Unit
part no. 138141



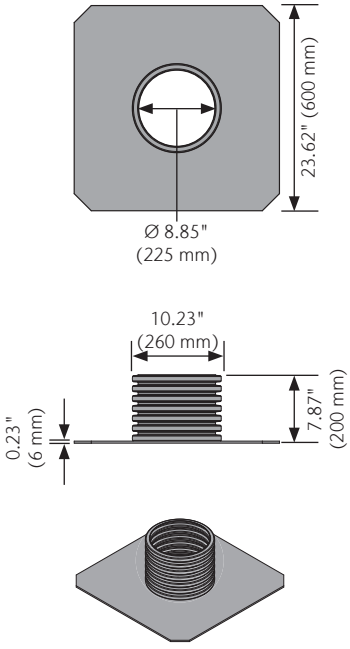
Extension Shaft
part no. 314038



Extension Shaft with Pipe Socket
part no. 314039



Vertical Inspection Point Connector
part no. 27018



ACO Specification Information

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2910 Brighton Road
Oakville ON L6H 5S3

Tel : +1 (905) 829-0665
info@acocan.ca

ACO StormBrixx® SD

January 2021

Stormwater Detention/Infiltration/Retention System

ACO StormBrixx SD Parts Table	Part No.	Length in (mm)	Width in (mm)	Depth in (mm)	Weight lbs (kg)
SD Half-Module	314090	47.24 (1200)	23.62 (600)	19.45 (494)	21.60 (9.80)
SD Side Panel	314091	35.71 (907)	23.31 (592)	1.57 (40)	7.20 (3.30)
SD Half-Layer Side Panel	314098	17.85 (454)	23.31 (592)	1.57 (40)	3.40 (1.54)
SD Top Cover	314092	21.65 (550)	21.65 (550)	1.96 (50)	1.60 (0.70)
Half-Layer Top Cover Plate	314094	47.25 (1200)	23.63 (600)	3.70 (94)	7.70 (3.50)
SD Remote Access Unit	138141	23.39 (594)	23.39 (594)	19.57 (497)	40.00 (18.12)
SD Layer Connector	314093	2.11 (54)	1.75 (44)	1.05 (27)	0.03 (0.02)
Remote Access Plate	314075	25.59 (650)	25.59 (650)	4.72 (120)	10.78 (4.90)
Remote Access Cover - Ductile Iron (Load Class D400)	314043	-	Ø 20.79 (528)	4.34 (110)	86.46 (39.30)
Remote Access Vented Cover - Ductile Iron (Load Class D400)	314053	-	Ø 20.79 (528)	4.34 (110)	83.60 (38.00)
Inspection Point Cover - Ductile Iron (Load Class D400)	314044	-	Ø 8.85 (225)	2.95 (75)	34.54 (15.70)
Extension Shaft	314038	-	Ø 17.21 (437)	13.78 (350)	4.84 (2.60)
Extension Shaft with Pipe Socket	314039	-	Ø 17.21 (437)	13.78 (350)	6.16 (2.80)
Vertical Inspection Point Connector	27018	-	Ø 8.85* (225)	7.87 (200)	5.52 (2.50)
Horizontal Pipe Connectors					
SDR 35 - 4"	93139		4.00* (102)		1.9 (0.87)
SCH 40 - 4"	93145		4.00* (102)		1.9 (0.87)
SDR 35 - 6"	93140		6.00* (152)		3.2 (1.49)
SCH 40 - 6"	93146	8.00 (203)	6.00* (152)	-	3.20 (1.49)
SDR 35 - 8"	93141		8.00* (203)		5.52 (2.50)
SCH 40 - 8"	93147		8.00* (203)		5.52 (2.50)
SDR 35 - 12"	93142		12.00* (305)		5.52 (2.50)
SDR 35 - 15"	93144		15.00* (381)		5.52 (2.50)

*Internal width

Specifications

General
The StormBrixx stormwater Detention*/ Infiltration*/Retention* system shall be ACO Stormbrixx SD as supplied by ACO, Inc.

ACO StormBrixx SD meets AASHTO H-20 and HS-20 loading conditions.

Materials
The half-module shall be manufactured from polypropylene and have minimum properties as follows:
Tensile impact strength:
152 ft-lb/in^2 (319 kj/m^2)
Tensile strength, ultimate:
3,480 psi (23,994 kpa)
Water absorption: 0.01%
Frost proof, salt proof and fuels and oils resistant

The stormwater tank shall provide an average 97% open area[1], holding up to 22.53[1] ft^3 (0.63 m^3) per module (2 half-modules assembled) and offer full access to all areas and levels for maintenance.

Geomembranes/Geotextiles
The StormBrixx stormwater system shall be wrapped in appropriate permeable geotextile or impermeable geomembrane* (supplied by others) as indicated by project design engineer.

Accessories
The StormBrixx stormwater system shall be used in conjunction with remote access unit or plate**/extension shaft**/inspection point connector**.

Installation
The StormBrixx stormwater system shall be installed in strict accordance with the manufacturer's installation instructions and recommendations.

*Choose one
**Choose none, one or more
[1]Configuration and use of side/top panels will marginally impact these figures

ACO Specification Information

ACO, Inc.

West Sales Office
825 W. Beechcraft Street
Casa Grande, AZ 85122
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Fax: (520) 421-9899

Northeast Sales Office
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Toll-Free: (800) 543-4764
Fax: (440) 639-7235

Southeast Sales Office
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Toll-Free: (800) 543-4764
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ACO StormBrixx®

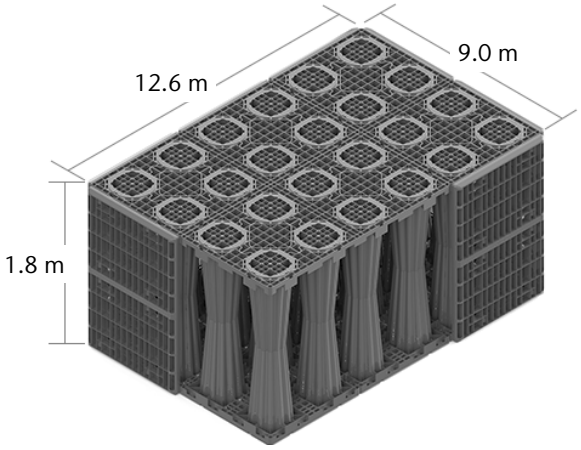
Online Project Configuration

Project Details
Description : peopleCare Delhi 2
Date : 02-14-2023
City : Delhi
State : Ontario
Zip Code : N4B 3B3
Country : CANADA

Customer Details
Contact : Tyler Keller
Email : tkeller@walterfedy.com

Tank Configuration

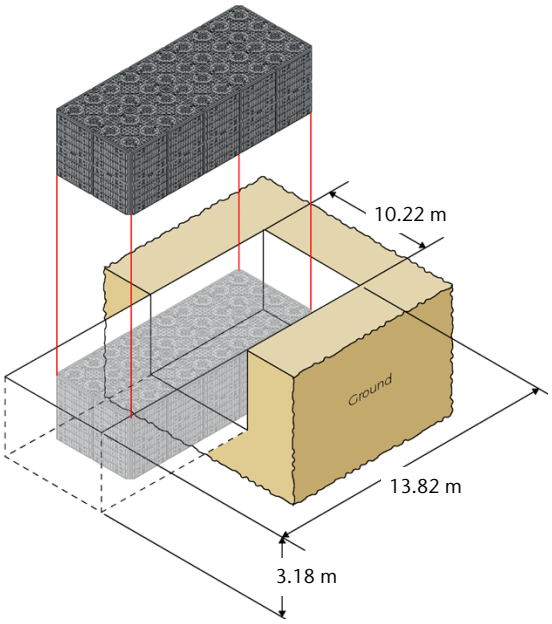
Tank Function	Infiltration
Product	Standard Duty (SD)
Number of Layers	2.0
Total Net Volume (m^3)	201.1 m^3
Total Gross Volume (m^3)	207.3 m^3
Length of Tank (m)	12.6 m
Width of Tank (m)	9.0 m
Depth of Tank (m)	1.8 m



Cavity & Excavation Details

Length of Cavity (m)	13.8 m
Width of Cavity (m)	10.2 m
Depth of Cavity (m)	3.2 m
Volume of Material to be Excavated (m^3)	449.1 m^3
*Membrane Quantity (m^2)	351.6 m^2
Cover Dimension (m)	1.2 m
**Backfill Material (m^3)	241.8 m^3

* Calculation includes a 15% overlap
** Pavement not accounted for



* Diagram shows cavity size rounded to nearest foot

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Project Configuration Inlets, Outlets, and Access

Inlets

		Qty
	Inlets	**3**
	Remote Access Unit	3
	Side Panels	0
	Horizontal Pipe Connector	0

Outlets

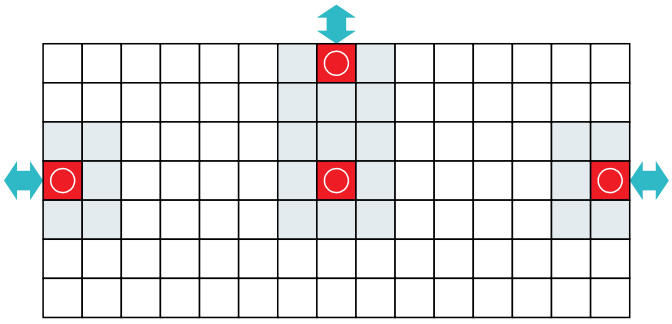
		Qty
	Outlets	**1**
	Remote Access Unit	0
	Side Panels	1
	Horizontal Pipe Connector	0

Access

		Qty
	Access Points	**1**
	Remote Access Unit	1
	Remote Access Plate	0

Grid Note

The grids below do not represent accurate dimensions or proportions they just give a general guide to both inlet / outlet and access placement on your StormBrixx scheme.



Inlet/Outlet Grid Key

Inlet/Outlet Pipe

Inlet/Outlet using Remote Access Unit

Access Grid Key

Remote Access Unit with maintenance access

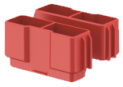
Remote Access Plate with maintenance access

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Bill of Materials

Pt No.		Description	Qty	Price Each ($)	Extended Price ($)	Weight Each (lbs)	Extended Weight (lbs)
314090		SD Half-Module	630			21.60	13,608.0
314091		SD Side Panel	144			7.20	1,036.8
314092		SD Top Cover	315			1.60	504.0
314093		SD Layer Connectors	473			0.03	14.2
138141		SD Remote Access Unit	16			40.00	640.0
314038		Extension Shaft	20			4.84	96.8
314053		Remote Access Vented Cover - Ductile Iron	4			83.60	334.4
27018		Vertical Inspection Point Connector	3			5.52	16.6
314044		Inspection Point Cover - Ductile Iron	3			34.54	103.6
Totals				**Price**		**Weight**	**16,354.4**

Notes:
1) These prices are the manufacturer's suggested retail price (MSRP). Please contact your local dealer or ACO Customer Service for more information.

2) You should have received an email with your output results from: no-reply@acosbconfigurator.com If you do not receive the confirmation within a few minutes, please check your spam folder.

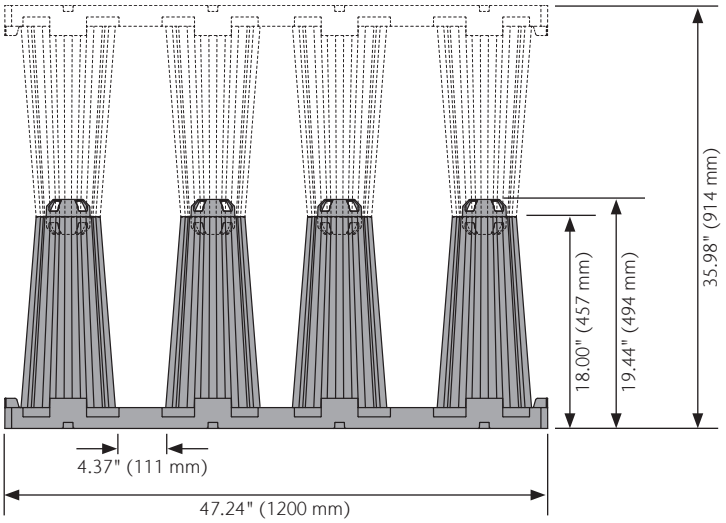
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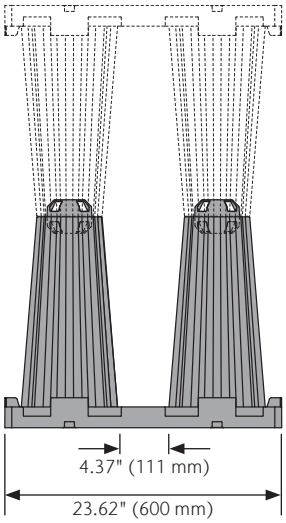
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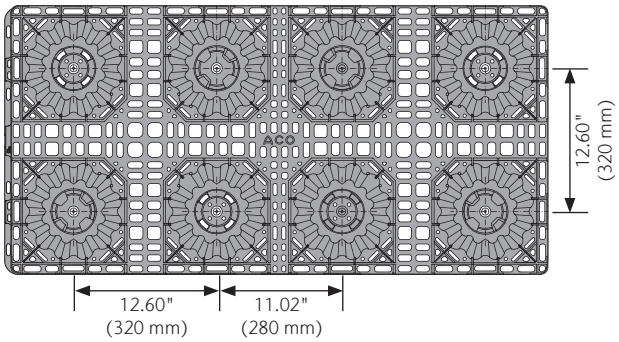
Stormwater Detention/Infiltration/Retention System

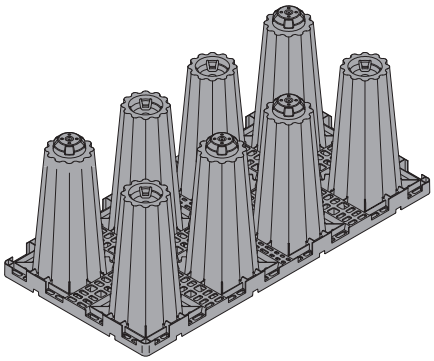
ACO Specification Information

SD Half-Module
part no. 314090

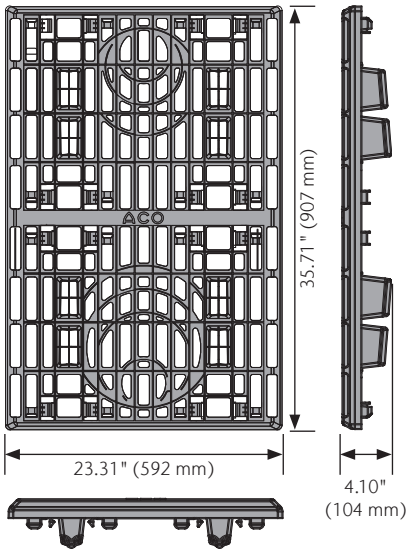




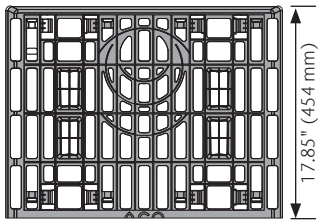




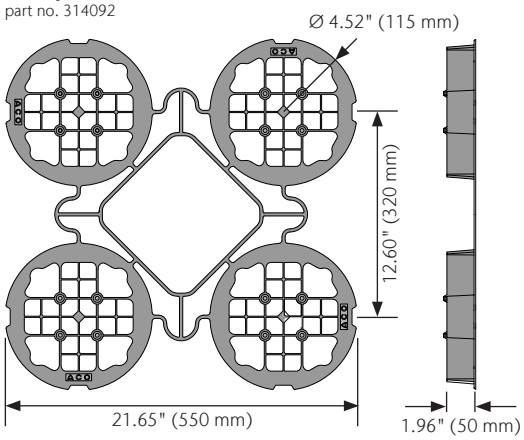
SD Side Panel
part no. 314091



SD Half-Layer Side Panel
part no. 314098



SD Top Cover
part no. 314092



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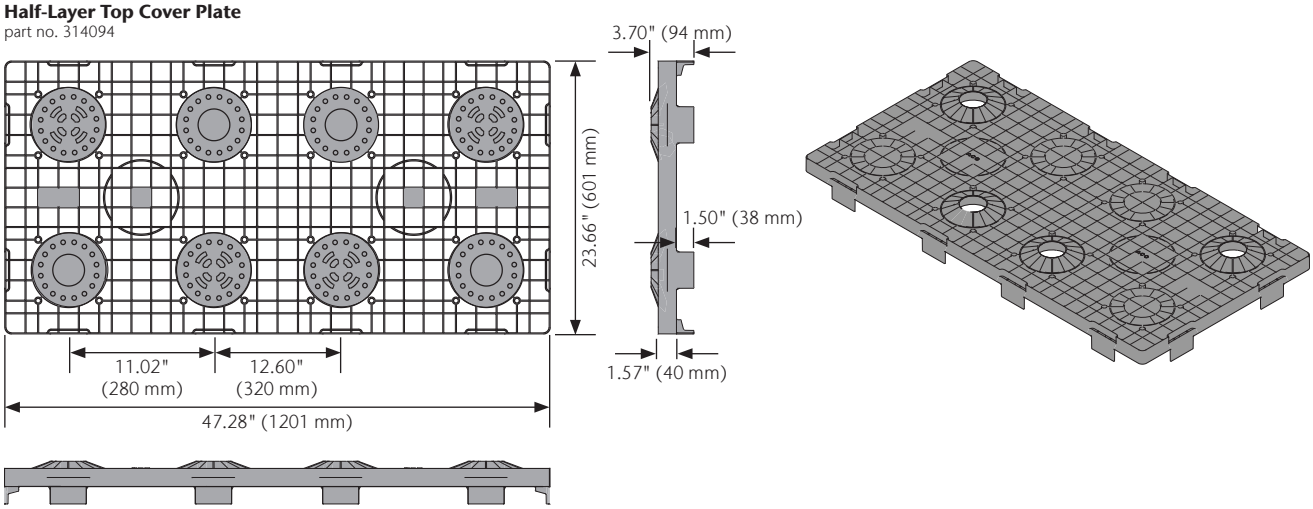
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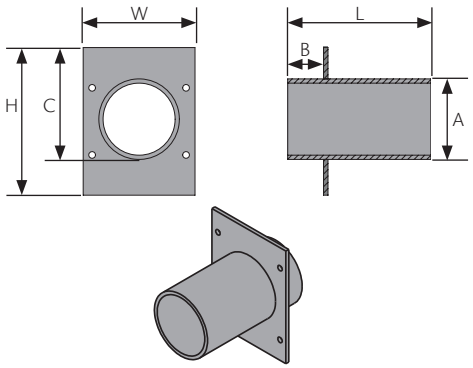
Stormwater Detention/Infiltration/Retention System

ACO Specification Information

Half-Layer Top Cover Plate
part no. 314094

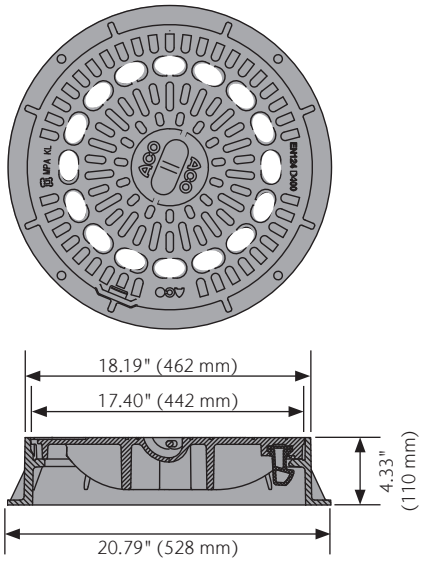


Horizontal Pipe Connector
part no.: see chart

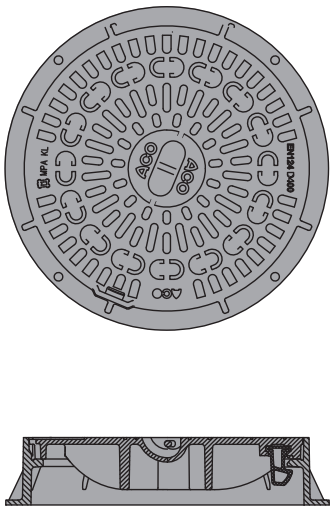


Part No.	A in (mm)	B in (mm)	C in (mm)	H in (mm)	W in (mm)	L in (mm)
93139	SDR 35 - 4"	2.00 (51)	6.25 (158)	8.25 (209)	6.70 (170)	8.00 (203)
93145	SCH 40 - 4"	2.00 (51)	7.47 (189)	8.29 (210)	6.70 (170)	8.00 (203)
93140	SDR 35 - 6"	2.00 (51)	8.95 (227)	9.93 (252)	10.22 (259)	8.00 (203)
93146	SCH 40 - 6"	2.00 (51)	9.11 (231)	9.93 (252)	10.22 (259)	8.00 (203)
93141	SDR 35 - 8"	2.00 (51)	10.46 (265)	11.39 (289)	11.64 (295)	8.00 (203)
93147	SCH 40 - 8"	2.00 (51)	10.57 (268)	11.39 (289)	11.64 (295)	8.00 (203)
93142	SDR 35 - 12"	2.00 (51)	13.48 (342)	14.30 (363)	16.66 (423)	8.00 (203)
93144	SCH 35 - 15"	2.00 (51)	17.28 (439)	19.25 (489)	19.25 (489)	8.00 (203)

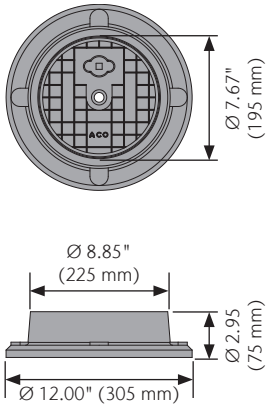
Remote Access Cover (Vented)
part no. 314053



Remote Access Cover (Non-Vented)
part no. 314043



Inspection Point Cover
part no. 314044



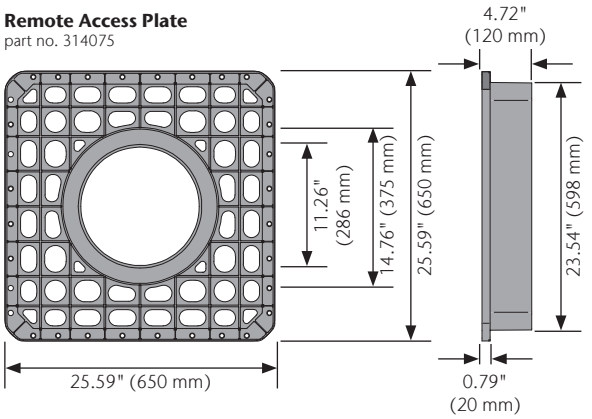
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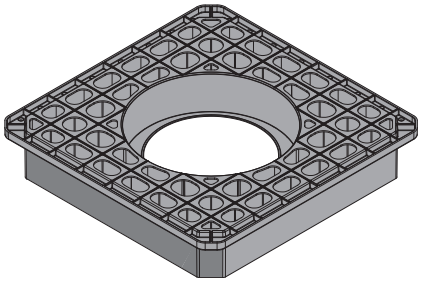
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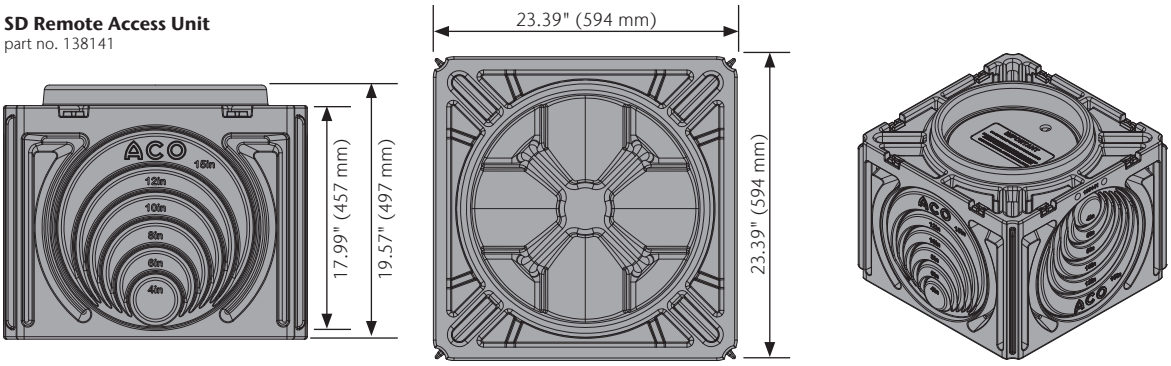
Stormwater Detention/Infiltration/Retention System

Remote Access Plate
part no. 314075

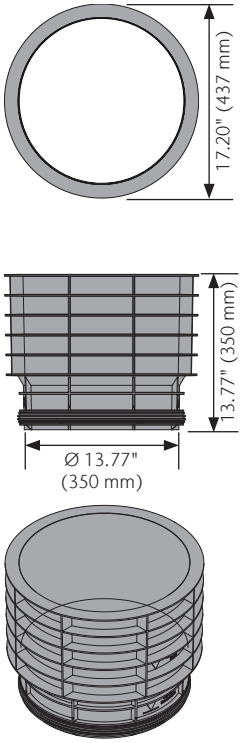




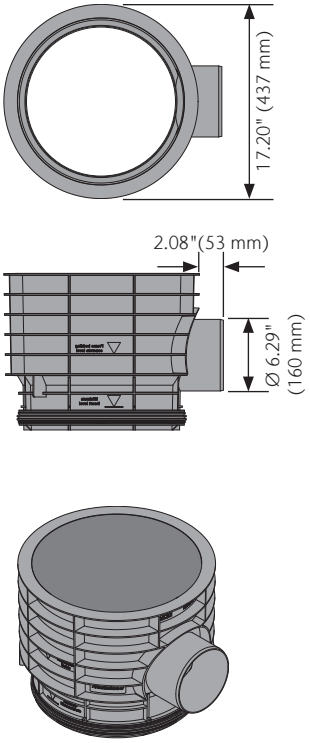
SD Remote Access Unit
part no. 138141



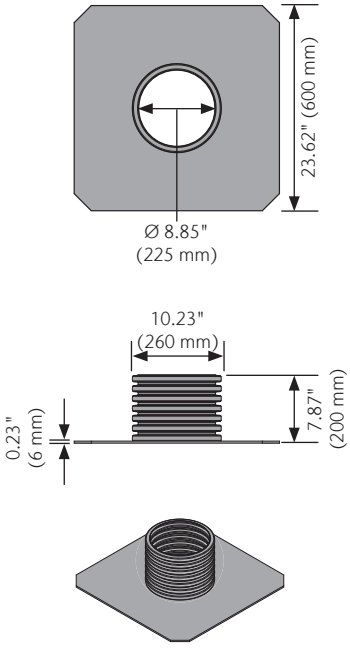
Extension Shaft
part no. 314038



Extension Shaft with Pipe Socket
part no. 314039



Vertical Inspection Point Connector
part no. 27018



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ACO StormBrixx® SD

January 2021

Stormwater Detention/Infiltration/Retention System

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Extension Shaft	314038	-	Ø 17.21 (437)	13.78 (350)	4.84 (2.60)
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SCH 40 - 4"	93145		4.00* (102)		1.9 (0.87)
SDR 35 - 6"	93140		6.00* (152)		3.2 (1.49)
SCH 40 - 6"	93146	8.00 (203)	6.00* (152)	-	3.20 (1.49)
SDR 35 - 8"	93141		8.00* (203)		5.52 (2.50)
SCH 40 - 8"	93147		8.00* (203)		5.52 (2.50)
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*Internal width

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**Choose none, one or more
[1]Configuration and use of side/top panels will marginally impact these figures

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Fax: (440) 639-7235

Southeast Sales Office
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Fort Mill, SC 29708
Toll-Free: (800) 543-4764
Fax: (803) 802-1063

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CHUNG & VANDER DOELEN
ENGINEERING LTD.

GEOTECHNICAL INVESTIGATION & PRELIMINARY HYDROGEOLOGICAL ASSESSMENT PROPOSED LONG-TERM CARE FACILITY

750 Gibralter Street & 724 James Street
Delhi, Ontario

SUBMITTED TO:
peopleCare Inc.
735 Bridge Street West
Waterloo, Ontario
N2V 2H1

ATTENTION:
Wade Stever

FILE NO /G22503**/**December 16, 2022

CHUNG & VANDER DOELEN
ENGINEERING LTD.

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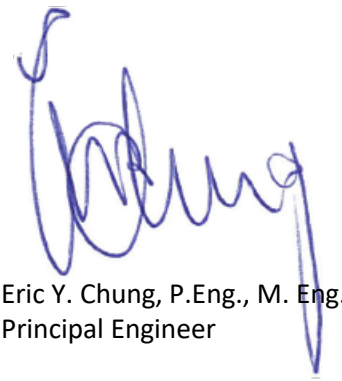
RE: Geotechnical Investigation
Proposed Long-Term Care Facility
750 Gibralter Street & 724 James Street, Delhi, Ontario

We take pleasure in enclosing one (1) copy of our Geotechnical Investigation Report prepared for the above-referenced site.

If you have any questions or clarifications are required, please contact the undersigned at your convenience.

We thank you for giving us this opportunity to be of service to you.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.



Eric Y. Chung, P.Eng., M. Eng.
Principal Engineer

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1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by peopleCare Inc. to conduct a geotechnical investigation for the proposed long-term care facility to be constructed at 750 Gibralter Street and 724 James Street in Delhi, Ontario.

It is understood that the existing long-term care facility and former automotive garage will be demolished, and the site will be redeveloped with a 2-storey "O"-shaped long-term care building with one (1) level of basement. The proposed building is to be located to the immediate south of the existing facility and will comprise 128 beds. Asphalt-paved driveways and parking areas are proposed to the south and east of the proposed building with driveway access to Dalton Road and James Street. The finished floor elevation and site grading plan were not provided at the time of reporting.

The purpose of this investigation was to determine the subsurface conditions at the site and, based on the findings, to make geotechnical recommendations for:

- Site grading and engineered fill construction;
- Foundation design recommendations;
- Excavation condition;
- Groundwater control during construction;
- Slab-on-grade design;
- Backfilling recommendations;
- Foundation soil classification for seismic design per OBC 2012;
- Foundation and retaining wall design;
- Site servicing; and
- Pavement design and construction

Infiltration rates of the various soil deposits encountered during the investigation will also be provided for stormwater management features.

2.0 FIELD AND LABORATORY WORK

To investigate the subsurface conditions at the site, fifteen (15) boreholes were advanced to depths between 3.5 and 8.1 m below existing grade on September 6 and 7, 2022. The borehole locations are illustrated on the Borehole Location Plan, Drawing No. 1, appended.

The field investigation program was conducted under the supervision of a member of our engineering team, who logged the subsurface conditions encountered at the boreholes, effected the subsurface sampling and testing, and monitored the groundwater conditions. The boreholes were advanced using a track-mounted drilling rig, supplied, and operated by a specialized contractor. The drill rig was equipped with continuous flight augers and standard soil sampling equipment. Underground utilities were located prior to commencing the field work program.

Standard penetration tests (SPTs) in accordance with ASTM Specification D1586, were carried out at frequent intervals of depth, and the results are shown on the Borehole Logs as Penetration Resistance or "N"-values. The compactness condition of the soil strata has been inferred from the test results.

Groundwater conditions were monitored during sampling and upon removal of the drilling augers at all borehole locations. In addition, as part of a concurrent Phase II Environmental Site Assessment (ESA) by CVD, three (3) monitoring wells were installed at the site to establish the groundwater table and allow for groundwater sampling.

Soil samples collected during the borehole investigation program were examined in the field and subsequently brought to CVD's laboratory for tactile examination. Moisture content determination on all retrieved soil samples was performed. Three (3) grain size distribution analyses were conducted on representative samples of the encountered soil deposits.

The location and ground surface elevation of the boreholes were surveyed by CVD with reference to a local temporary benchmark (TBM). The temporary benchmark elevation and ground surface elevations at the boreholes were surveyed by CVD for the purpose of this report using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using The UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

The referenced temporary benchmark (TBM) which is described below:

TBM: Top of manhole at southern site entrance at Dalton Road, as shown on Drawing No. 1

Elevation: 242.20 m (Geodetic)

3.0 EXISTING SITE CONDITIONS

The site is currently occupied by a single-storey long-term care facility located at the northwest corner and a single-storey former automotive garage located on the eastern portion (724 James Street) of the site. An asphalt-paved parking/driveway is located to the east and south of the existing long-term care facility. A gravel "worn-out" laneway passes centrally through the site connecting the long-term care facility parking lot to Dalton Road (east of 169 Dalton Road). An asphalt-paved parking lot surrounds the existing building at 724 James Street to the east and south. The remainder of the site is grass-covered with many mature trees scattered throughout.

The ground surface of the eastern portion of the site is relatively level in grade and then gently declines in elevation from east to west starting at the approximate midpoint of the site. The site also gently declines in elevation from south to north. The ground surface elevations at the borehole locations ranged between 239.17 and 242.20 m.

4.0 SUBSURFACE CONDITIONS

The subsurface conditions encountered at the boreholes are detailed on the Borehole Log Sheets, Enclosures 1 to 15 of this report. The following notes are intended to amplify and comment on the subsurface data.

The stratigraphic boundaries shown on the borehole logs are inferred from non-continuous sampling conducted during advancement of the borehole drilling procedures and, therefore, represent transitions between soil types rather than exact planes of geologic change. The subsurface conditions will vary between and beyond the borehole locations.

4.1 Topsoil and Pavement

Topsoil was encountered at the ground surface at Boreholes 1, 4 to 11, 13 and 15 with measured thicknesses ranging from 175 to 225 mm.

Asphalt pavement was encountered at the ground surface at Boreholes 2 and 12 with measured asphalt thicknesses between 25 and 50 mm and granular base thicknesses between 275 and 425 mm.

Gravel surface pavement was encountered at the ground surface at Boreholes 3, 14 and 15 with granular base thicknesses between 80 and 300 mm.

4.2 Fill

Fill materials were encountered underlying the topsoil at Borehole 8 and the pavement structure at Borehole 14 which extended to depths between 0.7 and 1.35 m below existing grade. It is noted that fill materials could be deeper in the vicinity of existing building foundations and utility trenches. The fill materials comprised of fine granular soils ranging from sand with some silt to sand and silt. The fill contained traces of gravel and topsoil.

Standard penetration testing within the fill yielded “N”-values between 5 and 11 blows per 300 mm of penetration, indicating a loose to compact compactness condition. Natural moisture contents were measured between 2 and 7%, indicating a damp to moist moisture condition.

4.3 Upper Sand

An upper fine to medium sand deposit was encountered underlying the topsoil at Boreholes 1, 4 to 6, 10, the pavement structure at Boreholes 2 and 15 and the fill at Borehole 14. The deposit extended to depths between 1.4 and 2.9 m below existing grade at Boreholes 1, 4 to 6, 10 and 15. Boreholes 2 and 14 were terminated within the deposit which extended to depths between 3.5 and 6.6 m below existing grade.

The deposit contained trace to some gravel and silt. The upper 2± m of the sand deposit at Borehole 2 contained gravel in the range of some to gravelly. Occasional sand and gravel seams were encountered within the sand deposit at Borehole 10. The deposit became silty below 6.0± m depth at Borehole 2. One (1) grain distribution analysis was conducted on a representative sample of the deposit from Borehole 10 and the results are graphically presented on Enclosure 18.

Standard penetration testing within the deposit yielded "N"-values between 4 and 64 blows per 300 mm, indicating a variable very loose to very dense compactness condition. Natural moisture contents were measured between 1 and 15%, indicating a damp to moist moisture condition.

4.4 Fine Granular Deposits

Fine granular deposit was encountered underlying the topsoil at Boreholes 7, 9, 11 and 13, the pavement structure at Boreholes 3 and 12, the upper sand deposit at Boreholes 1, 4 to 6, 10 and 15, and the fill at Borehole 8. The deposits extended to depths between 2.9 and 3.7 m below existing grades at Boreholes 1 and 3 to 9. Boreholes 10 to 13 and 15 were terminated within the deposits which extended to depths of 3.5 m below existing grade.

The deposits ranged in composition from silty sand to silt with trace sand. Traces of gravel and clay were encountered within the deposits. Occasional sand lenses were encountered within the deposits at Boreholes 1 and 7 and occasional topsoil pockets were encountered within the deposits at Borehole 7. A 0.7± m thick clayey layer was encountered at Borehole 11 between 1.5± and 2.2± m depth and a 0.6± m sand layer was encountered at Borehole 8 between 1.5± and 2.1± m depth. Two (2) grain distribution analyses were conducted on representative samples of the deposit from Boreholes 11 and 14 and the results are graphically presented on Enclosures 16 and 17.

Standard penetration testing within the deposits yielded "N"-values between 3 and 68 blows per 300 mm, indicating a variable very loose to very dense compactness condition. Natural moisture contents were measured between 2 and 18%, indicating a damp to wet moisture condition.

4.5 Lower Sand

A lower fine to medium grained sand deposit was encountered underlying the fine granular deposits at Boreholes 1 and 3 to 9. All eight (8) boreholes were terminated within the sand deposit which extended to depths between 3.5 and 8.1 m below existing grade. The deposit contained trace to some silt and traces of gravel. The deposit became silty below 7.5± m depth at Boreholes 1 and 6.

Standard penetration testing within the deposit yielded "N"-values between 12 and 79 blows per 300 mm, indicating a compact to very dense compactness condition. Natural moisture contents were measured between 3 and 8%, indicating a damp to moist moisture condition.

4.6 Groundwater

Groundwater conditions were monitored during sampling and upon removal of the drilling augers at all borehole locations.

In addition, as part of concurrent Phase II Environmental Site Assessment (ESA) by CVD, three (3) monitoring wells were installed at the site to establish the groundwater table and allow for groundwater sampling. The table below summarizes the water level readings in the monitoring well:

Monitoring Well No.	Existing Ground Elevation (m)	Date	Water Level Below Existing Ground Surface (m)	Water Level Elevation (m)
1	241.86	September 13, 2022	10.53	231.33
2	241.81	September 13, 2022	10.45	231.36
3	241.83	September 13, 2022	10.34	231.49

Groundwater levels measured in monitoring wells were at depths between 10.34 and 10.53 m below existing grades, corresponding to elevations between 231.33 and 231.49 m.

Groundwater was not encountered within geotechnical Boreholes 1 to 15 during sampling and following withdrawal of the drilling augers. Dry cave-in was experienced at Boreholes 1 to 8 at depths between 4.9± and 6.7± m below existing grade and Boreholes 9 to 15 remained open and dry upon withdrawal of the drilling augers.

Based on the measured/observed groundwater levels in the monitoring wells and boreholes upon withdrawal of the drilling augers during sampling and measured moisture contents, the groundwater table at the site lies at depths between 8.0± and 10.5± m below existing grade, corresponding to elevations between 231.3± and 231.5± m.

It is noted that the observed groundwater table will fluctuate seasonally and in response to major weather events.

5.0 DISCUSSION AND RECOMMENDATIONS

It is understood that the existing long-term care facility and former automotive garage will be demolished, and the site will be redeveloped with a 2-storey "O"-shaped long-term care building with one (1) level of basement. The proposed building is to be located to the immediate south of the existing facility and will comprise 128 beds. Asphalt-paved driveways and parking areas are proposed to the south and east of the proposed building with driveway access to Dalton Road and James Street. The finished floor elevation and site grading plan were not provided at the time of reporting.

In general, the surficial topsoil and pavement structure were underlain by fine granular fill materials at Boreholes 8 and 14 which extended to depths between 0.7 and 1.35 m below existing grades. These layers were underlain by variable, very loose to very dense sand and fine granular deposits ranging in composition from silty sand to silt which extended to the maximum explored depths of the boreholes.

Based on the measured/observed groundwater levels in the monitoring wells and boreholes upon withdrawal of the drilling augers during sampling and measured moisture contents, the groundwater table at the site lies at depths between 8.0± and 10.5± m below existing grade, corresponding to elevations between 231.3± and 231.5± m.

5.1 Hydrogeological Condition and One-Level Basement

It is understood that one-level of basement is to be constructed below the long-term care facility. The depth of the basement is anticipated to be in the order of 3± m. As the groundwater table was encountered at elevations between 231.3± and 231.5± m, some 8.0± to 10.5± m below existing grade, the proposed one level basement (approximately 3 m deep) is considered feasible.

It is anticipated that excavations will be made in damp to moist fine granular and sand deposits. Therefore, water-proofing will not be required for the basement floor and elevator pit. Dewatering will not be required and local control of seepage/surface water ingress using conventional sump pumping technique will be feasible for foundation and basement construction.

5.2 Site Grading and Engineered Fill Construction

In light of the grade differential across the site, some cutting, and filling will be carried out. It is recommended to construct engineered fill in areas where non-suitable founding soil conditions currently exist and in areas to be raised to suitably support the future building foundations, floor slabs and pavement areas. Engineered fill will allow foundation construction to occur at more desirable and conventional depth levels.

It is recommended to salvage inorganic granular-based soil excavated from "cut" and required repair areas and reuse them for site regrading and engineered fill purposes. The natural moisture content of the fill soil to be reused should be within 3% drier of the optimum moisture content in order to achieve the specified degree of compaction. Moisture adjustment of the salvaged fill may be required to produce a suitable moisture content.

Any engineered fill to be constructed below the proposed buildings/structures is recommended to consist of approved onsite granular-based soil or imported OPSS Granular B Type I. It is recommended that any proposed borrow source materials be tested prior to importing to ensure that the environmental quality of the imported fill meets all environmental approval criteria and to ensure that the natural moisture content of the fill is suitable for compaction.

It is recommended that engineered fill be constructed during the summer and early fall months when drier warmer weather conditions typically exist as onsite soils with appreciable amounts of silt and clay are sensitive to moisture and will become difficult to handle and compact to the specified degrees of compaction when wet.

The onsite fine granular soils are frost-susceptible. Constructing engineered fill, backfilling footings, foundation walls and service trenches using the finer grained soils during the winter months is not advisable, unless suitable weather conditions prevail, the soils are at suitable moisture content, and strict procedures are followed and monitored on a full-time basis by the geotechnical engineer.

The onsite soils are susceptible to softening and deformation when exposed to excessive moisture and construction traffic. As a result, it is imperative that the grading/filling operations are planned and maintained to direct surface water run-off to low points and then be positively drained by suitable means. During periods of wet weather, construction traffic should be directed along the designated construction routes so as not to disturb and rut the exposed subgrade soil. Temporary construction roads consisting of clear crushed material (such as crushed stone or recycled concrete) may be required during poor weather conditions such as wet Spring or Fall.

Engineered fill should be constructed in accordance with the following procedures to support building foundations, floor slabs and pavement areas:

1) All topsoil, pavement structure, existing foundations and backfill, fill materials and any deleterious materials, and **loose** native soil are to be excavated/removed from beneath the building footprint. Inorganic granular-based fill soil should be separated and salvaged for reuse to construct engineered fill. Organic and/or deleterious materials are to be discarded from being used as engineered fill;

2) The exposed inorganic earth subgrade is to be thoroughly recompacted by large heavy compaction equipment (10 tonne sheepsfoot compactor is recommended) and inspected by qualified geotechnical personnel. Any loose or soft areas identified should be excavated to the level of competent soil;

3) The required grades can then be achieved by placing approved onsite granular-based fill or imported OPSS Granular B Type I in maximum 300 mm thick loose lifts and compacting to a minimum of 100% Standard Proctor maximum dry density (SPMDD) in areas to support building foundations. The compaction can be reduced to 95% SPMDD to support the floor slabs.

   Use of imported coarse sand and gravel may be required for initial placement procedures if wet/unstable conditions are exposed at the subgrade preparation level. Salvaged fine grained

soil (including sand/silt or other approved inorganic earth fill) can be used beneath pavement areas. It can be placed in maximum 300 mm thick loose lifts and compacted to at least 95% SPMDD.

The moisture content of all fill materials should be within 3% below their optimum moisture contents to achieve the specified degrees of compaction;

4) Engineered fill used to support future building foundations and floor slabs must be placed such that the fill pad extends horizontally outwards from all footings at least the same distance as how thick the engineered fill pad will exist between the underside of future footings and the approved native earth subgrade;

5) All engineered fill placement and compaction operations must be supervised on a full-time basis by qualified geotechnical personnel to approve fill material and ensure the specified degrees of compaction have been achieved.

Vibration could be generated from various construction equipment during construction, such as compactors and rollers which could be harmful to surrounding structures and buildings. Peak particle velocity (PPV) of ground motion is widely accepted as the best descriptor of potential for vibration damage to structures. The safe vibration limit can be set to 10 to 20 mm/s PPV, depending on the sensitivity of surrounding structures to vibration.

Vibration monitoring can be carried out to measure the PPV of ground motion from vibration generated from typical compaction equipment at the beginning of the project in the potentially critical areas. This will set criteria and establish the type of equipment to be used for this project. A pre-construction condition survey could be conducted to document the condition of the existing structures within the possible zone of influence, if necessary.

5.3 Footing Foundations

The proposed long-term care facility can be supported on conventional strip and spread footing foundations. Footings constructed on approved monitored engineered fill (see Section 5.2, Site Grading and Engineered Fill Construction) and competent native deposits can be designed using a Geotechnical Reaction at SLS of 150 kPa. The Factored Geotechnical Resistance at ULS is 250 kPa.

These soil bearing pressures can be achieved provided that the founding subgrade is undisturbed during construction. The majority of the settlements will take place during construction and the first loading cycle of the building.

The maximum total and differential settlements of footings designed to the above recommended soil bearing pressure are expected to be less than 25 and 20 mm, respectively, and these are considered tolerable for the structure being contemplated.

The following table summarizes the highest founding level and elevation for the footing at each borehole location:

Borehole No.	Existing Ground Elevation (m)	Highest Founding Depth (m)	Highest Founding Elevation (m)
1	240.83	2.13	238.70
2	239.17	0.57	238.60
3	240.23	0.53	239.70
4	240.73	0.53	240.20
5	240.69	2.29	238.40
6	240.76	0.86	239.90
7	240.83	2.93	237.90
8	240.71	0.81	239.90

In addition, the footings should be founded below any existing foundations, fill materials and utility trenches, on competent native undisturbed soils. Spacing between adjacent footing steps should not be steeper than 10H to 7V.

Exterior footings and footings in unheated portions of the building should be provided with a soil cover of not less than 1.2 m or equivalent synthetic thermal insulation for adequate frost protection. The founding subgrade soils must be protected from frost penetration during winter construction.

It is recommended that a lean concrete mat be placed over approved footing subgrade in wet to saturated areas to prevent further disturbance to the bearing soils resulting from construction activities.

It is recommended that the footing excavations be inspected by the geotechnical engineer to ensure adequate soil bearing and proper subgrade preparation.

5.4 Earthquake Considerations

In accordance with The Ontario Building Code 2012 (OBC), the proposed structure should be designed to resist earthquake load and effects as per OBC Subsection 4.1.8.

Based on the anticipated condition of the engineered fill materials and the underlying soil condition encountered at the boreholes, the site can be classified as a Site Class C as per OBC Table 4.1.8.4.A (Page B4-24).

5.5 Floor Slab Construction

The floor slab can be constructed as conventional slab-on-grade on the competent native sand and fine granular deposits. The exposed subgrade should be proof-rolled with a heavy roller in conjunction with an inspection by the geotechnical engineer at the time of floor slab construction. Any soft and/or unstable areas detected should be replaced with granular fill which should be compacted to at least 95% SPMDD.

It is recommended that a minimum 150 mm thick layer of OPSS Granular "A" be placed and compacted to at least 100% SPMDD beneath the concrete floor slab to provide uniform support.

A modulus of subgrade reaction (k_s) of 50 MN/m^3 may be used for the design of the floor slabs, assuming a stable native sand/silt subgrade.

The floor slab should be separated structurally from the columns and foundation walls. Sawcut control joints should be provided at regular spacing (less than 30 times the concrete slab thickness) and to depths between one-third to one-quarter of the slab thickness.

Care should be taken to ensure that the backfill against foundation walls, interior piers/columns and concrete pits are placed in thin layers and each layer compacted to at least 95% SPMDD. These types of confined areas should be backfilled with excavated granular materials or imported granular soils such as OPSS Granular B Type I.

Moisture migration from the underlying soils through the concrete slab-on-grade will take place via "capillary action" and "diffusion" (due to vapour pressure differential). Although, the Granular "A" layer will provide a capillary break, the low permeance of the concrete slab and floor coverings will result in 100% humidity under the concrete slab and, consequently, the moisture in the concrete will increase over time. The potential effect of the soil moisture should be considered in selecting the floor coverings. A vapour retarder material (such as a 15-mil poly, ASTM E-1745) can be placed to reduce soil moisture migration. Reference is made to ACI 302.

5.6 Excavation and Site Servicing

The long-term care facility is to be municipally serviced. Excavation depths for site grading/engineered fill construction, site servicing and building foundations are expected to be in the order of 1.2 to 4.5 m below finished grades.

Excavations for site servicing and building construction will generally be made in Type 3 soils as per the Regulations for Construction Projects Under The Ontario Occupational Health and Safety Act. Excavations are expected to remain stable during the construction period provided that side slopes are shaped to 1H :1V from the bottom of the excavation and suitably protected from erosion processes. Should unstable and/or wet conditions be encountered, side slopes to excavations are to be flattened to a stable configuration. The side slopes should be suitably protected from erosion processes.



Uncontrollable groundwater flows are not expected to be encountered within the anticipated construction excavations. Subsurface seepage and surface water runoff into the excavations may be handled by conventional sump pumping techniques, as and where required. The sump pits should be filtered.

The subgrade is expected to be competent for the support of flexible or rigid pipes if founded in the compact native deposits or approved engineered fill. Any loose, unstable and/or organic soils encountered at the pipe invert should be sub-excavated and replaced with well compacted Granular "A" which should be placed in 150 mm thick layers and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD). The support of pipes in these areas can also be achieved with non-shrinkable fill if poor soil is encountered at the subgrade level and fully removed.

Pipe bedding should be in accordance with Ontario Provincial Standard Drawings OPSD - 802 series. The bedding shall be Class "B" and consist of at least 150 mm thick Granular "A" compacted to at least 95% SPMDD. Granular "A" should be used to backfill around the pipe to at least 150 mm above the top of the pipe. Particular attention should be given to ensure material placed beneath the haunches of the pipe is adequately compacted.

Excavated inorganic soil is considered suitable for reuse as trench backfill. If necessary, potential mixing of drier and wetter excavated soils in proper ratios or judicious addition of water can be done to produce a suitable mixture near the material’s optimum moisture content to achieve the required compaction specification.

The backfill should be placed in thin layers, 300 mm thick or less dependant on the demonstrated success of compaction based on in-situ density test results. Other types of materials such as organic soils, overly wet soils, boulders, and frozen materials (if work is carried out in the winter months) should not be used for backfilling. All backfill should be compacted to at least 95% SPMDD. Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time to minimize potential problems. This will potentially minimize over-wetting of the subgrade material.

5.7 Lateral Earth Pressure

The unbalanced foundation walls and any other soil retaining structures should be designed to resist the lateral earth pressure acting against these walls. The following formula may be used to calculate the unfactored earth pressure distribution. The factored resistance can be calculated by using a factor of 0.8.

$P = K (\gamma H + q)$

where:

P =	Lateral earth pressure	kPa
K =	earth pressure coefficient, 0.5 for non-yielding foundation wall earth pressure coefficient, 0.3 for yielding retaining wall	
γ =	unit weight of granular backfill, compacted to 95% SPMDD	21 kN/m^3
H =	unbalanced height of wall	m
q =	surcharge load at ground surface	kPa

The backfill for the foundation walls and retaining walls should be free-draining granular materials which should have less than 8% silt particles (OPSS Granular "B" Type I). The backfill should be placed in thin layers and compacted to 95% SPMDD. Over-compaction adjacent to the foundation/retaining walls should be avoided. Compaction should be carried out with hand operated equipment within 1 m of the foundation wall or retaining wall. Weeping tiles leading to a frost-free outlet or weep holes should be installed to effect drainage behind the retaining wall.

The sliding resistance of the retaining wall footings should be checked. The unfactored horizontal resistance against sliding between cast-in-place concrete and the various soils can be calculated using a friction coefficient as follows:

Soil	Unit Weight (kN/m^3)	Friction Coefficient
Well-Compacted Granular Backfill	21	0.40
Sand	20	0.35
Fine Granular Deposits	20	0.30

5.8 Driveway Pavement Design and Construction

The earth subgrade in pavement areas is expected to consist of sand and fine granular soils. The following flexible pavement structures are recommended based on an assumed CBR value, the observed groundwater conditions, and the frost susceptibility of the subgrade soils:

Component	Light Duty Pavement (mm)	Heavy Duty Pavement (mm)
Asphaltic Concrete HL3 Asphaltic Concrete HL8	40 40	40 50
Granular "A" Base	150	150
Granular "B" Sub-base	300	400

The pavement design considers that pavement construction will be carried out during the drier time of the year and that the subgrade is stable, not heaving under construction equipment traffic. If the subgrade is wet or unstable, additional granular sub-base may be required.

Prior to the placement of the granular base, the subgrade will be stripped of existing pavements, topsoil, and deleterious materials. The exposed subgrade should be thoroughly recompacted with a heavy vibratory compactor and inspected by a qualified geotechnical inspector. Any soft spots encountered during the process should be excavated to the level of competent soil. The required grades can then be achieved by placing approved on-site soils in maximum 200 to 300 thick lifts which should be compacted to 95% SPMDD.

The base and sub-base materials should be produced in accordance with the current OPSS specifications and placed and uniformly compacted to at least 100% SPMDD. The asphaltic concrete should be placed and compacted in accordance with OPSS.MUNI 310 Table 10 to at least 92% of the Marshall Density (MRD). Frequent in situ density testing by this office should be carried out to verify that the specified degree of compaction is being achieved and maintained.

It should be noted that even well compacted trench backfill could settle for a period of time after construction. In this regard, the surface course of the asphaltic concrete should be placed at least one (1) year after trench backfill is completed to allow any minor settlements to occur within the trench backfill. The incomplete pavement structure may not be capable of supporting construction traffic. Consequently, minor repairs of the sub-base, base and asphaltic concrete may be required prior to paving with the base course and/or the surface course asphaltic concrete.

Adequate drainage of the pavement subgrade is essential for the performance of the pavement. The subgrade should be free of any depressions and sloped at a minimum grade of 2% to provide positive drainage.

The prepared earth subgrade and final pavement surfaces should be graded to direct water runoff away from buildings, sidewalks, and other similar pertinent structures. Positive drainage outlets should be provided at all low points of the prepared subgrade, such as stub drains extended from the catch-basins

5.9 Infiltration Rate of Native Soil Deposits

Based on the laboratory gradational results and our experience, the coefficient of permeability and infiltration rate of the native soil deposits encountered are estimated and provided in the following table:

MATERIAL	PERMEABILITY (K) (cm/sec)	INFILTRATION RATE (mm/hr)
Sand, trace to some silt (Enclosure 18)	3×10^{-3}	50
Silty Sand to Sand and Silt (Enclosures 16 & 17)	2×10^{-4} to 1×10^{-3}	15 to 30
Silt, trace sand to sandy	1×10^{-5} to 1×10^{-4}	3 to 10

An at-source infiltration feature is considered feasible at the site within the sand, silty sand and sand and silt deposits.

5.10 Handling of Excess Soil

Excess soil may be generated due to the proposed site works. The management of excess soil is now governed by Ontario Regulation 406/19. In accordance with the regulation, the Project Leader is responsible for the handling, storage, reuse, transportation, and removal of all soil. To support off-site removal, the following is required:

- Planning Documentation
  - Assessment of Past Use
  - Sampling and Analysis Plan
  - Excess Soil Characterization Report
  - Excess Soil Destination Report
- Tracking
- Registry
- Record Keeping

CVD can provide further assistance on this matter as the project develops.

6.0 CLOSURE

The Limitations of Report, as quoted in Appendix A, is an integral part of this report.

We trust that the information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.





Joseph van der Zalm, P.Eng.
Geotechnical Engineer

Eric Y. Chung, P.Eng., M. Eng.
Principal Engineer

APPENDIX A

Limitation of Report

APPENDIX "A"

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes and their respective depths may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report.

APPENDIX B

Borehole Log Sheets from Phase II Environmental Site Assessment by Chung and Vander Doelen Engineering Ltd. (E22536)

FILE No: E22536

BOREHOLE No. 1

Client: **peopleCare Inc.**

Project: **Phase II Environmental Site Assessment**

Location: **750 Gibralter Street, 724 James Street & Part of 169 Dalton Road, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm ID**
Date: **Sep 07 - 22** TO **Sep 07 - 22**

Ground Elevation: **241.86 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
	76 mm FILL topsoil with sand and gravel brown ---	0.5		1-1		7
		1.0		1-2		9
	SAND trace to some gravel trace to some silt brown	1.5		1-3		20
		2.0				
		2.5				
		3.0				
		3.5				
		4.0				
		4.5				
		5.0				
		5.5				
		6.0				
		6.5				
		7.0				
		7.5				
		8.0				
		8.5				
		9.0				
		9.5				
		10.0				
	---	10.5				
	SATURATED	11.0		1-4		12
		11.5				
229.67 12.19	END OF BOREHOLE	12.0				
		12.5				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- Flush mount casing
- Groudnwater measured at 10.53 m (September 13, 2022)
- Monitoring well installed in BH1 at 12.19 m

PROJECT MANAGER: **PD**

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FILE No: E22536

BOREHOLE No. 2

Client: **peopleCare Inc.**

Project: **Phase II Environmental Site Assessment**

Location: **750 Gibralter Street, 724 James Street & Part of 169 Dalton Road, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm ID**
Date: **Sep 08 - 22** TO **Sep 08 - 22**

Ground Elevation: **241.81 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	WELL DATA	REMARKS
	76 mm ASPHALT 76 mm GRANULAR FILL some organics brown ---	0.5	2-1		8		Flush mount casing
		1.0	2-2		3		
	SAND trace to some gravel trace to some silt brown	1.5 2.0	2-3		17		
		10.5					Groudnwater measured at 10.45 m (September 13, 2022)
	--- SATURATED	11.0	2-4		13		
229.62 12.19	END OF BOREHOLE	12.0					Monitoring well installed in BH2 at 12.19 m

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **PD**

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FILE No: E22536

BOREHOLE No. 3

Client: **peopleCare Inc.**

Project: **Phase II Environmental Site Assessment**

Location: **750 Gibralter Street, 724 James Street & Part of 169 Dalton Road, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm ID**
Date: **Sep 08 - 22** TO **Sep 08 - 22**

Ground Elevation: **241.83 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE	WELL DATA	REMARKS
	51 mm ASPHALT 25 mm GRANULAR FILL brown ---	0.5	3-1		5		Flush mount casing
		1.0	3-2		28		
	SAND trace to some gravel trace to some silt brown	1.5	3-3		53		
		2.0					
		2.5					
		3.0					
		3.5					
		4.0					
		4.5					
		5.0					
		5.5					
		6.0					
		6.5					
		7.0					
		7.5					
		8.0					
		8.5					
		9.0					
		9.5					
		10.0					
	--- SATURATED	10.5					Groudnwater measured at 10.34 m (September 13, 2022)
		11.0	3-4		25		
		11.5					
229.64 12.19	END OF BOREHOLE	12.0					Monitoring well installed in BH3 at 12.19 m
		12.5					

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

PROJECT MANAGER: **PD**

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ENCLOSURES

Soil Abbreviations and Terms Used on Record of Borehole Sheets

TERMINOLOGY DESCRIBING COMMON SOIL TYPES:

Topsoil	-	mixture of soil and humus capable of supporting vegetation
Peat	-	mixture of visible and invisible fragments of decayed organic matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	soil materials identified as being placed anthropologically

CLASSIFICATION (UNIFIED SYSTEM)

Clay	<0.002mm		
Silt	0.002 to .075mm		
Sand	0.075 to 4.75mm		
		Fine	0.075 to 0.425 mm
		Medium	0.425 to 2.0 mm
		Coarse	2.0 to 4.75 mm
Gravel	4.75 to 75mm		
		Fine	4.75 to 19 mm
		Coarse	19 to 75 mm
Cobbles	75 to 300mm		
Boulders	>300mm		

TERMINOLOGY

Soil Composition	**% by Weight**
"traces"	<10%
"some"(eg. some silt)	10-20%
Adjective (eg. sandy)	20-35%
"and"(eg. sand and gravel)	35-50%

Standard Penetration Resistance (SPT): Standard Penetration Resistance ('N' Values) refers to the number of blows required to advance a standard (ASTM D1586) 51 mm Ø (2 inch) split-spoon sampler by the use of a free falling, 63.5 Kg (140lbs) hammer. The number of blows from the drop weight is recorded for every 15 cm (6 inches). The hammer is dropped from a distance of 0.76m (30 inches) providing 474.5 Joules per blow. When the sampler is driven a total of 45 cm (18 inches) into the soil, the standard penetration index ('N' Value) is the total number of blows for the last 30 cm (12 inches).

Dynamic Cone Penetration Resistance (DCPT): Dynamic Cone Penetration Resistance is similar to a SPT with the 474.5 Joule/blow impulse provided by the free falling hammer where the split-spoon sampler is replaced by a 51 mm Ø, 60˚ conical point and the number of blows is recorded continuously for every 30 cm (12 inches).

COHESIVE SOILS CONSISTENCY

	(kPa)	**(P.S.F.)**	**Nominal 'N' Value**
Very Soft	<12	<250	0-2
Soft	12-25	250-500	2-4
Firm	25-50	500-1000	4-8
Stiff	50-100	1000-2000	8-15
Very Stiff	100-200	2000-4000	15-30
Hard	>200	>4000	>30

RELATIVE DENSITY OF COHESIONLESS SOIL

	'N' Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

MOISTURE CONDITIONS:

Cohesive Soil
DTPL- Drier than plastic limit
APL- About plastic limit
WTPL- Wetter than plastic limit
MWTPL- Much wetter than plastic limit

Cohesionless Soil
Damp
Moist
Wet
Saturated

SAMPLE TYPES AND ADDITIONAL FIELD TESTS

SS	Split Spoon Sample (obtained from SPT)	**GS**	Grab Sample	**PP**	Pocket Penetrometer
		BS	Bulk Sample	**VANE**	Peak & Remolded shear
AS	Auger Sample	**TW**	Thin Wall Sample or Shelby Tube	**DMT**	Flat Plate Dilatometer

LABORATORY TESTS

SG	Specific Gravity	**S**	Sieve Analysis	**W**	Water Content
H	Hydrometer	**P**	Field Permeability	**K**	Lab Permeability
W_p	Plastic Limit	**W_l**	Liquid Limit	**I_p**	Plasticity Index
GSA	Grain Size Analysis	**C**	Consolidation	**UNC**	Unconfined compression

CHUNG & VANDER DOELEN
ENGINEERING LTD.

Enclosure A

FILE No: G22503

BOREHOLE No. 1

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 07 - 22** TO **Sep 07 - 22**

Ground Elevation: **240.83 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
240.66	175 mm TOPSOIL					
0.18	very loose to loose orangey brown to brown Fine to Medium SAND some silt to silty, trace gravel damp to moist	0.5 1.0 1.5 2.0		1 2 3	SS SS SS	8 4 7
238.73 2.10	compact to dense, brown SILT trace to some sand, trace clay occ. sand lenses moist	2.5 3.0 3.5		4 5	SS SS	18 37
237.13 3.70	dense to very dense brown Fine to Medium SAND trace to some silt, trace gravel damp to moist	4.0 4.5 5.0 5.5 6.0 6.5		6 7 8	SS SS SS	35 38 56
	-------- silty	7.0 7.5		9	SS	45
232.73 8.10	End of Borehole	8.0				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

dry borehole cave-in to 6.7 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 2

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 07 - 22** TO **Sep 07 - 22**

SOIL LITHOLOGY

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
	Ground Elevation: **239.17 m**					
	50 mm ASPHALT 425 mm GRANULAR BASE			1	SS	18
238.70 0.48		0.5				
		1.0		2	SS	64
		1.5		3	SS	42
	some gravel to gravelly --------	2.0				
		2.5		4	SS	20
	compact to very dense, brown Fine to Medium SAND trace to some silt, trace gravel occ. sand lenses damp to moist	3.0				
		3.5		5	SS	22
		4.0		6	SS	38
		4.5		7	SS	62
		5.0				
		5.5				
	-------- silty	6.0				
		6.5		8	SS	34
232.57 6.60	End of Borehole					
		7.0				
		7.5				
		8.0				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- dry borehole cave-in to 4.9 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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FILE No: G22503

BOREHOLE No. 3

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 07 - 22** TO **Sep 07 - 22**

Ground Elevation: **240.23 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
239.98	250 mm GRANULAR BASE				
0.25	compact to very dense orangey brown to brown SILTY SAND TO SAND AND SILT trace to some gravel damp to moist	0.5	1	SS	11
		1.0	2	SS	18
		1.5	3	SS	38
		2.0			
	-------- occ. silt seams	2.5	4	SS	54
237.33		3.0			
2.90	compact to dense brown Fine to Medium SAND trace to some silt, trace gravel damp to moist	3.5	5	SS	30
		4.0	6	SS	20
		4.5	7	SS	21
		5.0			
		5.5			
		6.0	8	SS	32
		6.5			
		7.0			
		7.5	9	SS	45
232.13		8.0			
8.10	End of Borehole				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

dry borehole cave-in to 6.7 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 4

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

Ground Elevation: **240.73 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
240.56	175 mm TOPSOIL				
0.18	compact, brown Fine to Medium SAND some silt, trace to some gravel damp to moist	0.5 1.0	1 2	SS SS	12 11
239.33 1.40	compact, brown SILTY SAND TO SAND AND SILT trace gravel damp to moist	1.5 2.0 2.5 3.0	3 4	SS SS	21 17
237.53 3.20	compact to very dense brown Fine to Medium SAND trace to some silt, trace gravel damp to moist	3.5 4.0 4.5 5.0 5.5 6.0 6.5	5 6 7 8	SS SS SS SS	26 25 17 79
234.13 6.60	End of Borehole	7.0 7.5 8.0			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

REMARKS

dry borehole cave-in to 5.2 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 5

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

SOIL LITHOLOGY

Ground Elevation: **240.69 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
240.49	200 mm TOPSOIL					
0.20	loose to compact orangey brown to brown Fine to Medium SAND some silt, trace gravel damp to moist	0.5 1.0 1.5 2.0		1 2 3	SS SS SS	7 14 5
238.59 2.10	compact, brown SANDY SILT trace gravel occ. sand lenses moist to wet	2.5 3.0 3.5		4 5	SS SS	23 13
236.99 3.70	compact to dense brown Fine to Medium SAND trace to some silt, trace gravel moist	4.0 4.5 5.0 5.5 6.0 6.5		6 7 8 9	SS SS SS SS	31 12 18 40
234.09 6.60	End of Borehole	7.0 7.5 8.0				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

REMARKS

dry borehole cave-in to 5.2 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 6

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 07 - 22** TO **Sep 07 - 22**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
	Ground Elevation: **240.76 m**					
240.59	175 mm TOPSOIL					
0.18	loose to dense orangey brown to brown Fine to Medium SAND some silt, trace gravel damp to moist	0.5 1.0 1.5		1 2 3	SS SS SS	9 18 32
238.66		2.0				
2.10	compact, brown SILTY SAND TO SAND AND SILT trace gravel moist to wet	2.5 3.0		4 5	SS SS	27 22
237.51						
3.25	compact to very dense brown Fine to Medium SAND some silt, trace gravel damp to moist	3.5 4.0 4.5		6 7	SS SS	23 17
		5.0 5.5 6.0		8	SS	28
	-------- silty	6.5 7.0 7.5		9	SS	57
232.66		8.0				
8.10	End of Borehole					

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

dry borehole cave-in to 6.7 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

Enclosure No.: 7
Sheet 1 of 1

FILE No: G22503

BOREHOLE No. 7

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 07 - 22** TO **Sep 07 - 22**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **240.83 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
240.61	225 mm TOPSOIL										
0.23	very loose to loose oragney brown SILTY SAND TO SAND AND SILT trace gravel occ. sand lenses occ. topsoil pockets moist	0.5		1	SS	9				0.5	
		1.0		2	SS	4				1.0	
		1.5		3	SS	4				1.5	
		2.0								2.0	
		2.5		4	SS	9				2.5	
237.93											
2.90	compact to very dense brown Fine to Medium SAND trace to some silt, trace gravel damp to moist	3.0		5	SS	28				3.0	
		3.5								3.5	
		4.0		6	SS	29				4.0	
		4.5		7	SS	17				4.5	
		5.0								5.0	
		5.5								5.5	dry borehole cave-in to 5.2 m bgs upon withdrawal of drilling augers
		6.0								6.0	
		6.5		8	SS	72				6.5	
234.23											
6.60	End of Borehole	7.0								7.0	
		7.5								7.5	
		8.0								8.0	

PROJECT MANAGER: **JV**

CHUNG & VANDER DOELEN ENGINEERING LTD.
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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 8

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Hollow Stem Auger**
Size: **108 mm I.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

Ground Elevation: **240.71 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
240.51	200 mm TOPSOIL					
0.20	loose, dark brown to brown FILL, sand, some silt, trace gravel, trace topsoil damp to moist	0.5		1	SS	5
240.01						
0.70	compact to dense, brown SILTY SAND TO SANDY SILT trace gravel damp to moist	1.0		2	SS	17
	--------	1.5				
	sand layer			3	SS	28
	--------	2.0				
		2.5		4	SS	32
	--------	3.0				
237.36	occ. wet seams			5	SS	31
3.35	compact to dense brown Fine to Medium SAND trace to some silt, trace gravel damp to moist	3.5				
		4.0		6	SS	47
		4.5		7	SS	41
		5.0				
		5.5				
		6.0		8	SS	39
		6.5				
		7.0				
		7.5		9	SS	21
232.61		8.0				
8.10	End of Borehole					

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

dry borehole cave-in to 6.7 m bgs upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 9

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

Ground Elevation: **241.07 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SAMPLE ID	TYPE	N-VALUE
240.87	200 mm TOPSOIL				
0.20	loose to very dense orangey brown to brown SILTY SAND TO SAND AND SILT trace gravel occ. silt lenses/seams damp to moist -------- occ. wet seams	0.5 1.0 1.5 2.0 2.5	1 2 3 4	SS SS SS SS	6 5 24 68
238.17 2.90	very dense, brown Fine to Medium SAND some silt moist	3.0	5	SS	64
237.57 3.50	End of Borehole	3.5			

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

borehole open and dry upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 10

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **241.01 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
240.84	175 mm TOPSOIL										
0.18	loose to dense orangey brown to brown Fine to Medium SAND trace to some, trace gravel damp to moist	0.5		1	SS	5				0.5	
		1.0		2	SS	12				1.0	
		1.5		3	SS	34				1.5	
	-------- occ. sand and gravel seams	2.0								2.0	
238.86											
2.15	dense, brown SILTY SAND TO SANDY SILT trace gravel, trace clay, occ. sand lenses moist to wet	2.5		4	SS	41				2.5	
		3.0		5	SS	41				3.0	
237.51											
3.50	End of Borehole	3.5								3.5	borehole open and dry upon withdrawal of drilling augers
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	
		6.0								6.0	
		6.5								6.5	
		7.0								7.0	
		7.5								7.5	
		8.0								8.0	

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

Enclosure No.: 11
Sheet 1 of 1

FILE No: G22503

BOREHOLE No. 11

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **241.40 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
241.23	175 mm TOPSOIL										
0.18	loose to compact orangey brown to brown SILTY SAND TO SAND AND SILT trace to some gravel moist	0.5		1	SS	9				0.5	
	---	1.0		2	SS	18				1.0	
	---	1.5		3	SS	35				1.5	
	brownish grey, clayey	2.0								2.0	
	--------	2.5		4	SS	66				2.5	
		3.0		5	SS	26				3.0	
237.90		3.5								3.5	
3.50	End of Borehole										borehole open and dry upon withdrawal of drilling augers
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	
		6.0								6.0	
		6.5								6.5	
		7.0								7.0	
		7.5								7.5	
		8.0								8.0	

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 12

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

Ground Elevation: **241.73 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
241.43	25 mm ASPHALT 275 mm GRANULAR BASE					
0.30	very loose to compact ornagey brown to brown SILTY SAND TO SAND AND SILT trace gravel damp to moist	0.5		1	SS	5
		1.0		2	SS	3
		1.5		3	SS	13
239.63		2.0				
2.10	compact, brown SANDY SILT trace to some gravel moist to wet	2.5		4	SS	18
238.53		3.0				
3.20	compact, brown, SILTY SAND, damp			5	SS	26
238.23		3.5				
3.50	End of Borehole					

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)	REMARKS
3.5	borehole open and dry upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

Enclosure No.: 13
Sheet 1 of 1

FILE No: G22503

BOREHOLE No. 13

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **240.73 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
240.53	200 mm TOPSOIL										
0.20	loose, orangey brown to brown SILTY SAND trace gravel damp	0.5		1	SS	5				0.5	
		1.0		2	SS	7				1.0	
239.33											
1.40	compact to dense, brown SILT some sand, trace gravel moist to wet	1.5		3	SS	15				1.5	
		2.0								2.0	
		2.5		4	SS	36				2.5	
		3.0								3.0	
	-------- occ. sand seams			5	SS	26					
237.23		3.5								3.5	
3.50	End of Borehole										borehole open and dry upon withdrawal of drilling augers
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	
		6.0								6.0	
		6.5								6.5	
		7.0								7.0	
		7.5								7.5	
		8.0								8.0	

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 14

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
	Ground Elevation: **240.91 m**					
240.61	300 mm GRANULAR BASE					
0.30	loose to comapct brown to dark brown FILL, sand and silt trace gravel, trace topsoil damp	0.5		1	SS	11
		1.0		2	SS	6
239.56						
1.35	compact dark brown to brown Fine to Medium SAND some silt, trace gravel damp to moist	1.5		3	SS	13
		2.0				
		2.5		4	SS	13
	-------- freq. silt seams	3.0		5	SS	14
237.41						
3.50	End of Borehole	3.5				
		4.0				
		4.5				
		5.0				
		5.5				
		6.0				
		6.5				
		7.0				
		7.5				
		8.0				

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

borehole open and dry upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12

FILE No: G22503

BOREHOLE No. 15

Client: **People Care Inc.**

Project: **Proposed Long-Term Care Facility**

Location: **750 Gibralter Street & 724 James Street, Delhi, Ontario**

EQUIPMENT DATA

Machine: **Diedrich D50T**
Method: **Solid Stem Auger**
Size: **152 mm O.D.**
Date: **Sep 06 - 22** TO **Sep 06 - 22**

Ground Elevation: **241.58 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE
241.51	80 mm GRANULAR BASE					
0.08	compact to very dense, brown Fine to Medium SAND trace to some silt, trace gravel damp	0.5		1	SS	12
		1.0		2	SS	16
		1.5		3	SS	16
239.43		2.0				
2.15	dense to very dense, brown SILTY SAND damp	2.5		4	SS	39
		3.0		5	SS	77
238.08		3.5				
3.50	End of Borehole					

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

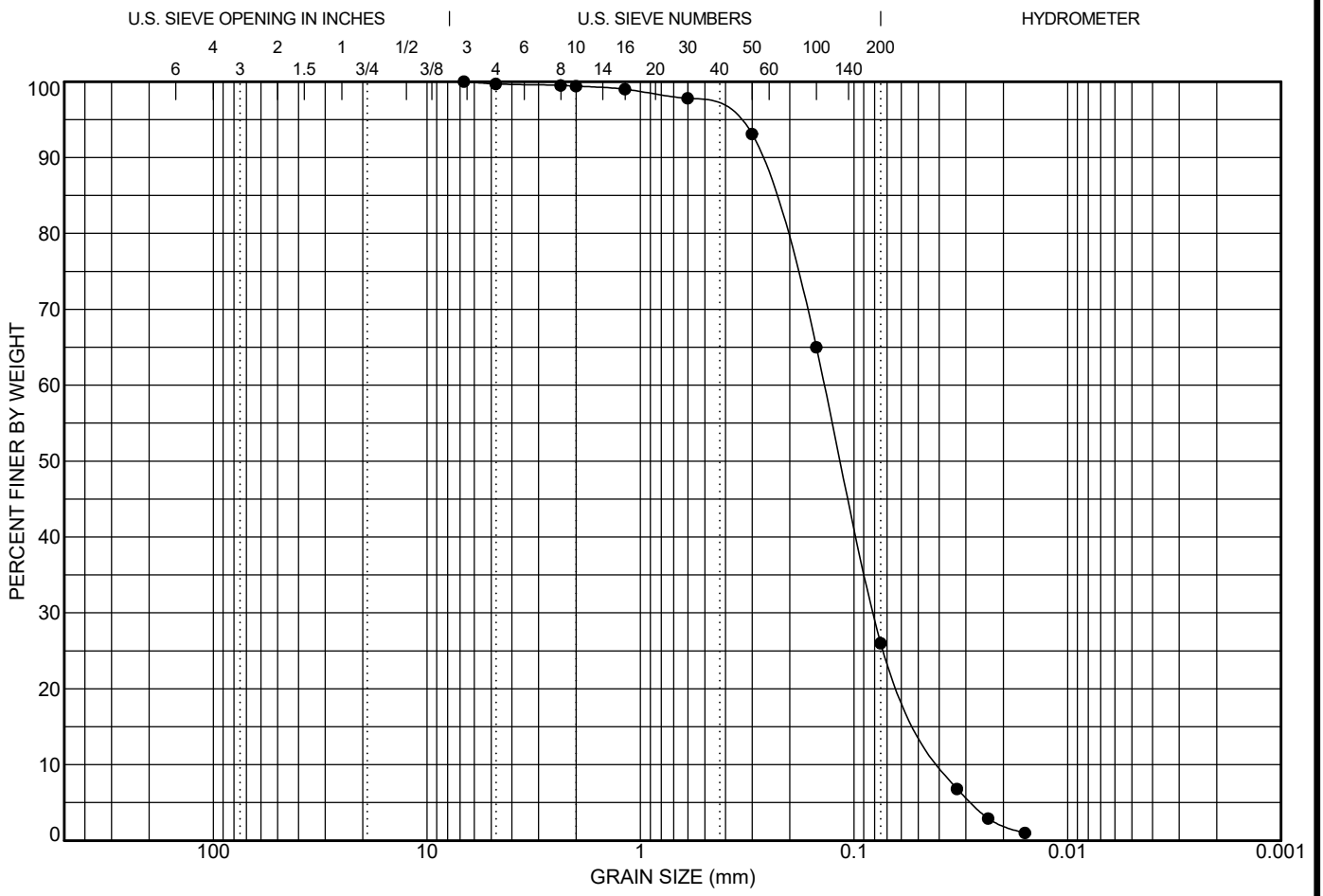
REMARKS

borehole open and dry upon withdrawal of drilling augers

PROJECT MANAGER: **JV**

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CVD BOREHOLE (2017) G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ CVD_ENG.GDT 22-12-12



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.25	3.64	6.7	0.137	0.081	0.038	0.3	73.7	26.0	

Date: Sep. 13 - 2022
Client: People Care Inc.
Contractor:
Source:
Sampled From: BH 10 - SA 4; 2.30 to 2.75 m depth
Sample No.: 10-4
Date Sampled: Sep. 06 - 2022
Sampled By: CA
Lab No.: 1186
Date Tested: Sep. 08 - 2022
Type of Material: Silty Sand, trace gravel

Sieve Size (mm)	Percent Passing	No Specifications

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Kitchener, Ontario N2H 5E1
Telephone: 519-742-8979
Fax: 519-742-7739
e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

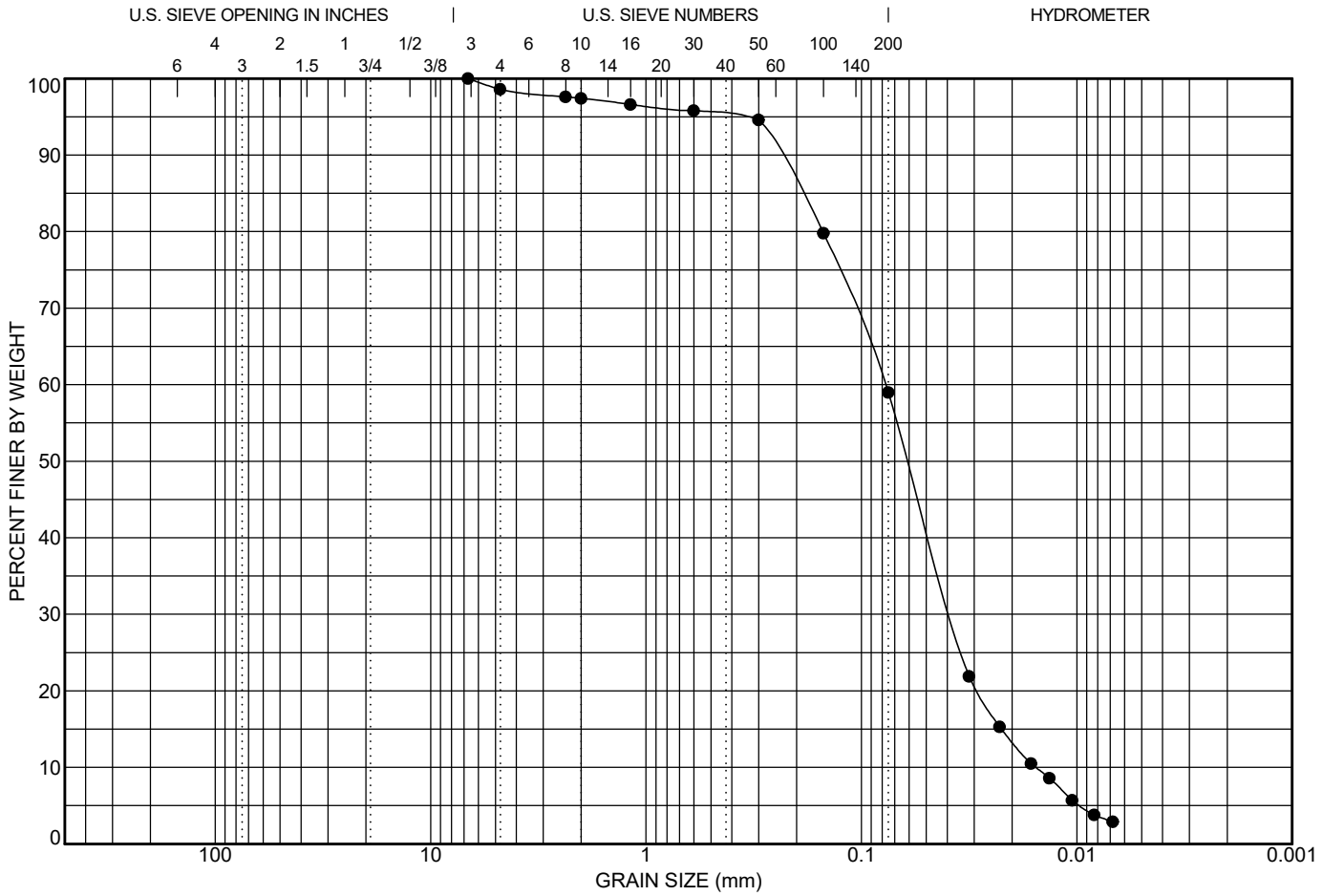
Project: Proposed Long-Term Care Facility

Location: 750 Gibralter Street & 724 James Street, Delhi

File No.: G22503

Enclosure No.: 16

DM - NO SPECIFICATIONS G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ LAW LNDN.GDT 22-9-13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.21	5.01	6.7	0.078	0.038	0.015	1.4	39.6	59.0	

Date: Sep. 13 - 2022
Client: People Care Inc.
Contractor:
Source:
Sampled From: BH 11 - SA 4; 2.30 to 2.75 m depth
Sample No.: 11-4
Date Sampled: Sep. 06 - 2022
Sampled By: CA
Lab No.: 1187
Date Tested: Sep. 08 - 2022
Type of Material: Sand and Silt, trace gravel

Sieve Size (mm)	Percent Passing	No Specifications

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311 Victoria Street North
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e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

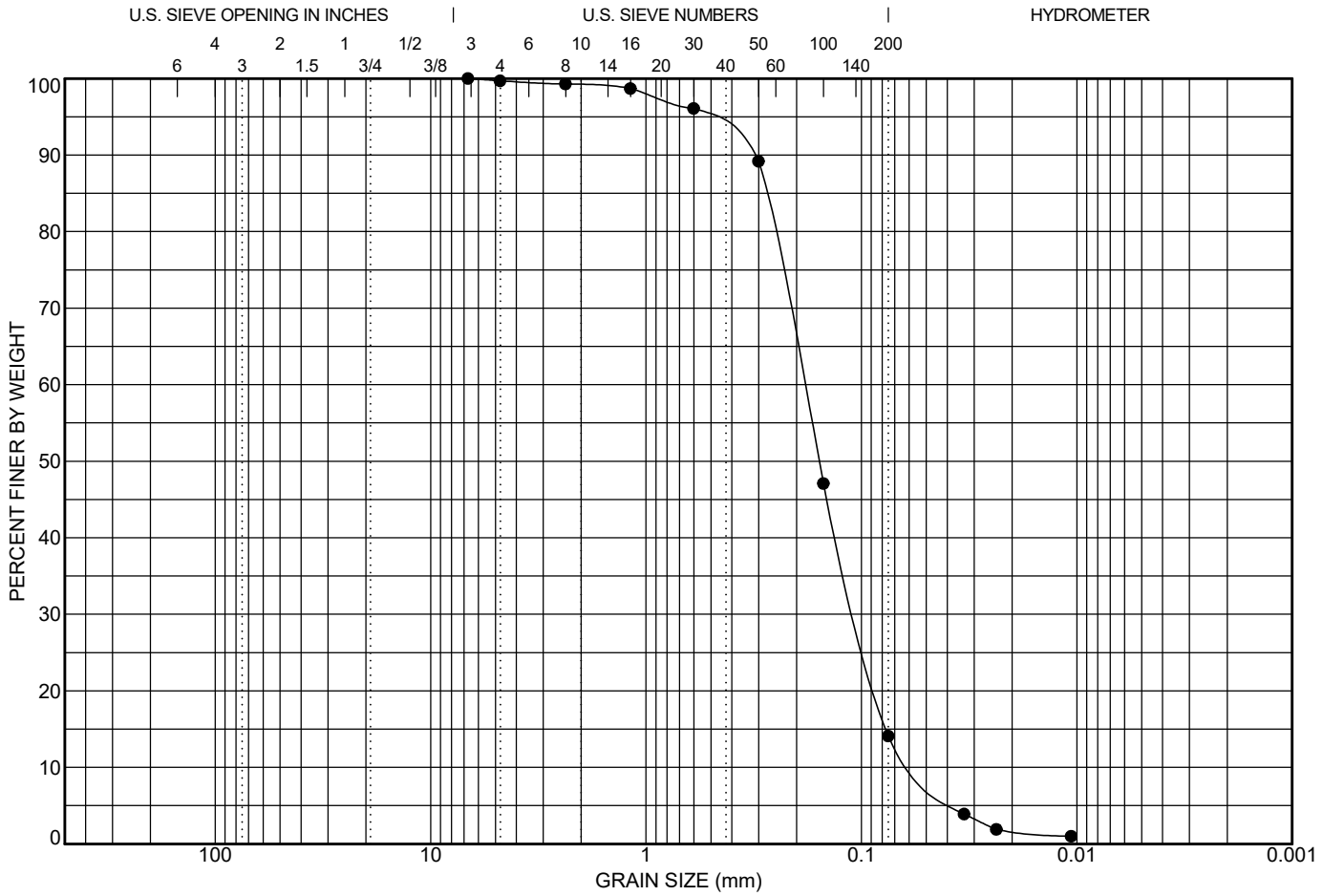
Project: Proposed Long-Term Care Facility

Location: 750 Gibralter Street & 724 James Street, Delhi

File No.: G22503

Enclosure No.: 17

DM - NO SPECIFICATIONS G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ LAW LNDN.GDT 22-9-13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.09	3.43	6.7	0.185	0.105	0.054	0.3	85.6	14.1	

Date: Sep. 13 - 2022
Client: People Care Inc.
Contractor:
Source:
Sampled From: BH 14 - SA 4; 2.30 to 2.75 m depth
Sample No.: 14-4
Date Sampled: Sep. 06 - 2022
Sampled By: CA
Lab No.: 1188
Date Tested: Sep. 08 - 2022
Type of Material: Sand, some silt, trace gravel

Sieve Size (mm)	Percent Passing	No Specifications

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ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario N2H 5E1
Telephone: 519-742-8979
Fax: 519-742-7739
e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

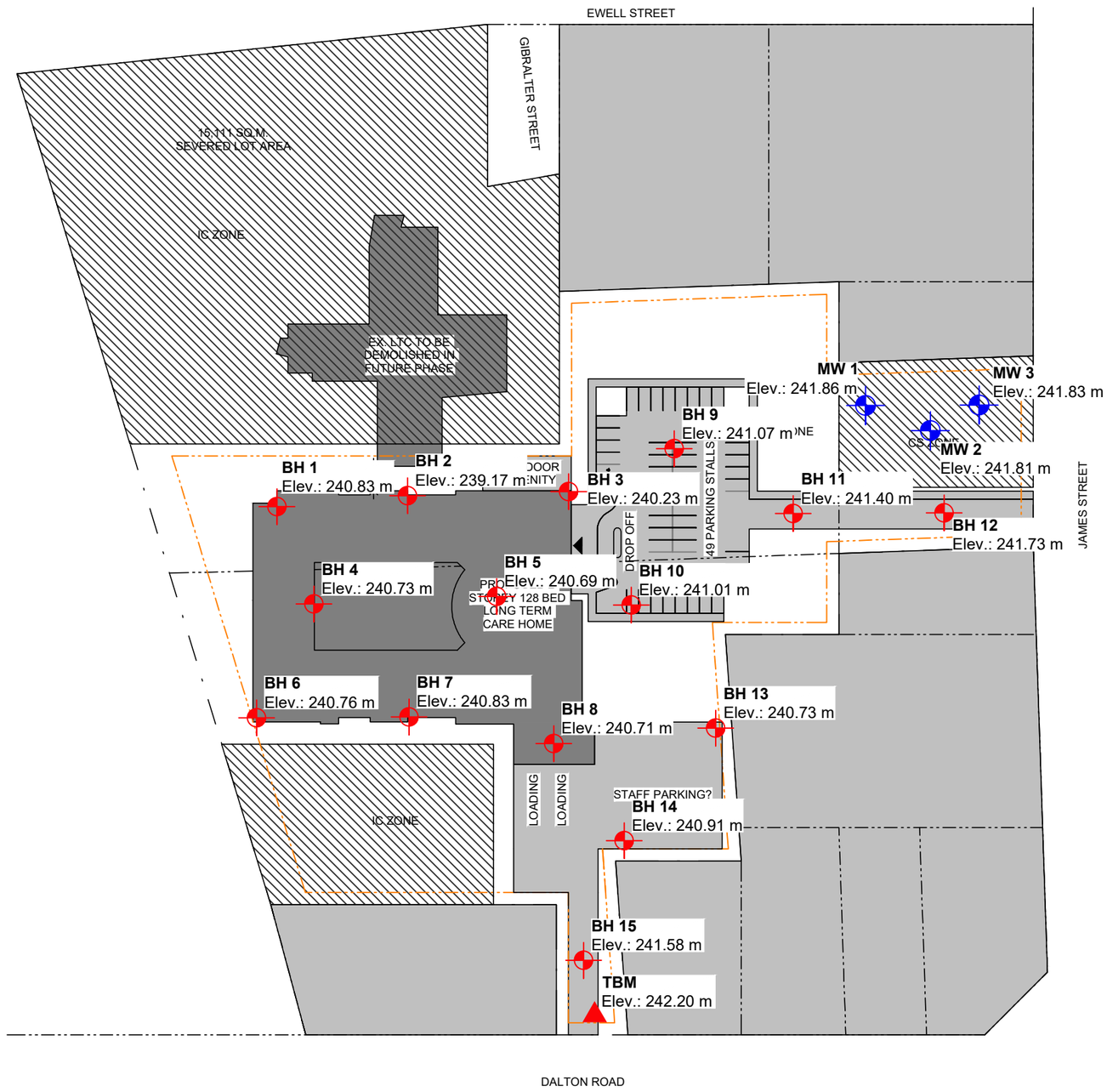
Project: Proposed Long-Term Care Facility

Location: 750 Gibralter Street & 724 James Street, Delhi

File No.: G22503

Enclosure No.: 18

DM - NO SPECIFICATIONS G22503 750 GIBRALTER ST & 724 JAMES ST, DELHI.GPJ LAW LNDN.GDT 22-9-13





KEY PLAN **SOURCE:** Google Earth

LEGEND

TBM: Top of manhole at southern site entrance at Dalton Road
Elev.: 242.20 m (Geodetic)

Borehole Location

Monitoring Well Location - CVD (E22536)

Elev. Ref.: The borehole locations and associated ground surface elevations were surveyed by CVD using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using the UTM Zone 17N Projection, NAD83(CSRS)V7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

DWG Ref.: *SRM Architects Inc.; 'Site Plan Option 3; 750 Gibralter Street., Delhi, ON'; Date: May 05, 2022.*

BOREHOLE LOCATION PLAN

Proposed Long-Term Care Facility

750 Gibralter Street & 724 James Street
Delhi, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

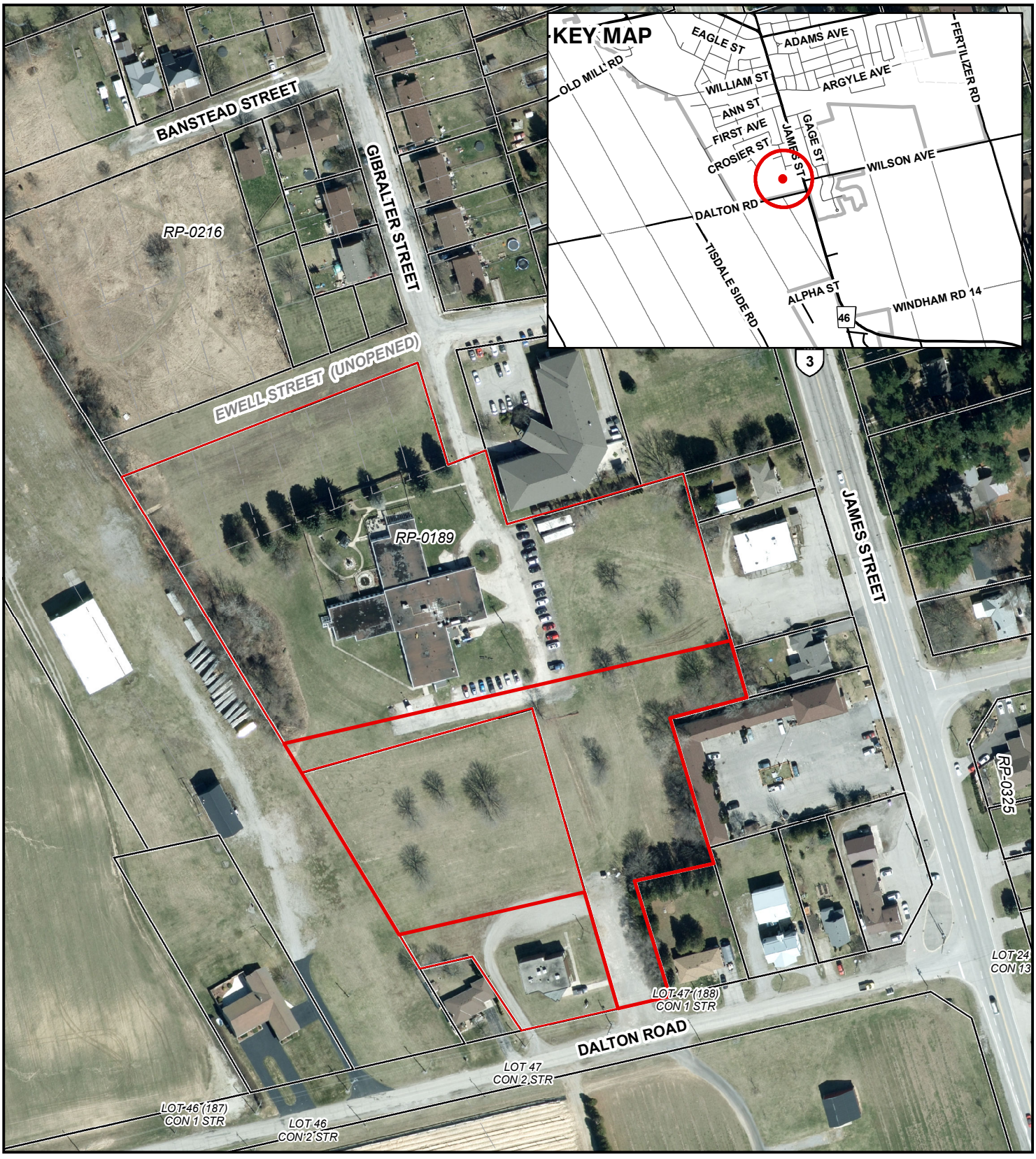
Drawn By: CA	Date: September, 2022	File No.: G22503
Checked By: JV	Scale: 1:1250	Drawing No.: 1

MAP A

CONTEXT MAP

Urban Area of DELHI

SPPL2023101



Legend

- Subject Lands
- Lands Owned
- 2020 Air Photo

3/21/2023

N

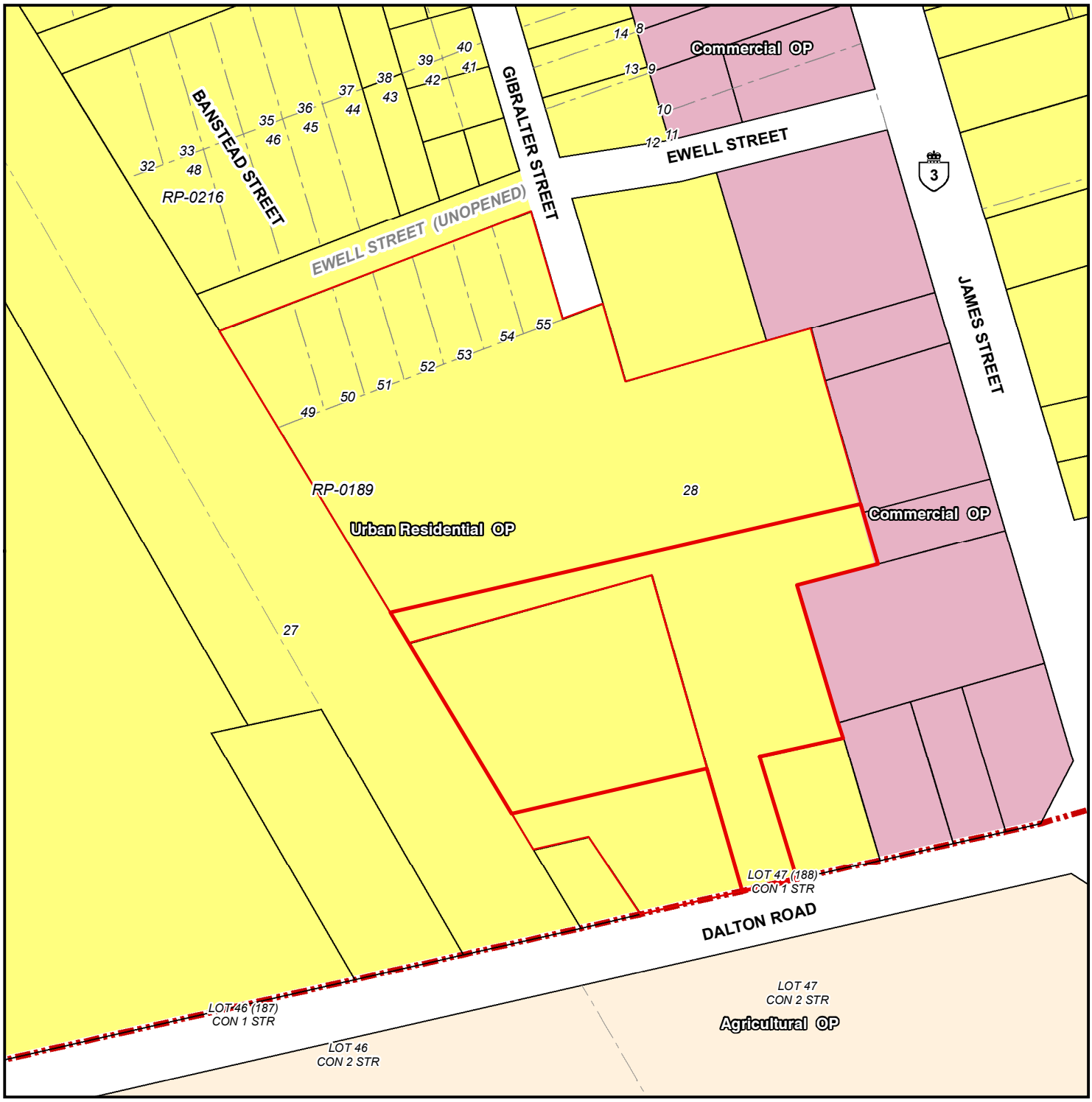
20 10 0 20 40 60 80 Meters

MAP B

SPPL2023101

OFFICIAL PLAN MAP

Urban Area of DELHI



Legend

- Subject Lands
- Lands Owned

Official Plan Designations

- Agricultural
- Urban Residential
- Commercial
- Urban Area Boundary

3/21/2023

N

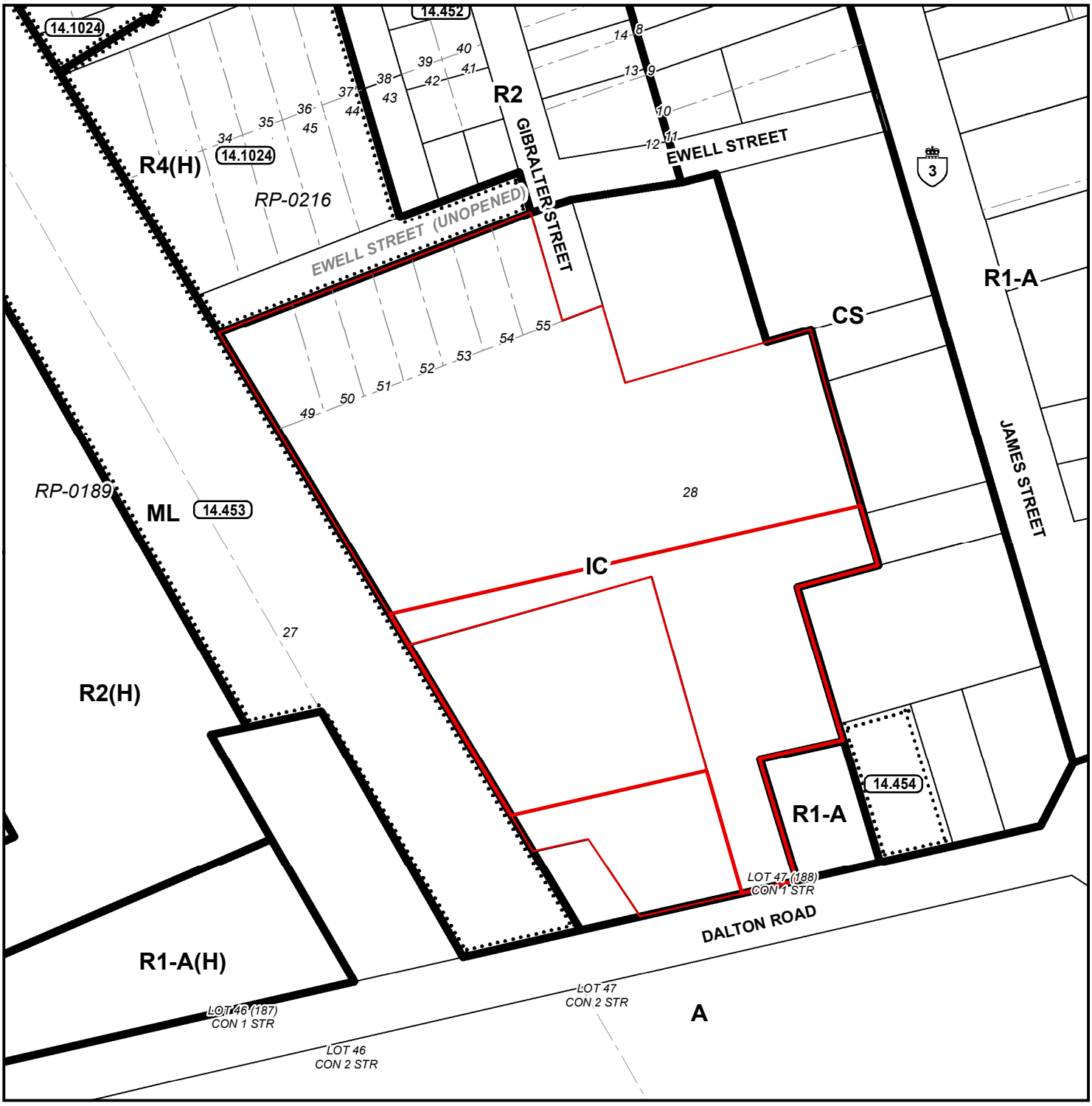
20 10 0 20 40 60 80 Meters

MAP C

ZONING BY-LAW MAP

Urban Area of DELHI

SPPL2023101



LEGEND

- Subject Lands
- Lands Owned

ZONING BY-LAW 1-Z-2014

- (H) - Holding
- A - Agricultural Zone
- CS - Service Commercial Zone
- IC - Community Institutional Zone
- ML - Light Industrial Zone
- OS - Open Space Zone
- R1-A - Residential R1-A Zone
- R2 - Residential R2 Zone
- R4 - Residential R4 Zone

3/21/2023

N

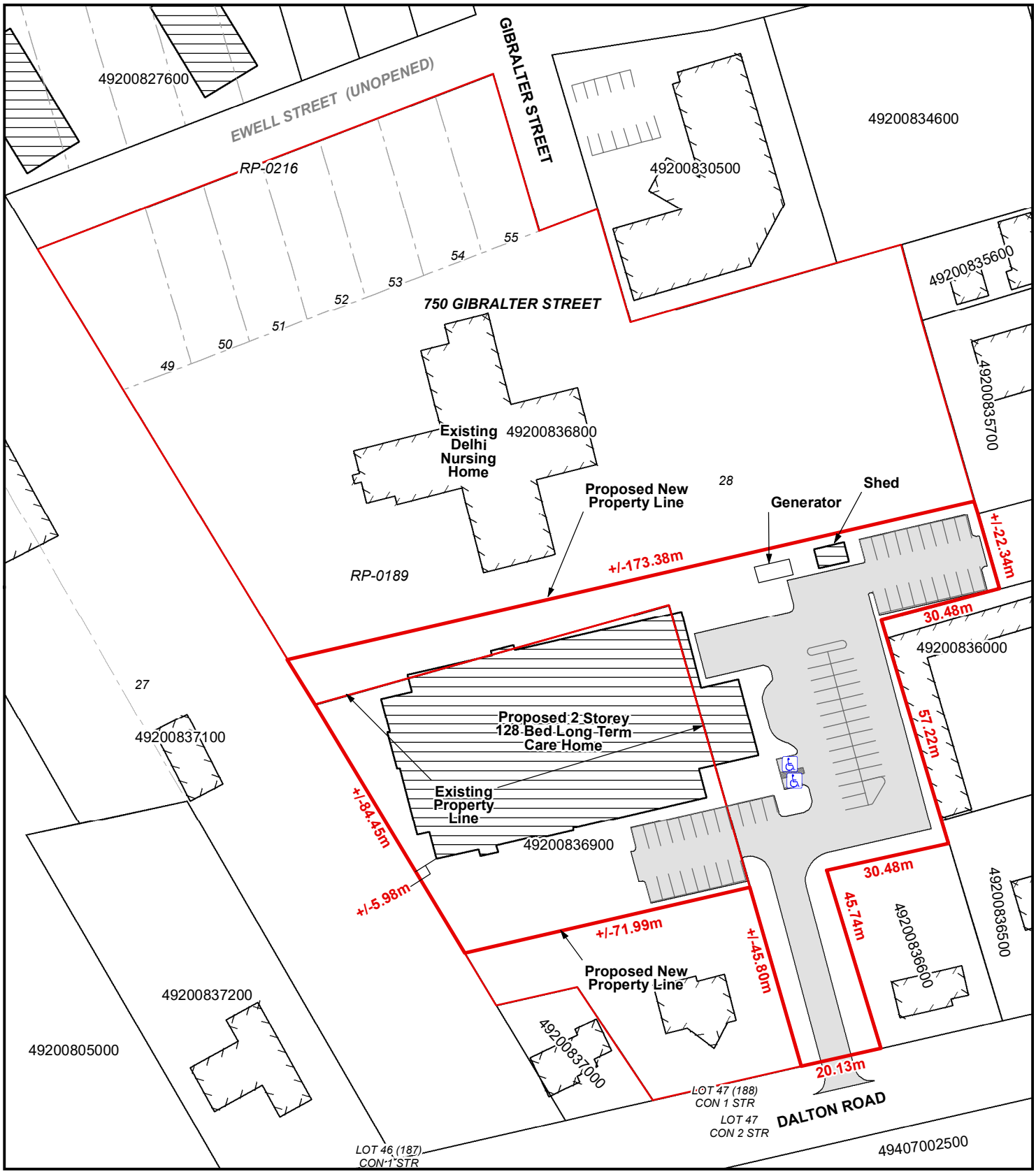
20 10 0 20 40 60 80 Meters

MAP D

SPPL2023101

CONCEPTUAL PLAN

Urban Area of DELHI



Legend

- Subject Lands
- Lands Owned

3/21/2023

N

10 5 0 10 20 30 40 Meters