GRANDVIEW RESORT REDEVELOPMENT
TOWN OF HUNTSVILLE
FUNCTIONAL SERVICING REPORT
DECEMBER 2024

Prepared by:

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22-11700 – Rev. 2

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APPENDICES

1.0 INTRODUCTION

1.1 General

Halmont Properties Corporation is the owner of the Grandview Resort property located in the Town of Huntsville along the north shore of Fairy Lake and south of Provincial Highway #60. The site currently contains a number of resort and residential uses and a 9 hole golf course. The owner is proposing to redevelop the golf course portion of the site to expand the residential uses on the property.

The subject site has been undergoing redevelopment over the last several years, with older resort buildings being replaced by residential waterfront condominium buildings. The total site area is approximately 19 ha, with the golf course lands or "Backlands" being approximately 13.8 ha and the "Shorelands" that contain existing development being approximately 5.2 ha.

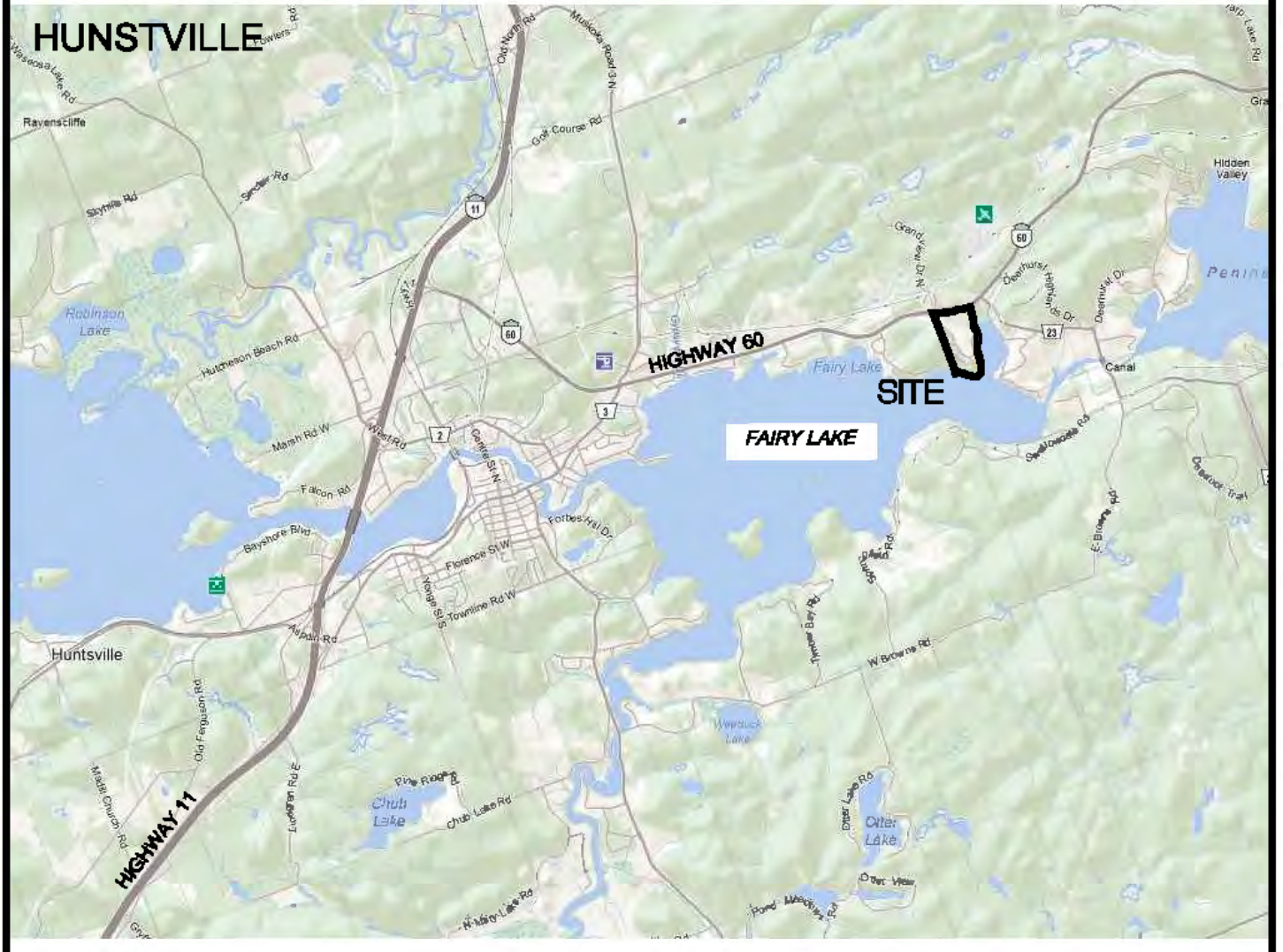
The site is bounded by Highway 60 to the north, District Road #23 to the east, Fairy Lake to the south and Grandview Drive to the west. The location of the subject site is illustrated on Figure 1 and the existing development layout is illustrated on Figure 2.

A conceptual master plan for the property has been developed which contemplates the development of 108 new townhouse style units on the "Backlands" in addition to existing and proposed development along the Fairy Lake shoreline, within the "Shorelands"

A copy of the current master concept plan prepared by The Planning Partnership is included as Figure 3 and illustrates both the new development proposed on the "Backlands" and the existing development on the property.

1.2 Purpose and Scope

Pinestone Engineering Ltd. (PEL) has been retained by owner to provide professional engineering services related to the preparation of a Functional Servicing Report (FSR). This report has been prepared in conjunction with a Rezoning Application for the subject lands. The purpose of this report is to describe the existing servicing infrastructure in the vicinity of the site, and provide recommendations for the provision of sanitary drainage, water distribution and stormwater management in accordance with Town and District of Muskoka criteria. This report has been updated from an earlier version to reflect the new concept plan.



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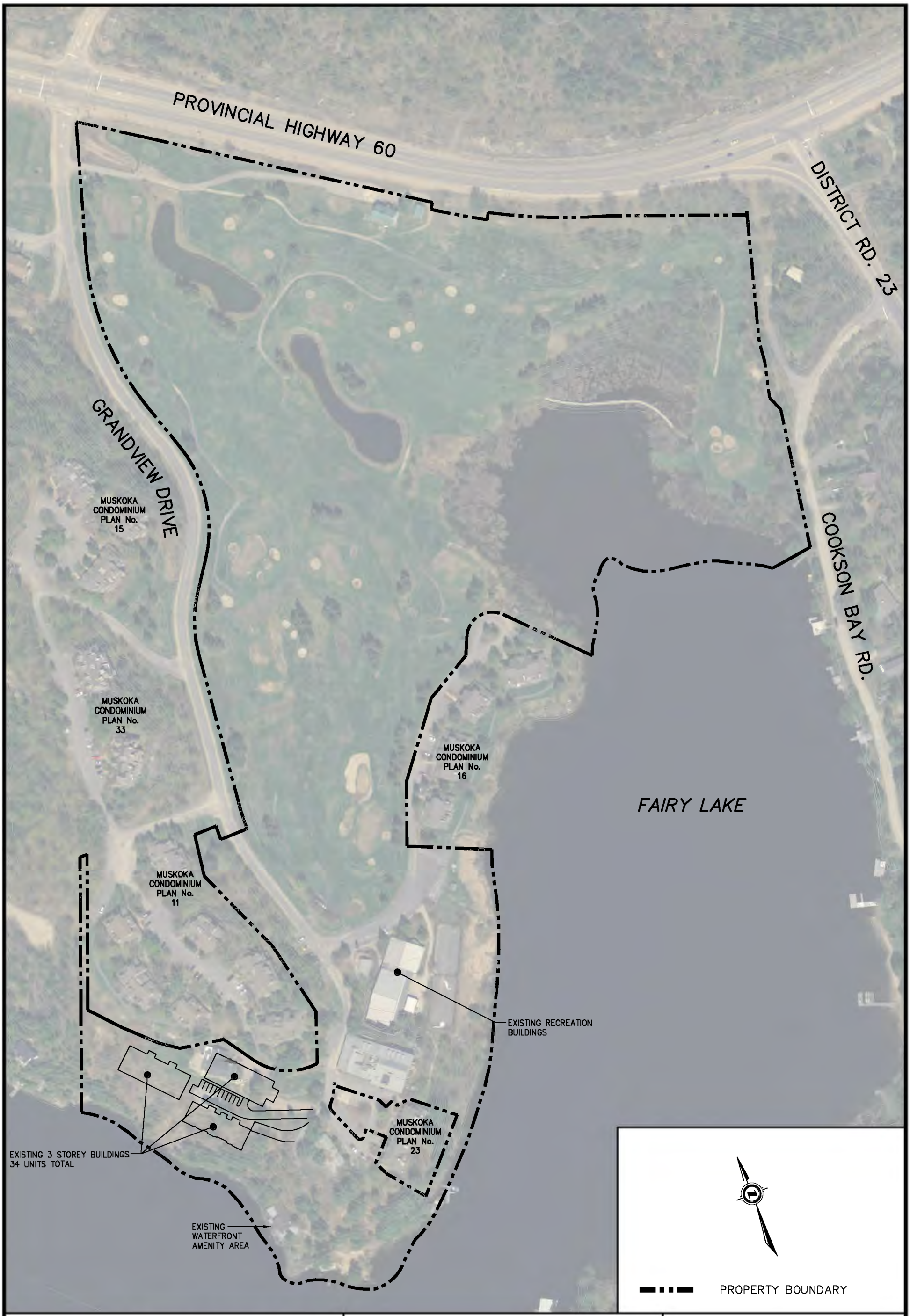
GRANDVIEW REDVELOPMENT

LOCATION PLAN

DATE:	SCALE:	PROJECT No.	FIGURE No.
DEC. 2024	N.T.S.	22-11700-M	FIGURE 1



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GRANDVIEW REDEVELOPMENT

EXISTING DEVELOPMENT

PROJECT NO. 21-11630-M

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DATE: DEC. 2024

FIGURE 2

PROVINCIAL HIGHWAY 60

DISTRICT RD. 23

GRANDVIEW DRIVE

COOKSON BAY RD.

FAIRY LAKE

BUFFER LIMIT

LIMIT OF WETLAND ESTIMATED BY RIVERSTONE ENVIRONMENTAL

PEDESTRIAN TRAIL

CURRENT LIMIT OF NATURAL RESOURCE/EP ZONING

MUSKOKA CONDOMINIUM PLAN No. 15

EX. RIGHT-OF-WAYS IN FAVOUR OF BENEFITING LANDS

MUSKOKA CONDOMINIUM PLAN No. 33

MUSKOKA CONDOMINIUM PLAN No. 16

EXISTING SPS #27 TO BE DECOMMISSIONED

27

MUSKOKA CONDOMINIUM PLAN No. 11

14

PROPOSED COMMUNITY WATERFONT

EXISTING RECREATION BUILDINGS

PROPOSED PHASE 3 BUILDING 30 UNITS

31

MUSKOKA CONDOMINIUM PLAN No. 23

EXISTING 3 STOREY BUILDINGS 34 UNITS TOTAL

EXISTING SPS

EXISTING WATERFRONT AMENITY AREA

PROPOSED PHASE 2 BUILDING 15 UNITS

WATERFRONT BEACH/AMENITY AREA

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GRANDVIEW REDEVELOPMENT

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PROPOSE DEVELOPMENT

FIGURE 3

2.0 SANITARY SERVICING

2.1 Existing Sanitary Servicing

A network of gravity sewers exists throughout the property and servicing the existing condominium developments south and west of the golf course area. Sewage from the property and the existing residential properties on Golden Pheasant Drive is ultimately conveyed to District of Muskoka owned pump station #27 (Grandview SPS) located adjacent to Muskoka Condominium #16 (Bayside) development along Fairy Lake. Sewage from the pump station is conveyed via a 150mm diameter PVC forcemain to Highway 60 where sewage discharges into an existing 250mm diameter forcemain. Sewage entering the forcemain flows westerly along Highway 60 and discharges to the Golden Pheasant Sewage Treatment Plant approximately 1900m to the west.

The existing forcemain on Highway 60 conveys sewage from the Deerhurst development and surrounding properties that discharge sewage into District of Muskoka owned pump station #15 located on Highway 60 approximately 400m northeast of Deerhurst-Highlands Drove. The total length of forcemain from PS #15 to the sewage treatment plant is estimated to be approximately 2700m

Two private sewage stations also exist on the property. Station 22-A and 22-B currently service the Rosewood Inn, the Dockside restaurant, and the Treetops building. Sewage from these stations is pumped to the gravity system that discharges to PS #27.

The existing infrastructure in the vicinity of the subject site is illustrated on Figure 4. The location of existing infrastructure was based off available as-constructed drawings provided by the District of Muskoka.

2.2 Existing District Pump Stations

Based on correspondence received from the District of Muskoka, it is understood that the Grandview PS #27 is equipped with constant speed Myers 4VC-250MM-53 solid handling pumps with a firm pumping capacity of 15.71 L/s at a total dynamic head (TDH) of 41.25m. The pumping station is also equipped with a permanent standby diesel generator.

Review of the Highlands PS #15 data sheet provided by the District indicates that PC #15 is equipped with variable speed Flygt 3201.18 raw sewage pumps with a firm capacity of 66 L/sec at a TDH of 32m. The District has confirmed this pump station is pumping approximately 650m3/day in the summer using an on/off pumping cycle pumping at a rate above 40 L/sec. The pumping station is also equipped with a permanent standby diesel generator.

PROVINCIAL HIGHWAY 60

PHEASANT STP

TO DISTRICT OF MUSKOKA HIGHLANDS PUMP STATION #15 CAPACITY = 66 L/SEC. TDH = 32m

EXISTING 250mmø FORCEMAIN

EXISTING 400mmø WATERMAIN

EXISTING 200mmø WATERMAIN

DISTRICT RD. 23

EXISTING 150mmø WATERMAIN

EXISTING 150mmø FORCEMAIN (TO BE DECOMMISSIONED)

GRANDVIEW DRIVE

COOKSON BAY RD.

MUSKOKA CONDOMINIUM PLAN No. 15

MUSKOKA CONDOMINIUM PLAN No. 33

MUSKOKA CONDOMINIUM PLAN No. 16

MUSKOKA CONDOMINIUM PLAN No. 11

MUSKOKA CONDOMINIUM PLAN No. 23

FAIRY LAKE

EXISTING 100mmø LOW PRESSURE SEWER FROM GOLDEN PHEASANT ROAD

EXISTING 200mmø WATERMAIN FROM GOLDEN PHEASANT ROAD

EXISTING SPS #27 TO BE DECOMMISSIONED

EXISTING PUMP STATION #27 OWNED BY DISTRICT OF MUSKOKA
CAPACITY = 15.9 L/SEC.
TDH = 41.25m
(TO BE DECOMMISSIONED)

EXISTING RECREATION BUILDINGS

EXISTING 3 STOREY BUILDINGS
34 UNITS TOTAL

EXISTING SPS

EXISTING WATERFRONT AMENITY AREA

EXISTING GRAVITY SEWER SERVICE

EXISTING FORCEMAIN

EXISTING SANITARY MANHOLE

EXISTING SEWAGE PUMP STATION

EXISTING WATERMAIN

EXISTING FIRE HYDRANT

PROPERTY BOUNDARY

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GRANDVIEW REDEVELOPMENT

EXISTING WATER SERVICING INFRASTRUCTURE

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FIGURE 4

2.3 Existing Sanitary Flows

The District of Muskoka has provided monthly average daily flow readings for PS #27 from 2018. Based on the information provided the average daily flow across all months was 47.0 cubic meters per day or 0.50 l/s, with the highest average reading in September of 83.14 cubic meters per day or 0.96 l/s. Applying a standard peaking factor of 4.0 to the average day flows, it appears that the station in 2018 was operating at 12.5%-25% of its nominal capacity during peak flow periods (2 l/s – 4 l/s). These flow numbers, however, do no include flows from the redevelopment at the south end of the site that has occurred since 2018.

Theoretical sewage flows from the existing and proposed units and the residential development on Golden Pheasant Dr., were calculated to determine the current peak flows entering PS #27.

Contributing sanitary flows from the existing development were calculated using the following criteria:

- A residential average sewage flow of 375 litres/capita/day
- A residential population of 221 on Golden Pheasant Dr. (66 units)
- 3.5 persons/unit
- An extraneous flow rate of 1.0 l/s/ha
- A peaking factor based on Harmon's equation
- Commercial demands based on the Ontario Building Code

The existing development on site includes:

Muskoka Condo #11 (Hilltop)	54 units
Muskoka Condo #15	33 units
Muskoka Condo #16 (Bayside)	20 units
Muskoka Condo #23 (Signature)	22 units
Muskoka Condo #33 (Forest Glen)	24 units
Muskoka Condo #91 (Grandview)	36 units
Recreation Centre	

In addition, the following future development outside the golf course lands is pending:

Grandview Phases 2 and 3	59 units
Golden Pheasant Infill	10 units

Incorporating extraneous flows, the peak sewage flow generated by existing development is calculated to be approximately 11.1 l/s. PS #27 has a rated capacity of 15.7 l/s. When the future development on the "Shorelands" and Golden Pheasant infill is added the peak flow increases to just over 14.0 l/s.

Detailed population and sanitary flow calculations are included in Appendix A.

2.4 Proposed Sanitary Flows

Contributing sanitary flows from the 108 proposed townhouse units on the "Backlands" were calculated using the following design criteria:

- A residential average sewage flow of 375 litres/capita/day
- A residential population density of 3.5 persons/unit for townhouse units
- A extraneous flow rate of 0.1 litres/sec/ha
- A peaking factor based on Harmon's equation

Incorporating extraneous flows, the combined peak sewage flows generated by the existing and proposed developments across the entire site and Golden Pheasant Dr. is approximately 24.3 l/sec. This exceeds the capacity of PS #27 by 60%. The calculated population of the Backlands development is 378 persons.

Detailed population and sanitary flow calculations are included in Appendix A.

2.5 Proposed Servicing Strategy

As the existing PS #27 is not suitable to service the full scale of existing and proposed development on the Grandview and Golden Pheasant sites, a new municipal Sewage Pump Station and forcemain will be constructed to replace PS #27 and service the entire catchment area. Existing PS #27 will be converted to a sanitary manhole with gravity connection to the new pumping station.

The new station will be municipally owned and operated and located near the north-west corner of the site, accessible from Grandview Dr. The new station will discharge via a new forcemain to the existing forcemain on Highway 60. The existing forcemain from PS #27 will be decommissioned.

The new SPS will be designed to meet current District of Muskoka standards for these works including but not limited to:

- A land allocation for a service yard
- A heated building containing controls and above grade (or open chase) access to valve arrays, meters etc.
- SCADA systems meeting current DMM standards
- A wet well sized for emergency storage as deemed required
- Alternating pumps sized to convey peak flows, with exterior lift system
- Stand by power and fuel or connections for mobile generators
- Wash station and exterior water source

The proposed golf course redevelopment will be structured as a plan of subdivision with a number of development blocks. The internal servicing may either be private or publicly owned and operated depending on the tenure of the units. This will be determined at the draft plan approval stage. Existing sanitary sewers across the site will remain in public or private ownership as the case may be. A new gravity sewer fromPS #27 to the new station will be municipally owned.

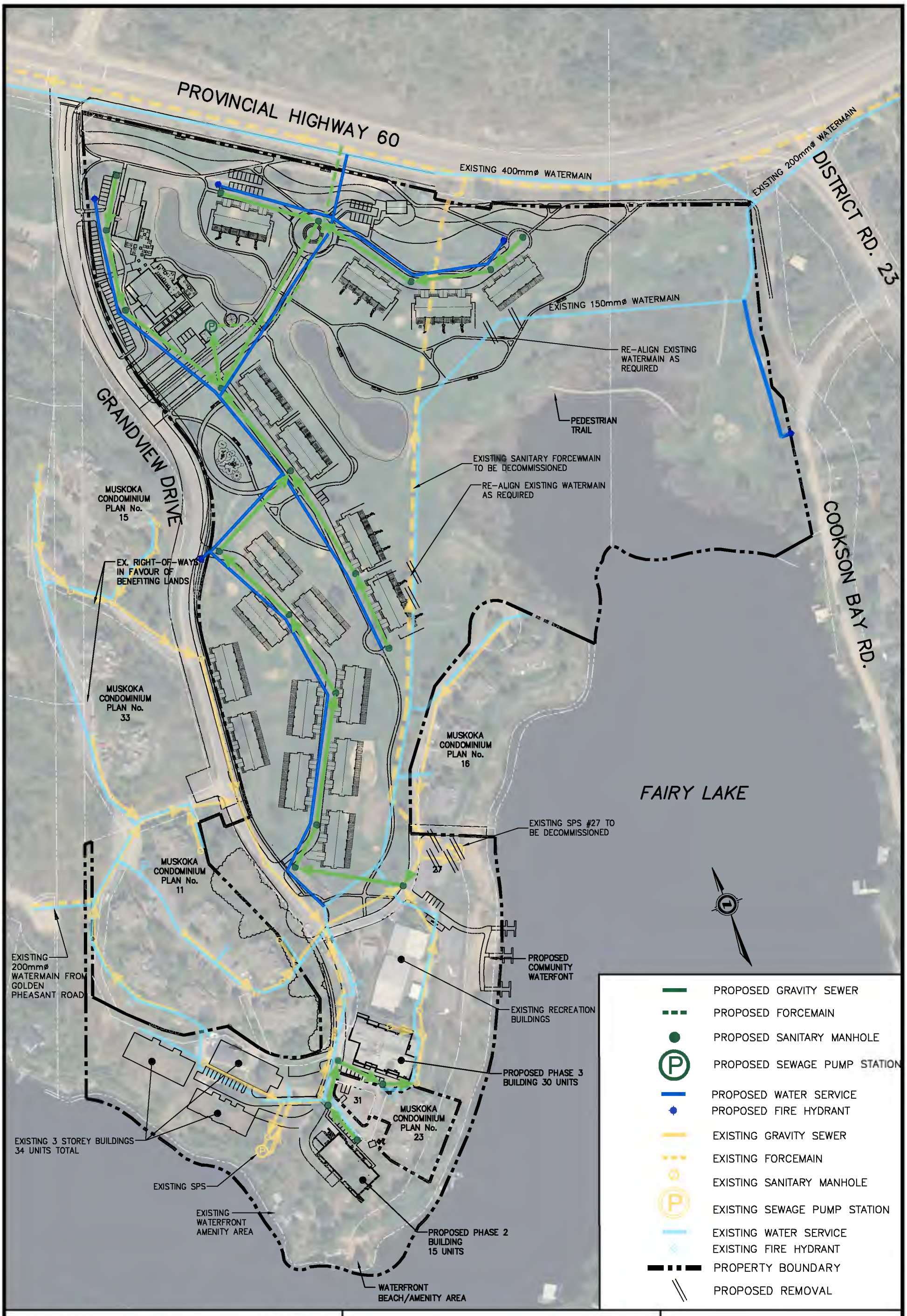
Servicing details will conform to District of Muskoka standards and the exact size and location of the proposed servicing will be determined during the detailed design to support the Site Plan Application(s).

A conceptual layout is provided on Figure 5.

A preliminary analysis of the existing forcemain on Highway 60 was completed from the PS #27 connection point to the sewage treatment plant. The forcemain length is approximately 1900m and a pump rate of 61 l/s (45 l/sec from PS #15 and 15.7 l/s from PS #27) was assumed.

To avoid additional head demands on the PS #15 pumps, it is recommended that SCADA systems be installed on PS #15 and the new SPS to communicate pump cycles to each station. Ideally pump cycles between the stations could be offset to avoid both pump stations running at the same time which would result in pumping inefficiencies due to increased friction losses. Consultation with the District of Muskoka will be required to confirm the existing pump curve details, pump rates, and head losses through the forcemain system on Highway 60 as part of the detailed design exercise.

A servicing agreement with the District of Muskoka will be required to secure necessary sewage allocation for the proposed development.



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GRANDVIEW REDEVELOPMENT

PROPOSED SERVICING CONCEPT

PROJECT NO. 22-11700-M

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FIGURE 5

3.0 WATER SERVICING

3.1 Existing Water Servicing

A series of 150mm and 200mm diameter watermain currently exists throughout the Grandview property to service the existing development on the property. A 200mm diameter watermain extends into the Grandview property from the terminus of Golden Pheasant Drive. A 150mm diameter watermain through the existing golf course provides a looped feed to the existing watermain on District Road #23. A 400mm diameter watermain also exists on Highway #60.

Onsite pressures and flows were confirmed to ensure they are sufficient for domestic and firefighting conditions.

We have utilized information obtained from the municipal hydrants in the vicinity of the subject site connected to the existing 150mm diameter watermain on Grandview Drive and connected to the existing watermain along Highway 60.

Table 1 illustrates the flow results obtain by Vipond on July 20th, 2021.

Table 1
Results of Hydrant Flow Tests

Test #	Outlet Inside Dia. (in.)	Number of Outlets	Residual (PSI)	Flow@ Residual (gal/min)
Grandview Drive				
1	n/a	n/a	62	n/a
2	1.75	1		660
3	2.5	1	58	954
HWY 60				
1	n/a	n/a	66	n/a
2	1.75	1	56	504
3	2.5	1	50	716

The flow test data is included in Appendix C for further information. The existing water servicing infrastructure in the vicinity of the site is illustrated on Figure 4.

3.2 Proposed Water Demands

The maximum day and peak hourly water demand calculations were based on MOE Guidelines and the following criteria:

- average per capita flow of 350 litres/day
- a population density of at 3.5 persons/unit
- Maximum day flow factor of 2.75
- Peak hour flow factor of 4.13

The domestic demands for both the Shorelands and Backlands development areas are indicated on Table 2 below. The domestic demands are based on the ultimate population of 868 in the Shorelands (248 units) and 378 (108 units) in the Backlands.

Table 2
Domestic Water Demand

Area	Per Capita Flow (L/day)	Peaking Factors (based on MOECC Guidelines)		Flows (L/s)	
		Peak Hour	Maximum Day	Peak Hour	Maximum Day
Shorelands	350	4.13	2.75	14.52	9.66
Backlands	350	4.13	2.75	6.32	4.21

3.3 Proposed Water Servicing Strategy

Water servicing for the proposed development will be provided by a single connection to the existing 150mm diameter watermain on the private driveway extension from Grandview Dr. extended into the site on private access driveways.

New watermains will be a minimum of 150mm diameter. Depth of bury will be 1.8m minimum and pipe embedment and backfill will be accordance with OPSD 802.010. A minimum 2.5m horizontal and 0.5m vertical separation will be maintained between watermains and sanitary sewers.

Water servicing within the new development boundary will either be private or publicly owned and operated depending on the tenure of the units determined at the draft approval stage.

Based on the criteria listed above for the ultimate build out of the entire development site, the maximum day and peak hour flow is 13.87 l/sec and 20.84 l/sec respectively.

System pressures were verified using the KYPIPE computer model to satisfy the conditions of peak hour, maximum day and maximum day plus fire. Simulation results are tabulated in Table 3 below along with the preferred pressure ranges as indicated in the MOE's Guide to Drinking Water Systems.

Table 3
KYPIPE Model Results

Scenario	Water Demand Input (L/s)	Minimum Pressure (kPa)	Preferred Pressure Range (kPa)
Ultimate Build-out			
Peak Hour	20.85	401.32	350-480
Maximum Day	13.88	405.89	350-480
Maximum Day + 55 L/s Fire	68.88	258.12	>=140

The model shows that a proposed 150mm dia. watermain can supply a fire flow demand of 55 l/s while maintaining pressures above 20 psi.

KYPIPE calculations are attached in Appendix B.

4.0 UTILITIES

The proposed development is located within the urban service areas of the Town of Huntsville and the standard utilities (Hydro, Bell, Gas, Cable) are all readily available. Interior lighting will be dark sky friendly. Correspondence from the Hydro and gas utilities is located in Appendix D

5.0 STORM DRAINAGE

5.1 Existing Storm Drainage

Based on a review of the available mapping data, drainage on the site sheet flows overland from the north to the south towards Fairy Lake. Drainage from the existing developed Shorelands area is directed to Fairy Lake and based on our review of available as-built drawings, no quantity or quality controls exist on the site. Two cascading ponds exist on the Backlands and outlet to Fairy Lake. External drainage enters the site from the northwest property corner at the intersection of Grandview Drive and Highway 60 and flows towards Fairy Lake through the 2 ponds. External drainage entering the site will be addressed at the detailed design stage for site plan approval.

5.2 Design Criteria

Based on a review of the District of Muskoka's (SWM) Guidelines, the following design criteria, in accordance with the current MOE SWM Planning and Design Manual (MOE, 2003) were established for the proposed development:

Quantity Control:

- Peak flow attenuation for the development is not required due to the limited risk associated with downstream flooding impact to private property.

Quality Control:

- Water quality enhancement to an "enhanced" level of protection (80% TSS removal) with accepted control techniques such as enhanced grass swales, level spreaders, and oil / grit separators.
- Preparation of detailed erosion, sediment control and construction mitigation plan to be implemented as part of the construction program.

5.3 Hydrology

A hydrologic model has been prepared for the site. The intent of the model was to provide quantitative estimates of runoff rates and volumes discharging from the Shorelands and Backlands during the pre-development and post development conditions.

The rainfall runoff event simulation model MIDUSS (Microcomputer Interactive Design of Urban Stormwater Management Systems) was used to simulate watershed response to the 5-year and 100-year design rainfall events. Derivation of the design storm hyetographs were based on the "Chicago" 3-hour distribution using the intensity, duration, and frequency (IDF) data from the District of Muskoka. The design storm parameters are outlined in Table 4, below:

Table 4
Design Storm Parameters
Chicago Distribution

Rainfall Event	Parameter			Duration (min)
	A	B	C	
5 Yr	950	6.75	0.820	180
100 Yr	1499	5.81	0.825	180

5.4 Drainage Catchments

A single pre-development and post development catchment area was delineated and the limits are illustrated on Figures 6 and 7. The catchment parameters used for the modelling are outlined in Table 5 below.

Table 5
Sub-catchment Parameters

Catchments	Area (ha)	% Impervious	Slope	SCS Curve #
Pre-Development				
101	19.9	11.0	5.0 %	74
Post Development				
201	19.9	31.0	5.0 %	74

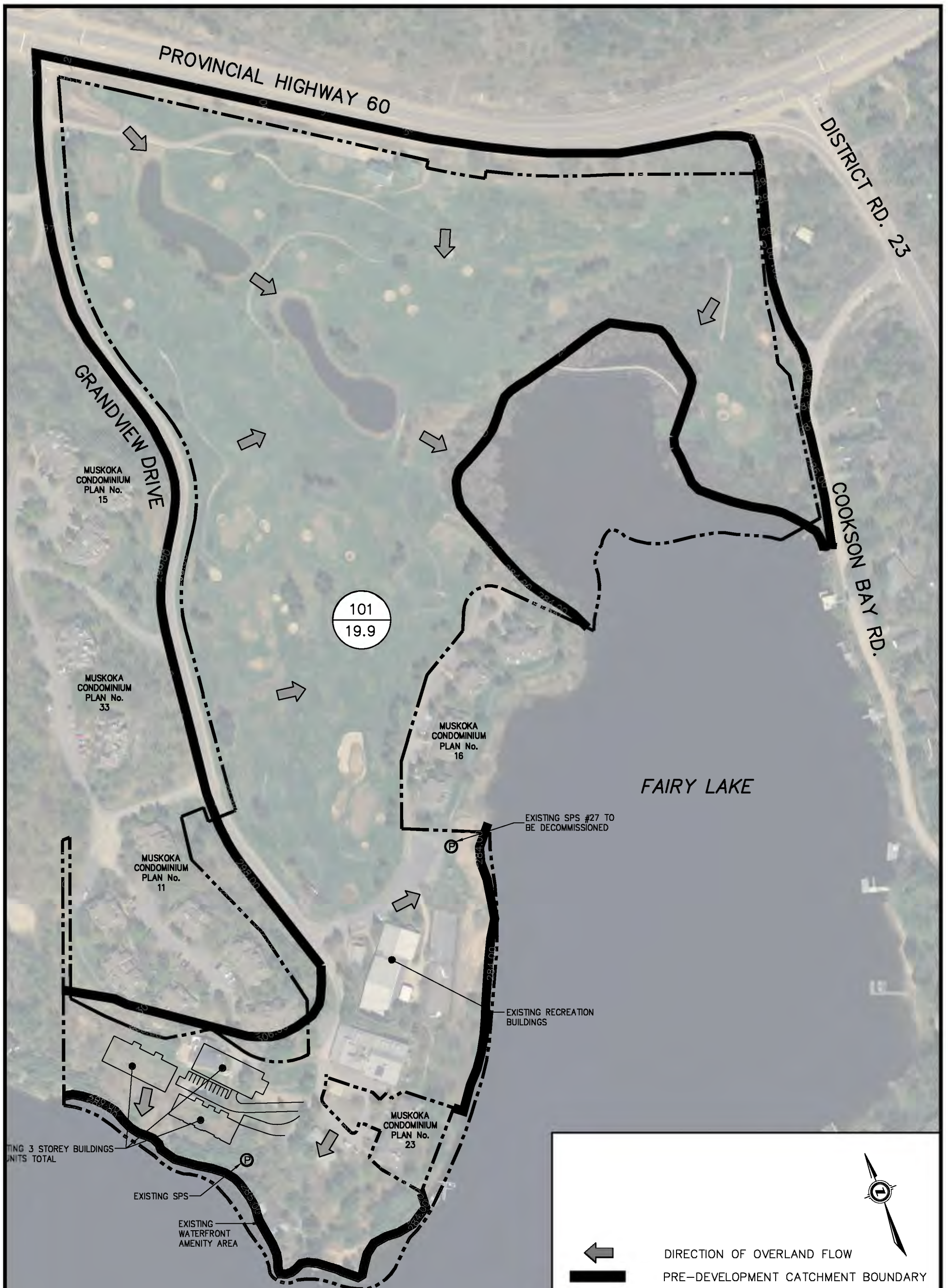
5.5 Model Results

Using the MIDUSS hydrologic model, pre-development and post development run-off hydrographs were generated for the site in response to the 5 and 100-year design storms. Modelling results are shown in Table 6. The MIDUSS files are included in Appendix C for further information.

Table 6
Peak Flows and Volumes

	5-year Event	100-year Event
Pre-development		
Peak flow rate (cms)	**0.568**	**1.091**
Post Development		
Peak flow rate (cms)	**1.541**	**2.643**

Based on the model results, an increase in peak flows is expected due to the increase in impervious area associated with the construction of roads and buildings mainly on the Backlands. As previously discussed, peak flow attenuation is not required due to the proximity of Fairy Lake, however, conveyance features will need to be adequately sized to convey post development peak flows safely to the lake and prevent long-term erosion. Conveyance features will be detailed at the site plan approval stage.



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GRANDVIEW REDEVELOPMENT

PRE-DEVELOPMENT CATCHMENT PLAN

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FIGURE 6

PROVINCIAL HIGHWAY 60

DISTRICT RD. 23

GRANDVIEW DRIVE

COOKSON BAY RD.

FAIRY LAKE

293.00

294.00

297.00

292.00

291.00

298.00

290.00

292.00

298.00

292.00

298.00

304.00

302.00

300.00

201
19.9

BUFFER LIMIT

LIMIT OF WETLAND ESTIMATED BY RIVERSTONE ENVIRONMENTAL

PEDESTRIAN TRAIL

CURRENT LIMIT OF NATURAL RESOURCE/EP ZONING

EX. RIGHT-OF-WAYS IN FAVOUR OF BENEFITING LANDS

MUSKOKA CONDOMINIUM PLAN No. 15

MUSKOKA CONDOMINIUM PLAN No. 33

MUSKOKA CONDOMINIUM PLAN No. 16

MUSKOKA CONDOMINIUM PLAN No. 11

MUSKOKA CONDOMINIUM PLAN No. 23

EXISTING SPS #27 TO BE DECOMMISSIONED

27

PROPOSED COMMUNITY WATERFONT

EXISTING RECREATION BUILDINGS

PROPOSED PHASE 3 BUILDING 30 UNITS

31

EXISTING 3 STOREY BUILDINGS 34 UNITS TOTAL

EXISTING SPS

EXISTING WATERFRONT AMENITY AREA

PROPOSED PHASE 2 BUILDING 15 UNITS

WATERFRONT BEACH/AMENITY AREA

290.00 PROPOSED GRADE

DIRECTION OF OVERLAND FLOW

POST-DEVELOPMENT CATCHMENT BOUNDARY

201 / 19.9 POST-DEVELOPMENT CATCHMENT NUMBER / POST-DEVELOPMENT CATCHMENT AREA(Ha.)

PROPERTY BOUNDARY

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GRANDVIEW REDEVELOPMENT

PROJECT NO. 22-11700-M

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POST-DEVELOPMENT CATCHMENT PLAN

FIGURE 7

5.6 Quality Control

The primary objective of the storm water management plan for this development is to maintain acceptable water quality within the receiving storm sewer and ultimate outfall, Fairy Lake by maintaining existing site drainage patterns. In order to provide water quality enhancement to an "enhanced" level of protection (80% TSS removal) for this development, the following best management and Low Impact Development (LIDS) controls will be considered at the detailed site plan approval stage:

- Provision of "soft" landscaping where feasible
- Construction of a graded rip rap splash pad at roof downspout disconnections
- Yard grading using minimal surface slopes to promote infiltration
- The installation of an oil/grit separator units in parking areas
- Construction of bio-retention cells to treat runoff from parking areas
- Maintenance of existing vegetation along the waterfront (vegetative filter strip)
- Alteration of existing ponds on the Backlands to provide quality control
- Implementation of suitable construction mitigation measures

5.7 Fairy Lake Regulatory Flood Limit

As per the Town of Huntsville's Zoning By-Law, the minimum building elevation of doors, windows and other openings in habitable buildings or structures must be located above 286.53m ASL. Based on the conceptual grading design for the master plan, all buildings would be located above this elevation. The grading design will be further detailed at the site plan approval stage.

5.8 Erosion and Sediment Control

Sedimentation and erosion control measures are required during construction and until such a time that site development has been completed.

The use of various siltation control measures will be implemented to protect the adjacent properties and receiving waterbodies from migrating sediments. These works include but may not be limited to:

- Installation of siltation fencing along perimeter of the development and along the shoreline buffer area
- Filter cloth / silt sack placement over drains
- Installation of vehicle tracking mud mats at the entrance to the site

Prior to carrying out site grading the siltation barriers and mud mats shall be in place. Any onsite storm sewer works will not be permitted to outlet until the site has been stabilized.

Other temporary installations of silt fence or other appropriate measures may be required during grading to minimize silt migration from the site. The measures will need to be removed, replaced and relocated as required during the construction period until the site works have been completed and vegetation established. During construction all stockpiled material will be placed up-gradient of the siltation controls.

Sediment and erosion controls devices will be detailed at the site plan stage once the site plan has been finalized.

6.0 TRAFFIC

An MTO Building and Land Use Permit will be required for this development due to the proximity of Highway 60. In order to secure the permit from MTO, a detailed SWM report, a photometric study and any signage details must be provided to MTO for review and approval.

7.0 CONCLUSION

The findings of this report are summarized as follows:

- The site is located within the Town of Huntsville's urban service boundary and existing municipal infrastructure is available in the vicinity of the proposed development
- The proposed sanitary servicing strategy is to service the site by gravity connections to a new sewage pump station which will replace existing municipal PS #27.
- Incorporating extraneous flows, the combined peak sewage flows generated by the existing and proposed developments in the Grandview and Golden Pheasant catchment area is calculated to be approximately 23.7 l/s
- The new municipal SPS will be designed in accordance with current District of Muskoka standards for these types of facilities including stand-by power
- To avoid additional head demands on the PS #15 pumps, it is recommended that SCADA systems be installed on PS #15 and the new SPS to communicate pump cycles to each station. Ideally pump cycles between the stations could be offset to avoid both pump stations running at the same time which would result in pumping inefficiencies due to increased friction losses.
- The proposed development can be serviced from the existing 150mm diameter watermain extending through the Backlands. A new looped feed from the existing 150mm dia. watermain is required to service the new development
- Based o the model results an increase in peak run-off rates is expected due to the increase in impervious area associated with the construction of new roads and buildings

- Peak flow attenuation should not be required due to the proximity of Fairy Lake, however conveyance features will need to be adequately sized to convey post development peak flows safely to the lake and prevent long term erosion
- An “enhanced” level of quality control is required and can be achieved through the implementation of a treatment train of low impact development controls (LIDS)
- The minimum elevation of doors, windows, and other openings into habitable building space must be located above 286.53m ASL
- Sediment and erosion control measures can be implemented during construction to minimize impacts on adjacent lands and water bodies
- Gas and hydro servicing is readily available to service the development from the existing infrastructure located along Highway 60.

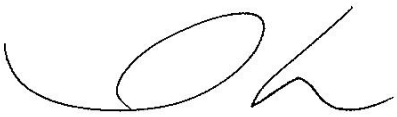
It is recommended that:

1) This report and associated drawings be submitted to the Town of Huntsville and District of Muskoka in support of the current planning applications.

2) External modelling analysis be completed by the District’s consultant and include the entire development concept to review and identify any capacity constraints in the existing infrastructure.

All of which is respectfully submitted by,

PINESTONE ENGINEERING LTD.



Tim Harvey, P.Eng.

APPENDIX A

Sanitary Sewer Calculations

GRANDVIEW REDEVELOPMENT

Gravenhurst

Project Number: 22-1170
Date: Rev. Aug 2024
Design By: TH
Checked By: TH
File: \\PEL-SERVER\Company\Project Documents\11700M Grandview Golf Redevelopment\FSR UPDATE AUGUST 2024\Appen

SANITARY SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Drainage Area Plan No: SAN - 1

Design Parameters

Average Daily Flow
Residential 0.0043 L/s/c
Commercial 1.5 L/s/ha
Industrial 1.0 L/s/ha
Inst. / School 2.5 L/s/ha

Mannings "*n*" 0.0130
Min. Velocity 0.60 m/sec
Max. Velocity 3.0 m/sec
Residential Harmon Peaking Factor (F)
Residential Areas Infiltration 0.28 L/s/ha

PEL
PINESTONE ENGINEERING LTD.

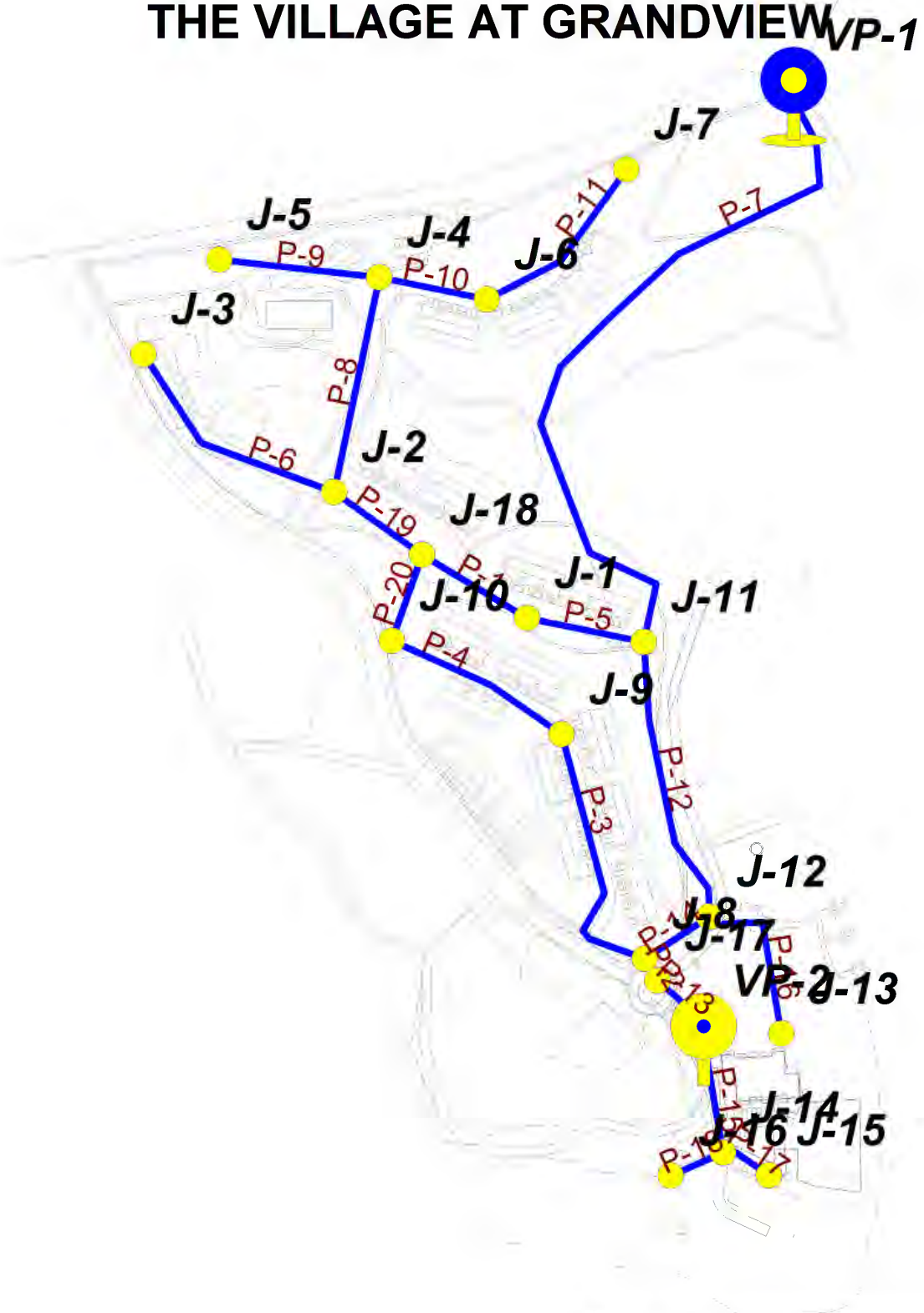
LOCATION				RESIDENTIAL AREAS and POPULATION						SCHOOL, INSTITUTIONAL			COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN							
										HECTARES AND FLOW OF EACH ZONING																			
										2.50 *L/s/ha*			1.50 *L/s/ha*			1.00 *L/s/ha*													
STREET	AREA NO.	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA	UNITS	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"	PEAK RES. FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	TOTALS-C-I FLOW	AREA	CUMUL AREA	INFIL FLOW	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY
				ha	*3.5pp/unit*	*1000s*	*1000s*		*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*m*	*%*	*mm*	*L/sec.*	*m/s*	*m/s*
Grandview Phase 1		1	SPS	0.45	36.00	0.126	0.126	4.214722	2.2835											0.45	0.45	0.1260	2.4095						
Grandview Phase 2 &3		2	SPS	0.85	59.00	0.207	0.207	4.142944	3.6787											0.85	1.30	0.3640	4.0427						
MCC 11		3	SPS	0.30	54.00	0.189	0.189	4.156892	3.3783											0.30	0.30	0.0840	3.4623						
MCC 15		4	SPS	0.30	33.00	0.116	0.305	4.075696	5.3365											0.30	0.60	0.1680	5.5045						
MCC 16		5	SPS	0.30	20.00	0.070	0.375	4.035583	6.4987											0.30	0.90	0.2520	6.7507						
MCC 23		6	SPS	0.30	22.00	0.077	0.452	3.996615	7.7592											0.30	1.20	0.3360	8.0952						
MCC 33		7	SPS	0.30	24.00	0.084	0.536	3.958718	9.1155											0.30	1.50	0.4200	9.5355						
Golden Pheasant inc. infill		8	SPS	5.00	76.00	0.266	0.266	4.100259	4.6899											5.00	5.00	1.4000	6.0899						
Recreation Centre		9	SPS	0.15	0.00	0.000	0.000	4.5	0.0000				0.15	0.15	0.2250				0.2250	0.15	0.15	0.0420	0.2670						
Golf Course Re-dev		10	SPS	13.00	108.00	0.378	0.378	4.033706	6.5564											13.00	13.00	3.6400	10.1964						
SPS to Highway 60				0.00	0.00	0.000	1.386	3.70412	22.0758											0.00	7.95	2.2260	**24.3018**						

APPENDIX B

Water Sewer Calculations

PINESTONE ENGINEERING LTD.

THE VILLAGE AT GRANDVIEW



KYPIPE

0 300

FLOW TEST RESULTS

FIRST FOR FIRE, LIFE SAFETY & SECURITY
VIPOND INC
est. 1945

DATE : JULY 20, 2021 TIME : 2:00 PM

LOCATION : GRANDVIEW FOREST GLEN
CITY OF HUNTSVILLE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC

STATIC PRESSURE : 62 PSI

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-3/4	0.995	56	32	504
2	1	2-1/2	0.90	50	18	716

FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC

est. 1945

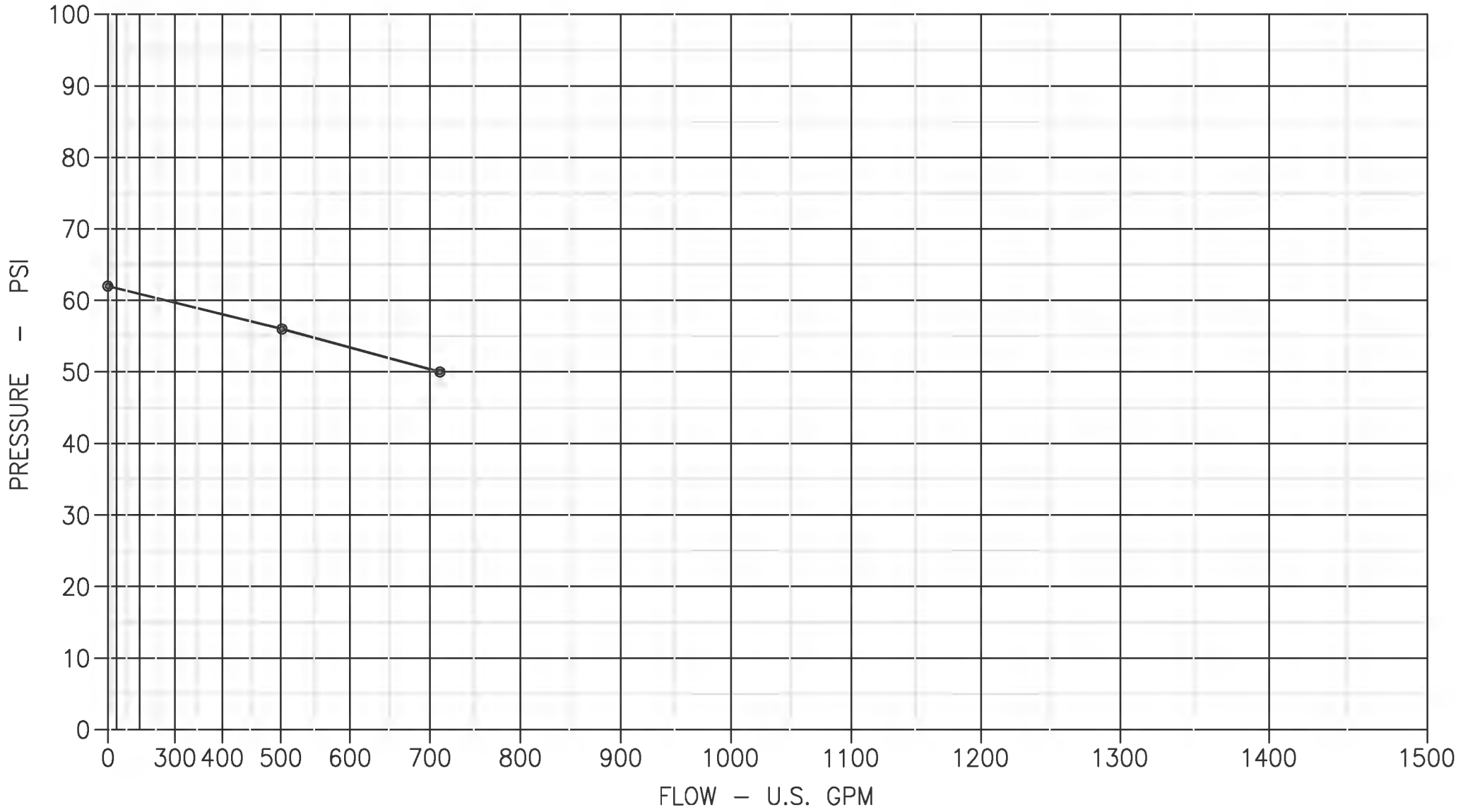
GRANDVIEW FOREST GLEN	BY : KRYSTIAN KRASON
CITY OF HUNTSVILLE	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND & PUC
	DATE : JULY 20, 2021

STATIC: 62 PSI

RESIDUAL:

TEST#1 56 PSI @ 504 GPM

TEST#2 50 PSI @ 716 GPM



FLOW TEST RESULTS

FIRST FOR FIRE, LIFE SAFETY & SECURITY
VIPOND INC
est. 1945

DATE : JULY 20, 2021 TIME : 12:00 P.M

LOCATION : HWY 60 & CANAL RD
HUNTSVILLE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC

STATIC PRESSURE : 66 PSI

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-3/4	0.995	60	48	617
2	1	2-1/2	0.9	56	30	924

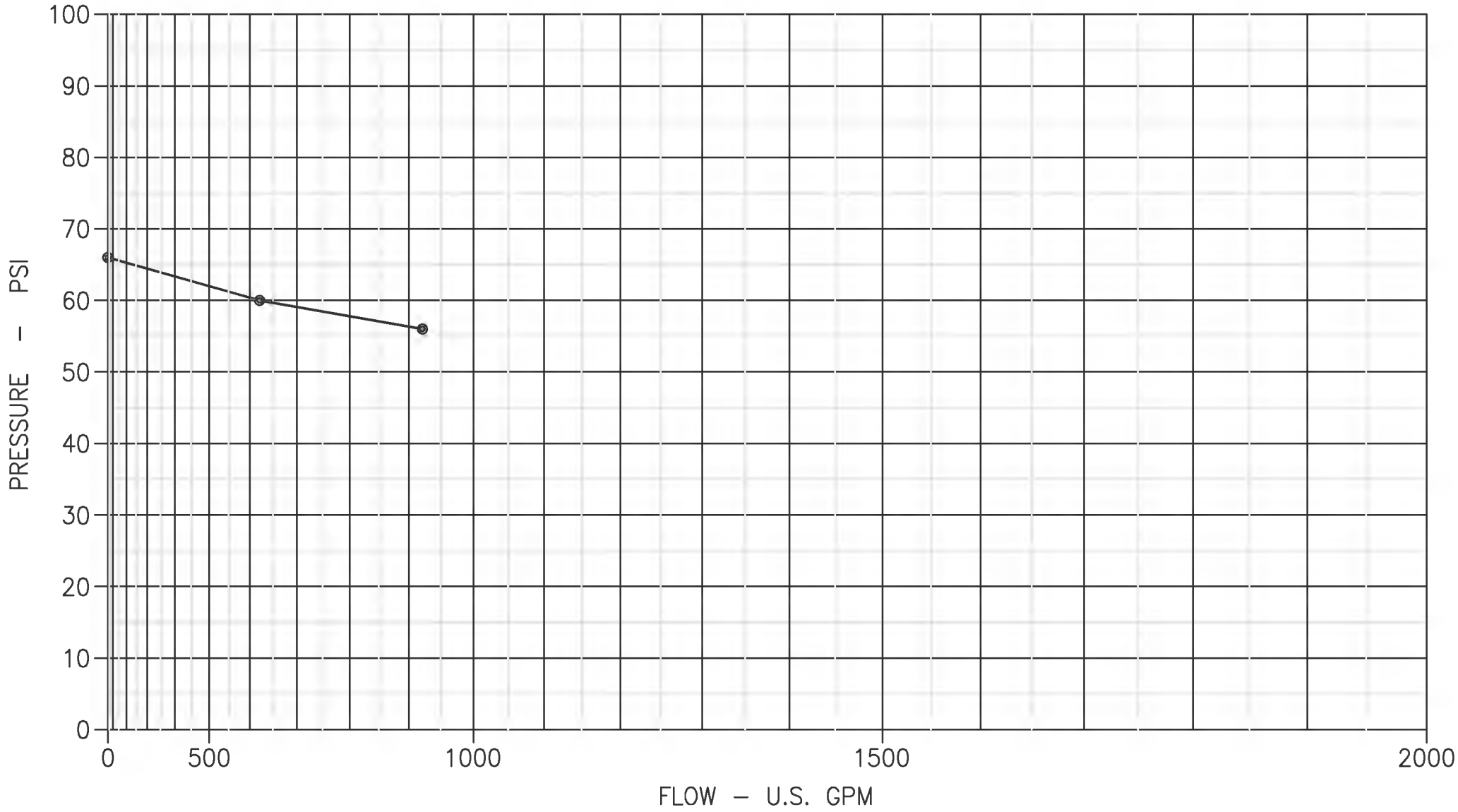
FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC

est. 1945

HWY 60 & CANAL RD	BY : KRYSTIAN KRASON
HUNTSVILLE	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND
	DATE : JULY 20, 2021

STATIC:	RESIDUAL:		FLOW:
66 PSI	TEST#1 60 PSI	@	617 GPM
	TEST#2 56 PSI	@	924 GPM



THE VILLAGE AT GRANDVIEW
WATERMAIN NETWORK ANALYSIS
Town of Huntsville

Project Number: 22-11700
Date: 28-Aug-24
Design By: LT

NODE	PIPE ELEVATION (m)	STATIC HEAD (m)	TOTAL HEAD (m)	UNITS	POPULATION	WATER DEMAND			
						AVE DAY (L/S)	MAX DAY (L/S)	PEAK HOURLY (L/S)	MAX DAY PLUS FIRE (L/S)
VP1	300.00	46.42	346.42		0.0	0.00	0.00	0.00	0.00
J1	291.00	N/A	N/A	12.00	42.0	0.17	0.47	0.70	0.47
J2	292.00	N/A	N/A	12.00	42.0	0.17	0.47	0.70	0.47
J3	293.00	N/A	N/A	0.00	0.0	0.00	0.00	0.00	0.00
J4	297.00	N/A	N/A	6.00	21.0	0.09	0.23	0.35	0.23
J5	294.00	N/A	N/A	6.00	21.0	0.09	0.23	0.35	0.23
J6	292.00	N/A	N/A	12.00	42.0	0.17	0.47	0.70	0.47
J7	301.00	N/A	N/A	0.00	0.0	0.00	0.00	0.00	0.00
J8	298.00	N/A	N/A	0.00	0.0	0.00	0.00	0.00	0.00
J9	292.00	N/A	N/A	42.00	147.0	0.60	1.64	2.46	1.64
J10	298.00	N/A	N/A	18.00	63.0	0.26	0.70	1.05	0.70
J11	290.00	N/A	N/A	0.00	0.0	0.00	0.00	0.00	0.00
J12 - Condo 16	292.00	N/A	N/A	20.00	70.0	0.28	0.78	1.17	0.78
J13 - Condo 23 + Grandview PH1/2	304.00	N/A	N/A	66.00	231.0	0.94	2.57	3.86	57.57
J14	304.00	N/A	N/A	0.00	0.0	0.00	0.00	0.00	0.00
J15 - Grandview PH1/2	300.00	N/A	N/A	17.00	59.5	0.24	0.66	1.00	0.66
J16	302.00	N/A	N/A	34.00	119.0	0.48	1.33	1.99	1.33
J17 - Condo 11, 15 & 33	308.00	N/A	N/A	111.00	388.5	1.57	4.33	6.50	4.33
J18	291.25	N/A	N/A	0.00	0.0	0.00	0.00	0.00	0.00
VP2	305.00	43.60	348.60		0.0	0.00	0.00	0.00	0.00
	TOTALS			356.00	1,246	5.05	13.88	20.85	68.88

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 11.112  01-27-2023                              *
*  Serial #:  8-10075593                                    *
*  Interface:  Classic                                      *
*   Licensed for Pipe2008                                   *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Tue Sep 03 14:48:41 2024

Master File : z:\project documents\11700m grandview golf redevelopment\kypipe\aug 2024\avgday.KYP\avgday.P2K

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = liters/second
HEAD (HGL) ..... = meters
PRESSURE ..... = kpa

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (m)	DIAMETER (mm)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-18	80.00	150.00	150.0000	0.00
P-2	J-8	J-17	17.00	150.00	150.0000	0.00
P-3	J-8	J-9	183.00	150.00	150.0000	0.00
P-4	J-9	J-10	128.00	150.00	150.0000	0.00
P-5	J-1	J-11	78.00	150.00	150.0000	0.00
P-6	J-2	J-3	163.00	150.00	150.0000	0.00
P-7	VP-1	J-11	503.00	150.00	150.0000	0.00
P-8	J-2	J-4	144.00	150.00	150.0000	0.00
P-9	J-4	J-5	106.00	150.00	150.0000	0.00
P-10	J-4	J-6	72.00	150.00	150.0000	0.00
P-11	J-6	J-7	129.00	150.00	150.0000	0.00
P-12	J-11	J-12	190.00	150.00	150.0000	0.00
P-13	J-17	VP-2	43.00	150.00	150.0000	0.00
P-14	J-12	J-8	50.00	150.00	150.0000	0.00
P-15	J-14	VP-2	90.00	150.00	150.0000	0.00
P-16	J-12	J-13	111.00	150.00	150.0000	0.00
P-17	J-14	J-15	36.00	150.00	150.0000	0.00
P-18	J-14	J-16	38.00	150.00	150.0000	0.00
P-19	J-18	J-2	71.00	150.00	150.0000	0.00
P-20	J-10	J-18	60.00	150.00	150.0000	0.00

PUMP/LOSS ELEMENT DATA

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
46.41	0.00	75.00
39.37	58.30	75.00
21.01	116.60	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
45.59	0.00	75.00
37.15	45.20	75.00
15.11	90.40	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		0.17	291.00	
J-2		0.17	292.00	
J-3		0.00	293.00	
J-4		0.09	297.00	
J-5		0.09	294.00	
J-6		0.17	292.00	
J-7		0.00	301.00	
J-8		0.00	298.00	
J-9		0.60	292.00	
J-10		0.26	298.00	
J-11		0.00	290.00	
J-12		0.28	292.00	
J-13		0.94	304.00	
J-14		0.00	304.00	
J-15		0.24	300.00	
J-16		0.48	302.00	
J-17		1.57	298.00	
J-18		0.00	291.25	
VP-1		----	300.00	300.00
VP-2		----	300.00	300.00

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 20
NUMBER OF END NODES .....(J) = 18
NUMBER OF PRIMARY LOOPS .....(L) = 1
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 19 TRIALS: ACCURACY = 0.23172E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE	HEAD LOSS	MINOR LOSS	LINE VELO.	HL+ML/ 1000	HL/ 1000

			lps	m	m	m/s	m/m	m/m
P-1	J-1	J-18	2.21	0.01	0.00	0.13	0.12	0.12
P-2	J-8	J-17	2.29	0.00	0.00	0.13	0.13	0.13
P-3	J-8	J-9	-0.83	0.00	0.00	0.05	0.02	0.02
P-4	J-9	J-10	-1.43	0.01	0.00	0.08	0.06	0.06
P-5	J-1	J-11	-2.38	0.01	0.00	0.13	0.14	0.14
P-6	J-2	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-7	VP-1	J-11	5.06	0.29	0.00	0.29	0.57	0.57
P-8	J-2	J-4	0.35	0.00	0.00	0.02	0.00	0.00
P-9	J-4	J-5	0.09	0.00	0.00	0.01	0.00	0.00
P-10	J-4	J-6	0.17	0.00	0.00	0.01	0.00	0.00
P-11	J-6	J-7	0.00	0.00	0.00	0.00	0.00	0.00
P-12	J-11	J-12	2.68	0.03	0.00	0.15	0.18	0.18
P-13	J-17	VP-2	0.72	0.00	0.00	0.04	0.02	0.02
P-14	J-12	J-8	1.46	0.00	0.00	0.08	0.06	0.06
P-15	J-14	VP-2	-0.72	0.00	0.00	0.04	0.02	0.02
P-16	J-12	J-13	0.94	0.00	0.00	0.05	0.03	0.03
P-17	J-14	J-15	0.24	0.00	0.00	0.01	0.00	0.00
P-18	J-14	J-16	0.48	0.00	0.00	0.03	0.01	0.01
P-19	J-18	J-2	0.52	0.00	0.00	0.03	0.01	0.01
P-20	J-10	J-18	-1.69	0.00	0.00	0.10	0.08	0.08

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m	Case
VP-1	5.06	0.00	46.33	46.3	75.00	2.	0.2	0.2	**	**	10.1	0.0000
Device "VP-2" is closed												
VP-2	0.00	0.00	46.00	0.0	75.00	0.	0.0	0.0	**	**	10.1	0.0000

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		0.17	346.03	291.00	55.03	539.65
J-2		0.17	346.02	292.00	54.02	529.74
J-3		0.00	346.02	293.00	53.02	519.94
J-4		0.09	346.02	297.00	49.02	480.70
J-5		0.09	346.02	294.00	52.02	510.12
J-6		0.17	346.02	292.00	54.02	529.74
J-7		0.00	346.02	301.00	45.02	441.48
J-8		0.00	346.00	298.00	48.00	470.76
J-9		0.60	346.01	292.00	54.01	529.64
J-10		0.26	346.01	298.00	48.01	470.87
J-11		0.00	346.04	290.00	56.04	549.57
J-12		0.28	346.01	292.00	54.01	529.63
J-13		0.94	346.00	304.00	42.00	411.92
J-14		0.00	346.00	304.00	42.00	411.88
J-15		0.24	346.00	300.00	46.00	451.10
J-16		0.48	346.00	302.00	44.00	431.49
J-17		1.57	346.00	298.00	48.00	470.74
J-18		0.00	346.02	291.25	54.77	537.10
VP-1		----	346.33	300.00	46.33	454.34
VP-2		----	346.00	300.00	46.00	451.12

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa

J-11	549.57	J-14	411.88
J-1	539.65	J-13	411.92
J-18	537.10	J-16	431.49
J-2	529.74	J-7	441.48
J-6	529.74	J-15	451.10

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-7	0.29	P-9	0.01
P-12	0.15	P-10	0.01
P-5	0.13	P-17	0.01
P-2	0.13	P-8	0.02
P-1	0.13	P-18	0.03

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-7	0.57	P-9	0.00
P-12	0.18	P-10	0.00
P-5	0.14	P-17	0.00
P-2	0.13	P-8	0.00
P-1	0.12	P-18	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-7	0.57	P-9	0.00
P-12	0.18	P-10	0.00
P-5	0.14	P-17	0.00
P-2	0.13	P-8	0.00
P-1	0.12	P-18	0.01

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	5.06	

NET SYSTEM INFLOW = 5.06
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 5.06

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Total Power Cost

****

TOTAL POWER COST($) FOR THIS SIMULATION = 0.15

****

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 11.112  01-27-2023                              *
*  Serial #:  8-10075593                                    *
*  Interface:  Classic                                      *
*   Licensed for Pipe2008                                   *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Tue Sep 03 15:41:53 2024

Master File : z:\project documents\11700m grandview golf redevelopment\kypipe\aug 2024\maxday.KYP\maxday.P2K

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = liters/second
HEAD (HGL) ..... = meters
PRESSURE ..... = kpa

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (m)	DIAMETER (mm)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-18	80.00	150.00	150.0000	0.00
P-2	J-8	J-17	17.00	150.00	150.0000	0.00
P-3	J-8	J-9	183.00	150.00	150.0000	0.00
P-4	J-9	J-10	128.00	150.00	150.0000	0.00
P-5	J-1	J-11	78.00	150.00	150.0000	0.00
P-6	J-2	J-3	164.00	150.00	150.0000	0.00
P-7	VP-1	J-11	503.00	150.00	150.0000	0.00
P-8	J-2	J-4	144.00	150.00	150.0000	0.00
P-9	J-4	J-5	106.00	150.00	150.0000	0.00
P-10	J-4	J-6	72.00	150.00	150.0000	0.00
P-11	J-6	J-7	129.00	150.00	150.0000	0.00
P-12	J-11	J-12	190.00	150.00	150.0000	0.00
P-13	J-17	VP-2	43.00	150.00	150.0000	0.00
P-14	J-12	J-8	50.00	150.00	150.0000	0.00
P-15	J-14	VP-2	90.00	150.00	150.0000	0.00
P-16	J-12	J-13	111.00	150.00	150.0000	0.00
P-17	J-14	J-15	36.00	150.00	150.0000	0.00
P-18	J-14	J-16	38.00	150.00	150.0000	0.00
P-19	J-18	J-2	71.00	150.00	150.0000	0.00
P-20	J-10	J-18	60.00	150.00	150.0000	0.00

PUMP/LOSS ELEMENT DATA

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
46.41	0.00	75.00
39.37	58.30	75.00
21.01	116.60	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
45.59	0.00	75.00
37.15	45.20	75.00
15.11	90.40	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		0.47	291.00	
J-2		0.47	292.00	
J-3		0.00	293.00	
J-4		0.23	297.00	
J-5		0.23	294.00	
J-6		0.47	292.00	
J-7		0.00	301.00	
J-8		0.00	298.00	
J-9		1.64	292.00	
J-10		0.70	298.00	
J-11		0.00	290.00	
J-12		0.78	292.00	
J-13		2.57	304.00	
J-14		0.00	304.00	
J-15		0.66	300.00	
J-16		1.33	302.00	
J-17		4.33	298.00	
J-18		0.00	291.25	
VP-1		----	300.00	300.00
VP-2		----	300.00	300.00

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 20
NUMBER OF END NODES .....(J) = 18
NUMBER OF PRIMARY LOOPS .....(L) = 1
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 7 TRIALS: ACCURACY = 0.55373E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE	HEAD LOSS	MINOR LOSS	LINE VELO.	HL+ML/ 1000	HL/ 1000

			lps	m	m	m/s	m/m	m/m
P-1	J-1	J-18	3.75	0.03	0.00	0.21	0.33	0.33
P-2	J-8	J-17	0.79	0.00	0.00	0.04	0.02	0.02
P-3	J-8	J-9	-0.01	0.00	0.00	0.00	0.00	0.00
P-4	J-9	J-10	-1.65	0.01	0.00	0.09	0.07	0.07
P-5	J-1	J-11	-4.22	0.03	0.00	0.24	0.41	0.41
P-6	J-2	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-7	VP-1	J-11	8.35	0.73	0.00	0.47	1.45	1.45
P-8	J-2	J-4	0.93	0.00	0.00	0.05	0.02	0.02
P-9	J-4	J-5	0.23	0.00	0.00	0.01	0.00	0.00
P-10	J-4	J-6	0.47	0.00	0.00	0.03	0.01	0.01
P-11	J-6	J-7	0.00	0.00	0.00	0.00	0.00	0.00
P-12	J-11	J-12	4.13	0.08	0.00	0.23	0.39	0.39
P-13	J-17	VP-2	-3.54	0.01	0.00	0.20	0.30	0.30
P-14	J-12	J-8	0.78	0.00	0.00	0.04	0.02	0.02
P-15	J-14	VP-2	-1.99	0.01	0.00	0.11	0.10	0.10
P-16	J-12	J-13	2.57	0.02	0.00	0.15	0.16	0.16
P-17	J-14	J-15	0.66	0.00	0.00	0.04	0.01	0.01
P-18	J-14	J-16	1.33	0.00	0.00	0.08	0.05	0.05
P-19	J-18	J-2	1.40	0.00	0.00	0.08	0.05	0.05
P-20	J-10	J-18	-2.35	0.01	0.00	0.13	0.14	0.14

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC-ENCY %	USEFUL POWER kW	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m	Case
VP-1	8.35	0.00	46.21	46.2	75.00	4.	0.3	0.3	**	**	10.1	0.0000
VP-2	5.53	0.00	45.42	45.4	75.00	2.	0.2	0.2	**	**	10.1	0.0000

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		0.47	345.45	291.00	54.45	533.98
J-2		0.47	345.42	292.00	53.42	523.87
J-3		0.00	345.42	293.00	52.42	514.07
J-4		0.23	345.42	297.00	48.42	474.80
J-5		0.23	345.42	294.00	51.42	504.22
J-6		0.47	345.42	292.00	53.42	523.83
J-7		0.00	345.42	301.00	44.42	435.57
J-8		0.00	345.41	298.00	47.41	464.90
J-9		1.64	345.41	292.00	53.41	523.74
J-10		0.70	345.42	298.00	47.42	464.99
J-11		0.00	345.48	290.00	55.48	544.10
J-12		0.78	345.41	292.00	53.41	523.75
J-13		2.57	345.39	304.00	41.39	405.89
J-14		0.00	345.41	304.00	41.41	406.09
J-15		0.66	345.41	300.00	45.41	445.31
J-16		1.33	345.41	302.00	43.41	425.69
J-17		4.33	345.41	298.00	47.41	464.90
J-18		0.00	345.42	291.25	54.17	531.26
VP-1		----	346.21	300.00	46.21	453.20
VP-2		----	345.42	300.00	45.42	445.41

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa

J-11	544.10	J-13	405.89
J-1	533.98	J-14	406.09
J-18	531.26	J-16	425.69
J-2	523.87	J-7	435.57
J-6	523.83	J-15	445.31

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-7	0.47	P-3	0.00
P-5	0.24	P-9	0.01
P-12	0.23	P-10	0.03
P-1	0.21	P-17	0.04
P-13	0.20	P-14	0.04

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-7	1.45	P-3	0.00
P-5	0.41	P-9	0.00
P-12	0.39	P-10	0.01
P-1	0.33	P-17	0.01
P-13	0.30	P-14	0.02

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-7	1.45	P-3	0.00
P-5	0.41	P-9	0.00
P-12	0.39	P-10	0.01
P-1	0.33	P-17	0.01
P-13	0.30	P-14	0.02

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	8.35	
VP-2	5.53	

NET SYSTEM INFLOW = 13.88
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 13.88

==========

Total Power Cost

****

TOTAL POWER COST($) FOR THIS SIMULATION = 0.42

****

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 11.112  01-27-2023                              *
*  Serial #:  8-10075593                                    *
*  Interface:  Classic                                      *
*   Licensed for Pipe2008                                   *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Tue Sep 03 15:50:39 2024

Master File : z:\project documents\11700m grandview golf redevelopment\kypipe\aug 2024\peakhour.KYP\peakhour.P2K

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = liters/second
HEAD (HGL) ..... = meters
PRESSURE ..... = kpa

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (m)	DIAMETER (mm)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-18	80.00	150.00	150.0000	0.00
P-2	J-8	J-17	17.00	150.00	150.0000	0.00
P-3	J-8	J-9	183.00	150.00	150.0000	0.00
P-4	J-9	J-10	128.00	150.00	150.0000	0.00
P-5	J-1	J-11	78.00	150.00	150.0000	0.00
P-6	J-2	J-3	164.00	150.00	150.0000	0.00
P-7	VP-1	J-11	503.00	150.00	150.0000	0.00
P-8	J-2	J-4	144.00	150.00	150.0000	0.00
P-9	J-4	J-5	106.00	150.00	150.0000	0.00
P-10	J-4	J-6	72.00	150.00	150.0000	0.00
P-11	J-6	J-7	129.00	150.00	150.0000	0.00
P-12	J-11	J-12	190.00	150.00	150.0000	0.00
P-13	J-17	VP-2	43.00	150.00	150.0000	0.00
P-14	J-12	J-8	50.00	150.00	150.0000	0.00
P-15	J-14	VP-2	90.00	150.00	150.0000	0.00
P-16	J-12	J-13	111.00	150.00	150.0000	0.00
P-17	J-14	J-15	36.00	150.00	150.0000	0.00
P-18	J-14	J-16	38.00	150.00	150.0000	0.00
P-19	J-18	J-2	71.00	150.00	150.0000	0.00
P-20	J-10	J-18	60.00	150.00	150.0000	0.00

PUMP/LOSS ELEMENT DATA

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
46.41	0.00	75.00
39.37	58.30	75.00
21.01	116.60	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
45.59	0.00	75.00
37.15	45.20	75.00

15.11 90.40 75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		0.70	291.00	
J-2		0.70	292.00	
J-3		0.00	293.00	
J-4		0.35	297.00	
J-5		0.35	294.00	
J-6		0.70	292.00	
J-7		0.00	301.00	
J-8		0.00	298.00	
J-9		2.46	292.00	
J-10		1.05	298.00	
J-11		0.00	290.00	
J-12		1.17	292.00	
J-13		3.86	304.00	
J-14		0.00	304.00	
J-15		1.00	300.00	
J-16		1.99	302.00	
J-17		6.50	298.00	
J-18		0.00	291.25	
VP-1		----	300.00	300.00
VP-2		----	300.00	300.00

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 20
NUMBER OF END NODES .....(J) = 18
NUMBER OF PRIMARY LOOPS .....(L) = 1
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 7 TRIALS: ACCURACY = 0.16443E-05

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE lps	HEAD LOSS m	MINOR LOSS m	LINE VELO. m/s	HL+ML/ 1000 m/m	HL/ 1000 m/m
P-1	J-1	J-18	4.65	0.04	0.00	0.26	0.49	0.49
P-2	J-8	J-17	-1.12	0.00	0.00	0.06	0.04	0.04
P-3	J-8	J-9	0.96	0.00	0.00	0.05	0.03	0.03
P-4	J-9	J-10	-1.50	0.01	0.00	0.08	0.06	0.06
P-5	J-1	J-11	-5.35	0.05	0.00	0.30	0.64	0.64
P-6	J-2	J-3	0.00	0.00	0.00	0.00	0.00	0.00

P-7	VP-1	J-11	10.22	1.06	0.00	0.58	2.11	2.11
P-8	J-2	J-4	1.40	0.01	0.00	0.08	0.05	0.05
P-9	J-4	J-5	0.35	0.00	0.00	0.02	0.00	0.00
P-10	J-4	J-6	0.70	0.00	0.00	0.04	0.01	0.01
P-11	J-6	J-7	0.00	0.00	0.00	0.00	0.00	0.00
P-12	J-11	J-12	4.87	0.10	0.00	0.28	0.54	0.54
P-13	J-17	VP-2	-7.62	0.05	0.00	0.43	1.23	1.23
P-14	J-12	J-8	-0.16	0.00	0.00	0.01	0.00	0.00
P-15	J-14	VP-2	-2.99	0.02	0.00	0.17	0.22	0.22
P-16	J-12	J-13	3.86	0.04	0.00	0.22	0.35	0.35
P-17	J-14	J-15	1.00	0.00	0.00	0.06	0.03	0.03
P-18	J-14	J-16	1.99	0.00	0.00	0.11	0.10	0.10
P-19	J-18	J-2	2.10	0.01	0.00	0.12	0.11	0.11
P-20	J-10	J-18	-2.55	0.01	0.00	0.14	0.16	0.16

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC-ENCY %	USEFUL POWER kW	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m	Case
VP-1	10.22	0.00	46.13	46.1	75.00	5.	0.3	0.3	**	**	10.1	0.0000
VP-2	10.61	0.00	45.01	45.0	75.00	5.	0.3	0.3	**	**	10.1	0.0000

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		0.70	345.01	291.00	54.01	529.69
J-2		0.70	344.97	292.00	52.97	519.42
J-3		0.00	344.97	293.00	51.97	509.61
J-4		0.35	344.96	297.00	47.96	470.31
J-5		0.35	344.96	294.00	50.96	499.73
J-6		0.70	344.96	292.00	52.96	519.33
J-7		0.00	344.96	301.00	43.96	431.07
J-8		0.00	344.96	298.00	46.96	460.54
J-9		2.46	344.96	292.00	52.96	519.33
J-10		1.05	344.96	298.00	46.96	460.56
J-11		0.00	345.06	290.00	55.06	539.98
J-12		1.17	344.96	292.00	52.96	519.37
J-13		3.86	344.92	304.00	40.92	401.32
J-14		0.00	345.00	304.00	41.00	402.03
J-15		1.00	344.99	300.00	44.99	441.24
J-16		1.99	344.99	302.00	42.99	421.60
J-17		6.50	344.96	298.00	46.96	460.54
J-18		0.00	344.97	291.25	53.72	526.85
VP-1		----	346.13	300.00	46.13	452.34
VP-2		----	345.01	300.00	45.01	441.45

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa
J-11	539.98	J-13	401.32
J-1	529.69	J-14	402.03
J-18	526.85	J-16	421.60
J-2	519.42	J-7	431.07
J-12	519.37	J-15	441.24

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)

P-7	0.58	P-14	0.01
P-13	0.43	P-9	0.02
P-5	0.30	P-10	0.04
P-12	0.28	P-3	0.05
P-1	0.26	P-17	0.06

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-7	2.11	P-14	0.00
P-13	1.23	P-9	0.00
P-5	0.64	P-10	0.01
P-12	0.54	P-3	0.03
P-1	0.49	P-17	0.03

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-7	2.11	P-14	0.00
P-13	1.23	P-9	0.00
P-5	0.64	P-10	0.01
P-12	0.54	P-3	0.03
P-1	0.49	P-17	0.03

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	10.22	
VP-2	10.61	

NET SYSTEM INFLOW = 20.83
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 20.83

Total Power Cost

****

TOTAL POWER COST($) FOR THIS SIMULATION = 0.62

****

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 11.112  01-27-2023                              *
*  Serial #:  8-10075593                                    *
*  Interface:  Classic                                      *
*   Licensed for Pipe2008                                   *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Tue Sep 03 15:53:41 2024

Master File : z:\project documents\11700m grandview golf redevelopment\kypipe\aug 2024\maxday.KYP\maxday.P2K

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = liters/second
HEAD (HGL) ..... = meters
PRESSURE ..... = kpa

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (m)	DIAMETER (mm)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-18	80.00	150.00	150.0000	0.00
P-2	J-8	J-17	17.00	150.00	150.0000	0.00
P-3	J-8	J-9	183.00	150.00	150.0000	0.00
P-4	J-9	J-10	128.00	150.00	150.0000	0.00
P-5	J-1	J-11	78.00	150.00	150.0000	0.00
P-6	J-2	J-3	164.00	150.00	150.0000	0.00
P-7	VP-1	J-11	503.00	150.00	150.0000	0.00
P-8	J-2	J-4	144.00	150.00	150.0000	0.00
P-9	J-4	J-5	106.00	150.00	150.0000	0.00
P-10	J-4	J-6	72.00	150.00	150.0000	0.00
P-11	J-6	J-7	129.00	150.00	150.0000	0.00
P-12	J-11	J-12	190.00	150.00	150.0000	0.00
P-13	J-17	VP-2	43.00	150.00	150.0000	0.00
P-14	J-12	J-8	50.00	150.00	150.0000	0.00
P-15	J-14	VP-2	90.00	150.00	150.0000	0.00
P-16	J-12	J-13	111.00	150.00	150.0000	0.00
P-17	J-14	J-15	36.00	150.00	150.0000	0.00
P-18	J-14	J-16	38.00	150.00	150.0000	0.00
P-19	J-18	J-2	71.00	150.00	150.0000	0.00
P-20	J-10	J-18	60.00	150.00	150.0000	0.00

PUMP/LOSS ELEMENT DATA

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
46.41	0.00	75.00
39.37	58.30	75.00
21.01	116.60	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (m)	FLOWRATE (l/s)	EFFICIENCY (%)
45.59	0.00	75.00
37.15	45.20	75.00
15.11	90.40	75.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (l/s)	JUNCTION ELEVATION (m)	EXTERNAL GRADE (m)
J-1		0.47	291.00	
J-2		0.47	292.00	
J-3		0.00	293.00	
J-4		0.23	297.00	
J-5		0.23	294.00	
J-6		0.47	292.00	
J-7		0.00	301.00	
J-8		0.00	298.00	
J-9		1.64	292.00	
J-10		0.70	298.00	
J-11		0.00	290.00	
J-12		0.78	292.00	
J-13		57.57	304.00	
J-14		0.00	304.00	
J-15		0.66	300.00	
J-16		1.33	302.00	
J-17		4.33	298.00	
J-18		0.00	291.25	
VP-1		----	300.00	300.00
VP-2		----	300.00	300.00

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 20
NUMBER OF END NODES .....(J) = 18
NUMBER OF PRIMARY LOOPS .....(L) = 1
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 6 TRIALS: ACCURACY = 0.98019E-05

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE	HEAD LOSS	MINOR LOSS	LINE VELO.	HL+ML/ 1000	HL/ 1000

			lps	m	m	m/s	m/m	m/m
P-1	J-1	J-18	6.94	0.08	0.00	0.39	1.03	1.03
P-2	J-8	J-17	-34.31	0.34	0.00	1.94	19.90	19.90
P-3	J-8	J-9	-3.20	0.05	0.00	0.18	0.25	0.25
P-4	J-9	J-10	-4.84	0.07	0.00	0.27	0.53	0.53
P-5	J-1	J-11	-7.41	0.09	0.00	0.42	1.17	1.17
P-6	J-2	J-3	0.00	0.00	0.00	0.00	0.00	0.00
P-7	VP-1	J-11	28.25	6.98	0.00	1.60	13.88	13.88
P-8	J-2	J-4	0.93	0.00	0.00	0.05	0.02	0.02
P-9	J-4	J-5	0.23	0.00	0.00	0.01	0.00	0.00
P-10	J-4	J-6	0.47	0.00	0.00	0.03	0.01	0.01
P-11	J-6	J-7	0.00	0.00	0.00	0.00	0.00	0.00
P-12	J-11	J-12	20.84	1.50	0.00	1.18	7.90	7.90
P-13	J-17	VP-2	-38.64	1.07	0.00	2.19	24.80	24.80
P-14	J-12	J-8	-37.51	1.17	0.00	2.12	23.48	23.48
P-15	J-14	VP-2	-1.99	0.01	0.00	0.11	0.10	0.10
P-16	J-12	J-13	57.57	5.76	0.00	3.26	51.90	51.90
P-17	J-14	J-15	0.66	0.00	0.00	0.04	0.01	0.01
P-18	J-14	J-16	1.33	0.00	0.00	0.08	0.05	0.05
P-19	J-18	J-2	1.40	0.00	0.00	0.08	0.05	0.05
P-20	J-10	J-18	-5.54	0.04	0.00	0.31	0.68	0.68

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE lps	INLET HEAD m	OUTLET HEAD m	PUMP HEAD m	EFFIC- ENCY %	USEFUL POWER kW	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. m	Case
VP-1	28.25	0.00	44.57	44.6	75.00	12.	0.8	0.8	**	**	10.1	0.0000
VP-2	40.63	0.00	38.66	38.7	75.00	15.	1.0	1.0	**	**	10.1	0.0000

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND lps	HYDRAULIC GRADE m	NODE ELEVATION m	PRESSURE HEAD m	NODE PRESSURE kPa
J-1		0.47	337.49	291.00	46.49	455.93
J-2		0.47	337.41	292.00	45.41	445.28
J-3		0.00	337.41	293.00	44.41	435.47
J-4		0.23	337.40	297.00	40.40	396.21
J-5		0.23	337.40	294.00	43.40	425.62
J-6		0.47	337.40	292.00	45.40	445.24
J-7		0.00	337.40	301.00	36.40	356.98
J-8		0.00	337.26	298.00	39.26	384.96
J-9		1.64	337.30	292.00	45.30	444.25
J-10		0.70	337.37	298.00	39.37	386.07
J-11		0.00	337.58	290.00	47.58	466.63
J-12		0.78	336.08	292.00	44.08	432.29
J-13		57.57	330.32	304.00	26.32	258.12
J-14		0.00	338.65	304.00	34.65	339.81
J-15		0.66	338.65	300.00	38.65	379.03
J-16		1.33	338.65	302.00	36.65	359.41
J-17		4.33	337.59	298.00	39.59	388.28
J-18		0.00	337.41	291.25	46.16	452.67
VP-1		----	344.57	300.00	44.57	437.05
VP-2		----	338.66	300.00	38.66	379.13

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES kPa	JUNCTION NUMBER	MINIMUM PRESSURES kPa

J-11	466.63	J-13	258.12
J-1	455.93	J-14	339.81
J-18	452.67	J-7	356.98
J-2	445.28	J-16	359.41
J-6	445.24	J-15	379.03

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (m/s)	PIPE NUMBER	MINIMUM VELOCITY (m/s)
P-16	3.26	P-9	0.01
P-13	2.19	P-10	0.03
P-14	2.12	P-17	0.04
P-2	1.94	P-8	0.05
P-7	1.60	P-18	0.08

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (m/m)	PIPE NUMBER	MINIMUM HL+ML/1000 (m/m)
P-16	51.90	P-9	0.00
P-13	24.80	P-10	0.01
P-14	23.48	P-17	0.01
P-2	19.90	P-8	0.02
P-7	13.88	P-18	0.05

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (m/m)	PIPE NUMBER	MINIMUM HL/1000 (m/m)
P-16	51.90	P-9	0.00
P-13	24.80	P-10	0.01
P-14	23.48	P-17	0.01
P-2	19.90	P-8	0.02
P-7	13.88	P-18	0.05

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE lps	NODE TITLE
VP-1	28.25	
VP-2	40.63	

NET SYSTEM INFLOW = 68.88
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 68.88

==========

Total Power Cost

****

TOTAL POWER COST($) FOR THIS SIMULATION = 1.85

****

***** HYDRAULIC ANALYSIS COMPLETED *****

APPENDIX C

Stormwater Management Calculations

PINESTONE ENGINEERING LTD.

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                                Version 2.25  rev. 473"
"                MIDUSS created                              Sunday, February 07, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                        \\tsclient\Z\Project Documents\"
"                                                11200 Grandview Redevelopment\FSR\MIDUSS"
"                Output filename:                                          SyrPRE.out"
"                Licensee name:                                      Windows XP Mode"
"                Company                                                             "
"                Date & Time last used:                      2/2/2016 at 4:46:14 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      950.000   Coefficient A"
"        6.750   Constant B"
"        0.820   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          125.977    mm/hr"
"             Total depth                 39.121    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Catchment 101:  Pre-development development area"
"       11.000   % Impervious"
"       19.900   Total Area"
"      175.000   Flow length"
"        5.000   Overland Slope"
"       17.711   Pervious Area"
"      175.000   Pervious length"
"        5.000   Pervious slope"
"        2.189   Impervious Area"
"      175.000   Impervious length"
"        5.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       74.000   Pervious SCS Curve No."
"        0.195   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.924   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.862   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                0.568     0.000     0.000     0.000 c.m/sec"
"            Catchment 101          Pervious   Impervious Total Area "
"            Surface Area           17.711     2.189      19.900     hectare"
"            Time of concentration  50.956     4.543      34.568     minutes"
"            Time to Centroid       164.668    94.022     139.724    minutes"
"            Rainfall depth         39.121     39.121     39.121     mm"
"            Rainfall volume        6928.74    856.36     7785.10    c.m"
"            Rainfall losses        31.489     5.418      28.621     mm"
"            Runoff depth           7.632      33.703     10.500     mm"
"            Runoff volume          1351.70    737.76     2089.46    c.m"
"            Runoff coefficient     0.195      0.862      0.268      "
"            Maximum flow           0.219      0.539      0.568      c.m/sec"
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"           4   Add Runoff "
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" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.568     0.568     0.568     0.000"
" 38         START/RE-START TOTALS 101"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                    19.900    hectare"
"            Total Impervious area                    2.189    hectare"
"            Total % impervious                      11.000"
" 19         EXIT"
```

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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                            Sunday, February 07, 2010"
"           10   Units used:                                                ie METRIC"
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"                                             11200 Grandview Redevelopment\FSR\MIDUSS"
"                Output filename:                                        100yrPRE.out"
"                Licensee name:                                       Windows XP Mode"
"                Company                                                             "
"                Date & Time last used:                     2/2/2016 at 4:48:08 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1499.000   Coefficient A"
"        5.810   Constant B"
"        0.825   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          210.327    mm/hr"
"             Total depth                 60.387    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Catchment 101:  Pre-development development area"
"       11.000   % Impervious"
"       19.900   Total Area"
"      175.000   Flow length"
"        5.000   Overland Slope"
"       17.711   Pervious Area"
"      175.000   Pervious length"
"        5.000   Pervious slope"
"        2.189   Impervious Area"
"      175.000   Impervious length"
"        5.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       74.000   Pervious SCS Curve No."
"        0.311   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.924   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.891   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    1.091     0.000     0.000     0.000 c.m/sec"
"              Catchment 101          Pervious   Impervious Total Area "
"              Surface Area           17.711     2.189      19.900     hectare"
"              Time of concentration  32.032     3.652      24.621     minutes"
"              Time to Centroid       140.456    91.358     127.636    minutes"
"              Rainfall depth         60.387     60.387     60.387     mm"
"              Rainfall volume        1.0695     0.1322     1.2017     ha-m"
"              Rainfall losses        41.578     6.605      37.731     mm"
"              Runoff depth           18.809     53.782     22.656     mm"
"              Runoff volume          3331.25    1177.28    4508.53    c.m"
"              Runoff coefficient     0.311      0.891      0.375      "
"              Maximum flow           0.778      0.880      1.091      c.m/sec"
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" 40           HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                    1.091     1.091     1.091     0.000"
" 38           START/RE-START TOTALS 101"
"             3   Runoff Totals on EXIT"
"              Total Catchment area                    19.900    hectare"
"              Total Impervious area                    2.189    hectare"
"              Total % impervious                      11.000"
" 19           EXIT"
```

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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                            Sunday, February 07, 2010"
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"                Job folder:                       \\tsclient\Z\Project Documents\"
"                                             11200 Grandview Redevelopment\FSR\MIDUSS"
"                Output filename:                                          5yrPOST.out" <--
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"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32         STORM Chicago storm"
"            1   Chicago storm"
"      950.000   Coefficient A"
"        6.750   Constant B"
"        0.820   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          125.977    mm/hr"
"             Total depth                 39.121    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Catchment 201:  Post-development development area"
"       31.000   % Impervious"
"       19.900   Total Area"
"      175.000   Flow length"
"        5.000   Overland Slope"
"       13.731   Pervious Area"
"      175.000   Pervious length"
"        5.000   Pervious slope"
"        6.169   Impervious Area"
"      175.000   Impervious length"
"        5.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       74.000   Pervious SCS Curve No."
"        0.195   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.924   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.862   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                1.541     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           13.731     6.169      19.900     hectare"
"            Time of concentration  50.956     4.543      20.097     minutes"
"            Time to Centroid       164.668    94.022     117.697    minutes"
"            Rainfall depth         39.121     39.121     39.121     mm"
"            Rainfall volume        5371.72    2413.38    7785.10    c.m"
"            Rainfall losses        31.489     5.418      23.407     mm"
"            Runoff depth           7.632      33.703     15.714     mm"
"            Runoff volume          1047.94    2079.14    3127.08    c.m"
"            Runoff coefficient     0.195      0.862      0.402      "
"            Maximum flow           0.170      1.518      1.541      c.m/sec"
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"           4   Add Runoff "
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" 38         START/RE-START TOTALS 201"
"           3   Runoff Totals on EXIT"
"            Total Catchment area                    19.900    hectare"
"            Total Impervious area                    6.169    hectare"
"            Total % impervious                      31.000"
" 19         EXIT"
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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                                Version 2.25  rev. 473"
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"                                                11200 Grandview Redevelopment\FSR\MIDUSS"
"                Output filename:                                        100yrPOST.out"
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"     1500.000   Max. Hydrograph"
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"            1   Chicago storm"
"     1499.000   Coefficient A"
"        5.810   Constant B"
"        0.825   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          210.327    mm/hr"
"             Total depth                 60.387    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Catchment 201:  Post-development development area"
"       31.000   % Impervious"
"       19.900   Total Area"
"      175.000   Flow length"
"        5.000   Overland Slope"
"       13.731   Pervious Area"
"      175.000   Pervious length"
"        5.000   Pervious slope"
"        6.169   Impervious Area"
"      175.000   Impervious length"
"        5.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       74.000   Pervious SCS Curve No."
"        0.311   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.924   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.891   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                2.643     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           13.731     6.169      19.900     hectare"
"             Time of concentration  32.032     3.652      16.074     minutes"
"             Time to Centroid       140.456    91.358     112.849    minutes"
"             Rainfall depth         60.387     60.387     60.387     mm"
"             Rainfall volume        0.8292     0.3725     1.2017     ha-m"
"             Rainfall losses        41.578     6.605      30.736     mm"
"             Runoff depth           18.809     53.782     29.650     mm"
"             Runoff volume          2582.66    3317.79    5900.45    c.m"
"             Runoff coefficient     0.311      0.891      0.491      "
"             Maximum flow           0.603      2.479      2.643      c.m/sec"
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"            4   Add Runoff "
"                2.643     2.643     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                2.643     2.643     2.643     0.000"
" 38          START/RE-START TOTALS 201"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    19.900    hectare"
"             Total Impervious area                    6.169    hectare"
"             Total % impervious                      31.000"
" 19          EXIT"
```

APPENDIX D

Utility Correspondence

From: Rogers, Christine
To: Joe Voisin
Subject: RE: Gas Servicing - Grandview Resort - Huntsville
Date: Tuesday, December 22, 2015 10:11:31 AM

Hi Joe,

Currently we have 2 mains in the area that could service this development. There is a 4" low pressure main from the station on Hwy 60 heading west, then south down Grandview Dr. We also have a 6" High pressure line from the station heading east. The star in the image below is showing approximate station location.

Once you have an estimated consumption I can send a request to our Distribution Planning department to confirm that the system can handle the added load.

Keep me posted! Thanks Joe and Merry Christmas!

Christine Rogers
New Business Project Coordinator
Union Gas Limited - A Spectra Energy Company
36 Charles St E
P.O. Box 3040
North Bay, Ont. P1B8K7
Office 705-475-7948
Cell 705-358-0628
Toll Free: 888-401-6791 x5177948

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uniongas
A Spectra Energy Company

From: Joe Voisin [mailto:jvoisin@pel.ca]
Sent: December-22-15 8:54 AM
To: Rogers, Christine
Subject: RE: Gas Servicing - Grandview Resort - Huntsville

Hi Christine:

We are looking into a development proposal that would rezoning existing golf course lands to permit residential development with upwards of 200 units at the subject development site located off Highway 60 east of the Town of Huntsville.

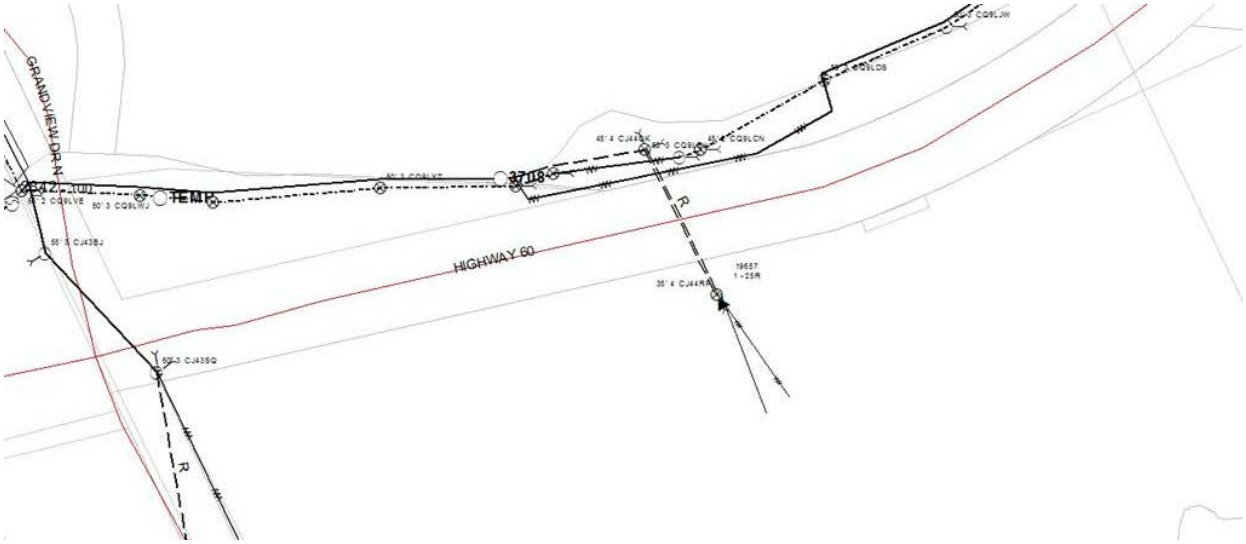
Can you please confirm existing gas servicing is readily available to service the proposed development. I believe there is a large gas main located on Highway 60.

Thanks and Merry Christmas
Joe Voisin, P.Eng.
Pinestone Engineering Ltd.

From: donovan.dockrill@HydroOne.com
To: Joe Voisin
Cc: Planning.Z5Distribution@HydroOne.com; subdivision@HydroOne.com
Subject: RE: Hydro Servicing - Grandview Resort - Huntsville
Date: Tuesday, December 22, 2015 2:19:25 PM

Good afternoon Joe,

From what I can see there is existing 7.2kV 3-phase overhead along Highway 60. Further information can be provided once a project is formally initiated and a field Tech provides their input.



Regards,

DONOVAN DOCKRILL
Supervising Planning Technician, Technical Services, BAF
Hydro One Networks Inc.
420 Welham Road, Barrie, ON L4N 8Z2
Tel: (705)719-5711
Fax: (705)719-0716
donovan.dockrill@hydroone.com
www.hydroone.com

From: Joe Voisin [mailto:jvoisin@pel.ca]
Sent: Tuesday, December 22, 2015 8:57 AM
To: DOCKRILL Donovan
Subject: FW: Hydro Servicing - Grandview Resort - Huntsville

Hi Donovan:

We are looking into a development proposal that would rezone existing golf course lands to permit residential development with upwards of 200 units at the subject development site located off Highway 60 east of the Town of Huntsville.

Can you please confirm existing hydro servicing is readily available to service the proposed development. I believe there are high voltage lines located on Highway 60.

Thanks and Merry Christmas
Joe Voisin, P.Eng.
Pinestone Engineering Ltd.