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**PROPOSED RESIDENTIAL DEVELOPMENT**
**7449 MONTROSE ROAD**
**CITY OF NIAGARA FALLS**

Project No. 20255

# FUNCTIONAL SERVICING REPORT

Prepared For:

**BAYFIELD ADVISORS**

Prepared By:

The Odan/Detech Group Inc.

Original: February 2021
Updated: May 2022
Updated: July 2022

DESCRIPTION page

## 1.0 BACKGROUND

The property under study is a 2.58 ha (6.37 acre) site located on the south east corner at the intersection of Pin Oak Drive and McLeod Road, in the City of Niagara Falls. The development is bound by Niagara Square to the south, McLeod Road to the north, Montrose Road to the east and Pin Oak Drive to the west. Currently, the site is vacant. The existing site consists of vegetation and open field.

It is proposed to construct 10 buildings of residential stacked townhouses 3 Storeys in height with a total of 57 units and Building A (13 Storey Bldg.) with 167 Units and Building B (8 Storey Bldg.) with 158 units including underground parking and additional surface visitor parking. For further information regarding the layout of the proposed development please refer to the drawings prepared by Leon Lubelski Architects.

The site is currently zoned for Planned Shopping Centre (SC)" and rezoning is targeted as a site specific "Residential Apartment (R5F)" zone and it is proposed to be rezoned to allow for residential use development.

This report will evaluate the serviceability of the site with respect to sanitary, water, storm services and also evaluate the stormwater management (SWM) strategy that will be implemented to meet the City of Niagara Falls and Region of Niagara requirements.

For detailed topography of the existing site conditions, December 2020, refer to the topographic survey prepared by Speight Van Nostrand & Gibson Ltd.

## 2.0 DESIGN CONSIDERATIONS

## A) SANITARY WASTE WATER DISPOSAL

### Existing Condition

The proposed development consists of a severed parcel of land that was formerly part of the Niagara Square Mall. The existing sanitary sewer service for the Mall has multiple outlets which currently connect at Pin Oak Drive and Canadian Drive to service the existing Mall property. As this parcel of land is no longer part of the Mall a separate sanitary service will be required.

The preferred connection for the property is to Pin Oak Drive. It is proposed to connect the proposed sanitary sewer for the development to Pin Oak Drive to an existing sanitary manhole located within the road allowance. Connection to an existing manhole is required by the Region of Niagara. The existing sanitary sewer on Pin Oak Drive is an existing 750mm diameter sewer at the existing manhole location.

Further to the above review of the potential to connect to Montrose Road was reviewed. Though it was indicated by the Region that this would be the preferred connection it would require extension of the existing sanitary sewer within the Right-of-Way for approximately 760m. This would have impacts on existing infrastructure and utilities. As the existing properties on Montrose Road currently have sanitary services justification to extend a service from this location is not a reasonable approach to service the proposed development.

Refer to Appendix B - Figure 1 – Sanitary Tributary Area Plan for additional information regarding the location of existing sanitary infrastructure within proximity to the proposed development.

For calculating the existing and proposed population/flows for the site the following Regional of Peel standards for population densities and flow rates will be used:

- flow rate = 275 L/person/day per capita
- Infiltration to be 90 L/person/day per capita
- Infiltration to be 0.286 L/s/ha (trunk sewers)
- for residential areas, population are as follows based on Schedule 7, Region of Niagara.
    - Singles & Semi Detached Units – 2.91 Persons
    - Townhomes – 2.12 Persons
    - Apartments – 1.62 Persons
- The Harmon formula will be used for the peaking factor

**Sanitary Waste Water Disposal:**

The following Table 1 summarizes the proposed flow for the residential site. Please refer to next page for sanitary flow calculations.

**Table 1 - Proposed Residential flows from the Site to Pin Oak Drive**

| Area (ha) | Population | Flow (l/s) | Infiltration Flow (l/s) | Total Flow (l/s) |
|---|---|---|---|---|
| 2.58 | 647 | 8.26 | 0.74 | **9.00** |

It is proposed to connect the residential site to the existing 750mm diameter sewer on Pin Oak Drive. The proposed connection will be a 200mm diameter PVC lateral at 1.0% having a full flow capacity of 32.8 l/s, greater than the calculated proposed total flow.

Connection will be made to an existing Sanitary Manhole as required by the Region of Niagara.

## RESIDENTIAL SANITARY FLOW CALCULATIONS FOR CITY OF NIAGARA FALLS

This program calculates the sanitary discharge from various land use As per the Region of Niagara

PROJECT: 7449 Montrose Road, Niagara Falls, ON

| | |
|---|---|
| COMMERCIAL SITE AREA (ha) = | n/a |
| RESIDENTIAL SITE AREA (ha) = | n/a |
| TOTAL SITE AREA (ha) = | 2.580 |

| LAND USE | NUMBER OF UNITS | SITE AREA, (ha) | GROSS FLOOR AREA, m2 | TOTAL POPULATION | TOTAL DAILY FLOW (LITERS) | AVERAGE DAILY FLOW l/sec | PEAKING FACTOR, M | TOTAL FLOW FROM LAND USE, l/sec |
|---|---|---|---|---|---|---|---|---|
| RESIDENTIAL Density 1, using 86 person/site area | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| RESIDENTIAL Singles & Detached, using 2.91 persons/unit | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| RESIDENTIAL Townhomes, using 2.12 persons/unit | 57 | | | 121 | 33231 | 0.38 | 4.22 | 1.62 |
| RESIDENTIAL Apartments, using 1.62 person/unit | 325 | | | 527 | 144788 | 1.68 | 3.96 | 6.64 |
| | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| **TOTAL RESIDENTIAL** | | | | | | | | 8.26 |
| COMMERCIAL, Using 136 persons/ha | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| COMMERCIAL, Using 50 persons/ha | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| Commercial, Using 1.5 persons/unit | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| **TOTAL COMMERCIAL** | | | | | | | | **0.00** |
| | 382 | | | 647 | | | | |

**TOTAL**

V1= 178019

| | |
|---|---|
| Q1= | 8.26 |
| Q2= | 0.00 |
| Qinfil | 0.74 |
| Qtot | 9.00 |

Q = (MqP/86400) + A * I (L/sec)

Q1= total flow from Residential Land Use (L/sec)
Q2= total flow from Commercial Land Use (L/sec)
Qinfil = total flow from infiltration (L/sec)
Qtot = total flow (Land use + infiltration)

V1= Total Volume from Land Use in liters

where : P is population
q = 275 L/person/day for proposed residential
q = 180000 L/floor ha/day for proposed commercial/offices
A = gross site area
i = 0.286 L/sec/ha (infiltration rate)
Peaking Factor M = 1 + [14 / (4 + (P/1000,1/2))]

## B) WATER DISTRIBUTION

### Existing Condition

There is an existing 300mm diameter Ductile Iron water main fronting the development located on Pin Oak Drive. This water main was recently abandoned and replaced with a new 300mm diameter PVC water main. There are no water mains fronting the Development at Montrose Road or McLeod Road.

### Design Considerations

The unit rate and peaking factors of water consumption, minimum pipe size and allowable pressure in line were established from the City of Niagara Falls Design Criteria.

The pressures and volumes must be sufficient for peak hour conditions and under fire conditions as established by the Fire Underwriters Survey for Fire Flows. The minimal residual pressure under fire conditions is 140 kpa (or 20.3 psi).

According to the MOE criteria the allowable pressures are as follows:

| **Condition** | **Allowable Pressures (kpa)** | |
|---|---|---|
| | **min.** | **max.** |
| 1) Min. Hour | 275 | 700 |
| 2) Peak Hour | 275 | 700 |
| 3) Peak Day + Fire Flow | 140 | 700 |

Due to time of year fire Flows test were not conducted for the site. A fire flow test will need to be conducted in the spring to determine available flows from Pin Oak Drive at that time. It is expected that adequate flows will be available as Pin Oak recently under infrastructure improvements and upgrades to the water main related to the recent Pin Oak and Canadian Drive improvements.

The water requirement for the residential portion of the site based on the new population is calculated as follows:

| | | | |
|---|---|---|---|
| a) | Average Day domestic demand - | using 275 L/cap/day | 2.06 L/s |
| b) | Max day demand - | 1.9 x daily demand | 3.91 L/s |
| c) | Peak hour demand - | 2.85 x daily demand | 5.84 L/s |
| d) | Fire flow (refer to FUS calculations, Appendix C) | | 200 L/s |

| **Table 2 - Total Water Demand for Site** | | |
|---|---|---|
| | L/s | USGM |
| Max Day Demand | 3.91 | 62 |
| Fire Flow Demand | 200 | 3,170 |
| Total Water Demand | 204 | 3,234 |
| Approx. Flow at 20 PSI Residual Pressure | TBD | TBD |

Refer to Appendix C Figure 2 – Water Distribution Plan for proposed water main layout.

Flow testing will be conducted at Pin Oak Drive hydrants at a later date. A flow test is scheduled for summer of 2022. This report will be updated to comment and provide actual available fire flows at that time. It is expected that adequate flows will be available as the existing water main is 300mm in diameter and part of a larger looped system. Refer to Appendix D for the complete FUS fire flow calculations.

The flow tests will demonstrate whether there is adequate flow within the system to meet the domestic and fire demands for the proposed site.

## C) STORM WATER MANAGEMENT

Storm water management for the proposed development will follow the storm water criteria as set out by the City of Niagara Falls guidelines for quantity and quality controls. The allowable post-development peak flow for the proposed development will match the pre-development flows for each design storm. Design storm data for the City of Niagara Falls 5 through 100 year storms are shown below. A comparison will be made for the entire range of storms for predevelopment versus post-development.

### Existing Condition

Allowable flows will be based on the predevelopment levels as determine using Visual OTTHYMO. The below Table shows the allowable flow for each storm based on the predevelopment model. Refer to Appendix D – Figure 3 - Predevelopment Storm Tributary Area plan.

**TABLE 3 - Catchment Characteristics for the Pre Developed Site**

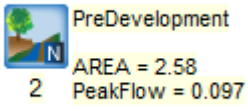
| Area No. | Area (ha) | Hydrograph Method | % impervious | % imperviousness directly connected | Loss Method for Pervious Area | CN for Pervious Area | Initial Abstraction for Pervious Area (mm) | Time to peak ($T_p$) hrs |
|---|---|---|---|---|---|---|---|---|
| Area 1 | 2.58 | NasHYD | - | - | SCS | 83 | 5.0 | 0.25 |
| **TOTAL** | **2.58** | | | | | | | |

Based on the predevelopment modelling the allowable flows from the proposed development will be as per the following Table 4:

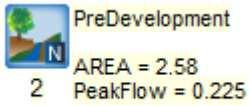
**TABLE 4 - Summary of Allowable Flows from the Site**

| Storm Event | Connection Location | Allowable Flow (L/s) |
|---|---|---|
| 5 Year Storm | Pin Oak Drive – 600mm dia. Stm. | 97 |
| 100 Year Storm | Pin Oak Drive – 600mm dia. Stm. | 225 |

**Pre-Development Otthymo Model – 5 Year**




**Pre-Development Otthymo Model – 100 Year**



**Post Development Flow Analysis**

For the purpose of post development analysis, the post development storm tributary areas of the subject site have been identified as shown on Figure 4 – Post Development Tributary Area Plan in Appendix D

In order to control the post development flows to the allowable flow rate, on-site storage will be required through use of underground storage system within the residential area. Depending on available land areas this tank could be located outside the underground parking or within the building in the form of a sealed water tight tank. As per the predevelopment conditions, OTTHYMO will be used to model and establish the post development flows and determine the detention volume required.

The following Table summarizes the parameters used in OTTHYMO to characterize the post development catchment areas.

**TABLE 5 - Catchment Characteristics for the Post-Developed Site**

| Area No. | Area (ha) | Hydrograph Method | % impervious | imperviousness directly connected % | Loss Method for Pervious Area | CN for Pervious Area | Initial Abstraction for Pervious Area (mm) | Time to peak ($T_p$) |
|---|---|---|---|---|---|---|---|---|
| Area 1 | 2.58 | StandHyd | 60 | 60 | SCS | 80 | 5 | - |
| **TOTAL** | **2.58** | | | | | | | |

The storage details and the stage/storage/discharge properties used to model the flow controls for this site are shown below.

**ORIFICE DISCHARGE CALCULATOR**

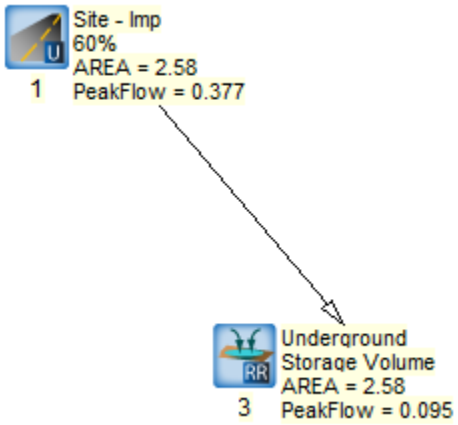
This program calculates the discharge from a circular orifice when given elevations and orifice diameters by the user.

Discharge based on orifice equ.: Q = CA x sqrt(2gh)

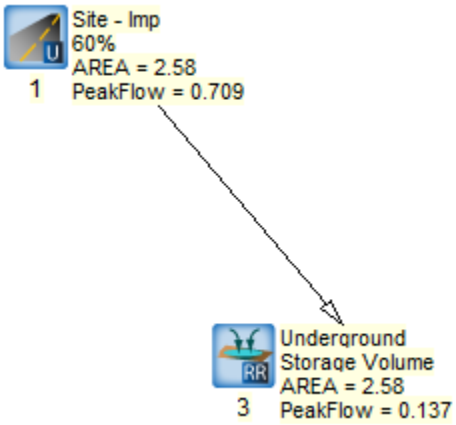
| | | | |
|---|---|---|---|
| **Orifice Diameter =** | **0.200** m ← | **Enter the orifice diameter in metres** | |
| **Area** | **0.03142** m2 | | |
| **Discharge Coeff. =** | **0.810** ← | **Enter discharge coeff. to use** | |
| | | **Orifice Tube** | |

| Elev. | Head | Discharge | Volume (ha.m.) | Tank Size | |
|---|---|---|---|---|---|
| **0.00** | 0 | **0.0000** | **0.0000** | L= | 45 |
| **0.25** | 0.25 | **0.0564** | **0.0113** | W= | 10 |
| **0.50** | 0.50 | **0.0797** | **0.0225** | H= | 1.8 |
| **0.75** | 0.75 | **0.0976** | **0.0338** | Area= | 450 |
| **1.00** | 1.00 | **0.1127** | **0.0450** | Vol= | 810 |
| **1.25** | 1.25 | **0.1260** | **0.0563** | | |
| **1.50** | 1.50 | **0.1380** | **0.0675** | | |
| **1.80** | 1.80 | **0.1512** | **0.0810** | | |

**Post-Development Otthymo Model – 5 Year**




**Post-Development Otthymo Model – 100 Year**




The following Table shows a summary of the total peak flows from the site. As shown, the total flow is less than the allowable flow for each storm.

**TABLE 6 - Summary of Flows from the Site**

| Storm Event | Total Flow (L/s) | Allowable Flow (L/s) |
|---|---|---|
| 5 Year Storm | 95 | 97 |
| 100 Year Storm | 137 | 225 |

The following Table summarizes the storage requirements for the 5 year and 100 year storm events. All storage will be underground via, storm pipes, manhole structures and storage chambers.

| TABLE 6 - Summary of Residential Volumes (100 Year Volume) | | | | | |
|---|---|---|---|---|---|
| **Ponding Area** | **Surface Pond Depth Calculated Above Rim Elevation (m)** | | **Ponding Volume Req'd ($m^3$)** | | **Ponding Volume Provided ($m^3$)** Volume within Tank |
| | **5 Yr** | **100 Yr** | **5 Yr** | **100 Yr** | |
| **1** | 0.00 | 0.00 | 324 | 662 | * 810 |

* - Exact Size to be determined at the detailed design stage.

As demonstrated in the above table, there is sufficient storage capacity on site to store the 5 to 100 year storm events to predevelopment levels with no surface ponding occurring during any storm.

A proposed 450$m^2$ stm tank area with a height of 1.8m will be required for the proposed development. The tank will be located at the south west corner of the site adjacent to the existing outlet pipe. An additional alternate tank location has been provided internally adjacent to the underground parking level. The final dimensions and locations and adjustments related to the tank size will be made at the detailed design stage based on the Architect and Owner's preferred location.

The existing storm lateral connecting to Pin Oak Drive is a 600mm dia. Concrete pipe at approximately 0.35% slope. Using an 'n' value of 0.013 this pipe will have a capacity of 390 L/s, which is greater than the site allowable of 97 L/s for a 5 Year storm and 225 L/s for a 100 Year storm.

In addition to the above a ditch inlet will be set at an elevation that will allow relief of the Stormwater Tank should the storage exceed the 100 year volume or become plugged acting as an overland flow relief for the site.

### Quality

The majority of the development will consist of landscape and rooftop. Landscape and rooftop are considered clean water and therefore will be provided with a TSS removal rate of 80%.

Asphalt areas will be reviewed further at the detailed design stage and will be treated with an adequately sized Oil/Grit Separator. Where site layout allows low impact design strategies will be implemented.

### Low Impact Development Strategy

As indicated within the EIS Sectoin 7.0 RECOMMENDATIONS AND MITIGATION MEASURES the following statement indicate that the "EIS report detailed the review of the Niagara Region Official Plan Policy 7.B and assessment of the vegetation patches including a woodlot and two small pocket wetlands contained within. The policy framework under Policy 7.B.1.8 for either woodlot and wetland feature has not been met on this Site based on the desktop review and field assessment."

Based on the above additional measure to provide for a wetland feature are not required. However during detailed design at the site plan stage use of Low Impact Development Strategies will be reviewed to enhance the site.

At detailed design stage soils will be reviewed to determine infiltration properties and if soils are conducive to infiltration the appropriate LIDs will be implemented to improve water quality and provide some benefit to water recharge.

## 3.0 CONCLUSIONS

From our investigation the site is serviceable utilizing existing sanitary, storm and water main infrastructure adjacent to the site.

Storm water management can be accommodated with on-site storage as described in this report. The post development storm design has been maintained below the allowable flow rate for the site for each storm event.

The following Table 7 summarizes the servicing and storm water management components of the proposed development.

| **TABLE 7 - Summary Information** | |
|---|---|
| Total Sanitary Flow (L/s) | 9.00 |
| Total Fire-Domestic Flow Required (L/s) | 204 |
| Allowable release rate from site (L/s) (5 year) | 97 |
| Actual release rate from site (L/s) (5 year) | 95 |
| Allowable Release Rate from site (L/s) (100 Year) | 225 |
| Actual Release Rate from site (L/s) (100 Year) | 137 |
| Orifice Tube Size (mm) | 200mm |
| 100 Year Maximum Storage Required (m3) | 662 |
| 100 Year Maximum Storage Available (m3) | 810 |

Respectfully Submitted;
**The Odan Detech Group Inc.**

Mark Harris
Digitally signed by Mark Harris
DN: cn=Mark Harris, o=The Odan/Detech Group Inc., ou, email=mark@odandetech.com, c=CA
Date: 2022.07.15 16:14:43 -04'00'

REGISTERED PROFESSIONAL ENGINEER
I. KRPAN
PROVINCE OF ONTARIO

July 14, 2022

Mark Harris, Dipl. Tech.

John Krpan, M.S.C.E., P.Eng

# APPENDIX A

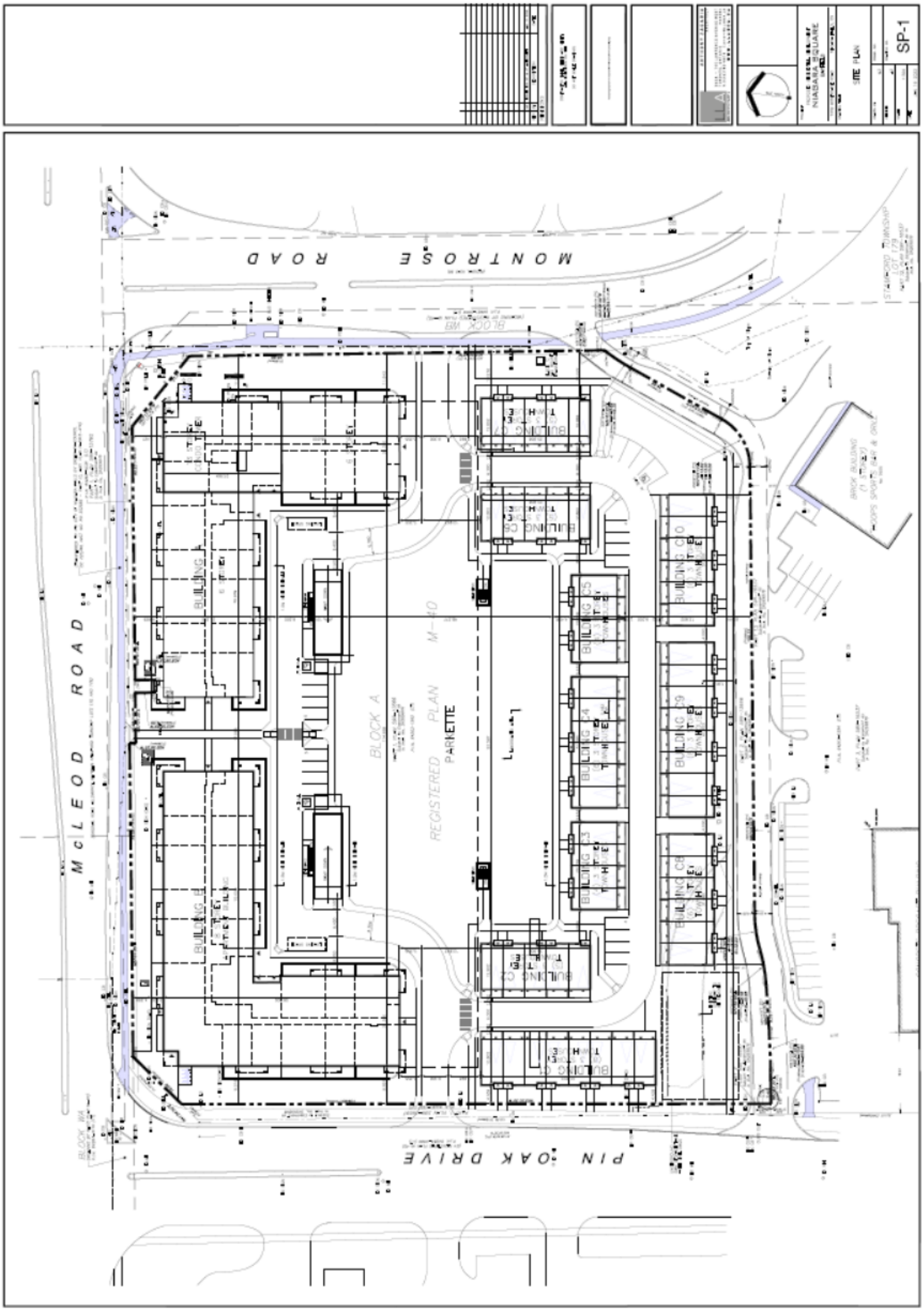
Aerial Photo of Existing Site (Not Current)

Site Plan

Site Statistics

## Aerial Photo of Existing Site (Not Current)

## Site Plan – Leon Lubelski Architects



## Site Statistics

NUMBER OF STOREYS
(BLDG A) = 13 STOREYS
(BLDG B) = 8 STOREYS
(BLDG C1) = 3 STOREYS
(BLDG C2) = 3 STOREYS
(BLDG C3) = 3 STOREYS
(BLDG C4) = 3 STOREYS
(BLDG C5) = 3 STOREYS
(BLDG C6) = 3 STOREYS
(BLDG C7) = 3 STOREYS
(BLDG C8) = 3 STOREYS
(BLDG C9) = 3 STOREYS
(BLDG C10) =3 STOREYS

NUMBER OF UNITS
BUILDING A (13 STOREY BLDG)
GROUND FLOOR
ONE BEDROOM =9 SUITES
TWO BEDROOMS =9 SUITES
THREE BEDROOMS =0 SUITES
TOTAL SUITES =18 SUITES

SECOND TO FIFTH FLOORS
ONE BEDROOM =7 SUITES X 5 =35 SUITES
TWO BEDROOMS =11 SUITES X 5 =55 SUITES
THREE BEDROOMS =2 SUITES X 5 =10 SUITES
TOTAL SUITES = 100

SIXTH TO THIRTEENTH FLOORS (TOWER)
ONE BEDROOM =6 SUITES X 7 =42 SUITES
TWO BEDROOMS =1 SUITES X 7 = 7 SUITES
TOTAL SUITES = 49

GRAND TOTAL SUITES= 18+100+49 = 167 SUITES

BUILDING B (8 STOREY BLDG)
GROUND FLOOR
ONE BEDROOM =9 SUITES
TWO BEDROOMS =9 SUITES
THREE BEDROOMS =0 SUITES
TOTAL SUITES = 18 SUITES

TYPICAL FLOOR
ONE BEDROOM =7 SUITES X 7 =49 SUITES
TWO BEDROOMS =11 SUITES X 7 =77 SUITES
THREE BEDROOMS =2 SUITES X 7 =14 SUITES
TOTAL SUITES = 140

TOTAL SUITES= 18+140 = 158 SUITES

TOWNHOUSES
BUILDING C1 = 8 UNITS
BUILDING C2 = 5 UNITS
BUILDING C3 = 4 UNITS
BUILDING C4 = 6 UNITS
BUILDING C5 = 4 UNITS
BUILDING C6 = 5 UNITS
BUILDING C7 = 5 UNITS
BUILDING C8 = 6 UNITS
BUILDING C9 = 8 UNITS
BUILDING C10 =6 UNITS
TOTAL = 57 UNITS

# APPENDIX B

Figure 1 – Sanitary Tributary Area Plan

Residential Sanitary Flow Calculations

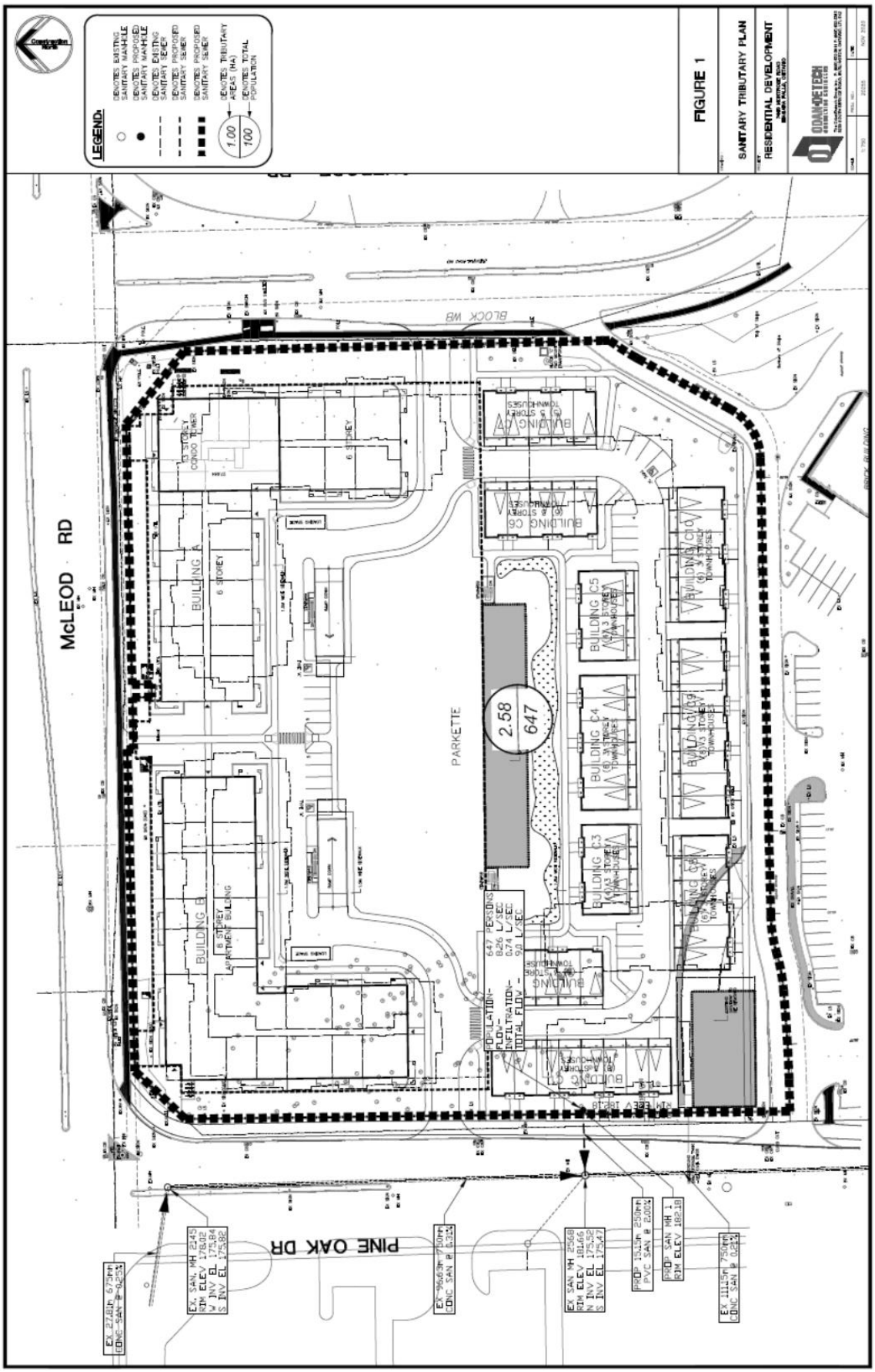


FIGURE 1
SANITARY TRIBUTARY PLAN
RESIDENTIAL DEVELOPMENT
LEGEND:
DENOTES EXISTING SANITARY MANHOLE
DENOTES PROPOSED SANITARY MANHOLE
DENOTES EXISTING SANITARY SEWER
DENOTES PROPOSED SANITARY SEWER
DENOTES PROPOSED SANITARY SEWER
DENOTES TRIBUTARY AREAS (HA)
DENOTES TOTAL POPULATION
1.00
100
McLEOD RD
PINE OAK DR
PARKETTE
BLOCK 98
BUILDING A
6 STOREY
BUILDING B
8 STOREY
APARTMENT BUILDING
BUILDING C1
BUILDING C2
BUILDING C3
BUILDING C4
BUILDING C5
BUILDING C6
BUILDING C7
BUILDING C8
2.58
647
POPULATION- 647 PERSONS
FLOW- INFILTRATION- 826 L/SEC
TOTAL FLOW 974 L/SEC
98 L/SEC
EX. SAN. MH 2145
RIM ELEV 178.02
W INV EL 175.84
S INV EL 175.82
EX SAN MH 2568
RIM ELEV 181.66
N INV EL 175.52
S INV EL 175.47
PROP SAN MH 1
RIM ELEV 182.18

## RESIDENTIAL SANITARY FLOW CALCULATIONS FOR CITY OF NIAGARA FALLS

This program calculates the sanitary discharge from various land use As per the Region of Niagara

PROJECT: 7449 Montrose Road, Niagara Falls, ON

| | |
|---|---|
| COMMERCIAL SITE AREA (ha) = | n/a |
| RESIDENTIAL SITE AREA (ha) = | n/a |
| TOTAL SITE AREA (ha) = | 2.580 |

| LAND USE | NUMBER OF UNITS | SITE AREA, (ha) | GROSS FLOOR AREA, m2 | TOTAL POPULATION | TOTAL DAILY FLOW (LITERS) | AVERAGE DAILY FLOW l/sec | PEAKING FACTOR, M | TOTAL FLOW FROM LAND USE, l/sec |
|---|---|---|---|---|---|---|---|---|
| RESIDENTIAL Density 1, using 86 person/site area | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| RESIDENTIAL Singles & Detached, using 2.91 persons/unit | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| RESIDENTIAL Townhomes, using 2.12 persons/unit | 57 | | | 121 | 33231 | 0.38 | 4.22 | 1.62 |
| RESIDENTIAL Apartments, using 1.62 person/unit | 325 | | | 527 | 144788 | 1.68 | 3.96 | 6.64 |
| | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| **TOTAL RESIDENTIAL** | | | | | | | | 8.26 |
| COMMERCIAL, Using 136 persons/ha | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| COMMERCIAL, Using 50 persons/ha | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| Commercial, Using 1.5 persons/unit | | | | 0 | 0 | 0.00 | 4.50 | 0.00 |
| **TOTAL COMMERCIAL** | | | | | | | | **0.00** |
| | 382 | | | 647 | | | | |

**TOTAL**

V1= 178019

| | |
|---|---|
| Q1= | 8.26 |
| Q2= | 0.00 |
| Qinfil | 0.74 |
| Qtot | 9.00 |

Q = (MqP/86400) + A * I (L/sec)

Q1= total flow from Residential Land Use (L/sec)
Q2= total flow from Commercial Land Use (L/sec)
Qinfil = total flow from infiltration (L/sec)
Qtot = total flow (Land use + infiltration)

V1= Total Volume from Land Use in liters

where : P is population
q = 275 L/person/day for proposed residential
q = 180000 L/floor ha/day for proposed commercial/offices
A = gross site area
i = 0.286 L/sec/ha (infiltration rate)
Peaking Factor M = 1 + [14 / (4 + (P/1000,1/2))]

# APPENDIX C

Figure 2 – Water Distribution Plan

FUS Calculations

Hydrant Flow Test

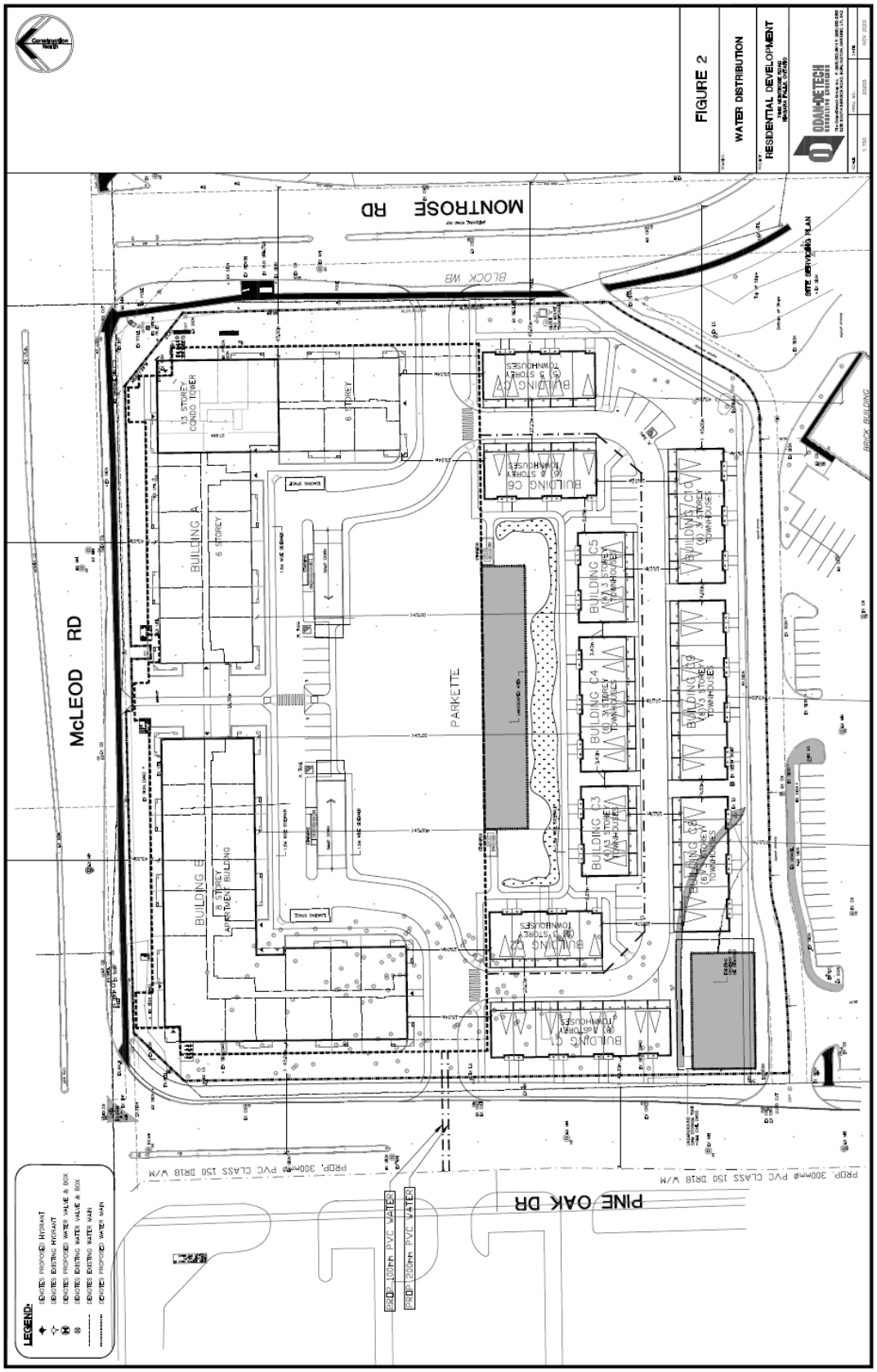


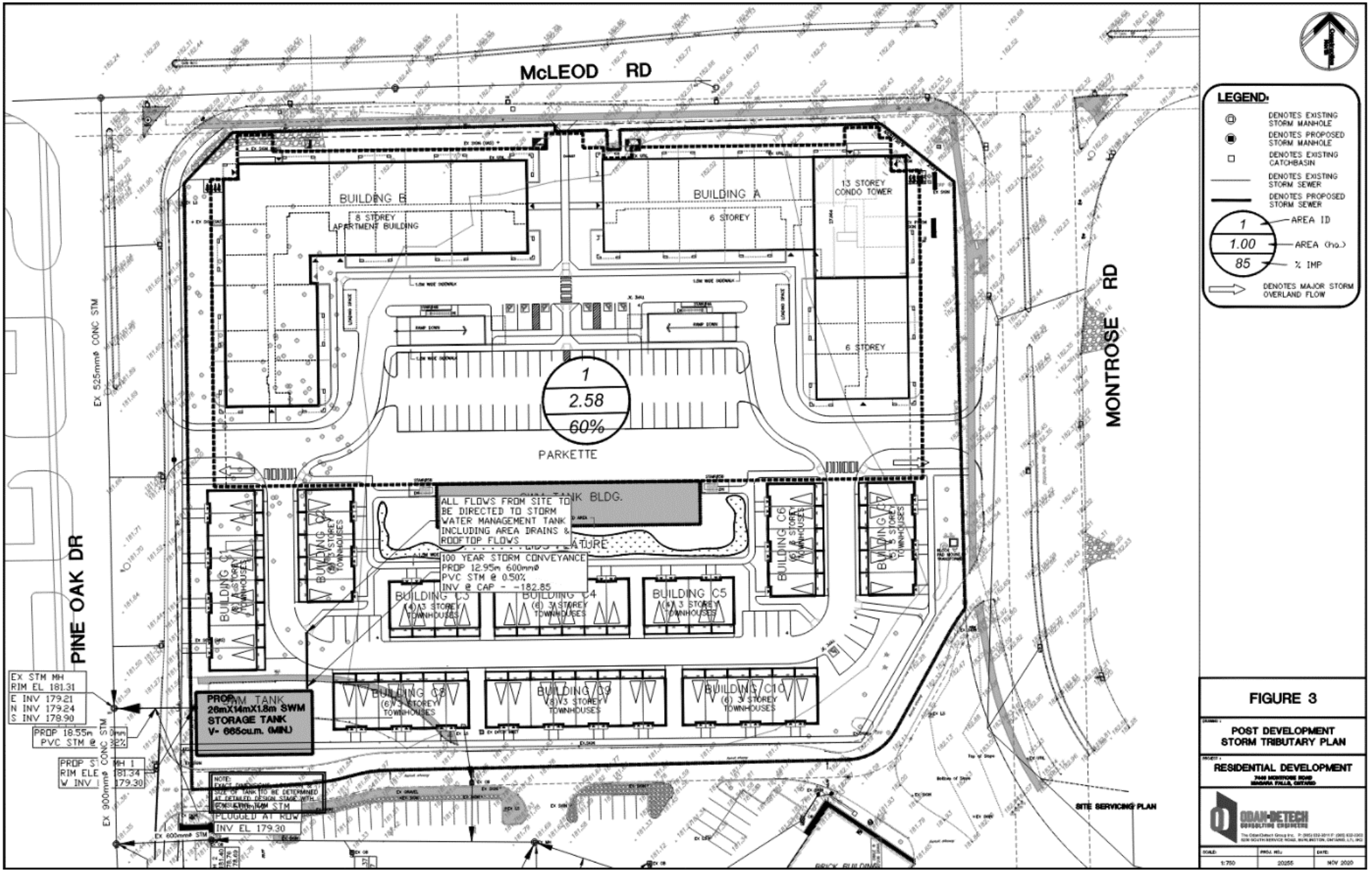
FIGURE 2
WATER DISTRIBUTION
RESIDENTIAL DEVELOPMENT
ODAN/DETECH
MONTROSE RD
McLEOD RD
PINE OAK DR
BLOCK MB
PARKETTE
BUILDING A
6 STOREY
BUILDING B
6 STOREY APARTMENT BUILDING
BUILDING C1
BUILDING C2
BUILDING C3
BUILDING C4
BUILDING C5
BUILDING C6
BUILDING C7
BUILDING C8
BUILDING C9
BUILDING C10
BUILDING C11
BUILDING C12
BUILDING C13
BRICK BUILDING
PROP. 100mm PVC WATER
PROP. 200mm PVC WATER
PROP. 300mmø PVC CLASS 150 DR18 W/M
LEGEND:
(EXISTING) PROPOSED HYDRANT
(EXISTING) EXISTING HYDRANT
(EXISTING) PROPOSED WATER VALVE & BOX
(EXISTING) EXISTING WATER VALVE & BOX
(EXISTING) EXISTING WATER MAIN
(EXISTING) PROPOSED WATER MAIN

# APPENDIX D

Figure 3 – Proposed Storm Tributary Plan

Visual Otthymo Pre Development 5 to 100 Year Design Storms

Visual Otthymo Post Development 5 to 100 Year Design Storms




**LEGEND:**

- DENOTES EXISTING STORM MANHOLE
- DENOTES PROPOSED STORM MANHOLE
- DENOTES EXISTING CATCHBASIN
- DENOTES EXISTING STORM SEWER
- DENOTES PROPOSED STORM SEWER
- 1 — AREA ID
- 1.00 — AREA (ha.)
- 85 — % IMP
- DENOTES MAJOR STORM OVERLAND FLOW

# FIGURE 3

**POST DEVELOPMENT STORM TRIBUTARY PLAN**

**RESIDENTIAL DEVELOPMENT**

7440 MONTROSE ROAD
NIAGARA FALLS, ONTARIO

ODAN-DETECH GROUP INC. CONSULTING ENGINEERS

| SCALE: | PROJ. NO.: | DATE: |
|---|---|---|
| 1:750 | 20255 | NOV 2020 |

```
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

--------------------
| CALIB            |
| NASHYD    (0002) |   Area     (ha)=   2.58   Curve
Number    (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of
Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0
MIN. TIME STEP.

                                  ---- TRANSFORMED
HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |
TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |
hrs   mm/hr |   hrs   mm/hr
                 .083    2.99 | 1.083   22.26 |
2.083    6.94 |  3.08    3.54
                 .167    2.99 | 1.167   22.26 |
2.167    6.94 |  3.17    3.54
                 .250    3.41 | 1.250   84.02 |
2.250    5.92 |  3.25    3.30
                 .333    3.41 | 1.333   84.02 |
2.333    5.92 |  3.33    3.30
                 .417    4.01 | 1.417   28.87 |
2.417    5.19 |  3.42    3.08
                 .500    4.01 | 1.500   28.87 |
2.500    5.19 |  3.50    3.08
                 .583    4.90 | 1.583   15.67 |
2.583    4.63 |  3.58    2.90
                 .667    4.90 | 1.667   15.67 |
2.667    4.63 |  3.67    2.90
                 .750    6.42 | 1.750   10.90 |
2.750    4.19 |  3.75    2.74
                 .833    6.42 | 1.833   10.90 |
2.833    4.19 |  3.83    2.74
                 .917    9.66 | 1.917    8.44 |
2.917    3.84 |  3.92    2.60
                1.000    9.66 | 2.000    8.44 |
3.000    3.84 |  4.00    2.60

     Unit Hyd Qpeak  (cms)=    .394

     PEAK FLOW       (cms)=    .097 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  15.195
     TOTAL RAINFALL   (mm)=  41.741
     RUNOFF COEFFICIENT   =    .364

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF
ANY.
```

```
------------------------------------------------
----------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

--------------------
| CALIB            |
| NASHYD    (0002) |   Area     (ha)=   2.58   Curve
Number    (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of
Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0
MIN. TIME STEP.

                                  ---- TRANSFORMED
HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |
TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |
hrs   mm/hr |   hrs   mm/hr
                 .083    6.43 |  .833   37.64 |
1.583   13.96 |  2.33    7.47
                 .167    6.43 |  .917  133.78 |
1.667   13.96 |  2.42    6.73
                 .250    7.93 | 1.000  133.78 |
1.750   11.39 |  2.50    6.73
                 .333    7.93 | 1.083   48.90 |
1.833   11.39 |  2.58    6.14
                 .417   10.51 | 1.167   48.90 |
1.917    9.65 |  2.67    6.14
                 .500   10.51 | 1.250   26.44 |
2.000    9.65 |  2.75    5.65
                 .583   16.06 | 1.333   26.44 |
2.083    8.41 |  2.83    5.65
                 .667   16.06 | 1.417   18.20 |
2.167    8.41 |  2.92    5.25
                 .750   37.64 | 1.500   18.20 |
2.250    7.47 |  3.00    5.25

     Unit Hyd Qpeak  (cms)=    .394

     PEAK FLOW       (cms)=    .225 (i)
     TIME TO PEAK    (hrs)=   1.250
     RUNOFF VOLUME    (mm)=  30.879
     TOTAL RAINFALL   (mm)=  63.422
     RUNOFF COEFFICIENT   =    .487

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF
ANY.

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----------------------------
```

```
=====================================================
=============================================          V   V   I   SSSSS  U   U   A   L
```

```
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO

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                    *****  D E T A I L E D   O U T P U T
*****


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(WIP) - REV 1\PROP & EX.out
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Reports\Computer Analysis\20255-Bayfield-Niagara-Montrose
(WIP) - REV 1\PROP & EX.sum


DATE: 7/14/2022                            TIME: 9:34:24 AM

USER:


COMMENTS:
_____________________________________________________________
_


------------------------------------------------------------
-------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 719.500
| Ptotal= 41.74 mm |                          B=   6.340
--------------------                          C=    .769
                        used in:   INTENSITY =  A / (t +
B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =   .33

                 TIME    RAIN |  TIME    RAIN |  TIME
RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs
mm/hr |   hrs   mm/hr
                  .17    2.99 |  1.17   22.26 |  2.17
6.94 |  3.17    3.54
                  .33    3.41 |  1.33   84.02 |  2.33
5.92 |  3.33    3.30
                  .50    4.01 |  1.50   28.87 |  2.50
5.19 |  3.50    3.08
                  .67    4.90 |  1.67   15.67 |  2.67
4.63 |  3.67    2.90
                  .83    6.42 |  1.83   10.90 |  2.83
4.19 |  3.83    2.74
                 1.00    9.66 |  2.00    8.44 |  3.00
3.84 |  4.00    2.60


------------------------------------------------------------
--------------------
--------------------
| CALIB            |
| NASHYD    (0002) |   Area     (ha)=   2.58   Curve Number
(CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear
Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME
STEP.


                                ---- TRANSFORMED HYETOGRAPH
----
                 TIME    RAIN |  TIME    RAIN |  TIME
RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs
mm/hr |   hrs   mm/hr
                  .083   2.99 | 1.083   22.26 | 2.083
6.94 |  3.08    3.54
                  .167   2.99 | 1.167   22.26 | 2.167
6.94 |  3.17    3.54
                  .250   3.41 | 1.250   84.02 | 2.250
5.92 |  3.25    3.30
                  .333   3.41 | 1.333   84.02 | 2.333
5.92 |  3.33    3.30
                  .417   4.01 | 1.417   28.87 | 2.417
5.19 |  3.42    3.08
                  .500   4.01 | 1.500   28.87 | 2.500
5.19 |  3.50    3.08
                  .583   4.90 | 1.583   15.67 | 2.583
4.63 |  3.58    2.90
                  .667   4.90 | 1.667   15.67 | 2.667
4.63 |  3.67    2.90
                  .750   6.42 | 1.750   10.90 | 2.750
4.19 |  3.75    2.74
                  .833   6.42 | 1.833   10.90 | 2.833
4.19 |  3.83    2.74
                  .917   9.66 | 1.917    8.44 | 2.917
3.84 |  3.92    2.60
                 1.000   9.66 | 2.000    8.44 | 3.000
3.84 |  4.00    2.60

     Unit Hyd Qpeak  (cms)=    .394

     PEAK FLOW       (cms)=    .097 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  15.195
     TOTAL RAINFALL   (mm)=  41.741
     RUNOFF COEFFICIENT   =    .364

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------
--------------------
--------------------
| CALIB            |
| STANDHYD  (0001) |   Area     (ha)=   2.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  60.00   Dir.
Conn.(%)=  60.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.55         1.03
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     131.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      84.02        43.88
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.22 (ii)   13.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .27          .08

*TOTALS*
     PEAK FLOW       (cms)=        .35          .06
.377 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50
1.33
     RUNOFF VOLUME    (mm)=      40.74         8.05
27.67
     TOTAL RAINFALL   (mm)=      41.74        41.74
41.74
     RUNOFF COEFFICIENT   =        .98          .19
.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 50.00          K  (1/hr)=  2.00
            Fc   (mm/hr)=  7.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------
--------------------
--------------------
| RESERVOIR (0003) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)
(ha.m.)
                           .0000      .0000    |    .1127
.0450
                           .0564      .0113    |    .1260
.0563
                           .0797      .0225    |    .1380
.0675
                           .0976      .0338    |    .1512
.0810
```

```
                                AREA      QPEAK
TPEAK       R.V.
                                 (ha)      (cms)
(hrs)       (mm)
     INFLOW : ID= 2 (0001)      2.580       .377
1.33       27.67
     OUTFLOW: ID= 1 (0003)      2.580       .095
1.67       27.65

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=
25.26
                   TIME SHIFT OF PEAK FLOW         (min)=
20.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=
.0324

------------------------------------------------------------
--------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1264.570
| Ptotal= 63.42 mm |                          B=   7.720
--------------------                          C=    .781
                       used in:   INTENSITY =  A / (t +
B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =   .33

                 TIME    RAIN |  TIME    RAIN |  TIME
RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs
mm/hr |   hrs   mm/hr
                  .17    6.43 |  1.00  133.78 |  1.83
11.39 |  2.67    6.14
                  .33    7.93 |  1.17   48.90 |  2.00
9.65 |  2.83    5.65
                  .50   10.51 |  1.33   26.44 |  2.17
8.41 |  3.00    5.25
                  .67   16.06 |  1.50   18.20 |  2.33
7.47 |
                  .83   37.64 |  1.67   13.96 |  2.50
6.73 |


------------------------------------------------------------
--------------------
--------------------
| CALIB            |
| NASHYD    (0002) |   Area     (ha)=   2.58   Curve Number
(CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear
Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME
STEP.


                                ---- TRANSFORMED HYETOGRAPH
----
                 TIME    RAIN |  TIME    RAIN |  TIME
RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs
mm/hr |   hrs   mm/hr
                 .083    6.43 |  .833   37.64 | 1.583
13.96 |  2.33    7.47
                 .167    6.43 |  .917  133.78 | 1.667
13.96 |  2.42    6.73
                 .250    7.93 | 1.000  133.78 | 1.750
11.39 |  2.50    6.73
                 .333    7.93 | 1.083   48.90 | 1.833
11.39 |  2.58    6.14
                 .417   10.51 | 1.167   48.90 | 1.917
9.65 |  2.67    6.14
                 .500   10.51 | 1.250   26.44 | 2.000
9.65 |  2.75    5.65
                 .583   16.06 | 1.333   26.44 | 2.083
8.41 |  2.83    5.65
                 .667   16.06 | 1.417   18.20 | 2.167
8.41 |  2.92    5.25
                 .750   37.64 | 1.500   18.20 | 2.250
7.47 |  3.00    5.25

     Unit Hyd Qpeak  (cms)=    .394

     PEAK FLOW       (cms)=    .225 (i)
     TIME TO PEAK    (hrs)=   1.250
     RUNOFF VOLUME    (mm)=  30.879
     TOTAL RAINFALL   (mm)=  63.422
     RUNOFF COEFFICIENT   =    .487

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------
--------------------
--------------------
| CALIB            |
| STANDHYD  (0001) |   Area     (ha)=   2.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  60.00   Dir.
Conn.(%)=  60.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.55         1.03
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     131.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=     133.78       101.91
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.68 (ii)    9.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .29          .11

*TOTALS*
     PEAK FLOW       (cms)=        .57          .17
.709 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08
1.00
     RUNOFF VOLUME    (mm)=      62.42        24.05
47.07
     TOTAL RAINFALL   (mm)=      63.42        63.42
63.42
     RUNOFF COEFFICIENT   =        .98          .38
.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo    (mm/hr)= 50.00           K  (1/hr)=  2.00
            Fc    (mm/hr)=  7.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------
--------------------
--------------------
| RESERVOIR (0003) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)
(ha.m.)
                          .0000      .0000   |    .1127
.0450
                          .0564      .0113   |    .1260
.0563
                          .0797      .0225   |    .1380
.0675
                          .0976      .0338   |    .1512
.0810

                                AREA      QPEAK
TPEAK       R.V.
                                 (ha)      (cms)
(hrs)       (mm)
     INFLOW : ID= 2 (0001)      2.580       .709
1.00       47.07
     OUTFLOW: ID= 1 (0003)      2.580       .137
1.42       47.06

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=
19.26
                   TIME SHIFT OF PEAK FLOW         (min)=
25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=
.0662

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 FINISH
============================================================
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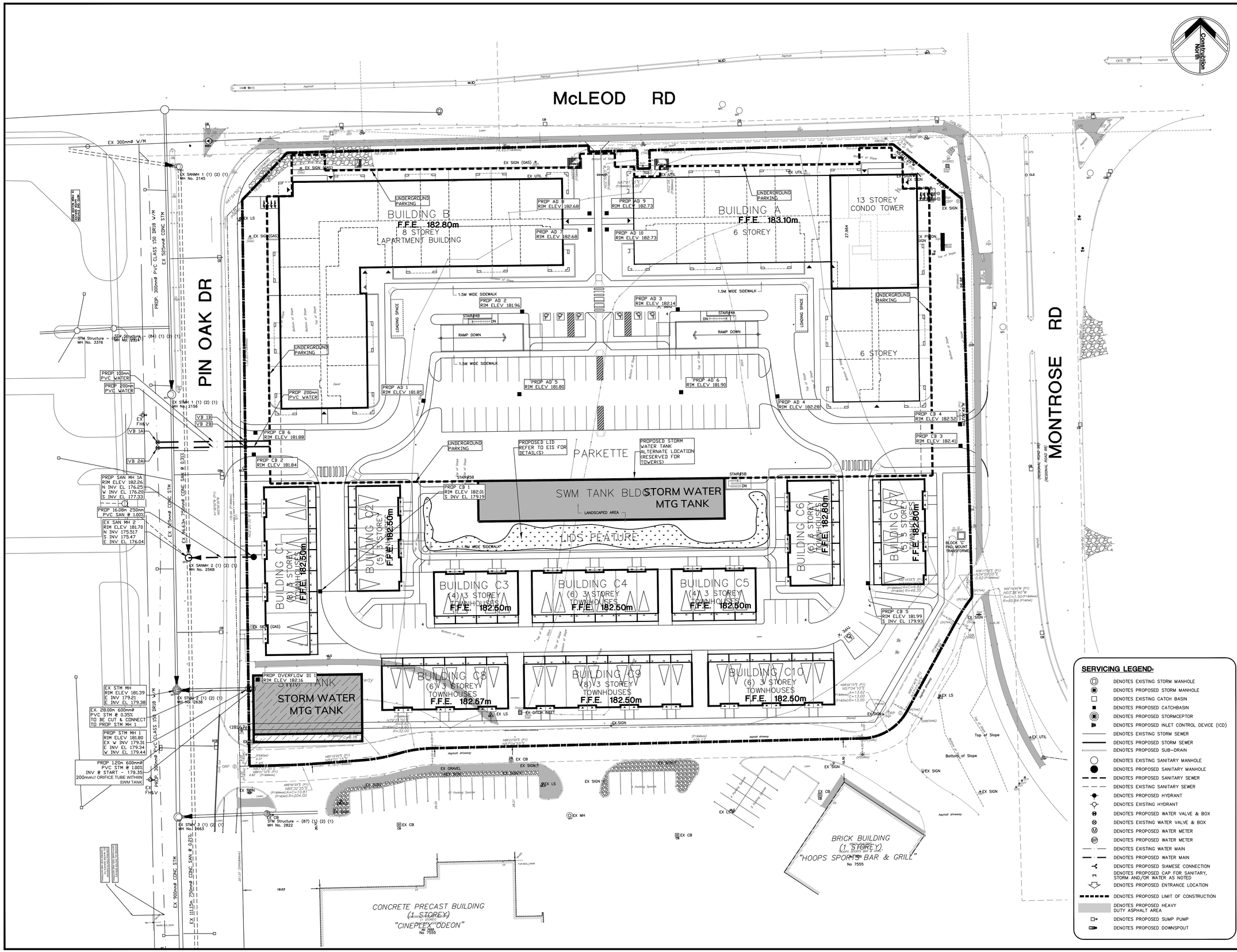
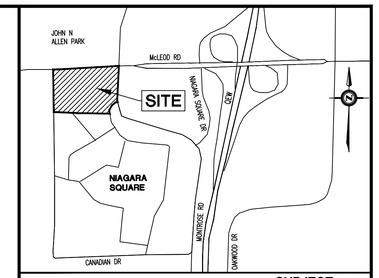
# APPENDIX E

Concept Site Servicing Plan
Concept Site Grading Plan




**KEY PLAN** Scale : N.T.S. — **SUBJECT LANDS**

**CONTRACTOR TO PROVIDE AS-BUILT DRAWINGS UPON COMPLETION OF ALL WORKS TO THE ODAN/DETECH GROUP**

**CONTRACTOR TO VERIFY ALL INVERTS, SIZE, MATERIAL, AND LOCATION OF ALL SERVICES PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE ODAN/DETECH GROUP**

## NOTES:

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND UNDERGROUND AND ABOVE GROUND UTILITIES 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 THE WORK THE CONTRACTOR SHALL CONFIRM OF THE EXACT LOCATION OF ALL UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCY TO THE ARCHITECTS/ENGINEERS BEFORE PROCEEDING WITH THE WORKS.

ALL DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF SERVICE AND THE PROPERTY OF THE ENGINEER WHICH MUST BE RETURNED AT THE COMPLETION OF WORK.

THIS DRAWING IS NOT TO BE SCALED. CONTRACTOR TO USE DIGITAL FILES FOR LAYOUT PROVIDED BY ENGINEER. THIS PLAN MUST NOT BE USED TO SITE THE PROPOSED BUILDINGS.

THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNER'S CONTRACTOR FROM OBTAINING, BUT NOT LIMITED TO THE FOLLOWING PERMITS: ROAD CUT, SEWER PERMITS, RELOCATION OF SERVICES, ENCROACHMENT AGREEMENTS, APPROACH APPROVAL PERMITS, ETC..

EXISTING TOPOGRAPHICAL INFORMATION SUPPLIED BY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED .

## BENCH MARK:

ELEVATIONS ARE BASED ON THE CANADIAN GEODETIC DATUM AND WERE DERIVED FROM NIAGARA FALLS BENCH MARK 90036061, HAVING A PUBLISHED ELEVATION OF 181.508 metres.

## BEARING NOTE:

BEARINGS SHOWN HEREON ARE UTM GRID, ARE DERIVED FROM THE SMARTNET NETWORK AND ARE REFERRED TO UTM ZONE 17 CENTRAL MERIDIAN 81°00' WEST LONGITUDE, NAD 83 (CSRS) (2010).

## METRIC NOTE:

DISTANCES AND ELEVATIONS ON THIS PLAN ARE TYPICALLY SHOWN IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

| NO. | REVISIONS | DATE | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| 3 | ISSUED FOR OPA/ZBA 2nd SUBMISSION | JUL 15/22 | MHH |
| 2 | ISSUED FOR REVIEW & COORDINATION | JUL 14/22 | SAA |
| 1 | ISSUED FOR REVIEW & COORDINATION | MAY 24/22 | Z.Z. |

SCALE(S):

0 5 10 20 30 40

1:400

## SERVICING LEGEND:

- DENOTES EXISTING STORM MANHOLE
- DENOTES PROPOSED STORM MANHOLE
- DENOTES EXISTING CATCH BASIN
- DENOTES PROPOSED CATCHBASIN
- DENOTES PROPOSED STORMCEPTOR
- DENOTES PROPOSED INLET CONTROL DEVICE (ICD)
- DENOTES EXISTING STORM SEWER
- DENOTES PROPOSED STORM SEWER
- DENOTES PROPOSED SUB-DRAIN
- DENOTES EXISTING SANITARY MANHOLE
- DENOTES PROPOSED SANITARY MANHOLE
- DENOTES PROPOSED SANITARY SEWER
- DENOTES EXISTING SANITARY SEWER
- DENOTES PROPOSED HYDRANT
- DENOTES EXISTING HYDRANT
- DENOTES PROPOSED WATER VALVE & BOX
- DENOTES EXISTING WATER VALVE & BOX
- DENOTES PROPOSED WATER METER
- DENOTES PROPOSED WATER METER
- DENOTES EXISTING WATER MAIN
- DENOTES PROPOSED WATER MAIN
- DENOTES PROPOSED SIAMESE CONNECTION
- DENOTES PROPOSED CAP FOR SANITARY, STORM AND/OR WATER AS NOTED
- DENOTES PROPOSED ENTRANCE LOCATION
- DENOTES PROPOSED LIMIT OF CONSTRUCTION
- DENOTES PROPOSED HEAVY DUTY ASPHALT AREA
- DENOTES PROPOSED SUMP PUMP
- DENOTES PROPOSED DOWNSPOUT

DRAWING TITLE:

# CONCEPTUAL SITE SERVICING PLAN

PROJECT:

# RESIDENTIAL DEVELOPMENT

**7449 MONTROSE ROAD**
**NIAGARA FALLS, ONTARIO**

CLIENT:

## BAYFIELD

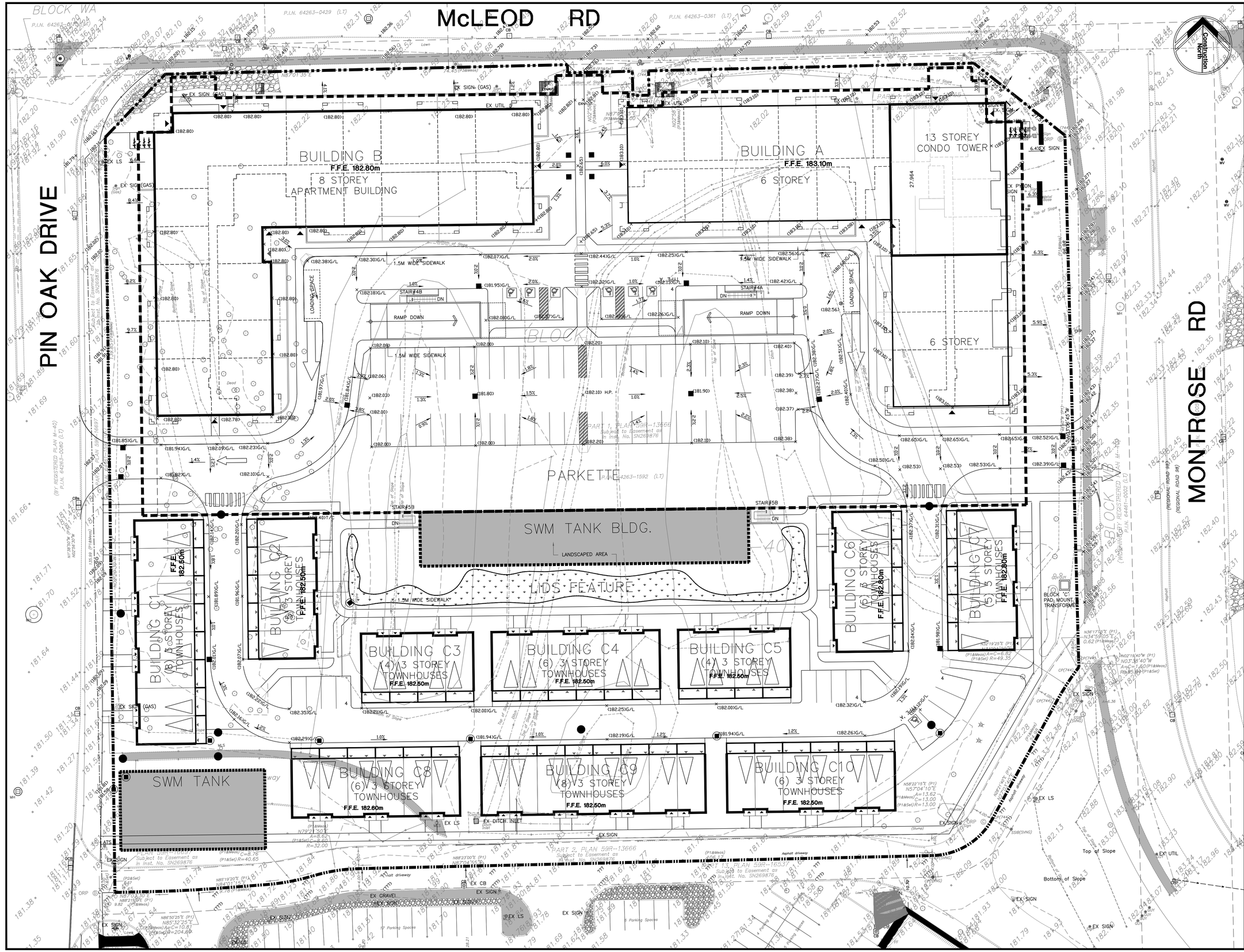
PROJECT AND CONSTRUCTION MANAGEMENT INC.
2300 YONGE STREET, SUITE 904, TORONTO ONTARIO M4P 1E4

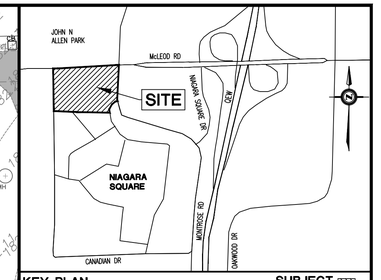
ODAN·DETECH CONSULTING ENGINEERS
The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

REGISTERED PROFESSIONAL ENGINEER — JUL 15 2022 — I. KRPAN — PROVINCE OF ONTARIO

ENGINEER

| | |
|---|---|
| DESIGNED BY: M.H.H. | PROJECT No: 20255 |
| DRAWN BY: Z.Z. | DATE: NOV 2020 |
| CHECKED BY: M.H.H. | DRAWING No.: 1 OF 2 |
| APPROVED BY: J.K. | |




**KEY PLAN** — Scale : N.T.S. — **SUBJECT LANDS**

**CONTRACTOR TO PROVIDE AS-BUILT DRAWINGS UPON COMPLETION OF ALL WORKS TO THE ODAN/DETECH GROUP**

**CONTRACTOR TO VERIFY ALL INVERTS, SIZE, MATERIAL, AND LOCATION OF ALL SERVICES PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE ODAN/DETECH GROUP**

## NOTES:

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND UNDERGROUND AND ABOVE GROUND UTILITIES 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 THE WORK THE CONTRACTOR SHALL CONFIRM OF THE EXACT LOCATION OF ALL UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCY TO THE ARCHITECTS/ENGINEERS BEFORE PROCEEDING WITH THE WORKS.

ALL DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF SERVICE AND THE PROPERTY OF THE ENGINEER WHICH MUST BE RETURNED AT THE COMPLETION OF WORK.

THIS DRAWING IS NOT TO BE SCALED. CONTRACTOR TO USE DIGITAL FILES FOR LAYOUT PROVIDED BY ENGINEER. THIS PLAN MUST NOT BE USED TO SITE THE PROPOSED BUILDINGS.

THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNER'S CONTRACTOR FROM OBTAINING, BUT NOT LIMITED TO THE FOLLOWING PERMITS: ROAD CUT, SEWER PERMITS, RELOCATION OF SERVICES, ENCROACHMENT AGREEMENTS, APPROACH APPROVAL PERMITS, ETC..

EXISTING TOPOGRAPHICAL INFORMATION SUPPLIED BY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED .

## BENCH MARK:

ELEVATIONS ARE BASED ON THE CANADIAN GEODETIC DATUM AND WERE DERIVED FROM NIAGARA FALLS BENCH MARK 90036061, HAVING A PUBLISHED ELEVATION OF 181.508 metres.

## BEARING NOTE:

BEARINGS SHOWN HEREON ARE UTM GRID, ARE DERIVED FROM THE SMARTNET NETWORK AND ARE REFERRED TO UTM ZONE 17 CENTRAL MERIDIAN 81°00' WEST LONGITUDE, NAD 83 (CSRS) (2010).

## METRIC NOTE:

DISTANCES AND ELEVATIONS ON THIS PLAN ARE TYPICALLY SHOWN IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

| NO. | REVISIONS | DATE | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| 3 | ISSUED FOR OPA/ZBA 2nd SUBMISSION | JUL 15/22 | MHH |
| 2 | ISSUED FOR REVIEW & COORDINATION | JUL 14/22 | SAA |
| 1 | ISSUED FOR REVIEW & COORDINATION | MAY 24/22 | Z.Z. |

SCALE(S):

1:400 — 0 5 10 20 30 40

DRAWING TITLE:

**CONCEPTUAL SITE GRADING PLAN**

PROJECT:

**RESIDENTIAL DEVELOPMENT**

**7449 MONTROSE ROAD**
**NIAGARA FALLS, ONTARIO**

CLIENT:

**BAYFIELD**

PROJECT AND CONSTRUCTION MANAGEMENT INC.
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REGISTERED PROFESSIONAL ENGINEER — JUL 15 2022 — I. KRPAN — PROVINCE OF ONTARIO

ENGINEER

| | |
|---|---|
| DESIGNED BY: M.H.H. | PROJECT No: 20255 |
| DRAWN BY: Z.Z. | DATE: NOV 2020 |
| CHECKED BY: M.H.H. | DRAWING No.: 2 OF 2 |
| APPROVED BY: J.K. | |