Mitchell Ridge

Functional Servicing Report

Project Location:

Lands west of Vivian Street
Mitchell, ON

Prepared for:

Parkwood Developments (Kitchener) Ltd.
745 Bridge Street West
Waterloo, ON

Prepared by:

MTE Consultants Inc.
365 Home Street
Stratford, ON N5A 2A5

November 12, 2025

MTE File No.: 62167_001

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Appendices

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by Parkwood Developments (Kitchener) Ltd. to complete a Functional Servicing Report, in support of the proposed subdivision development for the lands west of Vivian Street located in the Municipality of West Perth. The subject site consists of two main pieces of land:

- The land west of Vivian Street consisting of approximately **1.74ha** generally bounded by a line of the Canadian National Railway (CNR) to the north, Vivian Street to the west, Frank Street to the south and Residential Lands to the east.
- The said land is split in two pieces by the part of land that is currently undeveloped but will be the extension of Clayton Street.

Vivian Street is also to be constructed as a part of this development, as shown in Figure 1.0. The development will also include the extension of Clayton Street, which will connect the existing end of Clayton Street with the proposed Vivian Street and will extend to the property limits to provide access for future development. Additionally, a dry pond is proposed to be installed along Vivian Street just south of the Clayton Street extension to control the storm flows. The northern 20m of the subject lands will not be developed as they are in a setback zone from a high-pressure gas line running along the northern property line adjacent to the Goderich Exeter Railway (GEXR) lands.

It is proposed to develop the lands into 30 semi-detached houses units with 14 units to the north of the Clayton Street extension, the dry pond south of the Clayton Street extension and the remaining 16 residential units to the south of the dry pond. All new housing units will be fronting Vivian Street.

Lands situated east of Vivian Street and north of Clayton Street, are zoned R3-1 and currently remain undeveloped. The proposed sanitary sewer, and watermain systems will be designed to accommodate future service connections from these lands. The proposed storm pipes and the stormwater management (SWM) facility will be sized to manage post development peak flow conditions from that external lands as well as the rear yards of the existing development located along Kenton Street to the ease to the east.

A Draft Plan for the proposed development has been prepared by GSP Group. This proposed Draft Plan forms the basis for the preliminary servicing design and can be found in Appendix A.

Engineers, Scientists, Surveyors

PROJECT

MITCHELL RIDGE PRELIMINARY DESIGN

TITLE

SITE LOCATION

Drawn: AXF	Scale: 1:10,000	Figure: **1.0**
Checked: SAH	Project No.: 62167_001	
Date: 2025-11-12	Rev No.: 2	

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2.0 MUNICIPAL SERVICING

2.1 Sanitary Servicing

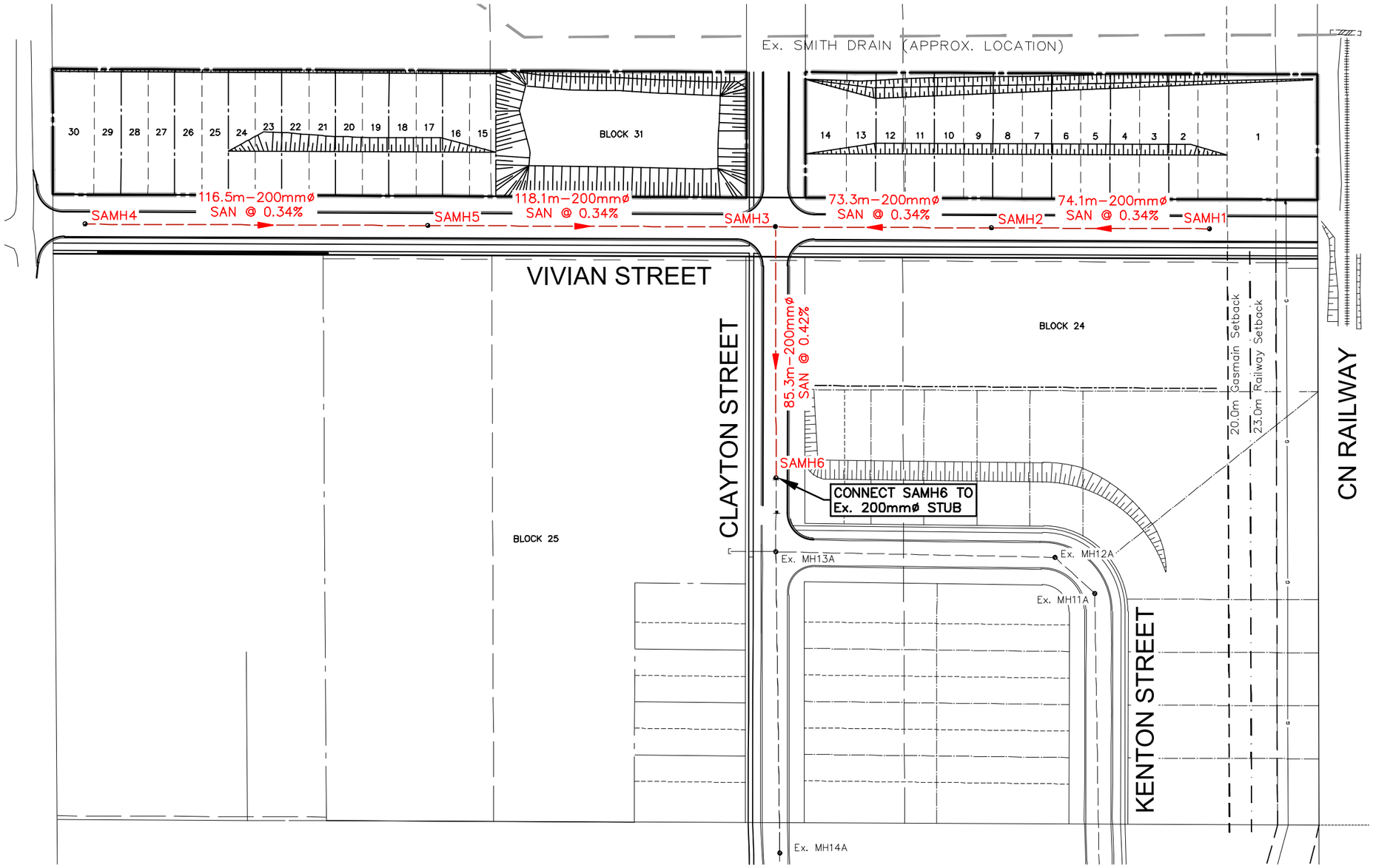
The sanitary sewage from the proposed development will discharge to the existing 200mm sanitary sewer within the right-of-way of Clayton Street. The connection will be achieved with the installation of a sanitary manhole (SAMH6) at the end of an existing stub (located at a depth of approximately 5.0m), located at the existing end of Clayton Street. Proposed 200mm diameter sanitary sewers will convey the sewage of all proposed and future houses along Vivian Street to Clayton Street and to the aforementioned SAMH6.

The preliminary sanitary servicing plan for the proposed development can be seen on Figure 2.0. The sanitary sewers are proposed to be constructed at depths that will allow for the majority of the development to be serviced via gravity sewers, some lots may need grinder pumps for basement discharge closer to Frank Street.

The sanitary sewers will be constructed within Vivian Street and Clayton Street at depths ranging from 1.6m (minimum) to 5.0m (maximum). The minimum cover will be at the south end of Vivian Street where the road will steeply slope down. For the majority of the road the pipe will be at depths greater than 2.5m.

The sanitary sewer design spreadsheet and the respective plan can be found in Appendix B.

As shown in the appended drawing, the capacity of the sanitary network can accommodate the proposed development up to the downstream 450mm pipe along Clayton Street located just east of Napier Street. Capacity of the sewers downstream of this point and the capacity of the wastewater treatment plant to accommodate the proposed development will have to be confirmed with the Municipality of West Perth.



LEGEND: EXISTING FEATURES

- SITE BOUNDARY
- Ex. 300mmø SAN. / Ex. MHA — Ex. SANITARY SEWER
- Ex. Drop Curb — Ex. CURB
- (TOP) / (BOTTOM) — Ex. EMBANKMENT (SLOPE AS NOTED)

PROPOSED FEATURES

- MH — 14.6m–200mmø SAN @ 1.50% — SANITARY SEWER
- (DROP CURB) / CONC. CURB & GUTTER — CURB
- (TOP) / 3:1 / (BOTTOM) — EMBANKMENT (SLOPE AS NOTED)

0 25 50 75m

MTE
Engineers, Scientists, Surveyors

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN

TITLE
PRELIMINARY SANITARY SERVICING PLAN

Drawn	Scale	Figure
AXF	1:1,500	2.0
Checked: SAH	Project No.: 62167_001	
Date: 2025-11-12	Rev No.: 2	

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Plot Date: November 12, 2025 – 10:32 AM

2.2 Water Distribution

Water supply for the proposed development will be provided by connection to the existing 150mm watermain within Clayton Street, roughly 20m from the proposed Vivian Street centreline.

At the crossing of Vivian Street and Clayton Street, this pipe will split into two runs along Vivian Street: one to the north of the crossing and one to the south. The pipes will provide water to all the proposed lots.

The existing and proposed water distribution networks are illustrated on Figure 3.0 and include preliminary pipe sizes.

Based on the preliminary analysis the following conclusions can be made:

- Connection to the existing watermain along Clayton Street will adequately service the proposed development; and
- Two fire hydrants are proposed to be installed within the Vivian Lane right-of-way, which will ensure compliance with the Municipality of West Perth Development and Servicing Guidelines that requires a maximum hydrant spacing of 150m.

Confirmation will be required with the Municipality of West Perth that there will be adequate pressure and flow throughout the entire proposed development.

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Ex. SMITH DRAIN (APPROX. LOCATION)

BLOCK 31

BLOCK 24

BLOCK 25

HYD SET

BLOW-OFF V-LVE

150mmø WTM

150x150 TEE

V.

VIVIAN STREET

CONNECT TO Ex. 150mmø WM.

CLAYTON STREET

KENTON STREET

CN RAILWAY

Ex. 150mmø WTM

PROPOSED 2.3m CSW

20.0m Gasmain Setback

23.0m Railway Setback

G

LEGEND:
EXISTING FEATURES

SITE BOUNDARY

Ex. 200mmø WTM. Ex. HYD. SET Ex. V — Ex. W-TERM-IN

Ex. Drop Curb — Ex. CURB

(TOP) (BOTTOM) — Ex. EMBANKMENT (SLOPE AS NOTED)

PROPOSED FEATURES

200mmø WTM HYD. SET V. TEE — W-TERMAIN

(DROP CURB) CONC. CURB & GUTTER — CURB

(TOP) 3:1 (BOTTOM) — EMBANKMENT (SLOPE AS NOTED)

0 25 50 75m

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Engineers, Scientists, Surveyors

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN

TITLE
PRELIMINARY WATER DISTRIBUTION PLAN

Drawn	Scale	Figure
AXF	1:1,500	**3.0**
Checked: SAH	Project No.: 62167_001	
Date: 2025-11-12	Rev No.: 0	

Plot Date: November 12, 2025 - 10:37 -M

2.3 Storm Sewer Servicing

A detention pond (dry pond) is proposed to be installed south of Clayton Street within the development. The pond will accommodate minor and major flows from the development and the roads that are to be constructed as a part of it. While lands north of Clayton and east of Vivian are not a part of the subdivision, these lands, as well as lands adjacent to it at its east side, have been considered for the purpose of designing the storm sewer system within Vivian Street.

Flows will be controlled in the pond by an orifice. Controlled flows will then be conveyed to the Smith Drain that runs in the adjacent agricultural land to the west of the site.

A network of storm sewers is proposed to be installed along Vivian Street, along the west portion of the existing part of Clayton Street and along the rear property lines of some of the lots. The storm sewer network will convey the site's runoff to the dry pond. The pipes along the roads will be overdesigned to convey the 100-year storm flows to the pond. The pipes at the rear yards will be designed for the 5-year storm with runoff from major events will be temporarily stored in the swales where these pipes are to be installed in.

A minor portion of the site including strips of land along the rear lot lines and a portion of the Clayton Street extension that will be sloped towards the neighbouring lands to the west will not be drained by the proposed storm network.

The I.D.F parameters for the design of the storm sewers (either for the 5-year or the 100-year storm event, has been derived from the City of Stratford's Design Guidelines. The sewer network will be designed to operate by gravity and is proposed to be constructed at depths of 0.8m (minimum) to 3.7m (maximum) below finished grades. With the exception of a small portion of the network at the edges of Vivian Street, and the pipes discharging Block 24 and the rear yards of the northern part of the development, the majority of the pipes will be installed at depths greater than 1.5m. The preliminary storm servicing plan for the proposed development can be seen on Figure 4.0, and the storm sewer design spreadsheet and the respective plan can be found in Appendix B.

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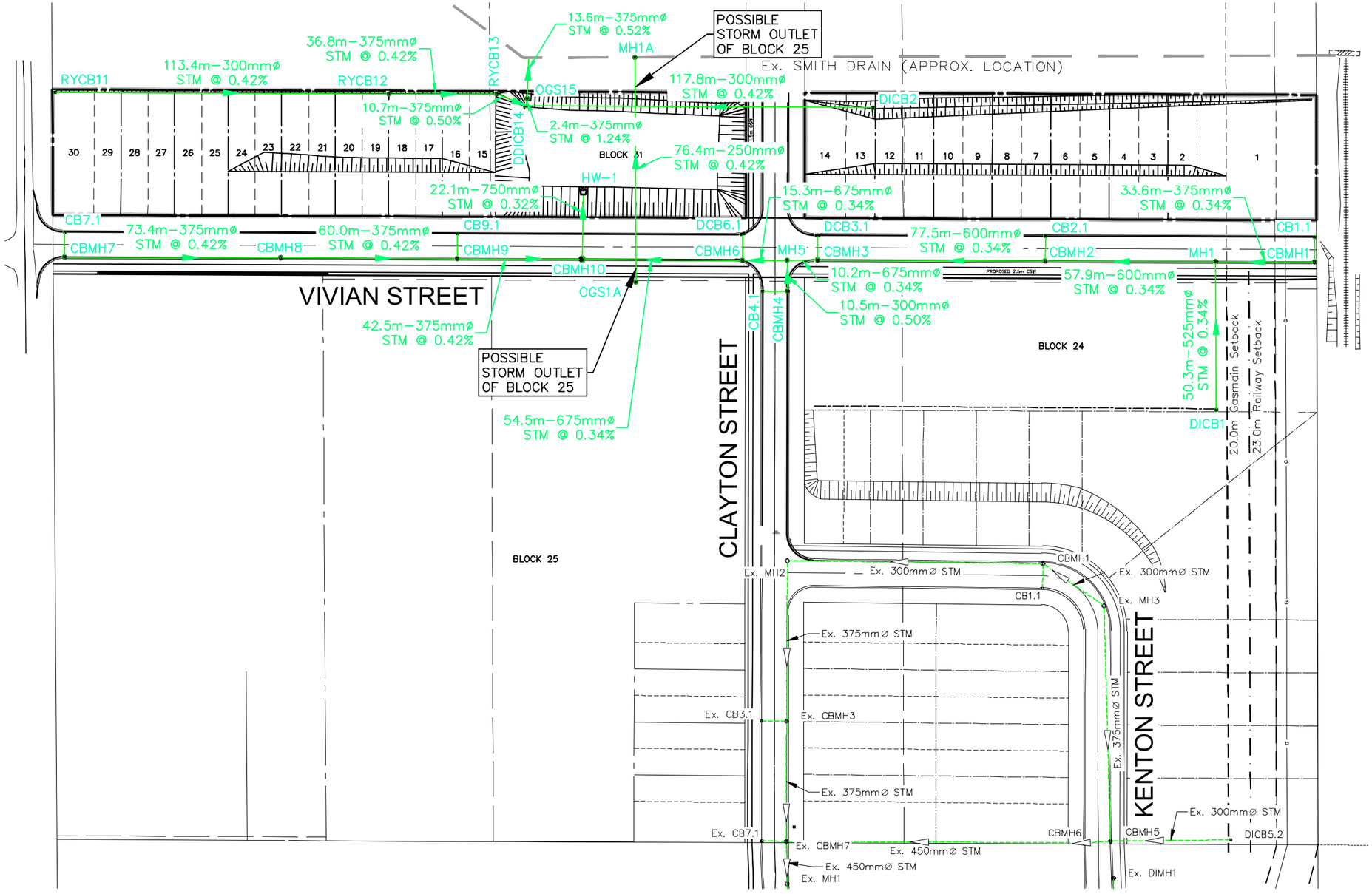

LEGEND: EXISTING FEATURES

- SITE BOUNDARY
- Ex. 375mmø STM. / Ex. MH — Ex. STORM SEWER
- Ex. Drop Curb — Ex. CURB
- (TOP) / (BOTTOM) — Ex. EMBANKMENT (SLOPE AS NOTED)

PROPOSED FEATURES

- MH — 21.3m–300mmø STM @ 1.30% — STORM SEWER
- (DROP CURB) / CONC. CURB & GUTTER — CURB
- (TOP) / 3:1 / (BOTTOM) — EMBANKMENT (SLOPE AS NOTED)

0 25 50 75m

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Engineers, Scientists, Surveyors

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN

TITLE
PRELIMINARY STORM SERVICING PLAN

Drawn: AXF	Scale: 1:1,500	Figure: **4.0**
Checked: SAH	Project No.: 62167_001	
Date: 2025-11-12	Rev No.: 2	

Plot Date: November 12, 2025 – 10:40 AM

3.0 STORMWATER MANAGEMENT

The post-development peak flow rates were determined through the use of MIDUSS NET, a hydrologic and hydraulic modeling program. This program allows the user to analyze the impact of developments on new and existing systems through the use of accepted rainfall data. The program allows the user to represent design storms of various durations, and aids in the design of stormwater management facilities.

The City of Stratford's IDF curve parameters were used for the rainfall data utilizing a 4-hour Chicago Storm distribution model with a peak ratio of 0.40. These parameters were used to determine the peak flow rates for the 100-year storm event.

3.1 Allowable/Pre-Development Conditions

The subject land is currently used for agricultural purposes. The site is generally sloped from east to west towards the neighbouring agricultural lands and the Smith Drain. Along the north-south axis the lowest elevations are generally located within or close to the Clayton Street right-of-way. The site's runoff is eventually directed towards a branch of the Smith Drain. The lands at the south of the development are relatively flat with no clearly defined drainage patterns.

As per the 1982 Plan and Profile drawing of Smith Drain's Branches 'B' and 'C' (see Appendix C), runoff from the whole aforementioned area, external lands to the northeast and the rear yards of the adjacent existing development located to the east along Kenton Street discharge to these branches of Smith Drain, which is located roughly 10m west of the western property line. These lands cover an area of approximately 4.497ha.

According to the City's Drainage Superintendent the allowable discharge of the 6.8ha total area of the site and the lands that adjoin it from the east, is 16.4 l/s. The numbers mentioned above yield an allowable flowrate of roughly **11 l/s** for the site.

3.2 Post-Development Conditions

As per the Municipality of West Perth's requirements, the stormwater runoff from the development will have to be controlled to the allowable capacity of Smith Drain, for all the design storms with periods of return between 5 and 100-yr, using the City of Stratford's IDF parameters.

The site's storm pipes will be overdesigned as needed to convey the 100-year storm flows to the pond. See the Storm Drainage Area Plan in Appendix B for more information.

It is noted that the external lands to the northeast and the rear yards of the adjacent existing development located to the east along Kenton Street will convey flows to the development. These lands have been included in the modeling for the calculation of the post development hydrograph.

Hence, all the lands that will be draining to the proposed dry pond have been considered to be one catchment, **Catchment 201**. It has to be noted that Catchment 201 is slightly smaller (4.417 versus 4.497ha) than area that will drain to the Smith Drain. The reason for this is some landscaped strips of land at the rear yards that are impossible to drain to the pond and a portion of the Clayton Street extension that will be developed in the future.

In order to achieve the stormwater management quantity control objective, the runoff generated by the proposed development will be controlled by a 60mm diameter online orifice installed in a storm ditch inlet catchbasin (DDICB14) located inside the proposed dry pond at an invert elevation of 345.030m. The storage provided in the detention pond along with the orifice will control all minor and major (up to an including the 100-year storm) flows from the site.

The post-development peak flows will be restricted to the maximum allowable flowrate for the Smith Drain. As shown in Appendix D the 100-yr flowrate from the pond will be matching the allowable, at **11 l/s**. Therefore, flowrates from the pond for all the other events with lower period of return will also not exceed this number.

Refer to Appendix D for modeling information and results.

3.3 Water Quality Control

It is anticipated that the site will also require stormwater quality controls to obtain a minimum of Enhanced Level of quality control as defined by the Ministry of the Environment, Conservation and Parks (MECP). An Enhanced Level of quality control is defined by the MECP as removing 80% of the total suspended solids from the stormwater discharge. This could be achieved by the installation of an oil-grit separator (OGS) unit just downstream of the structure where the site's control orifice will be installed.

4.0 ROADWORKS AND LOT GRADING / SITE GRADING AND PAVEMENT DESIGN

Access to the proposed development will be the extension of Clayton Street or Frank Street or by the future extension of Vivian Street to the north, located north of the railway line.

For Vivian Street preliminary centerline road grades for the proposed roadways will most likely range from 0.50% (minimum) to 3.5% (maximum). These grades will generally slope towards the dry pond location that is roughly at the middle of the portion of the road that is to be developed. For Clayton Street preliminary centerline road grades for the proposed roadways will most likely range from 0.50% (minimum) to approximately 5.0% (maximum). These grades will generally slope from east to west. Refer to Figure 5.0 for details.

The proposed roadways will be constructed to a full urban cross-section including asphalt pavement, concrete curb and gutters, concrete sidewalks, roadway illumination and boulevard landscaping all in accordance with the standards of the Municipality of West Perth, wherever feasible. A proposed pavement structure is summarized in Table 4.1 below.

Table 4.1 – Preliminary Pavement Structure

Pavement Structure Component	**Component Design Depth** (mm)
Surface Asphalt	40*
Base Asphalt	50*
Granular 'A' Base	150*
Granular 'B' Sub-base	450*

*A geotechnical investigation is required to provide the pavement structure based on site characteristics

Preliminary lot grades will range from 2.0% (minimum) to approximately 6.5% split drainage type lots. Together with the centerline road grades, the development's lot grading will be designed to generally meet the following criteria:

- Match existing road grades at the subdivision access;
- Match existing grades around the perimeter of the development;
- Ensure adequate cover is provided over municipal services;
- Ensure 'major' overland flow routes are directed to the proposed SWM facilities and the downstream outlets as shown in Figure 6.0; and
- Comply with the current municipal standards for minimum and maximum road grades and for various other lot grading specifications including minimum and maximum grades and rear-yard swale widths, depths, and slopes.

5.0 UTILITY SERVICING

Utility servicing of the proposed development will be completed through the connection to and the extension of existing services along Clayton Street. An application will be made to ERTH Power during the detailed design stage for hydro servicing. Enbridge Gas (natural gas), Bell Communications (telephone and internet services), and Quadro Communications (telephone and internet services) servicing will be coordinated during the detailed design phase.

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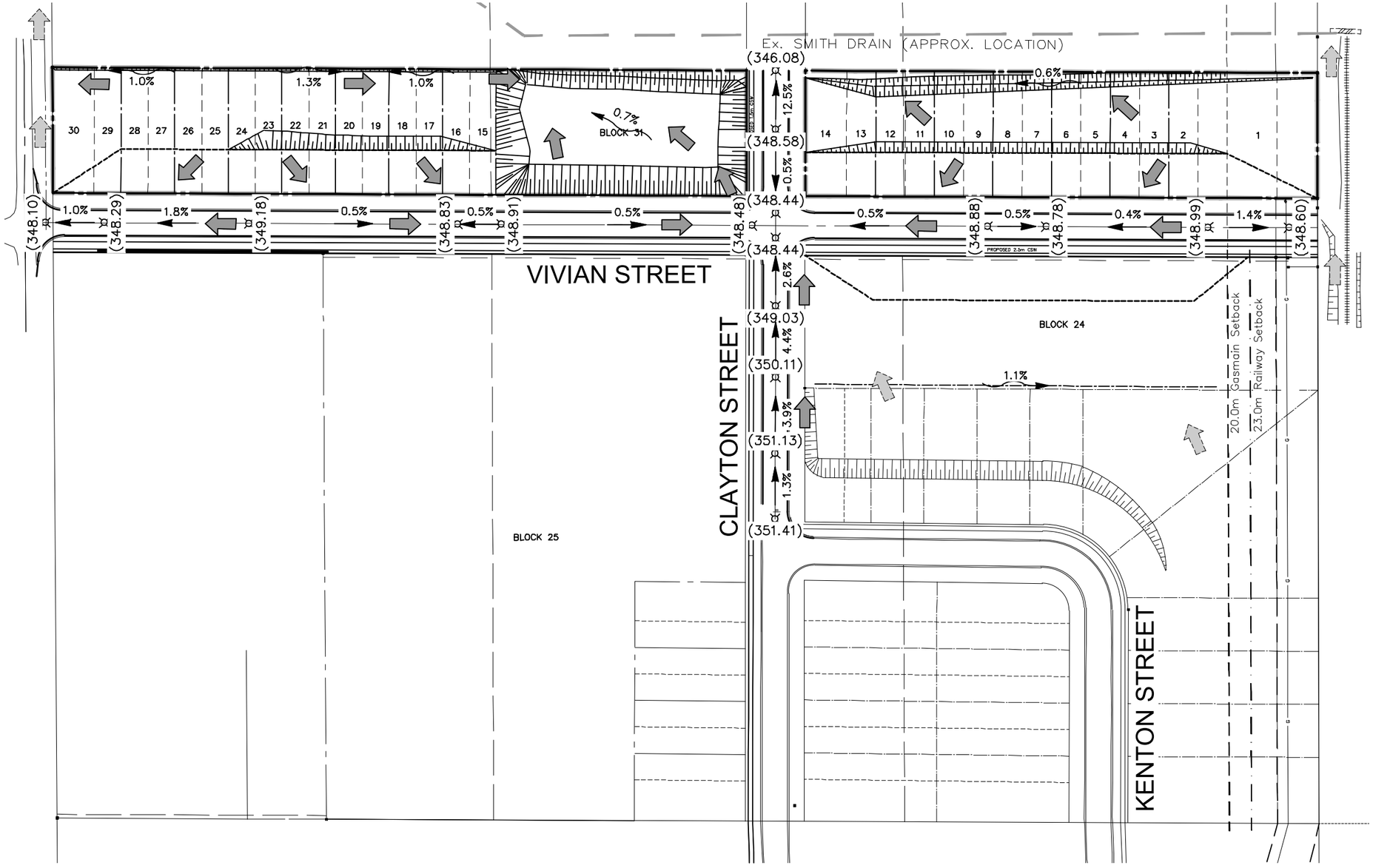

LEGEND:
EXISTING FEATURES

- SITE BOUNDARY
- Ex. CURB (Ex. Drop Curb)
- Ex. EMBANKMENT (SLOPE AS NOTED) (TOP / BOTTOM)
- Ex. OVERLAND FLOW ROUTE (MAJOR STORM)

PROPOSED FEATURES

- DIRECTION OF DRAINAGE /SWALE (1.0%)
- CURB (DROP CURB / CONC. CURB & GUTTER)
- EMBANKMENT (SLOPE AS NOTED) (TOP / 3:1 / BOTTOM)
- OVERLAND FLOW ROUTE (MAJOR STORM)

0 25 50 75m

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Engineers, Scientists, Surveyors

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN

TITLE
PRELIMINARY SITE DRAINAGE PLAN

Drawn: AXF	Scale: 1:1,500	Figure: **5.0**
Checked: SAH	Project No.: 62167_001	
Date: 2025-11-12	Rev No.: 0	

6.0 SUMMARY

Based on the foregoing analysis, the main findings of the functional servicing report for the proposed development are:

- The proposed development can be adequately serviced through the extension of gravity sewers and municipal watermains.
- The sanitary sewage generated from the development will be discharged into the existing Clayton Street sewer. Downstream sewers up to the 450mm pipe along Clayton Street east of Napier Street have been constructed with adequate capacity for the proposed development.
- Water supply for the proposed development will be provided by the existing 150mm watermain along Clayton Street.
- The stormwater management quantity control requirements for the proposed development can be accommodated by storing stormwater in a proposed detention facility and controlling the flowrates with a combination of an orifice and a weir.
- The stormwater quality control requirements for the proposed development can be achieved by the installation of an OGS unit downstream of the quantity control location.
- Overall site grading will provide for 'major' overland flow conveyances throughout the site, will provide adequate cover over the site's services, and will generally match existing road and boundary grades with appropriate slopes.

All of which is respectfully submitted,

MTE Consultants Inc.

Spiros Anthoulakis.
Civil Design Engineer
519-204-6510
santhoulakis@mte85.com

SXP:cmb
https://mte85.sharepoint.com/sites/62167_001/Shared Documents/03- Reports/01 - Functional Servicing Report (FSR)/Rev 02/62167_001_2025-11-12_FSR_Rev-02.docx

Appendix A

Draft Plan

GODERICH EXETER RAILWAY (GEXR)

Turning Circle (R=13.0m)

Block 32 R.O.W. (TURNING CIRCLE) 0.01ha.

Existing Residential

Future Residential

Existing Agricultural

Block 31 Stormwater Management 0.36ha.

Future Extension of Clayton Street

Vivian Street

Kenton Street

Clayton Street

Future Residential

Existing Residential / Agricultural

Frank Street

LOT	LOTS/BLKS.	UNITS	AREA (ha.)
SEMI DETACHED RESIDENTIAL	1-30	30	1.37
STORMWATER MANAGEMENT	31		0.36
R.O.W (TURNING CIRCLE)	32		0.01
TOTAL		30	1.74

ADDITIONAL INFORMATION
(UNDER SECTION 51(17) OF THE PLANNING ACT)

INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,g,j and l ARE AS SHOWN ON THE DRAFT PLAN.
h) Municipal water supply
i)
k) All sanitary and storm sewers as required

OWNER'S CERTIFICATE

I AUTHORIZE THE GSP GROUP INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO

OWNER _____ DATE _____

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE CORRECTLY SHOWN.

PAUL J. BENEDICT, OLS _____ DATE _____

DRAFT PLAN OF SUBDIVISION

PART OF
PARK LOTS 71, 74 AND 77
REGISTERED PLAN NO. 341
AND PART OF LOT 28
MUNICIPALITY OF WEST PERTH
COUNTY OF PERTH

GSP group
PLANNING I URBAN DESIGN I LANDSCAPE ARCHITECTURE
gspgroup.ca

REVISIONS

Date: November 12, 2025	Drawn By: HS	Dwg File Name: 62167_001-D1 revisions.dwg
Scale: 1: 750	Project No.: 21064	

Appendix B

Preliminary Sanitary and Storm Drainage Area Plans and Design Sheets

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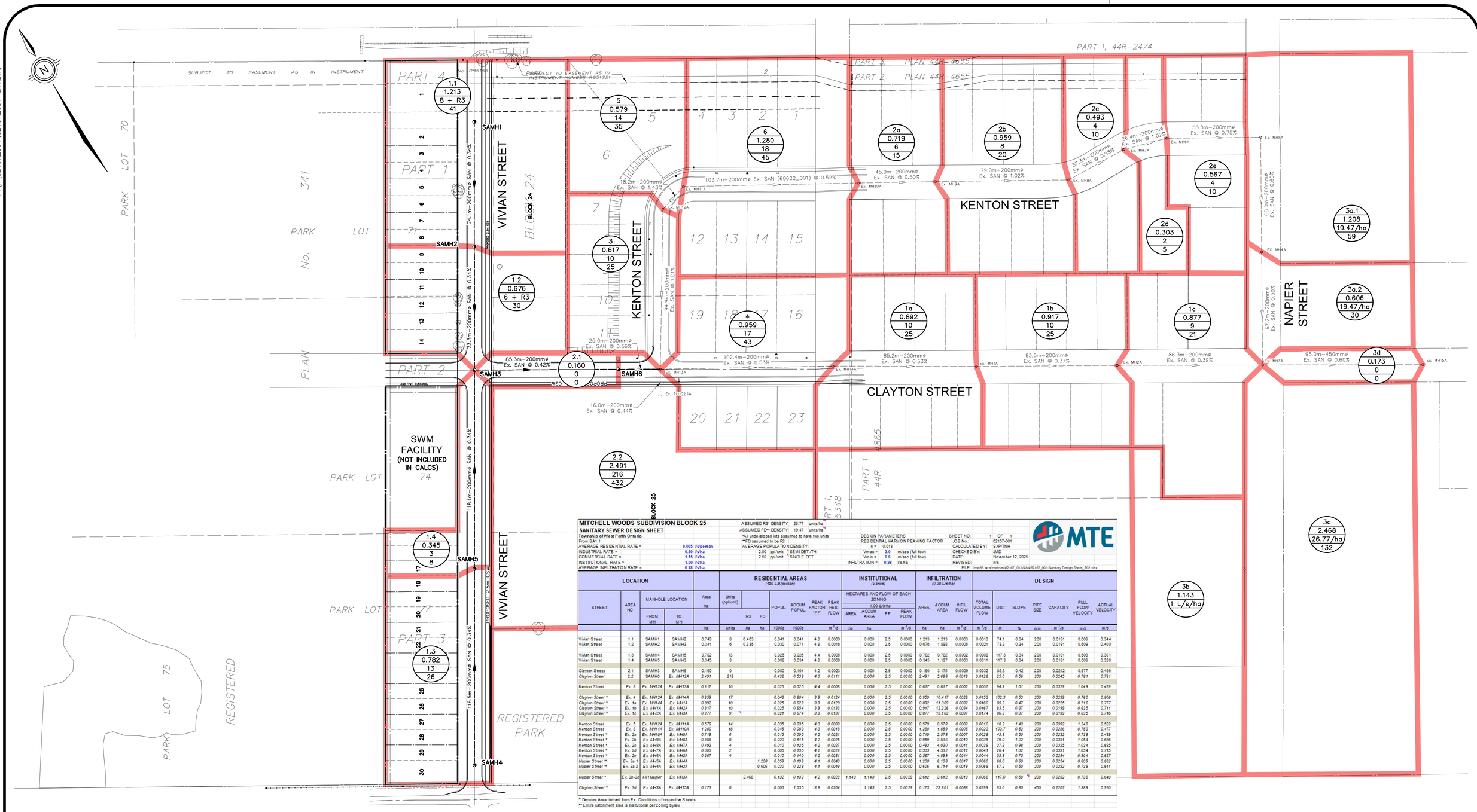
November 12, 2025 – 4:09:50 PM – Plotted By: Spiros Anthoulakis



MITCHELL WOODS SUBDIVISION BLOCK 25
SANITARY SEWER DESIGN SHEET
Township of West Perth Ontario
From SA1.1

AVERAGE RESIDENTIAL RATE = 0.005 l/s/person
INDUSTRIAL RATE = 0.50 l/s/ha
COMMERCIAL RATE = 1.15 l/s/ha
INSTITUTIONAL RATE = 1.00 l/s/ha
AVERAGE INFILTRATION RATE = 0.28 l/s/ha

ASSUMED R3* DENSITY: 26.77 units/ha
ASSUMED FD** DENSITY: 19.47 units/ha
*All undeveloped lots assumed to have two units
**FD assumed to be R2
AVERAGE POPULATION DENSITY:
2.00 ppl/unit SEMI DET./TH
2.50 ppl/unit SINGLE DET.

DESIGN PARAMETERS
RESIDENTIAL HARMON PEAKING FACTOR
n = 0.013
Vmax = 3.0 m/sec (full flow)
Vmin = 0.6 m/sec (full flow)
INFILTRATION = 0.28 l/s/ha

SHEET NO. 1 OF 1
JOB No. 62167-001
CALCULATED BY: SXP/TNH
CHECKED BY: JMD
DATE: November 12, 2025
REVISED: n/a
FILE: \mte65.local\mtedocs\62167_001\SAN\62167_001-Sanitary Design Sheet_R02.xlsx

LOCATION					RESIDENTIAL AREAS (450 L/d/person)							INSTITUTIONAL (Varies)			INFILTRATION (0.28 L/s/ha)			DESIGN						
STREET	AREA NO.	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	Area ha	Units (pp/unit) R3	Units (pp/unit) FD	POPUL. ha	ACCUM. POPUL. ha	PEAK FACTOR "PF"	PEAK RES. FLOW	HECTARES AND FLOW OF EACH ZONING 1.00 L/s/ha AREA ha	ACCUM AREA ha	PF	PEAK FLOW	AREA ha	ACCUM AREA ha	INFIL FLOW	TOTAL VOLUME FLOW	DIST	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY
				ha	units	ha	1000s	1000s																
Vivian Street	1.1	SAMH1	SAMH2	0.749	8	0.463	0.041	0.041	4.3	0.0009		0.000	2.5	0.0000	1.213	1.213	0.0003	0.0013	74.1	0.34	200	0.0191	0.609	0.344
Vivian Street	1.2	SAMH2	SAMH3	0.341	6	0.335	0.030	0.071	4.3	0.0016		0.000	2.5	0.0000	0.676	1.888	0.0005	0.0021	73.3	0.34	200	0.0191	0.609	0.400
Vivian Street	1.3	SAMH4	SAMH5	0.782	13		0.026	0.026	4.4	0.0006		0.000	2.5	0.0000	0.782	0.782	0.0002	0.0008	117.3	0.34	200	0.0191	0.609	0.301
Vivian Street	1.4	SAMH5	SAMH3	0.345	3		0.008	0.034	4.3	0.0008		0.000	2.5	0.0000	0.345	1.127	0.0003	0.0011	117.3	0.34	200	0.0191	0.609	0.328
Clayton Street	2.1	SAMH3	SAMH6	0.160	0		0.000	0.104	4.2	0.0023		0.000	2.5	0.0000	0.160	3.175	0.0009	0.0032	85.3	0.42	200	0.0212	0.677	0.466
Clayton Street	2.2	SAMH6	Ex. MH13A	2.491	216		0.432	0.536	4.0	0.0111		0.000	2.5	0.0000	2.491	5.666	0.0016	0.0126	25.0	0.56	200	0.0245	0.781	0.781
Kenton Street	Ex. 3	Ex. MH12A	Ex. MH12A	0.617	10		0.025	0.025	4.4	0.0006		0.000	2.5	0.0000	0.617	0.617	0.0002	0.0007	94.9	1.01	200	0.0329	1.049	0.429
Clayton Street *	Ex. 4	Ex. MH13A	Ex. MH14A	0.959	17		0.043	0.604	3.9	0.0124		0.000	2.5	0.0000	0.959	10.417	0.0029	0.0153	102.3	0.53	200	0.0239	0.760	0.806
Clayton Street *	Ex. 1a	Ex. MH14A	Ex. MH1A	0.892	10		0.025	0.629	3.9	0.0128		0.000	2.5	0.0000	0.892	11.309	0.0032	0.0160	85.2	0.47	200	0.0225	0.716	0.777
Clayton Street *	Ex. 1b	Ex. MH1A	Ex. MH2A	0.917	10		0.025	0.654	3.9	0.0133		0.000	2.5	0.0000	0.917	12.226	0.0034	0.0167	83.5	0.37	200	0.0199	0.635	0.715
Clayton Street *	Ex. 1c	Ex. MH2A	Ex. MH3A	0.877	9		0.021	0.674	3.9	0.0137		0.000	3.5	0.0000	0.877	13.102	0.0037	0.0174	86.3	0.37	200	0.0199	0.635	0.716
Kenton Street	Ex. 5	Ex. MH12A	Ex. MH11A	0.579	14		0.035	0.035	4.3	0.0008		0.000	2.5	0.0000	0.579	0.579	0.0002	0.0010	18.2	1.43	200	0.0392	1.248	0.522
Kenton Street	Ex. 6	Ex. MH11A	Ex. MH10A	1.280	18		0.045	0.080	4.3	0.0018		0.000	2.5	0.0000	1.280	1.859	0.0005	0.0023	103.7	0.52	200	0.0236	0.753	0.477
Kenton Street *	Ex. 2a	Ex. MH10A	Ex. MH9A	0.719	6		0.015	0.095	4.2	0.0021		0.000	2.5	0.0000	0.719	2.578	0.0007	0.0028	45.9	0.50	200	0.0232	0.738	0.499
Kenton Street *	Ex. 2b	Ex. MH9A	Ex. MH8A	0.959	8		0.020	0.115	4.2	0.0025		0.000	2.5	0.0000	0.959	3.536	0.0010	0.0035	79.0	1.02	200	0.0331	1.054	0.686
Kenton Street *	Ex. 2c	Ex. MH8A	Ex. MH7A	0.493	4		0.010	0.125	4.2	0.0027		0.000	2.5	0.0000	0.493	4.030	0.0011	0.0039	37.3	0.98	200	0.0325	1.034	0.695
Kenton Street *	Ex. 2d	Ex. MH7A	Ex. MH6A	0.303	2		0.005	0.130	4.2	0.0029		0.000	2.5	0.0000	0.303	4.333	0.0012	0.0041	26.4	1.02	200	0.0331	1.054	0.715
Kenton Street *	Ex. 2e	Ex. MH6A	Ex. MH5A	0.567	4		0.010	0.140	4.2	0.0031		0.000	2.5	0.0000	0.567	4.899	0.0014	0.0044	55.8	0.75	200	0.0284	0.904	0.657
Napier Street **	Ex. 3a.1	Ex. MH5A	Ex. MH4A			1.208	0.059	0.199	4.1	0.0043		0.000	2.5	0.0000	1.208	6.108	0.0017	0.0060	68.0	0.60	200	0.0254	0.809	0.662
Napier Street **	Ex. 3a.2	Ex. MH4A	Ex. MH3A			0.606	0.030	0.228	4.1	0.0049		0.000	2.5	0.0000	0.606	6.714	0.0019	0.0068	67.2	0.50	200	0.0232	0.738	0.641
Napier Street *	Ex. 3b-3c	MH Napier	Ex. MH3A			2.468	0.132	0.132	4.2	0.0029	1.143	1.143	2.5	0.0029	3.612	3.612	0.0010	0.0068	117.0	0.50	200	0.0232	0.738	0.640
Clayton Street *	Ex. 3d	Ex. MH3A	Ex. MH15A	0.173	0		0.000	1.035	3.8	0.0204		1.143	2.5	0.0029	0.173	23.601	0.0066	0.0299	95.0	0.60	450	0.2207	1.389	0.970

* Denotes Area derived from Ex. Conditions of respective Streets
** Entire catchment area is Institutional per zoning bylaw

LEGEND

- MH — 14.6m–200mmø SAN @ 1.50% — PROPOSED SANITARY SEWER
- (DROP CURB) — CONC. CURB & GUTTER — PROPOSED CONCRETE CURB
- PROPOSED FENCE
- PROPOSED DRIVEWAY
- (TOP) / (BOTTOM) — EXISTING EMBANKMENT (SLOPE AS NOTED)
- Ex. Drop Curb — EXISTING CURB
- DRAINAGE AREA
- SITE BOUNDARY
- EASEMENT
- Ex. 300mmø SAN / Ex. MH — EXISTING SANITARY SEWER
- EXISTING FENCE
- 1 / 0.78 / 50 / 94 — ID No. / AREA (Ha) / UNITS / DESIGN POPULATION

NOTE TO CONTRACTOR :

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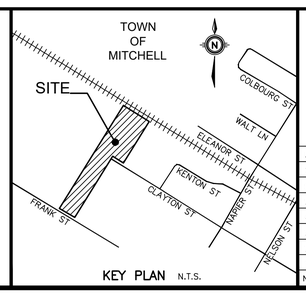

KEY PLAN N.T.S.

No.	REVISION	BY	YYYY-MM-DD
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GEODETIC BM ELEV. =338.386 m
COSINE REPORT 01019915459: ON NW CORNER OF BRIDGE OVER N THAMES RIVER ON FRANK ST, IN THE TOWN OF MITCHELL, +/– 250m E OF INTERSECTION IWTH BLANCHARD ST, 0.55m E OF WET END OF BRIDGE.

SITE BENCHMARK ELEV. =352.273 m
TOP NUT OF EXISTING FIRE HYRDRANT ON CLAYTON ST AS NOTED ON DRAWINGS.

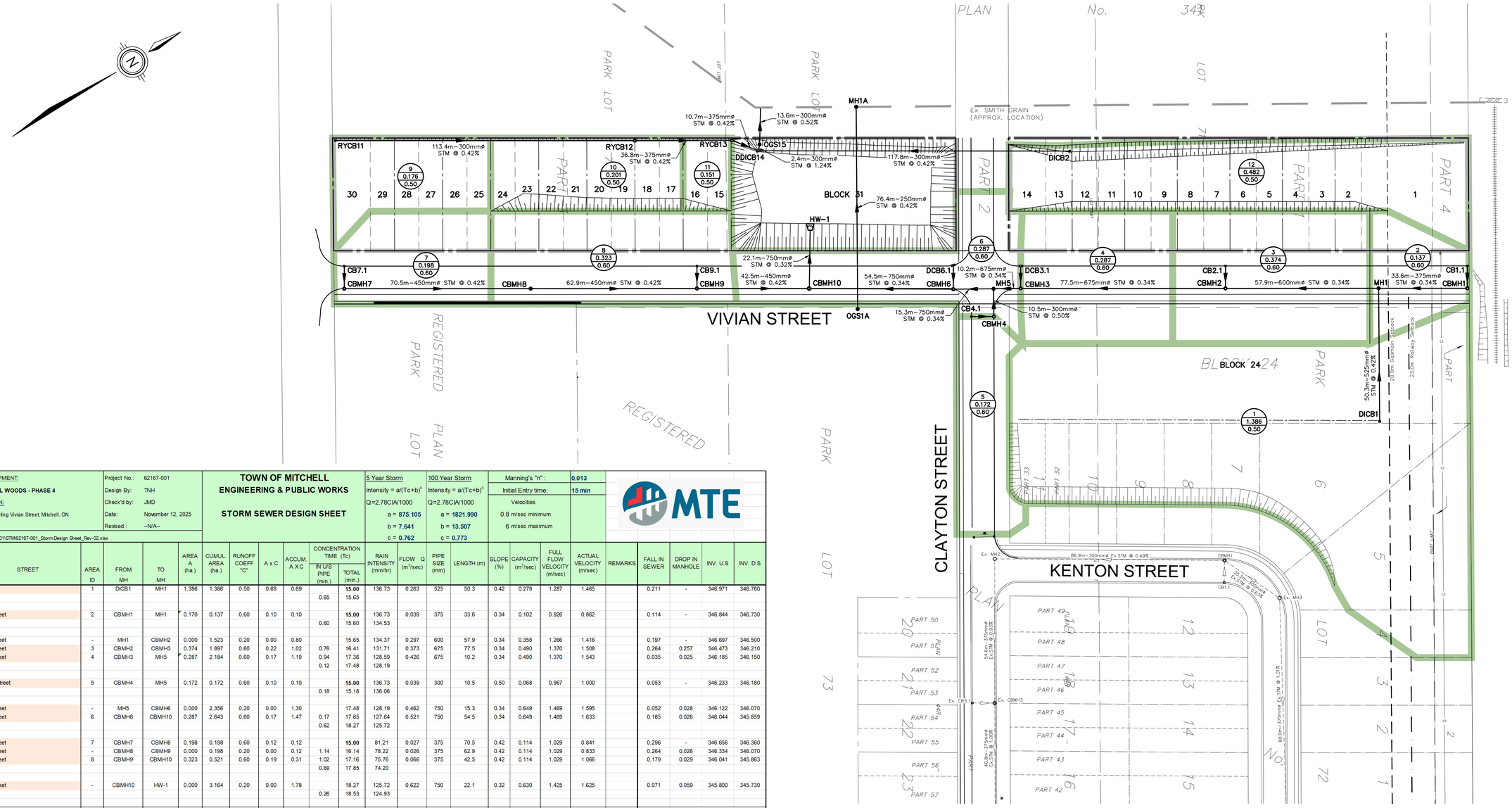
OWNER
PARKWOOD DEVELOPMENTS (KITCHENER) LTD
745 BRIDGE ST W WATERLOO, ON

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN
LANDS FRONTING VIVIAN LANE MITCHELL, ON

DRAWING
GENERAL PLAN OF SERVICING

MTE
Engineers, Scientists, Surveyors
519-271-7952

Project Manager S. ALHAMZA	Project No. 62167_001
Design By SXP/TNH	Checked By JMD
Drawn By MRB	Checked By SXP
Surveyed By MTE OLS LTD	Drawing No. SA1.1
Date Jun.06/25	
Scale 1:1000	Sheet 1 of 1



DEVELOPMENT:	Project No.:	62167-001
MITCHELL WOODS - PHASE 4	Design By:	TNH
LOCATION:	Check'd by:	JMD
Lands fronting Vivian Street, Mitchell, ON	Date:	November 12, 2025
	Revised :	--N/A--

Q:\62167_001\STM\62167-001_Storm Design Sheet_Rev-02.xlsx

TOWN OF MITCHELL
ENGINEERING & PUBLIC WORKS

STORM SEWER DESIGN SHEET

5 Year Storm	100 Year Storm	Manning's "n" :	0.013
Intensity = a/(Tc+b)^c	Intensity = a/(Tc+b)^c	Initial Entry time:	15 min
Q=2.78CIA/1000	Q=2.78CIA/1000	Velocities	
a = 875.105	a = 1821.990	0.8 m/sec minimum	
b = 7.641	b = 13.507	6 m/sec maximum	
c = 0.762	c = 0.773		

STREET	AREA ID	FROM MH	TO MH	AREA A (ha.)	CUMUL AREA (ha.)	RUNOFF COEFF "C"	A x C	ACCUM. A X C	CONCENTRATION TIME (Tc) IN U/S PIPE (min.)	CONCENTRATION TIME (Tc) TOTAL (min.)	RAIN INTENSITY (mm/hr)	FLOW Q (m^3/sec)	PIPE SIZE (mm)	LENGTH (m)	SLOPE (%)	CAPACITY (m^3/sec)	FULL FLOW VELOCITY (m/sec)	ACTUAL VELOCITY (m/sec)	REMARKS	FALL IN SEWER	DROP IN MANHOLE	INV. U.S	INV. D.S
Block 24	1	DICB1	MH1	1.386	1.386	0.50	0.69	0.69		**15.00**	136.73	0.263	525	50.3	0.42	0.279	1.287	1.465		0.211	-	346.971	346.760
									0.65	15.65													
Vivian Street	2	CBMH1	MH1	0.170	0.137	0.60	0.10	0.10		**15.00**	136.73	0.039	375	33.6	0.34	0.102	0.926	0.862		0.114	-	346.844	346.730
									0.60	15.60	134.53												
Vivian Street	-	MH1	CBMH2	0.000	1.523	0.20	0.00	0.80		15.65	134.37	0.297	600	57.9	0.34	0.358	1.266	1.416		0.197	-	346.697	346.500
Vivian Street	3	CBMH2	CBMH3	0.374	1.897	0.60	0.22	1.02	0.76	16.41	131.71	0.373	675	77.5	0.34	0.490	1.370	1.508		0.264	0.257	346.473	346.210
Vivian Street	4	CBMH3	MH5	0.287	2.184	0.60	0.17	1.19	0.94	17.36	128.59	0.426	675	10.2	0.34	0.490	1.370	1.543		0.035	0.025	346.185	346.150
									0.12	17.48	128.19												
Clayton Street	5	CBMH4	MH5	0.172	0.172	0.60	0.10	0.10		**15.00**	136.73	0.039	300	10.5	0.50	0.068	0.967	1.000		0.053	-	346.233	346.180
									0.18	15.18	136.06												
Vivian Street	-	MH5	CBMH6	0.000	2.356	0.20	0.00	1.30		17.48	128.19	0.462	750	15.3	0.34	0.649	1.469	1.595		0.052	0.028	346.122	346.070
Vivian Street	6	CBMH6	CBMH10	0.287	2.643	0.60	0.17	1.47	0.17	17.65	127.64	0.521	750	54.5	0.34	0.649	1.469	1.633		0.185	0.026	346.044	345.859
									0.62	18.27	125.72												
Vivian Street	7	CBMH7	CBMH8	0.198	0.198	0.60	0.12	0.12		**15.00**	81.21	0.027	375	70.5	0.42	0.114	1.029	0.841		0.296	-	346.656	346.360
Vivian Street	-	CBMH8	CBMH9	0.000	0.198	0.20	0.00	0.12	1.14	16.14	78.22	0.026	375	62.9	0.42	0.114	1.029	0.833		0.264	0.026	346.334	346.070
Vivian Street	8	CBMH9	CBMH10	0.323	0.521	0.60	0.19	0.31	1.02	17.16	75.76	0.066	375	42.5	0.42	0.114	1.029	1.066		0.179	0.029	346.041	345.863
									0.69	17.85	74.20												
Vivian Street	-	CBMH10	HW-1	0.000	3.164	0.20	0.00	1.78		18.27	125.72	0.622	750	22.1	0.32	0.630	1.425	1.625		0.071	0.059	345.800	345.730
									0.26	18.53	124.93												
Rear-yards	9	RYCB11	RYCB12	0.176	0.176	0.50	0.09	0.09		**15.00**	136.73	0.033	300	113.4	0.42	0.063	0.887	0.901		0.476	-	345.776	345.300
Rear-yards	10	RYCB12	RYCB13	0.201	0.377	0.50	0.10	0.19	2.13	17.13	129.32	0.068	375	36.8	0.42	0.114	1.029	1.073		0.155	0.029	345.271	345.120
Rear-yards	11	RYCB13	DDICB14	0.051	0.428	0.50	0.03	0.21	0.60	17.73	127.40	0.076	375	10.7	0.42	0.114	1.029	1.101		0.045	0.045	345.075	345.030
									0.17	17.90	126.86												
Rear-yards	12	DICB2	DDICB14	0.482	0.482	0.50	0.24	0.24		**15.00**	81.21	0.054	300	117.8	0.42	0.063	0.887	0.998		0.495	-	345.525	345.030
									2.21	17.21	129.05												
												0.011	* Allowable Flow from SWM Facility										
SWM Facility Outlet	--	DDICB14	OGS15	0.000	0.000	0.20	0.00	0.00		17.90	126.86	0.011	300	2.4	1.24	0.108	1.523	0.979		0.030	0.000	345.030	345.000
SWM Facility Outlet	--	OGS15	*Ex. Tile* (Blind Connection)	0.000	0.000	0.20	0.00	0.00	0.03	17.93	126.78	0.011	300	14.1	0.52	0.070	0.986	0.719		0.073	0.030	344.970	344.900
									0.24	18.17													

Denotes Pipes designed for the 100-yr storm

LEGEND

- SITE BOUNDARY
- DRAINAGE AREA
- EMBANKMENT (TOP) / (BOTTOM)
- EXISTING STORM SEWER — Ex. 375mmø STM. — Ex. MH
- STORM SEWER — MH — 21.3m–300mmø STM @ 1.30%
- 1 / 2.02 / 0.9 — ID No. / AREA (Ha) / RUNOFF COEFFICIENT

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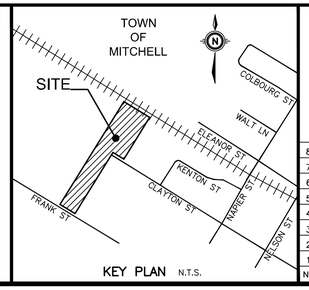

KEY PLAN N.T.S.

No.	REVISION	BY	YYYY-MM-DD
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GEODETIC BM ELEV. =338.386 m
COSINE REPORT 01019915459: ON NW CORNER OF BRIDGE OVER N THAMES RIVER ON FRANK ST, IN THE TOWN OF MITCHELL, +/- 250m E OF INTERSECTION IWTH BLANCHARD ST, 0.55m E OF WET END OF BRIDGE.

SITE BENCHMARK ELEV. =352.273 m
TOP NUT OF EXISTING FIRE HYRDRANT ON CLAYTON ST AS NOTED ON DRAWINGS.

OWNER
PARKWOOD DEVELOPMENTS (KITCHENER) LTD
745 BRIDGE ST W WATERLOO, ON

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN
LANDS FRONTING VIVIAN LANE MITCHELL, ON

DRAWING
STORM DRAINAGE AREA PLAN

MTE
Engineers, Scientists, Surveyors
519-271-7952

Project Manager: S. ALHAMZA	Project No.: 62167_001
Design By: TNH	Checked By: JMD
Drawn By: TNH	Checked By: JMD
Surveyed By: MTE OLS LTD	Drawing No.: ST1.1
Date: Jul.02/25	
Scale: 1:750	Sheet 1 of 1

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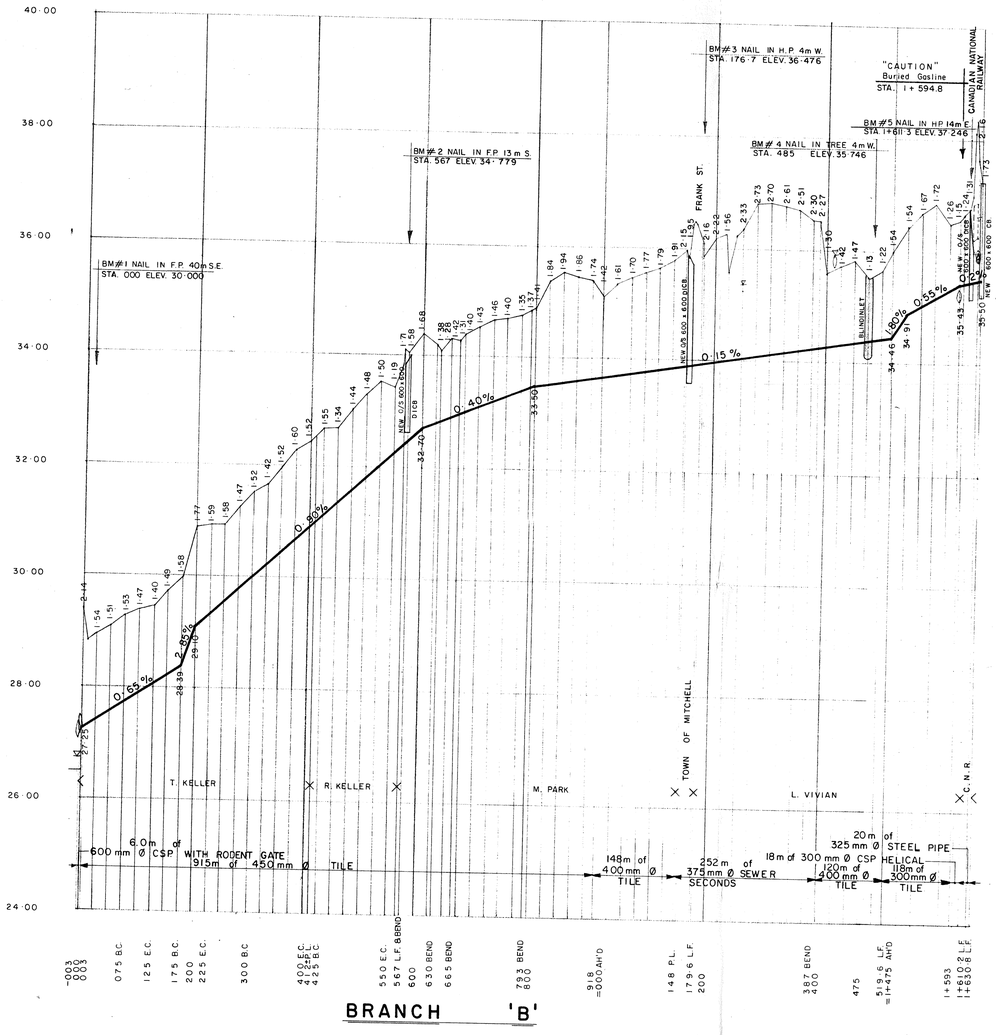
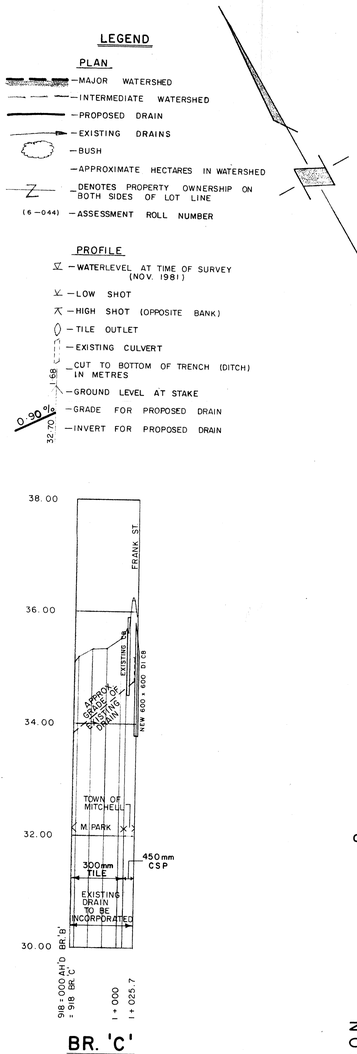
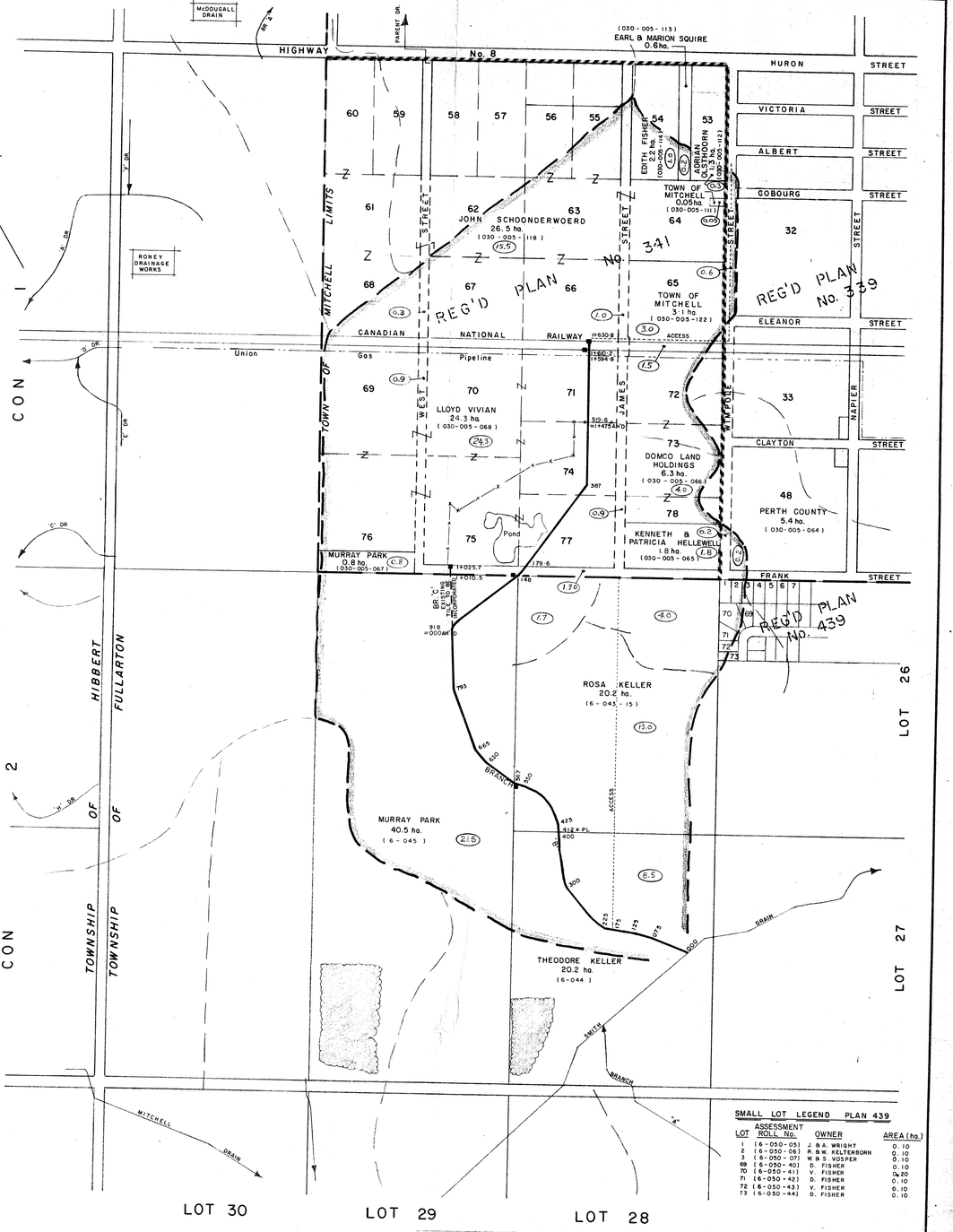
November 12, 2025 - 4:09:25 PM - Plotted By: Spiros Anhoulakis

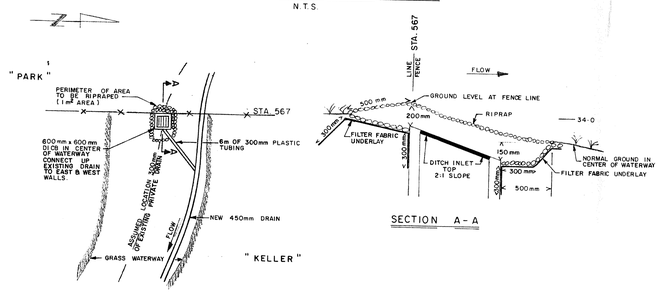
Appendix C

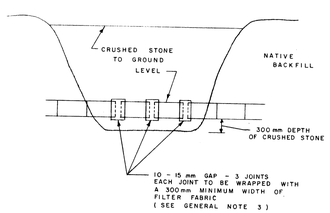
Smith Drain – Branches ‘B’ and ‘C’ Plan and Profile











BRANCH 'B'

LEGEND

PLAN

▬ ▬ ▬	MAJOR WATERSHED
— — —	INTERMEDIATE WATERSHED
━━━	PROPOSED DRAIN
——►	EXISTING DRAINS
	BUSH
	APPROXIMATE HECTARES IN WATERSHED
—Z—	DENOTES PROPERTY OWNERSHIP ON BOTH SIDES OF LOT LINE
(6 — 044)	ASSESSMENT ROLL NUMBER

PROFILE

∇	WATERLEVEL AT TIME OF SURVEY (NOV. 1981)
	LOW SHOT
	HIGH SHOT (OPPOSITE BANK)
0	TILE OUTLET
	EXISTING CULVERT
1·68	CUT TO BOTTOM OF TRENCH (DITCH) IN METRES
	GROUND LEVEL AT STAKE
0·90%	GRADE FOR PROPOSED DRAIN
32·70	INVERT FOR PROPOSED DRAIN

BR. 'C'

DETAIL 1

OFFSET CATCHBASIN - STA. 567

N.T.S.

DETAIL 2

BLIND INLET - STA. 475

N.T.S.

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 HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

SMALL LOT LEGEND PLAN 439

LOT	ASSESSMENT ROLL No.	OWNER	AREA (ha.)
1	(6-050-05)	J. & A. WRIGHT	0.10
2	(6-050-06)	R. & W. KELTERBORN	0.10
3	(6-050-07)	W. & S. VOSPER	0.10
69	(6-050-40)	D. FISHER	0.10
70	(6-050-41)	V. FISHER	0.20
71	(6-050-42)	D. FISHER	0.10
72	(6-050-43)	V. FISHER	0.10
73	(6-050-44)	D. FISHER	0.10

NOTE : METRIC CONVERSION

1. TO CONVERT FEET TO METRES MULTIPLY FEET BY 0 3048
2. TO CONVERT METRES TO FEET DIVIDE METRES BY 0·3048
3. TILE SIZE EQUIVALENTS ARE AS FOLLOWS :

4" - 100 mm	16" - 400 mm	3·5' - 1000 mm
6" - 150 mm	18" - 450 mm	4' - 1200 mm
8" - 200 mm	21" - 530 mm	5' - 1600 mm
10" - 250 mm	24" - 600 mm	6' - 2000 mm
12" - 300 mm	27" - 685 mm	
14" - 350 mm	30" - 750 mm	
15" - 375 mm	36" - 900 mm	

4. TO CONVERT ACRES TO HECTARES MULTIPLY ACRES BY 0·4047
5. TO CONVERT HECTARES TO ACRES DIVIDE HECTARES BY 0·4047

NOTE TO CONTRACTORS

"Contractors are advised that all extra work must be reported on daily extra work sheet to engineer by phone or by person at completion of each day or prior to starting any further extra work the next day. Failure to do such may cause rejection of claim for extra payment. Tile connections are exempted".

K. A. SMART

J. W. KUNTZE

SMITH DRAIN - BRANCHES 'B' & 'C'

COUNTY OF PERTH

TOWNSHIP OF FULLARTON

SCALE: PL. - 5,000 PR. HOR. 1:5000 VER. 1:50	FIELD BOOK 81112 (F.L.)	JOB NO. 81112	DRAWN BY I.U.
DATE: MAR. 22, 1982			REVISED

PLAN AND PROFILE

K. SMART
ASSOCIATES LIMITED

DRAWING NUMBER
1 OF 2

CONSTRUCTION NOTES – (SPECIAL PROVISIONS)

General Notes

Note – The contractor shall supply all labour, equipment and materials to complete the work outlined except as per General Note # 4

1. Working Area – General Condition E.38
   - For tile installation by tiling machine or backhoe – 10 metres on either side of new trench or any combination not to exceed 20 metres – where trenching is required to permit tile installation by tiling machine increase above dimensions to 15 metres and 30 metres respectively.
   - For sewer pipe installation by backhoe Station 179.6 to 400
     - 15 metres on either side of new trench or any combination not to exceed 30 metres.
   - For installation by boring Station 1+630.8 north
     - 15 metres on either side of bore pit or any combination not to exceed 30 metres by 15 metre length from fenceline.

2. Access – General Condition E.39
   - The contractor shall have access to the drain along the routes shown on the plan and then along the drain path or from existing road allowances and then along the drain path.
   - Each access route shall be along existing laneways, roads or road allowances or over a 6 metre (maximum) wide path where no roadway or laneway exists.
   - All specifications governing fences, livestock and crops during drain construction shall apply to access routes.
   - No other access routes shall be used unless first approved by the Engineer and the affected landowner.

3. Laying Tile or Sewer Pipe – Standard Specification F.2.3.E
   - Wherever backhoe is used or trenching is required, topsoil to be stripped, saved and replaced separately.
   - For joint protection due to tile or sewer pipe irregularities or alignment irregularity such as at bends the contractor shall use a 400 mm – 600 mm width of filter fabric (Texel #7609 is suggested) to fully protect the joint. At all pipe-tile junctions and at tile size changes the junction shall be fully and tightly wrapped with a 400 mm – 600 mm width of fabric.
   - A 150 mm overlap on top is required.
   - No additional payment will be allowed for implementing these protective measures.

4. Soil Instability – Standard Specification F.2.3.I
   If soil instability is encountered during construction, tile or sewer pipe may have to be installed on a 300 mm ± (minimum depth) bedding of crushed stone. No additional payment will be allowed for such work except that the stone as required and directed by the Engineer will be supplied by the Township at no cost to the contractor (the cost of the stone will be added to the final project cost).

5. Catchbasins – Standard Specification F.2.3.O
   - At all on-line catchbasins place crushed stone from bottom of excavation to inverts of all tile or pipe. Stone is to extend from catchbasin to start of standard tile trench. Approximately 2 cubic metres required per catchbasin. For offset catchbasins use stone as required at connections. For offset ditch inlet catchbasins backfill low wall area using the 2 cubic metres of stone specified above.
   - All catchbasin sumps to be fully cleaned by the contractor after completion of the drain installation and backfilling.
   - Grates for ditch inlet tops to have vertical bars with 100 mm minimum spacing.

6. Texel Filter Fabric
   Material is available from Terrafix, Rexdale, Ontario. (416 - 745 - 7290)
   Approved equal will also be considered by the Engineer.
   Contractor is to avail himself of manufacturer's recommendations for installation, cutting and precautions necessary to avoid damage to fabric.

7. Miscellaneous Elevations
   Elevations were only determined along the staked route except for those shown, if any, on the plan. If any owner wishes to determine if other low areas can be drained, he is to contact the engineer.

8. Riprap
   All riprap is to be placed on filter fabric underlay (Texel #7612 is suggested) unless directed otherwise on plan.
   Along upstream edges of riprap, where surface water will enter, underlay is to extend a minimum of 300 mm upstream from riprap and then be keyed down a minimum of 300 mm. The riprap is to be heavy stone (quarry stone is suggested) with particles averaging in size from 225 mm to 450 mm and is to be placed at 450 mm thickness.
   Wherever riprap is used, the area is to be overdug so that finished top of riprap is at design cross-section at design elevation or flush with existing ground.

SPECIFIC NOTES

A) TILE PORTION

i) BRANCH B

-003 TO 003
- NEW TILE OUTLET TO BE ON NORTH SIDE OF EXISTING OUTLET.
- PLACE RIPRAP PROTECTION WITH FILTER FABRIC UNDERLAY TO PROTECT DITCH BANK (APPROX. 5 m^2 AREA).

000 TO 008.5
- BERM ON DITCH BANK TO BE FULLY RESTORED TO EXISTING CONDITION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR WASHOUT OF BERM IN THIS AREA DURING ONE YEAR MAINTENANCE PERIOD.
- CONTRACTOR TO SEED OR RIPRAP BERM ON DISTURBED AREA AS REQUIRED TO ENSURE STABILITY.
- ENSURE THAT OVERFLOW CULVERT IS UNIMPEDED AFTER RESTORATION COMPLETED.

000 TO 567
- NEW TILE TO BE INSTALLED JUST INSIDE NORTH AND EAST EDGE OF GRASS WATERWAY THROUGHOUT.
- LAND OWNER RESPONSIBLE FOR RESEEDING DISTURBED EDGE OF GRASS WATERWAY.

000 TO 918 = 000 AH'D
- IF EXISTING PRIVATE TILE IS INTERCEPTED IT SHALL BE CROSS-CONNECTED OVER OR UNDER THE NEW DRAIN IN AN APPROVED MANNER.
- IF CROSS-CONNECTION IS NOT POSSIBLE THEN BOTH ENDS OF EXISTING DRAIN SHALL BE CONNECTED TO THE NEW DRAIN IN AN APPROVED MANNER.
- THE ABOVE, IF REQUIRED, WILL BE PAID AS AN EXTRA TO THE CONTRACT.

567
- SEE DETAIL 1 FOR NEW CB

148 TO 179.6
- ROAD CROSSING TO BE BY OPEN CUT IN ACCORDANCE WITH GENERAL CONDITION E·17.
- ALL NON-GRANULAR MATERIAL EXCAVATED TO BE HAULED AWAY.

151
- CONSTRUCT 600 mm x 600 mm DITCH INLET CB WITH LOW WALL IN ROAD DITCH AND HIGHWALL TOWARD PROPERTY LINE.
- SET LOW WALL AT ELEVATION 35.70. TOP TO HAVE 2 : 1 SLOPE.
- CONNECT UP TO NEW DRAIN WITH 2 METRES OF 300 mm DIAMETER PLASTIC TUBING.

179.6 TO 400
- PIPE TO BE INSTALLED BY BACKHOE.
- TOPSOIL TO BE STRIPPED, SAVED AND REPLACED SEPARATELY.

400 TO 519.6 = 1+475 AH'D
- LOW WET AREA. SEE GENERAL NOTE 4.

475
- CONSTRUCT BLIND INLET. SEE DETAIL 2.

519.6 = 1+475 AH'D
- IF BORING PORTION ALREADY INSTALLED CONTRACTOR TO VERIFY BORE PIPE ELEVATION BEFORE INSTALLING TILE UPSTREAM.

1+593 TO 1+610.2
- DRAIN TO PASS OVER GASLINE.
- CONTRACTOR TO NOTIFY UNION GAS (1 - 800 - 265 - 8528) 48 HOURS PRIOR TO COMMENCING CROSSING.
- CSP (HELICAL WELD) TO BE PLACED ON 300 mm DEPTH OF CRUSHED STONE FOR 1 METRE EITHER SIDE OF PIPELINE.
- CONTRACTOR TO PLACE ANY SEPARATION MEDIUM REQUIRED BY UNION GAS (WOODEN BLOCK, RUBBER PADS, ETC. TO BE SUPPIED BY UNION GAS.)

1+610.2
- USE A CSP COUPLER FOR CONNECTION TO BORE PIPE.

1+610.2 TO 1+630.8
- SEE BORING PORTION. BORING WORK MAY BE AWARDED AS SEPARATE CONTRACT.

1+611
- CONSTRUCT 600mm x 600mm DITCH INLET CB WITH HIGH WALL ON FENCE LINE, LOW WALL TOWARD RAILROAD CULVERT.
- SET LOW WALL AT ELEVATION 36.00.
- PLACE RIPRAP AND FILTER FABRIC UNDERLAY ON 0.5 m^2 OF AREA IN FRONT OF LOW WALL.
- EXCAVATE A CHANNEL OVER TO RAILROAD CULVERT (1 m BOTTOM, 3 : 1 SIDESLOPE). LEVEL SPOIL IN RAILROAD RIGHT-OF-WAY.
- DITCH INLET TOP TO HAVE 1 : 1 SLOPE.
- SEAL DOWNSTREAM END OF EXISTING DRAIN ON SOUTHSIDE OF FENCE LINE.
- CONNECT DI CB TO NEW DRAIN WITH 2 m OF 150 mm DIA. PLASTIC TUBING.

1+630.8
- CONSTRUCT A 600 mm x 600 mm CB ON PROPERTY LINE. SET TOP AT ELEVATION 37.25. CONNECT BORE PIPE TO CB.
- CONNECT 3 EXISTING DRAINS TO NEW CB. MAKE CONNECTIONS IN NORTH WALL OF CB. EXISTING CSP OUTLETS MAY BE USED FOR CONNECTIONS.
- SUPPLY AND PLACE 7 m^3 OF CRUSHED STONE TO MAKE FIRM BEDDING FOR CONNECTIONS AND CB.
- BACKFILL AND GRADE DISTURBED AREA ON NORTHSIDE OF RAILROAD ENSURE UPSTREAM END OF RAILROAD CULVERT IS OPEN.

ii) BRANCH C

1+025.7
- NEW DI CB TO BE CONNECTED TO EXISTING ROAD PIPE (450 mm) WITH LOW WALL TO NORTH AT ELEVATION 35.20.
- DITCH INLET TOP TO HAVE 1 : 1 SLOPE
- BACKFILL EXISTING DITCH IN ROAD ALLOWANCE AND PLACE RIPRAP PROTECTION AND FILTER FABRIC UNDERLAY IN FRONT OF CB (0.5 m^2 OF AREA)
- CONNECT UP EXISTING TILE DRAIN (250 mm) TO WEST WALL. REUSE EXISTING OUTLET PIPE FOR CONNECTION.

B) BORING PORTION

BRANCH B

1+610.2 TO 1+630.8
- SEE STANDARD SPECIFICATION F·4
- WORK SHOULD BE DONE FROM NORTHSIDE OF RAILWAY DUE TO PRESENCE OF BURIED GAS LINE ON SOUTHSIDE. WORK MAY BE DONE FROM SOUTHSIDE WITH PRIOR APPROVAL BY ENGINEER AND AFFECTED LANDOWNER.
- ELEVATION OF GAS LINE TO BE CHECKED BEFORE BORING COMMENCES.
- ONLY 50 mm ± VARIATION FROM DESIGN GRADE PERMITTED AT DOWNSTREAM END OF BORING SO THAT DRAIN DOWNSTREAM CAN PASS OVER BURIED GAS LINE.
- REVERSE GRADE NOT ACCEPTABLE.
- CROSSING TO BE INSTALLED BELOW OR SLIGHTLY TO ONE SIDE OF EXISTING RAILROAD CULVERT. IF PORTIONS OF PIPE ARE INSTALLED BY OPEN CUT BETWEEN RAILBED AND FENCELINE THE PIPE SHALL BE WELDED TO GIVE A CONTINUOUS LENGTH OF RIGID PIPE (MINIMUM BORE LENGTH 13 m).
- LAND ON NORTH SIDE OF RAILROAD IS SYSTEMATICALLY TILE DRAINED. ALL TILE AFFECTED BY THE BORE PIT SHALL BE REPAIRED IN AN APPROVED MANNER.

REGISTERED PROFESSIONAL ENGINEER K. A. SMART PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER J. W. KUNTZE PROVINCE OF ONTARIO

SMITH DRAIN - BRANCHES 'B' & 'C'			
COUNTY OF PERTH			TOWNSHIP OF FULLARTON
SCALE: N/A	FIELD BOOK 81112 (F.L.)	JOB NO. 81112	DRAWN BY R.A.M.
DATE: MAR. 22, 1982			REVISED
CONSTRUCTION NOTES			
K. SMART ASSOCIATES LIMITED			DRAWING NUMBER 2 OF 2

Appendix D

Preliminary Stormwater Management Analysis

CAD: P:\P\62167_001\62167_001-F2.DWG

Ex. SMITH DRAIN (APPROX. LOCATION)

30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15

BLOCK 31

14 13 12 11 10 9 8 7 6 5 4 3 2 1

201
4.417

VIVIAN STREET

CLAYTON STREET

BLOCK 24

BLOCK 25

KENTON STREET

LEGEND:

- SITE BOUNDARY
- Ex. EMBANKMENT (SLOPE AS NOTED) (TOP) / (BOTTOM)
- CATCHMENT 201
- 201 / 0.131 — SUB-CATCHMENT NUMBER / AREA (ha.)
- EMBANKMENT (SLOPE AS NOTED) (TOP) 3:1 (BOTTOM)

0 25 50 75m

MTE
Engineers, Scientists, Surveyors

PROJECT
MITCHELL RIDGE PRELIMINARY DESIGN

TITLE
POST-DEVELOPMENT CATCHMENT AREAS

Drawn AXF/TNH	Scale 1:1,500	Figure II
Checked SAH	Project No. 62167_001	
Date 2025-11-12	Rev No. 2	

Plot Date: November 12, 2025 - 3:41 PM

```
POST-100 YR
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 7, 2010"
"           10   Units used:                                        ie METRIC"
"                Job folder:                          Q:\62167_001\SWM\MIDUSS"
"                Output filename:  02 - 62167-001_POST_100yr_11lps-rev3-4hr.out"
"                Licensee name:                                             A"
"                Company                                                     "
"                Date & Time last used:             11/12/2025 at 11:38:43 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 47          FILEI_O Read/Open Stratford-100yr-4hr.stm"
"            1   1=read/open; 2=write/save"
"            1   1=rainfall; 2=hydrograph"
"            1   1=rain; 2=imperv; 3=perv"
"             Stratford-100yr-4hr.stm"
"             Enter a description for file identification."
"             New storm defined"
"             Total depth                101.000    mm"
"             Maximum intensity          185.623    mm/hr"
"             Duration                   240.000   minutes"
"                  0.000     0.000     0.000     0.000 c.m/sec"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   CONTROLLED"
"       55.000   % Impervious"
"        4.417   Total Area"
"       60.000   Flow length"
"        1.500   Overland Slope"
"        1.988   Pervious Area"
"       60.000   Pervious length"
"        1.500   Pervious slope"
"        2.429   Impervious Area"
"       60.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.478   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."
"        0.927   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.131     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           1.988      2.429      4.417      hectare"
"             Time of concentration  20.321     2.875      8.054      minutes"
"             Time to Centroid       157.030    118.664    130.053    minutes"
"             Rainfall depth         101.000    101.000    101.000    mm"
"             Rainfall volume        2007.53    2453.65    4461.17    c.m"
"             Rainfall losses        52.699     7.389      27.779     mm"
"             Runoff depth           48.301     93.611     73.221     mm"
"             Runoff volume          960.05     2274.13    3234.18    c.m"
"             Runoff coefficient     0.478      0.927      0.725      "
"             Maximum flow           0.267      1.075      1.131      c.m/sec"
```

```
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                     1.131     1.131     0.000     0.000"
" 54          POND DESIGN"
"         1.131   Current peak flow    c.m/sec"
"         0.537   Target outflow    c.m/sec"
"        3234.2   Hydrograph volume    c.m"
"           21.   Number of stages"
"       345.000   Minimum water level    metre"
"       347.000   Maximum water level    metre"
"       345.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 345.000     0.000     0.000"
"                 345.100   0.00137  1.00E-07"
"                 345.200   0.00285     2.000"
"                 345.300   0.00378     4.000"
"                 345.400   0.00453     8.000"
"                 345.500   0.00517    11.000"
"                 345.600   0.00574    45.000"
"                 345.700   0.00626   142.000"
"                 345.800   0.00674   283.000"
"                 345.900   0.00719   441.000"
"                 346.000   0.00761   612.000"
"                 346.100   0.00801   795.000"
"                 346.200   0.00839   990.000"
"                 346.300   0.00875  1199.000"
"                 346.400   0.00910  1422.000"
"                 346.500   0.00944  1658.000"
"                 346.600   0.00976  1908.000"
"                 346.700   0.01007  2171.000"
"                 346.800   0.01038  2452.000"
"                 346.900   0.01067  2752.000"
"                 347.000   0.01096  3073.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                345.030     0.630    0.0600     1.000"
"          10.   SUPERPIPES_1"
"           1.   Type 1 is Pipe"
"             Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                 Invert    Length     Width    Height   Grade %     Pipes"
"                345.030    47.500     0.375     0.375     0.420     1.000"
"                345.300   113.400     0.300     0.300     0.420     1.000"
"                345.860   175.900     0.375     0.375     0.420     1.000"
"                345.030   117.800     0.300     0.300     0.420     1.000"
"                346.760    50.300     0.525     0.525     0.420     1.000"
"                346.700    33.600     0.375     0.375     0.340     1.000"
"                346.500    57.900     0.600     0.600     0.340     1.000"
"                346.070    87.700     0.675     0.675     0.340     1.000"
"                346.180    10.500     0.300     0.300     0.500     1.000"
"                345.730    91.900     0.750     0.750     0.330     1.000"
"             Peak outflow                 0.011    c.m/sec"
"             Maximum level              347.000    metre"
"             Maximum storage           3071.808    c.m"
"             Centroidal lag              51.548   hours"
"                  1.131     1.131     0.011     0.000 c.m/sec"
```