Appendix A:
Background Information

WASAGA BEACH NOT SATISFIED WITH PROPOSAL

Police Village Trustees Give Notice to Sunnidale

AT JUNE MEETING

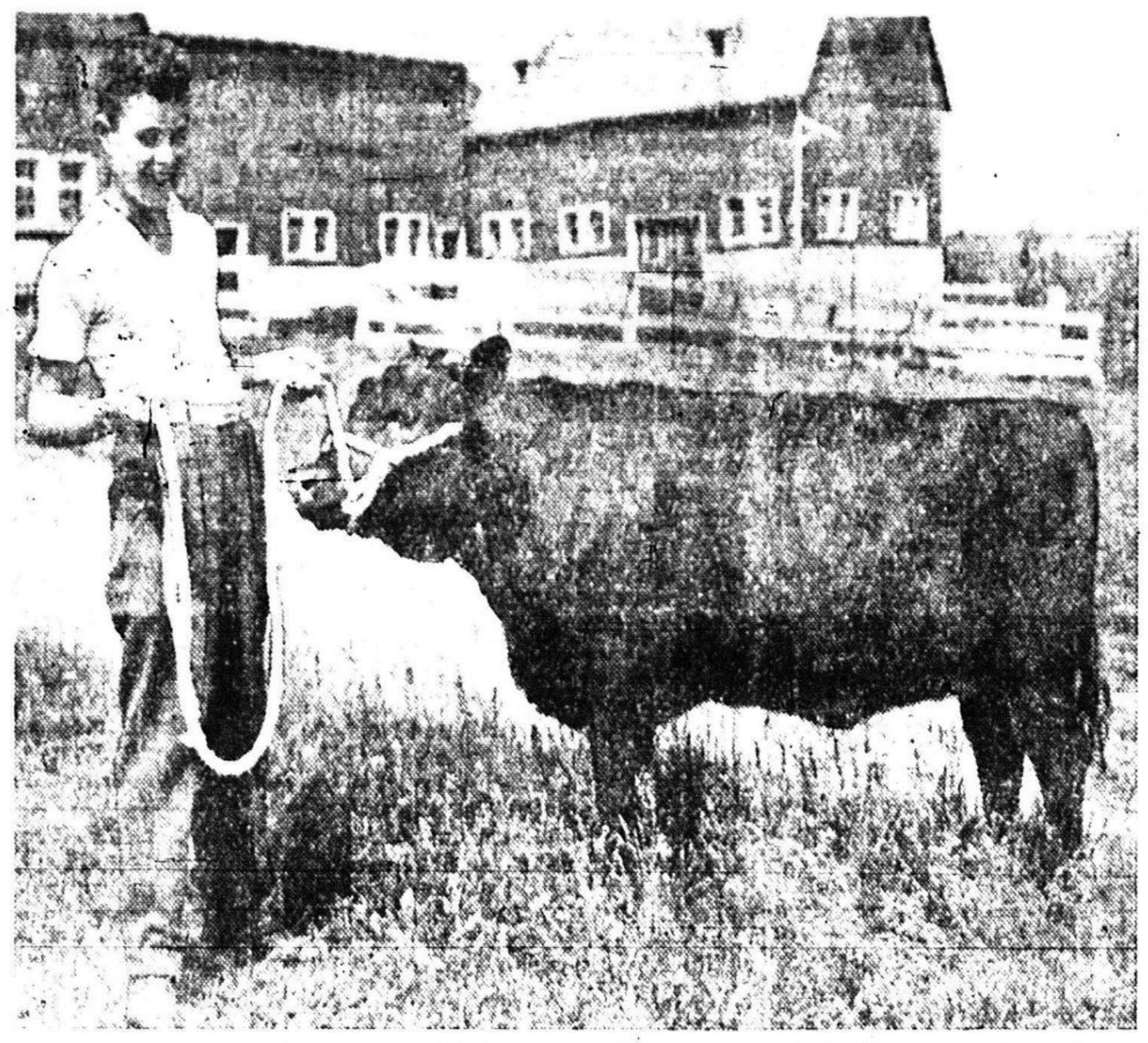
[illegible]

60 MILL TAX RATE

ALLISTON [illegible]

[illegible]

Grand Prize in Dufferin-Simcoe War Drive



In the above picture, thirteen-year-old Lennox Rowe, [illegible] child of Hon. Earl Rowe, M.P. for Dufferin-Simcoe, and Mrs. Rowe, is wearing quite a [illegible]. He is holding the halter of Miss Victory, a purebred Shorthorn heifer donated by the father as grand lucky draw prize in the Dufferin-Simcoe War Service Production Drive. The [illegible] of the beautiful Rowe farm [illegible] at Newton Robinson.

Gross proceeds of the Drive, which entails contributions by Dufferin-Simcoe farmers of poultry and [illegible], will be divided equally between The Toronto Evening Telegram British War Victims' Fund and the Red Cross Bomb Victims' Fund. Administration costs are being [illegible] by Hon. Earl Rowe. A draw ticket is available free to each person donating $2 worth of produce, or may be secured by a $2 cash payment. "Miss Victory" is worth about $200.

ESSA COUNCIL PASSES MOTION OF CONDOLENCE

Expresses Sympathy for Families of Davis Boys Killed on Active Service; Delegation to Interview Department re Roads Near Borden

Essa Council held its regular meeting at Angus, June 1, after completing Court of Revision. Minute of last meeting were read and adopted and correspondence read.

The following accounts were presented and ordered paid: J. Tiffin, 1 sheep killed, 1 injured, 2 lambs injured, 1 killed, $36; A. Miller, 1 lamb injured, $4; G. Ellis, 2 lambs killed, $20.00, 2 injured, $8.00, $28; Allen Miller, 1 lamb killed, $12; N. Coxworth, relief officer, $6.00, 2 pensions, $6.00, $12; D. H. Coleman, hospital accounts, $25.68; P. Woloch, relief accounts, $10; J. H. Bell, ditto, $8; A. Middlebrook, ditto, $22; Mrs. J. E. Baker, ditto, $33.43; G. C. Allen, ditto, $9.25; C. Arnold, valuing sheep, 5 trips, $7.50; J. Ellis, police duties, Angus village, $14; G. McMaster, collect garbage, Angus, $40.50; H. E. Dunn, insurance on road grader, $90; W. McCann, stamps for treasurer, $3; H. Smith, relief account, $15.

A resolution was passed instructing the Clerk to write a letter to J. H. Davis and family and Dr. R. E. Davis, Toronto, expressing sympathy on behalf of the ratepayers and council in the sad news received that Laurance had been killed on active service in England and Robert in Libya.

Two hospital accounts were refused payment and the Clerk and Reeve were instructed to have Township Solicitor defend any action that might be taken to collect these accounts.

A delegation was appointed to interview the Department of Highways asking for assistance owing to the heavy traffic on township roads from Camp Borden.

The assessment roll was accepted from the assessor and his salary ordered paid and the Clerk instructed to have usual number of voters' lists printed.

Council adjourned to meet in Baxter on July 2 at one o'clock.

MARKET

The early, dark red peonies were on the market on Saturday morning, together with iris, snowballs, flowering thorn and other varieties, priced from 5c to 25c per bunch.

Vegetable and flower plants were still plentiful in boxes and pots. Carrots are done, but parsnips and turnips were on sale. Potatoes remained at $1.65 per bag. Butter and egg prices were unchanged.

Vegetables	
Radishes, bunch	5c
Rhubarb, bunch	5c
Asparagus, bunch	10c
or three for	25c
Green onions, bunch	5c
Turnips, each	5c
Parsnips, 6 qt. basket	25c
Potatoes, bag, 75 lbs.	$1.65
Potatoes, 11-qt. basket	50c to 60c
6-qt. basket	25c to 30c
Produce	
Chickens, lb.	27c-30c
Stewing fowl, lb.	25c
Eggs, dozen	25c to 33c
(According to grade and weight)	
Butter, lb.	38c to 39c
Baking	
Buns and cakes 15c doz. to	25c
Doughnuts, doz.	20c
Homemade bread, white or brown	8c and 10c
Pies, each	25c
Tarts, dozen	25c
Special Baking	30c
Marmalade, orange and grapefruit, jars, various sizes 15c to	32c
Maple syrup, jars	55c
Clover honey, 5 lb. tin	65c
Flowers and Plants	
Cut peonies, iris, snowballs and other kinds, bunch 15c to	25c
Geraniums, pink, red and white, per pot	25c
Double petunia	25c
Petunias, Snapdragon, stocks, etc., per box	15c
Pansies, box	25c
Coleus, box	15c
Cabbage plants, box	15c
or two for	25c
Tomato plants, box	15c
Tomato plants, single pots	5c
Pepper plants, box	15c

TO USE CALCIUM IN INNISFIL TP. BUT WITH CARE

Reeve and Road Supt. Will Decide Details; Park Matters Discussed

JUNE MEETING

(By R. G. S.)

At the opening of June meeting of Innisfil Council, held at Thornton, on the 1st inst., with all the members present, Reeve Todd expressed his thanks to members of the Council and also to other residents of the township for their kindly consideration shown to Mrs. Todd during her stay in hospital and also for flowers sent to her. Mrs. Todd herself wrote the Clerk thanking the Council for their good wishes and flowers.

Mrs. Todd is now home and progressing as well as can be expected.

Flood Damage at Minet's

Deputy Reeve Cook and Coun. Lockhart brought up the question of some action on changing a culvert at Minet's Point where considerable damage was caused this spring when the water was backed up and cottages flooded. A representative of a Metal Supply firm quoted approximately $265.00 for a 7' x 3' arch, 20 feet long, which would replace the present 3-foot cement tiles. Deputy Reeve Cook said he had been deluged by complaints from summer residents who have had sand and debris washed into cottages.

Ask Federation Nominations

A form was received by Innisfil Council asking them to make a nomination from the Township for some of the officers of the Simcoe County Federation of Agriculture. Reeve Todd suggested that as many as possible should attend the annual meeting being held in Angus on June 12. He felt that owing to present conditions he might not be prepared to accept any nomination.

Shooting of Sheep-Killing Dogs

Unless an affidavit has been signed by the claimant and unless the sheep valuator sees where and how a dog was destroyed, then no claim should be paid, Council decided.

Application of Calcium

After considerable discussion about the application of calcium this year, it was decided to have the Reeve and Road Supervisor as a committee to handle this matter. Coun. Black felt that this should be left in abeyance this year. Reeve Todd believed, however, in view of the benefit of calcium to the roads, which cost less for maintenance where it is applied, and also with reduced speeds and less traffic, that the necessary materials should be purchased and used with discretion. A motion was passed to this effect.

Maintainer Operator's Pay

John Cowan, operator of maintainer, had asked through the chairman of Roads Committee for an increase in pay.

After some discussion, when Deputy Reeve Cook said: "I promised we would use him right, but he wanted to know what 'right' was," it was agreed to raise his pay to fifty cents an hour, retroactive to May 1st.

Use of Snow Fence

Coun. Banting asked if the Council was aware that some of the snow fence was being used for farm purposes. No one admitted that he knew of any such case but there had been rumours that it had been so used. A motion was passed last year specifying how the fence was to be cared for during the summer and if the supervisor did not adhere to this the Council should be aware of it. Coun. Banting felt that with the Township lot now available the snow fence would be better kept there under supervision. No motion was made to this effect. Coun. Lockhart said the fence and posts should be stored away at once.

Will Accept Lowest Tender

Quotations for the various materials required for the new implement shed being built at the Eighth Line were received. It was decided to award the contract to the lowest of the offers, all of which were from local business men.

The work being put on this lot by the Road Supervisor's men and equipment seems to be at the expense of township roads which are suffering from lack of repairs.

Dog Destruction Claim

William Hopkins came to enquire re paying $ for a [illegible] dog he claimed to have destroyed and for which he had sent an account to Council. He claimed that this dog had been known as a killer and he had awaited an opportunity to destroy same. His neighbour had also seen it worrying sheep. The allowance of $10.00 was granted.

William Hopkins said when he asked compensation for destruction of a dog it was found that his name was not on the voters' list though he had lived on the same farm for 28 years. "An error for that year only," Clerk explained.

Council read and passed the accounts of the Road Supervisor, who was not present, owing to attending a funeral.

Discuss Park Matters

A letter was read by the Reeve embodying a number of requests by Park Superintendent, T. Donnelly. Among these was a request that Council allow him to exclude all dogs from the park whether on leash or otherwise.

"We would only be making more trouble if we do," Deputy Reeve Cook said. "There are enough rules and regulations at the park now." Coun. Black wanted to know why the gate was locked, especially on the holiday. The Reeve stated that a car had been stuck earlier in the day. "Let us not make the place unpopular with stringent rules," Coun. Lockhart said. "It is a place for people to enjoy themselves." It was agreed that the dog situation was to be handled as at present.

Deputy Reeve Cook felt that during the summer the staff should be cut to one man.

Clerk Allan expressed the opinion that transient dogs coming into the Township areas would be subject to the Township dog license even though they were licensed in another municipality. Coun. Black suggested that this fee be collected at the Park. This was not agreed to. Other members were not agreed that collection of these fees should be enforced.

Building Permits Being Issued

The Clerk advised that already several building permits had been issued and other applications were awaiting investigation. It is believed that almost everyone contemplating building is conforming with the new bylaw.

Discuss Road Dept. Affairs

Council gave some time to various complaints coming to individual members over roads and the way the work was handled. "I do not think we should have to put up with complaints because of the way the Road Supervisor carries out his duties," Coun. Black remarked. No recommendations were made.

Council adjourned to meet at Stroud on Monday, July 6, unless specially called by the Reeve in the meantime.

Seven-Year Sentence For Orillia Soldier

Private Francis J. Martin, formerly of Orillia, was convicted of manslaughter, Tuesday, after a jury deliberated for two hours, and was sentenced to seven years in penitentiary with hard labor, by Chief Justice Horwood.

Martin was charged originally with murder following the death of Private Edward Arnold in a barrack-room fracas at Lester's Field, May 15. He said in court he had been drinking and "went nuts" and hit and kicked Arnold during the affray. Arnold died during the fight.

ORO COUNCIL ORDERS SNOW FENCE RETURNED

Township Snow Fence Not to be Used for Other Than Snow Purposes

Oro Township Council met in the Town Hall on June 2 with all members present.

Communications were read from Major Milligan, Mrs. H. Bartley, Stewart & Stewart, Robert Storey, Federation of Agriculture, Angus McMillan, J. D. A. McDonald, Letter Shop and Supply Co., Department of Municipal Affairs, Ralph McLeod, Mrs. D. McKinlay and family.

Request of Stewart & Stewart regarding closing of Bayview Road; application to be made for closing of this piece of road.

Treasurer was instructed to send membership fee to Association of Assessing Officers of Ontario.

Treasurer reported 1941 arrears of taxes had been returned to County Treasurer.

List of receipts received since last meeting were accepted as satisfactory.

Complaint of Allan Rinehart re water condition left in hands of Reeve and Road Superintendent.

Claim of Ernest Perryman for sheep killed by dogs was ordered paid.

The question of snow fence being used in summer time was discussed and the Road Superintendent instructed to see all parties using snow fence to have it returned and properly stored and that it be understood that Township snow fence is not to be used for other than snow fences.

Road Superintendent Bell presented his report for work done during May, voucher etc., which was accepted as satisfactory and passed for payment.

The various accounts before council were ordered paid and council adjourned to meet again on July 6.

INNISFIL NOTES

(By R.G.S.)

(Intended for Last Week)

The correspondents of The Examiner are united in their expression of sympathy with the Gilford correspondent, Mrs. Neilly, in the loss of her son, Sergt. Scott Neilly, an instructor pilot in the R.C.A.F., who was killed in a plane accident in New Brunswick.

Claims Prize Money Unjustly Withheld

William Smyth, of Stroud, breeder of prize Shorthorns and Herefords, has been advised by the Barrie Agricultural Fair Board that prize awards allowed him last year would not be paid. The stand taken by the Board for this action was that Mr. Smyth removed his stock before 9 p.m. and was therefore disqualified. Mr. Smyth claims, however, that other prize winners, whose stock was removed at the same time as his, received their prize money and that he is being discriminated against.

Less Than Half Spring Seeding Done

The continued rains have considerably held up farm work during May. Many farmers have not got started seeding yet, others are only partly done. Fields, which were intended for fallow and root crops, have been seeded if fit to work in preference to others still too wet.

Bags, Milk Cans Urgently Needed

Under an order, recently issued, jute bags must not be used for any purpose other than containers and should be returned to the dealers and shippers. Bags needing repairs should be sent through salvage depots or for repair. Milk cans also must not be held or used for any other purpose, as they are very scarce. A contemplated cheese factory for Innisfil had to be abandoned owing to the shortage of cans. Every can and bag, no matter what its condition, should be put into circulation.

Carload of Scrap Shipped

A carload of scrap iron was loaded and shipped from Lefroy on Saturday, with a total weight of over 25 tons. The Salvage Committee desire to thank those who turned out to help with the work.

BUILDING news

FARM and HOME

Extensive Damage At Minet's Point In Flood's Wake

With so many incidents and accidents following in the path of the record-breaking rains of Friday night and Saturday morning, the troubles near at hand have not become known like the major calamities as at Holland Marsh.

Across the bay at Minet's Point, flooding was not anticipated, as the new large culvert and the smaller one of the arch type had previously handled any freshet. This time there was a difference and following the tropical intensity of steady rain from early Friday afternoon until on into the early hours of Saturday morning, the upper culvert, which is at the approach, up a steep grade, to the homes on the upper stretches of the property, failed to take the load and after nine p.m. the water evidently started across the oil surfaced pavement west and ran across the flat section which reaches from there to the bay shore, covering it to a depth of nearly two feet with a fast running flood, an unpleasant surprise for those living in that area, who are: Dick Wilson, at Minet's Grocery, and also in the large residence next; Mr. and Mrs. George Hill next to this had the additional feature of a 100-foot willow falling from the back of the lot and landing with most of the top resting on the roof of the garage. The other half just missed the Wilson garage when it separated at the roots and fell southeast. Mr. and Mrs. Bert Johnson are in the Mooney cottage next and then Mr. and Mrs. George Montgomery on the waterfront, next to Mr. and Mrs. L. Dollery, and at the end, Mr. and Mrs. George Wright.

Carman Dollery, with Torgis Automotive, had a call in the worst part of storm to take the heavy duty truck back to the store on High Street where flooding was also giving trouble, and making the hill through the rushing water at the foot, he ran into a hole evidently caused by rain erosion before the flood and on the west side of the road, which looked safe, and the huge vehicle partially blocked the approach to the point after the rain ceased, but was towed out before noon, leaving a narrow strip for one-way traffic. When the other road washed out, the force dug a new channel beside the creek bed.

Fortunately the hydro power was maintained all through the worst of the storm or conditions would have been much more unpleasant. The heavy two-inch pipe which brings the water from Fred Pither's flowing well to a barrel beside the creek, opposite the store, and a great convenience for cottages all around there and up in the other sections, was marooned in the rushing water and the pipe was bent to almost a right angle by the force of the stream.

Up at the CNR crossing on Minet's Point road, the same creek passes under the CNR main line and two other sidings. On the north side, under the siding used for handling the enormous quantities of coal in the reserve piles, the bank washed out entirely above the culvert at that side, and it also weakened part of the fill under the main line south of this.

Over in the CNR yard, which is over a mile in length, a huge hole washed out near the east side of the depot and on Saturday morning came a rather unusual sight of a convoy of Cook Construction trucks loaded with fill working steadily by way of the end of Tiffin Street and across the station platform in front to the spot just below the point of the triangle of roadbed.

Washouts also resulted at nearly all of the streams running under the main line north and east from the hills to the bay, and coupled with the Holland Marsh catastrophe and others, tied up the whole system for a time.

BAXTER

Narrow Escape

Mr. and Mrs. L. McLachlan narrowly escaped on Friday night. While returning from Toronto during the storm they tried to come home three different ways and the bridges or culverts had been swept away so decided to spend the night in a motel. During the night they had to get out in water up to their waists.

Heavy Toll Lives, Property

The hurricane which struck these parts on Friday took its heavy toll of both property and lives. Two of our citizens lost their lives by drowning, John Haugh and R. Eagar, both retired and in their early 70's. They both lived alone and had gone to visit some friends Mr. and Mrs. Otto Haugh, of Egbert, who were also drowned. As no one knew they were both gone or where they had had gone until Saturday around noon, when phone and radio calls came to say there had been four drowned east of Beeton, then friends discovered these two men were gone and had not been home all night. Then relatives had a difficult time to reach the place as all roads were covered by water or bridges washed out. When they reached Tottenham where the bodies were they were told a very tragic story of how they had tried to come through and the water was so deep where they had drove into that in some way they had climbed to the top of the car and people who heard their cries for help tried to rescue them by boat. They were all swept away and all four were drowned. The funerals of Mr. Haugh and Mr. Edgar will be on Tuesday, Oct. 19, from Thomas Funeral Home, Allliston, Mr. Haugh to Allliston Cemetery and Mr. Edgar to Parklawn Cemetery, Toronto. Mr. and Mrs. Haugh will be buried on Tuesday from Cookstown.

H & S SPEAKER

P. M. Scott, BA, B.Paed., public school inspector for Centre Simcoe, will address the October meeting of the Prince of Wales Home and School Association at eight o'clock this evening.

CNR Operate North Possibility Today Impossible South

The Toronto-North Bay division of the CNR went out of operation about 8 p.m. on Friday and nothing from Barrie to Toronto is possible yet. The expectation is that with a fill completed at Oro today they will operate north to North Bay and cut over on the Ottawa division for the east.

Telephone and TV Kiwanis Subject Today's Meeting

E. C. Forster of the Bell Telephone Company, Toronto, will be the speaker for today's dinner meeting of Kiwanis. Dr. J. Edwin Wilson will preside. Mr. Forster's subject is, "Your Telephone Company and Television." The talk will be illustrated by special display equipment demonstrating the unusual characteristics of microwaves.

In connection with the junior plowing school sponsored by the Kiwanis Club recently, the judge, Norman McLeod, an executive of the Ontario Plowmen's Association, ruled that Michael Newton had turned the best furrow of the day. Special mention was made of the hospitality of Mrs. Nowton in providing meals for the young plowmen on short notice.

Mostly Sunny Some Cooler Northerly Wind

The past week gave varied weather, a touch of Indian summer and a tropical rain on Friday which lasted with intensity until early morning of Saturday.

Local conditions were serious enough with road flooding, railway culverts washed out and many minor floods in the area, with a disaster at Holland Marsh. The drop in temperature caused more discomfort for those involved, but this morning indicates sunny and cool.

Temperatures were:

	High	Low
Oct. 10	56	48
Oct. 11	68	42
Oct. 12	67	58
Oct. 13	70	40
Oct. 14	70	41
Oct. 15	64	42
Oct. 16	57	39
Oct. 17	52	31

STAYNER POSTMASTER

Michael Hurman has been appointed postmaster at Stayner. Active in the Legion branch in which he is treasurer, Mr. Hurman has been employed at Wyant Motors for several years.

BORN

CHURCH—At the Royal Victoria Hospital, on Oct. 18, 1954, to Mr. and Mrs. Charles Church (nee Isobel Fletcher), 174 Burton Ave., a son.

GEORGE—At the Royal Victoria Hospital, on Oct. 15, 1954, to Cpl. and Mrs. F. C. George, RR 2, Elmvale, a son.

HORNCASTLE—At the Royal Victoria Hospital, on Oct. 16, 1954, to Cpl. and Mrs. W. W. Horncastle, 85 Sanford St., a son.

MOSHER—At the Royal Victoria Hospital, on Oct. 16, 1954, to Cpl. and Mrs. M. W. Mosher, 42 Ellen Sta., a daughter, (Karen Lynn).

MOWFORTH—At the Royal Victoria Hospital, on Oct. 15, 1954, to Mr. and Mrs. Russel Mowforth, 87 John St., a daughter, (Janice Elaine).

MENSOUR—At Private Patients Pavilion, Toronto General Hospital, on Oct. 13, 1954, to Mr. and Mrs. M. J. Mensour (nee Bernice Baldwin), a son, (Brian Michael).

NIELSON—At the Royal Victoria Hospital, on Oct. 16, 1954, to Mr. and Mrs. Peter Nielson, RR 1, Barrie, a son, (Frederick Gordon).

POOLE—At the Royal Victoria Hospital, on Oct. 17, 1954, to Mr. and Mrs. William Poole, Midhurst, a daughter, (Margaret Anne).

ROSS—At the Royal Victoria Hospital, on Oct. 17, 1954, to LAC and Mrs. K. J. Ross, Dalston, a daughter.

RODGERS—At the Royal Victoria Hospital, on Oct. 16, 1954, to Mr. and Mrs. Ross Rodgers, 32 Letitia St., a daughter, (Rebecca Ellen).

DIED

NELLES—At Simcoe Manor Hospital, on Monday, Oct. 18, 1954, Isaac W. Nelles, in his 89th year, beloved husband of Sarah Conklin and dear father of Marjorie (Mrs. William Adams) of Midland, Eva (Mrs. W. Macriner) of Barrie, Harry and Lloyd of Toronto. Resting at Lloyd and Steckley Funeral Home, Barrie, for service Wednesday, Oct. 20, at 2 p.m. Interment Barrie Union Cemetery.

TUCKER—In Ottawa Hospital, Friday, Oct. 15, 1954, Rose Churchill, widow of the late Duncan A. Tucker, formerly of Barrie, in her 75th year. Resting at the Pethick-Smith Funeral Home for service on Tuesday at 2 p.m. Interment Barrie Union Cemetery.

WEBBER—At the Royal Victoria Hospital, Barrie, on Friday, Oct. 15, 1954, Elizabeth Lindsay, beloved wife of the late Samuel Webber, formerly of Minesing; dear mother of George W. of Hanover, and Annie (Mrs. Wilbur Bonser) of Barrie. Resting at the Pethick-Smith Funeral Home, 127 Bayfield St. Service in the chapel, Monday, 2 p.m. Interment Minesing Cemetery.

AUCTION SALES

Every Thursday at 1.30 p.m. - Elmvale Community Sales Arena. Phone W. A. Whitton, 102 Elmvale. 59tfM

Tuesday, Oct. 26 - Simcoe County Shorthorn Club semi-annual sale, Barrie Fair Grounds, at 1 p.m. 19 females, 13 bulls. Bull bonus to apply. For catalogue apply William New, Stroud, Secretary. 113-121

Wednesday, Oct. 27 - Auction sale of livestock for A. G. Ireton, Lot 5, Con. 6, Township of Innisfil. Sale at 1 p.m. A. M. McEwen, Auctioneer. 119-121

Wednesday, Oct. 27 - Auction sale of livestock, poultry, hay and grain and implements, for Justin Guilfoyle, Lot 1, Con. 5, Sunnidale Township, 4 miles north west of New Lowell. Terms cash. Sale at 12.30 p.m. sharp. Jerry Coughlin, Auctioneer. 117-122

Municipal Structure Inspection Form **Structure Number: 101306688**

Inventory Data

Structure Name	Whiskey Creek - The Boulevard				
Main Hwy/Road #		On ☐	Under ☑	Crossing Type	Non-navig water
Road Name	The Boulevard				
Structure Location	0.01 km south of White Oaks Road				
Latitude	44.374713		Longitude	-79.667414	
Owner(s)	City of Barrie		MTO Site Number		
Heritage Designation	Not "Cons"				
Road Class:	Local				
MTO Region	Central				
MTO District	Central Region		Posted Speed	50	No of Lanes 2
Old County	Simcoe		AADT	0	% Trucks 0
Geographic Twp	Barrie		Special Routes:	Transit ☐	Truck ☐ School ☐ Bicycle ☐
Structure Type	Arch Culvert		Detour Length Around Bridge		(km)
Total Deck Length	14	(m)	Fill on Structure	0.6	(m)
Overall Str Width	2	(m)	Skew Angle		(Degrees)
Total Deck Area	28	(sq. m)	Direction of Structure	East/West	
Roadway Width	7.5	(m)	No of Spans	1	
Span Lengths	2				(m)

Historical Data

Year Built:		Last Biennial Inspection:	
Current Load Limit:	(tonnes)	Last BridgeMaster Inspection:	
Load Limit By-Law #:		Last Evaluation:	
By-Law Expiry Date:		Last Underwater Inspection:	
Min Vertical Clearance:	(m)	Last Condition Survey:	

Rehab History: (Date/description)

Field Inspection Information

Date of Inspection: 24-Jul-19

Temperature: 27 °C

Inspected By: Chisholm, Fleming & Associates

Inspector: Tim Campbell, P.Eng.

Others in Party: Edgar Huang, EIT; Justin Wan, EIT

Equipment Used: Camera and Hand Tools

Weather: Sunny

Additional Investigations Required

	Priority	Estimated Cost
Material Condition Survey		
Detailed Deck Condition Survey		$0.00
Non-Destructive Delamination Survey of Asphalt Covered Deck		$0.00
Concrete Substructure Condition Surve		$0.00
Detailed Coating Condition Survey		$0.00
Detailed Timber Investigation		$0.00
Post-Tensioned Strand Investigation		$0.00
Underwater Investigation		$0.00
Fatigue Investigation		$0.00
Seismic Investigation		$0.00
Structure Evaluation		$0.00
Load Posting:Estimated Load 0	**Total Cost**	$0.00

Date Next Inspection: **24-Jul-21**

BCI 74.49

Recommended Work	
Alternative Treatment No. 1	
Alternative Treatment No. 2	

Suspected Performance Deficiencies

00 None
01 Load carrying capacity
02 Excessive deformations (deflections rotations)
03 Continuing settlement
04 Continuing movements
05 Seized bearings
06 Bearing not uniformly loaded/unstable
07 Jammed expansion joint
08 Pedestrian/vehicular hazard
09 Rough riding surface
10 Surface ponding
11 Deck drainage
12 Slippery surfaces
13 Flooding/channel blockage
14 Undermining of foundation
15 Unstable embankments
16 Other

Maintenance Needs

01 Lift and Swing Bridge Maintenance
02 Bridge Cleaning
03 Bridge Handrail Maintenance
04 Painting Steel Bridge Structures
05 Bridge Deck Joint Repair
06 Bridge Bearing Maintenance
07 Repair to Structural Steel
08 Repair of Bridge Concrete
09 Repair of Bridge Timber
10 Bailey Bridges - Maintenance
11 Animal/Pest Control
12 Bridge Surface Repair
13 Erosion Control at Bridges
14 Concrete Sealing
15 Rout and Seal
16 Bridge deck Drainage
17 Other

Element Group:	Decks	Length:	14
Element Name:	Wearing surface	Width:	7.15
Location:		Height:	
Material:	Asphalt	Count:	
Element Type:		Total Quantity:	105
Environment:	Severe	Limited Inspection	☐
Protection System:	None		

Maint. Needs: Bridge Surface Repair

Perform. Deficiencies: None

Condition Data:	Units	Exc	Good	Fair	Poor
	Sq. m	0	102.5	0	2.5

Comments

Settlement of edge asphalt on west side. Pothole in northwest approach. Wide crack in southeast approach.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / **1-5 yrs** / Within 1 yr / Urgent

Recomendations

Repair asphalt as maintenance.

Element Group:	Culverts	Length:	14
Element Name:	Barrels	Width:	2
Location:		Height:	1.2
Material:	Corrugated steel	Count:	1
Element Type:	Pipe Arch	Total Quantity:	70.37
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Perform. Deficiencies: None

Condition Data:	Units	Exc	Good	Fair	Poor
	Sq. m	0	69.87	0.25	0.25

Comments

Medium deformations in inlet obvert.

Estimated Construction Cost: $0.00

Priority: **None** / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations

Element Group:	Approaches	Length:	14
Element Name:	Curb/gutters	Width:	0.15
Location:		Height:	0.15
Material:	Cast-in-place concrete	Count:	2
Element Type:		Total Quantity:	28
Environment:	Severe	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:

Units	Exc	Good	Fair	Poor
m	0	28	0	0

Perform. Deficiencies: None

Comments: Light scaling.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations:

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:	Through Culvert	Height:	
Material:		Count:	1
Element Type:		Total Quantity:	1
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:

Units	Exc	Good	Fair	Poor
all	0	1	0	0

Perform. Deficiencies: None

Comments:

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations:

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	All	Height:	
Material:		Count:	4
Element Type:		Total Quantity:	4
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Condition Data:

Units	Exc	Good	Fair	Poor
Each	0	2	2	0

Maint. Needs: Erosion Control at Bridges

Perform. Deficiencies: Unstable embankments

Comments: Medium to severe erosion in southeast and northwest embankments.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations: Provide rock protection as maintenance.

Repair and Rehabilitation Required

Associated Work

	Comments	Estimated Cost
Approaches		$0.00
Detours		$0.00
Traffic Control		$0.00
Utilities		$0.00
Right of Way		$0.00
Environmental Study		$0.00
Other	Engineering (15%)	$0.00
Contingencies	(30%)	$0.00
	Total Estimated Const. Cost	**$0.00**

Inspection Notes

Justification

Looking South at Road over Culvert

East Elevation

West Elevation

Settlement of Edge Asphalt along West Edge

Pothole in Northwest Approach Asphalt Wearing Surface

Wide Cracks in Southeast Approach

Deformations in Inlet Obvert

Looking West through Culvert

Medium to Severe Erosion of Northwest Embankment

Medium to Severe Erosion of Southeast Embankment

Looking West (Upstream)

Looking East (Downstream)

Municipal Structure Inspection Form **Structure Number: 120054504**

Inventory Data

Structure Name	Roadway Bridge No. 120054504				
Main Hwy/Road #		On ☑ Under ☐	Crossing Type	Non-navig water	
Road Name	Whiskey Creek - Brennan Avenue				
Structure Location	0.15 km east of White Oaks Road				
Latitude	44.37522677		Longitude	-79.66736746	
Owner(s)	City of Barrie		MTO Site Number		
Heritage Designation	Not "Cons"				
Road Class:	Local				
MTO Region	Central				
MTO District	Central Region		Posted Speed	50	No of Lanes 2
Old County	Simcoe		AADT	600	% Trucks 0
Geographic Twp	Barrie		Special Routes:	Transit ☐ Truck ☐ School ☐ Bicycle ☐	
Structure Type	Rigid Frame, Vertical legs		Detour Length Around Bridge		(km)
Total Deck Length	4.3 (m)		Fill on Structure	0.3	(m)
Overall Str Width	12 (m)		Skew Angle	0	(Degrees)
Total Deck Area	51.6 (sq. m)		Direction of Structure	North/South	
Roadway Width	7 (m)		No of Spans	1	
Span Lengths	3.7 m (m)				

Historical Data

Year Built:	1950	Last Biennial Inspection:	10/08/2017
Current Load Limit:	(tonnes)	Last BridgeMaster Inspection:	
Load Limit By-Law #:		Last Evaluation:	
By-Law Expiry Date:		Last Underwater Inspection:	
Min Vertical Clearance:	(m)	Last Condition Survey:	

Rehab History: (Date/description)

Formerly BOI now a culvert

Field Inspection Information

Date of Inspection: 24-Jul-19 Temperature: 26 °C

Inspected By: Chisholm, Fleming & Associates

Inspector: Tim Campbell, P.Eng.

Others in Party: Edgar Huang, EIT; Justin Wan, EIT

Equipment Used: Camera and Hand Tools

Weather: Sunny

Additional Investigations Required

	Priority	Estimated Cost
Material Condition Survey		
Detailed Deck Condition Survey		$0.00
Non-Destructive Delamination Survey of Asphalt Covered Deck		$0.00
Concrete Substructure Condition Surve		$0.00
Detailed Coating Condition Survey		$0.00
Detailed Timber Investigation		$0.00
Post-Tensioned Strand Investigation		$0.00
Underwater Investigation		$0.00
Fatigue Investigation		$0.00
Seismic Investigation		$0.00
Structure Evaluation		$0.00
Load Posting:Estimated Load 0	**Total Cost**	$0.00

Date Next Inspection: **24-Jul-21**

BCI 68.19

Recommended Work	Replace bridge due to excessive deterioration of deck.
Alternative Treatment No. 1	
Alternative Treatment No. 2	

Suspected Performance Deficiencies

00 None
01 Load carrying capacity
02 Excessive deformations (deflections rotations)
03 Continuing settlement
04 Continuing movements
05 Seized bearings
06 Bearing not uniformly loaded/unstable
07 Jammed expansion joint
08 Pedestrian/vehicular hazard
09 Rough riding surface
10 Surface ponding
11 Deck drainage
12 Slippery surfaces
13 Flooding/channel blockage
14 Undermining of foundation
15 Unstable embankments
16 Other

Maintenance Needs

01 Lift and Swing Bridge Maintenance
02 Bridge Cleaning
03 Bridge Handrail Maintenance
04 Painting Steel Bridge Structures
05 Bridge Deck Joint Repair
06 Bridge Bearing Maintenance
07 Repair to Structural Steel
08 Repair of Bridge Concrete
09 Repair of Bridge Timber
10 Bailey Bridges - Maintenance
11 Animal/Pest Control
12 Bridge Surface Repair
13 Erosion Control at Bridges
14 Concrete Sealing
15 Rout and Seal
16 Bridge deck Drainage
17 Other

Element Group:	Foundations
Element Name:	Foundation (below ground level)
Location:	
Material:	
Element Type:	
Environment:	Benign
Protection System:	None

Length:	
Width:	
Height:	
Count:	
Total Quantity:	
Limited Inspection	☑

Maint. Needs:

Condition Data:

Units	Exc	Good	Fair	Poor
all				

Perform. Deficiencies: None

Comments:
Exposed top face along east wall.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / **1-5 yrs** / Within 1 yr / Urgent

Recomendations:
Foundation removal to be included with culvert replacement (costed under barrel component).

Element Group:	Embankments & Streams
Element Name:	Embankments
Location:	All
Material:	
Element Type:	
Environment:	Benign
Protection System:	None

Length:	
Width:	
Height:	
Count:	4
Total Quantity:	4
Limited Inspection	☐

Maint. Needs:

Condition Data:

Units	Exc	Good	Fair	Poor
Each	0	4	0	0

Perform. Deficiencies: None

Comments:
Well-vegetated.

Estimated Construction Cost: $0.00

Priority: **None** / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations:

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:	Under Bridge	Height:	
Material:		Count:	1
Element Type:		Total Quantity:	1
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:	Units	Exc	Good	Fair	Poor
	all	0	0	1	0

Perform. Deficiencies: None

Comments:
Scour along east wall has exposed top face of footing.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations:

Element Group:	Embankments & Streams	Length:	4.5
Element Name:	Slope protection	Width:	1
Location:	All Quadrants	Height:	1
Material:	Other	Count:	4
Element Type:	Gabions	Total Quantity:	18
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:	Units	Exc	Good	Fair	Poor
	m	0	16	1	1

Perform. Deficiencies: None

Comments:
Deformation and stone loss of north gabion retaining walls. Gabions severed at waterline in northeast quadrant.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / 1-5 yrs / Within 1 yr / Urgent

Recomendations:
Gabion retaining wall repair to be included with culvert replacement (costed under barrel component).

Element Group:	Decks	Length:	12
Element Name:	Soffit - Thick Slab	Width:	3.7
Location:		Height:	
Material:	Cast-in-place concrete	Count:	1
Element Type:		Total Quantity:	44.4
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:	Units	Exc	Good	Fair	Poor
	Sq. m	0	27.4	8.5	8.5

Perform. Deficiencies: None

Comments

Severe scaling and spalled concrete at north fascia and exterior soffit.
Honeycombing, spalls, and delaminations around spalls in soffit.
Narrow stained cracks with efflorescence in north fascia.
Several areas in soffit with exposed, severely corroded rebar.
Medium honeycombing in east top haunch.

Estimated Construction Cost: $295,000.00

Priority: None / 6-10 yrs / **1-5 yrs** / Within 1 yr / Urgent

Recomendations

Replace culvert (including asphalt wearing surface replacement and repair of gabion retaining walls).

Element Group:	Decks	Length:	10
Element Name:	Wearing surface	Width:	7
Location:		Height:	0.09
Material:	Asphalt	Count:	1
Element Type:		Total Quantity:	70
Environment:	Severe	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:	Units	Exc	Good	Fair	Poor
	Sq. m	0	62	4	4

Perform. Deficiencies: None

Comments

Medium to severe cracks. Severe map cracks.
Potholes and disintegration around maintenance hole cover in east approach.

Estimated Construction Cost: $0.00

Priority: None / 6-10 yrs / **1-5 yrs** / Within 1 yr / Urgent

Recomendations

Replace with culvert (costed under barrel component).

Element Group:	Abutments	Length:	12
Element Name:	Abutment walls	Width:	
Location:	Each End	Height:	1.5
Material:	Cast-in-place concrete	Count:	2
Element Type:	Legs of rigid frame	Total Quantity:	36
Environment:	Benign	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:

Units	Exc	Good	Fair	Poor
Sq. m	0	36	0	0

Perform. Deficiencies: None

Comments:

Estimated Construction Cost: $0.00

Priority: None

Recomendations:

Element Group:	Sidewalks/curbs	Length:	10
Element Name:	Curb/gutters	Width:	
Location:	North & South	Height:	
Material:	Cast-in-place concrete	Count:	2
Element Type:	Concrete	Total Quantity:	20
Environment:	Severe	Limited Inspection	☐
Protection System:	None		

Maint. Needs:

Condition Data:

Units	Exc	Good	Fair	Poor
m	0	19	1	0

Perform. Deficiencies: None

Comments: Localized medium to severe scaling.

Estimated Construction Cost: $0.00

Priority: 1-5 yrs

Recomendations: Replace with culvert (costed under barrel component).

Repair and Rehabilitation Required

Decks	Soffit - Thick Slab	Replace culvert (including asphalt wearing surface replacement and repair of gabion retaining walls).	1-5 yrs	$295,000.00

Associated Work

	Comments	Estimated Cost
Approaches		$0.00
Detours		$0.00
Traffic Control		$10,000.00
Utilities		$0.00
Right of Way		$0.00
Environmental Study		$15,000.00
Other	Engineering (15%)	$48,000.00
Contingencies	(30%)	$96,000.00
	Total Estimated Const. Cost	**$464,000.00**

Inspection Notes

Justification

The deck exhibits extensive deterioration including large areas of spalled concrete from the soffit and severely corroded rebar. The large areas of exposed, severely corroded rebar in the soffit will begin to lose their load carrying capacity as the corrosion worsens.

Looking West at Bridge

North Elevation

South Elevation

Wide Map Cracks in Asphalt Wearing Surface

Medium to Severe Scaling of Curb

Loss of Stone from Gabions

Large Spall and Severe Scaling of North Fascia

Spall with Exposed, Corroded Rebar at Edge of North Exterior Soffit

Looking South under Bridge

Looking South at Soffit

West Wall

Spall in East Wall

Spall with Exposed, Corroded Rebar in North Exterior Soffit

Delaminations and Small Spalls with Exposed, Corroded Rebar in Interior Soffit

Delaminations and Spalls with Exposed, Corroded Rebar in Interior Soffit

Looking North (Downstream)

Looking South (Upstream)

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December , 2011

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December 19, 2011
Reference No. P11-5718A

The Corporation of the City of Barrie,
Engineering Department,
70 Collier Street,
Barrie, Ontario
L4M 4T5

Re: Geotechnical and Environmental Design Report
Whiskey Creek Watercourse Improvements
Kempenfelt Bay to The Boulevard
Barrie, Ontario

Introduction

This geotechnical and environmental investigation was required as a part of the proposed improvements to Whiskey Creek to improve the hydraulic capacity. As part of this investigation, a hydrogeological study (FE-P-11-5818B) was conducted to determine the need to apply to the MOE for a PTTW.

Background

The City of Barrie is planning to improve the hydraulic capacity of the Whiskey Creek Watercourse between Kempenfelt Bay to The Boulevard. The proposed works will include excavation, widening and armouring of the watercourse channel as well as replacement of the road crossing culverts at Brennan Avenue and The Boulevard.

The site location is on the south shore of Kempenfelt Bay in Barrie as shown in the appended Figure 1. The site geology was mapped as "sand plains" by Chapman, L J and D F Putnam in 1972. "Physiography of the South Central Portion of Southern Ontario Map 2226" as shown in the appended Figure 2.

Field Investigation

The borehole locations are shown in the appended Site Plan. The onsite investigation included five (5) boreholes with seven (7) water course samples. The boreholes were drilled on November 17, 2011. The boreholes were all drilled to depths of 9.75 m (32'-0") as shown on the borehole log sheets. Two (2) monitor wells were installed in boreholes 2, and 3 as shown. Wells become the property of the Owner and will have to be decommissioned when no longer required.

The field work was done with the supervision of the field engineer who monitored the drilling operation, and prepared the stratigraphic logs. Water level observations were carried out and the results, where observed, are shown on the borehole logs. The results were compiled on the borehole log sheets.

Stratigraphy

The boreholes generally encountered sand and gravel, peat, sand and silty clay.

Sand and Gravel

Boreholes 1 to 5 encountered sand and gravel with topsoil or organic material. The sand and gravel was found to depths of 0.91 m (3'-0") in borehole 1, 1.52 m (5'-0') in boreholes 2, and 5 and 1.98 m (6'-6") in boreholes 3 and 4. The water content varied from 3.0% to 114.9%.

The standard penetration N-values varied from 2 blows per 0.3 m in boreholes 1, 2 and 5 to 27 blows per 0.3 m in borehole 4. The consistency of the sand and gravel (fill) was loose to compact.

Peat

Boreholes 1 to 5 encountered peat, a dark organic material in all of the boreholes. The peat was found from 0.61 to 1.37 m (2'-0" to 4'-6") in borehole 1 and from 1.52 to 3.66 m (5'-0" to 12'-0") in borehole 2. The peat was found from 1.98 to 3.05 m (6'-6" to 10'-0") in borehole 3 and from 1.98 to 3.66 m (6'-6" to 12'-0") in borehole 4. The peat was found from 1.52 to 1.98 m (5'-0" to 6'-6") in borehole 5. The water content was 20.6% in borehole 4.

The standard penetration N-values varied from 2 blows per 0.3 m in boreholes 2 and 3 to 10 blows per 0.3 m in borehole 3. The consistency of the peat was soft to firm.

Sand

The brown or grey sand was found to a depth of 9.75 m (32'-0") in boreholes 1 and 5. The brown or grey sand was found to a depth of 7.45, 6.71 and 6.10 m (24'-6", 22'-0" and 20'-0") in boreholes 2, 3 and 4 respectively. The sand was wet with water contents from 16.7% to 28.7%. The sand was medium to fine in size.

The standard penetration N-values varied from 4 blows per 0.3 m in borehole 4, to 54 blows per 0.3 m in borehole 5. The consistency of the brown or grey sand was loose to dense.

Silty Clay

The brown to grey silty clay was found in boreholes 2, 3, and 4 to the full depth investigated. The silty clay contained trace of fine sand or silt. The silt and clay was moist with water contents from 19.8% to 24.2%.

The appended Grain Size Distribution sheet confirmed the visual soil identification of silty clay or silt.

The standard penetration N-values varied from 18 blows per 0.3 m in borehole 2, to 55 blows per 0.3m in borehole 4. The consistency of the silty clay was very stiff to hard.

Soil and Ground Water Chemical Test Results

Preliminary screening for Metals, Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbons (PHCs) (F1-F4) and Conductivity, Sodium

Absorption Ratio (SAR), and Chloride were done on five (5) soil samples from the boreholes and seven (7) water course samples.

In addition, preliminary screening for Metals, Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbons (PHCs) (F1-F4) and Conductivity, Sodium Absorption Ratio (SAR), and Chloride were done on two (2) water samples. The chemical testing was carried out to provide preliminary environmental characterization of the site soils to assess disposal options and for background water quality. The chemical results are appended.

Ground Water Condition

The groundwater level was found at 1.70 m, and 1.73 m below the ground surface (BGS) in monitor wells 2, and 3 respectively.

Discussion

The proposed watercourse improvements are feasible. The proposed works will include excavation, widening and armouring of the water course channel as well as replacement of the road crossing culverts at Brennan Avenue and The Boulevard.

The invert elevations of the culverts to be replaced were not provided. However, it is anticipated the culvert foundations will be based in or near the dark organic material. It would be appropriate to sub-excavate the base of the foundations for the culverts and replace with engineered fill. Alternately, the culvert may be supported on helical piers.

The following sections provide discussion and recommendations for;

1. Earthquake Design Factors
2. Lateral Earth Pressure and Soil Properties
3. Excavation, Dewatering and Trench Stability with Soil Type
4. Sewer and Water-main Bedding
5. Engineered Backfill and Compaction
6. Permit to Take Water
7. Foundation Bearing Capacity
8. Helical Piles
9. Pavement Design
10. Chemical Test Results

Earthquake Design Factors

The Site Classification for Seismic Site Response, Table 4.1.8.4.A., is Site Class D. The Seismic Hazard Index is 0.27 (=1.3*1.3*0.21).

Lateral Earth Pressure and Soil Properties

Walls must be designed to resist the unbalanced lateral earth pressure imposed by the backfill adjacent to the walls. The lateral earth pressure may be computed using the equivalent fluid pressure method presented in Section 6.9 of the Canadian Highway Bridge Design Code (CHBDC), Can/DSA-S6-06, November 2006, or employing the following equation.

$$P = K(\gamma h + q) + C_p$$

Where

P = lateral pressure at depth h (m) below ground surface (kPa)

K = lateral earth pressure coefficient of compacted backfill

h = depth below grade (m) at which lateral pressure is calculated

γ = unit weight of compacted free draining backfill

q = vertical stress at depth h due to surcharge loads (kPa)

C_p = compaction pressure (refer to clause 6.9.3 of CHBDC)

Appropriate factors of safety must be used in the design.

Free draining or granular material (Granular A or B) must be used as backfill behind the wall. The following parameters are recommended for design:

	Granular A	Granular B
Angle of Internal Friction (degrees)	35	32
Unit Weight (kN/m^3)	22	21
Active Earth Pressure Coefficient (K_a)	0.27	0.31
At Rest Earth Pressure Coefficient (K_o)	0.43	0.47
Passive Earth Pressure Coefficient (K_p)	3.70	3.23

A weeping tile system and/or weeping holes should be installed to minimize the build-up of hydrostatic pressure behind the walls. The weeping tiles should be surrounded by a properly designed granular filter or geotextile to prevent migration of fines into the system. The drainage pipe should be placed on a positive grade and lead to a frost-free outlet.

Excavation, De-watering and Trench Stability with Soil Type

It is considered that any excavations required for the services to normal depths will be carried out in open cut. All work should be carried out in accordance with The Ontario Occupational Health and Safety Act Regulation 691, and local regulations. The soil type may generally be considered to be Type 3 provided that excavation is within 0.5 m of the surface of the ground water elevation. Deeper excavations below the water table would require the use of well points or the like to temporarily depress the water table for construction purposes. The dewatering system must be designed and installed by specialist in this field.

Construction slopes for foundations and service trenches may be cut at an inclination of 1 horizontal to 1 vertical in the loose to compact sand above the groundwater elevation. If areas or

zones of persistent water seepage are encountered, it may be necessary to locally further flatten the side slopes. Nuisance seepage or surface runoff from rainfall that enters the excavations should be readily controlled by conventional sump pumping.

Subject to effective ground water control, the site slopes may be considered as Type 3 soils requiring trench side walls to be constructed at no steeper than 1 horizontal to 1 vertical. In areas where the ground water control is not completely effective, it may be necessary to provide a granular drainage blanket on the slope in conjunction with pumping and will be subject to geotechnical field review.

Depending on the depth of excavation and the proximity to adjacent building foundations, temporary shoring may be required during construction. Particular attention should be given to ensure adjacent structures are not affected by the construction. There is a potential for settlement due to dewatering and the recommended hydrogeological assessment should determine the zone of influence and the ground water drawdown profile. The foundations depths of adjacent structures should be determined to assess underpinning and/or shoring requirements.

An inventory of settlement sensitive structures within the zone of influence should be compiled in a pre-construction survey. Monitoring during construction may then be undertaken to evaluate the impact and to initiate preventive and/or remedial measures.

It is recommended that a test dig be undertaken to allow prospective contractors an opportunity to evaluate the conditions to be encountered and to assess the method of excavation and ground water control measures based on their own experience.

All slopes should be continuously inspected by qualified geotechnical personnel, particularly following periods of heavy rainfall, spring thaw, or if the excavations are left open for any extended period of time.

Engineered Backfill and Compaction

Based on our general knowledge and experience with similar types of material, it is considered that the sand material may be generally suitable for use as backfill provided that any organic or other deleterious or wet material is removed and appropriate compaction procedures are used.

For sand backfill, compaction should be carried out in thin 200 mm lifts to a minimum of 100% of standard Proctor density. The lift thickness may be increased where it can be shown that the compaction equipment achieves the required density. The water content of the backfill material should be within 3% of the optimum water content.

It is recommended that the project design drawings be submitted to Fisher Environmental for review for compatibility with site subsurface conditions and the recommendations contained herein.

A bulk unit weight of 18 kN/m^3 and an angle of internal friction (φ) of 25^o may be assumed for the backfill for preliminary planning purposes. This estimate may be confirmed during construction based on the actual materials used.

Earthwork operations should be carried out with review and inspection by Fisher Environmental to approve subgrade preparation, backfill materials, placement and compaction procedures and to check the specified degree of compaction.

The comments and recommendations provided in the report are based on information revealed in the boreholes. Conditions between the boreholes may vary. Geotechnical review during construction should be on going to confirm the subsurface conditions are substantially similar to the boreholes which may otherwise require modification to the original recommendations.

Permit to Take Water

Water taking in Ontario is governed by the Ontario Water Resources Act (OWRA) and the Water Taking and Transfer Regulation O.Reg. 387/040. Section 3 of the OWRA requires any one taking more than 50,000 L/d to obtain a Permit to Take Water (PTTW). This requirement applies to all withdrawals, whether for consumption, temporary construction dewatering or permanent drainage improvements. It is anticipated that dewatering will require a PTTW.

A hydrogeological assessment was conducted to more fully assess ground water dewatering needs, the hydrogeological impact to the site, and/or in support of an application to the Ministry of Environment (MOE) for a PTTW.

Foundation Bearing Capacity

The culvert construction may be carried out using conventional pipe bedding based on compact sand or engineered fill (compacted Granular A or B) at a depth of approximately 1.83 m (6'-0").

Pipe foundations may be sized using a factored soil resistance Ultimate Limit State (ULS) of 200 kPa (4,170 psf) for strip footings. For Serviceability Limit State (SLS) design purposes, the soil resistance of 100 kPa (2,090 psf) is applicable.

It is anticipated that the total settlements will be within the normal maximum requirement of 25 mm (1 inch).

All footing excavations should be subject to inspection by geotechnical personnel from Fisher Environmental Ltd., to confirm that the excavations are clean and free of mud and water, and the foundation soils are adequate for the required design loads.

Helical Piers

The culverts may also be supported on helical piers. It is expected that the helical piers could be installed in the compact sand at depths of 3.05 to 6.10 m (10'-0" to 20'-0").

The compact sand at a depth of approximately 5.48 m (18'-0") will give a factored resistance for the Ultimate Limit State (ULS) of 1000 kPa (20,890 psf) and the Serviceability Limit State (SLS) resistance of 650 kPa (13,580 psf). Assuming a 25/30/35 cm (10/12/14) helical pier with a 73 mm by 6.65 mm wall (2.875 inch by 0.262 inch wall) shaft configuration gives a factored resistance of 145 kN (32,600 lbs) based on the SLS resistance. Load testing would be required to verify the design capacity. The actual depth required during installation will be determined by in-situ soil conditions encountered while torquing the piles.

The cross section area of the pile shaft is relatively small and consequently the adjacent soils offer little resistance to lateral loads on the pile. The use of inclined or battered piers is suggested for this purpose.

The installation of helical pier foundations should be subject to inspection by geotechnical personnel from Fisher Environmental Ltd., to confirm that the installation conforms to the design assumptions and that the piers are properly installed.

Sewer and Water-main Bedding

Where native sand subgrade is encountered at the proposed invert level, standard granular bedding in accordance with Ontario Provincial Standard Specifications (OPSS) should be satisfactory. Where fill material or the peat or dark organic material is encountered, it may be sub-excavated and replaced with engineered fill (compacted Granular A or B).

For flexible pipes, bedding and cover material should comprise OPSS Granular A. For rigid pipe, the bedding material should comprise OPSS Granular A and cover material may comprise select native soil free of oversized material. The bedding material should be compacted to 100% standard Proctor maximum dry density. Clear stone is not recommended as bedding due to the potential for fines to migrate into the voids which may lead to settlement and/or loss of pipe support.

Pavement Design

It is anticipated that the pavement will be constructed at approximately the existing grade. The sub grade soil is anticipated to be sand. The pavement design has been determined based upon the frost susceptibility and strength characteristics of the soil using the AADT of 1000.

The pavements should be constructed after first removing any organic material that may be present at the sub grade level. The construction design should include drainage tile beneath the shoulders or curbs draining to the storm sewer. The drainage tile is to be wrapped in filter fabric and buried with a minimum of 100 mm of a properly graded filter all around. Table 1, below presents the pavement design.

Table 1 - Pavement Design Thickness

Material	Course	Urban Street
Granular B	Sub Base	300 mm
Granular A	Base	150 mm
Asphalt HL8	Binder	80 mm
Asphalt HL3	Surface	50 mm

Prior to placement of backfill or the granular sub base, the sub grade should be prepared by scarifying and compacting to a minimum of 95% of standard Proctor density. The exposed sub grade should be proof rolled to ensure uniformity of support. Any soft or excessively wet zones that become evident during the proof rolling operation should be sub-excavated and replaced with acceptable fill or Granular B compacted to a minimum of 95% standard Proctor density, as should any fill required to raise the grade. The top 300 mm of the sub-grade shall be compacted to a minimum of 100% of standard Proctor density.

The Granular A base should be placed in maximum 200 mm thick lifts and compacted to a minimum of 100% standard Proctor maximum dry density.

For spring or late fall construction on a wet sub grade, the sub-base course or Granular B thickness may have to be increased to carry the heavy construction traffic.

Asphaltic concrete should be placed and compacted to at least 97% Marshall density.

The sub grade sand is borderline frost susceptible and will lose the strength to support traffic loads if allowed to become wet due to surface water or during freezing and thawing periods. Therefore, drainage of the granular courses and sub grade becomes essential.

It is recommended that catch basins and manholes be back filled with compacted Granular B Limestone material. The catch basins should be perforated just above the drain invert level and the holes screened with filter cloth. This will help to drain the pavement structure as well as alleviate the problems of differential movement between the pavement and catch basins or manholes due to frost action. Along the edge of the pavement area, it is recommended that drainage tile, wrapped in filter fabric (Big "O") be installed to facilitate the drainage of the base granular material in wet periods.

The pavement construction operations should be inspected by a geotechnical technician from Fisher Environmental Ltd. The purpose of the inspection is to evaluate the sub grade conditions and to ensure conformity with design specifications.

Chemical Analysis

Geo-environmental screening was carried out on selected soil and ground water samples. The purpose was to provide comments regarding the suitability for re-use of the soil on site and to assess off-site disposal options.

Seven (7) watercourse samples, five (5) soil samples were submitted from the boreholes, and one water sample from each of the two (2) monitoring wells for chemical testing in accordance with Ontario Regulation 153/04 (O. Reg. 153/04) as amended, protocols for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act dated April 15, 2011.

For general environmental quality characterization, soil and ground water samples were tested for the following;

- Metals and Inorganics
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Petroleum Hydrocarbons (PHCs) F1 to F4 Fractions
- Volatile Organic Compounds (VOCs)

The following samples were submitted for testing;

Seven (7) watercourse samples

Borehole 1, Sample 2 (organic peat - 0.6 to 1.4 m)

Borehole 2, Sample 3 (organic peat - 1.5 to 2.1 m)

Borehole 3, Sample 1 (sand and gravel – 0.1 to 0.7 m)

Borehole 4, Sample 4 (organic peat – 2.3 to 2.9 m)

Borehole 5, Sample 5 (dark brown sand – 3.0 to 3.6 m)

Borehole 2, Water

Borehole 3, Water

In general, the applicable environmental quality guidelines depend on the site location, land use, soil texture and source of potable water at the site. The Generic Criteria of the O. Reg. 153/04, as amended, Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act dated April 15, 2011 were selected.

Section 41 of O.Reg. 153/04, as amended, was used to evaluate the site sensitivity. Table A provides the criteria and the site is considered a "sensitive site" due to the proximity to Kempenfelt Bay.

Further, the site was reviewed against the City of Barrie's wells and well head protective areas (Schedule G, dated June 2006) which indicated that the site is near a well head protection zone. According, criteria of Table 8: Generic Site Condition Standards for use Within 30 m of a Water Body in a Potable Ground Water Condition for Residential/Parkland land use is applicable.

The Certificates of Analysis are appended. The concentration of the measured parameters in the submitted soil and ground water standards were either not detected (below the method detection limit) or were within the Table 8 Standards except for the following;

- **Benzo (k) fluoranthene 0.26 (ppb) WC sample no 7** (Guideline is 0.24 ppb)
- **Indeno (1,2,3-cd) pyrene 0.28 (ppb) WC sample no 7** (Guideline is 0.20 ppb)
- **Dibenzo (a,h) anthracene 0.27 (ppb) WC sample no 7** (Guideline is 0.06 ppb)
- **Benzo (g,h,i) perylene 0.34 (ppb) WC sample no 7** (Guideline is 0.17 ppb)

The testing indicates that the soil samples in water course no. 7 contained PAHs in excess of the guideline and must be removed from the site. Additional sampling and testing may be carried out to assist in defining the limits of the impacted soil.

When transporting the site soils to another site the following is recommended;

1. All available analytical results and environmental assessment reports must be fully disclosed to the receiving site owners/authorities and they must agree to receive the material.
2. The environmental consultant must confirm the land use at the receiving site is compatible to receive the material.

3. Transportation and placement of the material must be monitored by the environmental consultant to check the material is appropriately placed at the approved site.

Where soil is to be transported to a landfill site, additional chemical testing in accordance with Ontario Regulation 347, Schedule 4, as amended to Ontario Regulation 558/00, dated March 2001, Toxicity Characteristic Leaching Procedure (TCLP) will be required.

Soil conditions between and beyond the sampled locations may differ from those encountered during this investigation. There is no legal imperative to remove or treat the soil that exceeds the applicable site standards provided it is demonstrated that there is no off site impact or adverse effect. If contaminated soil is left on site, the landowner assumes liability associated with the site contamination and potential off site contamination. The liability concerns could include potential scrutiny from the MOE and the public, potential for decreased value of the land and issues during potential divesting of the property due to environmental liability concerns on the part of future owners or their financiers/insurers.

Conclusion and Recommendations

It is concluded that the proposed Whiskey Creek Watercourse improvements and culvert replacements are feasible. It is recommended that;

1. The foundations be placed on the in-situ sand or engineered fill after first removing any deleterious organic material.

2. The urban street sections may be constructed with the recommendations contained herein and

3. The foundation excavations and engineered fill placement are to be inspected during construction by a representative of Fisher Environmental Ltd to confirm the soil conditions are similar to the assumptions made for this report.

Limitations

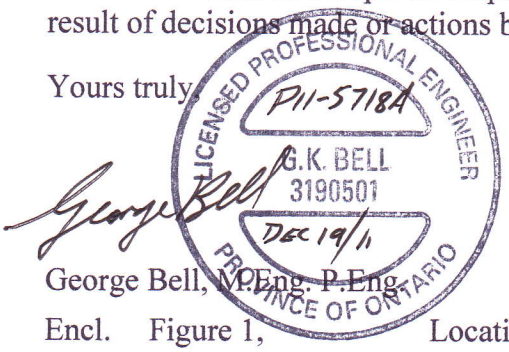
This report was prepared for use by the Corporation of the City of Barrie and is based on the work as described in the Scope of Work. The conclusions presented in this report reflect existing site conditions within the scope of this assignment and the results of previous investigation on the property.

No investigation method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. It can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and the formulation of the conclusions and recommendations. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions reached, but commit ourselves to care and competence in reaching those conclusions. No warranty, whether expressed or implied, is included or intended in this report.

The scope of services performed may not be appropriate for the purposes of other users. This report should not be used in contexts other than pertaining to the evaluation of the property at the current time. Written authorization must be obtained from Fisher Environmental Ltd. prior to use by any other parties, or any future use, of this document or its findings, conclusions, or recommendations represented herein. Any use which a third party makes of this report, or any

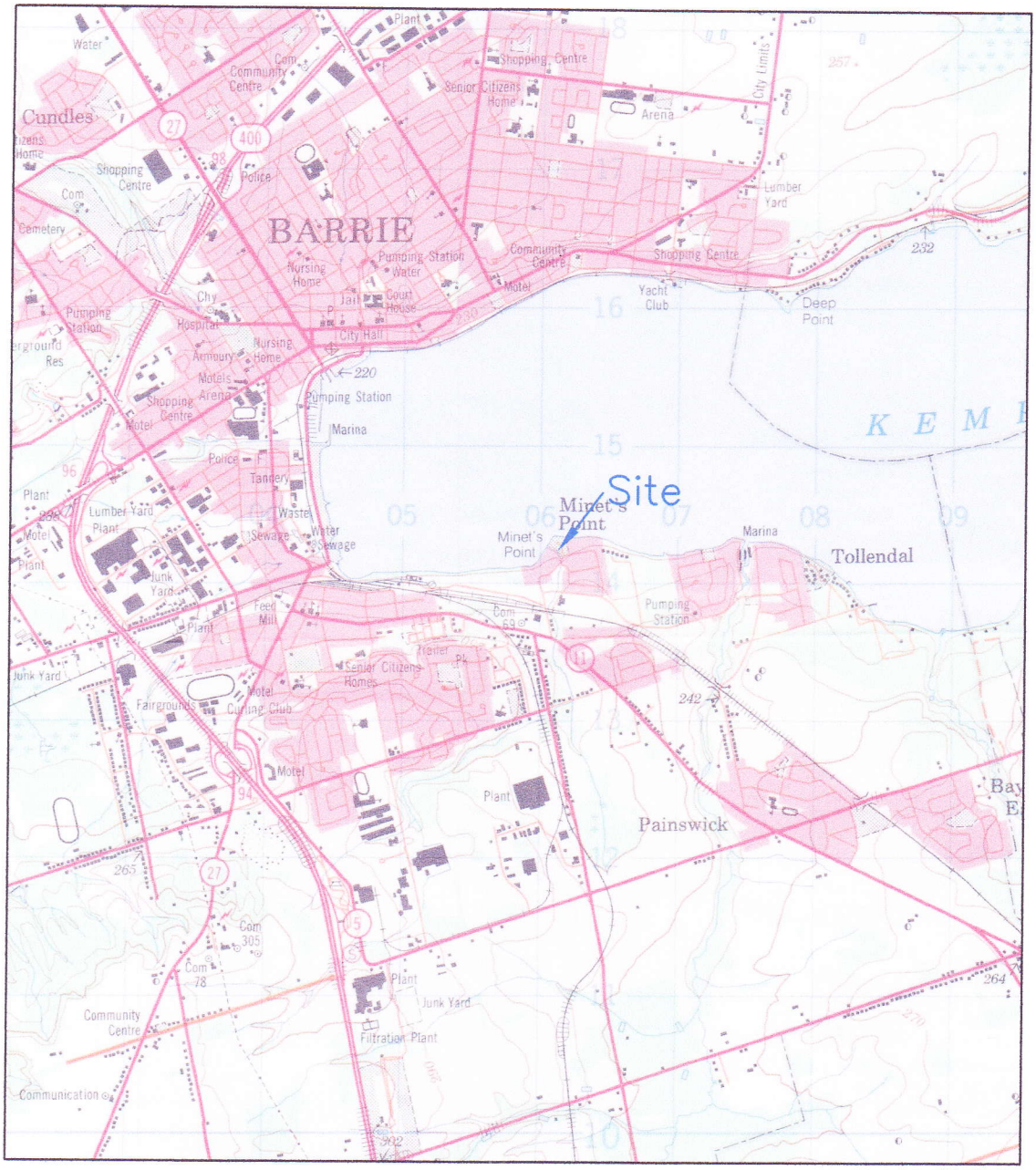
reliance on or decisions made on the basis of it, are the responsibility of the third parties. Fisher Environmental Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Yours truly,



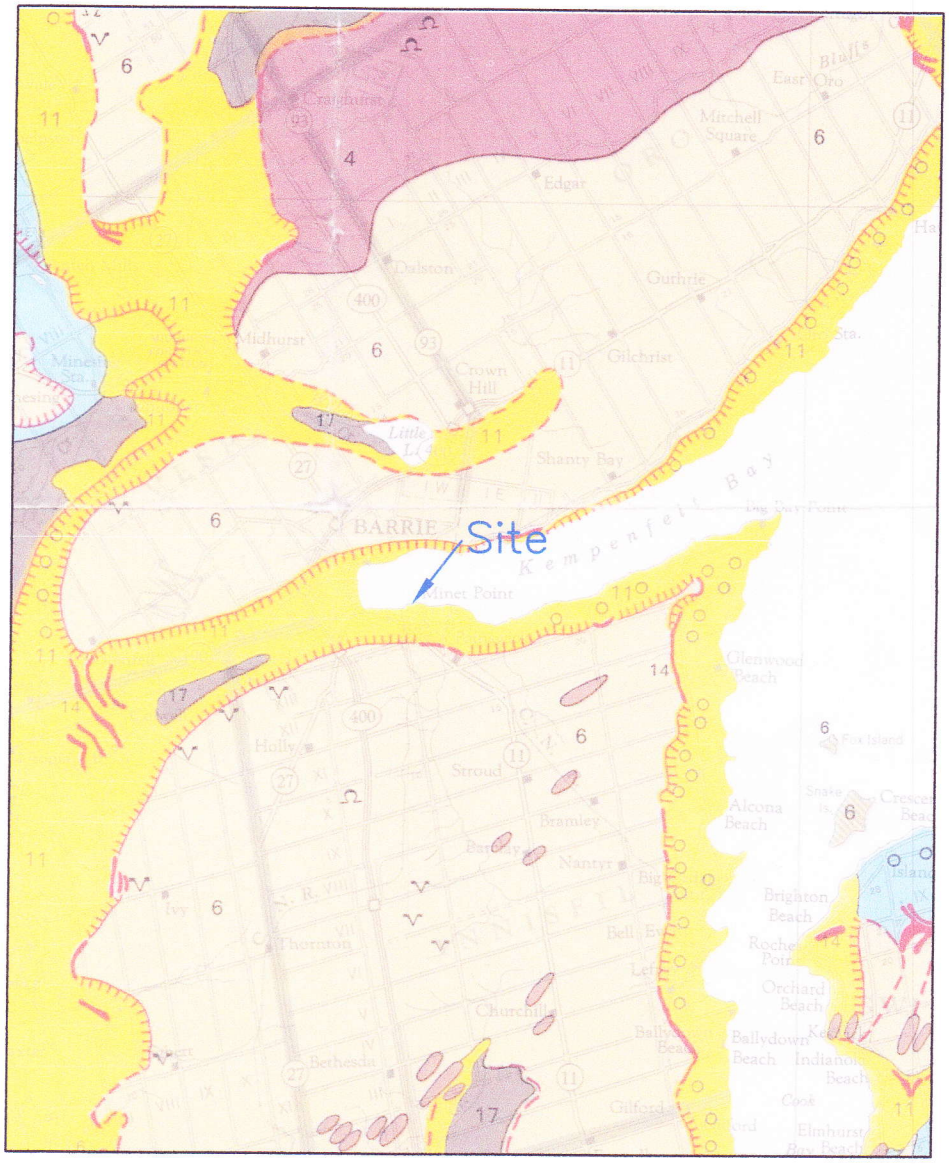
George Bell, M.Eng. P.Eng.

Encl. Figure 1, Location Plan
Figure 2, Surficial Geology Plan
Site Plan with Borehole & Monitoring Well Locations
Borehole Log Sheets
Grain Size Distribution
Chemical Analysis



Ministry of Natural Resources. Department of Energy, Mines and Resources. 1986. Barrie 31 D/5

Location Plan		
Whiskey Creek Barrie, Ontario		
Fisher Environmental Ltd		
Dec 2011	1:50,000	Ref: P11-5718
Drawn: GB	Checked: GB	Figure: 1



Chapman, L J and D F Putnam 1972 Physiography of the South Central Portion of Southern Ontario Map 2226

Surficial Geology Plan		
Whiskey Creek Barrie, Ontario		
Fisher Environmental Ltd		
Dec 2011	1:100,000	Ref: P11-5718
Drawn: GB	Checked: GB	Figure: 2

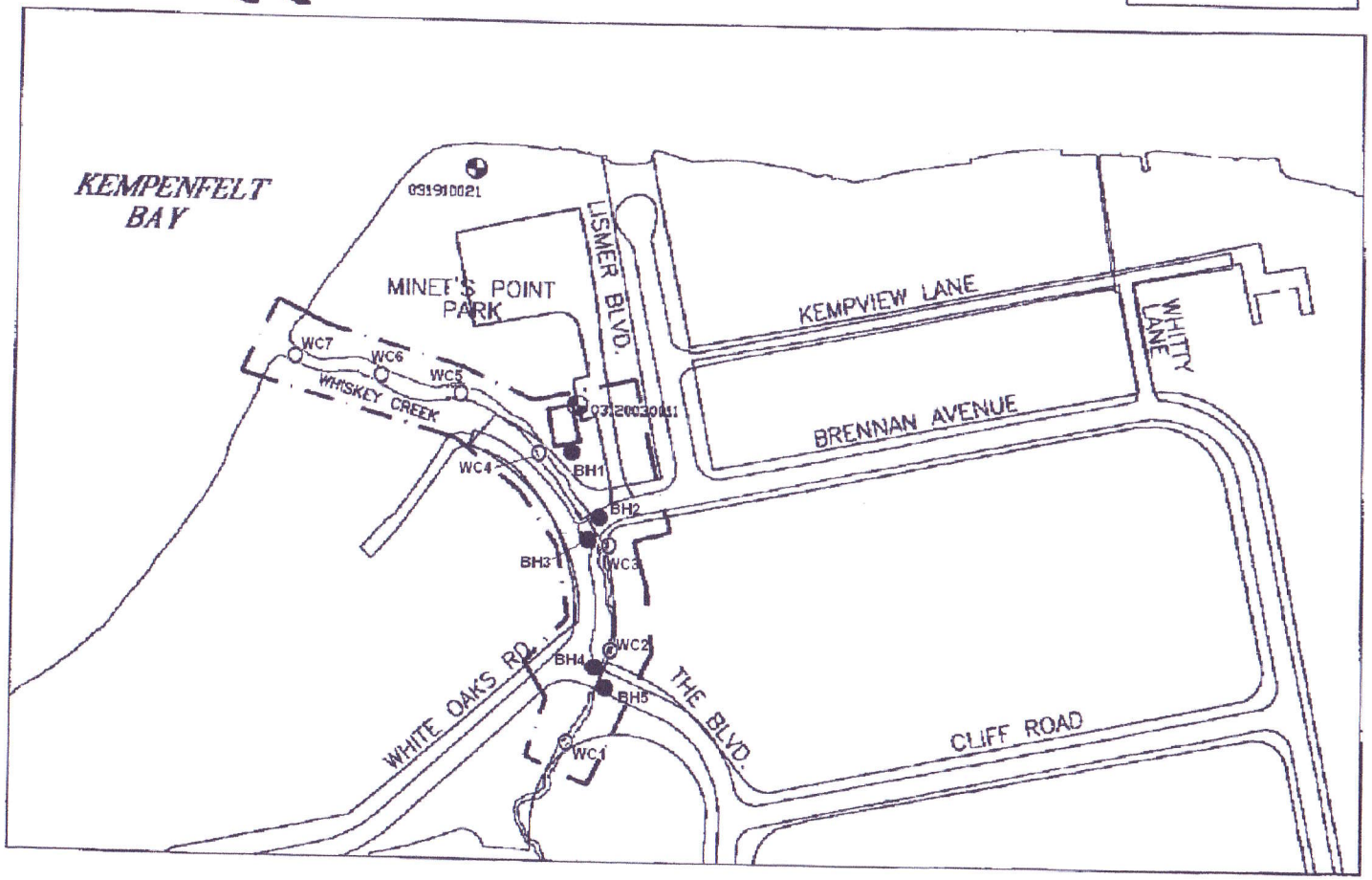
The City of BARRIE

WHISKEY CREEK WATERCOURSE IMPROVEMENTS
KEMPENFELT BAY TO THE BOULEVARD

LEGEND

WC: WATERCOURSE SAMPLE LOCATION

BH: BOREHOLE LOCATION



Key Plan

LEGEND

No.	Revision/Issue	Date

Fisher Environmental Ltd.

400 Esna Park Dr., #15 Markham, Ontario L3R 3K2

Tel: 905 475-7755 Fax: 905 475-7718

Project Name and Address

City of Barry
Whiskey Creek Development

Watercourse Improvment Plan with Borehole and Watercourse Sample Locations

Project P 11-5718	Sheet 1
Date November 23, 2011	
Scale	

Fisher Environmental Ltd.	Log of Borehole: BH1 Whiskey Creek Barrie, Ontario	Sheet: 1 of 5 Project #: P11-5718 G.S.Elevation: 220.298 m

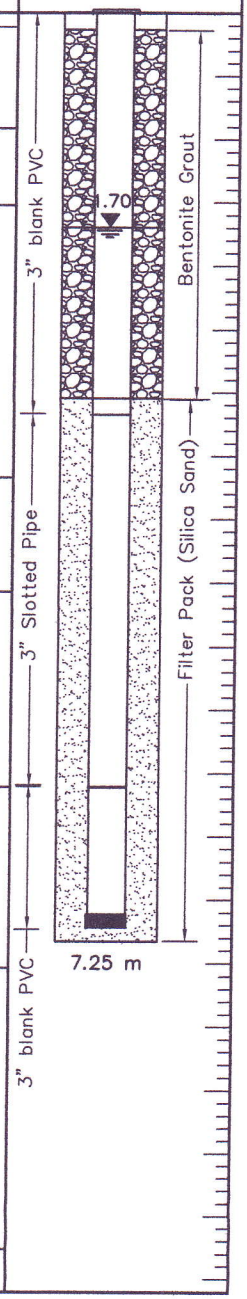
Location:			
Drill Method: D-50		Drilling Date: November 17, 2011	
Sample Method: Split Spoon		Dates: Water Level	
Borehole Diameter: 4"	Water Level:	Logged By: TB	Checked By: DW

Sample No.	Moisture Content (%)	Bulk Unit Weight Dry (kN/m3)	'N' Value	DEPTH (feet)	DEPTH (meters)	Materials Description	Monitoring Well Construction & Water Level (m)
						Surface – Grass	
	8.5	12.3	7	2		FILL: Topsoil, Sand, some Gravel	
11-3233-1			2	4	1	dark Organic Material, Peat	
			2	6	2	dark grey Sand, wet	
	16.9		17	8		grey Sand, wet, medium	
			30	10	3	grey Sand, wet, medium to fine	
			19	12			
				14	4		
	23.4		7	16	5		
			9	18		grey Sand – fine, wet	
			8	20	6		
				22	7		
				24			
	20.9	16.7	18	26	8		
				28		grey Sand – very fine/silt – wet	
			13	30	9		
				32	10	End of Borehole at 9.75 m	

Fisher Environmental Ltd.	Log of Borehole: BH2(MW) Whiskey Creek Barrie, Ontario	Sheet: 2 of 5 Project #: P11-5718 G.S.Elevation: 220.793 m
Location:		
Drill Method: D-50	Drilling Date: November 17, 2011	
Sample Method: Split Spoon	Dates: Water Level November 17, 2011	
Borehole Diameter: 4"	Water Level: 1.70m	Logged By: TB / Checked By: DW

Sample No.	Moisture Content (%)	Bulk Unit Weight Dry (kN/m3)	'N' Value	(feet) DEPTH (meters)	Materials Description
					Surface – Asphalt
			17	2	Sand & Gravel
	14.9	12.4	4	4 / 1	dark brown Sand & Gravel
11-3233-2			2	6 / 2	dark Organic Material, Peat
			2	8	
	20.6		4	10 / 3	
			5	12 / 4	dark Organic Material Some sand, wet
			16	16 / 5	Grey Sand, wet
	20.1		20	18	
			28	20 / 6	Grey Sand, very fine with some Silt, wet
				22 / 7	
			18	24	
				26 / 8	Clay & Silt, trace Sand
				28	
	22.9	18.2	24	30 / 9	
				32 / 10	End of Borehole at 9.75 m

Monitoring Well Construction & Water Level (m)



Fisher Environmental Ltd.

Log of Borehole: BH3(MW)
Whiskey Creek
Barrie, Ontario

Sheet: 3 of 5
Project #: P11-5718
G.S.Elevation: 220.928 m

Location:

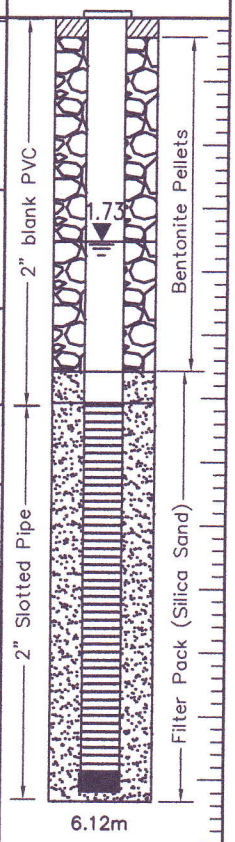
Drill Method: D-50
Drilling Date: November 17, 2011

Sample Method: Split Spoon
Dates: Water Level November 17, 2011

Borehole Diameter: 4"
Water Level: 1.73m
Logged By: TB
Checked By: DW

Sample No.	Moisture Content (%)	Bulk Unit Weight Dry (kN/m3)	'N' Value	(feet) DEPTH (meters)	Materials Description
					Surface – Asphalt
11-3233-3			18	2 / 1	Sand & Gravel
	3.0	13.7	8	4	
			2	6 / 2	Sand & Gravel, trace Peat
			10	8 / 3	dark Organic Material, Peat
	20.6		20	10	grey Sand, wet
			32	12 / 4	greyish brown Sand, wet
			18	14 / 5	grey Sand, very fine, Stones, wet
	23.1		47	16 / 6	grey Sand, wet
			52	18 / 7	
				20 / 8	
			42	22 / 9	grey silty Clay, Clay
				24 / 10	
	19.8	18.7	50	26 / 11	grey Clay
				28 / 12	
				30 / 13	
				32 / 14	End of Borehole at 9.75 m

Monitoring Well Construction & Water Level (m)



Fisher Environmental Ltd.

Log of Borehole: BH4
Whiskey Creek
Barrie, Ontario

Sheet: 4 of 5
Project #: P11-5718
G.S.Elevation: 221.283 m

Location:

Drill Method: D-50

Drilling Date: November 18, 2011

Sample Method: Split Spoon

Dates: Water Level

Borehole Diameter: 4"

Water Level:

Logged By: TB

Checked By: DW

Sample No.	Moisture Content (%)	Bulk Unit Weight Dry (kN/m3)	'N' Value	DEPTH (feet)	DEPTH (meters)	Materials Description	Monitoring Well Construction & Water Level (m)
						Surface – Asphalt	
	7.9	13.9	27	2		Sand & Gravel	
			16	4	1	Sand & Gravel, moist to wet	
			7	6	2	Sand & Gravel, Organic Material Peat, Wood, moist	
11-3233-4			8	8		dark Organic Material pieces of Wood, moist	
			3	10	3		
	22.6		4	12			
			9	14	4		
	28.7		16	16		brown, dark brown Sand, some Stone, wet	
			36	18	5		
				20			
				22	6		
	24.2	14.2	55	24		brown Silt & Clay very fine Sand, wet	
				26	7		
				28			
			50	30	8		
				32			
					9		
					10	End of Borehole at 9.75 m	

Fisher Environmental Ltd.

Log of Borehole: BH5
Whiskey Creek
Barrie, Ontario

Sheet: 5 of 5
Project #: P11-5718
G.S.Elevation: 221.643 m

Location:

Drill Method: D-50
Drilling Date: November 18, 2011

Sample Method: Split Spoon
Dates: Water Level

Borehole Diameter: 4"
Water Level:
Logged By: TB
Checked By: DW

Sample No.	Moisture Content (%)	Bulk Unit Weight Dry (kN/m3)	'N' Value	(feet) DEPTH (meters)	Materials Description	Monitoring Well Construction & Water Level (m)
					Surface – Asphalt	
			11	2	Sand & Gravel	
	15.5	15.2	6	4 1	Sand & Gravel, some dark Silt	
			2	6 2	dark Organic Material Peat, Wood, moist	
	18.1		6	8	dark Organic, brown Sand, wet	
11-3233-5			19	10 3	brown, dark brown Sand, some stone, wet	
			29	12	brown Sand, wet	
			31	14 16 4 5		
	16.7		54	18	brownish grey, grey very fine Sand Silt, wet	
			25	20 6		
				22	brown Sand, wet	
	27.6	15.2	23	24 7 26 8		
				28		
			50	30 9	greyish brown, very fine Sand, Silt, wet	
				32 10	End of Borehole at 9.70 m	

Report No.
11-5748

Chih S. Huang & Associates, Inc.

CONSULTING GEOTECHNICAL INSPECTION & TESTING ENGINEERS

Ref. No.
C-3791

2750 14th Avenue, Unit 11, Markham, Ontario L3R 0B6
Telephone: (905) 475-0784 Fax: (905) 475-5127

Date: November 25, 2011

Fisher Environmental Ltd.
400 Esna Park Dr., Unit #15
Markham, Ontario L3R 3K2

Attention: Mr. Dave Fisher, P.Eng.

Re: GRAIN SIZE ANALYSIS AND HYDROMETER TEST ON SOIL SAMPLE, WHISKEY CREEK WATERCOURSE IMPROVEMENTS, BARRIE, ONTARIO

As requested, we have conducted grain size analysis and hydrometer test on the samples submitted to our laboratory on *November 22, 2011.*

The grain size distribution curves are presented on *enclosure no. 1.*

The moisture content of the soil samples are described as follows:

Soil Sample	Moisture Content (%)
B.H. 2 (7.62m-8.23m)	21.3
B.H. 4 (6.10m-6.71m)	19.6

CHIH S. HUANG & ASSOCIATES INC.

Chih Huang, P.Eng.

LICENSED PROFESSIONAL ENGINEER
CHIH HUANG
PROVINCE OF ONTARIO

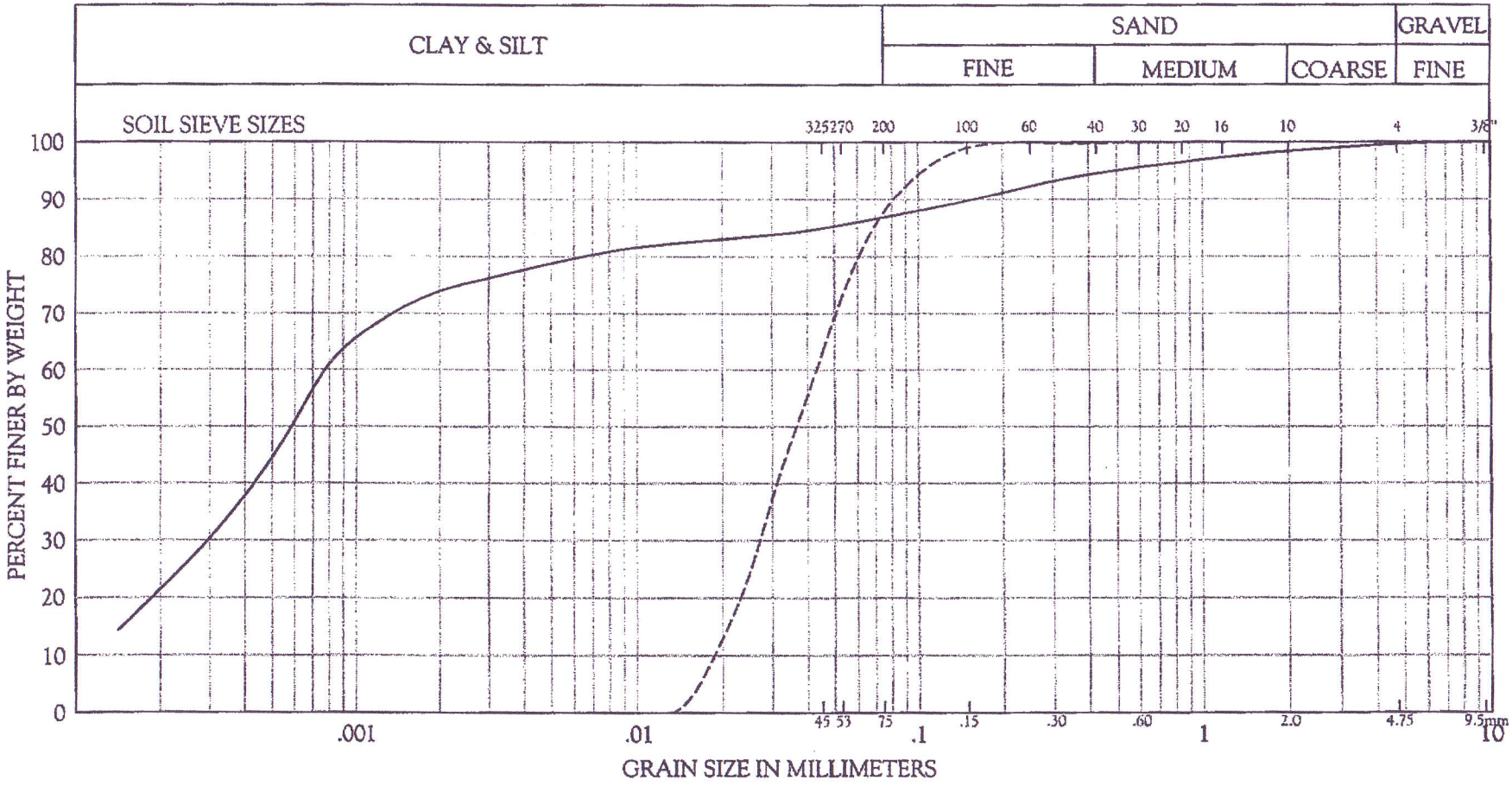
CSH:lc

Chih S. Huang & Associates Inc.

Ref. No. C-3791

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION SYSTEM



Project: Soil Samples BH# 2 & 4, WHISKEY CREEK WATERCOURSE IMPROVEMENTS, BARRIE, ONTARIO

BH #2 (7.62m-8.23m) ———— CLAY & SILT with some sand, trace of gravel Gravel=0.4% Sand=12.8%, Silt & Clay=86.8%

BH #4 (6.10m-6.71m) — — — — — SILT with some sand. Gravel=0% Sand=12.3%, Silt & Clay=87.7%

Enclosure No. 1

GRADING\C-3700+\C-3791u.dwg

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Client: The City of Barrie
Address: 70 Collier Street, P.O. Box 400, Barrie, ON L4M 4T5
Tel.:
Email:
Attn: J.S. Capling

F.E. Job #: 11-3233
Project Name: Whiskey Creek Watercourse Improvements
Project ID: FE-P-11-5718
Date Sampled: 21-Nov-11
Date Received: 21-Nov-11
Date Reported: 1-Dec-11
Location: N/A

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-1*** BH1 0.75-1.35m	***11-3233-2*** BH2 1.50-2.10m	***11-3233-3*** BH3 0.15-0.75m	***11-3233-4*** BH4 2.25-2.85m	***11-3233-5*** BH5 3.00-3.60m	**Soil [1] Table 8 R/P/I/I/C/C**
	Concentration (ppm)					
Metals in Soil						
Antimony	<1	<1	<1	<1	<1	1.3
Arsenic	<5	<5	<5	<5	<5	18
Barium	45.3	11.2	30.3	32.7	14.2	220
Beryllium	<2	<2	<2	<2	<2	2.5
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
Chromium	13.2	5.7	6.0	20.6	11.1	70
Cobalt	<2	<2	2.2	3.5	3.0	22
Copper	6.4	<5	<5	12.1	<5	92
Lead	<10	<10	<10	<10	<10	120
Molybdenum	<2	<2	<2	<2	<2	2
Nickel	<5	<5	<5	5.7	<5	82
Selenium	<1	<1	<1	<1	<1	1.5
Silver	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Thallium	<1	<1	<1	<1	<1	1
Vanadium	13.4	13.7	13.9	22.3	27.4	86
Zinc	16.5	<15	<15	34.7	<15	290

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use (**R/P/I/I/C/C**).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-6*** Creek Sediment Sample #1	***11-3233-7*** Creek Sediment Sample #2	***11-3233-8*** Creek Sediment Sample #3	***11-3233-9*** Creek Sediment Sample #4	***11-3233-10*** Creek Sediment Sample #5	**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
Metals in Soil						
Antimony	<1	<1	<1	<1	<1	NV
Arsenic	<5	<5	<5	<5	<5	6
Barium	10.8	10.5	22.4	16.9	7.0	NV
Beryllium	<2	<2	<2	<2	<2	NV
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
Chromium	7.2	5.7	17.3	10.1	5.1	26
Cobalt	<2	2.0	3.3	2.2	<2	50
Copper	<5	<5	9.6	5.6	<5	16
Lead	<10	<10	<10	<10	<10	31
Molybdenum	<2	<2	<2	<2	<2	NV
Nickel	<5	<5	<5	<5	<5	16
Selenium	<1	<1	<1	<1	<1	NV
Silver	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Thallium	<1	<1	<1	<1	<1	NV
Vanadium	17.1	17.4	37.9	18.9	13.7	NV
Zinc	19.4	18.5	35	32.5	<15	120

< result obtained was below RL (Reporting Limit).
NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-11*** Creek Sediment Sample #6	***11-3233-12*** Creek Sediment Sample #7				**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
Metals in Soil						
Antimony	<1	<1				NV
Arsenic	<5	<5				6
Barium	50.7	29.9				NV
Beryllium	<2	<2				NV
Cadmium	<0.5	<0.5				0.6
Chromium	17.8	10.4				26
Cobalt	4.6	2.4				50
Copper	12.0	8.6				16
Lead	19.8	<10				31
Molybdenum	<2	<2				NV
Nickel	6.7	<5				16
Selenium	<1	<1				NV
Silver	<0.5	<0.5				0.5
Thallium	<1	<1				NV
Vanadium	28.0	17.0				NV
Zinc	60.2	56.0				120

< result obtained was below RL (Reporting Limit).
NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppm)		Recovery (%)		RPD (%)	
Metals in Soil						
Antimony	<1	1	nd	nd	0.0	0-20
Arsenic	<5	5	101	33-167	0.0	0-20
Barium	<5	5	108	69-131	6.7	0-20
Beryllium	<2	2	nd	nd	0.0	0-20
Cadmium	<0.5	0.5	nd	nd	0.0	0-20
Chromium	<5	5	110	41-159	1.3	0-20
Cobalt	<2	2	125	75-125	5.2	0-20
Copper	<5	5	102	73-127	4.8	0-20
Lead	<10	10	102	54-146	4.4	0-20
Molybdenum	<2	2	nd	nd	0.0	0-20
Nickel	<5	5	107	61-139	4.8	0-20
Selenium	<1	1	nd	nd	0.0	0-20
Silver	<0.5	0.5	nd	nd	0.0	0-20
Thallium	<1	1	nd	nd	0.0	0-20
Vanadium	<10	10	135	50-150	6.2	0-20
Zinc	<15	15	108	72-128	6.5	0-20

LEGEND:

< result obtained was below RL (Reporting Limit);

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

Metals - Method #F-1, Rev.4.4, Standard Operation Procedure for determination of Metals by the Inductively Coupled Plasma- Optical. Method used by Fisher Environmental Lab complies with the Standard Methods for the Examination of Water and Wastewater, 20th Ed.3120-B.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-1*** BH1 0.75-1.35m	***11-3233-2*** BH2 1.50-2.10m	***11-3233-3*** BH3 0.15-0.75m	***11-3233-4*** BH4 2.25-2.85m	***11-3233-5*** BH5 3.00-3.60m	**Soil [1] Table 8 R/P/I/I/C/C**
	Concentration (ppm)					
VOCs in Soil						
Acetone	<0.02	<0.02	<0.02	<0.02	<0.02	0.5
Benzene	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Bromodichloromethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Bromoform	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Bromomethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Carbon Tetrachloride	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Chlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Chloroform	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Dibromochloromethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,2-Dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,3-Dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,4-Dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,1-Dichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,2-Dichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,1-Dichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
c-1,2-Dichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
t-1,2-Dichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,2-Dichloropropane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,3-Dichloropropene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Ethylbenzene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Methyl Ethyl Ketone	<0.02	<0.02	<0.02	<0.02	<0.02	0.5
Methylene Chloride	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,1,2,2-Tetrachloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Tetrachloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Toluene	<0.02	<0.02	<0.02	<0.02	<0.02	0.2
1,1,1-Trichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
1,1,2-Trichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Trichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Xylenes	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Surrogate Recovery (%)						
Bromochloromethane	77	117	87	117	110	70-130
1,4-Difluorobenzene	71	105	83	103	115	70-130
1,4-Dichlorobutane	73	117	77	107	112	70-130

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use (**R/P/I/I/C/C**).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-6*** Creek Sediment Sample #1	***11-3233-7*** Creek Sediment Sample #2	***11-3233-8*** Creek Sediment Sample #3	***11-3233-9*** Creek Sediment Sample #4	***11-3233-10*** Creek Sediment Sample #5	**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
VOCs in Soil						
Acetone	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Benzene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Bromodichloromethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Bromoform	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Bromomethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Carbon Tetrachloride	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Chlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Chloroform	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Dibromochloromethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,2-Dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,3-Dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,4-Dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,1-Dichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,2-Dichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,1-Dichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
c-1,2-Dichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
t-1,2-Dichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,2-Dichloropropane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,3-Dichloropropene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Ethylbenzene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Methyl Ethyl Ketone	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Methylene Chloride	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,1,2,2-Tetrachloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Tetrachloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Toluene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,1,1-Trichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
1,1,2-Trichloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Trichloroethylene	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Xylenes	<0.02	<0.02	<0.02	<0.02	<0.02	NV
Surrogate Recovery (%)						
Bromochloromethane	102	117	111	114	84	70-130
1,4-Difluorobenzene	103	103	110	116	79	70-130
1,4-Dichlorobutane	93	107	97	104	82	70-130

< result obtained was below RL (Reporting Limit).
NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-11*** Creek Sediment Sample #6	***11-3233-12*** Creek Sediment Sample #7				**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
VOCs in Soil						
Acetone	<0.02	<0.02				NV
Benzene	<0.02	<0.02				NV
Bromodichloromethane	<0.02	<0.02				NV
Bromoform	<0.02	<0.02				NV
Bromomethane	<0.02	<0.02				NV
Carbon Tetrachloride	<0.02	<0.02				NV
Chlorobenzene	<0.02	<0.02				NV
Chloroform	<0.02	<0.02				NV
Dibromochloromethane	<0.02	<0.02				NV
1,2-Dichlorobenzene	<0.02	<0.02				NV
1,3-Dichlorobenzene	<0.02	<0.02				NV
1,4-Dichlorobenzene	<0.02	<0.02				NV
1,1-Dichloroethane	<0.02	<0.02				NV
1,2-Dichloroethane	<0.02	<0.02				NV
1,1-Dichloroethylene	<0.02	<0.02				NV
c-1,2-Dichloroethylene	<0.02	<0.02				NV
t-1,2-Dichloroethylene	<0.02	<0.02				NV
1,2-Dichloropropane	<0.02	<0.02				NV
1,3-Dichloropropene	<0.02	<0.02				NV
Ethylbenzene	<0.02	<0.02				NV
Methyl Ethyl Ketone	<0.02	<0.02				NV
Methylene Chloride	<0.02	<0.02				NV
1,1,2,2-Tetrachloroethane	<0.02	<0.02				NV
Tetrachloroethylene	<0.02	<0.02				NV
Toluene	0.09	0.09				NV
1,1,1-Trichloroethane	<0.02	<0.02				NV
1,1,2-Trichloroethane	<0.02	<0.02				NV
Trichloroethylene	<0.02	<0.02				NV
Xylenes	<0.02	<0.02				NV
Surrogate Recovery (%)						
Bromochloromethane	93	120				70-130
1,4-Difluorobenzene	80	123				70-130
1,4-Dichlorobutane	92	128				70-130

< result obtained was below RL (Reporting Limit).
NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppm)		Recovery (%)		RPD (%)	
VOCs in Soil						
Acetone	<0.02	0.02	103	70-130	ND	0-20
Benzene	<0.02	0.02	112	70-130	3.0	0-20
Bromodichloromethane	<0.02	0.02	100	70-130	ND	0-20
Bromoform	<0.02	0.02	100	70-130	ND	0-20
Bromomethane	<0.02	0.02	97	70-130	ND	0-20
Carbon Tetrachloride	<0.02	0.02	98	70-130	ND	0-20
Chlorobenzene	<0.02	0.02	101	70-130	ND	0-20
Chloroform	<0.02	0.02	88	70-130	ND	0-20
Dibromochloromethane	<0.02	0.02	106	70-130	ND	0-20
1,2-Dichlorobenzene	<0.02	0.02	104	70-130	ND	0-20
1,3-Dichlorobenzene	<0.02	0.02	92	70-130	ND	0-20
1,4-Dichlorobenzene	<0.02	0.02	93	70-130	ND	0-20
1,1-Dichloroethane	<0.02	0.02	97	70-130	ND	0-20
1,2-Dichloroethane	<0.02	0.02	98	70-130	ND	0-20
1,1-Dichloroethylene	<0.02	0.02	99	70-130	ND	0-20
c-1,2-Dichloroethylene	<0.02	0.02	93	70-130	ND	0-20
t-1,2-Dichloroethylene	<0.02	0.02	90	70-130	ND	0-20
1,2-Dichloropropane	<0.02	0.02	109	70-130	ND	0-20
1,3-Dichloropropene	<0.02	0.02	93	70-130	ND	0-20
Ethylbenzene	<0.02	0.02	102	70-130	11.0	0-20
Methyl Ethyl Ketone	<0.02	0.02	105	70-130	ND	0-20
Methylene Chloride	<0.02	0.02	92	70-130	ND	0-20
1,1,2,2-Tetrachloroethane	<0.02	0.02	89	70-130	ND	0-20
Tetrachloroethylene	<0.02	0.02	97	70-130	ND	0-20
Toluene	<0.02	0.02	112	70-130	18.0	0-20
1,1,1-Trichloroethane	<0.02	0.02	101	70-130	ND	0-20
1,1,2-Trichloroethane	<0.02	0.02	103	70-130	ND	0-20
Trichloroethylene	<0.02	0.02	96	70-130	ND	0-20
Xylenes	<0.02	0.02	106	70-130	15.0	0-20
Surrogate Recovery (%)						
Parameter	**Blank**	**AR**	**QC Sample**	**AR**	**Duplicate**	**AR**
Bromocholoromethane	82	70-130	109	70-130	87	70-130
1,4-Difluorobenzene	74	70-130	110	70-130	84	70-130
1,4-Dichlorobutane	77	70-130	114	70-130	76	70-130

LEGEND:

< result obtained was below RL (Reporting Limit);

ND: No Data;

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

VOCs - Method #F-6, Rev. 4.4, Standard Operating Procedures for determination of Volatile Organic Compounds by Purge and Trap / GC-FID. Methods used by Fisher Environmental Lab are in full compliance with the reference methods for the Examination of Water and Wastewater, 20th Ed. 6220 Purge &Trap GC Method.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-1*** BH1 0.75-1.35m	***11-3233-2*** BH2 1.50-2.10m	***11-3233-3*** BH3 0.15-0.75m	***11-3233-4*** BH4 2.25-2.85m	***11-3233-5*** BH5 3.00-3.60m	**Soil [1] Table 8 R/P/I/I/C/C**
	Concentration (ppm)					
PHC (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	<10	<10	<10	<10	25
F2 (C_{10} - C_{16})	<10	<10	<10	<10	<10	10
F3 (C_{16} - C_{34})	<50	<50	<50	<50	<50	240
F4 (C_{34} - C_{50})	<50	<50	<50	<50	<50	120
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes	Yes	Yes	Yes	
Surrogate Recovery (%)						
Bromochloromethane	77	117	87	117	110	70-130
1,4-Difluorobenzene	71	105	83	103	115	70-130
1,4-Dichlorobutane	73	117	77	107	112	70-130

F_{4G} (gravimetric heavy hydrocarbons) cannot be added to the C_6 to C_{50} hydrocarbons.

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use (**R/P/I/I/C/C**).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-6*** Creek Sediment Sample #1	***11-3233-7*** Creek Sediment Sample #2	***11-3233-8*** Creek Sediment Sample #3	***11-3233-9*** Creek Sediment Sample #4	***11-3233-10*** Creek Sediment Sample #5	**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
PHC (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	<10	<10	<10	<10	NV
F2 (C_{10} - C_{16})	<10	<10	<10	51	<10	NV
F3 (C_{16} - C_{34})	110	<50	140	155	<50	NV
F4 (C_{34} - C_{50})	<50	<50	<50	<50	<50	NV
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes	Yes	Yes	Yes	
Surrogate Recovery (%)						
Bromochloromethane	102	117	111	114	84	70-130
1,4-Difluorobenzene	103	103	110	116	79	70-130
1,4-Dichlorobutane	93	107	97	104	82	70-130

Parameter	***11-3233-11*** Creek Sediment Sample #6	***11-3233-12*** Creek Sediment Sample #7				**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
PHC (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	<10				NV
F2 (C_{10} - C_{16})	<10	28				NV
F3 (C_{16} - C_{34})	230	93				NV
F4 (C_{34} - C_{50})	120	<50				NV
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes				
Surrogate Recovery (%)						
Bromochloromethane	93	120				70-130
1,4-Difluorobenzene	80	123				70-130
1,4-Dichlorobutane	92	128				70-130

F_{4G} (gravimetric heavy hydrocarbons) cannot be added to the C_6 to C_{50} hydrocarbons.

< result obtained was below RL (Reporting Limit).

NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppm)		Recovery (%)		RPD (%)	
PHC (F1-F4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	10	109	70-130	9	0-20
F2 (C_{10} - C_{16})	<10	10	98	70-130	11	0-20
F3 (C_{16} - C_{34})	<50	50	98	70-130	8	0-20
F4 (C_{34} - C_{50})	<50	50	97	70-130	14	0-20
Surrogate Recovery (%)						
Parameter	**Blank**	**AR**	**QC Sample**	**AR**	**Duplicate**	**AR**
Bromochloromethane	83	70-130	78	70-130	111	70-130
1,4-Difluorobenzene	85	70-130	77	70-130	108	70-130
1,4-Dichlorobutane	81	70-130	83	70-130	107	70-130

LEGEND:

< result obtained was below RL (Reporting Limit);

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

BTEX should be subtracted from F_1, Naphthalene from F_2 and selected PAHs from F_3 if BTEX/PAHs are analyzed, then report $F_{1\text{-BTEX}}$, $F_{2\text{-Naph.}}$ and $F_{3\text{-PAH}}$. nC_{50} response factor was within 70% of nC_{10}+nC_{16}+nC_{34} average.

ANALYTICAL METHODS:

PHC (F_1-F_4) - Method # F-7, Rev 1.4., Standard Operating Procedures for determination of Petroleum Hydrocarbons (F1-F4). Method used by Fisher Environmental Lab complies with the Standard Method for the Canada Wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method, CCME 2001 and is validated for use in the laboratory.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-1*** BH1 0.75-1.35m	***11-3233-2*** BH2 1.50-2.10m	***11-3233-3*** BH3 0.15-0.75m	***11-3233-4*** BH4 2.25-2.85m	***11-3233-5*** BH5 3.00-3.60m	**Soil [1] Table 8 R/P/I/I/C/C**
	Concentration (ppm)					
PAHs in Soil						
Naphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
2-Methylnaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	0.59
1-Methylnaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	
Acenaphthylene	<0.05	<0.05	<0.05	<0.05	<0.05	0.093
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	0.072
Fluorene	<0.05	<0.05	<0.05	<0.05	<0.05	0.19
Phenanthrene	<0.05	<0.05	<0.05	<0.05	<0.05	0.69
Anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	0.22
Fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	0.69
Pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	1
Benzo [a] anthracene	0.12	<0.05	<0.05	<0.05	<0.05	0.36
Chrysene	0.09	<0.05	<0.05	0.08	<0.05	2.8
Benzo [b] fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	0.47
Benzo [k] fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	0.48
Benzo [a] pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	0.3
Indeno [1,2,3-cd] pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	0.23
Dibenzo [a,h] anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	0.1
Benzo [g,h,i] perylene	<0.1	<0.1	<0.1	<0.1	<0.1	0.68
Surrogate Recovery (%)						
Naphthalene-d8	57	84	87	85	98	46-182
Phenanthrene-d10	53	81	78	75	89	56-204
Chrysene-d12	56	72	75	75	84	33-122

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use (**R/P/I/I/C/C**).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-6*** Creek Sediment Sample #1	***11-3233-7*** Creek Sediment Sample #2	***11-3233-8*** Creek Sediment Sample #3	***11-3233-9*** Creek Sediment Sample #4	***11-3233-10*** Creek Sediment Sample #5	**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
PAHs in Soil						
Naphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	NV
2-Methylnaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	NV
1-Methylnaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	
Acenaphthylene	<0.05	<0.05	<0.05	<0.05	<0.05	NV
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	NV
Fluorene	<0.05	<0.05	<0.05	<0.05	<0.05	0.19
Phenanthrene	<0.05	<0.05	<0.05	<0.05	<0.05	0.56
Anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	0.22
Fluoranthene	<0.05	<0.05	0.10	0.06	<0.05	0.75
Pyrene	<0.05	<0.05	0.10	<0.05	<0.05	0.49
Benzo [a] anthracene	<0.05	<0.05	0.05	<0.05	<0.05	0.32
Chrysene	<0.05	<0.05	0.07	<0.05	<0.05	0.34
Benzo [b] fluoranthene	<0.05	<0.05	0.06	<0.05	<0.05	NV
Benzo [k] fluoranthene	<0.05	<0.05	0.06	<0.05	<0.05	0.24
Benzo [a] pyrene	<0.05	<0.05	0.06	<0.05	<0.05	0.37
Indeno [1,2,3-cd] pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
Dibenzo [a,h] anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	0.06
Benzo [g,h,i] perylene	<0.1	<0.1	<0.1	<0.1	<0.1	0.17
Surrogate Recovery (%)						
Naphthalene-d8	105	105	91	94	100	46-182
Phenanthrene-d10	100	98	84	87	90	56-204
Chrysene-d12	89	86	73	79	81	33-122

< result obtained was below RL (Reporting Limit).

NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-11*** Creek Sediment Sample #6	***11-3233-12*** Creek Sediment Sample #7				**Sediment [2] Table 8 All Types**
	Concentration (ppm)					
PAHs in Soil						
Naphthalene	<0.05	<0.05				NV
2-Methylnaphthalene	<0.05	<0.05				NV
1-Methylnaphthalene	<0.05	<0.05				
Acenaphthylene	<0.05	0.06				NV
Acenaphthene	<0.05	0.08				NV
Fluorene	<0.05	0.07				0.19
Phenanthrene	<0.05	0.24				0.56
Anthracene	<0.05	0.09				NV
Fluoranthene	0.12	0.40				0.75
Pyrene	0.10	0.34				0.49
Benzo [a] anthracene	0.06	0.20				0.32
Chrysene	0.08	0.29				0.34
Benzo [b] fluoranthene	0.07	0.28				NV
Benzo [k] fluoranthene	0.06	**0.26**				0.24
Benzo [a] pyrene	0.07	0.28				0.37
Indeno [1,2,3-cd] pyrene	<0.1	**0.28**				0.2
Dibenzo [a,h] anthracene	<0.05	**0.27**				0.06
Benzo [g,h,i] perylene	<0.1	**0.34**				0.17
Surrogate Recovery (%)						
Naphthalene-d8	84	85				46-182
Phenanthrene-d10	78	80				56-204
Chrysene-d12	71	78				33-122

< result obtained was below RL (Reporting Limit).
Bold: Results exceed limit noted in Sediment Standards.
NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppm)		Recovery (%)		RPD (%)	
PAHs in Soil						
Naphthalene	<0.05	0.05	113	41-154	0.0	0-30
2-Methylnaphthalene	<0.05	0.05	94	23-162	0.0	0-30
1-Methylnaphthalene	<0.05	0.05	99	38-155	0.0	0-30
Acenaphthylene	<0.05	0.05	92	41-154	0.0	0-30
Acenaphthene	<0.05	0.05	97	50-149	0.0	0-30
Fluorene	<0.05	0.05	94	47-154	0.0	0-30
Phenanthrene	<0.05	0.05	94	54-150	2.7	0-30
Anthracene	<0.05	0.05	99	36-161	0.0	0-30
Fluoranthene	<0.05	0.05	94	25-169	0.0	0-30
Pyrene	<0.05	0.05	94	25-162	0.0	0-30
Benzo [a] anthracene	<0.05	0.05	102	29-168	0.0	0-30
Chrysene	<0.05	0.05	109	38-166	4.3	0-30
Benzo [b] fluoranthene	<0.05	0.05	85	32-158	0.0	0-30
Benzo [k] fluoranthene	<0.05	0.05	93	30-166	0.0	0-30
Benzo [a] pyrene	<0.05	0.05	88	46-145	0.0	0-30
Indeno [1,2,3-cd] pyrene	<0.1	0.1	90	30-159	0.0	0-30
Dibenzo [a,h] anthracene	<0.05	0.05	90	28-168	0.0	0-30
Benzo [g,h,i] perylene	<0.1	0.1	83	33-154	0.0	0-30
Surrogate Recovery (%)						
Parameter	**Blank**	**AR**	**QC Sample**	**AR**	**Duplicate**	**AR**
Naphthalene-d8	114	52-154	65	52-154	80	52-154
Phenanthrene-d10	119	32-137	103	32-137	83	32-137
Chrysene-d12	135	27-159	92	27-159	82	27-159

LEGEND:

< result obtained was below RL (Reporting Limit);

Nd: No Data;

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

PAHs - Method #F-4, Rev 3.1, Standard Operating Procedures for determination of Polynuclear Aromatic Hydrocarbons in Soil Samples. Method used by Fisher Environmental Lab complies with the Standard Methods for the Examination of Water and Wastewater, 20th Ed. 6440 B.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-1*** BH1 0.75-1.35m	***11-3233-2*** BH2 1.50-2.10m	***11-3233-3*** BH3 0.15-0.75m	***11-3233-4*** BH4 2.25-2.85m	***11-3233-5*** BH5 3.00-3.60m	**Soil [1] Table 8 R/P/I/I/C/C**
pH *(no unit)*	6.42	7.88	8.22	7.19	7.89	(5-11) 5-9 *
EC *(mS/cm)*	0.11	0.64	0.20	0.58	0.53	0.7
SAR *(no unit)*	0.58	4.07	3.36	2.97	4.42	5
Sodium *(ppm)*	9.0	123.0	64.6	77.0	125.0	NA
Chloride *(ppm)*	19.60	31.70	8.11	77.90	32.40	NA

< result obtained was below RL (Reporting Limit).

* Surface soil pH value from 5 - 9, Sub-surface soil pH value from 5-11.

NA: Not applicable.

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use (**R/P/I/I/C/C**).

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-6*** Creek Sediment Sample #1	***11-3233-7*** Creek Sediment Sample #2	***11-3233-8*** Creek Sediment Sample #3	***11-3233-9*** Creek Sediment Sample #4	***11-3233-10*** Creek Sediment Sample #5	**Sediment [2] Table 8 All Types**
pH *(no unit)*	7.83	8.22	7.47	7.38	7.50	(5-11) 5-9 *
EC *(mS/cm)*	0.15	0.20	0.27	0.40	0.34	NA
SAR *(no unit)*	0.75	1.79	1.37	2.06	2.01	NA
Sodium *(ppm)*	13.5	26.8	40.8	48.1	40.2	NV
Chloride *(ppm)*	3.2	12.3	18.9	17.4	13.0	NV

Parameter	***11-3233-11*** Creek Sediment Sample #6	***11-3233-12*** Creek Sediment Sample #7				**Sediment [2] Table 8 All Types**
pH *(no unit)*	7.19	6.80				(5-11) 5-9 *
EC *(mS/cm)*	0.27	0.38				NA
SAR *(no unit)*	0.73	1.19				NA
Sodium *(ppm)*	25.2	32.6				NV
Chloride *(ppm)*	12.8	12.5				NV

< result obtained was below RL (Reporting Limit).

* Surface soil pH value from 5 - 9, Sub-surface soil pH value from 5-11.

NA: Not applicable. NV: No value derived.

[2] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
			Recovery (%)		RPD (%)	
pH *(no unit)*	NA	NA	7.83	7.50-8.50	1.7	0-20
EC *(mS/cm)*	<0.01	0.01	0.52	0.416-0.624	3.9	0-20
SAR *(no unit)*	NA	NA	3.16	1.69-4.07	6.7	0-20
Sodium *(ppm)*	<10	10	99	80-120	1.1	0-20
Chloride *(ppm)*	<0.1	0.1	116	80-120	9.3	0-20

LEGEND:

< result obtained was below RL (Reporting Limit);
NA - Not Applicable;
AR - Acceptable Range obtained from historical data;
RPD - Relative Percent Difference.

ANALYTICAL METHODS:

pH by pH meter, EC by EC meter, SAR by ICP #F-16 Rev.1.1; Sodium by ICP #F-1, Rev.4.0; Chloride by Colorimetric #F20. Rev. 1.0; Methods used by Fisher Environmental Lab comply with the Standard Methods for the Examination of Water and Wastewater, 20th Ed.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-13*** BH2 (MW)	***11-3233-14*** BH3 (MW)	***11-3233-15*** BH3 (MW) Duplicate	***11-3233-16*** Spike Recovery (%)	***11-3233-17*** Trip Blank	**Ground Water [3] Table 8 All Types**
	Concentration (ppb)					
Metals in Water						
Antimony	<2	<2	<2	73	<2	6
Arsenic	18.5	21.4	20.0	71	<2.5	25
Barium	203	215	231	102	<2	1,000
Beryllium	<0.5	<0.5	<0.5	98	<0.5	4
Cadmium	<1	<1	<1	102	<1	2.1
Chromium	<10	<10	<10	99	<10	50
Cobalt	<1	<1	<1	119	<1	3.8
Copper	<5	<5	<5	122	<5	69
Lead	<2.5	<2.5	<2.5	111	<2.5	10
Molybdenum	8.8	5.5	8.3	122	<0.5	70
Nickel	<1	<1	<1	102	<1	100
Selenium	<5	<5	<5	168	<5	10
Silver	<1	<1	<1	114	<1	1.2
Thallium	<1	<1	<1	Nd	<1	2
Vanadium	<0.5	<0.5	<0.5	109	<0.5	6.2
Zinc	<5	<5	<5	109	<5	890

< result obtained was below RL (Reporting Limit).

Nd: No data.

[3] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppb)		Recovery (%)		RPD (%)	
Metals in Water						
Antimony	<2	2	99	80-120	9.5	0-20
Arsenic	<2.5	2.5	100	80-120	6.0	0-20
Barium	<2	2	100	80-120	0.1	0-20
Beryllium	<0.5	0.5	100	80-120	0.0	0-20
Cadmium	<1	1	100	80-120	0.0	0-20
Chromium	<10	10	99	80-120	0.0	0-20
Cobalt	<1	1	99	80-120	0.4	0-20
Copper	<5	5	100	80-120	0.0	0-20
Lead	<2.5	2.5	99	80-120	0.0	0-20
Molybdenum	<0.5	0.5	98	80-120	1.1	0-20
Nickel	<1	1	99	80-120	2.0	0-20
Selenium	<5	5	100	80-120	0.0	0-20
Silver	<1	1	100	80-120	0.0	0-20
Thallium	<1	1	96	80-120	0.0	0-20
Vanadium	<0.5	0.5	99	80-120	0.0	0-20
Zinc	<5	5	100	80-120	2.0	0-20

LEGEND:

< result obtained was below RL (Reporting Limit);

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

Metals - Method #F-1, Rev.4.3, Standard Operation Procedure for determination of Metals by the Inductively Coupled Plasma- Optical. Method used by Fisher Environmental Lab complies with the Standard Methods for the Examination of Water and Wastewater, 20th Ed.3120-B.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-13*** BH2 (MW)	***11-3233-14*** BH3 (MW)	***11-3233-15*** BH3 (MW) Duplicate	***11-3233-16*** Spike Recovery (%)	***11-3233-17*** Trip Blank	**Ground Water [3] Table 8 All Types**
	Concentration (ppb)					
VOCs in Water						
Acetone	<1.0	<1.0	<1.0	N/P	<1.0	2,700
Benzene	<1.0	<1.0	<1.0	N/P	<1.0	5
Bromodichloromethane	<1.0	<1.0	<1.0	N/P	<1.0	16
Bromoform	<1.0	<1.0	<1.0	N/P	<1.0	25
Bromomethane	<1.0	<1.0	<1.0	N/P	<1.0	0.89
Carbon Tetrachloride	<1.0	<1.0	<1.0	N/P	<1.0	0.79
Chlorobenzene	<1.0	<1.0	<1.0	N/P	<1.0	30
Chloroform	<1.0	<1.0	<1.0	N/P	<1.0	2.4
Dibromochloromethane	<1.0	<1.0	<1.0	N/P	<1.0	25
1,2-Dichlorobenzene	<1.0	<1.0	<1.0	N/P	<1.0	3
1,3-Dichlorobenzene	<1.0	<1.0	<1.0	N/P	<1.0	59
1,4-Dichlorobenzene	<1.0	<1.0	<1.0	N/P	<1.0	1
1,1-Dichloroethane	<1.0	<1.0	<1.0	N/P	<1.0	5
1,2-Dichloroethane	<1.0	<1.0	<1.0	N/P	<1.0	1.6
1,1-Dichloroethylene	<1.0	<1.0	<1.0	N/P	<1.0	1.6
c-1,2-Dichloroethylene	<1.0	<1.0	<1.0	N/P	<1.0	1.6
t-1,2-Dichloroethylene	<1.0	<1.0	<1.0	N/P	<1.0	1.6
1,2-Dichloropropane	<1.0	<1.0	<1.0	N/P	<1.0	5
1,3-Dichloropropene	<1.0	<1.0	<1.0	N/P	<1.0	0.5
Ethylbenzene	<1.0	<1.0	<1.0	N/P	<1.0	2.4
Methyl Ethyl Ketone	820	<1.0	<1.0	N/P	<1.0	1800
Methylene Chloride	<1.0	<1.0	<1.0	N/P	<1.0	50
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	N/P	<1.0	1
Tetrachloroethylene	<1.0	<1.0	<1.0	N/P	<1.0	1.6
Toluene	850	<1.0	<1.0	N/P	<1.0	22
1,1,1-Trichloroethane	<1.0	<1.0	<1.0	N/P	<1.0	200
1,1,2-Trichloroethane	<1.0	<1.0	<1.0	N/P	<1.0	4.7
Trichloroethylene	<1.0	<1.0	<1.0	N/P	<1.0	1.6
Xylenes	<1.0	<1.0	<1.0	N/P	<1.0	300
Surrogate Recovery (%)						
Bromochloromethane	98	78	112	107	72	70-130
1,4-Difluorobenzene	107	77	101	106	76	70-130
1,4-Dichlorobutane	111	83	111	101	73	70-130

< result obtained was below RL (Reporting Limit).

N/P: Not Performed.

[3] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppb)		Recovery (%)		RPD (%)	
VOCs in Water						
Acetone	<1.0	1.0	103	70-130	ND	0-20
Benzene	<1.0	1.0	109	70-130	ND	0-20
Bromodichloromethane	<1.0	1.0	98	70-130	ND	0-20
Bromoform	<1.0	1.0	96	70-130	ND	0-20
Bromomethane	<1.0	1.0	98	70-130	ND	0-20
Carbon Tetrachloride	<1.0	1.0	94	70-130	ND	0-20
Chlorobenzene	<1.0	1.0	101	70-130	ND	0-20
Chloroform	<1.0	1.0	106	70-130	ND	0-20
Dibromochloromethane	<1.0	1.0	105	70-130	ND	0-20
1,2-Dichlorobenzene	<1.0	1.0	104	70-130	ND	0-20
1,3-Dichlorobenzene	<1.0	1.0	103	70-130	ND	0-20
1,4-Dichlorobenzene	<1.0	1.0	102	70-130	ND	0-20
1,1-Dichloroethane	<1.0	1.0	97	70-130	ND	0-20
1,2-Dichloroethane	<1.0	1.0	94	70-130	ND	0-20
1,1-Dichloroethylene	<1.0	1.0	98	70-130	ND	0-20
c-1,2-Dichloroethylene	<1.0	1.0	99	70-130	ND	0-20
t-1,2-Dichloroethylene	<1.0	1.0	115	70-130	ND	0-20
1,2-Dichloropropane	<1.0	1.0	102	70-130	ND	0-20
1,3-Dichloropropene	<1.0	1.0	98	70-130	ND	0-20
Ethylbenzene	<1.0	1.0	102	70-130	ND	0-20
Methyl Ethyl Ketone	<1.0	1.0	101	70-130	12.0	0-20
Methylene Chloride	<1.0	1.0	114	70-130	ND	0-20
1,1,2,2-Tetrachloroethane	<1.0	1.0	99	70-130	ND	0-20
Tetrachloroethylene	<1.0	1.0	102	70-130	ND	0-20
Toluene	<1.0	1.0	106	70-130	6.0	0-20
1,1,1-Trichloroethane	<1.0	1.0	94	70-130	ND	0-20
1,1,2-Trichloroethane	<1.0	1.0	102	70-130	ND	0-20
Trichloroethylene	<1.0	1.0	98	70-130	ND	0-20
Xylenes	<1.0	1.0	109	70-130	ND	0-20
Surrogate Recovery (%)						
Parameter	**Blank**	**AR**	**QC Sample**	**AR**	**Duplicate**	**AR**
Bromochloromethane	107	70-130	89	70-130	80	70-130
1,4-Difluorobenzene	108	70-130	90	70-130	80	70-130
1,4-Dichlorobutane	114	70-130	97	70-130	78	70-130

LEGEND:

< result obtained was below RL (Reporting Limit);

ND - No Data;

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

VOCs - Method #F-6, Rev. 4.4, Standard Operating Procedures for determination of Volatile Organic Compounds by Purge and Trap / GC-FID. Method used by Fisher Environmental Lab complies with the Standard Methods for the Examination of Water and Wastewater, 20th Ed. 6220 Purge &Trap GC Method.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-13*** BH2 (MW)	***11-3233-14*** BH3 (MW)	***11-3233-15*** BH3 (MW) Duplicate	***11-3233-16*** Spike Recovery (%)	***11-3233-17*** Trip Blank	**Ground Water [3] Table 8 All Types**
	Concentration (ppb)					
PHCs (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	<25	<25	<25	N/P	<25	420
F2 (C_{10} - C_{16})	<100	<100	<100	N/P	<100	150
F3 (C_{16} - C_{34})	<100	<100	<100	N/P	<100	500
F4 (>C_{34})	<100	<100	<100	N/P	<100	500
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes	Yes		Yes	
Surrogate Recovery (%)						
Bromochloromethane	98	78	112		72	70-130
1,4-Difluorobenzene	107	77	101		76	70-130
1,4-Dichlorobutane	111	83	111		73	70-130

< result obtained was below RL (Reporting Limit).
N/P: Not Performed.

[3] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppb)		Recovery (%)		RPD (%)	
PHC (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	<25	25	91	70-130	7	0-20
F2 (C_{10} - C_{16})	<100	100	99	70-130	6	0-20
F3 (C_{16} - C_{34})	<100	100	99	70-130	14	0-20
F4 (>C_{34})	<100	100	97	70-130	10	0-20
Surrogate Recovery (%)						
Parameter	**Blank**	**AR**	**QC Sample**	**AR**	**Duplicate**	**AR**
Bromochloromethane	107	70-130	89	70-130	80	70-130
1,4-Difluorobenzene	108	70-130	90	70-130	80	70-130
1,4-Dichlorobutane	114	70-130	97	70-130	78	70-130

LEGEND:

< result obtained was below RL (Reporting Limit);

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

BTEX should be subtracted from F_1, Naphthalene from F_2 and selected PAHs from F_3 if BTEX/PAHs are analyzed, then report $F_{1\text{-BTEX}}$, $F_{2\text{-Naph.}}$ and $F_{3\text{-PAH}}$.

nC_{50} response factor was within 70% of nC_{10}+nC_{16}+nC_{34} average.

ANALYTICAL METHODS:

PHC (F_1-F_4) - Method # F-7, Rev 1.4., Standard Operating Procedures for determination of Petroleum Hydrocarbons (F1-F4). Method used by Fisher Environmental Lab complies with the Standard Method for the Canada Wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method, CCME 2001 and is validated for use in the laboratory.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-13*** BH2 (MW)	***11-3233-14*** BH3 (MW)	***11-3233-15*** BH3 (MW) Duplicate			**Ground Water [3] Table 8 All Types**
	Concentration (ppb)					
PAHs in Water						
Naphthalene	<2	<2	<2			11
2-Methylnaphthalene	<2	<2	<2			3
1-Methylnaphthalene	<2	<2	<2			
Acenaphthylene	<1	<1	<1			1.0
Acenaphthene	<1	<1	<1			4.1
Fluorene	<0.5	<0.5	<0.5			120
Phenanthrene	<0.1	<0.1	<0.1			1
Anthracene	<0.1	<0.1	<0.1			1
Fluoranthene	<0.4	<0.4	<0.4			0.41
Pyrene	<0.2	<0.2	<0.2			4.1
Benzo [a] anthracene	<0.2	<0.2	<0.2			1.0
Chrysene	<0.1	<0.1	<0.1			0.1
Benzo [b] fluoranthene	<0.1	<0.1	<0.1			0.10
Benzo [k] fluoranthene	<0.1	<0.1	<0.1			0.1
Benzo [a] pyrene	<0.01	<0.01	<0.01			0.01
Indeno [1,2,3-cd] pyrene	<0.2	<0.2	<0.2			0.2
Dibenzo [a,h] anthracene	<0.2	<0.2	<0.2			0.2
Benzo [g,h,i] perylene	<0.2	<0.2	<0.2			0.2
Surrogate Recovery (%)						
Naphthalene-d8	67	59	81			20-157
Phenanthrene-d10	58	59	60			20-147
Chrysene-d12	50	55	50			20-147

< result obtained was below RL (Reporting Limit).

[3] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	Blank	RL	QC Sample	AR	Duplicate	AR
	(ppb)		Recovery (%)		RPD (%)	
PAHs in Water						
Naphthalene	<2	2	91	41-154	5.5	0-30
2-Methylnaphthalene	<2	2	ND	23-162	ND	0-30
1-Methylnaphthalene	<2	2	ND	38-155	ND	0-30
Acenaphthylene	<1	1	95	41-154	0.3	0-30
Acenaphthene	<1	1	160	50-149	1.2	0-30
Fluorene	<0.5	0.5	163	47-154	1.4	0-30
Phenanthrene	<0.1	0.1	84	54-150	4.7	0-30
Anthracene	<0.1	0.1	81	36-161	2.6	0-30
Fluoranthene	<0.4	0.4	94	25-169	1.9	0-30
Pyrene	<0.2	0.2	92	25-162	3.4	0-30
Benzo [a] anthracene	<0.2	0.2	99	29-168	0.4	0-30
Chrysene	<0.1	0.1	101	38-166	3.2	0-30
Benzo [b] fluoranthene	<0.1	0.1	97	32-158	3.4	0-30
Benzo [k] fluoranthene	<0.1	0.1	92	30-166	0.0	0-30
Benzo [a] pyrene	<0.01	0.01	89	46-145	2.4	0-30
Indeno [1,2,3-cd] pyrene	<0.2	0.2	77	30-159	2.0	0-30
Dibenzo [a,h] anthracene	<0.2	0.2	56	28-168	1.6	0-30
Benzo [g,h,i] perylene	<0.2	0.2	61	33-154	3.0	0-30
Surrogate Recovery (%)						
Parameter	**Blank**	**AR**	**QC Sample**	**AR**	**Duplicate**	**AR**
Naphthalene-d8	71	20-157	60	20-157	64	20-157
Phenanthrene-d10	61	20-147	65	20-147	67	20-147
Chrysene-d12	79	20-147	115	20-147	68	20-147

LEGEND:

< result obtained was below RL (Reporting Limit);

ND - No Data;

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

PAHs - Method #F-4, Rev 3.1., Standard Operating Procedures for determination of Polynuclear Aromatic Hydrocarbons in Soil Samples. Methods used by Fisher Environmental Lab are in full compliance with the reference methods for the Standard Methods for the Examination of Water and Wastewater, 20th Ed. 6440 B.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR, Sodium, Chloride
Sample Description:	5 Soil, 7 Sediment, 5 Water Samples

Parameter	***11-3233-13*** BH2 (MW)	***11-3233-14*** BH3 (MW)	***11-3233-15*** BH3 (MW) Duplicate			**Ground Water [3] Table 8 All Types**
pH *(no unit)*	7.32	7.13	7.59			NA
EC *(mS/cm)*	0.98	2.79	2.75			NA
SAR *(no unit)*	2.42	4.53	2.59			NA
Sodium *(ppb)*	84100	225000	94600			490000
Chloride *(ppb)*	75500	782000	122000			790000

< result obtained was below RL (Reporting Limit).

NA: Not applicable.

[3] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. **Table 8**: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition; All Types of Property Use (All Types).

QA/QC Report

Parameter	**Blank**	**RL**	**QC Sample**	**AR**	**Duplicate**	**AR**
			Recovery (%)		**RPD (%)**	
pH *(no unit)*	NA	NA	7.03	6.90-7.10	1.6	0-20
EC *(mS/cm)*	<0.01	0.01	1.41	1.25-1.55	3.8	0-20
SAR *(no unit)*	NA	NA	98	80-120	6.0	0-20
Sodium *(ppb)*	<100	100	99	80-120	1.1	0-20
Chloride *(ppb)*	<100	100	116	80-120	9.3	0-20

LEGEND:

< result obtained was below MDL (Method Detection Limit);

NA - Not Applicable;

AR - Acceptable Range obtained from historical data;

RPD - Relative Percent Difference.

ANALYTICAL METHODS:

pH by pH meter, EC by EC meter, SAR by ICP #F-16 Rev.1.1; Sodium by ICP #F-1, Rev.4.0; Chloride by Colorimetric #F20. Rev. 1.0; Methods used by Fisher Environmental Lab comply with the Standard Methods for the Examination of Water and Wastewater, 20th Ed.

Authorized by:_____

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

GEOTECHNICAL INVESTIGATION
PROPOSED MINET'S POINT PUMPING STATION
BARRIE, ONTARIO
FOR
CITY OF BARRIE
c/o GORE AND STORRIE LIMITED

DISTRIBUTION

5cc Client
1cc PML Toronto
1cc PML Barrie

JOB NO. 84 F 9

FEBRUARY, 1984

PETO MacCALLUM LTD.

PETO MacCALLUM LTD.
UNIT 9, 240 BAYVIEW DRIVE, BARRIE, ONTARIO L4N 4Y8
CONSULTING ENGINEERS
'Phone (705) 726-5555

Job No. 84 F 9 February 6, 1984

City of Barrie
c/o Gore and Storrie Limited
49 Essa Road
Barrie, Ontario

Attention: Mr. N. Huggins

Gentlemen:

Re: Geotechnical Investigation
Proposed Minet's Point Pumping Station
Barrie, Ontario

We are pleased to present our report on the geotechnical investigation carried out at the above referenced site involving two (2) boreholes drilled to depths of 5.05 and 9.60 m below existing grade at locations shown on the appended Borehole Location Plan. This work was authorized by Mr. N. Huggins in a letter dated January 24, 1984.

The boreholes were advanced with a CME-45 Bombardier mounted drillrig under full time engineering supervision. The boreholes were located in the field by Peto MacCallum Ltd. and the ground surface elevations have been referred to an assumed benchmark as described on the Borehole Location Plan, appended.

The soil conditions encountered at the site are described in detail on the appended Log of Borehole sheets and comprise fill or peat overlying a major deposit of saturated sand.

The fill deposit encountered in borehole 2, located in the change-room area, comprised a very moist brown fine to medium sand to a depth of 0.90 m.

Underlying the fill in borehole 2, and from the surface in borehole 1, a wet dark brown fibrous peat deposit was penetrated to a depth of 1.10 m below existing grade in both boreholes.

The peat overlies a major deposit of brown fine to medium sand with trace of silt. At depth, the sand unit changes to a grey fine sand with trace of silt as illustrated by the particle size distribution shown on Figure 1. Moisture contents of the sand are generally in excess of 20% indicating a saturated condition. Standard penetration 'N' values and dynamic cone penetration test results ranged from 4 blows/0.30 m at shallow depth, to average values between 10 and 30 blows/0.30 m at greater depth; these results generally show loose to compact conditions. Borehole 1 and 2 were terminated in the sand stratum at depths of 5.05 and 9.60 m below existing grade.

Groundwater level observations in the boreholes during and upon completion of drilling indicate the stabilized groundwater level lies slightly above the existing lake level which is presently at elevation 98.3 (relative to the assumed benchmark). Seasonal fluctuations of Lake Simcoe are in the order of 0.4 m.

The results of pH and sulphate content determinations carried out on groundwater samples are presented in Table I. The results indicate pH values of 7.6 and 7.7 and sulphate contents as SO_4 of 50 and 120 ppm. The measurements indicate a negligible degree of sulphate attack on buried concrete structures. For information regarding type of cement required, reference is made to C.S.A. A23.

DISCUSSION AND RECOMMENDATIONS

It is understood the proposed structure will consist of an underground pump station, 7 m deep and 4 m in diameter, with an adjacent single storey slab-on-grade change-room structure.

Pump Station

Soil conditions at the site of the proposed pump station consist of saturated sands at shallow depth. At the proposed founding level of 7.0 m (elevation 92.15) a net allowable soil bearing pressure of 200 kPa may be used for design purposes provided the foundations are placed on undisturbed native sands.

During construction, conventional sump pumping will not be sufficient to control the groundwater level in the excavation. We therefore recommend a vacuum well point system be installed around the perimeter of the excavation to control the inflow of groundwater.

With the operation of the well point system lowering the groundwater level below 7 m, the excavation may be carried out with side slopes of 1 horizontal to 1 vertical.

Backfilling against the exterior foundation walls of the pump station can be carried out with on-site granular soils compacted to 95% Standard Proctor maximum dry density. The walls should be designed to resist the lateral earth pressures calculated using a coefficient of lateral earth pressure $K_o = 0.5$, with a submerged unit weight of the soil of 10 kN/m^3 plus full hydrostatic water pressure to the ground surface. Any surcharge or footing loads applied at the ground surface should also be considered in the analysis.

The pump station should also include precautions to avoid the possibility of "floating" when empty.

Change-Rooms

It is understood the change-room structure will be located immediately north of the proposed pump station. The soil conditions contacted in this area are suitable to support the proposed structure on conventional spread or strip footings founded on the native sands available below a depth of 1.10 m, elevation 98.0.

Footings founded in undisturbed native sands above elevation 97.0 may be designed for a net allowable soil bearing pressure of 75 kPa. Footings founded below elevation 97.0 may be designed for a net allowable soil bearing pressure of 150 kPa.

It is envisaged that the change-room structure will be attached to the pump house; therefore, footings for the change-room will be supported on backfill placed around the pump station walls. In this case the backfill beneath any footings should be MTC Granular 'B' placed in lifts not exceeding 200 mm, and compacted to at least 98% Standard Proctor maximum dry density.

In order to maintain the stress bulbs of the footings within the compacted MTC Granular 'B', the compacted zone should extend beyond the outside edge of the footings an amount determined by drawing a line at a slope of 1 horizontal to 1 vertical down to natural ground from the outside edges of the footing. Footings placed on this structural fill may be designed adopting a net allowable soil bearing pressure of 150 kPa.

Footing excavations will extend at least 0.30 to 0.60 m below the stabilized groundwater level. If foundations are constructed during the dry season, the requirements for groundwater control will be reduced. However, at other times of the year conventional sump pumping is not considered sufficient and we recommend a vacuum wellpoint system be installed around the perimeter of the excavation to control groundwater inflow and subgrade stability.

General

It is recommended that all footings be maintained at least 1.20 m below final exterior grade to ensure adequate protection against possible frost damage.

We also recommend that all founding surfaces be inspected by Peto MacCallum Ltd. geotechnical personnel, prior to concreting, to ensure the founding soils are undisturbed and capable of supporting the design loads. Full time compaction inspection of the structural fill placement will be required to ensure material quality and levels of compaction are as specified.

We trust this report is sufficient for your present requirements; however, should you have any questions please do not hesitate to contact our office.

Yours very truly,
PETO MacCALLUM LTD.

GM/cob

G. Mitchell, B. Eng.

S. Pilch, P. Eng.
Chief Geotechnical Engineer

JOB NO. 84 F 9
FEBURARY, 1984

TABLE I

pH VALUE AND SULPHATE CONTENT OF WATER SAMPLES

PROPOSED MINET'S POINT PUMPING STATION
BARRIE, ONTARIO

BOREHOLE NO.	DEPTH (m)	pH VALUE	SULPHATE CONTENT ppm as SO_4	RELATIVE DEGREE SULPHATE ATTACK ON CONCRETE
1	0.30	7.6	50	negligible
5	1.50	7.7	120	negligible

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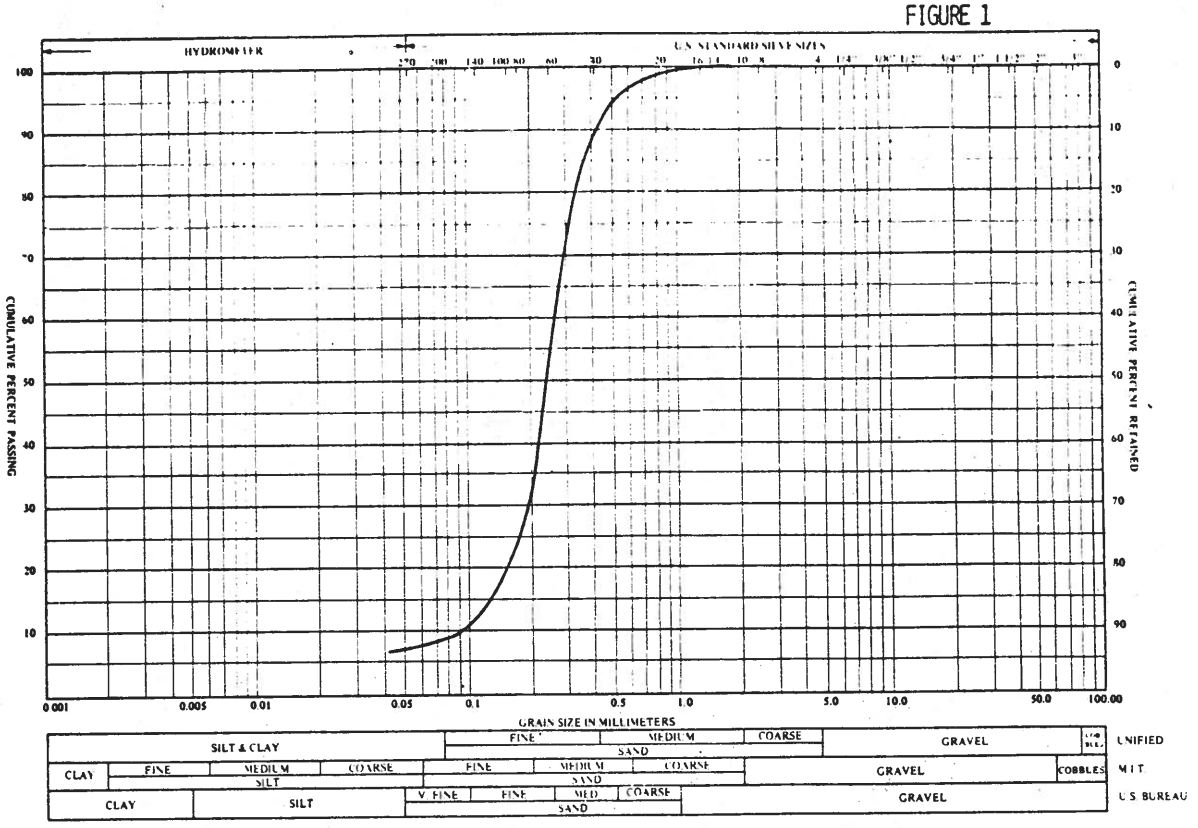
FEBRUARY, 1984

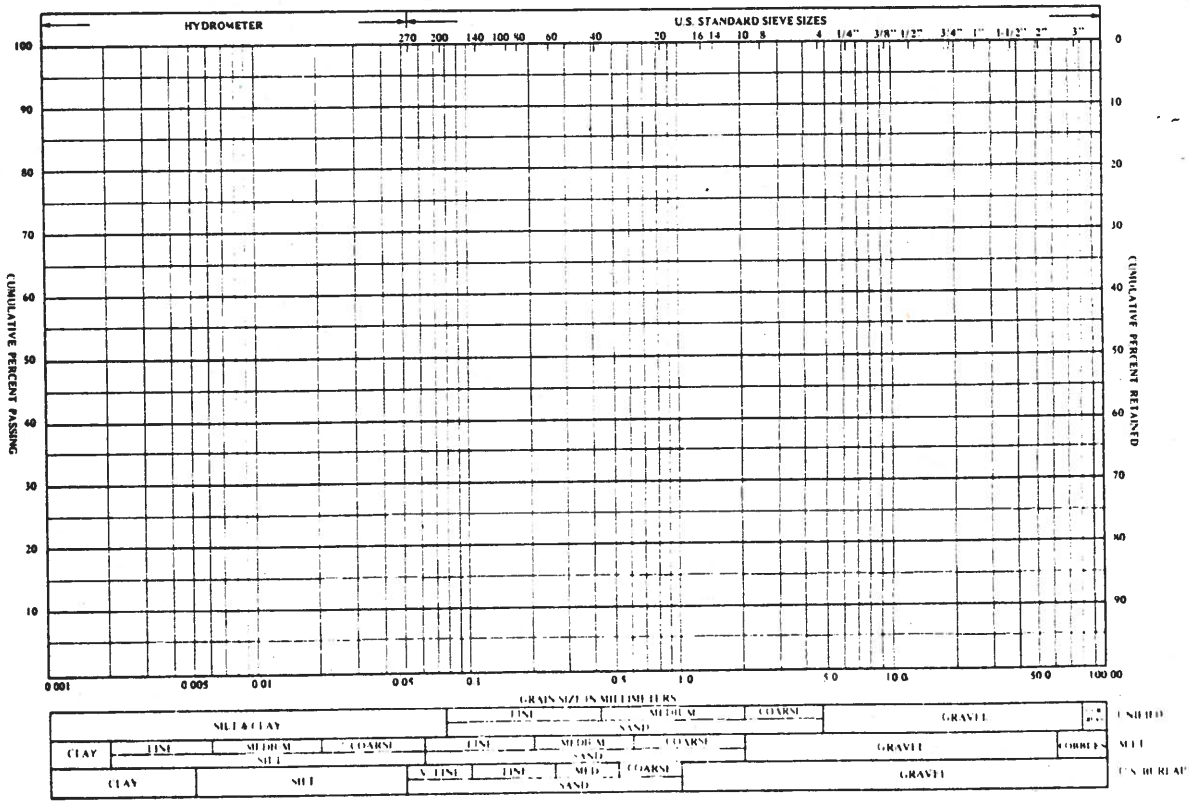
PARTICLE SIZE DISTRIBUTION CHART

FIGURE 1



REMARKS Borehole 1, Sample 5, Depth 4.55 - 5.00 m

FINE SAND, TRACE SILT



REMARKS

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N', - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 0.3m INTO THE SUBSOIL. DRIVEN BY MEANS OF A 63.5kg HAMMER FALLING FREELY A DISTANCE OF 0.76m.

DYNAMIC PENETRATION RESISTANCE : - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 51mm, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS. 0.3m INTO THE SUBSOIL. THE DRIVING ENERGY BEING 475 J PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS : -

CONSISTENCY	'N' BLOWS/0.3 m	c kPa	DENSENESS	'N' BLOWS/0.3 m
VERY SOFT	0 - 2	0 - 12	VERY LOOSE	0 - 4
SOFT	2 - 4	12 - 25	LOOSE	4 - 10
FIRM	4 - 8	25 - 50	COMPACT	10 - 30
STIFF	8 - 15	50 - 100	DENSE	30 - 50
VERY STIFF	15 - 30	100 - 200	VERY DENSE	> 50
HARD	> 30	> 200		

W.T.P.L. WETTER THAN PLASTIC LIMIT D.T.P.L. DRIER THAN PLASTIC LIMIT

A.P.L. ABOUT PLASTIC LIMIT

TYPE OF SAMPLE

S.S	SPLIT SPOON	T W	THINWALL OPEN
W S	WASHED SAMPLE	T P	THINWALL PISTON
S B	SCRAPER BUCKET SAMPLE	O S	OESTERBERG SAMPLE
A S	AUGER SAMPLE	F S	FOIL SAMPLE
C S	CHUNK SAMPLE	R C	ROCK CORE
S.T	SLOTTED TUBE SAMPLE		

P H SAMPLE ADVANCED HYDRAULICALLY

P M SAMPLE ADVANCED MANUALLY

SOIL TESTS

Qu	UNCONFINED COMPRESSION	L V	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F V	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	DRAINED TRIAXIAL		

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LOG OF BOREHOLE No. 1

JOB NAME PROPOSED MINET'S POINT PUMPING STATION
LOCATION Lakeview and Parkside Drive, Barrie, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE January 27, 1984
JOB No 84 F 9
ENGINEER S. Pilch
TECHNICIAN P. Chan

DEPTH in METRES	DESCRIPTION	ELEVATION	SAMPLES NUMBER	SAMPLES TYPE	BLOWS/0.3m N VALUES
	GROUND ELEVATION 99.15	99			
	PEAT: dark brown fibrous peat, wet				
1.10		98	1	SS	4
1.5	SAND: loose to compact brown fine to medium sand, trace silt, occasional seams with coarse sand and gravel, saturated				
		97	2	SS	12
			3	SS	12
3.05		96			
3.0	becoming grey fine sand, little medium sand, trace silt		4	SS	20
		95			
4.5			5	SS	38*
		94			
6.0		93	6	SS	16*
		92			
7.5 7.60	becoming silty sand		7	SS	8*
		91			
9.0		90	8	SS	18*
9.60	BOREHOLE TERMINATED AT 9.60 m				
10.5					
12.0					
13.5					
15.0					
16.5					
18.0					

SHEAR STRENGTH C_u ▲
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
BLOWS 0.3m 20 40 60 80

LIQUID LIMIT ____ W_L
PLASTIC LIMIT ____ W_P
WATER CONTENT ____ W
W_P W W_L
WATER CONTENT 10 20 30

GROUNDWATER OBSERVATIONS AND REMARKS

bentonite seal

cave material

After sample 2 water level at 1.05 m

After sample 3, water level at 0.85 m

After sample 4 water level at 0.85 m and cave at 2.15 m

*N value influenced by borehole caving

Upon completion of augering, water level at 0.30 m and borehole caved at 0.45 m

NOTES

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CONSULTING ENGINEERS

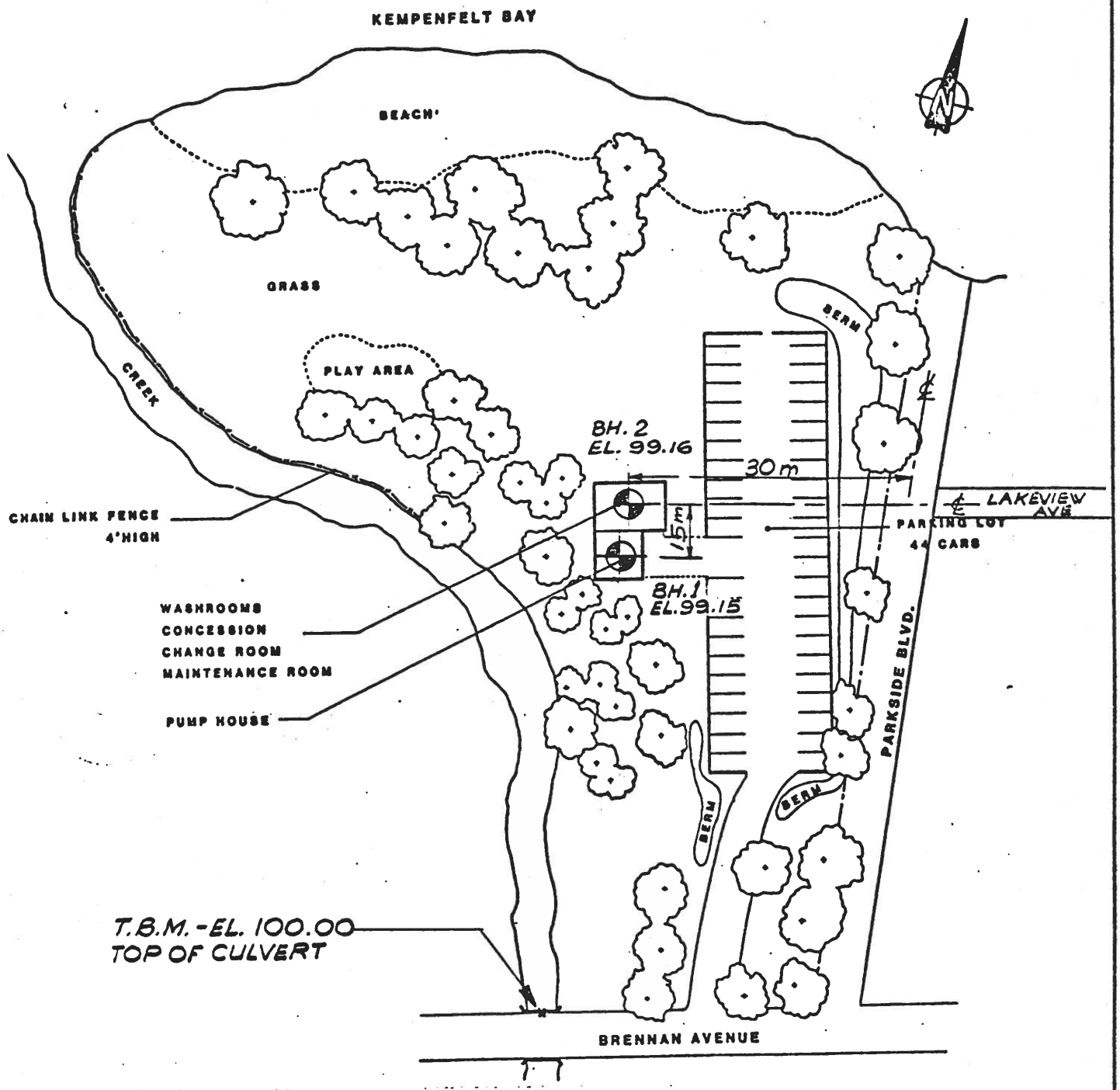
LOG OF BOREHOLE No. 2

JOB NAME: PROPOSED MINET'S POINT PUMPING STATION
JOB No: 84 F 9
LOCATION: Lakeview and Parkside Drive, Barrie, Ontario
BORING DATE: January 27, 1984
ENGINEER: S. Pilch
BORING METHOD: Continuous Flight Solid Stem Augers
TECHNICIAN: P. Chan

DEPTH in METRES	DESCRIPTION	GROUND ELEVATION 99.16	LEGEND	ELEVATION	SAMPLES NUMBER	SAMPLES TYPE	BLOWS/0.3m N VALUES	SHEAR STRENGTH C_u ▲ / DYNAMIC CONE PENETRATION × / STANDARD PENETRATION TEST • BLOWS/0.3m (20 40 60 80)	LIQUID LIMIT W_L / PLASTIC LIMIT W_P / WATER CONTENT W (W_P W W_L) WATER CONTENT (10 20 30)	GROUNDWATER OBSERVATIONS AND REMARKS
	FILL: brown fine to medium sand, little silt, trace gravel, very moist			99						
0.90										
1.10	PEAT: dk.br. fibrous peat, wet			98	1	SS	4			
1.5	SAND: loose to compact brown medium sand, trace of fine sand and silt, saturated				2	SS	15			After sample 2, water level at 1.20 m
				97						
					3	SS	31			After sample 3, water level at 1.10 m
3.00										
3.0	becoming fine sand with occasional organic seams			96	4	SS	9			
				95						
4.5					5	SS	25			Upon completion of augering, water level at 1.05 m and cave at 1.20 m
5.05				94						
	BOREHOLE TERMINATED AT 5.05 m									
6.0										
7.5										
9.0										
10.5										
12.0										
13.5										
15.0										
16.5										
18.0										

NOTES

CHECKED BY



BOREHOLE LOCATION PLAN
PROPOSED MINET'S POINT PUMPING STATION
BARRIE, ONTARIO

Reference:
Reproduced from plan supplied by client

NOTE: The inferred stratigraphy referred to in the report is based on data from these boreholes, supplemented by geological evidence, and the

PETO MacCALLUM LTD.
CONSULTING ENGINEERS

DATE	SCALE	JOB NO.	DRAWING NO.
FEB./83	N.T.S.	8459	1

PETO MacCALLUM LTD.

REPORT NUMBER _____

ENCLOSURE _____ of _____

TECHNICIAN'S FIELD REPORT

TYPE OF INSPECTION: In situ Density Testing (Nuclear)

CLIENT	City of Barrie-Engineering	JOB NUMBER	85 B 426
JOB NAME	Minet's Point Area Reconstr.	DATE OF INSPECTION	86.07.24
CONTRACTOR	Cascone Construction Ltd.	WEATHER	

AREA INSPECTED

Parking Lot area by the beach area.

As requested by the client, In situ Density Tests were performed on the Granular 'A' material in the above noted area.

All test results meet the specification of 100% of Standard Proctor density.

All test locations were selected at random.

Detailed test data is presented on the appended report form.

COPIES HANDED ON SITE TO

SUBMITTED BY

R. Stewart

PETO MacCALLUM LTD.

REPORT NUMBER _____

ENCLOSURE _____ OF _____

FIELD COMPACTION TEST RESULTS

CLIENT City of Barrie-Engineering

JOB NUMBER 85 B 426

JOB NAME Minet's Point Area Reconstruction

LOCATION Barrie, Ontario

TEST METHOD Nuclear Instrumentation

GENERAL CONTRACTOR Cascone Construction Ltd.

TECHNICIAN R. Stewart

EARTHWORK CONTRACTOR Cascone Construction Ltd.

DATE TYPED 1986.08.15

Test No.	Date Tested	Depth Below Final Grade m	LOCATION OF TESTS	LABORATORY PROCTOR RESULTS				FIELD RESULTS		Compaction Obtained	Test Results As Specified	MATERIAL TESTED
				Std. or Mod.	Specified	Optimum Moisture	Maximum Dry Density	Moisture Content	Dry Density			
				S/M	%	%	t/m^3	%	t/m^3	%	Yes/No	
1	86.07.24	Grade	NE corner of parking lot	S	100	7.0	2.225	2.9	2.214	100	yes	Granular 'A'
2	86.07.24	"	N centre of parking lot	S	100	7.0	2.225	2.7	2.221	100	yes	Granular 'A'
3	86.07.24	"	NW corner of parking lot	S	100	7.0	2.225	3.0	2.223	100	yes	Granular 'A'
4	86.07.24	"	W centre of parking lot	S	100	7.0	2.225	3.0	2.228	100	yes	Granular 'A'
5	86.07.24	"	centre of parking lot	S	100	7.0	2.225	2.2	2.249	100+	yes	Granular 'A'
6	86.07.24	"	E centre of parking lot	S	100	7.0	2.225	2.0	2.241	100	yes	Granular 'A'
7	86.07.24	"	SE corner of parking lot	S	100	7.0	2.225	2.5	2.228	100	yes	Granular 'A'
8	86.07.24	"	S centre of parking lot	S	100	7.0	2.225	2.9	2.222	100	yes	Granular 'A'
9	86.07.24	"	SW corner of parking lot	S	100	7.0	2.225	2.7	2.232	100	yes	Granular 'A'

COMPACTION METHOD

REMARKS

TEST HOLES

Location & EL.

JAN 9/86

D. CLINE
S O'REILLY
C. REID

LAKEVIEW AVE

#1 0+043 ℄	219.8
#2 0+119 ℄	219.5
#3 0+190 ℄	219.5

WHITE OAKS RD

#4
0+340
5"R

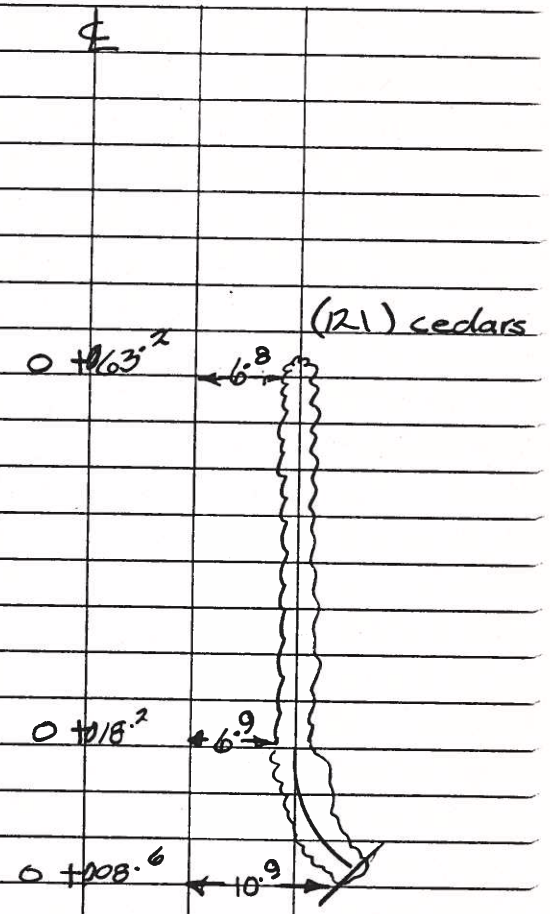
220.6

No.

Date.....Page.....

No. CLIFF RD

Date. MAY /86 Page. 35

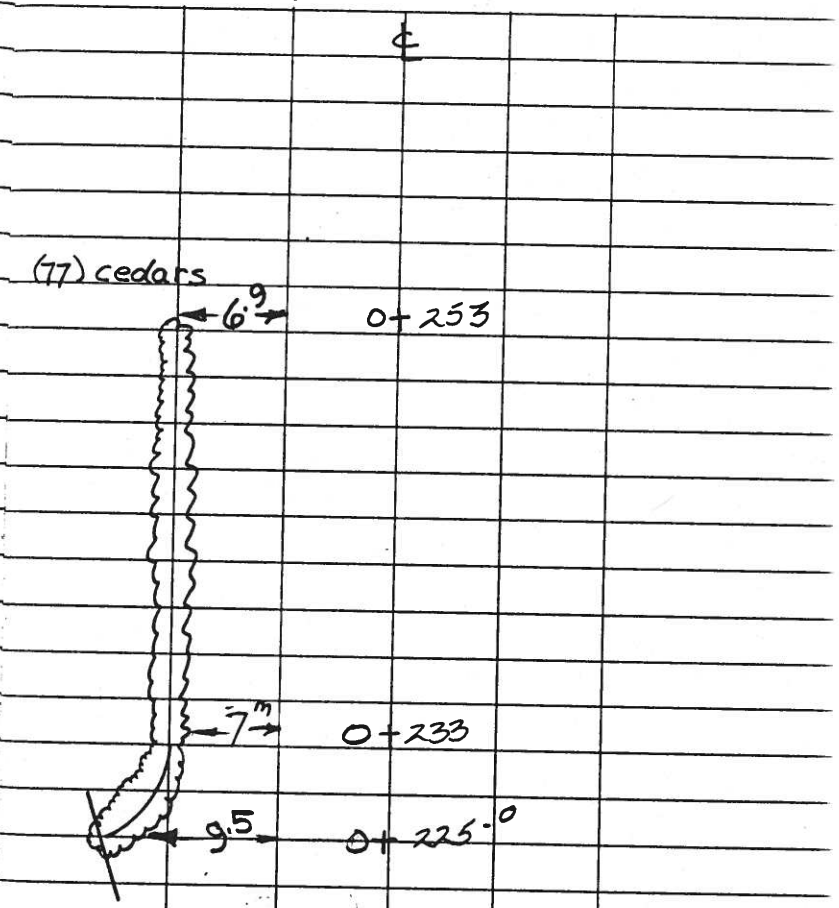


No.....

Date.....Page.....

No. BRENNAN AVE

Date. MAY '36 Page. 30



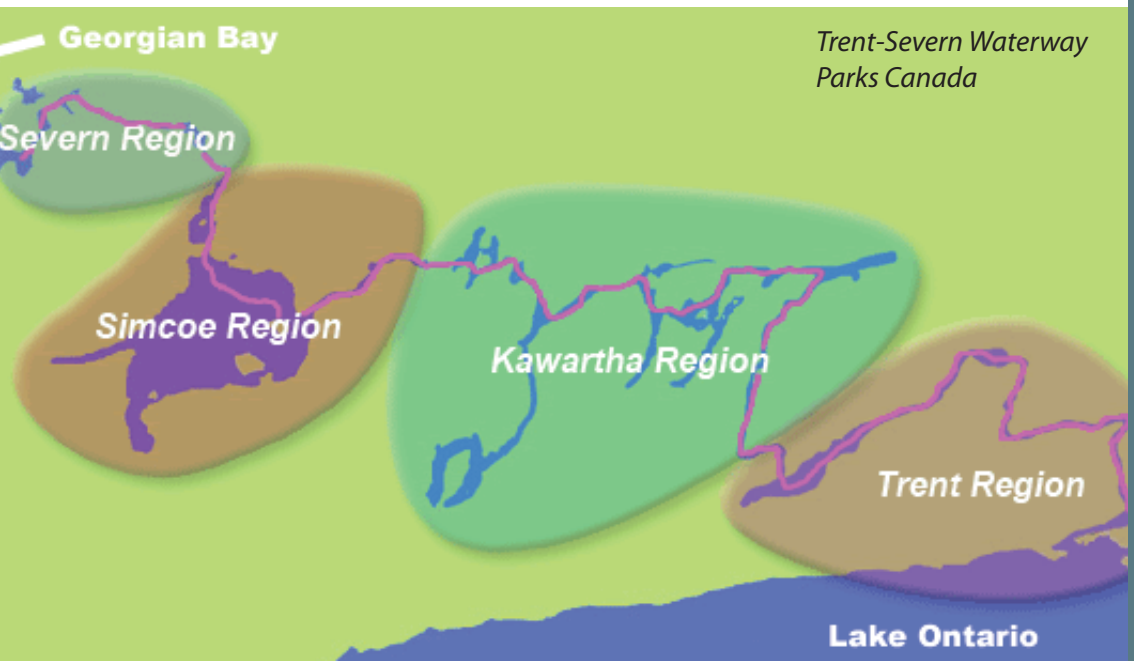
Lake Simcoe Water Levels

Lake Simcoe Region conservation authority

Each year questions about Lake Simcoe water levels come up. Who controls them? Why are they so low? Why are they so high? To name a few. The fact is Lake Simcoe water levels are not "controlled". They are "managed" with the understanding that climate conditions can be unpredictable at times. Here are some facts that provide a better understanding of Lake Simcoe water levels and how they are managed.

To begin, Lake Simcoe is part of a much larger system known as the Trent-Severn Waterway (TSW). Ultimately water levels in Lake Simcoe are managed by Parks Canada, the Federal Government, via the Trent-Severn Waterway. Management of this system is extremely complex and considers all the varying needs and impacts that each decision or action will have on the rest of the system.

Depending on your relationship with the lake you, may have a different perspective on water levels. However, we do need to remember that Lake Simcoe is only one part of a much larger system. A balance must be achieved between managing water quantity to prevent flooding of property and the importance of water for recreational use and maintaining fish and wildlife habitats.



Trent-Severn Waterway
Parks Canada

Quick Facts: Trent-Severn Waterway

The Trent-Severn Waterway (TSW) is a National Historic Site which offers a navigable route for recreation and commerce.

- It is 386 km long, 18,600 square kilometers of interconnected lakes, rivers and channels connecting Lake Ontario at Trenton to Georgian Bay at Port Severn.
- Nearly 50 communities are located on its shores.
- Hundreds of thousands of people rely on this waterway for drinking water, flood control, tourism and recreation.
- It provides water for power generation, municipal water supplies, and agriculture and supports a tremendous variety of fish and wildlife.

The Trent-Severn Waterway is an important economic, environmental and recreational resource used by thousands of boaters, shoreline residents, businesses and vacationers every year.

For further information please visit:
Parks Canada - Trent-Severn Waterway

Changes in Lake Simcoe Water Levels

Typically Lake Simcoe water levels vary by about 0.4-0.5 metres during any given year. The highest levels usually occur between April and June. As the summer progresses, the levels begin to drop because of increased evaporation and reduced inflows. The lowest levels are reached in late fall and winter.

Why can't the water levels in Lake Simcoe stay higher longer?

Because Lake Simcoe is a part of the larger Trent-Severn Waterway system, actions taken to change the water levels in Lake Simcoe cannot occur without repercussions in other ways and other areas. For example, keeping Lake Simcoe water levels higher into late summer increases the potential of flooding in cottage country the following spring. This is because Lake Simcoe acts as a large storage basin for winter and spring snowfall, melt-water and precipitation. If the lake levels are kept high for too long, essentially there wouldn't be enough room in the lake to hold the water from these natural cycles, which would cause flooding and other environmental issues within the watershed.

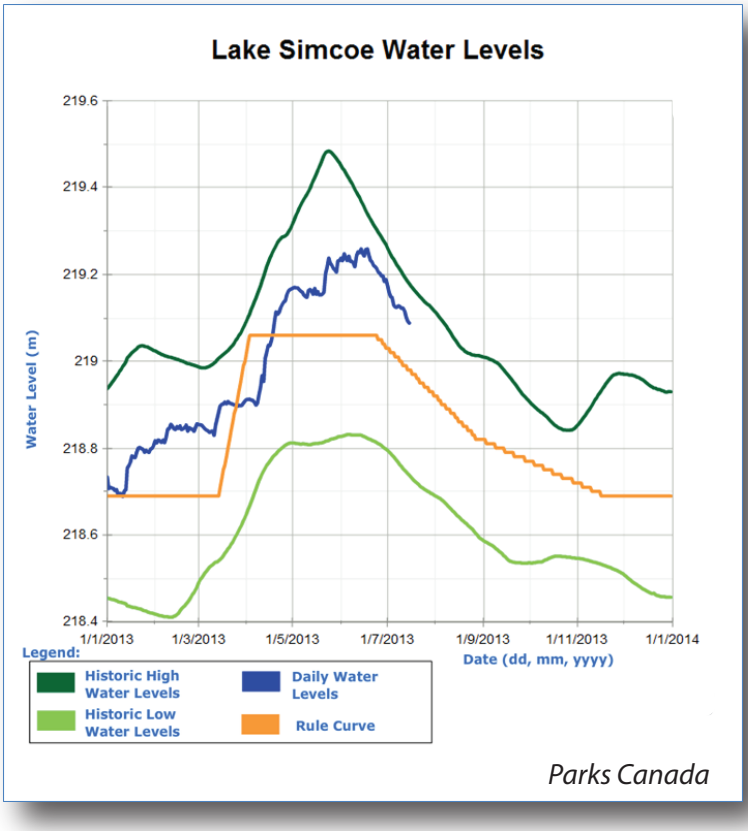
Why are Lake Simcoe Water levels lowered in the summer?

The lowering of water levels which occurs every year at the same time is referred to as "drawdown".

Drawdown begins in the summer because it takes time to gradually reduce the levels in the lake. This needs to take place to make room for the precipitation that happens in the fall, winter and spring. In order to protect against flooding and optimize public safety throughout the interconnected system, the lake is lowered to make room for high inflows that are typical over the non-navigation (off-boating) seasons.

It is important to note that Lake Simcoe water levels do not actually fluctuate all that much (see chart) Historic lows run at 716.5 feet and historic highs run at 720.1 feet. Actual fluctuations over the course of any one year are even smaller.

Lakes in the TSW system are also subject to drawdown. In order to meet the targeted levels this drawdown must begin by mid-summer. What happens in one lake or river impacts rivers and lakes both upstream and downstream.



Parks Canada

Water levels have an impact on our fish

It is essential to have the TSW systems water levels lowered prior to fish spawning as fish spawn close to the water's edge in shallow areas. If the drawdown is done after eggs have been laid, the eggs may be exposed, dry up and die. This will not only affect fish and their habitat but other wildlife as well.

For more information contact LSRCA
Phone:1-800-465-0437
Visit: www.lsrca.on.ca

NORTH ELEVATION

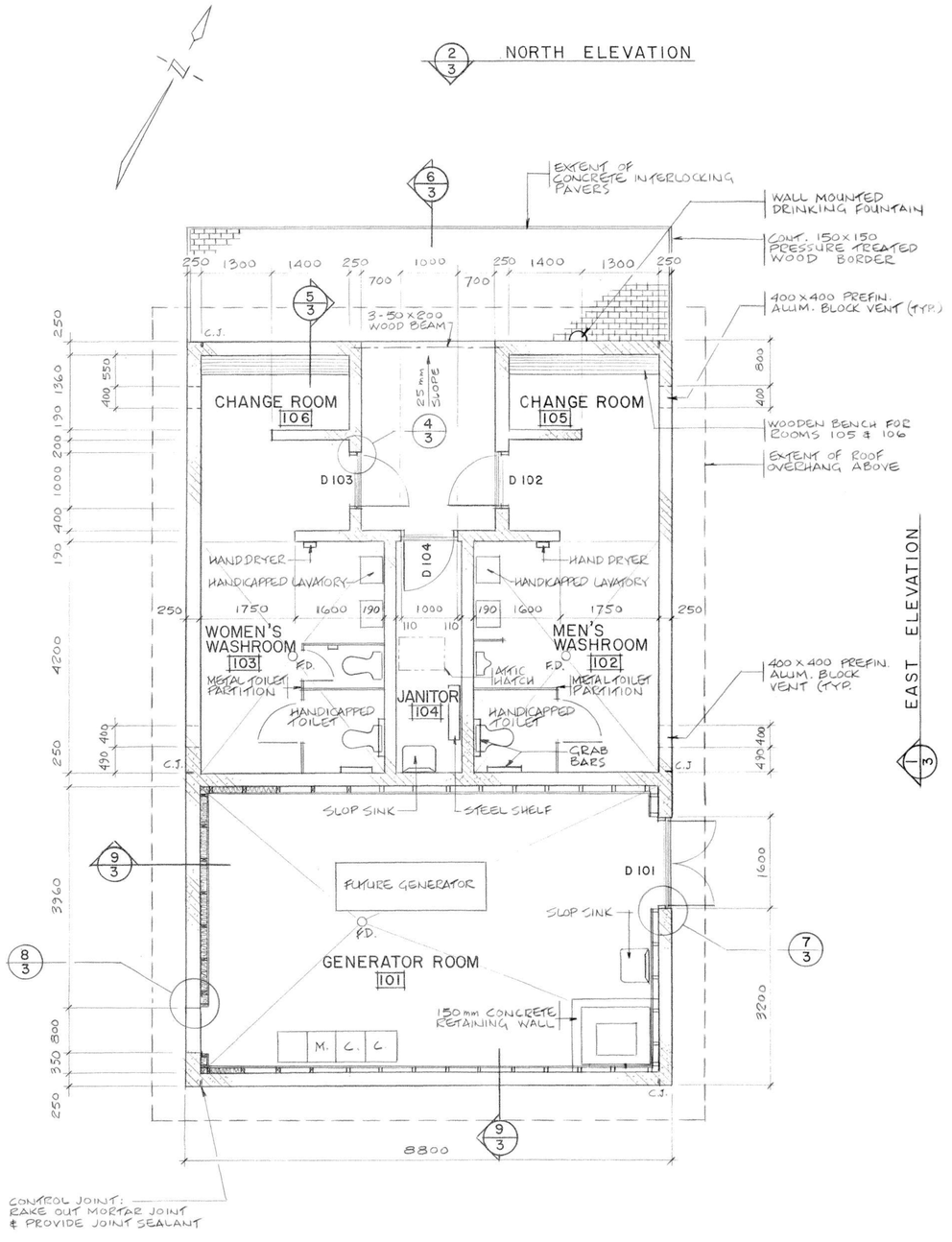
(2/3)

WEST ELEVATION

(3/3)

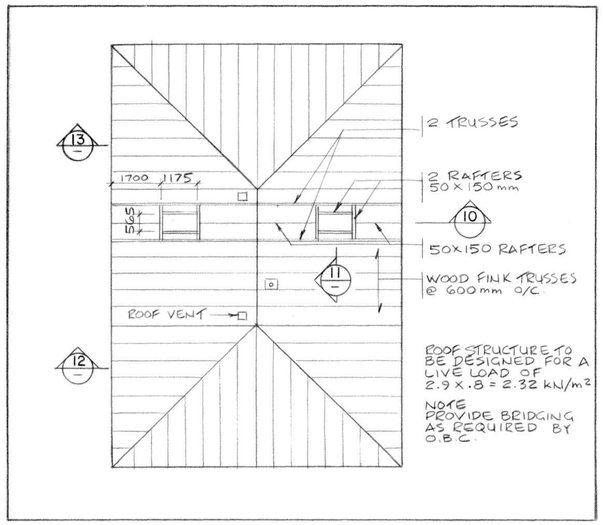
EAST ELEVATION

(1/3)



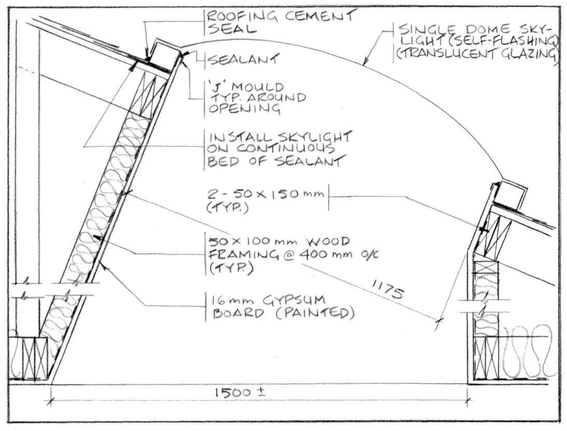
FLOOR PLAN

SCALE 1 : 50



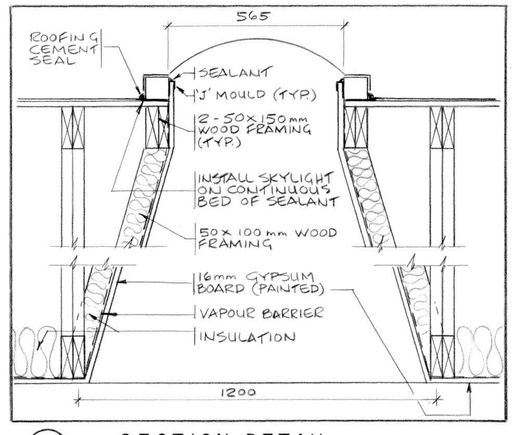
ROOF FRAMING PLAN

SCALE 1 : 100



(10/—) SECTION DETAIL

SCALE 1 : 10



(11/—) SECTION DETAIL

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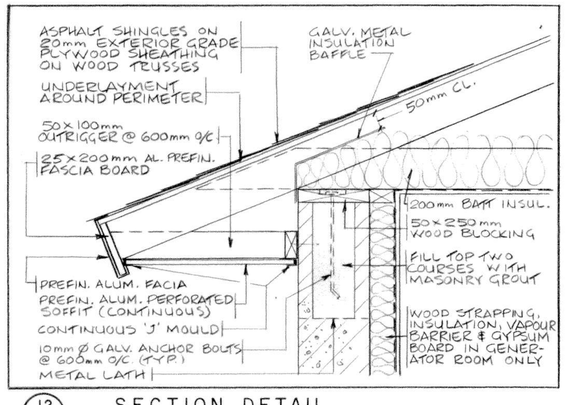

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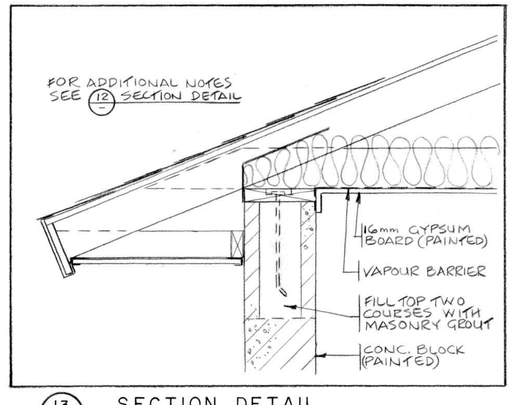


(13/—) SECTION DETAIL

SCALE 1 : 10

GENERAL NOTES

DUSHAW D. KAMRA ASSOCIATES

GORE & STORRIE LIMITED
CONSULTING ENGINEERS
BARRIE, ONTARIO

No	REVISIONS	DATE	APPROVED

MINET'S POINT PARK
PUMPING STATION & WASHROOM

MAIN FLOOR PLAN
ROOF PLAN & DETAILS

CITY OF BARRIE INCORPORATED 1853

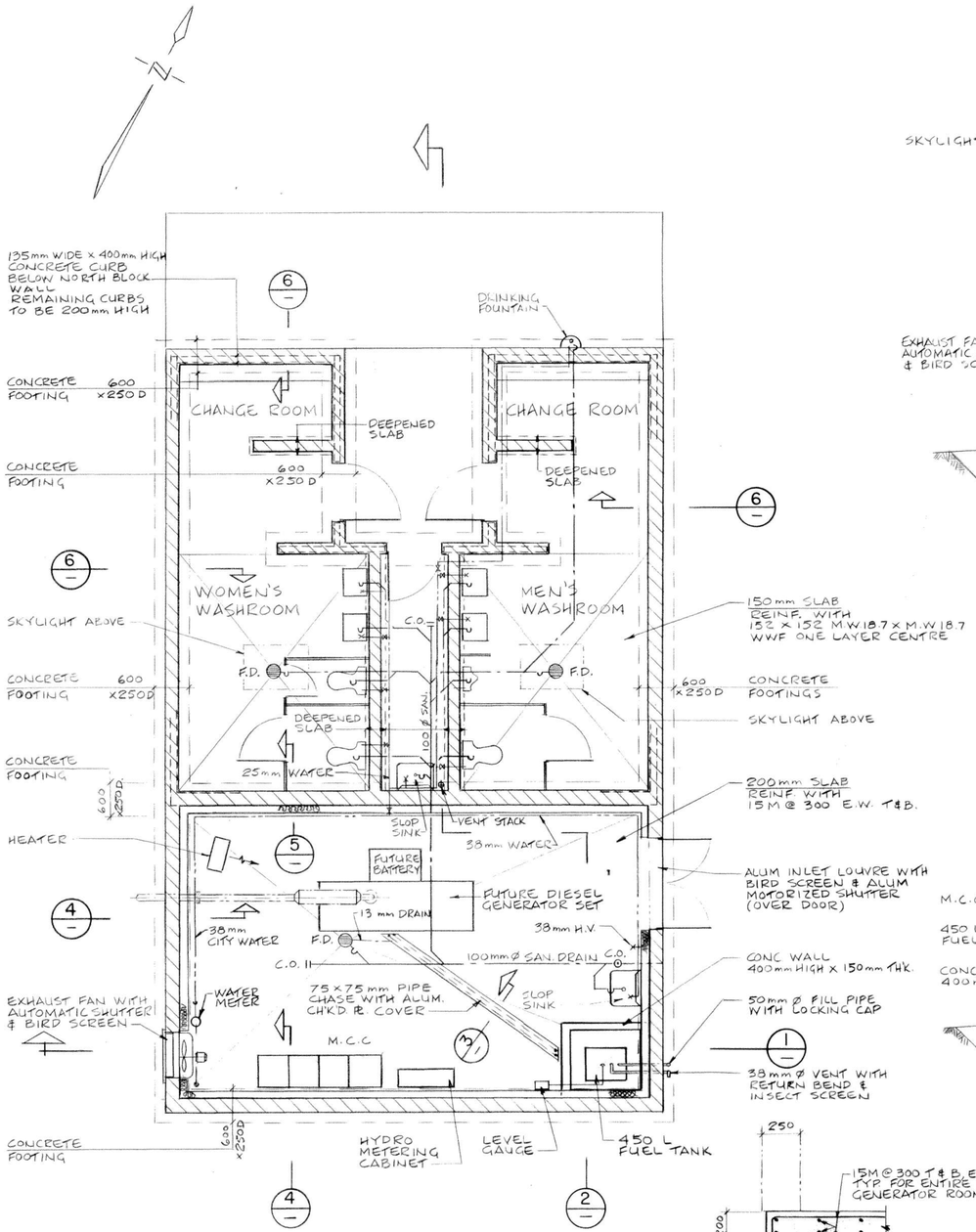
CITY of BARRIE
ENGINEERING DEPARTMENT

DESIGN D. I.	SCALE HOR. AS NOTED VERT.		
DRAWN R. J. M.	REVIEWED G.C.S.	DRAWING No	85-28
DATE SEPT. 1985	SHEET No 2		

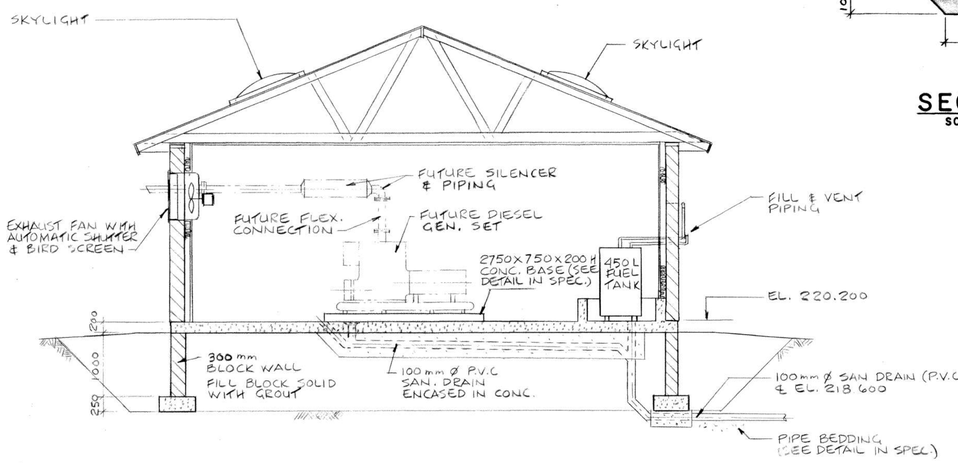
FILE No 339.34-AI-03859

TRANSLAR

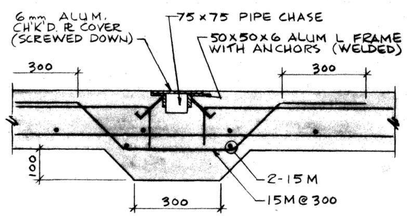
1985-028-003



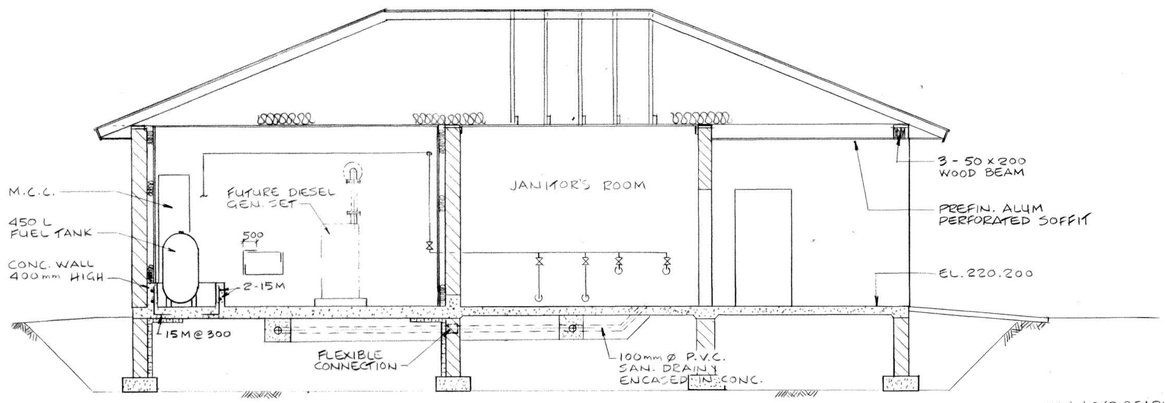
MAIN FLOOR PLAN & FOUNDATION PLAN
SCALE 1 : 50

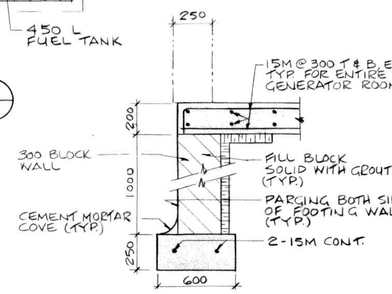


SECTION 1
SCALE 1 : 50

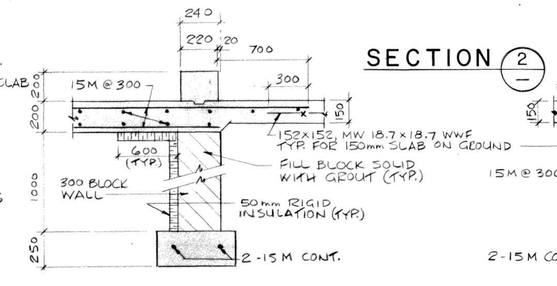


SECTION 3
SCALE 1 : 10





SECTION 4
SCALE 1 : 20



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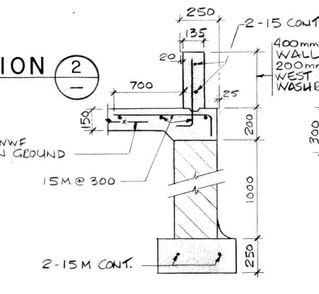

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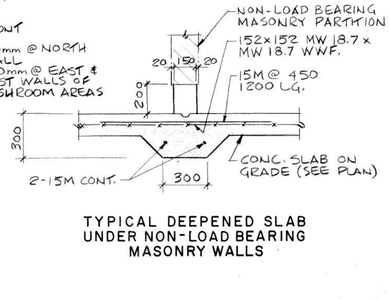


TYPICAL DEEPENED SLAB UNDER NON-LOAD BEARING MASONRY WALLS

SECTION 6
SCALE 1 : 20

GENERAL NOTES

REGISTERED PROFESSIONAL ENGINEER G. G. POWELL PROVINCE OF ONTARIO

GORE & STORRIE LIMITED
CONSULTING ENGINEERS
BARRIE, ONTARIO

NO	REVISIONS	DATE	APPROVED

MINET'S POINT PARK
PUMPING STATION & WASHROOM

PLAN & SECTIONS

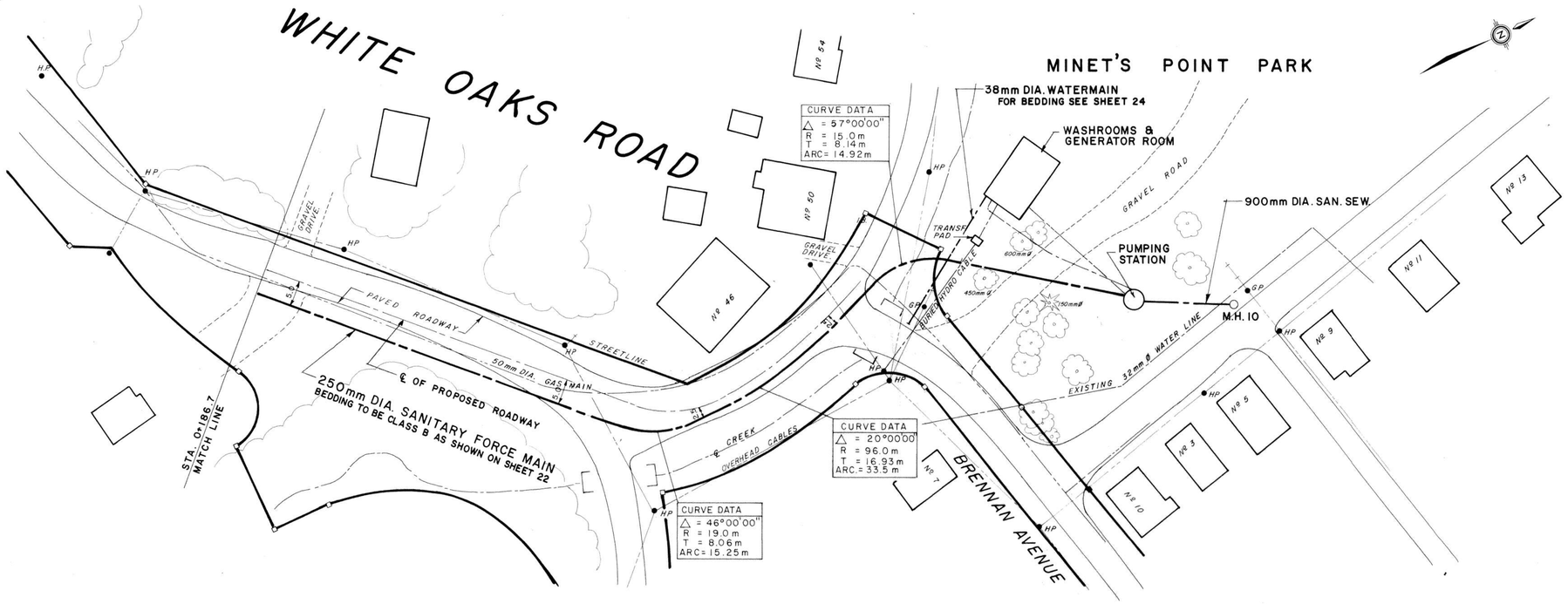
CITY OF BARRIE INCORPORATED 1853 — CITY of BARRIE — ENGINEERING DEPARTMENT

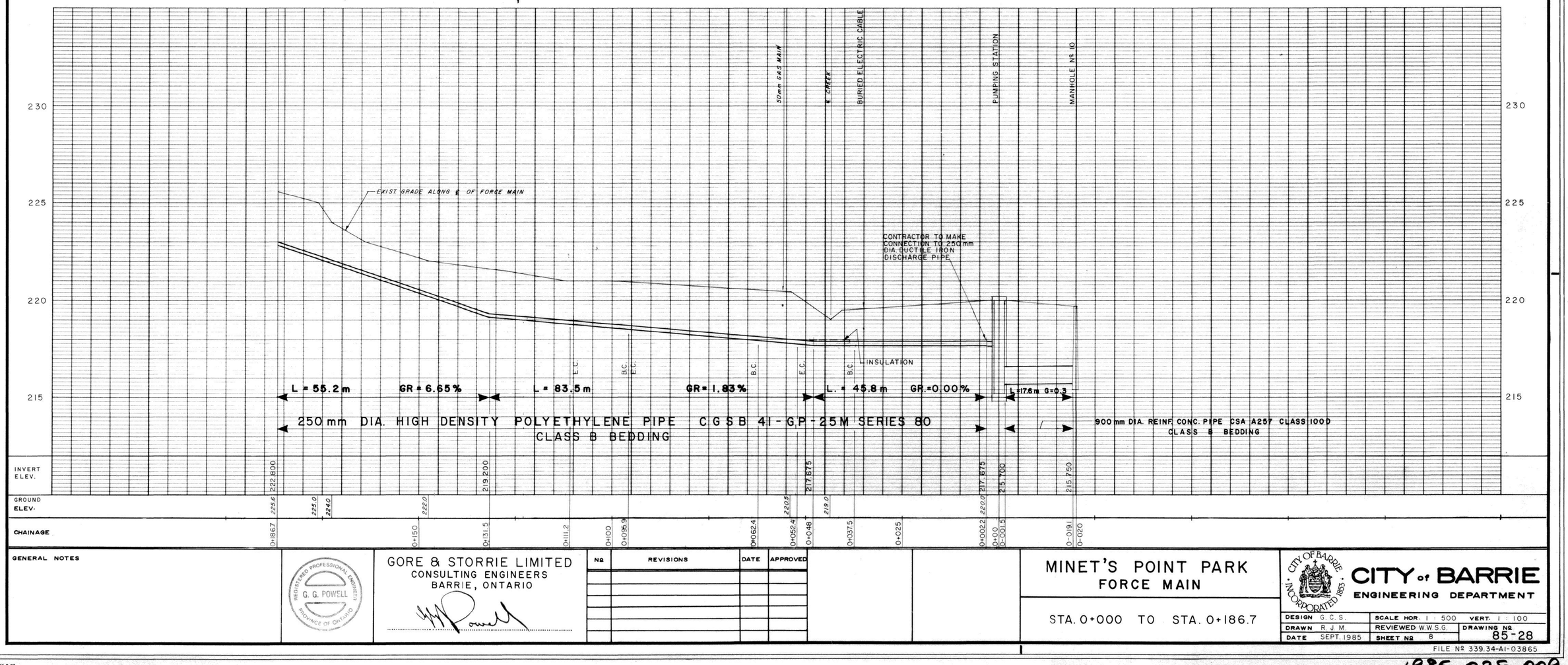
DESIGN G.C.S	SCALE HOR. 1 : 50	VERT.	
DRAWN R.J.M.	REVIEWED G.C.S.	DRAWING NO. 85-28	
DATE SEPT. 1985	SHEET NO 4		

FILE Nº 339.34-AI-03861

TRANSLAR

1985-028-005





GENERAL NOTES

GORE & STORRIE LIMITED
CONSULTING ENGINEERS
BARRIE, ONTARIO

G. G. POWELL
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

Nº	REVISIONS	DATE	APPROVED

MINET'S POINT PARK
FORCE MAIN

STA. 0+000 TO STA. 0+186.7

CITY OF BARRIE · INCORPORATED 1853 ·

CITY of BARRIE
ENGINEERING DEPARTMENT

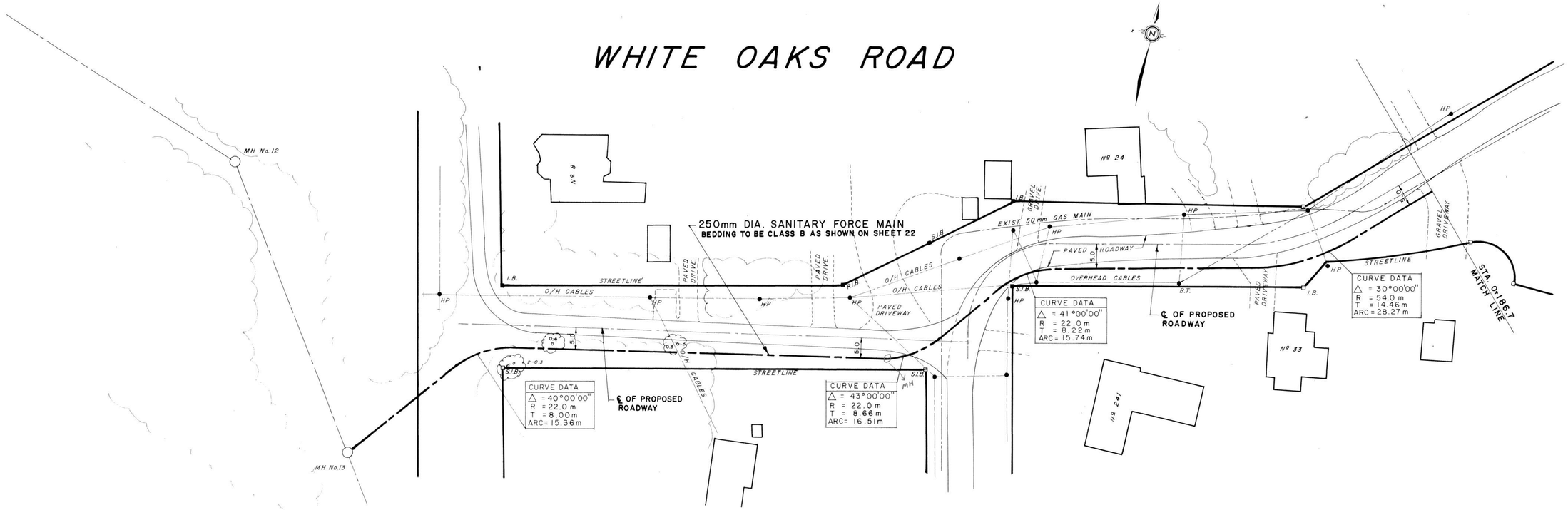
DESIGN	G. C. S.	SCALE HOR.	1 : 500 VERT. 1 : 100
DRAWN	R. J. M.	REVIEWED	W. W. S. G.
DATE	SEPT. 1985	SHEET Nº	8
		DRAWING Nº	85-28

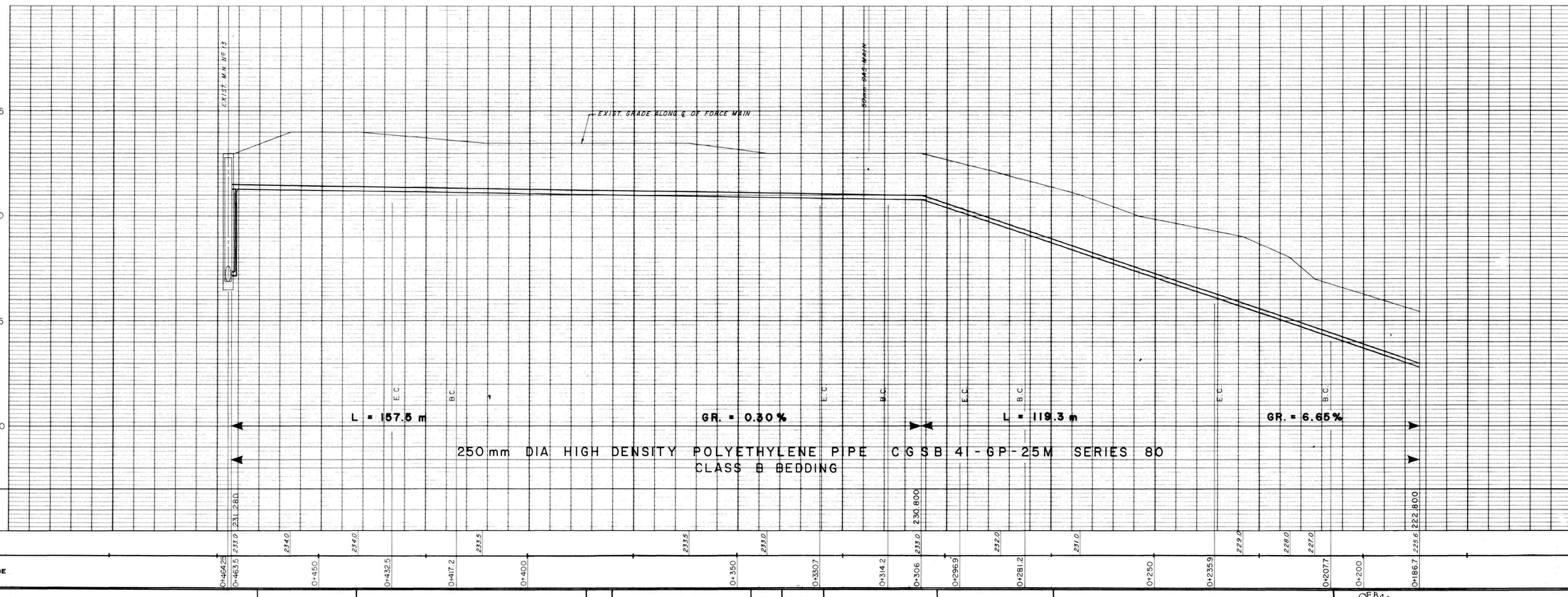
FILE Nº 339.34-AI-03865

TRANSLAR 100-5-78

1985-028-009

WHITE OAKS ROAD





GENERAL NOTES

REGISTERED PROFESSIONAL ENGINEER G. G. POWELL PROVINCE OF ONTARIO

GORE & STORRIE LIMITED
CONSULTING ENGINEERS
BARRIE, ONTARIO

Nº	REVISIONS	DATE	APPROVED

MINET'S POINT PARK
FORCE MAIN

STA. 0+186.7 TO STA. 0+464.25

CITY OF BARRIE INCORPORATED 1853

CITY of BARRIE
ENGINEERING DEPARTMENT

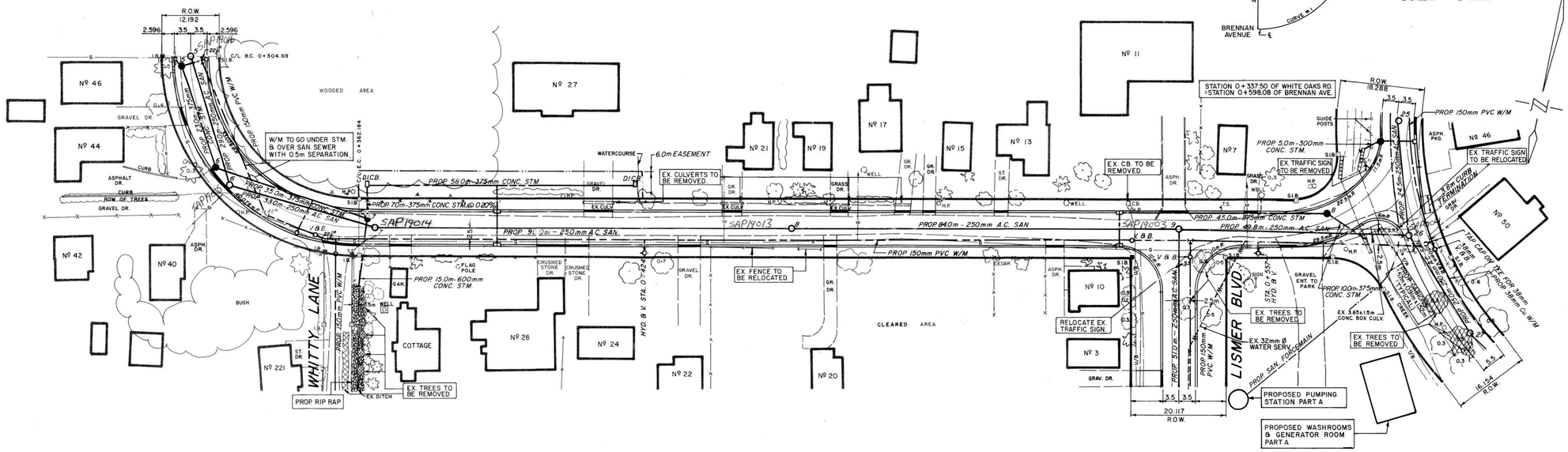
DESIGN G. C. S.	SCALE HOR. 1 : 500	VERT. 1 : 100	
DRAWN R. J. M.	REVIEWED W.W.S.G.	DRAWING Nº 85-28	
DATE SEPT. 1985	SHEET Nº 9		

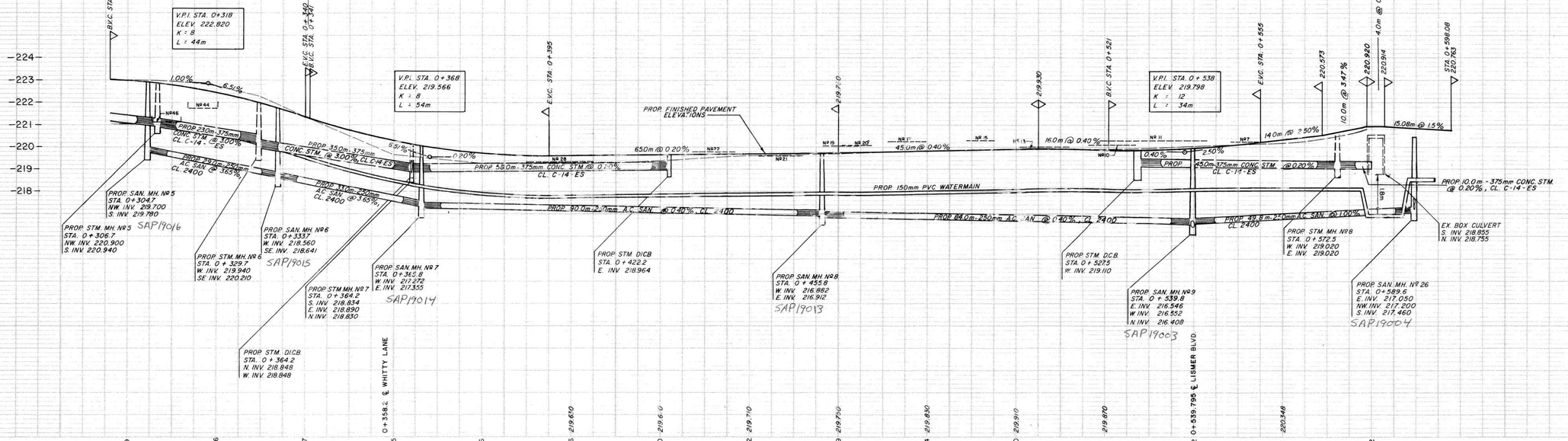
FILE Nº 339.34-AI-03866

TRANSLAR 100-5-78

1985-028-010

BRENNAN AVENUE





CHAINAGE	0+300	0+320	0+340	0+360	0+380	0+400	0+420	0+440	0+460	0+480	0+500	0+520	0+540	0+560	0+580
EXISTING ELEV.	222.99	222.76	221.37	219.65	219.26	219.26	219.40	219.62	219.69	219.84	219.90	219.91	220.02	220.19	220.82

0+358.2 ℄ WHITTY LANE

0+539.795 ℄ LISMER BLVD.

GENERAL NOTES

ALL TO BE IN ACCORDANCE WITH CURRENT CITY OF BARRIE STANDARDS AND SPECIFICATIONS AND TO THE SATISFACTION OF THE ENGINEERING DEPARTMENT.

ALL UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

ALL UTILITIES TO BE RELOCATED BY THE UTILITY CONCERNED. CONTRACTOR TO CO-ORDINATE.

ALL WATERMAIN TO BE LOCATED 1.7m BELOW FINISHED GROUND ELEVATION.

WATER APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER G. R. DUFTON PROVINCE OF ONTARIO

BENCH MARKS

219.312 – TOP OF S.I.B. ON NORTH SIDE BRENNAN AVE. AT STA. 0+362.18 (SET P.T.P.)

219.833 – TOP OF S.I.B. AT NORTHEAST CORNER OF BRENNAN AVE. & LISMER BLVD. (SET P.T.P.)

Nº	REVISIONS	DATE	APPROVED
1	ADDITION OF EX. 32mm Ø WATER SERVICE	21/11/85	
2	ELEV. AT STA. 0+538, ADD GRADE AT BOX CULVERT	17/02/86	

CITY OF BARRIE **APPROVED**
DATE 1985-10-17
CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEER P. E. LEE PROVINCE OF ONTARIO

BRENNAN AVENUE

PROPOSED RECONSTRUCTION

STA. 0+304.69 TO WHITE OAKS ROAD

CITY OF BARRIE INCORPORATED 1853

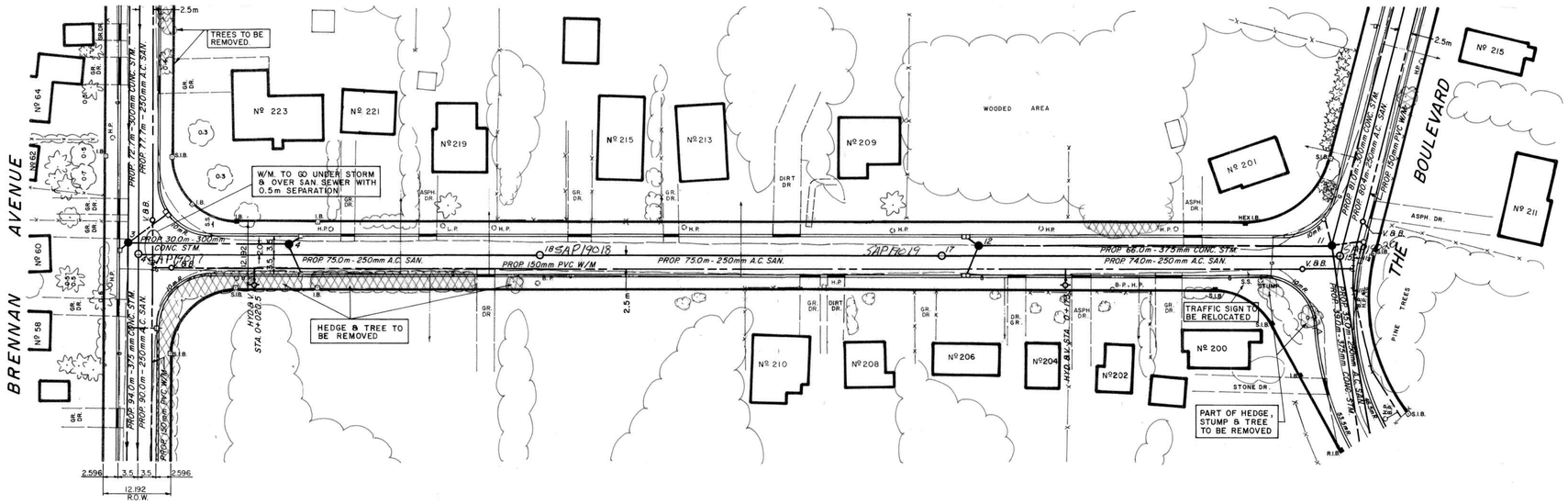
CITY of BARRIE
ENGINEERING DEPARTMENT

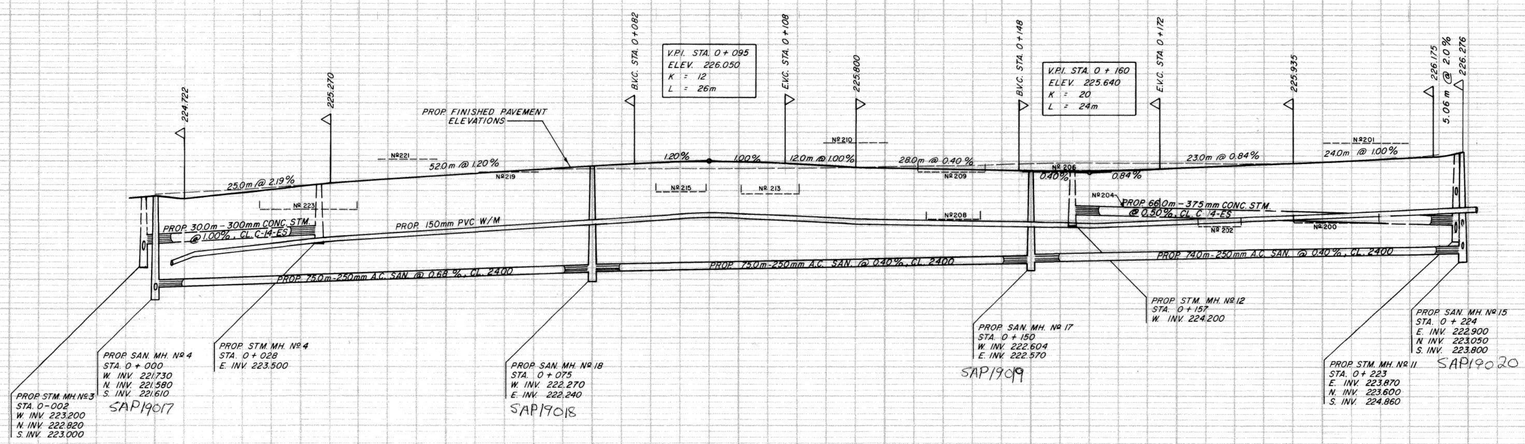
DESIGN	M.A.LEES	SCALE HOR.	1:500 VERT. 1:100
DRAWN	Z.S., G.M.	REVIEWED	P.E.LEE
DATE	SEPT. 1985	SHEET Nº	13
		DRAWING Nº	85-28

TRANSLAR 100-5-78

1985-028-014

CLIFF ROAD





EXISTING ELEV.	224.822	225.051	225.390	225.630	225.870	225.973	225.720	225.809	225.985	226.195
CHAINAGE	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+224.06 ℄ THE BOULEVARD
---	---	---	---	---	---	---	---	---	---	---	---	---	---

GENERAL NOTES

ALL TO BE IN ACCORDANCE WITH CURRENT CITY OF BARRIE STANDARDS AND SPECIFICATIONS AND TO THE SATISFACTION OF THE ENGINEERING DEPARTMENT.

ALL UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

ALL UTILITIES TO BE RELOCATED BY THE UTILITY CONCERNED. CONTRACTOR TO CO-ORDINATE.

ALL WATERMAIN TO BE LOCATED 1.7m BELOW FINISHED GROUND ELEVATION.

WATER APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER G. R. DUFTON PROVINCE OF ONTARIO

BENCH MARKS

225.204 – TOP OF PLANTED S.I.B. AT SOUTHWEST CORNER OF CLIFF RD. & BRENNAN AVE. (P.T.P.)

Nº	REVISIONS	DATE	APPROVED

CITY OF BARRIE **APPROVED**
DATE 1985-10-17
"P" CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEER P. E. LEE PROVINCE OF ONTARIO

CLIFF ROAD

PROPOSED RECONSTRUCTION

STA. 0+000 TO STA. 0+224.06

CITY OF BARRIE INCORPORATED 1853

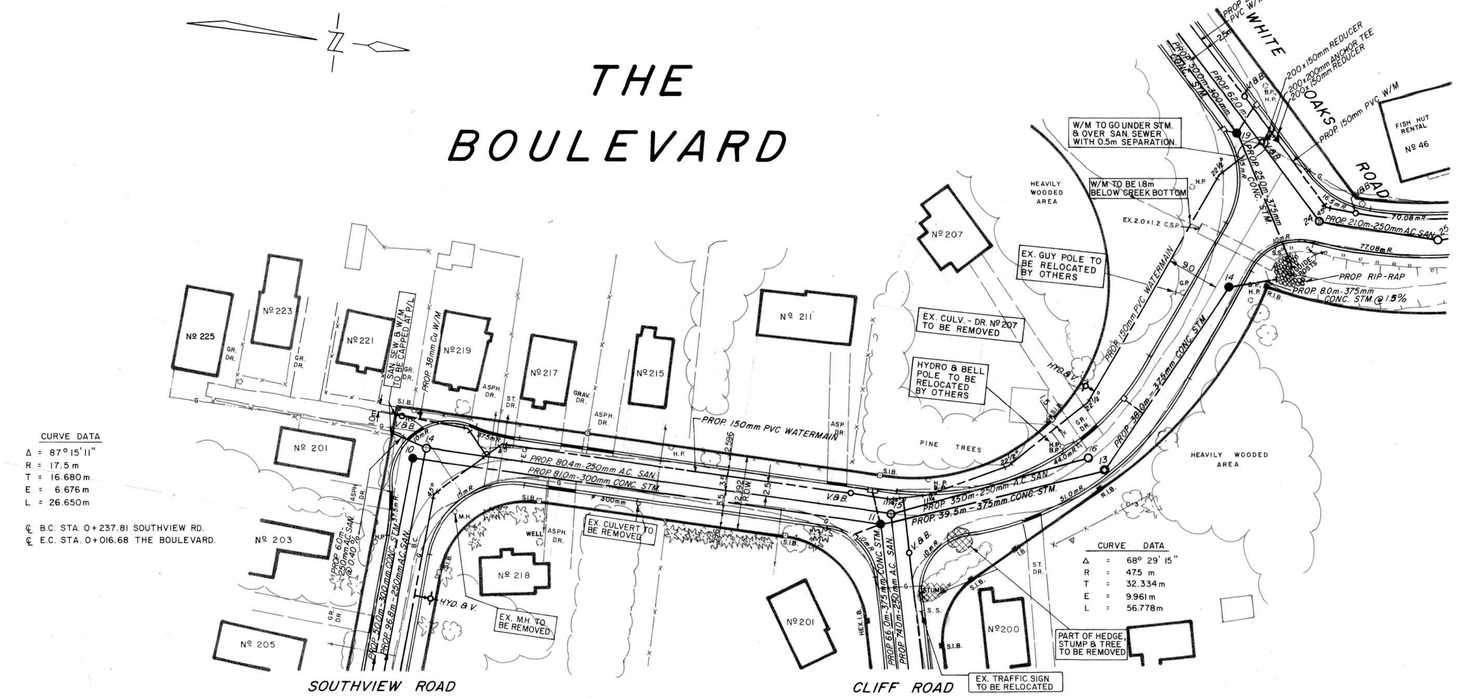
CITY of BARRIE
ENGINEERING DEPARTMENT

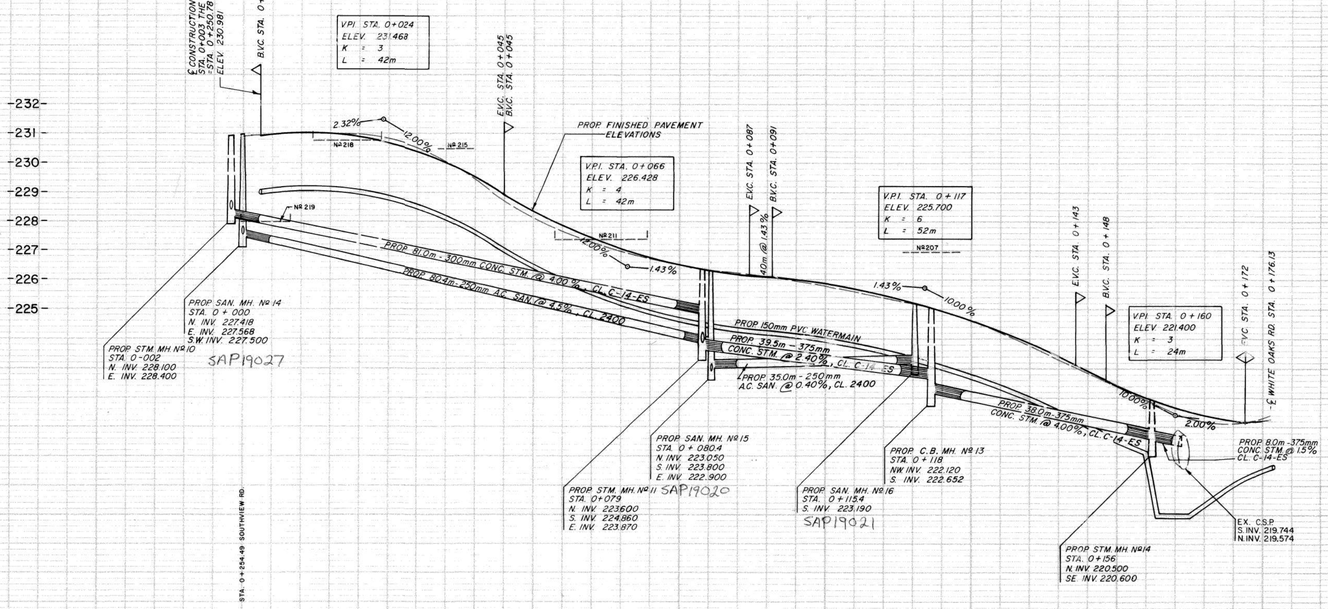
DESIGN M.A. LEES	SCALE HOR. 1:500	VERT. 1:100	
DRAWN Z.S., G.M.	REVIEWED P.E.LEE	DRAWING Nº	85-28
DATE SEPT. 1985	SHEET Nº 15		

TRANSLAR 100-5-78

1985-028-016

THE BOULEVARD





CHAINAGE	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+176.13
EXISTING ELEV.	230.89	230.96	229.46	227.30	226.32	225.77	224.99	223.34	221.44	221.35

GENERAL NOTES

ALL TO BE IN ACCORDANCE WITH CURRENT CITY OF BARRIE STANDARDS AND SPECIFICATIONS AND TO THE SATISFACTION OF THE ENGINEERING DEPARTMENT.

ALL UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

ALL UTILITIES TO BE RELOCATED BY THE UTILITY CONCERNED CONTRACTOR TO CO-ORDINATE.

ALL WATERMAIN TO BE LOCATED 1.7m BELOW FINISHED GROUND ELEVATION.

WATER APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — G. R. DUFTON — PROVINCE OF ONTARIO

BENCH MARKS

222.788 - NAIL IN HYDRO POLE ON NORTHSIDE WHITE OAKS ROAD, SOUTHWEST SIDE CANNINGS STORE. (P.T.P.)

Nº	REVISIONS	DATE	APPROVED
1	ROAD ALIGNMENT ALTERED NORTH OF CLIFF ROAD.	26/11/85	

CITY OF BARRIE
APPROVED
DATE 1985-10-17
CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEER — P. E. LEE — PROVINCE OF ONTARIO

THE BOULEVARD

PROPOSED RECONSTRUCTION

STA. 0+000 TO STA. 0+176.13

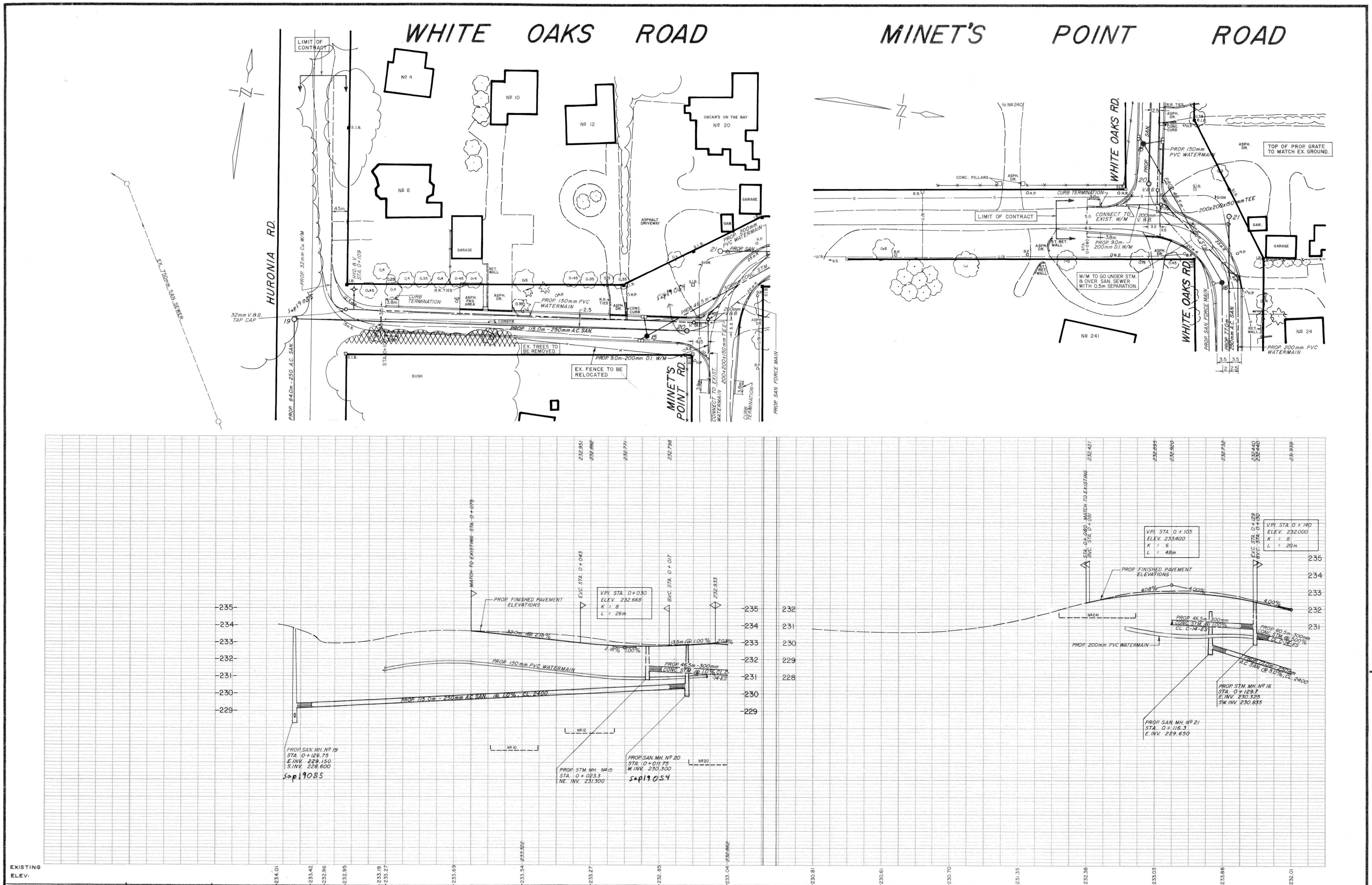
CITY OF BARRIE INCORPORATED 1853

CITY of BARRIE
ENGINEERING DEPARTMENT

DESIGN M.A.LEES	SCALE HOR. 1:500	VERT. 1:100	
DRAWN Z.S., J.E., G.M.	REVIEWED P.E.LEE	DRAWING Nº	85-28
DATE SEPT. 1985	SHEET Nº 16		

TRANSLAR 100-5-78

1985-028-017



CHAINAGE	EXISTING ELEV.
0+131.8	234.01
0+121.8	233.42
0+117.8	232.96
0+111.8	232.95
0+101.8	233.19
0+100	233.27
0+080	233.69
0+060	233.54
0+040	233.27
0+020	232.85
0+000	233.04
0+000	230.81
0+020	230.61
0+040	230.70
0+060	231.35
0+080	232.38
0+100	233.03
0+120	233.88
0+140	232.01

GENERAL NOTES

ALL TO BE IN ACCORDANCE WITH CURRENT CITY OF BARRIE STANDARDS AND SPECIFICATIONS AND TO THE SATISFACTION OF THE ENGINEERING DEPARTMENT.

ALL UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

ALL UTILITIES TO BE RELOCATED BY THE UTILITY CONCERNED. CONTRACTOR TO CO-ORDINATE.

ALL WATERMAIN TO BE LOCATED 1.7m BELOW FINISHED GROUND ELEVATION.

WATER APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — G. R. DUFTON — PROVINCE OF ONTARIO

BENCH MARKS

231.990 – TOP OF SOUTHEAST CORNER OF SOUTHERLY PILLAR IN DRIVEWAY TO Nº 240 MINET'S POINT ROAD.

Nº	REVISIONS	DATE	APPROVED
1	SAN. FORCE MAIN, SAN. SEWER & MH.s Nº 19, 20, 21	86-2-12	

CITY OF BARRIE
APPROVED
DATE 1985-10-17
CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEERS — P. E. LEE — PROVINCE OF ONTARIO

WHITE OAKS ROAD
AND PART OF
MINET'S POINT ROAD
PROPOSED RECONSTRUCTION

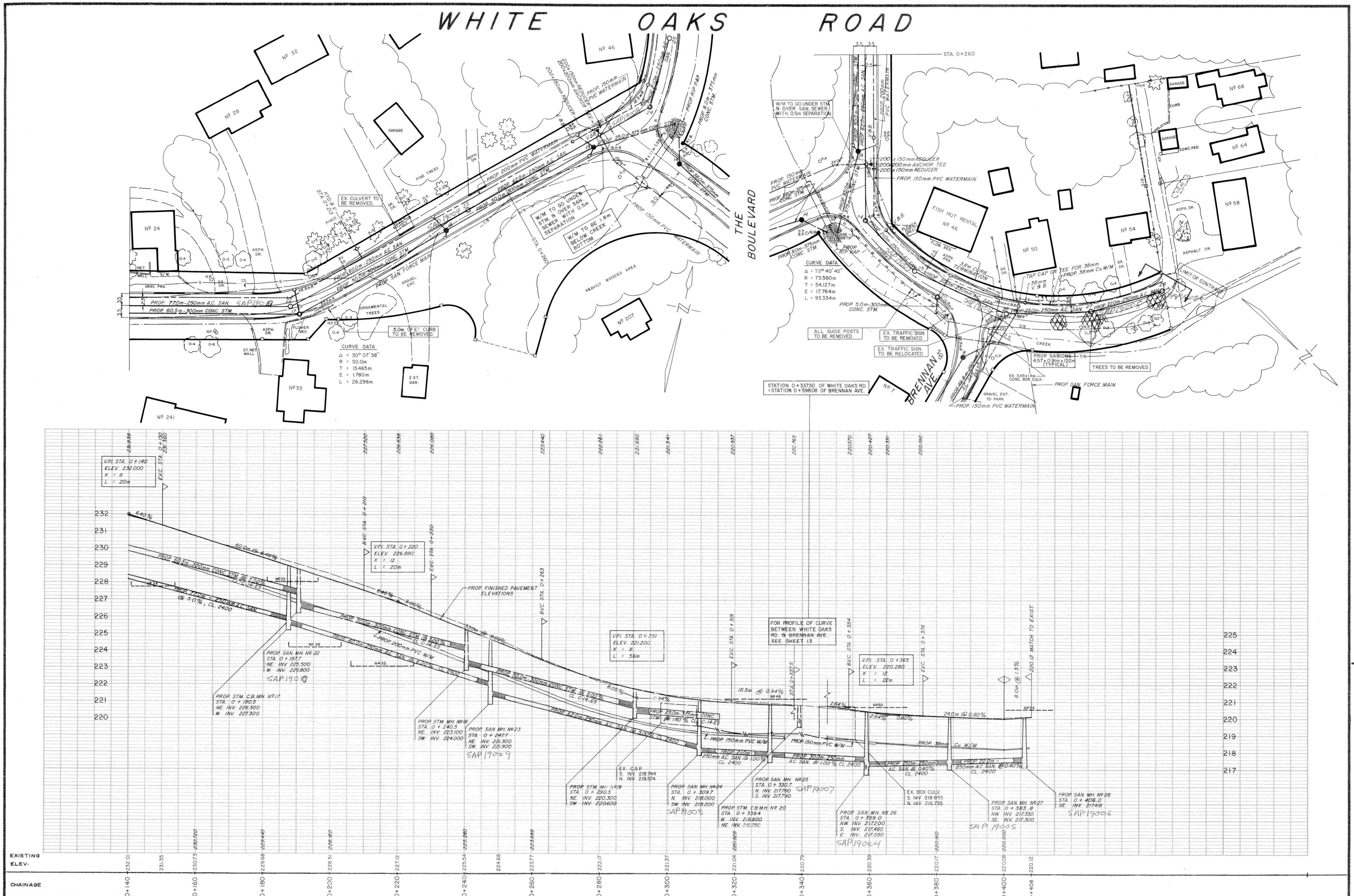
CITY OF BARRIE INCORPORATED 1853

CITY of BARRIE
ENGINEERING DEPARTMENT

DESIGN M.A. LEES	SCALE HOR. 1:500	VERT. 1:100	
DRAWN Z.S., G.M.	REVIEWED P.E. LEE	DRAWING Nº 85-28	
DATE SEPT. 1985	SHEET Nº 17		

TRANSLAR 100-5-78

1985-028-018



GENERAL NOTES

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WATER APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — G. R. DUFTON — PROVINCE OF ONTARIO

BENCH MARKS

231.990 - TOP OF SOUTHEAST CORNER OF SOUTHERLY PILLAR IN DRIVEWAY TO Nº 240 MINET'S POINT ROAD.

228.655 - P.T.P. - NAIL IN HYDRO POLE Nº 28 ON NORTH SIDE WHITE OAKS RD. OPPOSITE Nº 28.

225.977 - NAIL IN HYDRO POLE Nº 2176 ON NORTH SIDE WHITE OAKS RD. EAST OF Nº 32.

Nº	REVISIONS	DATE	APPROVED
1	SAN. SEWER BETWEEN MH. Nº 21 & 22, CORRECTION OF GRADES STA. 0+319 to 365	86-2-13	

CITY OF BARRIE
APPROVED
DATE 1985-10-17
CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEER — P. E. LEE — PROVINCE OF ONTARIO

WHITE OAKS ROAD

PROPOSED RECONSTRUCTION

STA. 0+140 TO STA. 0+408.053

CITY OF BARRIE INCORPORATED 1853

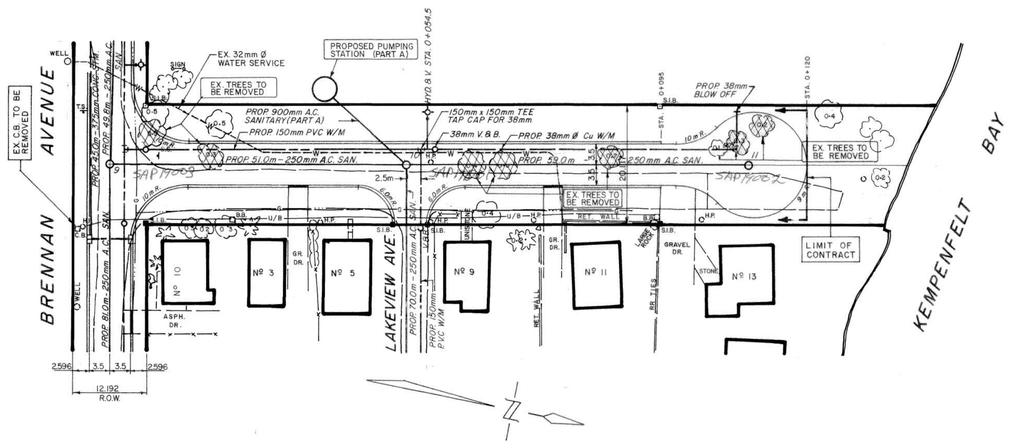
CITY of BARRIE
ENGINEERING DEPARTMENT

DESIGN M.A. LEES	SCALE HOR. 1:500	VERT. 1:100	
DRAWN Z.S., G.M.	REVIEWED P.E. LEE	DRAWING Nº 85-28	
DATE SEPT. 1985	SHEET Nº 18		

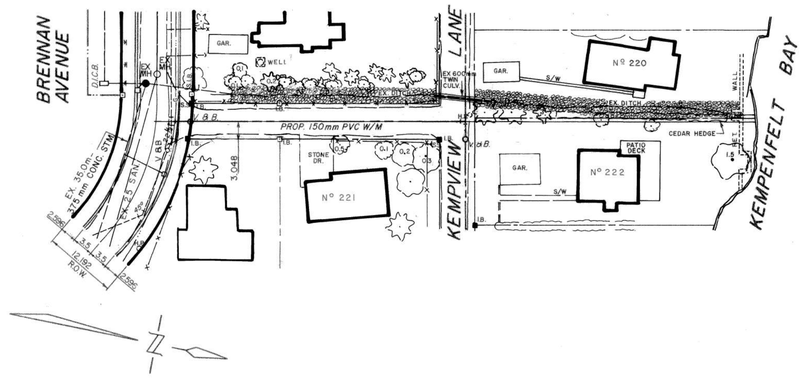
TRANSLAR 100-5-78

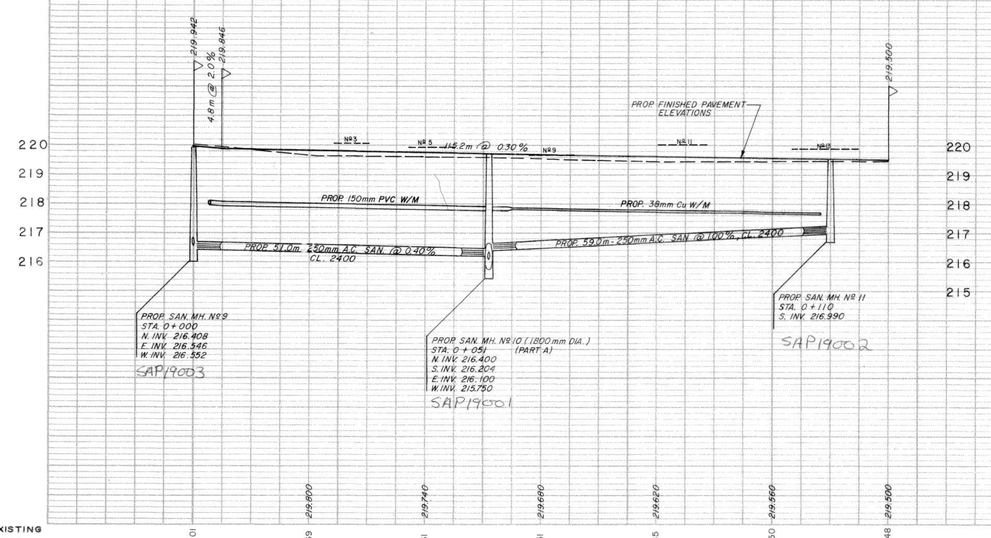
1985-028-019

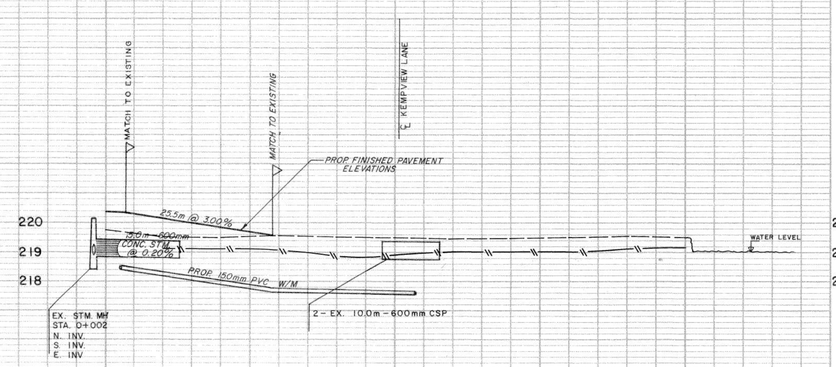
LISMER BLVD.



WHITTY LANE







CHAINAGE	0+000	0+020	0+040	0+060	0+080	0+100	0+120
EXISTING ELEV.	220.01	219.69	219.61	219.51	219.45	219.50	219.48
PROPOSED ELEV.	219.900	219.740	219.690	219.620	219.560	219.500	

CHAINAGE	0+000	0+010	0+020	0+030	0+040	0+050	0+060	0+070	0+080	0+090	0+100
EXISTING ELEV.	219.76	219.92	219.90	219.57	219.51	219.49	219.44	219.47	219.51	219.54	219.51
PROPOSED ELEV.	220.389	220.124	219.824								

GENERAL NOTES

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WATER APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — G. R. DUFTON — PROVINCE OF ONTARIO

BENCH MARKS

219.312 – TOP OF S.I.B. ON NORTH SIDE BRENNAN AVE. AT STA. 0+362.18 (SET P.T.P.)

219.833 – TOP OF S.I.B. AT NORTHEAST CORNER OF BRENNAN AVE. & LISMER BLVD. (SET P.T.P.)

NO	REVISIONS	DATE	APPROVED
1	ADDITION OF EX. 32mm Ø WATER SERVICE	21/11/85	

CITY OF BARRIE
APPROVED
DATE.....
CITY ENGINEER

LISMER BLVD & WHITTY LANE

PROPOSED RECONSTRUCTION

CITY OF BARRIE INCORPORATED 1853

CITY of BARRIE
ENGINEERING DEPARTMENT

DESIGN M.A.LEES	SCALE HOR. 1:500	VERT. 1:100	
DRAWN Z.S., J.E., G.M.	REVIEWED P.E.LEE	DRAWING NO.	
DATE	SHEET NO. 19	85-28	

TRANSLAR 100-5-78

1985-028-020

PLAN OF SURVEY OF

PART OF LOTS 9, 10, 11 AND 12 AND PART OF PARK ROAD AND PART OF BAYVIEW ROAD AND PART OF THE BOULEVARD REGISTERED PLAN 602

GEOGRAPHIC TOWNSHIP OF INNISFIL

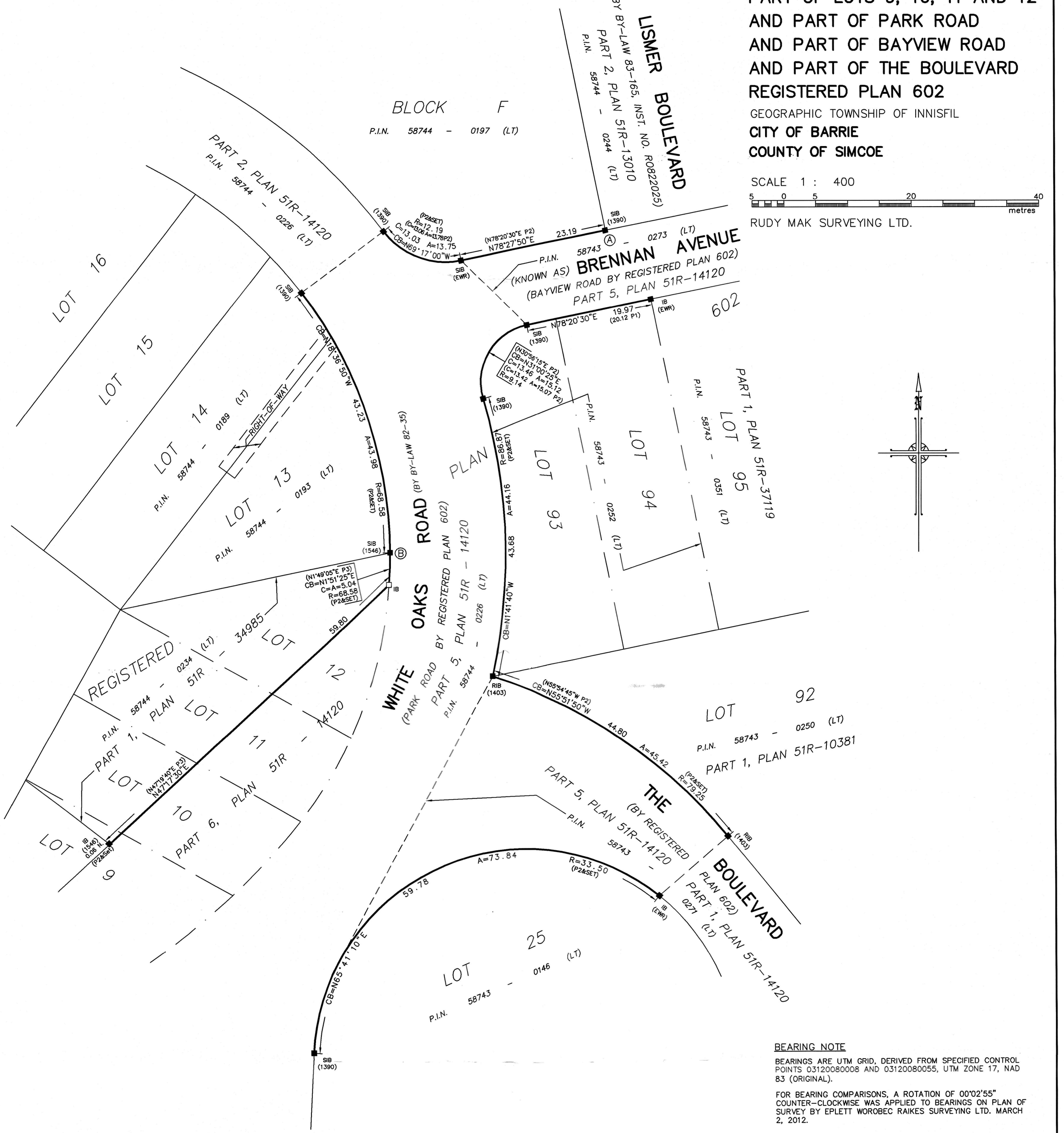
CITY OF BARRIE

COUNTY OF SIMCOE

SCALE 1 : 400

5 0 5 20 40 metres

RUDY MAK SURVEYING LTD.



BEARING NOTE

BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIED CONTROL POINTS 03120080008 AND 03120080055, UTM ZONE 17, NAD 83 (ORIGINAL).

FOR BEARING COMPARISONS, A ROTATION OF 00°02'55" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN OF SURVEY BY EPLETT WOROBEC RAIKES SURVEYING LTD. MARCH 2, 2012.

DISTANCES

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999709.

SPECIFIED CONTROL POINTS (SCPs): UTM ZONE 17, NAD 83 (ORIGINAL). COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
SCP 03120080008	4911764.139	610187.544
SCP 03120080055	4912122.851	611241.154
ORP A	4914426.543	606196.667
ORP B	4914375.914	606162.645

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THE PLAN.

LEGEND

■	DENOTES	FOUND SURVEY MONUMENT
□	DENOTES	PLANTED SURVEY MONUMENT
SIB	DENOTES	STANDARD IRON BAR
IB	DENOTES	IRON BAR
RIB	DENOTES	ROUND IRON BAR
(738)	DENOTES	R. C. KIRKPATRICK, O.L.S.
(1390)	DENOTES	PAUL R. KITCHEN SURVEYING LTD.
(1403)	DENOTES	W. DOUGLAS SMITH LTD.
(1546)	DENOTES	RUDY MAK, O.L.S.
(EWR)	DENOTES	EPLETT WOROBEC RAIKES SURVEYING LTD.
(P1)	DENOTES	REGISTERED PLAN 602
(P2)	DENOTES	PLAN BY EPLETT WOROBEC RAIKES SURVEYING LTD. DATED MARCH 2, 2012
(P3)	DENOTES	PLAN 51R-34985

METRIC

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

REVISION	BY	DATE
FIRST ISSUE	HFD	AUG. 1/17

RUDY MAK SURVEYING LTD.
ONTARIO LAND SURVEYORS
89 BIG BAY POINT ROAD
BARRIE, ONTARIO L4N 8M5 (705) 722-3845
E-MAIL MAIL@MAKSURVEYING.COM

DRAWN BY: HFD | CHECK BY: RAP | FILE No. 12663-65, 66

White Oaks Road

SCHEDULE		
PART	LOT/BLOCK PLAN/CONCESSION	PIN
1	PART OF BLOCK E REGISTERED PLAN 602	ALL OF PIN 58744-0533 (LT)
2	PART OF BLOCK E REGISTERED PLAN 602 AND PART OF WATER LOT IN KEMPENFELDT BAY IN FRONT OF LOT 11, CONCESSION 14	
3		

PART 1 IS SUBJECT TO RIGHT-OF-WAY AS IN INST. No. RO1235288.
PART 1 IS SUBJECT TO EASEMENT IN SC39009.

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE : SEPTEMBER 7, 2007

ALAN J. WOROBEC
ONTARIO LAND SURVEYOR

PLAN 51R-35632

RECEIVED AND DEPOSITED :

DATE : Sept. 13, 2007

Asst. DEPUTY LAND REGISTRAR FOR THE LAND TITLES DIVISION OF SIMCOE (No. 51)

LAND REGISTRY OFFICE (51)
114 WORSLEY STREET
BARRIE, ONT. L4M 1M1

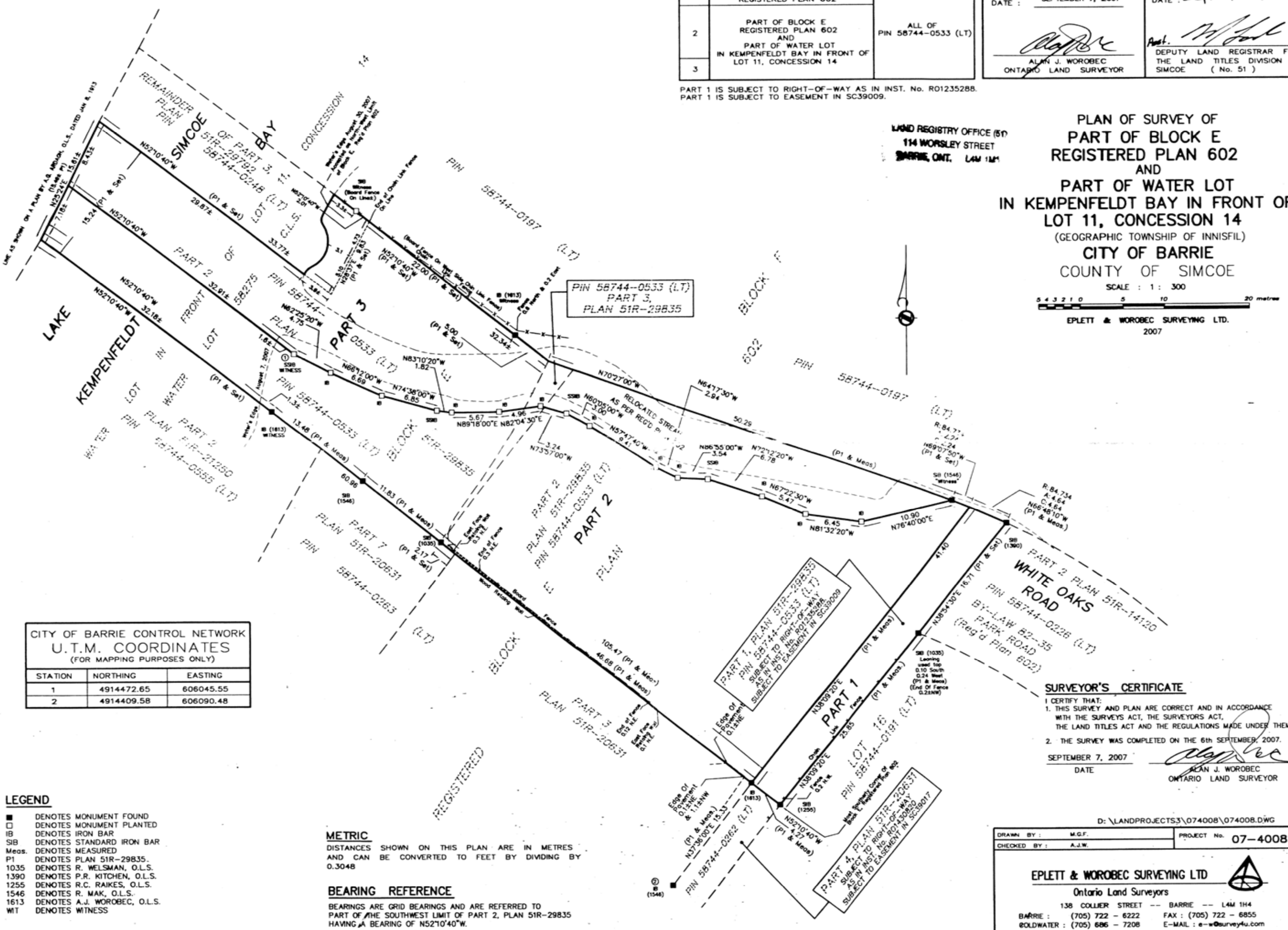
PLAN OF SURVEY OF PART OF BLOCK E REGISTERED PLAN 602 AND PART OF WATER LOT IN KEMPENFELDT BAY IN FRONT OF LOT 11, CONCESSION 14

(GEOGRAPHIC TOWNSHIP OF INNISFIL)

CITY OF BARRIE
COUNTY OF SIMCOE

SCALE : 1 : 300

EPLETT & WOROBEC SURVEYING LTD.
2007



CITY OF BARRIE CONTROL NETWORK U.T.M. COORDINATES (FOR MAPPING PURPOSES ONLY)		
STATION	NORTHING	EASTING
1	4914472.65	606045.55
2	4914409.58	606090.48

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 6th SEPTEMBER, 2007.

SEPTEMBER 7, 2007
DATE

ALAN J. WOROBEC
ONTARIO LAND SURVEYOR

LEGEND

■	DENOTES MONUMENT FOUND
□	DENOTES MONUMENT PLANTED
IB	DENOTES IRON BAR
SIB	DENOTES STANDARD IRON BAR
Meas.	DENOTES MEASURED
P1	DENOTES PLAN 51R-29835.
1035	DENOTES R. WELSMAN, O.L.S.
1390	DENOTES P.R. KITCHEN, O.L.S.
1255	DENOTES R.C. RAIKES, O.L.S.
1546	DENOTES R. MAK, O.L.S.
1613	DENOTES A.J. WOROBEC, O.L.S.
WIT	DENOTES WITNESS

METRIC

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

BEARING REFERENCE

BEARINGS ARE GRID BEARINGS AND ARE REFERRED TO PART OF THE SOUTHWEST LIMIT OF PART 2, PLAN 51R-29835 HAVING A BEARING OF N52°10'40"W.

D:\LANDPROJECTS3\074008\074008.DWG

DRAWN BY :	M.G.F.	PROJECT No. 07-4008
CHECKED BY :	A.J.W.	

EPLETT & WOROBEC SURVEYING LTD
Ontario Land Surveyors
138 COLLIER STREET -- BARRIE -- L4M 1H4
BARRIE : (705) 722 - 6222 FAX : (705) 722 - 6855
COLDWATER : (705) 686 - 7208 E-MAIL : e-w@survey4u.com