

## **APPENDIX C**

### **Water Servicing & Fire Flow Analysis**

**TABLE C1 - PROPOSED PEAK WATER DEMAND CALCULATIONS - RESIDENTIAL -  
BLOCK 1, WEST CONDO**

		<b>TOTAL</b>
1.1 Total One-Bedroom or One Bedroom + Den Units	units	169
1.2 Persons Per Unit*	persons/unit	1.4
2.1 Total Two Bedroom Units	units	151
2.2 Persons Per Unit*	persons/unit	2.1
3.1 Total Three Bedroom Units	units	20
3.2 Persons Per Unit*	persons/unit	3.1
4.1 Total Residential Population	persons	616
4.2 Total Population Used for Calculation Purposes**	persons	620
5.1 Per Capita Demand @ 191 L/person/day	L/day	118,420
5.2 Equivalent Population Demand	L/s	1.371
6.1 Peak Hour Peaking Factor*		2.5
6.2 Peak Hour Design Demand Rate	L/s	3.4
6.3 Peak Hour Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	296
7.1 Maximum Day Peaking Factor*		1.3
7.2 Maximum Day Design Demand Rate	L/s	1.8
6.4 Maximum Day Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	154

\* as per City of Toronto Design Criteria for Sewers and Watermains - Nov. 2009

\*\* The population was rounded to 620 persons to provide a conservative figure for demand calculations.

**TABLE C2 - PROPOSED PEAK WATER DEMAND CALCULATIONS - RETAIL -  
BLOCK 1, WEST CONDO**

		<b>TOTAL</b>
1.1 Total Retail Floor Area	m <sup>2</sup>	1,100
1.2 Equivalent Population Density*	persons/100m <sup>2</sup>	1.1
1.3 Equivalent Population	persons	12
1.4 Per Capita Demand @ 191 L/person/day*	L/day	2,311
1.5 Total Retail Demand	L/s	0.03
2.1 Peak Hour Peaking Factor*		1.2
2.2 Peak Hour Design Demand	L/s	0.03
2.3 Peak Hour Design Demand	m <sup>3</sup> /day	3
3.1 Maximum Day Peaking Factor*		1.1
3.2 Maximum Day Design Demand	L/s	0.03
3.3 Maximum Day Design Demand	m <sup>3</sup> /day	3

\* as per City of Toronto Design Criteria for Sewers and Watermains - Nov. 2009

**TABLE C3- PROPOSED PEAK WATER DEMAND CALCULATIONS - DOMESTIC**

		<b>PEAK HOUR</b>	<b>MAXIMUM DAY</b>	<b>AVERAGE</b>
1.1 Residential Demand	L/s	3.43	1.78	1.37
1.2 Retail Demand	L/s	0.03	0.03	0.03
2.1 Total Flow Rate	L/s	3.46	1.81	1.40
2.2 Total Flow Rate	L/min	208	109	84

**TABLE C4 - PROPOSED PEAK WATER DEMAND CALCULATIONS - RESIDENTIAL -  
BLOCK 1, EAST CONDO**

		<b>TOTAL</b>
1.1 Total One-Bedroom or One Bedroom + Den Units	units	161
1.2 Persons Per Unit*	persons/unit	1.4
2.1 Total Two Bedroom Units	units	209
2.2 Persons Per Unit*	persons/unit	2.1
3.1 Total Three Bedroom Units	units	0
3.2 Persons Per Unit*	persons/unit	3.1
4.1 Total Residential Population	persons	664
4.2 Total Population Used for Calculation Purposes**	persons	670
5.1 Per Capita Demand @ 191 L/person/day	L/day	127,970
5.2 Equivalent Population Demand	L/s	1.481
6.1 Peak Hour Peaking Factor*		2.5
6.2 Peak Hour Design Demand Rate	L/s	3.7
6.3 Peak Hour Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	320
7.1 Maximum Day Peaking Factor*		1.3
7.2 Maximum Day Design Demand Rate	L/s	1.9
6.4 Maximum Day Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	166

\* as per City of Toronto Design Criteria for Sewers and Watermains - Nov. 2009

\*\* The population was rounded to 670 persons to provide a conservative figure for demand calculations.

**TABLE C5- PROPOSED PEAK WATER DEMAND CALCULATIONS - DOMESTIC - BLOCK 1, EAST CONDO**

		<b>PEAK HOUR</b>	<b>MAXIMUM DAY</b>	<b>AVERAGE</b>
1.1 Residential Demand	L/s	3.70	1.93	1.48
2.1 Total Flow Rate	L/s	3.70	1.93	1.48
2.2 Total Flow Rate	L/min	222	116	89

**TABLE C6 - PROPOSED PEAK WATER DEMAND CALCULATIONS - RESIDENTIAL -  
BLOCK 2, NORTH CONDO**

		<b>TOTAL</b>
1.1 Total One-Bedroom or One Bedroom + Den Units	units	188
1.2 Persons Per Unit*	persons/unit	1.4
2.1 Total Two Bedroom Units	units	142
2.2 Persons Per Unit*	persons/unit	2.1
3.1 Total Three Bedroom Units	units	0
3.2 Persons Per Unit*	persons/unit	3.1
4.1 Total Residential Population	persons	561
4.2 Total Population Used for Calculation Purposes**	persons	570
5.1 Per Capita Demand @ 191 L/person/day	L/day	108,870
5.2 Equivalent Population Demand	L/s	1.260
6.1 Peak Hour Peaking Factor*		2.5
6.2 Peak Hour Design Demand Rate	L/s	3.2
6.3 Peak Hour Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	272
7.1 Maximum Day Peaking Factor*		1.3
7.2 Maximum Day Design Demand Rate	L/s	1.6
6.4 Maximum Day Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	142

\* as per City of Toronto Design Criteria for Sewers and Watermains - Nov. 2009

\*\* The population was rounded to 570 persons to provide a conservative figure for demand calculations.

**TABLE C7- PROPOSED PEAK WATER DEMAND CALCULATIONS - DOMESTIC - BLOCK 2, NORTH CONDO**

		<b>PEAK HOUR</b>	<b>MAXIMUM DAY</b>	<b>AVERAGE</b>
1.1 Residential Demand	L/s	3.15	1.64	1.26
2.1 Total Flow Rate	L/s	3.15	1.64	1.26
2.2 Total Flow Rate	L/min	189	98	76



**TABLE C8 - PROPOSED PEAK WATER DEMAND CALCULATIONS - RESIDENTIAL -  
BLOCK 2, SOUTH CONDO**

		<b>TOTAL</b>
1.1 Total One-Bedroom or One Bedroom + Den Units	units	140
1.2 Persons Per Unit*	persons/unit	1.4
2.1 Total Two Bedroom Units	units	220
2.2 Persons Per Unit*	persons/unit	2.1
3.1 Total Three Bedroom Units	units	0
3.2 Persons Per Unit*	persons/unit	3.1
4.1 Total Residential Population	persons	658
4.2 Total Population Used for Calculation Purposes**	persons	660
5.1 Per Capita Demand @ 191 L/person/day	L/day	126,060
5.2 Equivalent Population Demand	L/s	1.459
6.1 Peak Hour Peaking Factor*		2.5
6.2 Peak Hour Design Demand Rate	L/s	3.6
6.3 Peak Hour Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	315
7.1 Maximum Day Peaking Factor*		1.3
7.2 Maximum Day Design Demand Rate	L/s	1.9
6.4 Maximum Day Design Demand Rate (m <sup>3</sup> /day)	m <sup>3</sup> /day	164

\* as per City of Toronto Design Criteria for Sewers and Watermains - Nov. 2009

\*\* The population was rounded to 570 persons to provide a conservative figure for demand calculations.

**TABLE C9- PROPOSED PEAK WATER DEMAND CALCULATIONS - DOMESTIC - BLOCK 2, SOUTH CONDO**

		<b>PEAK HOUR</b>	<b>MAXIMUM DAY</b>	<b>AVERAGE</b>
1.1 Residential Demand	L/s	3.65	1.90	1.46
2.1 Total Flow Rate	L/s	3.65	1.90	1.46
2.2 Total Flow Rate	L/min	219	114	88

**TABLE C10 - FIRE DEMAND CALCULATIONS - BASED ON F.U.S. GUIDELINES  
Tower A**

		TOTAL
1.1	Coefficient for type of construction:	0.6
1.2	Height in Stories	29
1.3	1st Floor Area (Largest Floor Area)	m <sup>2</sup> 5,182
1.4	2nd Floor Area	m <sup>2</sup> 5,182
1.5	3rd Floor Area	m <sup>2</sup> 5,182
1.6	Stories to Use in Calculation (1 + 25% of each of the ftwo floors immediately above the largest floor)	1 + 2 * 25%
1.7	Total Area	m <sup>2</sup> 7,773
1.8	Fire Flow Required	L/min 12,000
2.1	25% Reduction for Occupancy Charge - low fire hazard	L/min -3,000
2.2	Fire Flow Required	L/min 9,000
3.1	50% Reduction for Automatic Sprinklers	L/min -4,500
4.1	Charge for Building Separation	
	North: Nearest Building	10.1 - 20.0m 15%
	West: Nearest Building	10.1 - 20.0m 15%
	South: Nearest Building	20.1 - 30.0m 10%
	East: Nearest Building	30.1 - 45.0m 5%
4.2	Charge for Building Separation	L/min 4,050
5.1	Fire Flow Required	L/min 9,000
5.2	Fire Flow Required	L/s 150.0

**TABLE C11 - FIRE DEMAND CALCULATIONS - BASED ON F.U.S. GUIDELINES  
Tower B**

			<b>TOTAL</b>
1.1	Coefficient for type of construction:		0.6
1.2	Height in Stories		39
1.3	1st Floor Area (Largest Floor Area)	m <sup>2</sup>	5,182
1.4	2nd Floor Area	m <sup>2</sup>	5,182
1.5	3rd Floor Area	m <sup>2</sup>	5,182
1.6	Stories to Use in Calculation (1 + 25% of each of the ftwo floors immediately above the largest floor)		1 + 2 * 25%
1.7	Total Area	m <sup>2</sup>	7,773
1.8	Fire Flow Required	L/min	12,000
2.1	25% Reduction for Occupancy Charge - low fire hazard	L/min	-3,000
2.2	Fire Flow Required	L/min	9,000
3.1	50% Reduction for Automatic Sprinklers	L/min	-4,500
4.1	Charge for Building Separation		
	North: Nearest Building	20.1 - 30.0m	10%
	West: Nearest Building	10.1 - 20.0m	15%
	South: Nearest Building	0 - 3.0 m	25%
	East: Nearest Building	30.1 - 45.0m	5%
4.2	Charge for Building Separation	L/min	4,950
5.1	Fire Flow Required	L/min	10,000
5.2	Fire Flow Required	L/s	166.7

**TABLE C12 - FIRE DEMAND CALCULATIONS - BASED ON F.U.S. GUIDELINES  
Tower C**

		TOTAL
1.1	Coefficient for type of construction:	0.6
1.2	Height in Stories	34
1.3	1st Floor Area (Largest Floor Area)	m <sup>2</sup> 3,646
1.4	2nd Floor Area	m <sup>2</sup> 3,646
1.5	3rd Floor Area	m <sup>2</sup> 3,646
1.6	Stories to Use in Calculation (1 + 25% of each of the ftwo floors immediately above the largest floor)	1 + 2 * 25%
1.7	Total Area	m <sup>2</sup> 5,468
1.8	Fire Flow Required	L/min 10,000
2.1	25% Reduction for Occupancy Charge - low fire hazard	L/min -2,500
2.2	Fire Flow Required	L/min 7,500
3.1	50% Reduction for Automatic Sprinklers	L/min -3,750
4.1	Charge for Building Separation	
	North: Nearest Building	10.1 - 20.0m 15%
	West: Nearest Building	30.1 - 45.0m 5%
	South: Nearest Building	30.1 - 45.0m 5%
	East: Nearest Building	10.1 - 20.0m 15%
4.2	Charge for Building Separation	L/min 3,000
5.1	Fire Flow Required	L/min 7,000
5.2	Fire Flow Required	L/s 116.7

**TABLE C13 - C-TA TOWNHOUSE BLOCK A - FIRE DEMAND CALCULATIONS - BASED ON F.U.S. GUIDELINES (1999)**

1.1 Coefficient for type of construction:						1.25
1.2 Total GFA For Block					m <sup>2</sup>	541.10
1.3 Fire Flow Required					L/min	6,000
2.1 Reduction for Occupancy Charge			Non-Combustible	-25%	L/min	-1,500
2.2 Fire Flow Required					L/min	4,500
3.1 Reduction for Automatic Sprinklers				0%	L/min	0
3.2 Fire Flow Required					L/min	4,500
4.1 Charge for Building Separation						
North			27.4m	10%		50%
South			17.3m	15%		
West			9.7m	15%		
East			28.0m	10%		
4.2 Charge for Building Separation					L/min	2,250
5. Fire Flow Required					L/min	7,000
6. Fire Flow Required					L/s	116.67

**TABLE C14 - C-TA TOWNHOUSE BLOCK B - FIRE DEMAND CALCULATIONS - BASED ON F.U.S. GUIDELINES (1999)**

1.1 Coefficient for type of construction:						1.25
1.2 Total GFA For Block					m <sup>2</sup>	541.15
1.3 Fire Flow Required					L/min	6,000
2.1 Reduction for Occupancy Charge			Non-Combustible	-25%	L/min	-1,500
2.2 Fire Flow Required					L/min	4,500
3.1 Reduction for Automatic Sprinklers				0%	L/min	0
3.2 Fire Flow Required					L/min	4,500
4.1 Charge for Building Separation						
North			27.4m	10%		60%
South			17.3m	15%		
West			16.7m	15%		
East			9.7m	20%		
4.2 Charge for Building Separation					L/min	2,700
5. Fire Flow Required					L/min	7,000
6. Fire Flow Required					L/s	116.67

**TABLE C15 - FIRE DEMAND CALCULATIONS - BASED ON F.U.S. GUIDELINES**  
**Tower D**

			<b>TOTAL</b>
1.1	Coefficient for type of construction:		0.6
1.2	Height in Stories		28
1.3	1st Floor Area (Largest Floor Area)	m <sup>2</sup>	3,646
1.4	2nd Floor Area	m <sup>2</sup>	3,646
1.5	3rd Floor Area	m <sup>2</sup>	3,646
1.6	Stories to Use in Calculation (1 + 25% of each of the ftwo floors immediately above the largest floor)		1 + 2 * 25%
1.7	Total Area	m <sup>2</sup>	5,468
1.8	Fire Flow Required	L/min	10,000
2.1	25% Reduction for Occupancy Charge - low fire hazard	L/min	-2,500
2.2	Fire Flow Required	L/min	7,500
3.1	50% Reduction for Automatic Sprinklers	L/min	-3,750
4.1	Charge for Building Separation		
	North: Nearest Building	3.1 to 10m	25%
	West: Nearest Building	30.1 - 45.0m	5%
	South: Nearest Building	10.1 - 20.0m	15%
	East: Nearest Building	30.1 - 45.0m	5%
4.2	Charge for Building Separation	L/min	3,750
5.1	Fire Flow Required	L/min	8,000
5.2	Fire Flow Required	L/s	133.3



**TABLE C16 - PROPOSED REDEVELOPMENT TOTAL WATER DEMAND**

PER CITY OF TORONTO DESIGN CRITERIA AND MOE DESIGN GUIDELINES, WATER SUPPLY SYSTEMS SHOULD BE DESIGNED TO SATISFY THE GREATER OF EITHER OF THE FOLLOWING DEMANDS:

- MAXIMUM DAY DOMESTIC DEMAND PLUS FIRE FLOW
- PEAK HOUR DOMESTIC DEMAND

**MAX DAY & FIRE FLOWS**

MAX DAY	1.93 L/S
FIRE	166.7 L/s
Total Max Day & Fire Flow	168.6 L/s

**PEAK HOUR DOMESTIC DEMAND**

PEAK RATE	3.46 L/s
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THEREFORE, MAX DAY + FIRE FLOW IS GOVERNING REQUIREMENT

**WATER DEMAND**

Max Day Demand	1.93 L/s	116 L/min
Fire Flow*	166.7 L/s	10,000 L/min
Total Water Demand Requirement	168.6 L/s	10,116 L/min

Note (\*): Per City of Toronto's Design Criteria for Sewers and Watermains, in accordance with the Fire Underwriters Survey (FUS), fire flows will not be less than 4,800L/minute for a 2-hour duration in addition to maximum daily domestic demand, delivered with a residual pressure of not less than 140kPa (20psi).

Mr. Mauro Russo  
**Delnova Developments Limited**  
2001 Sheppard Avenue East, Suite 400  
Toronto Ontario **M2J 4Z8**

**03 November 2014**

Jackson Waterworks has completed fire hydrant flow testing and offer our report(s) accordingly.

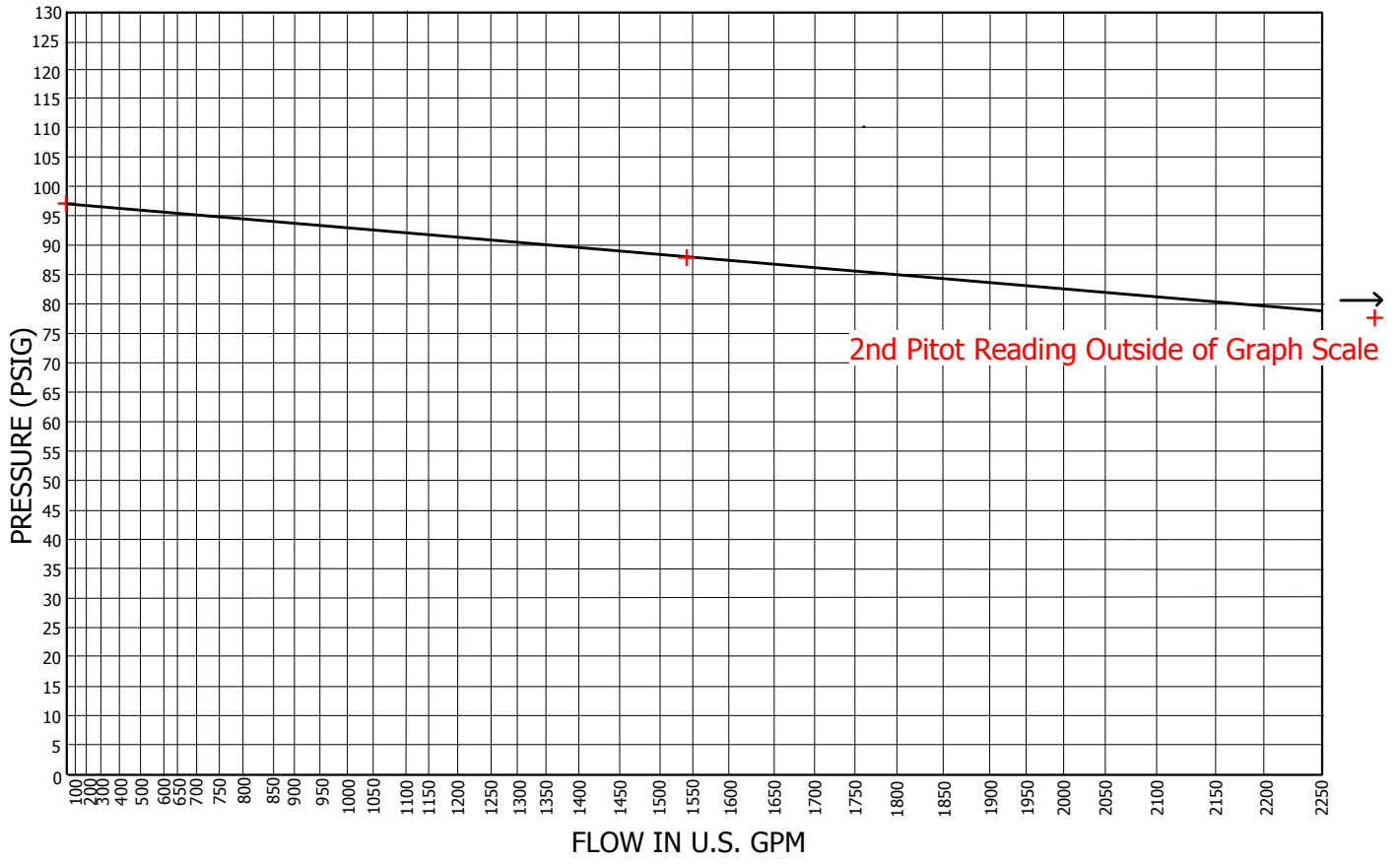
We define the Test Hydrant as the one being flowed, and the Base Hydrant as the one where static and residual pressure readings are recorded.

High water velocity caused pitot pressure gauge fluctuations, from which we used the mean for plotting purposes. This does not effect the overall accuracy of the test results.

Trusting this meet with your approval, we are...

Yours truly,

Mark Schmidt  
Jackson Waterworks



PORT No.	PORT DIA. (in/mm)	PITOT (psig)	FLOW (usgpm)	RESIDUAL (psig)
1	2.50/63	84	1540	88
2	2.50/63	68/68	2670	78
<b>THEORETICAL FLOW @ 20psi</b>			<b>4902</b>	

General Data	
Test Date	31 October 2014
Test Time	9:30am
Pipe Dia.	300mm
Static	97psig

Site Information	
Site or Developer Name	Delnove Developments Limited
Site Address/Municipality	Leslie Street, Toronto
Location of Test Hydrant	Leslie Street, 2nd North of Eglinton Avenue East
Location of Base Hydrant	Leslie Street, 3rd North of Eglinton Avenue East
Technician's Comments	No conversion factor used for flow calculation based on round and flush internal nozzle configuration. Refer to attached letter for any further comments.
	Verified By: Mark Schmidt

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*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.0                                 *
*****
```

Input File: 142950-20141124-EPANET Model-Looped.NET

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	14	450	300
13	14	2	90	300
2	2	3	80	300
3	3	4	5	150
4	4	5	.1	63
5	4	6	.1	63
6	3	7	20	300
7	7	8	20	300
8	8	9	20	300
9	9	10	20	300
10	10	11	20	300
11	11	12	20	300
12	12	13	20	300
14	3	18	20	300
15	18	19	20	300
16	19	20	20	300
17	20	21	20	300
18	21	22	20	300
19	22	23	20	300
20	23	13	20	300

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	-262.00	192.30	0.00	0.00 Reservoir
14	0.00	148.70	25.20	0.00
2	0.00	144.01	20.51	0.00
3	0.00	139.84	19.84	0.00
4	0.00	139.84	19.84	0.00
5	0.00	139.84	18.84	0.00
6	0.00	139.84	18.84	0.00
7	0.00	139.59	21.39	0.00
8	0.00	139.35	20.77	0.00
9	0.00	139.10	19.44	0.00
10	0.00	138.85	17.99	0.00

11	0.00	138.61	16.55	0.00
12	0.00	138.36	15.14	0.00

Page 2

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality
13	262.00	138.12	14.32	0.00
18	0.00	139.59	21.39	0.00
19	0.00	139.35	20.77	0.00
20	0.00	139.10	19.44	0.00
21	0.00	138.85	17.99	0.00
22	0.00	138.61	16.55	0.00
23	0.00	138.36	15.14	0.00

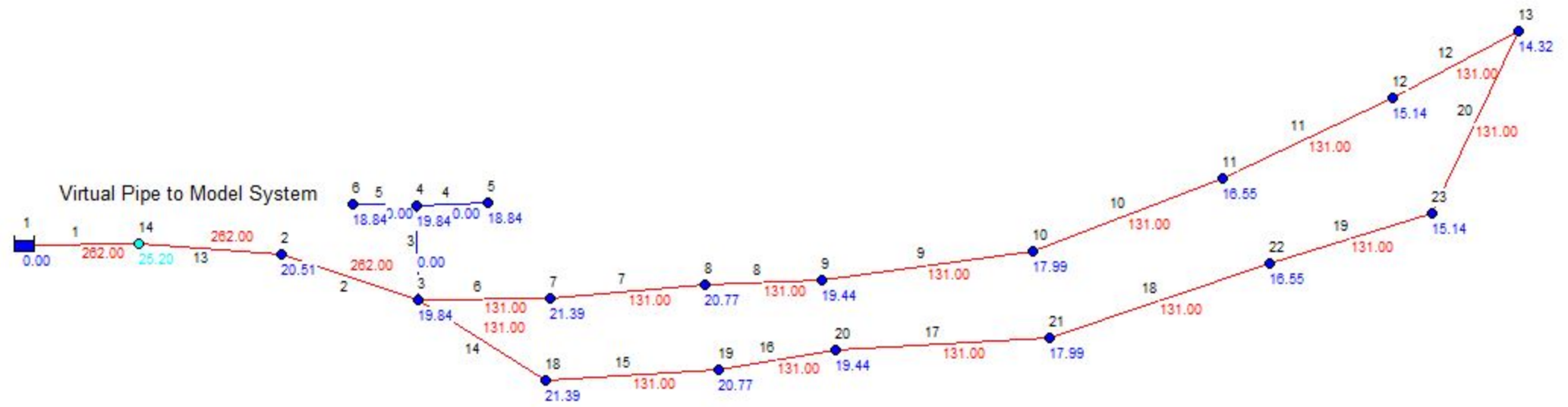
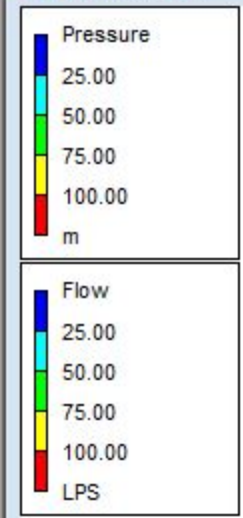
Link Results:

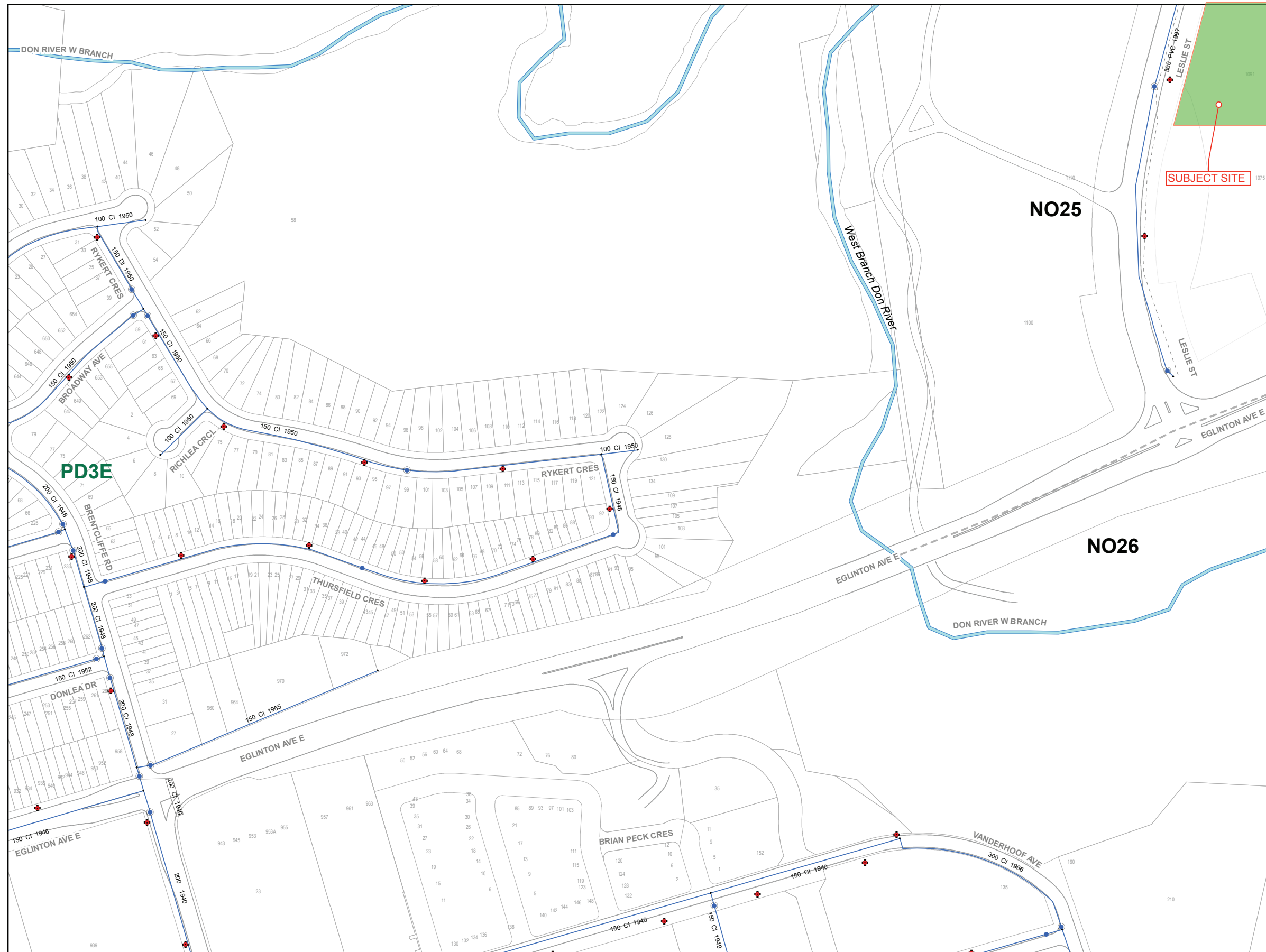
Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	262.00	3.71	96.89	Open
13	262.00	3.71	52.12	Open
2	262.00	3.71	52.12	Open
3	0.00	0.00	0.00	Open
4	0.00	0.00	0.00	Open
5	0.00	0.00	0.00	Open
6	131.00	1.85	12.29	Open
7	131.00	1.85	12.29	Open
8	131.00	1.85	12.29	Open
9	131.00	1.85	12.29	Open
10	131.00	1.85	12.29	Open
11	131.00	1.85	12.29	Open
12	131.00	1.85	12.29	Open
14	131.00	1.85	12.29	Open
15	131.00	1.85	12.29	Open
16	131.00	1.85	12.29	Open
17	131.00	1.85	12.29	Open
18	131.00	1.85	12.29	Open
19	131.00	1.85	12.29	Open
20	131.00	1.85	12.29	Open



Network Map

Day 1, 12:00 AM





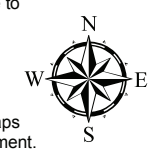
**Toronto Water Atlas**

- |                   |                               |                         |                    |                              |                  |
|-------------------|-------------------------------|-------------------------|--------------------|------------------------------|------------------|
| <b>Hydrant</b>    | <b>PRV</b>                    | <b>Valve</b>            | <b>Watermain</b>   | <b>Abandoned Main</b>        | <b>River</b>     |
| • Other           | ✱ Meter                       | • Open                  | — Distribution     | - - - Abandoned Main         | — River          |
| ✱ City of Toronto | ✱ Pressure District Valve     | • Closed                | — Transmission     | — Forcemain                  | — Highway        |
| ✱ Private         | <b>Metro Connection Valve</b> | ○ Chamber               | — Metro Connection | ■ Reservoir                  | — Curb           |
|                   | ● Open                        | ● Sanitary Pump Station | ■ Encasement       | — Pressure District Boundary | — Wards Boundary |
|                   | ○ Closed                      |                         |                    |                              |                  |

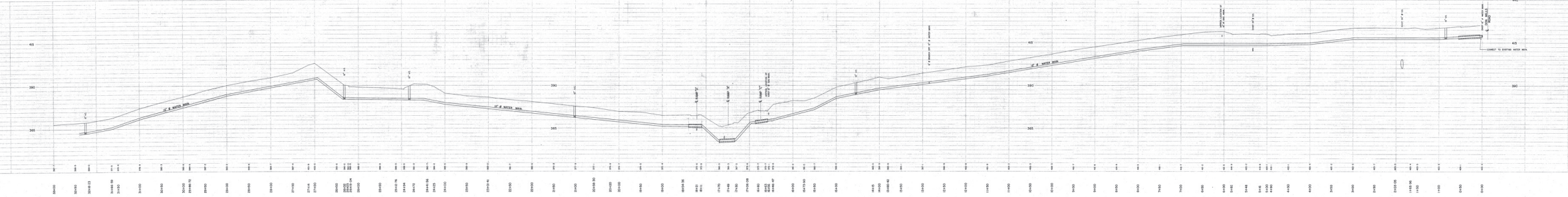
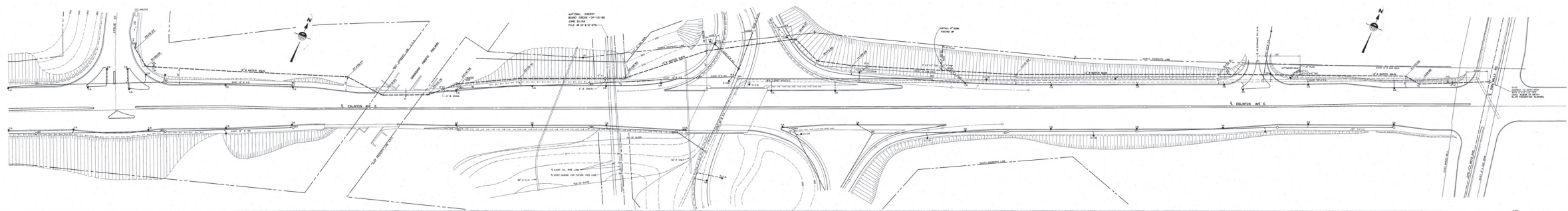
Third Edition  
Date: 01/09/2010



**General Notes:**  
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 - Any discrepancies, inaccuracies, errors and/or omissions in the maps should be reported to Toronto Water, Water Infrastructure Management. (18th Floor, Metro Hall, 55 John St, Toronto, ON, M5V 3C6) (Tel: 416-392-3957)



710	746	780
711	747	781
712	748	782



M. M. DILLON LIMITED  
 ENGINEERS  
 TOWNSHIP OF NORTH YORK  
 PROJECT NO. E-21-101  
 SCALE: 1" = 40' HORIZONTAL  
 1" = 4' VERTICAL  
 DATE: 10/1/01  
 SHEET NO. 1 OF 1  
 E-21-101

E-21-101

E-21-101