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23 May 2025

SBM-24-2255

Municipality of Strathroy-Caradoc
52 Frank Street
Strathroy, ON N7G 2R4

**Attn: Jake DeRidder**
**Senior Development Coordinator**

**Re: Site Servicing Feasibility Study**
**Proposed 26-unit Senior Townhome Development**
**101 Hull Road and 6 Locke Heights, Strathroy, ON**

## 1. INTRODUCTION

This Servicing Feasibility Study (Study) has been prepared by Strik, Baldinelli, Moniz Ltd. (SBM) for Gold Leaf Properties to address the requirements of the Municipality of Strathroy-Caradoc and all communications and conversations for the proposed development located on 101 Hull Road in the Township of Strathroy.

This Study is to determine the adequacy of the existing Municipality of Strathroy-Caradoc services in support of the Zoning By-Law Amendment (ZBA) application for the proposed development and should be read in conjunction with all other submitted documents. The Engineering Drawings SP1, C2, C3 & C4, provided separately, have been prepared to address Municipality of Strathroy-Caradoc requirements.

The 1.27 ha subject site is located northeast of the Caradoc Street (County Road 81) and Hull Road intersection at the north end of Strathroy. Approximately 1.20 ha of the subject lands resides to Municipal No. 101 Hull Road containing a single-family residential dwelling with an outdoor pool and a large driveway that abuts the Hull Road Right-Of-Way (ROW) to the south, forest to the north, and is bounded by existing residential dwellings to the east and west, respectively. The remaining 0.07 ha of the subject site resides to Municipal No. 6 Locke Heights Road containing a single-family residential dwelling fronting the Locke Heights Road Right-of-Way (ROW) to the east, open grass/forest to the west (existing portion of the subject site located at Municipal No. 101 Hull Road), and is bounded by existing residential dwellings to the north and south that front Locke Heights Road ROW, respectively.

It is our understanding that the proposed development is to include twenty-six (26) townhome units with associated parking garages and driveways, internal private drives with associated visitor parking areas (six (6) visitor parking spaces), and access from Hull Road. Please refer to the Site Plan and Zoning Chart (SP1) prepared by SBM, provided in Appendix A.

Design requirements have been based on the Municipality of Strathroy-Caradoc Servicing Standards (MSCSS), dated October 2021, the Ministry of the Environment, Conservation, and Parks (MECP), and the current edition of the Ontario Building Code (OBC).

## 2. SANITARY SERVICING

Based on the Municipality of Strathroy-Caradoc's record drawing "Locke Heights" (CS–9780–P2) prepared by Cole, Sherman Engineers and Planners dated August 1980, provided in Appendix A, there is an existing 200 mm diameter sanitary sewer in the Locke Heights Road ROW. This sanitary sewer running north–south along the entire length of the Locke Heights Road ROW connects to an existing 200 mm diameter sanitary sewer in the Hull Road ROW that continues east along the Hull Road ROW, as shown in the Locke Heights drawing.

It is proposed to have a new gravity-driven sanitary system comprised of 200 mm diameter sanitary sewers extended to the private drives of the proposed development to provide the sanitary servicing for the new development. The internal sanitary system will collect flows from the townhouse units from a north to south flowing direction and will ultimately drain to the Locke Height Road ROW, near the intersection with Hull Road, via the new proposed sanitary manhole (SAMH 1) in the existing 200 mm diameter sewer. Please refer to the Site Servicing Plans, C3, provided separately.

The proposed flows from the subject property are shown on the Sanitary Sewer Design Sheet provided in Appendix B. Using a design flow of 300 L/capita/day as per the MSCSS dated October 2021, and a population of 188 people (26 units, multiplied by 3 accounting for additional units as per Bill 23 guidelines) at 2.4 people per unit (medium density of 75 people per net hectare) results in an anticipated peak domestic flow of 3.28 L/s. When combined with infiltration, this results in a total peak sanitary flow of 3.38 L/s. A private drain connection with a diameter of 200 mm and a slope of 0.4% has sufficient capacity (20.76 L/s) to convey the proposed flows from the development. The existing sanitary sewer in the Locke Heights Road ROW has a downstream capacity of 20.76 L/s (200 mm diameter at slope of 0.40%) and is expected to have sufficient capacity to accommodate the expected total peak sanitary flow (proposed development plus external peak sanitary flows). The downstream conveyance capacity was not reviewed by SBM and if required should be confirmed with the Municipality.

## 3. WATER SERVICING CONSIDERATIONS

### *3.1. General Considerations*

Based on the Municipality of Strathroy-Caradoc's record drawing "Locke Heights" (CS–9780–P2) prepared by Cole, Sherman Engineers and Planners dated August 1980, provided in Appendix A, there is an existing 150 mm diameter DI watermain in the Hull Road ROW. The development is proposed to be serviced by a new private internal water distribution system. A new 200 mm diameter is proposed to connect the internal water distribution to the existing 150 mm diameter DI watermain in the Hull ROW at the south-eastern portion of the site between Block D and E, to provide domestic and fire flow demand. Please refer to the Site Servicing Plans C3, provided separately, for the proposed water servicing layout.

### *3.2. Design Criteria*

The design parameters outlined below are based on the Municipality's water design standards found in Section 4 of the MSCSS, dated October 2021:

- An average demand of 250 Litres per person per day (L/capita/day)
- A Medium density residential population density of 2.4 persons per unit
- Minimum water pressures to be maintained in the distribution system of:
    - Minimum of 140 kPa (20 psi) at maximum day demand flow plus fire flow
    - Minimum of 275 kPa (40 psi) at maximum hourly demand flow
    - Minimum of 275 kPa (40 psi) at average day demand flow
- Maximum residual pressure in the distribution system should not exceed 700 kPa (100 psi)
- Peaking factors of 3.5 for maximum day and 7.8 for maximum hour
- A maximum velocity of 3.0 m/s under fire flow demand and normal operating velocity between 0.9 and 1.5 m/s

The design hydraulic grade line (HGL) was calculated by taking the approximate elevation at the hydrant where the hydrant flow test was completed (Fire Flow Testing Report by SCG Flowmetrix dated October 26, 2020, provided in Appendix C) and 'zeroing' out the flow. The HGL used was 272.49m for the purposes of the water model '*Domestic Water Demand'.*

As shown on the Domestic Water Demand Calculations, provided in Appendix C, using an average daily demand allowance of 250 L/cap/day, and a population of 188 people (26 units, multiplied by 3 accounting for additional units as per Bill 23 guidelines) at 2.4 people per unit as per Section 4.3.2. of the MSCSS results in an anticipated maximum day demand of 1.94 L/s, a maximum hour demand of 4.24 L/s, and an average day demand of 0.54 L/s. The proposed 200 mm diameter watermain has a velocity of 0.14 m/s, which is below the maximum allowable velocity of 1.5 m/s under maximum hour domestic flow conditions as per the MSCSS.

### *3.3. Water Demand for Fire Protection*

Water supply for fire-fighting was calculated in accordance with OBC Div. B – A.3.2.5.7., with the design parameters of the current OBC Part 9 buildings of 600 m2 or less, assuming a building height of 8 m, combustible construction with a fire-resistance rating, and building classification Group C in accordance with OBC 3.2.2., the volume of the building is 3877.92 m3. Calculations, provided in Appendix C, show that the minimum required water supply flow rate was calculated to be 3,600 L/min (60.0 L/s). The required fire flow + maximum day demand rate was calculated to be 3,714 L/min (61.9 L/s).

Based on the OBC requirements for a Part 3 development, a fire hydrant must be located within 90 m of the fire-fighters' entrance to all units, considering that this development is a Part 9 development fire protection is the responsibility of the local fire department and municipality, and a private hydrant is proposed to satisfy these requirements. The nearest existing municipal fire hydrant is located in the Hull Rd ROW at 95 Hull Rd and is not in close enough proximity to service several of the proposed units, therefore a new private hydrant is proposed for maximum coverage. The proposed fire hydrant is located <90m from the furthest firefighters' entrance to the buildings and therefore, adequate provisions for fire-fighting are provided per OBC Part 3.

### *3.4. Design Software*

The modelling software, EPANET V2.2, was used to calculate the hydraulic loads and water aging in the system. In this case, the network consists of links (pipes), nodes (pipe junctions), and the sources (reservoirs). EPANET calculates the flow rate and velocity of the water in each pipe and the pressure at each node based on the total head at the connection points (source) and design demands assigned to select nodes. The network map displaying nodes, links, and sources (water distribution layout) for each scenario (Average Day Demand, Maximum Hour Demand, Maximum Day + Fire Demand) are provided in Appendix C. Each scenario was modelled for the project individually. The Hazen-Williams formula was used within the model for head loss calculations, and to address water quality concerns, the EPANET quality parameter was set to age, and the analysis runtime was set to 72 hours with analysis report results being displayed at the 72-hour mark.

### *3.5. Project Design Results*

The detailed EPANET result tables for the average day, maximum hour, and maximum day + fire flow demand (for both boundary conditions) is provided in Appendix C. The EPANET V2.2 modelling software output results show that the proposed water distribution system follows the MSCSS requirements for water supply, water pressures, and proposed velocities.

The average day demand flow results show that the proposed water distribution system has a minimum pressure of 41.44 m (58.92 psi, 406.28 kPa) at node Hydrant, which is greater than the minimum pressure of 275 kPa (40 psi) required at average day demand as per the MSCSS. To address quality concerns, current standards dictate that water shall not remain in the watermain for more than 72 hours under average day demand. The results show that the maximum age of water in the watermain (excluding dead-ends/stubs and hydrant lead) is 2.24 hours at node J8, which is less than the 72-hour maximum.

The maximum hourly flow results show that the minimum pressure in the system is 41.44 m (58.92 psi, 406.28 kPa) at node Hydrant, which is more than the minimum allowable pressure of 275 kPa (40 psi) permitted as per the MSCSS. The maximum velocity during the maximum hour demand is 0.78 m/s at link P8, which is less than the maximum allowable velocity of 1.5 m/s as per the DS&RM.

The maximum day + fire flow demand results show that the lowest pressure in the system under these conditions is 38.34 m (54.51 psi, 375.89 kPa) at node Hydrant which is higher than the minimum required pressure of 140 kPa (20 psi) required during maximum + fire flow demand as per the MSCSS. The maximum velocity in the system during maximum day + fire flow demand is 2.93 m/s at link P1 (excluding hydrant leads), which is less than the maximum allowable velocity of 3.0 m/s during maximum day + fire flow demand per the MECP.

## 4. STORM SERVICING AND STORMWATER MANAGEMENT

### *4.1. Pre-Development Conditions*

Pre-development conditions were obtained from the Existing Conditions, Sediment Control and Removals Plan C2 prepared by SBM, provided separately. Under pre-development conditions, the approximately 1.27 ha site consists of a single-family residential dwelling with an outdoor pool and a large driveway that abuts the Hull Rd ROW to the south. Under pre-development conditions, the 1.27 ha subject site is comprised of a building area (727.74 m2), asphalt/concrete areas (426.38 m2), and landscaped areas (11,638.18 m2). As per the Storm Water Management (SWM) calculations provided in Appendix D, the pre-development site has a calculated runoff coefficient C-value of 0.26.

The SWM calculations, provided in Appendix D, and the Existing Conditions, Sediment Control and Removals Plan C2, provided separately, show that under pre-development conditions the site has been divided into 3 uncontrolled catchment areas (U201, U202 and U203), and 1 external catchment area draining into U103 (EXT101).

Under pre-development conditions, water from major storm events (ie. 250-year storm) is safely conveyed overland to the Locke Heights ROW from U101, to the Hull Rd ROW from U102, and to the northwest into the Stokeman Drain.

### *4.2. Post-Development Conditions*

Post-development conditions were based on the Site Plan prepared by SBM, provided in Appendix A. Under post-development conditions, the entire site will be comprised of the six (6) townhouse buildings (approximately 4,046.20 $m^2$ total), asphalt/concrete area (approximately 3,905.08 $m^2$), and landscaped/open area (approximately 4,841.02 $m^2$) with a calculated C-value of 0.64. Please refer to the Storm Water Management (SWM) Calculations, provided in Appendix D.

The SWM calculations, provided in Appendix D, and the Site Grading Plans C4, provided separately, show that under post-development conditions the site has been divided into 2 uncontrolled catchment areas (U201 and U202), 1 controlled catchment area (A201), and 1 external catchment area draining into A201 (EXT201).

Major storm events exceeding the 250-year event will be safely conveyed overland by the site's grading to the site's storm outlet in the Hull Rd ROW. Please refer to the Site Servicing Plan C3 prepared by SBM, provided separately.

### *4.3. Storm Servicing*

Based on the Municipality of Strathroy-Caradoc's record drawing "Locke Heights" (CS–9780–P2) prepared by Cole, Sherman Engineers and Planners dated August 1980, provided in Appendix A, there is an existing 375 mm diameter storm sewer in the Hull Rd ROW that is located at the southeast corner of the subject site. It is proposed to connect to the existing 375 mm diameter storm sewer to provide storm servicing for the proposed development.

The stormwater runoff for the proposed development is collected and conveyed by six (6) maintenance holes (STMH1, STMH4, STMH5, STMH6, STMH7, and STMH13), two (2) catch basin manholes (CBMH2, and 12), ten (10) catch basins (CB8, 10, 11, 14, 15, 16, 17, 18, 19, and 20), and one (1) ditch inlet catch basin (DICB9) located at associated low points. An oil grit separator (OGS) is also proposed (See Section 4.5 – Stormwater Management – Quality Control). The OGS unit is proposed to outlet to a new 300 mm diameter storm sewer at a slope of 0.54% that will ultimately discharge to the existing 375 mm diameter storm sewer in the Hull Rd ROW at the southeast quadrant of the site. Please refer to the Site Servicing and Grading Plans C3 and C4, prepared by SBM, provided separately.

### *4.4. Stormwater Management – Quantity Controls*

The SWM calculations provided in Appendix D show a post-development C-value of 0.64 for the entire site, which is higher than the pre-development C-value of 0.26. Therefore, stormwater management quantity controls are proposed to release flows at allowable pre-development levels.

The uncontrolled catchment area U201 is comprised of building area (approximately 496.78 $m^2$ total), asphalt/concrete area (approximately 420.06 $m^2$), and landscaped/open area (approximately 690.47 $m^2$) with a calculated C-value of 0.60, and uncontrolled post-development flow rates of 28.74 L/s, and 57.01 L/s, under 5- and 250-year storm events, respectively. Please

refer to the SWM Calculations, provided in Appendix D. U201 is currently uncontrolled to Hull Rd ROW, however, once future grades are established, area U201 will become a controlled unrestricted area ultimately draining to the 300mm diameter at 0.54% proposed outlet pipe.

The uncontrolled catchment area U202 is comprised of building area (approximately 246.32 $m^2$ total), asphalt/concrete area (approximately 263.98 $m^2$), and landscaped/open area (approximately 2,040.05 $m^2$) with a calculated C-value of 0.34, and uncontrolled post-development flow rates of 25.88 L/s, and 51.33 L/s, under the 5- and 250-year storm events, respectively. Please refer to the SWM Calculations, provided in Appendix D. U202 is uncontrolled to Stokeman Drain.

Catchment area A201 is comprised of building area (approximately 3,303.10 $m^2$ total), asphalt/concrete area (approximately 3,221.04 $m^2$), and landscaped/open area (approximately 1,905.56 $m^2$) with a calculated C-value of 0.74 and controlled post-development flow rates of 186.56 L/s, and 370.06 L/s, under the 5- and 250-year storm events, respectively. Please refer to the SWM Calculations, provided in Appendix D.

Catchment area A202 is comprised of landscaped/open area (approximately 204.94 $m^2$) with a calculated C-value of 0.20 and controlled post-development flow rates of 1.22 L/s, and 2.43 L/s, under the 5- and 250-year storm events, respectively. Please refer to the SWM Calculations, provided in Appendix D.

External catchment area EXT201 where Municipal No. 6 resides (refer to the Site Plan prepared by SBM, provided in Appendix A), is comprised of building area (approximately 352.24 $m^2$ total), asphalt/concrete area (approximately 203.90 $m^2$), and landscaped/open area (approximately 391.05 $m^2$) with a calculated C-value of 0.61 and external post-development flow rates of 17.27 L/s, and 34.25 L/s, under the 5- and 250-year storm events, respectively. Please refer to the SWM Calculations, provided in Appendix D.

The storm flows discharged from the subject site will be controlled via an IPEX inlet control device (ICD) installed on the outlet of STMH4 to conservatively restrict flows to 18.14 L/s (to be confirmed during detailed design). The IPEX ICD vortex is provided in Appendix D. Please refer to the SWM Calculations, provided in Appendix D.

Based on the SWM calculations provided in Appendix D, the max storage volume required for the site is 169.10 $m^3$ under the 5year storm event, 301.04 $m^3$ under the 100year storm event and 344.89 $m^3$ under the 250year storm event, respectively. Approximately 195 $m^3$ is required underground through underground storage chamber for this site and is to be designed during the SPA phase.

### *4.5. Stormwater Management – Quality Controls*

For site plan applications, water quality control shall be provided to all new and redeveloping industrial, commercial, institutional, and medium/high density residential developments. The Municipality of Strathroy-Caradoc requirement for water quality treatment is to meet a minimum of 80% (enhanced) TSS removal. The proposed OGS 'FD-4HC' (or approved equivalent) demonstrates compliance with the SWM criteria and environmental targets identified. Please refer to Appendix D for all details and calculations for the 'FD-4HC' by Advanced Drainage Systems Inc. (ADS). Please refer to the Site Servicing Plans, prepared by SBM, provided separately, for the proposed location of the OGS. Maintenance of the OGS is the Contractor's responsibility during construction and the Owner's responsibility for the service life of the unit.

## 5. HULL ROAD 'FUTURE' RECONSTRUCTION CONSIDERATIONS

### *5.1. Hull Road 'Potential Future' Reconstruction*

A future connection to Hull Road has been considered as part of the proposed development. This connection would require raising the existing road along the subject property and adjacent properties at 115, 95, and 83 Hull Road. At its highest point—near the proposed site access—the road would need to be elevated by approximately 3.03 m, tapering back to existing grades as determined during detailed design (to be completed by the Municipality), should Hull Road be upgraded. The proposed grade elevations (see "future grades" shown in blue on Sheet C4) represent the minimum required to accommodate gravity-based onsite servicing. This is due to the elevation of existing municipal services—particularly the sanitary sewer—which are sufficiently high to dictate the proposed site grading. The future connection is shown with light grey hatching on Sheets C3 and C4, with the associated proposed slopes in blue (refer to Sheet C4 for details).

Upgrading Hull Road to municipal standards would place a significant financial burden on Goldleaf Properties. and the associated design, stakeholder coordination, and full road reconstruction would render the development economically unfeasible. This work would require the involvement of multiple stakeholders—including, but not limited to, the local conservation authority, utility providers, and multiple municipal departments—due to the impact on the road profile and the need to accommodate the required elevation increase.

## 6. LIMITATIONS

This Brief was prepared by SBM for The Corporation of the Municipality of Strathroy-Caradoc and Gold Leaf Properties. Use of this Brief by any third party, or any reliance upon its findings, is solely the responsibility of that party. SBM accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions undertaken as a result of this Brief. Third party use of this Brief, without the express written consent of the Consultant, denies any claims, whether in contract, tort, and/or any other cause of action in law, against the Consultant.

All findings and conclusions presented in this Brief are based on information as it appeared during the period of the investigation. This Brief is not intended to be exhaustive in scope, or to imply a risk-free facility. It should be recognized that the passage of time may alter the opinions, conclusions, and recommendations provided herein.

The design was limited to the documents referenced above and on SBM's drawings, provided separately. SBM accepts no responsibility for the accuracy of the information provided by others. All designs and recommendations presented in this Brief are based on the information available at the time of the review.



## 7. CLOSURE

We trust this Brief meets your satisfaction. Should you have any questions or require further information, please do not hesitate to contact us.

Respectfully submitted,

**Strik, Baldinelli, Moniz Ltd.**

Planning • Civil • Structural • Mechanical • Electrical

Ryan Frouws, P.Eng.
Civil Team Lead, Tech IV


Rawan Safieddine, M.Eng.
Civil Engineering Trainee II

**List of Appendices**

**Appendix A:** Site Plan and Zoning Chart (SP1) prepared by SBM
Municipality of Strathroy-Caradoc's record drawing "Locke Heights" (CS–9780–P2) prepared by Cole, Sherman Engineers and Planners dated August 1980

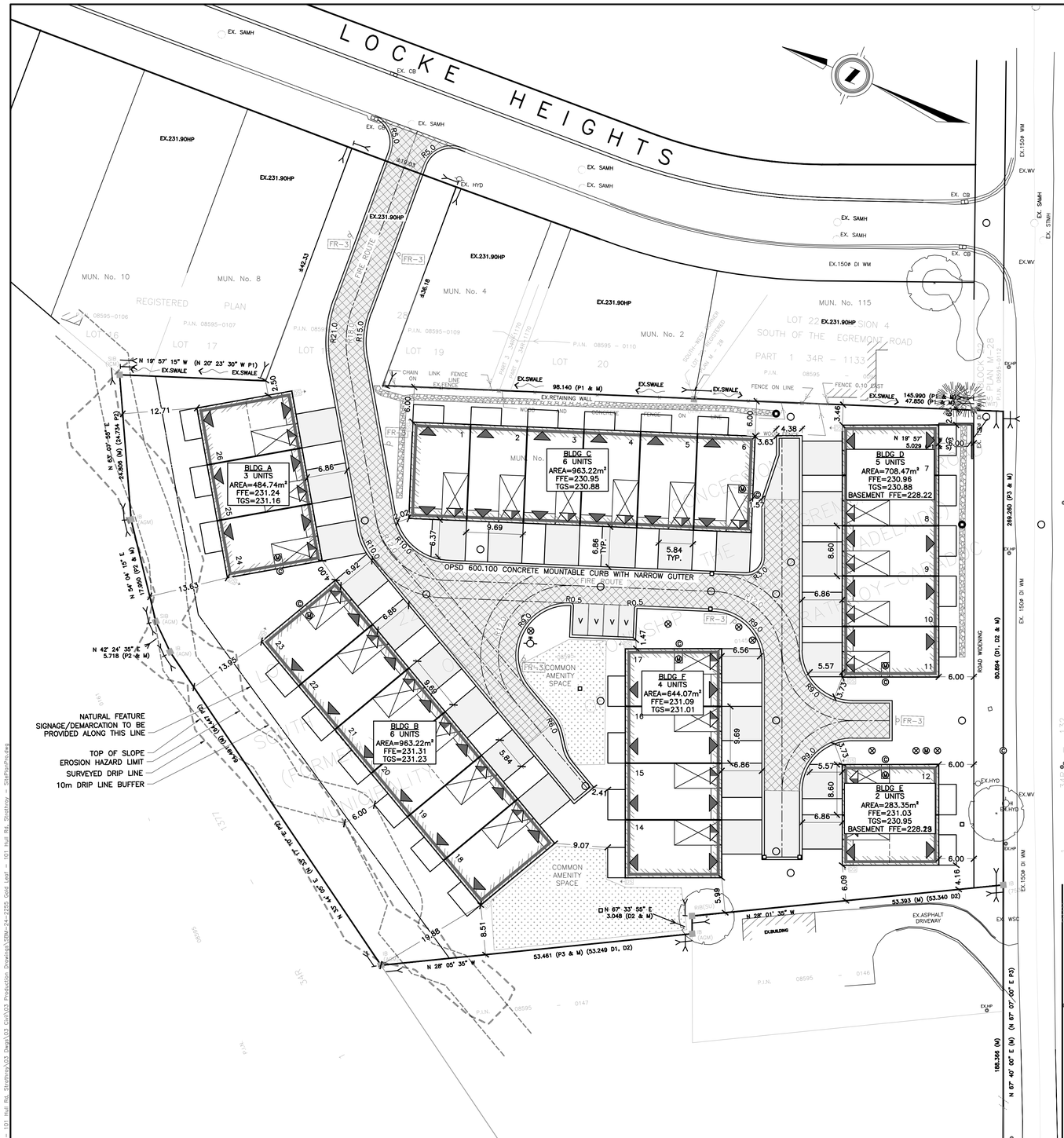
**Appendix B:** Sanitary Sewer Design Sheet

**Appendix C:** Domestic Water Demand Calculations
Fire-Flow Calculations (OBC)
Hydrant Flow Test by SCG Flowmetrix dated October 26, 2020
Average Day Demand EPANET Model Layout and Results
Maximum Hour Demand EPANET Model Layout and Results
Maximum Hour Demand + Fire Flow Demand EPANET Model Layout and Results

**Appendix D:** Stormwater Management Calculations
Advanced Drainage Systems Inc. (ADS) 'FD-4HC' OGS Details and Calculations Package
IPEX Inlet Control Device Details

## APPENDIX A

Site Plan and Zoning Chart (SP1) prepared by SBM
Municipality of Strathroy-Caradoc's record drawing "Locke Heights" (CS–9780–P2) prepared by Cole, Sherman Engineers and Planners dated August 1980




## ZONING DATA CHART

SITE AREA: 12792.3 m² ASPHALT AREA: 2784.2 m²
BUILDING AREA: 4046.2 m² LANDSCAPED AREA: 5961.9 m²
PROPOSED UNIT COUNT 26

| ITEM | R3 ZONE | REQUIRED | PROVIDED |
|---|---|---|---|
| 1 | PERMITTED USES | SEE PERMITTED USE NOTE ON THIS SHEET | TOWNHOUSE |
| 2 | LOT AREA (m² PER UNIT MIN) | 210.0 | 492.0 |
| 3 | LOT FRONTAGE (m MIN PER UNIT) | 6.0 | 0.7, 8.6 UNIT WIDTH |
| 4 | FRONT YARD AND EXTERIOR SIDE YARD WIDTH (m MIN) | 4.5 | 6.0 |
| 5 | SIDE YARD WIDTH (m MIN) | 2.0 | 2.5 |
| 6 | REAR YARD DEPTH (m MIN) | 9.0 | 12.7 |
| 7 | LANDSCAPED OPEN SPACE (%) MINIMUM | 30.0 | 46.6 |
| 8 | LOT COVERAGE (%) MAX | 45.0 | 31.6 |
| 9 | HEIGHT MAXIMUM (m) | 15 | 1 STOREY |
| 10 | PARKING COVERAGE (% OF LOT MAX) | 25.0 | 21.8 |
| 11 | OUTDOOR COMMON AMENITY AREA (m² PER UNIT) MIN | 20.0 | 38.1 |

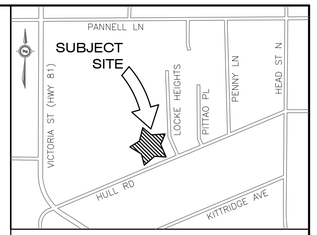
## PARKING DATA CHART

ZONING BY-LAW OF THE MUNICIPALITY OF STRATHROY-CARADOC:
4.23 PARKING REGULATIONS

| | REQUIREMENT | PROPOSED |
|---|---|---|
| MINIMUM REQUIRED OFF-STREET PARKING REGULATION: DWELLING TOUNHOUSE | 1.5 SPACES PER DWELLING UNIT: 39 SPACES REQUIRED | 3 SPACES (1 GARAGE, 2 DRIVEWAY) 78 SPACES PROPOSED |
| VISITOR PARKING | 0.15 PARKING SPACES PER UNIT: 4 SPACES REQUIRED | 4 SPACES PROPOSED |
| TOTAL PARKING PROPOSED: | | 82 SPACES PROPOSED |

## LEGEND:

- XX-X — PROPOSED SIGN, TYPE OF SIGN
- PROPOSED BARRIER FREE ROUTE
- PROPOSED FIRE ROUTE (6.0m WIDE, 12.0m ℄ RADIUS)
- PROPOSED SNOW STORAGE
- PROPOSED RAMP (SEE DETAIL ON SP2)
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- PROPOSED FIRE DEPARTMENT CONNECTION
- PRINCIPAL BARRIER FREE ENTRANCE & FIRE FIGHTER ACCESS ENTRANCE
- BUILDING ENTRANCE
- OVERHEAD DOOR
- DRIVETHRU WINDOW
- PROPOSED LIGHT-DUTY ASPHALT
- PROPOSED HEAVY-DUTY ASPHALT
- PROPOSED CONCRETE
- PROPOSED RETAINING WALL (DESIGNED BY OTHERS)
- EXISTING BUILDING
- PROPOSED BUILDING
- LIMITS OF SUBJECT PROPERTY
- DECIDUOUS/CONIFEROUS TREE
- BH 3 — BOREHOLE LOCATIONS, SEE GEOTECHNICAL INVESTIGATION




## KEY PLAN

N.T.S.

## LEGAL INFORMATION

PART OF
LOT 22 CONCESSION 4
IN THE
MUNICIPALITY OF
STRATHROY-CARADOC
COUNTY OF MIDDLESEX

PART OF
PLAN M28 LOT 18
IN THE
MUNICIPALITY OF
STRATHROY-CARADOC
COUNTY OF MIDDLESEX

## SITE BENCHMARK:

MONUMENT TYPE: BM No. 0011979U255

LOCATION: DEEP BENCH MARK IN MANHOLE IN GRD OF ST RIGHT-OF-WAY ON E SIDE OF MCNAB AVENUE, 71.2m S OF C/L OF COUNTY RD #39 AND 18.0m E OF C/L OF MCNAB AVENUE. FROM JCT OF HWY #402 AND MIDDLESEX RD #39 TAKE EXIT S TO STRATHROY FOR 3.8KM TO MCNAB ST. AND ORANGE CYL WITNESS SIGN WAS SET 14.18m AWAY AT A MAG BRG OF 99 DEG TO THE STA, ON POWER POLE.

GEODETIC ELEVATION: 226.695m (CGVD28:78)

(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)

## REFERENCE DOCUMENTS:

1. PREVIOUS SITE PLAN BY LDS, PROJECT No. LD-00209. DATED JULY 2023
2. LDS SITE PLAN DRIP LINE SURVEY, PROJECT No. LD-00209, DATED JULY 2023
3. LOT GRADING PLAN BY COLE SHERMAN ENGINEER AND PLANNERS, DWG No. CS-9780-G2, DATED AUGUST 1980
4. GENERAL PLAN SHOWING ALL SERVICES BY COLE SHERMAN ENGINEERS AND PLANNERS, DWG FILE No. CS-9780-G1, DATED AUGUST 1980
5. LAND SURVEY BY SOUTH WESTERN SURVEYING LTD., PROJECT: 20-003, DATED FEBRUARY 14, 2020
6. ENVIRONMENTAL DEVELOPMENT ASSESSMENT BY NATURAL RESOURCE SOLUTIONS INC., PROJECT #2336, DATED JANUARY 22, 2024

## WASTE REMOVAL

GARBAGE TO BE STORED INTERNALLY IN PRIVATE CONTAINERS TO BE PICKED UP BY MUNICIPAL GARBAGE COLLECTION.

## BUILDING CLASS.

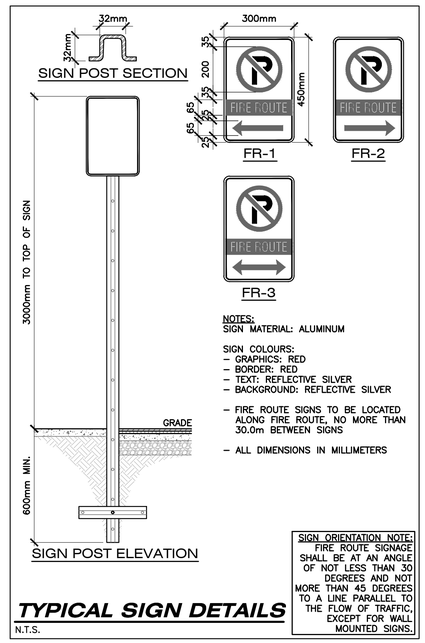
RESIDENTIAL – GROUP C OCCUPANCY, PART 9 OF THE ONTARIO BUILDING CODE.

## CANADA POST

THIS DEVELOPMENT WILL RECEIVE MAIL TO A NEAR-BY SUPERBOX AS LOCATED BY CANADA POST.

## PERMITTED USES

R3 ZONE:
- DWELLING, APARTMENT
- DWELLING, MULTIPLE-UNIT
- DWELLING, TOUNHOUSE
- GROUPED HOUSING
- LONG TERM CARE FACILITY




## TYPICAL SIGN DETAILS

N.T.S.

| AS CONSTRUCTED SERVICES | COMPLETION | | No. | REVISIONS | D/M/Y | BY |
|---|---|---|---|---|---|---|
| | | DESIGN AB | 1 | FOR CLIENT REVIEW/APPROVAL | 05/05/25 | AB |
| | | DRAWN AB | | | | |
| | | CHECKED RF | | | | |
| | | APPROVED RF | | | | |
| | | DATE 07/05/2025 | | | | |
| | | CAD 24-2255 | | | | |

CONSULTANT
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ENGINEER'S STAMP
**PRELIMINARY NOT FOR CONSTRUCTION**

ENGINEER'S STAMP

CLIENT
GOLDLEAF PROPERTIES
9644 TOWNSEND LINE
KERWOOD, ON
N0M 2B0
P: 519.870.3214
E: CINDYR@MCFLTD.CA

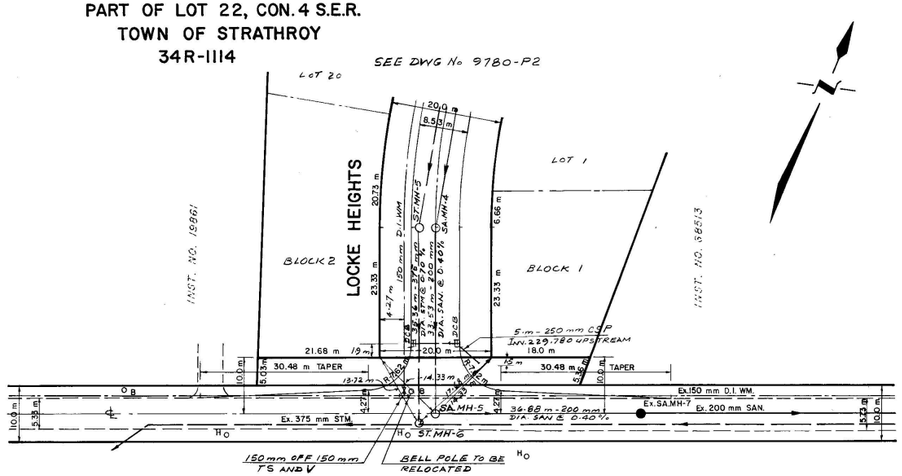
SCALE
SCALE – 1:400
4.0 0 8.0m

TITLE
SITE PLAN & ZONING CHART
PROPOSED RESIDENTIAL DEVELOPMENT
101 HULL ROAD
STRATHROY, ON.

PROJECT No. SBM-24-2255
SHEET No. SP1
PLAN FILE No. –

G:\2024 Jobs\SBM-24-2255 Goldleaf - 101 Hull Rd, Strathroy\A00 Drawings\A03 Civil\A03 Production Drawings\SBM-24-2255 Site Level - 101 Hull Rd, Strathroy - SitePlan.dwg

# PLAN OF SUBDIVISION
# PART OF LOT 22, CON. 4 S.E.R.
# TOWN OF STRATHROY
# 34R-1114




NOTES

1- SUMP ON EXISTING MANHOLE TO BE FILLED IN AND BENCHED TO SPRING LINE OF SEWER.
2- DEPTH AND LOCATION OF EXISTING STORM SEWER AND WATERMAIN ARE APPROXIMATE ONLY AND THE EXACT MEASUREMENT WILL BE DETERMINED IN THE FIELD AT TIME OF CONSTRUCTION.
3- SEE NOTES 1-15 ON DWG. No. CS-9780-P2




A. F. DIAS

| No. | REVISION | DATE | BY |
|---|---|---|---|

TOWN OF STRATHROY

LOCKE VALLEY ESTATES
M & R BRUGGEMAN DEVELOPMENTS LIMITED

HULL ROAD

COLE, SHERMAN
ENGINEERS AND PLANNERS

SCALE: 1:500 HOR. 1:50 VERT. | DATE: AUG. 1980 | DWG. No. CS-9780-P1

**APPENDIX B**

Sanitary Sewer Design Sheet

STRIK BALDINELLI MONIZ
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LONDON LOCATION
1599 Adelaide St. N., Unit 301
London, ON N5X 4E8
P: 519-471-6667

KITCHENER LOCATION
132 Queen St. S. Unit 4
Kitchener, ON N2G 1V9
P: 519-725-8093

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# Sanitary Service Design Sheet

## Municipality of Strathroy-Caradoc

**Date:** May 21, 2025
**Job Number:** SBM-24-2255
**Client:** Gold Leaf Properties
**Project:** Proposed Residential Development
**Location:** 101 Hull Road, Strathroy, Ontario

**Designed By:** RS
**Reviewed By:** RF

### Sanitary Sewage Flows

**(A) Area Basis**

*Low Density Residential (Zone Category R1) = 30 Units/hectare @2.4 people/unit
***Medium Density Residential (Zone Category R2)** =75 Units/hectare @ 2.4 people/unt
*High Density Residential (Zone Category R3) =150-300 Units/hectare @ 1.6 people/unit
*Commercial = 70 people/hectare

*Daily Flow (L/cap/day) 300
*Sewage Infiltration (Litres/hectare/day) 6740
Harmon Formula (Peaking Factor)
M = (1 + 14/(4+P^0.5))*1.1
Uncertainty Factor 1.1

| Location | | | Area | | Population | | | | | Sewage Flows | | | | Sewer design | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area No. | From MH | To MH | **Delta Hectare | Total Hectare | **No. of Units | People Per Unit | People Per Hectare | ***Delta Pop. | ***Total Pop. | Harmon Peaking Factor | Infilt L/S | Sewage L/S | Total L/S | n | Pipe Slope % | Dia. mm | Capacity L/S | Velocity m/s |
| | | | | | | | | | | | | | | | | | | |
| **Proposed Residential Development** | | | 1.27 | 1.27 | 26 | 2.4 | | 187.2 | 188 | 4.57 | 0.10 | 3.28 | **3.38** | 0.013 | 0.40% | 200 | **20.76** | 0.66 |
| | | | | | | | | | | | | | | | | | | |

*Refer to the Municipality of Strathroy-Caradoc Standards Section 2.3
**Refer to the Site Plan drawing SP1 prepared by Strik, Baldinelli, Moniz, provided separately.
***A population of 188 people is calculated as follows: 26 units multiplyed by 3 accounting for additional units as per Bill 23 guidelines, at 2.4 people per unit

**APPENDIX C**

Domestic Water Demand Calculations
Fire-Flow Calculations (OBC)
Hydrant Flow Test by SCG Flowmetrix dated October 26, 2020
Average Day Demand EPANET Model Layout and Results
Maximum Hour Demand EPANET Model Layout and Results
Maximum Hour Demand + Fire Flow Demand EPANET Model Layout and Results

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P: 519-471-6667

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Kitchener, ON N2G 1V9
P: 519-725-8093

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## DOMESTIC WATER DEMAND AND VELOCITY CALCULTIONS

| | |
|---|---|
| DATE: | May 21, 2025 |
| JOB No.: | SBM-24-2255 |
| **Client:** | **Gold Leaf Properties** |
| **Project:** | **Proposed Residential Development** |
| **Location:** | **101 Hull Road, Strathroy, Ontario** |

**DEMAND CALCULATION**

| | | | |
|---|---|---|---|
| Avg. Day Demand = | 250 | L/day/cap | As per MSCSS - Section 4.3.2 b) |
| Avg. Day Demand = | 0.002893519 | L/s/cap | |
| Max. Day Peaking Factor = | 3.5 | | As per MSCSS - Section 4.3.2 b) |
| Max. Hour Peaking Factor = | 7.8 | | As per MSCSS - Section 4.3.2 b) |
| Medium Density Residential = | 2.4 | ppl/unit | As per MSCSS - Section 4.3.2 b) |

| | * Units | **Population | Avg. Day (L/s) | Max. Hour (L/s) | Max. Day (L/s) |
|---|---|---|---|---|---|
| Medium Density Residential | 26 | 188 | 0.54 | 4.24 | 1.90 |
| **Total** | | | **0.54** | **4.24** | **1.90** |

* Number of units obtained from Site Plan prepared by SBM, provided separately.

**A population of 188 people is calculated as follows: 26 units multiplyed by 3 accounting for additional units as per Bill 23 guidelines, at 2.4 people per unit

**VELOCITY CALCULATION**

| Diameter (mm) | Demand (L/s) | Velocity (m/s) |
|---|---|---|
| 50 | 4.24 | 2.16 |
| 200 | 4.24 | 0.14 |

Maximum allowable velocity of 1.5 m/s under maximum hour domestic flow conditions as per Section 4.3.2 of the Municipality of Strathroy-Caradoc Servicing Standards (MSCSS).

| Node | Number of Units | Population (Ppl) | Avg. Day (L/s) | Max. Hour (L/s) | Max. Day (L/s) | ** Elevation (m) |
|---|---|---|---|---|---|---|
| Reservoir1 (Municipal Supply — Hull Rd ROW) | | | | | | 272.49 |
| J1 (Building E) | 2 | 14 | 0.042 | 0.33 | 0.15 | 228.49 |
| J2 (Building D) | 5 | 36 | 0.104 | 0.81 | 0.36 | 228.63 |
| J3 (Tee) | | | | | | 228.85 |
| J4 (Building C) | 6 | 43 | 0.125 | 0.98 | 0.44 | 229.24 |
| J5 (Building F) | 4 | 29 | 0.083 | 0.65 | 0.29 | 228.99 |
| J6 (Tee) | | | | | | 228.88 |
| J7 (Hydrant) | | | | | | 231.05 |
| J8 (Buildings A/B) | 9 | 65 | 0.188 | 1.46 | 0.66 | 229.38 |
| **Proposed Residetional Development Total** | **26** | 188 | 0.54 | 4.24 | 1.90 | |

** Refer to Site Grading Plan prepared by SBM, provided septerately for Elevations (Ground – 1.7 m Cover for Junctions, + 0.45 m to Hydrant Lateral for Hydrant)

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132 Queen St. S. Unit 4
Kitchener, ON N2G 1V9
P: 519-725-8093

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## Fire-Fighting Flow (OBC A-3.2.5.7.)

| | |
|---|---|
| | For data entry |
| | Calculated, not for data entry |

| | |
|---|---|
| DATE: | May 22, 2025 |
| JOB N0.: | SBM-24-2255 |

| | |
|---|---|
| **Client:** | **Gold Leaf Properties** |
| **Project:** | **Proposed Residential Development** |
| **Location:** | **101 Hull Road, Strathroy, Ontario** |

---

$Q=K*V*S_{Tot}$

| | | |
|---|---|---|
| Building Classification (3.1.2.1): | C | |
| Type of Construction: | Combustible | |
| K (Table 1): | **23** | |
| Building Area, $m^2$: | 484.74 | (Building D - assuming a fire wall protection) |
| Building Height, m: | 8.00 | (Building D - 1 storey unit + basement) |
| Building Volume, $m^3$: | **3877.92** | |

$S_{Tot} = 1.0 + (S_{side1} + S_{side2} + S_{side3} + S_{side4})$

| | | |
|---|---|---|
| $S_{side1}$ (Figure 1) = | 0.50 | (North) |
| $S_{side2}$ (Figure 1) = | 0.00 | (East) |
| $S_{side3}$ (Figure 1) = | 0.00 | (South) |
| $S_{side4}$ (Figure 1) = | 0.00 | (West) |
| $S_{Tot}$ = | 1.50 | |
| $S_{Tot}$ < or = 2, therefore $S_{Tot}$ = | **1.50** | |
| **Q, L =** | **133788** | |

| | | |
|---|---|---|
| **Required Supply Flow Rate, L/min (Table 2) =** | 3600 | |
| **Maximum day domestic demand (as per separate calculation sheet) =** | 1.90 | L/sec |
| | 114.00 | L/min |
| **Required Supply Fire Flow + Maximum Day Demand, L/min =** | **3714** | |

| | | | | |
|---|---|---|---|---|
| **Provided Supply Flow Rate @** | **68.00** | *psi (468.84 kPa) = | **0** | *L/min (0 USGPM) |
| | **55.00** | *psi (379.21 kPa) = | **6722** | *L/min (1776 USGPM) |
| | **20.00** | *psi (137.9 kPa) = | **13607** | *L/min (3595 USGPM) |
| **Using linear interpolation, residual pressure at hydrant =** | **60.82** | *psi (419.32 kPa) = | **3714** | *L/min (981 USGPM) |

**Water Pressure Under Firefighting Conditions =** 60.82 psi (42.77 m head, 419.32 kPa)

*Refer to the Hydrant Flow Test by SCG Flowmetrix dated October 26, 2020.

| | | |
|---|---|---|
| **Approximate Elevation at the Ex. Hydrant = | **224.67** | m (deducting 1.7m cover) |
| *Head at zero flow = | **47.82** | m head (refer to the Hydrant Flow Test) |
| Total HGL Pressure at the reservoir = | **272.49** | m head (used in EPAnet model) |

*Refer to the Gradin Plan Sheet C4 prepared by SBM, provided seperately.

**Therefore, water supply pressure for the proposed buildings under fire flow conditions = 60.82 psi (42.77 m head, 419.32 kPa) which is > 20 psi and < 100 psi**

**Using Q = V*A**

| | | | | | |
|---|---|---|---|---|---|
| pipe diameter (mm) = | 200 | Area ($m^2$) = | 0.0314 | Max Day + Fire Velocity (m/s) = | 1.97 |

Therefore, velocity under Maximum Day + Fireflow Demand is 1.97 m/s which is < 3.0 m/s per MECP Design Guidelines for Drinking Water Systems

# Fire Flow Testing Report

## Residual Hydrant # 386
## NFPA Colour Code BLUE

### RESIDUAL HYDRANT INFO.

| | | |
|---|---|---|
| HYDRANT # | 386 | |
| N.F.P.A. COLOUR CODE | BLUE | |
| STATIC PRESSURE | 68.0 | psi |
| RESIDUAL PRESSURE | 55.0 | psi |
| PRESSURE DROP | 13 | psi |
| % PRESSURE DROP | 19.1 | % psi |
| NFPA 291 CONFORMANCE<br>criteria - 25% pressure drop | TEST DOES NOT MEET NFPA 291 CONFORMANCE FOR REQUIRED PRESSURE DROP | |
| AWWA M-17 CONFORMANCE<br>criteria - 10 psi pressure drop | TEST MEETS AWWA M-17 PRACTICAL PRESSURE DROP OF 10 PSI or GREATER | |
| Flow on Water Main At Test Hydrant - | 20 psi | 3595 USGPM |

**DATE** October 26, 2020
**TIME** 10:00 AM

**ADDRESS**
95 Hull Road
Strathroy, Ontario
N7G 2B7

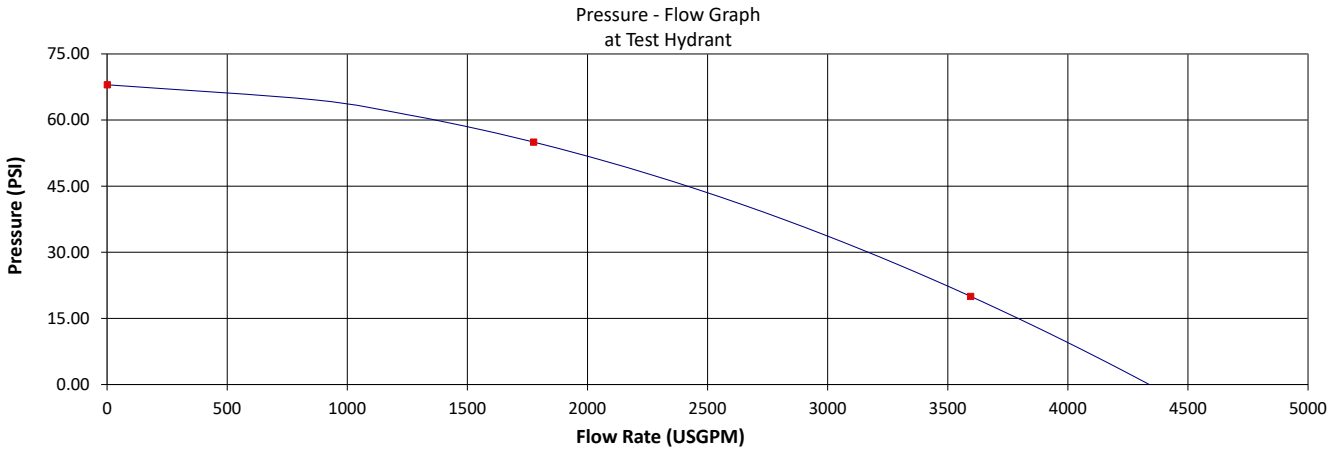
**SIZE-inches/mm** 6 150

**CONTACT INFO**
Abe Harder
Senior Civil Designer
LDS CONSULTANTS INC.
15875 Robins Hill Road, Unit 1
London, Ontario N5V 0A5
abe.harder@LDSconsultants.ca
226-289-2952
519-537-0045

### FLOW HYDRANT(S) INFO.

| HYDRANT ASSET ID | HYD. # PORTS | OUTLET DIAMETER (INCHES) | NOZZLE COEFFICIENT | DIFFUSER TYPE | DIFFUSER COEFFICIENT | PITOT READING (psi) | PITOT FLOW (USGPM) | FLOW METER (USGPM) |
|---|---|---|---|---|---|---|---|---|
| 385 | 2 | 2.5 | Round | Swivel | 1.00 | 7.0 | 888 | 0 |
| | | 2.5 | Round | None | 1.00 | 7.0 | 888 | 0 |
| | | | | | | | | 0 |
| | | | | | | | | 0 |
| | | | | | | | | 0 |
| | | | | | | | | 0 |
| | | | | Total Flow (USGPM) | | | 1776 | 0 |
| | | | | Total Flow (USGPM) | | | 1776 | |

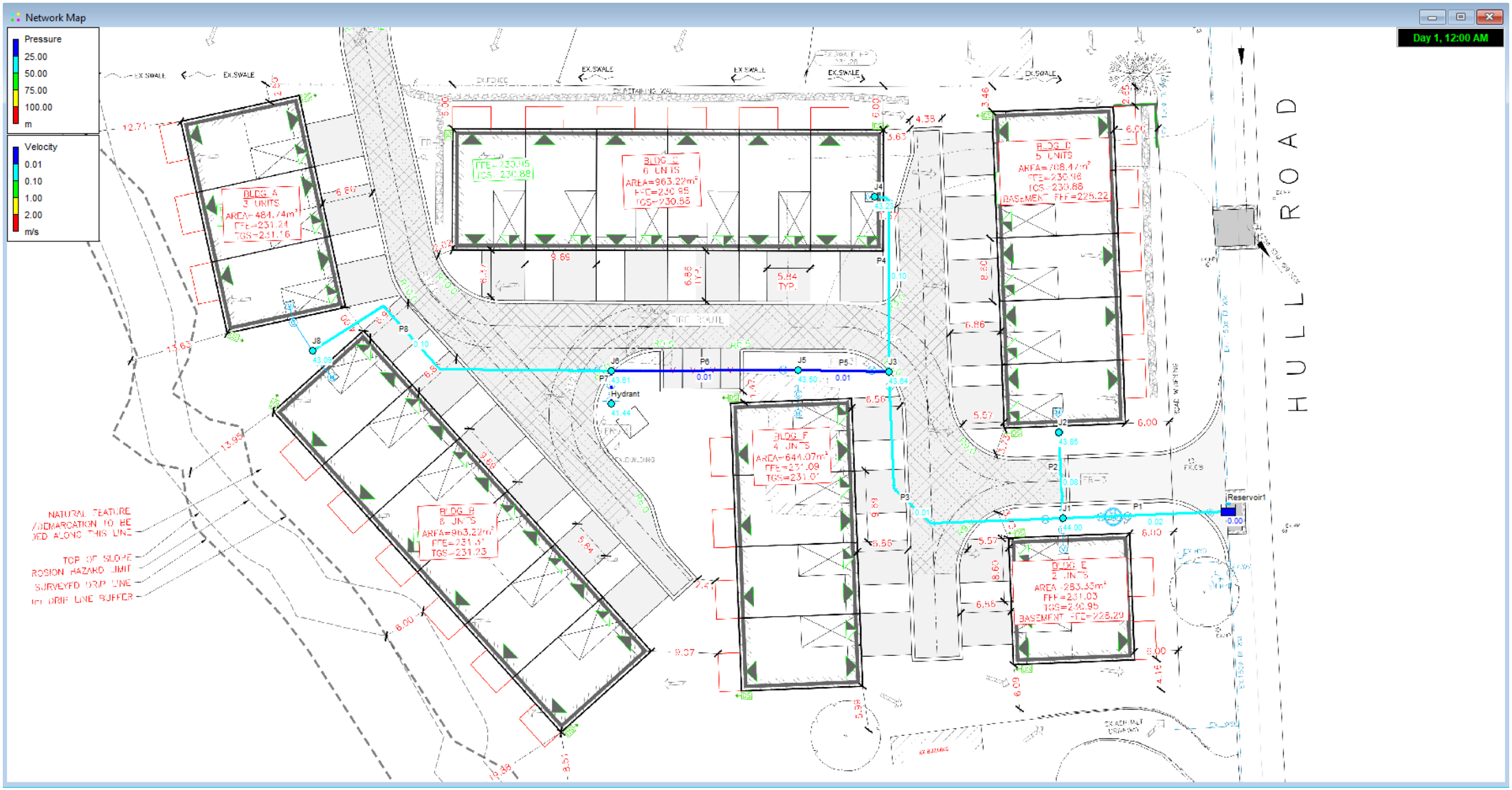
### FIRE FLOW CHART




### COMMENTS

| | | |
|---|---|---|
| OPERATOR | FMX | Michael Lawrie |
| OPERATOR | FMX | Scott Whitlock |
| OPERATOR | | Strathroy-Caradoc |
| PRESSURE ZONE | | n/a |
| TOWER LEVEL | ft | n/a |
| PUMPS (ON/OFF) | | n/a |
| OTHER-1 | | n/a |
| OTHER-2 | | n/a |

# Average Day Demand



```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.2                             *
******************************************************************
```

Input File: SBM-24-2255 Gold Leaf - 101 Hull Rd, Strathroy - Avg Day Demand.net

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| P1 | Reservoir1 | J1 | 17 | 200 |
| P2 | J1 | J2 | 8 | 40 |
| P3 | J1 | J3 | 30.69 | 200 |
| P4 | J3 | J4 | 19.1 | 40 |
| P5 | J3 | J5 | 9.21 | 200 |
| P6 | J5 | J6 | 19.23 | 200 |
| P7 | J6 | Hydrant | 3.25 | 150 |
| P8 | J6 | J8 | 34.71 | 50 |

Node Results at 0:00 Hrs:

| Node ID | Demand LPS | Head m | Pressure m | Quality hours | |
|---|---|---|---|---|---|
| J1 | 0.04 | 272.49 | 44.00 | 0.00 | |
| J2 | 0.10 | 272.48 | 43.85 | 0.00 | |
| J3 | 0.00 | 272.49 | 43.64 | 0.00 | |
| J4 | 0.12 | 272.47 | 43.23 | 0.00 | |
| J5 | 0.08 | 272.49 | 43.50 | 0.00 | |
| J6 | 0.00 | 272.49 | 43.61 | 0.00 | |
| Hydrant | 0.00 | 272.49 | 41.44 | 0.00 | |
| J8 | 0.19 | 272.47 | 43.09 | 0.00 | |
| Reservoir1 | -0.54 | 272.49 | 0.00 | 0.00 | Reservoir |

Link Results at 0:00 Hrs:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| P1 | 0.54 | 0.02 | 0.00 | Open |
| P2 | 0.10 | 0.08 | 0.69 | Open |
| P3 | 0.40 | 0.01 | 0.00 | Open |
| P4 | 0.12 | 0.10 | 0.98 | Open |

| | | | | |
|---|---|---|---|---|
| P5 | 0.27 | 0.01 | 0.00 | Open |
| P6 | 0.19 | 0.01 | 0.00 | Open |
| P7 | 0.00 | 0.00 | 0.00 | Open |
| P8 | 0.19 | 0.10 | 0.70 | Open |



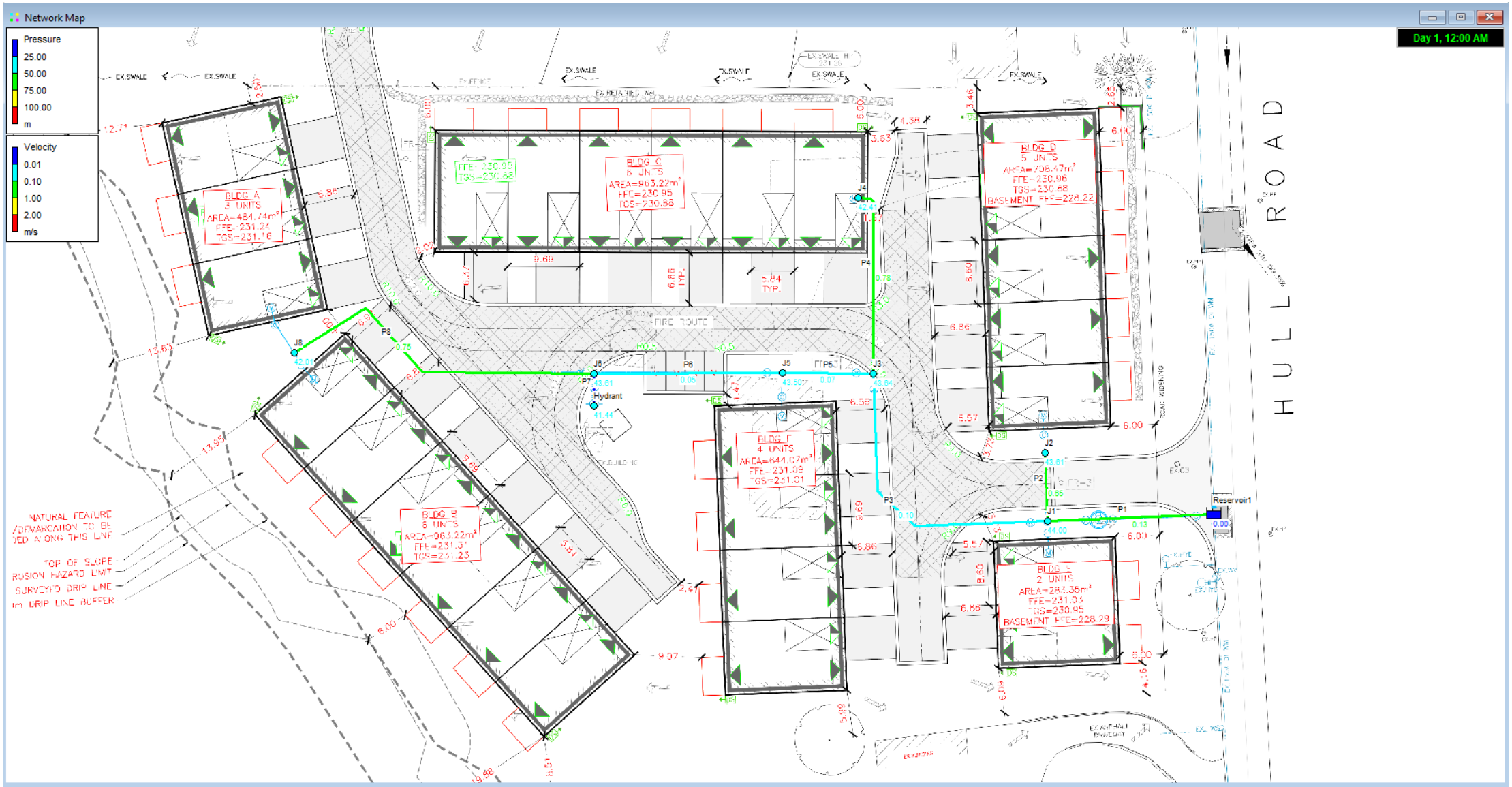
Node Results at 72:00 Hrs:

| Node ID | Demand LPS | Head m | Pressure m | Quality hours | |
|---|---|---|---|---|---|
| J1 | 0.04 | 272.49 | 44.00 | 0.27 | |
| J2 | 0.10 | 272.48 | 43.85 | 0.30 | |
| J3 | 0.00 | 272.49 | 43.64 | 0.95 | |
| J4 | 0.12 | 272.47 | 43.23 | 1.00 | |
| J5 | 0.08 | 272.49 | 43.50 | 1.25 | |
| J6 | 0.00 | 272.49 | 43.61 | 2.14 | |
| Hydrant | 0.00 | 272.49 | 41.44 | 72.00 | |
| J8 | 0.19 | 272.47 | 43.09 | 2.24 | |
| Reservoir1 | -0.54 | 272.49 | 0.00 | 0.00 | Reservoir |

Link Results at 72:00 Hrs:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| P1 | 0.54 | 0.02 | 0.00 | Open |
| P2 | 0.10 | 0.08 | 0.69 | Open |
| P3 | 0.40 | 0.01 | 0.00 | Open |
| P4 | 0.12 | 0.10 | 0.98 | Open |
| P5 | 0.27 | 0.01 | 0.00 | Open |
| P6 | 0.19 | 0.01 | 0.00 | Open |
| P7 | 0.00 | 0.00 | 0.00 | Open |
| P8 | 0.19 | 0.10 | 0.70 | Open |

# Maximum Hour Demand



```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.2                             *
******************************************************************
```

Input File: SBM-24-2255 Gold Leaf - 101 Hull Rd, Strathroy - Max Hr Demand.net

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| P1 | Reservoir1 | J1 | 17 | 200 |
| P2 | J1 | J2 | 8 | 40 |
| P3 | J1 | J3 | 30.69 | 200 |
| P4 | J3 | J4 | 19.1 | 40 |
| P5 | J3 | J5 | 9.21 | 200 |
| P6 | J5 | J6 | 19.23 | 200 |
| P7 | J6 | Hydrant | 3.25 | 150 |
| P8 | J6 | J8 | 34.71 | 50 |

Node Results at 0:00 Hrs:

| Node ID | Demand LPS | Head m | Pressure m | Quality hours | |
|---|---|---|---|---|---|
| J1 | 0.33 | 272.49 | 44.00 | 0.00 | |
| J2 | 0.81 | 272.24 | 43.61 | 0.00 | |
| J3 | 0.00 | 272.49 | 43.64 | 0.00 | |
| J4 | 0.98 | 271.65 | 42.41 | 0.00 | |
| J5 | 0.65 | 272.49 | 43.50 | 0.00 | |
| J6 | 0.00 | 272.49 | 43.61 | 0.00 | |
| Hydrant | 0.00 | 272.49 | 41.44 | 0.00 | |
| J8 | 1.47 | 271.39 | 42.01 | 0.00 | |
| Reservoir1 | -4.23 | 272.49 | 0.00 | 0.00 | Reservoir |

Link Results at 0:00 Hrs:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| P1 | 4.23 | 0.13 | 0.10 | Open |
| P2 | 0.81 | 0.65 | 31.18 | Open |
| P3 | 3.09 | 0.10 | 0.06 | Open |
| P4 | 0.98 | 0.78 | 43.83 | Open |

| | | | | |
|---|---|---|---|---|
| P5 | 2.11 | 0.07 | 0.03 | Open |
| P6 | 1.47 | 0.05 | 0.01 | Open |
| P7 | 0.00 | 0.00 | 0.00 | Open |
| P8 | 1.47 | 0.75 | 31.48 | Open |



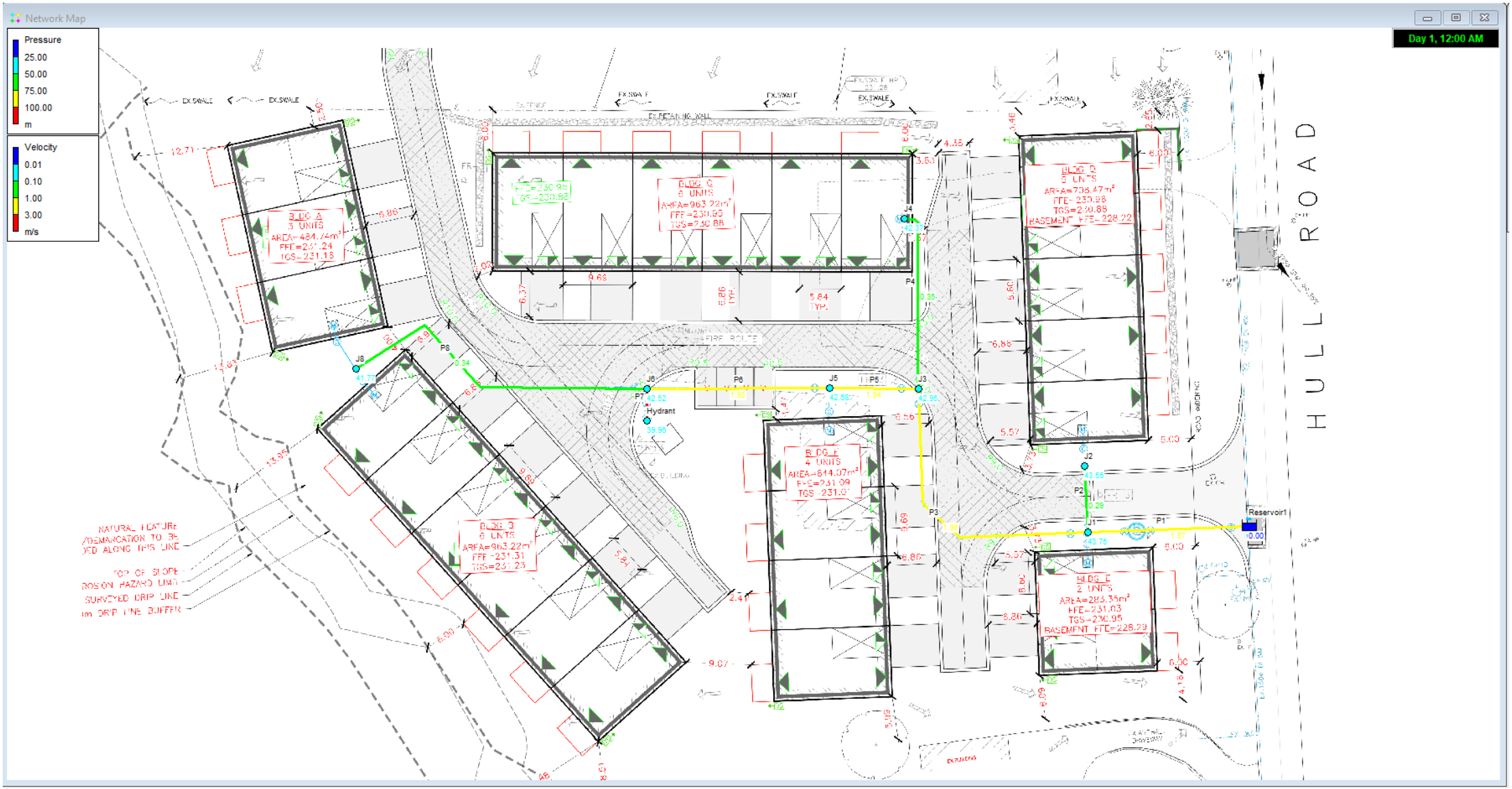
Node Results at 72:00 Hrs:

| Node ID | Demand LPS | Head m | Pressure m | Quality hours | |
|---|---|---|---|---|---|
| J1 | 0.33 | 272.49 | 44.00 | 0.04 | |
| J2 | 0.81 | 272.24 | 43.61 | 0.04 | |
| J3 | 0.00 | 272.49 | 43.64 | 0.12 | |
| J4 | 0.98 | 271.65 | 42.41 | 0.13 | |
| J5 | 0.65 | 272.49 | 43.50 | 0.16 | |
| J6 | 0.00 | 272.49 | 43.61 | 0.27 | |
| Hydrant | 0.00 | 272.49 | 41.44 | 72.00 | |
| J8 | 1.47 | 271.39 | 42.01 | 0.29 | |
| Reservoir1 | -4.23 | 272.49 | 0.00 | 0.00 | Reservoir |

Link Results at 72:00 Hrs:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| P1 | 4.23 | 0.13 | 0.10 | Open |
| P2 | 0.81 | 0.65 | 31.18 | Open |
| P3 | 3.09 | 0.10 | 0.06 | Open |
| P4 | 0.98 | 0.78 | 43.83 | Open |
| P5 | 2.11 | 0.07 | 0.03 | Open |
| P6 | 1.47 | 0.05 | 0.01 | Open |
| P7 | 0.00 | 0.00 | 0.00 | Open |
| P8 | 1.47 | 0.75 | 31.48 | Open |

# Maximum Day + Fire Flow Demand



```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.2                             *
******************************************************************
```

Input File: SBM-24-2255 Gold Leaf - 101 Hull Rd, Strathroy - Max Day Demand.net

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| P1 | Reservoir1 | J1 | 17 | 200 |
| P2 | J1 | J2 | 8 | 40 |
| P3 | J1 | J3 | 30.69 | 200 |
| P4 | J3 | J4 | 19.1 | 40 |
| P5 | J3 | J5 | 9.21 | 200 |
| P6 | J5 | J6 | 19.23 | 200 |
| P7 | J6 | Hydrant | 3.25 | 150 |
| P8 | J6 | J8 | 34.71 | 50 |

Node Results at 0:00 Hrs:

| Node ID | Demand LPS | Head m | Pressure m | Quality hours | |
|---|---|---|---|---|---|
| J1 | 0.15 | 272.24 | 43.75 | 0.00 | |
| J2 | 0.36 | 272.18 | 43.55 | 0.00 | |
| J3 | 0.00 | 271.80 | 42.95 | 0.00 | |
| J4 | 0.44 | 271.61 | 42.37 | 0.00 | |
| J5 | 0.29 | 271.67 | 42.68 | 0.00 | |
| J6 | 0.00 | 271.40 | 42.52 | 0.00 | |
| Hydrant | 60.00 | 271.01 | 39.96 | 0.00 | |
| J8 | 0.66 | 271.15 | 41.77 | 0.00 | |
| Reservoir1 | -61.90 | 272.49 | 0.00 | 0.00 | Reservoir |

Link Results at 0:00 Hrs:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| P1 | 61.90 | 1.97 | 14.61 | Open |
| P2 | 0.36 | 0.29 | 7.07 | Open |
| P3 | 61.39 | 1.95 | 14.39 | Open |
| P4 | 0.44 | 0.35 | 9.94 | Open |

| | | | | |
|---|---|---|---|---|
| P5 | 60.95 | 1.94 | 14.20 | Open |
| P6 | 60.66 | 1.93 | 14.08 | Open |
| P7 | 60.00 | 3.40 | 118.71 | Open |
| P8 | 0.66 | 0.34 | 7.14 | Open |



Node Results at 72:00 Hrs:

| Node ID | Demand LPS | Head m | Pressure m | Quality hours | |
|---|---|---|---|---|---|
| J1 | 0.15 | 272.24 | 43.75 | 0.00 | |
| J2 | 0.36 | 272.18 | 43.55 | 0.01 | |
| J3 | 0.00 | 271.80 | 42.95 | 0.01 | |
| J4 | 0.44 | 271.61 | 42.37 | 0.02 | |
| J5 | 0.29 | 271.67 | 42.68 | 0.01 | |
| J6 | 0.00 | 271.40 | 42.52 | 0.01 | |
| Hydrant | 60.00 | 271.01 | 39.96 | 0.01 | |
| J8 | 0.66 | 271.15 | 41.77 | 0.04 | |
| Reservoir1 | -61.90 | 272.49 | 0.00 | 0.00 | Reservoir |

Link Results at 72:00 Hrs:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| P1 | 61.90 | 1.97 | 14.61 | Open |
| P2 | 0.36 | 0.29 | 7.07 | Open |
| P3 | 61.39 | 1.95 | 14.39 | Open |
| P4 | 0.44 | 0.35 | 9.94 | Open |
| P5 | 60.95 | 1.94 | 14.20 | Open |
| P6 | 60.66 | 1.93 | 14.08 | Open |
| P7 | 60.00 | 3.40 | 118.71 | Open |
| P8 | 0.66 | 0.34 | 7.14 | Open |

**APPENDIX E**

Stormwater Management Calculations
Advanced Drainage Systems Inc. (ADS) 'FD-4HC' OGS Details and Calculations Package
IPEX Inlet Control Device Details

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## Stormwater Management Calculations:

DATE: May 22, 2025
JOB No.: SBM-24-2255

**Client:** Gold Leaf Properties
**Project:** Proposed Residential Development
**Location:** 101 Hull Road, Strathroy, Ontario

**CHICAGO STORM DISTRIBUTION PARAMETERS* (MUNICIPALITY OF STRATHROY-CARADOC)**

| Return Period (years) | A,B,C Parameters | | |
|---|---|---|---|
| | A | B | C |
| 25mm | 538.850 | 6.331 | 0.809 |
| 5 | 1137.257 | 7.184 | 0.830 |
| 10 | 1425.011 | 7.382 | 0.843 |
| 25 | 1835.352 | 7.844 | 0.858 |
| 50 | 2225.884 | 8.620 | 0.871 |
| 100 | 2561.151 | 9.093 | 0.880 |
| 250 | 3048.220 | 10.030 | 0.888 |

*Intensity i=A/(t+B)^C (mm/hr)
**Refer to the Municipality of Strathroy-Caradoc Standards Section 3.2.3

## PRE-DEVELOPMENT AND POST-DEVELOPMENT - ENTIRE SITE

**PRE-DEVELOPMENT ENTIRE SITE (A101):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 12792.30 | | |
| Building Area: | 625.86 | 0.9 | 563.2731 |
| Concrete/Asphalt: | 527.26 | 0.9 | 474.534 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 11639.18 | 0.2 | 2327.8362 |
| Totals: | 12792.30 | | 3365.6433 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.26 | | |

**POST-DEVELOPMENT ENTIRE SITE (A200):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 12792.30 | | |
| Building Area: | 4046.20 | 0.9 | 3641.58 |
| Concrete/Asphalt: | 3905.08 | 0.9 | 3514.572 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 4841.02 | 0.2 | 968.204 |
| Totals: | 12792.30 | | 8124.356 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.64 | | |

## PRE-DEVELOPMENT CONDITIONS

**PRE-DEVELOPMENT UNCONTROLLED AREA TO LOCKE HEIGHTS (U101):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 172.90 | | |
| Building Area: | 50.59 | 0.9 | 45.531 |
| Concrete/Asphalt: | 48.99 | 0.9 | 44.091 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 73.32 | 0.2 | 14.664 |
| Totals: | 172.90 | | 104.286 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.60 | | |

**U101: 5 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 3.11 L/s

**U101: 100 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 5.54 L/s

**U101: 250 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 6.17 L/s

**PRE-DEVELOPMENT UNCONTROLLED AREA TO HULL ROAD (U102):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 5500.00 | | |
| Building Area: | 194.94 | 0.9 | 175.446 |
| Concrete/Asphalt: | 478.27 | 0.9 | 430.443 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 4826.79 | 0.2 | 965.358 |
| Totals: | 5500.00 | | 1571.247 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.29 | | |

**U102: 5 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 46.88 L/s

**U102: 100 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 83.47 L/s

**U102: 250 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 92.99 L/s

**PRE-DEVELOPMENT UNCONTROLLED AREA TO NORTH BOUNDARY LINE OF SITE (U103):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 7119.40 | | |
| Building Area: | 380.33 | 0.9 | 342.2961 |
| Concrete/Asphalt: | 0.00 | 0.9 | 0 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 6739.07 | 0.2 | 1347.8142 |
| Totals: | 7119.40 | | 1690.1103 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.24 | | |

**U103: 5 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 50.43 L/s

**U103: 100 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 89.79 L/s

**U103: 250 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 100.03 L/s

**PRE-DEVELOPMENT EXTERNAL AREA TO SITE (EXT101):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 947.19 | | |
| Building Area: | 352.24 | 0.9 | 317.016 |
| Concrete/Asphalt: | 203.90 | 0.9 | 183.51 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 391.05 | 0.2 | 78.21 |
| Totals: | 947.19 | | 578.736 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.61 | | |

**EXT101: 5-Year Pre-Development External Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 17.27 L/s

**EXT101: 100-Year Pre-Development External Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 30.75 L/s

**EXT101: 250-Year Pre-Development External Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Pre-Development Flow, $Q_c$ = 2.78*C*i*A = 34.25 L/s

## POST-DEVELOPMENT UNCONTROLLED CONDITIONS

**POST-DEVELOPMENT UNCONTROLLED AREA TO HULL ROAD (U201):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 1607.31 | | |
| Building Area: | 496.78 | 0.9 | 447.102 |
| Concrete/Asphalt: | 420.06 | 0.9 | 378.054 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 690.47 | 0.2 | 138.094 |
| Totals: | 1607.31 | | 963.25 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | **0.60** | | |

**U201: 5 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 28.74 L/s

**U201: 100 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 51.17 L/s

**U201: 250 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 57.01 L/s

**POST-DEVELOPMENT UNCONTROLLED AREA TO NORTH BOUNDARY LINE OF SITE (U202):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 2550.35 | | |
| Building Area: | 246.32 | 0.9 | 221.688 |
| Concrete/Asphalt: | 263.98 | 0.9 | 237.582 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 2040.05 | 0.2 | 408.01 |
| Totals: | 2550.35 | | 867.28 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | **0.34** | | |

**U202: 5 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 25.88 L/s

**U202: 100 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 46.08 L/s

**U202: 250 Year Post-Development Uncontrolled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 51.33 L/s

## POST-DEVELOPMENT CONTROLLED CONDITIONS

**POST-DEVELOPMENT CONTROLLED CATCHMENT TO HULL ROAD (A201):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 8429.70 | | |
| Building Area: | 3303.10 | 0.9 | 2972.79 |
| Concrete/Asphalt: | 3221.04 | 0.9 | 2898.936 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 1905.56 | 0.2 | 381.112 |
| Totals: | 8429.70 | | 6252.838 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | **0.74** | | |

**A201: 5 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 186.56 L/s

**A201: 100 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 332.19 L/s

**A201: 250 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 370.06 L/s

**POST-DEVELOPMENT CONTROLLED CATCHMENT TO HULL ROAD (A202):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 204.94 | | |
| Building Area: | 0.00 | 0.9 | 0 |
| Concrete/Asphalt: | 0.00 | 0.9 | 0 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 204.94 | 0.2 | 40.988 |
| Totals: | 204.94 | | 40.988 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | **0.20** | | |

**A201: 5 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 1.22 L/s

**A201: 100 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 2.18 L/s

**A201: 250 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 2.43 L/s

**POST-DEVELOPMENT EXTERNAL AREA TO SITE (EXT201):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 947.19 | | |
| Single Family Residential: | 352.24 | 0.9 | 317.016 |
| Concrete/Asphalt: | 203.90 | 0.9 | 183.51 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 391.05 | 0.2 | 78.21 |
| Totals: | 947.19 | | 578.736 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.61 | | |

**EXT201: 5 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 107.33 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 17.27 L/s

**EXT201: 100 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 191.10 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 30.75 L/s

**EXT201: 250 Year Post-Development Controlled Flows**
**Time to concentration $t_c$ = 10 min
Intensity, i (@ $t_c$) = 212.89 mm/hr
Post Development Flow, $Q_c$ = 2.78*C*i*A = 34.25 L/s

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| ALLOWABLE RELEASE TO LOCKE HEIGHTS | | |
|---|---|---|
| **Return Period of Storm** | **Pre-Development Uncontrolled Flows (U101) (L/s)** | **Post-Development Uncontrolled Flows (N/A) (L/s)** |
| 5-year | 3.11 | 0.00 |
| 100-year | 5.54 | 0.00 |
| 250-year | 6.17 | 0.00 |

Therefore no post development flow restrictions are proposed as there is no flows from the subject site discharging to Locke Heights.

| ALLOWABLE RELEASE TO HULL RD. | | | | |
|---|---|---|---|---|
| **Return Period of Storm** | **Pre-Development Uncontrolled Flows (U102) (L/s)** | **Post-Development Uncontrolled Flows (U201) (L/s)** | **Allowable Release (L/s)** | **Allowable Surface Release (L/s)** |
| 5-year | 46.88 | 28.74 | **+18.14** | 0 |
| 100-year | 83.47 | 51.17 | **32.30** | 14.16 |
| 250-year | 92.99 | 57.01 | **35.98** | 17.84 |

* Restricted flow rate (L/s)

Therefore post development flow restrictions are proposed as the current flows onsite are greater than the allowable flows.

| ALLOWABLE RELEASE TO NORTH BOUNDARY LINE OF SITE | | |
|---|---|---|
| **Return Period of Storm** | **Pre-Development Uncontrolled + External Flows (U103+EXT101) (L/s)** | **Post-Development Uncontrolled Flows (U202) (L/s)** |
| 5-year | 67.69 | 25.88 |
| 100-year | 120.54 | 46.08 |
| 250-year | 134.28 | 51.33 |

Therefore no post development flow restrictions are proposed as the current flows onsite are less than the pre-development flows.

## A201 STORAGE CALCULATIONS

**POST-DEVELOPMENT CONTROLLED CATCHMENT TO HULL ROAD (A201+A202):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 8634.64 | | |
| Building Area: | 3303.10 | 0.9 | 2972.79 |
| Concrete/Asphalt: | 3221.04 | 0.9 | 2898.936 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 2110.50 | 0.2 | 422.1 |
| Totals: | 8634.64 | | 6293.826 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | **0.73** | | |

**POST-DEVELOPMENT EXTERNAL AREA TO SITE (EXT201):**

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 947.19 | | |
| Single Family Residential: | 352.24 | 0.6 | 211.344 |
| Concrete/Asphalt: | 203.90 | 0.9 | 183.51 |
| Gravel | 0.00 | 0.7 | 0 |
| Landscaped/Open: | 391.05 | 0.2 | 78.21 |
| Totals: | 947.19 | | 473.064 |
| $C_{eq}$ = ∑(A*C)/∑(A) = | 0.50 | | |

**Orifice Parameters (C201):**

Orifice diameter is based on Bernoulli's equation, $Q=C_o*A*(2gH)^{0.5}$

Rearranging, $A= Q/(C_o*(2gH)^{0.5})$, where:

| | | | |
|---|---|---|---|
| Allowable Restricted Flow Rate, Q = | **18.14** | L/s | *(Installed on outlet of STMH4)* |
| Orifice Coefficient, $C_o$ = | 0.6 | | |
| Gravitational Acceleration, g = | 9.81 | $m/s^2$ | |
| *Top of Ponding = | 230.63 | m | **Refer to Site Grading Plan C4, provided separately* |
| **Orifice Invert = | 226.57 | m | ***Refer to Site Servicing Plan C3, provided separately* |
| Hydraulic Head on Orifice, H = | 4.06 | m | |
| Required Cross-Sectional Area, A = | 0.0034 | $m^2$ | |
| Required Diameter, d = ((4*A)/pi)^0.5 = | 0.066 | m | |
| **Therefore, Orifice Flow Restrictor =** | **66** | **mm** | *Note: Minimum diameter = 75 mm per MECP SWMPDM* |

**Rainfall Data:**

Rainfall Data - London Rainfall Intensity Duration

**Storage Calculations:**

5-Yr Stm Event

| Duration (min.) | Intensity "i" (mm/hr) | Inflow, $Q_i$ + $Q_r$ 2.78*C*i*A + $Q_r$ (L/s) | Volume In Qt*t*60/1000 ($m^3$) | Orifice Restrictor Outflow, $Q_o$ (L/s) | Surface Release $Q_o$ (L/s) | Total Release, $Q_o$ (L/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|---|---|
| 10 | 107.33 | 201.90 | 121.14 | 18.14 | 0.00 | 18.14 | 10.88 | 110.26 |
| 12.5 | 95.88 | 180.38 | 135.28 | 18.14 | 0.00 | 18.14 | 13.61 | 121.68 |
| 15 | 86.83 | 163.34 | 147.00 | 18.14 | 0.00 | 18.14 | 16.33 | 130.68 |
| 30 | 56.55 | 106.39 | 191.50 | 18.14 | 0.00 | 18.14 | 32.65 | 158.85 |
| 60 | 34.61 | 65.11 | 234.40 | 18.14 | 0.00 | 18.14 | 65.31 | 169.10 |
| 120 | 20.38 | 38.34 | 276.02 | 18.14 | 0.00 | 18.14 | 130.61 | 145.41 |
| 180 | 14.79 | 27.82 | 300.42 | 18.14 | 0.00 | 18.14 | 195.92 | 104.50 |
| | | | | | | **Max. Storage Volume ($m^3$) =** | | **169.10** |
| | | | | | | Drawdown Time (hr) = | | 2.59 |

100-Yr Stm Event

| Duration (min.) | Intensity "i" (mm/hr) | Inflow, $Q_i$ 2.78*C*i*A (L/s) | Volume In Qt*t*60/1000 ($m^3$) | Orifice Restrictor Outflow, $Q_o$ (L/s) | Surface Release $Q_o$ (L/s) | Total Release, $Q_o$ (L/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|---|---|
| 10 | 191.10 | 359.50 | 215.70 | 18.14 | 14.16 | 32.30 | 19.38 | 196.32 |
| 12.5 | 171.49 | 322.61 | 241.96 | 18.14 | 14.16 | 32.30 | 24.23 | 217.73 |
| 15 | 155.73 | 292.96 | 263.66 | 18.14 | 14.16 | 32.30 | 29.07 | 234.59 |
| 30 | 101.72 | 191.35 | 344.42 | 18.14 | 14.16 | 32.30 | 58.14 | 286.28 |
| 60 | 61.62 | 115.92 | 417.32 | 18.14 | 14.16 | 32.30 | 116.28 | 301.04 |
| 120 | 35.55 | 66.88 | 481.51 | 18.14 | 14.16 | 32.30 | 232.57 | 248.95 |
| 180 | 25.41 | 47.80 | 516.20 | 18.14 | 14.16 | 32.30 | 348.85 | 167.35 |
| | | | | | | **Max. Storage Volume ($m^3$) =** | | **301.04** |
| | | | | | | Drawdown Time (hr) = | | 4.61 |

250-Yr Stm Event

| Duration (min.) | Intensity "i" (mm/hr) | Inflow, $Q_i$ 2.78*C*i*A (L/s) | Volume In Qt*t*60/1000 ($m^3$) | Orifice Restrictor Outflow, $Q_o$ (L/s) | Surface Release $Q_o$ (L/s) | Total Release, $Q_o$ (L/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|---|---|
| 10 | 212.89 | 400.49 | 240.29 | 18.14 | 17.84 | 35.98 | 21.59 | 218.70 |
| 12.5 | 191.78 | 360.77 | 270.58 | 18.14 | 17.84 | 35.98 | 26.99 | 243.59 |
| 15 | 174.67 | 328.58 | 295.73 | 18.14 | 17.84 | 35.98 | 32.38 | 263.34 |
| 30 | 115.11 | 216.55 | 389.79 | 18.14 | 17.84 | 35.98 | 64.77 | 325.02 |
| 60 | 70.05 | 131.79 | 474.43 | 18.14 | 17.84 | 35.98 | 129.54 | 344.89 |
| 120 | 40.44 | 76.07 | 547.70 | 18.14 | 17.84 | 35.98 | 259.08 | 288.62 |
| 180 | 28.87 | 54.31 | 586.56 | 18.14 | 17.84 | 35.98 | 388.62 | 197.94 |
| | | | | | | **Max. Storage Volume ($m^3$) =** | | **344.89** |
| | | | | | | Drawdown Time (hr) = | | 5.28 |

STRIK BALDINELLI MONIZ
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LONDON LOCATION
1599 Adelaide St. N., Unit 301
London, ON N5X 4E8
P: 519-471-6667

KITCHENER LOCATION
132 Queen St. S. Unit 4
Kitchener, ON N2G 1V9
P: 519-725-8093

www.sbmltd.ca

sbm@sbmltd.ca

**Available Surface Storage:**

| Location | Area ($m^2$) | *Avg. Ponding Depth (m) | Volume ($m^3$) |
|---|---|---|---|
| STMH5 | 991.62 | - | 85.6 |

(Refer to Site Grading Plan, C4, Provided separately)

*Max depth = 0.21 (Asphalt) and Max depth = 0.34m (Landscape)

| | |
|---|---|
| **Total Surface Storage ($m^3$) =** | **85.6** |

**Available Storage in Structures:**

| Location | Area ($m^2$) | Depth to Invert (m) | Volume ($m^3$) |
|---|---|---|---|
| DICB9 | 0.36 | 1.20 | 0.43 |
| CB8 | 0.36 | 1.21 | 0.44 |
| STMH7 | 1.13 | 1.43 | 1.62 |
| STMH6 | 1.13 | 3.59 | 4.06 |
| CB11 | 0.36 | 3.25 | 1.17 |
| CB17 | 0.36 | 1.47 | 0.53 |
| CB18 | 0.36 | 1.47 | 0.53 |
| STMH5 | 1.13 | 3.90 | 4.41 |
| CBMH12 | 1.13 | 3.26 | 3.69 |
| CB20 | 0.36 | 1.47 | 0.53 |
| CB19 | 0.36 | 1.47 | 0.53 |
| STMH13 | 1.13 | 3.78 | 4.28 |
| CB15 | 0.36 | 1.45 | 0.52 |
| CB16 | 0.36 | 1.45 | 0.52 |
| STMH4 | 1.13 | 4.06 | 4.59 |
| **Total Structure Storage ($m^3$) =** | | | **27.84** |

(Refer to Site Servicing Plan, C3, Provided separately)

**Available Storage in Pipes**

| Location | Area ($m^2$) | Length (m) | Volume ($m^3$) |
|---|---|---|---|
| DICB9-STMH7 | 0.049 | 4.70 | 0.23 |
| CB8-STMH7 | 0.049 | 6.30 | 0.31 |
| STMH7-STMH6 | 0.283 | 30.70 | 8.68 |
| STMH6-STMH5 | 0.071 | 65.20 | 4.61 |
| CB11-TEE | 0.049 | 42.20 | 2.07 |
| Building-TEE | 0.049 | 3.30 | 0.16 |
| CB17-TEE | 0.049 | 3.00 | 0.15 |
| CB18-TEE | 0.049 | 3.00 | 0.15 |
| CBMH12-STMH5 | 0.283 | 29.90 | 8.45 |
| CB20-TEE | 0.049 | 3.90 | 0.19 |
| CB19-TEE | 0.049 | 0.70 | 0.03 |
| CB15-TEE | 0.049 | 1.90 | 0.09 |
| CB16-TEE | 0.049 | 3.90 | 0.19 |
| STMH13-STMH4 | 0.283 | 24.50 | 6.93 |
| STMH5-STMH4 | 0.283 | 21.60 | 6.11 |
| **Total Pipe Storage ($m^3$) =** | | | **38.36** |

(Refer to Site Servicing Plan, C3, Provided separately)

**Required Underground Storage (To be designed later in SPA stages)**

| Location | Area ($m^2$) | Length (m) | Volume ($m^3$) |
|---|---|---|---|
| Underground storage | - | - | 195.00 |

(Specific underground storage to be specified/detailed during formal SPA phase)

| | |
|---|---|
| **Total Underground Storage ($m^3$) =** | **261.20** |

| | | |
|---|---|---|
| **Total Storage Available On-Site ($m^3$) =** | **346.80** | |
| **Required 5-year Storage ($m^3$) =** | **169.10** | **Note: no surface ponding occurs under 5-year storm event** |
| **Required 100-year Storage ($m^3$) =** | **301.04** | **Ponding utilized under 100-year event = 83.69$m^3$** |
| **Required 250-year storage ($m^3$) =** | **344.89** | |

Therefore, sufficient storage is provided to store the post-development 5-year through 250-year storm events

# ADS OGS Sizing Summary

| | |
|---|---|
| **Project Name:** | 101 Hull Road |
| **Consulting Engineer:** | SBM - London |
| **Location:** | Strathroy, ON |
| **Sizing Completed By:** | Steve Buckley |

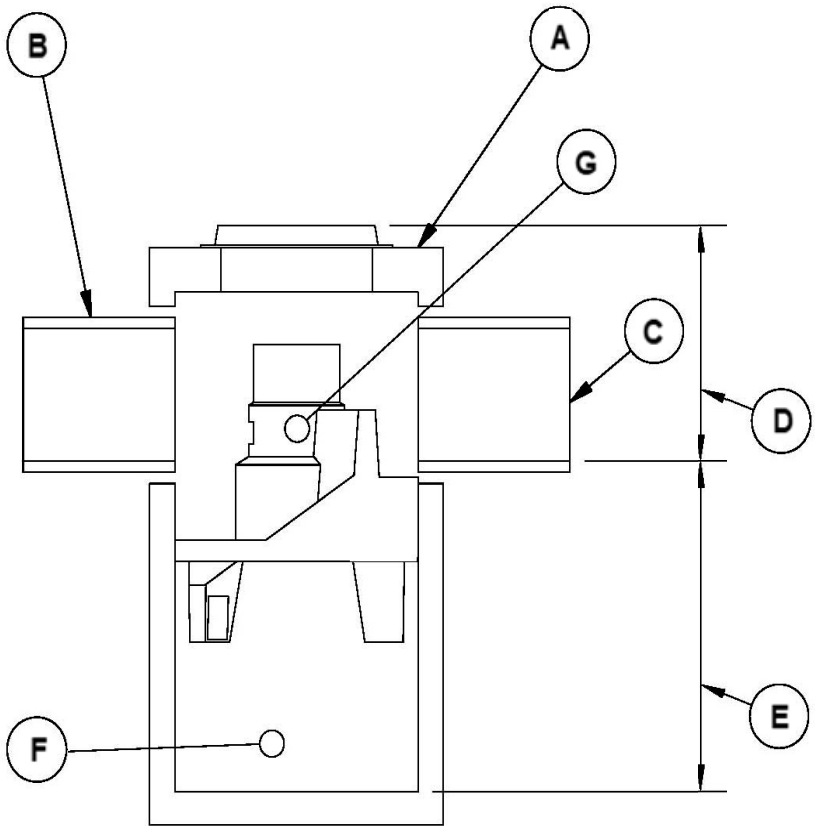
**Email:** steve.buckley@adspipe.com

| Treatment Requirements | | |
|---|---|---|
| Treatment Goal: | Enhanced (MOE) | |
| Selected Parameters: | 80% TSS | 90% Volume |
| Selected Unit: | **FD-4HC** | |

| Site Details | |
|---|---|
| Site Area: | 1.142 ha |
| % Impervious: | --- |
| Rational C: | 0.68 |
| Rainfall Station: | London Intl Airport, ON |
| Particle Size Distribution: | Fine |
| Peak Flowrate: | --- |

| Summary of Results | | |
|---|---|---|
| **Model** | **TSS Removal** | **Volume Treated** |
| FD-4HC | 86.0% | >90% |
| FD-5HC | 90.0% | >90% |
| FD-6HC | 92.0% | >90% |
| FD-8HC | 95.0% | >90% |
| FD-10HC | 97.0% | >90% |

| FD-4HC Specification | |
|---|---|
| Unit Diameter (A): | 1,200 mm |
| Inlet Pipe Diameter (B): | 250, 300 mm |
| Outlet Pipe Diameter (C): | 300 mm |
| Height, T/G to Outlet Invert (D): | 3790 mm |
| Height, Outlet Invert to Sump (E): | 1515 mm |
| Sediment Storage Capacity (F): | 2.1 m³ |
| Oil Storage Capacity (G): | 723 L |
| Max. Pipe Diameter: | 600 mm |
| Peak Flow Capacity: | 510 L/s |




| Site Elevations: | |
|---|---|
| Rim Elevation: | 230.16 |
| Inlet Pipe Elevation: | 226.43, 226.4 |
| Outlet Pipe Elevation: | 226.37 |

**Notes:**

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

| | |
|---|---|
| Project Name: | 101 Hull Road |
| Consulting Engineer: | SBM - London |
| Location: | Strathroy, ON |

## Net Annual Removal Efficiency Summary: FD-4HC

| Rainfall Intensity[1] | Fraction of Rainfall[1] | FD-4HC Removal Efficiency[2] | Weighted Net-Annual Removal Efficiency |
|---|---|---|---|
| mm/hr | % | % | % |
| 0.50 | 0.2% | 100.0% | 0.2% |
| 1.00 | 13.7% | 96.8% | 13.3% |
| 1.50 | 17.3% | 93.2% | 16.2% |
| 2.00 | 13.5% | 90.8% | 12.3% |
| 2.50 | 2.7% | 88.9% | 2.4% |
| 3.00 | 2.3% | 87.4% | 2.0% |
| 3.50 | 8.5% | 86.2% | 7.4% |
| 4.00 | 4.7% | 85.1% | 4.0% |
| 4.50 | 1.5% | 84.2% | 1.2% |
| 5.00 | 5.2% | 83.4% | 4.3% |
| 6.00 | 4.1% | 82.0% | 3.3% |
| 7.00 | 4.4% | 80.8% | 3.6% |
| 8.00 | 3.3% | 79.8% | 2.6% |
| 9.00 | 2.4% | 78.9% | 1.9% |
| 10.00 | 2.3% | 78.2% | 1.8% |
| 20.00 | 9.2% | 73.3% | 6.7% |
| 30.00 | 2.5% | 70.6% | 1.8% |
| 40.00 | 1.1% | 68.7% | 0.7% |
| 50.00 | 0.4% | 67.3% | 0.3% |
| 100.00 | 0.6% | 63.1% | 0.4% |
| | | | |
| | | | |
| | | | |
| | | **Total Net Annual Removal Efficiency:** | 86.0% |
| | | **Total Runoff Volume Treated:** | 99.9% |

**Notes:**

(1) Rainfall Data: 1960:2002, HLY03, London AP, ONT, 6144475.

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.

# TEMPEST Product Submittal Package


**Date**: **May 20, 2025**

**Customer**: **SBM**

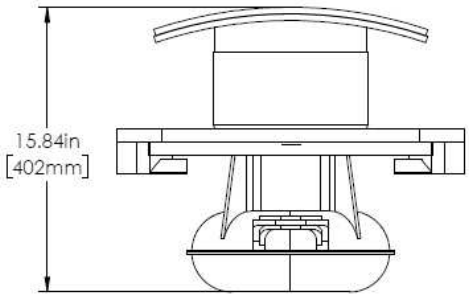
**Contact**: **Rawan Safieddine**

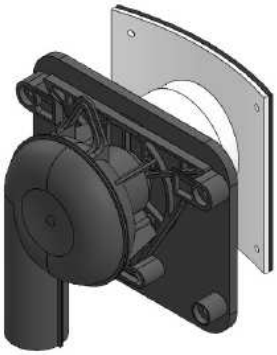
**Location**: **Strathroy**

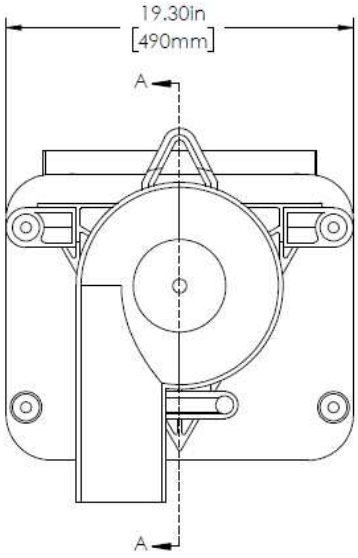
**Project Name**: **101 Hull Rd**

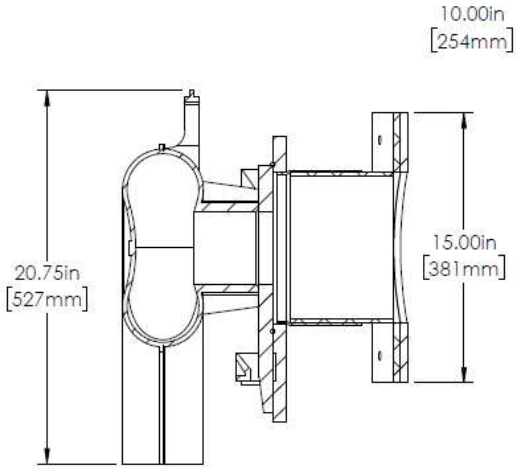
IPEX

# Tempest LMF ICD Rd Shop Drawing

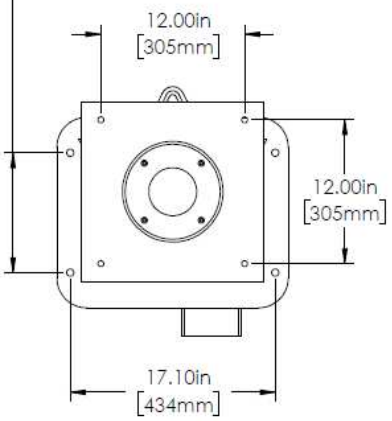





SECTION A-A
SCALE 1 : 8




| 0 | FOR REVIEW | DATE | REVISION | CHK |
|---|---|---|---|---|
| | | | | |



IPEX by allaxis
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MISSISSAUGA, ONTARIO CANADA
PH: (905) 670-7676 FAX: (905) 6705295

LMF ROUND CB ASSEMBLY

CUSTOMER

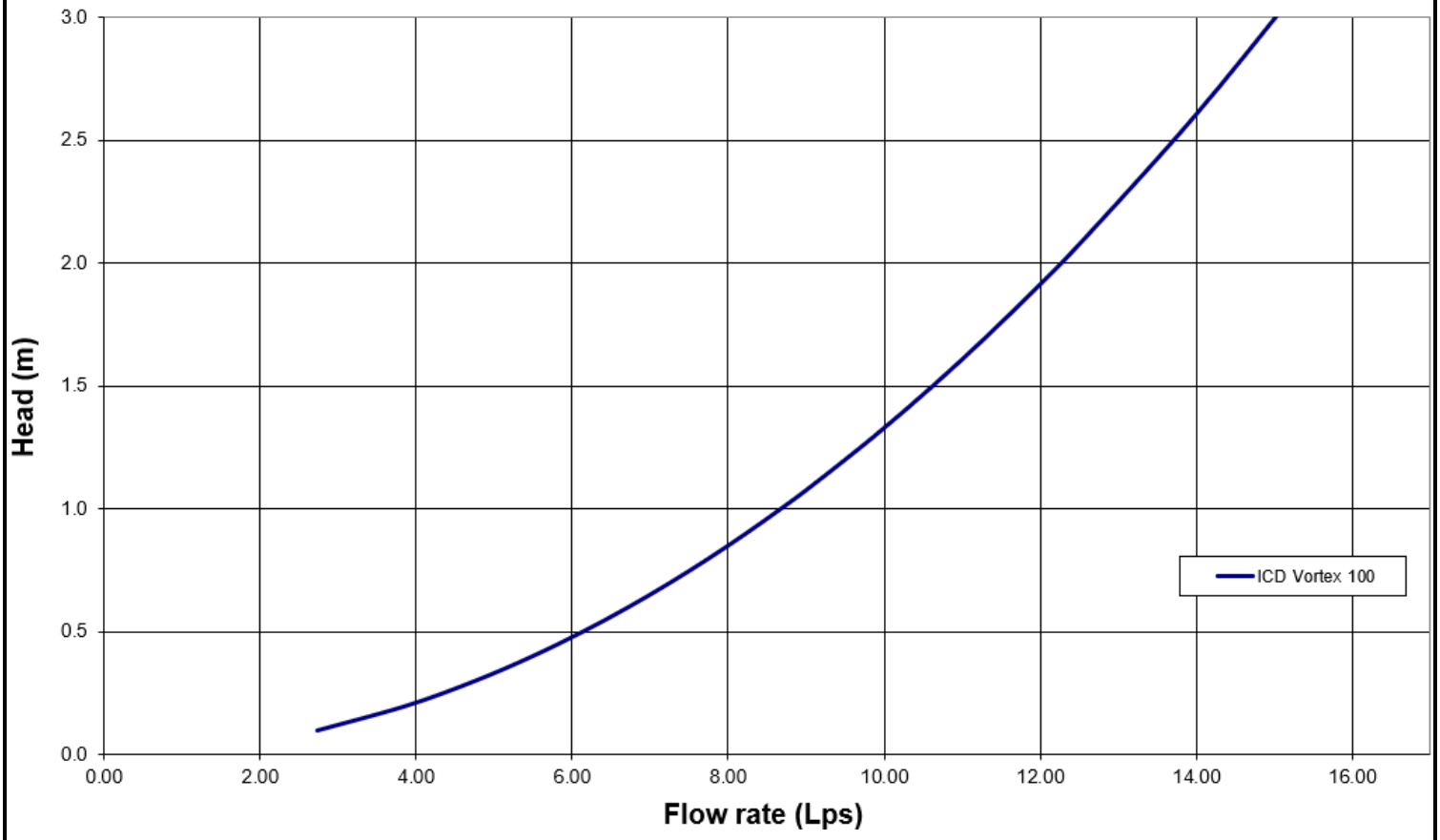
| DATE | DRAWN BY | CHECKED BY | SCALE | DWG. NO. |
|---|---|---|---|---|
| 4/16/2024 | J.B. | | NTS | N/A |

IPEX

## Tempest LMF ICD Flow Curve

conservatively we have restricted to this flow rate (to be confirmed during detailed design)

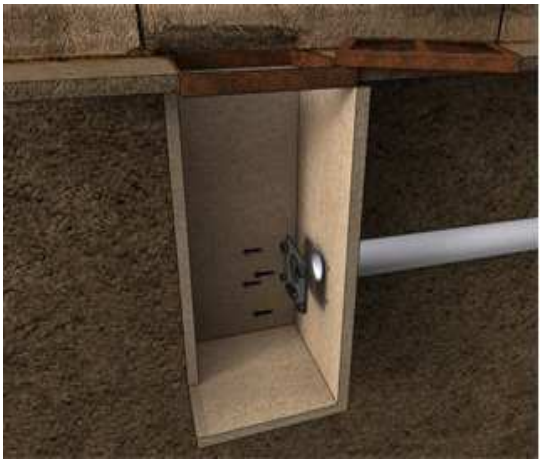
**Flow: 17.30 L/s**
**Head: 4.06 m**
**STMH4**

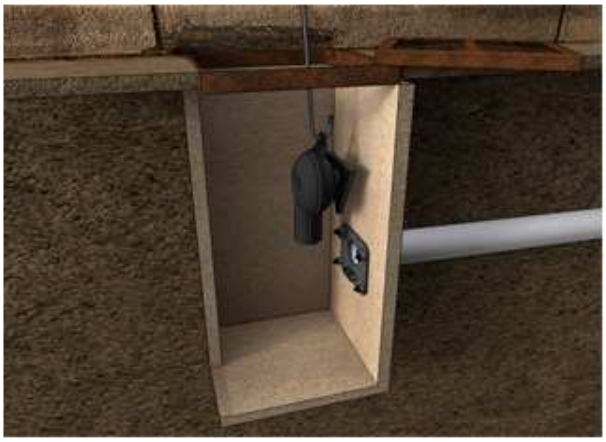



IPEX

## Square CB Installation Notes:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8'' concrete bit, torque wrench for 9/16''nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8'' concrete bit to make the four holes at a minimum of 1-1/2'' depth up to 2-1/2''. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.



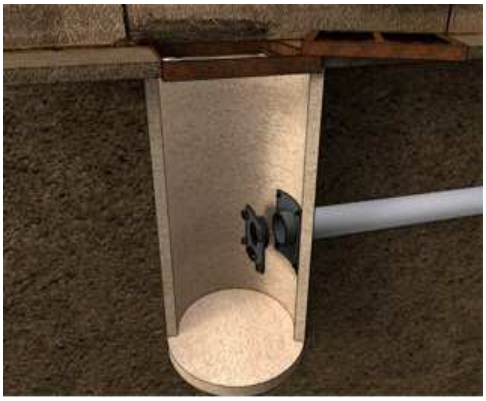


IPEX

## Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.






**CAUTION/WARNING/DISCLAIM:**

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
- Call your IPEX representative for more information or if you have any questions about our products.

IPEX

# IPEX TEMPEST Inlet Control Devices Technical Specification

## General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's must have no moving parts.

## Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

## Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

## Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.