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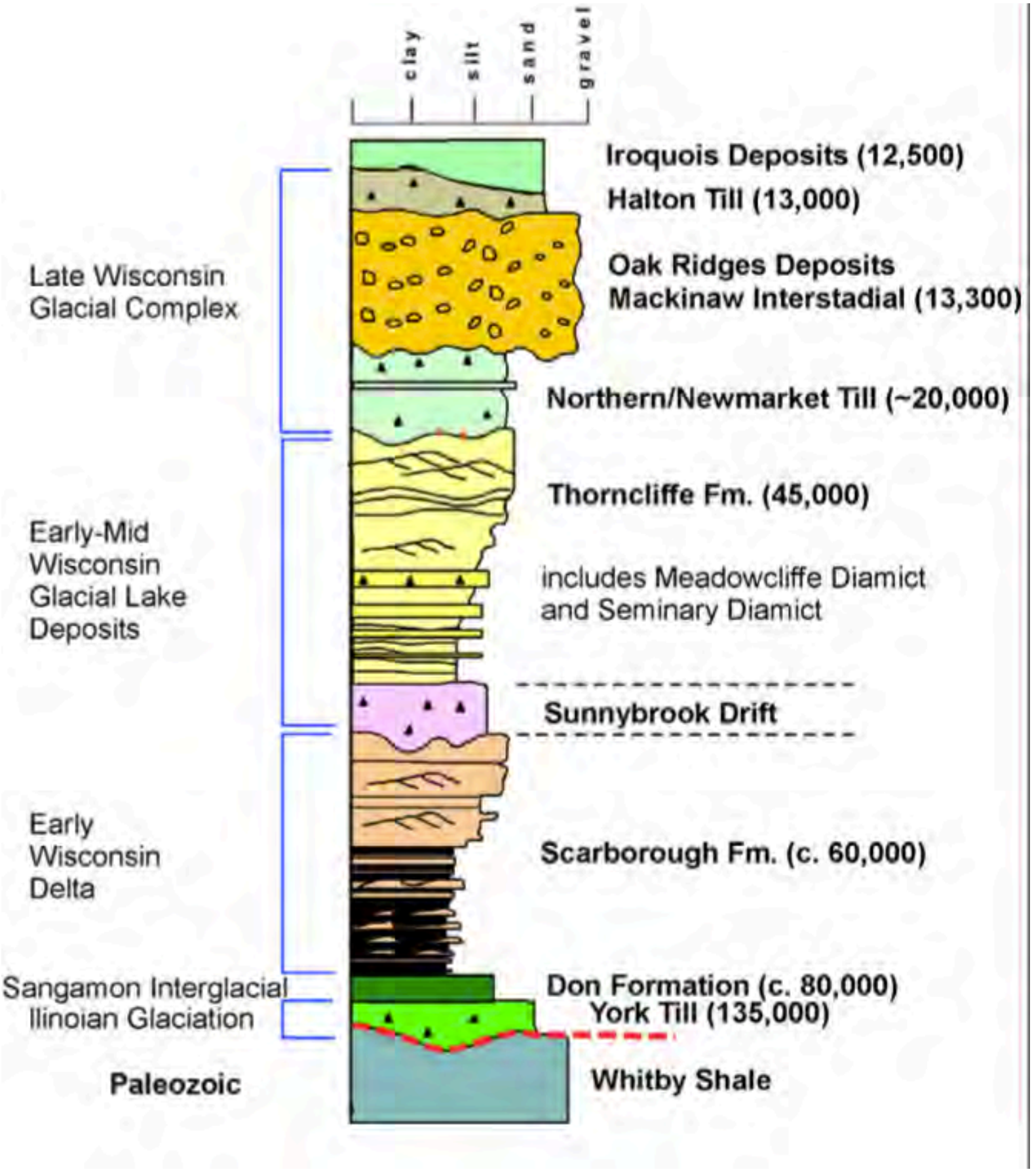
Appendix A

Oak Ridges Moraine Conceptual Model Cross Section (Kassenaar and Wexler, 2006)


clay
silt
sand
gravel
Iroquois Deposits (12,500)
Halton Till (13,000)
Oak Ridges Deposits
Mackinaw Interstadial (13,300)
Northern/Newmarket Till (~20,000)
Thorncliffe Fm. (45,000)
includes Meadowcliffe Diamict
and Seminary Diamict
Sunnybrook Drift
Scarborough Fm. (c. 60,000)
Don Formation (c. 80,000)
York Till (135,000)
Whitby Shale
Late Wisconsin
Glacial Complex
Early-Mid
Wisconsin
Glacial Lake
Deposits
Early
Wisconsin
Delta
Sangamon Interglacial
Illinoian Glaciation
Paleozoic

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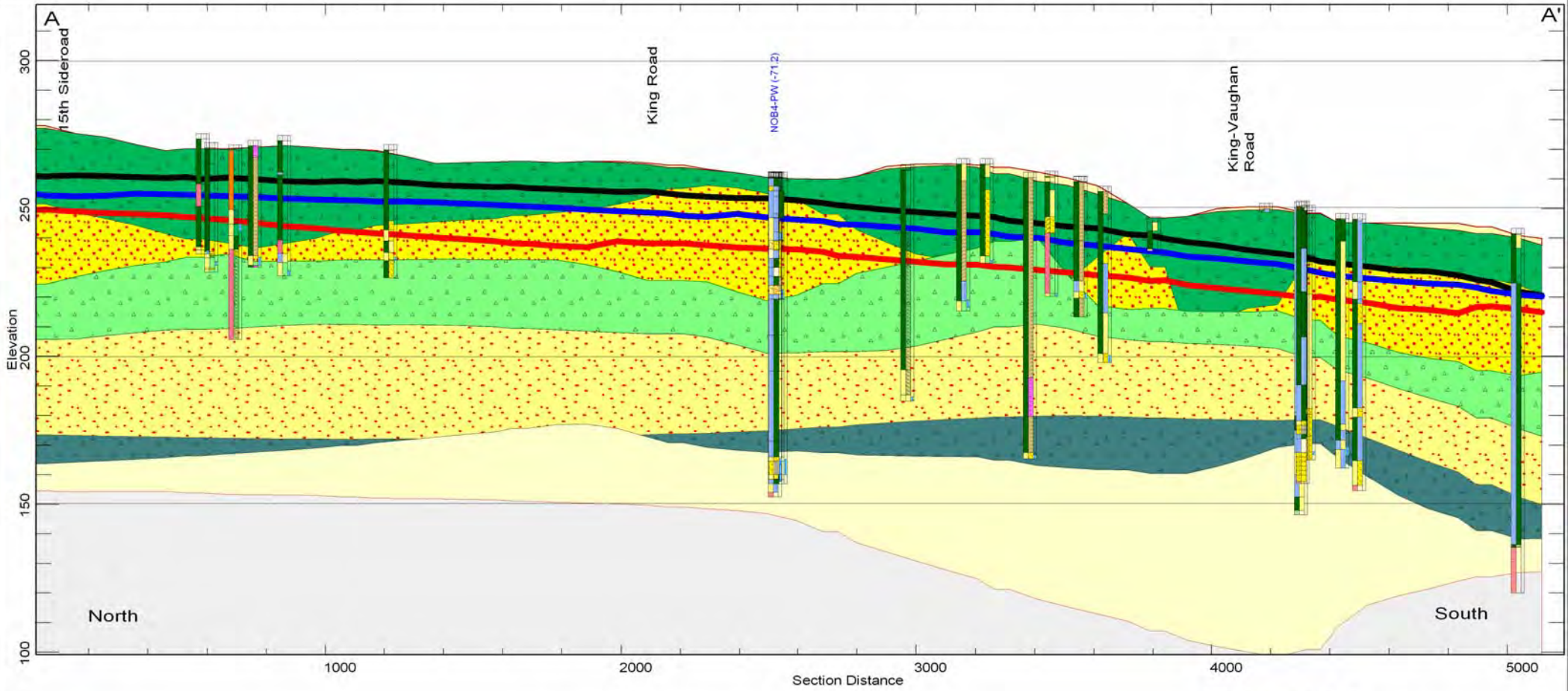
Appendix B

Hydrostratigraphic Cross Section of Study Area (MMM, 2007)



Most recent deposits
Halton Till
ORMAC (or equivalent)
Newmarket Till (or equivalent)
Thorncliffe Fm (or equivalent)
Sunnybrook Drift (or equivalent)
Scarborough Fm (or equivalent)
Bedrock - unsubdivided
ORM Observed Potentials
Thorncliffe Observed Potentials
Scarborough Observed Potentials

Distance in Metres, NAD83 UTM Zone 17

0 400 800

Horizontal scale 1:12500
Vertical exaggeration 10x
Map units - metres
Section offset distance - 150 metres

Highway 27
North-South Cross Section

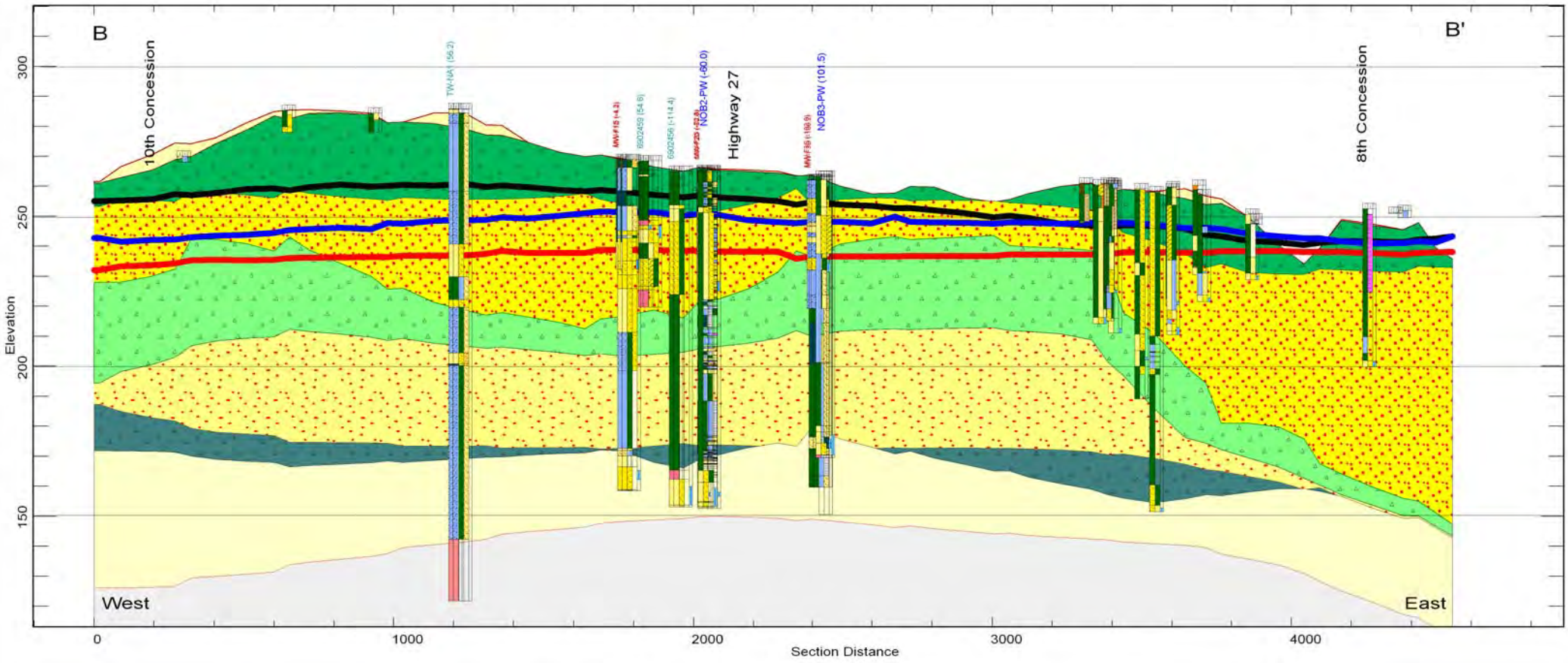
Figure 7

September, 2007

York Region

Earthfx

MMM GROUP



Distance in Metres - NAD83, UTM Zone 17

0 400 800

- Most recent deposits
- Halton Till
- ORMAC (or equivalent)
- Newmarket Till (or equivalent)
- Thorncliffe Fm (or equivalent)
- Sunnybrook Drift (or equivalent)
- Scarborough Fm (or equivalent)
- Bedrock - unsubdivided
- ORM Observed Potentials
- Thorncliffe Observed Potentials
- Scarborough Observed Potentials

Horizontal scale 1:12500
Vertical exaggeration 10x
Map units - metres
Section offset distance - 150 metres

King Road
East-West Cross Section

Figure 8

September, 2007

York Region

Earthfx

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Appendix C

Production Well Borehole Logs (PW-2, PW-3 and PW5)

69 No.

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

County or District YORK Township, Village, Town or City King

Con. 9 Lot 5 Date completed 19 (day) Feb. (month) 1961 (year)

Owner Fuller Village of Nobleton (print in block letters) Address Nobleton, Ontario

Casing and Screen Record

Inside diameter of casing 12 3/4" ø

Total length of casing 347 from grade

Type of screen Johnson #125 slot 35

Length of screen 19'8" with 3'6" of 10" pipe on top

Depth to top of screen 342'10"

Diameter of finished hole 12 3/4"

Pumping Test

Static level Approx. 59'

Test-pumping rate 380

Pumping level 89' 6"

Duration of test pumping 24 hr.

Water clear or cloudy at end of test clear

Recommended pumping rate 300

with pumping level of Approx. 82'

Well Log NOBLETON Well #2

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of (fresh, sulphur
Brown Clay	0	15	39		
Blue Clay	15	39	327	268	fres
Sand & Gravel	39	42			
Clay, Sand & Gravel	42	140			
Blue Clay	140	327			
Sand, Gravel & Clay					
Packed very tight	327	340			
Clean sand & gravel	340	361			
Gravel, Clay & Boulders	361	362			
Sand & Fine Gravel	362	366			
Sand and few small stones	366	367			

For what purpose(s) is the water to be used?

MUNICIPAL

Is well on upland, in valley, or on hillside?

Upland

Drilling Firm J. J. Rutledge

Address

Licence Number

Name of Driller Dale

Address

Date

(Signature of Licensed Drilling Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow

Form 7

COPY
Lot 6
MOE#8538
30-13

SEP 13 1976

4 8 6 1 7 7 5
4 8 6 5 5
2 4

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District YORK Township, Village, Town or City
Con. 8 Lot 6 Date completed 50 (day)

Owner PUBLIC UTILITIES COMMISSION OF NOBLETON (print in block letters) Address MARS H. HILL NOBLETON

Casing and Screen Record

Inside diameter of casing 12 5/8
Total length of casing 283
Type of screen JONSON STAINLESS STEEL
Length of screen 22' 10" 10" NIPPEL ON TOP
Depth to top of screen 273
Diameter of finished hole 12 5/8

Pumping Test

Static level 54' 4"
Test-pumping rate 350 I.P.G.
Pumping level 91' 4"
Duration of test pumping 72 HOURS
Water clear or cloudy at end of test CLEAR
Recommended pumping rate 300
with pump setting of 160 feet below ground su

Well Log

Well #3

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of w (fresh, su sulphur)
BROWN CLAY	0	4	173	FRE
AND SAND	4	34		
GRAVEL	34	43		
GRAVEL SAND BOLDERS MUD	43	25		
SILT	25	204		
BLUE CLAY	204	273		
FINE SAND	273	280		
MEDIUM SAND	280	292	280	
GRAVEL MEDIUM SAND	292	305		
HARD PAN	305	300		

For what purpose(s) is the water to be used? DOMESTIC P.U.C.

Is well on upland, in valley, or on hillside? UPLAND

Drilling or Boring Firm VAN DEN BOOM WELL DRILLING

Address NOBLETON BOX 245

Licence Number 2445

Name of Driller or Borer R. VAN DEN BOOM

Address SAME

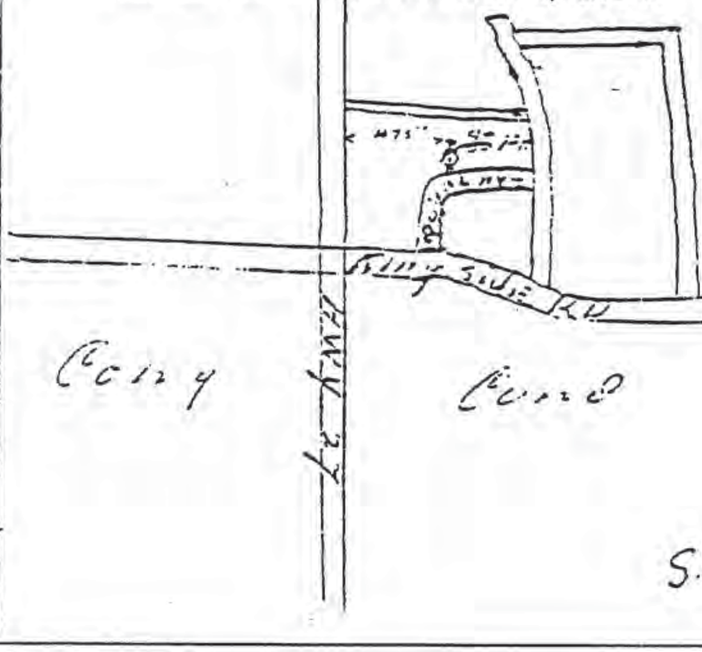
Date 10-5-60

(Signature of Licensed Drilling or Boring Contractor)

Public Utilities of Nobleton

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 7 15M-60-4138

OWRC COPY

S.C

MMM GROUP

Project No: 14-05124-001-HG1
Project: Hydrogeological Investigation
Client: Regional Municipality of York
Location: Nobleton, Ontario

Northing: 4864319
Easting: 608241
MOE ID#: A125896
Logged By: NC

Log of Borehole PW5 (NOB-PW5)

SUBSURFACE PROFILE

Depth (mbgs)	Symbol	Description	Elev/ Depth	Well Data	Number	Type	Recovery	Comments
		Ground Surface	260.50					

0		***TOPSOIL*** Black	0.00 / 260.05					**Well Construction**
								- Stick up: 0.92 mags
								- Well Diameter: 0.30 m
								- Outer Casing Diameter: 0.45 m
								- Inner well casing extends to 96.62 mbgs
								- Outer well casing extends to 41.15 mbgs
								- Annulus space between outer well casing and working casing filled with:
								  - cement from 0 to 4.27 mbgs
								- Annulus space between inner and outer well casings filled with:
								  - cement grout from 0 to 25.91 mbgs
								  - bentonite grout from 25.91 to 41.15 mbgs
								- Annulus space filled with bentonite mud from 41.15 to 70.10 mbgs
								- Screened depth: 96.62 to 101.19 mbgs

0.45		***SILTY SAND*** Brown						
1								
1.83		***CLAY*** Brown, some sand and gravel	258.67					
2								
3								
4								
4.57		***SAND AND GRAVEL*** Brown, waterbearing	255.93					
5								
6								
6.40		***SILT*** Grey, some clay	254.10					
7								
8								
9								
10								
11								
12								
		From 12.50 to 17.37 mbgs: Some fine sand, trace clay						
13								
14								
15								
16								
17								
17.37		***SAND*** Brownish grey, waterbearing	243.13					
18								
18.59		***SAND AND GRAVEL*** Grey, waterbearing	241.91					
19								
20			240.38					
20.12								

Drilled By: G Hart & Sons Well Drilling Ltd.
Drill Method: Dual Air and Mud Rotary
Drill Date: May 23, 2012

MMM Group Limited
100 Commerce Valley Drive West
Thornhill, Ontario L3T 0A1
Borehole Log is for Environmental Purposes Only

Hole Size: 0.45 m
Datum: NAD 83

MMM GROUP

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MOE ID#: A125896
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Log of Borehole PW5 (NOB-PW5)

SUBSURFACE PROFILE

Depth (mbgs)	Symbol	Description	Elev/ Depth	Well Data	Number	Type	Recovery	Comments
21		***SILTY SAND AND GRAVEL*** Grey, waterbearing	238.86 21.64					Water level on June 11, 2012 was 20.49 mbgs.
22		***SAND AND GRAVEL*** Grey, waterbearing						
23								
24			235.81 24.69					
25		***SANDY CLAY*** Grey						
26								
27								
28			231.54 28.96					
29		***SILTY SAND AND GRAVEL*** Grey, some clay, wet	230.63 29.87					
30		***CLAY*** Grey						
31								
32								
33								
34								
35			225.14 35.36					
36		***SILTY SAND AND GRAVEL*** Grey, waterbearing						
37								
38			222.40 38.10					
39		***GRAVEL*** Grey, some sand, waterbearing	221.18 39.32					
40		***SILT WITH CLAY*** Grey, layered						

Drilled By: G Hart & Sons Well Drilling Ltd.
Drill Method: Dual Air and Mud Rotary
Drill Date: May 23, 2012

MMM Group Limited
100 Commerce Valley Drive West
Thornhill, Ontario L3T 0A1
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Hole Size: 0.45 m
Datum: NAD 83
Sheet: 2 of 6

MMM GROUP

Project No: 14-05124-001-HG1
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Location: Nobleton, Ontario

Northing: 4864319
Easting: 608241
MOE ID#: A125896
Logged By: NC

Log of Borehole PW5 (NOB-PW5)

SUBSURFACE PROFILE

Depth (mbgs)	Symbol	Description	Elev/ Depth	Well Data	Number	Type	Recovery	Comments
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51			209.60 50.90					
		CLAYEY SILT Grey						
52								
53								
54								
55								
56			204.72 55.78					
		SILT WITH CLAY TO CLAYEY SILT Grey						
57								
58								
59								
60								

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Drill Method: Dual Air and Mud Rotary
Drill Date: May 23, 2012

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Hole Size: 0.45 m
Datum: NAD 83

MMM GROUP

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Project: Hydrogeological Investigation
Client: Regional Municipality of York
Location: Nobleton, Ontario

Northing: 4864319
Easting: 608241
MOE ID#: A125896
Logged By: NC

Log of Borehole PW5 (NOB-PW5)

SUBSURFACE PROFILE

Depth (mbgs)	Symbol	Description	Elev/ Depth	Well Data	Number	Type	Recovery	Comments
61								
62								
			197.71					
63		***CLAYEY SILT TO SILT AND CLAY*** Grey	62.79					
64								
65								
66								
67								
68								
69								
70								- End of 0.45 m outer well casing
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								

Drilled By: G Hart & Sons Well Drilling Ltd.
Drill Method: Dual Air and Mud Rotary
Drill Date: May 23, 2012

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Hole Size: 0.45 m
Datum: NAD 83

MMM GROUP

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Location: Nobleton, Ontario

Northing: 4864319
Easting: 608241
MOE ID#: A125896
Logged By: NC

Log of Borehole PW5 (NOB-PW5)

SUBSURFACE PROFILE

Depth (mbgs)	Symbol	Description	Elev/ Depth	Well Data	Number	Type	Recovery	Comments
81								
82								
83								
84								
85								
86								
87			173.63					
		SILT WITH CLAY	86.87					
88		Grey						
			171.80					
89		***SILT WITH CLAY TO SANDY SILT***	88.70					
		Grey, wet						
90								
91								
92								
93								
			166.62					
94		***SILTY SAND TO FINE SAND***	93.88					
		Grey, waterbearing						
			165.71					
95		***FINE TO MEDIUM SAND WITH GRAVEL***	94.79					
		Grey,waterbearing						
96								
			163.88					
		SAND AND GRAVEL	96.62					- Natural sand pack from 96.62 to 98.15 mbgs - Packer: 96.62 to 96.77 mbgs - #0 slot from 96.77 to 98.15 mbgs - #50 slot from 98.15 to 98.76 mbgs - #50 expanding to #100 slot from 98.76 to 99.36 mbgs - #100 slot from 99.36 to 101.19 mbgs - Hole was backfilled with caved in material from 101.19 to 107.29 mbgs
97		Grey, waterbearing						
98								
99								
100								

Drilled By: G Hart & Sons Well Drilling Ltd.
Drill Method: Dual Air and Mud Rotary
Drill Date: May 23, 2012

MMM Group Limited
100 Commerce Valley Drive West
Thornhill, Ontario L3T 0A1
Borehole Log is for Environmental Purposes Only

Hole Size: 0.45 m
Datum: NAD 83
Sheet: 5 of 6

MMM GROUP

Project No: 14-05124-001-HG1
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Client: Regional Municipality of York
Location: Nobleton, Ontario

Northing: 4864319
Easting: 608241
MOE ID#: A125896
Logged By: NC

Log of Borehole PW5 (NOB-PW5)

SUBSURFACE PROFILE

Depth (mbgs)	Symbol	Description	Elev/ Depth	Well Data	Number	Type	Recovery	Comments
101			159.31					
		CLAYEY SILT WITH SILTY SAND AND GRAVEL	101.19					
		Grey						
102		101.2 to 102.4 mbgs: Clayey Silt, some sand						
		102.4 to 104.2 mbgs: Clayey Silt, Sand & Gravel, wet						
103								
104		104.2 to 106.1 mbgs: Silty Sand, waterbearing						
105								
106		106.1 to 106.5 mbgs: Silty Sand, some gravel, waterbearing	153.97					
		SHALE	106.53					
107		Greenish grey	153.21					
		End of Borehole	107.29					
108								
109								
110								
111								
112								
113								
114								
115								
116								
117								
118								
119								
120								

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Drill Method: Dual Air and Mud Rotary
Drill Date: May 23, 2012

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Hole Size: 0.45 m
Datum: NAD 83
Sheet: 6 of 6