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Consulting Engineers

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November 30th, 2007

Calnitsky Associates Architects
124 Nassau Street North
Winnipeg, Manitoba
R3L 2H1
Attention: Mr. Slavko Skocrlj

Dear Sir:

RE: GEOTECHNICAL INVESTIGATION FOR THE PROPOSED 10,000 FT^2 NORBERRY-GLENLEE COMMUNITY CENTRE ADDITION, 26 MOLGAT, WINNIPEG, MANITOBA

1.0 TERMS OF REFERENCE

On November 15th, 2007, M. Block & Associates Ltd. (MBA) received verbal authorization from Mr. Slavko Skocrlj, representing Calnitsky Associates Architects, the project's coordinator and architectural design consultant, to proceed with the geotechnical investigation for the proposed 10,000 ft^2 one–storey, steel-frame, addition to the Norberry-Glenlee Community Centre located at 26 Molgat Avenue in Winnipeg, Manitoba. Therefore, on November 28th, 2007, three test holes were bored implementing a truck-mounted B-40 drill rig, using interconnected 5' long x 5" diameter continuous flight solid stem augers, supplied by Maple Leaf Drilling Ltd. of Winnipeg, Manitoba. Representative "undisturbed" and "disturbed" soil samples were retrieved from the test holes and brought back to MBA's CSA certified materials testing laboratory in Winnipeg for unconfined compression and moisture content testing, respectively, and verification of the field soil classifications. Alternatively, during the field investigation, the fine grained soils' respective 'disturbed' undrained shear strengths were measured implementing a hand-held calibrated Pocket Geotester. Upon the completion of this investigation, the test holes' elevations and the groundwater elevations in them, if any, were measured and referenced to their respective surfaces and the top of the fire hydrant situated at the northeast corner of Scouters lane and Molgat Avenue, as illustrated on pages 14 - 19 of this report. In addition, the test holes were backfilled with a mixture of bentonite and the soil cuttings.

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2.0 SOIL LITHOLOGY AND GROUNDWATER CONDITIONS

Test hole #2 was overlain with, approximately, 6" of brown, damp, very dense, silty gravelly sand fill. Next, black/brown, stiff to firm, moist, silty clay fill was observed in test holes #1, #2 and #3 down to the 2'6", 2'6" and 2' depths, respectively. Black, becoming grey and then brown in colour with increasing depth, alluvially deposited, firm to stiff, moist, silty clay was then traversed in test holes #1, #2 and #3 down to the 6'3", 7' and 6'9" depths, respectively. Brown, alluvially deposited, soft, saturated, sandy silt was next recorded in test holes #1, #2 and #3 down to the 9'3", 10' and 8' depths, respectively. Brown, becoming grey in colour below the 26' depth, glaciolacustrine, stiff to firm, moist, silty clay with silt and gypsum inclusions was then noted in the deep test holes, #1 and #3, down to the 51' and 48' depths, respectively. Brown, soft, saturated, compact, gravelly sandy silt with cobbles and boulders (glacial till) was next encountered in test holes #1 and #3 down to the 54' and 55' depths, respectively. Next, suspected fractured limestone bedrock, consisting of saturated sand, gravel, cobbles and boulders was observed in, only, test hole #1 down to the 56'3" depth, where the auger refused on suspected solid limestone bedrock. Finally, in, only, test hole #3, brown, hard, dry, very dense, gravelly sandy silt with cobbles and boulders (glacial till) was traversed down to the 57' depth, where the auger refused on boulders in the hard glacial till matrix. As such, upon obtaining auger refusal, the deep test holes were terminated at the aforementioned depths. Alternatively, as per the RFP, the shallow probe hole was discontinued at the 10'3" depth. Upon penetrating the suspected fractured limestone bedrock's aquifer in test hole #1, groundwater flowed and soil sloughed into it at a very high inflow rate. However, due to the severely sloughing silt stratum, the groundwater elevation in test hole #1 was not measurable from the carbonate aquifer upon obtaining auger refusal. During this investigation, groundwater seepage and soil sloughing, emanating from the saturated glacial till matrix, flowed and sloughed into all the deep test holes at relatively low inflow rates. Alternatively, groundwater seepage and soil sloughing, originating from the saturated, alluvially deposited, sandy silt stratum, flowed and sloughed into all the test holes at more moderate to significant and severe inflow rates, respectively. The soil lithology in the test holes and their specific locations were appended to this report on pages 14 – 19.

3.0 SUMMARY OF FIELD AND LABORATORY TESTS

TH #	DEPTH	UNCONFINED COMPRESSION	BULK UNIT WEIGHT	MOISTURE CONTENT
3	16'	2316 psf	108.87 pcf	57.85 %
3	26'	2295 psf	109.33 pcf	48.85 %
3	36'	1577 psf	104.64 pcf	58.20 %
3	46'	1458 psf	103.22 pcf	59.13 %

The unconfined compressive strengths are also located on test hole #3's log sheets.
The soils' measured Pocket Geotester strengths are located on test hole #1's log sheets.
Moisture content vs. Depth graphs are located on the test holes' log sheets.
A summary of the laboratory data is appended to this report on pages 21 - 22.

4.0 FOUNDATION DESIGN ALTERNATIVES

4.1 DEEP CONCRETE FOOTINGS

Predicated upon the well-documented, volumetrically sensitive, glaciolacustrine silty clay deposition in the former Lake Agassiz that has caused significant structural distresses in typical deep below grade footings in similarly constructed structures in the Red River Basin and the upper glaciolacustrine deposition's stiff unconfined compressive strength, its estimated extremely high liquid limit and plasticity index, and "normal" moisture content on this site above the 15' depth, it is the writer's professional opinion that a reinforced concrete deep footing foundation system, constructed on the glaciolacustrine soil above the 15' depth on this site, is still susceptible to significant soil swelling, shrinkage and/or rebound, and, as such, strongly not recommended as a feasible foundation support system for this project.

4.2 DRILLED CAST IN PLACE CONCRETE FRICTION PILES

Alternatively, drilled cast in place concrete friction piles could be implemented as the foundation design for the proposed 10,000 ft^2 one–storey, steel-frame, addition to the Norberry-Glenlee Community Centre located at 26 Molgat Avenue in Winnipeg, Manitoba. Predicated upon the soft, saturated, sandy silt stratum recorded in test hole #2 down to the

10' depth and the risk of basal instability occurring in this foundation type below the 46' depth, the allowable effective functional friction length of glaciolacustrine silty clay at this site, from present grade, is **46' – 10' = 36'**. The laboratory data indicates that the allowable average skin friction of the soil/concrete interface from the 10' to 46' depths, only, is 350 psf. Based upon these calculations, a 16" diameter friction pile drilled 46' deep, properly constructed, would safely transfer 50 kips of load down to the underlying glaciolacustrine deposition. The concrete, relative to the soil, has an additional net weight of, approximately, 40 pcf in the upper 46' of overburden. Therefore, the additional net weight of the concrete is included in the above analysis. In addition, in order to avoid reducing the piles' net efficiency, they must be spaced at least three pile diameters, on center. Furthermore, in order to resist potential soil swelling and frost jacking uplift stresses, these piles shall also have a minimum embedment length of 25' and 35' in heated and unheated areas of the site, respectively. Finally, full-length reinforcing steel shall also be installed in all the piles implemented in an unheated service condition.

It is recommended that the geotechnical engineer's personnel inspect the installation of this foundation type in order to verify that it conforms to the contents of this report, the structural drawings and project's specifications.

The foundation contractor shall be fully cognizant that the soft, saturated, sandy silt stratum will slough and seep severely into many or all of the piles' excavations during most seasons and/or years. Therefore, should that situation transpire, steel casing through that entire deposition would then be required. Since soil sloughing during concreting may cause improper foundation performance, special care must be given when removing the steel sleeve not to cause sloughing soil from entering a pile's excavation from in behind it. As such, the foundation contractor should be diligent when removing the steel sleeve not to cause sloughing soil from entering the pile's excavation from in behind it. In addition, the top 7' of embedment length in every concrete pile should be mechanically vibrated.

The advantages of this piling system are its relatively fast rate of pile installation, frequency of being more economical than other piled foundation designs in this area, efficiency of installation in comparison with driven pre-cast concrete end-bearing piles, the many piling businesses located in the vicinity and minimal magnitude of modeled long-term foundation settlement. The disadvantages of this piling system are the limited functional depth of serviceable silty clay and, as such, frictional pile capacity on this site, the extra cost associated with steel sleeving, if any, and potential pile settlement, if constructed improperly.

4.3 DRIVEN PRE-CAST CONCRETE END BEARING PILES

Similarly, driven pre-cast concrete end-bearing piles could be implemented as the foundation design for the proposed 10,000 ft^2 one–storey, steel-frame, addition to the Norberry-Glenlee Community Centre located at 26 Molgat Avenue in Winnipeg, Manitoba. All pre-cast concrete piles should be pre-drilled at least 2.0 m in depth and also through the depth of frost penetration, if any, prior to being driven down to refusal onto a dense stratum, such as, a hard glacial till matrix, a dense granular stratum or bedrock. The estimated length of properly driven pre-cast concrete piles required at this location would be **in the order of 16.46 m – 17.37 m from the present ground elevation of test hole #1.** However, the foundation contractor should still verify the estimated length of pre-cast concrete piles required at this site and become fully cognizant with the contents of this report. Following their successful installation, in order to maximize their lateral support and minimize their adhesion and frictional capacity with the underlying volumetrically sensitive glaciolacustrine silty clay, all the piles' oversized pre-bores should then be backfilled with clean sand or another pre-approved equivalent substitute alternative. Furthermore, the geotechnical engineer's personnel should inspect the foundation installation in order to verify the piles' respective capacities based upon the following pile driving criteria:

PILE DIAMETER	DRIVING ENERGY	REFUSAL CRITERIA	CAPACITY
305 mm	30 foot * kips	5 blows / 1" (25 mm)	50 tons
350 mm	30 foot * kips	10 blows / 1" (25 mm)	70 tons
400 mm	30 foot * kips	15 blows / 1" (25 mm)	90 tons

Note: Max 1" (25.4 mm) penetration per set, for 3 consecutive sets

In addition to the aforementioned specifications for driven pre-cast concrete piles, MBA offers the following recommendations:

- Pre-drilling through the zone of frost may be required for winter or early spring construction.
- If a drop hammer is to be used to install these piles, the mass of the hammer shall be 3 times greater than the mass of the pile.
- Pile spacing shall not be less than three pile diameters, on center.
- Piles driven within five pile diameters, on center, shall be monitored for heave and where it is observed; the piles shall be re-driven to the aforementioned refusal criteria.
- Once pile driving is initiated, all piles shall be driven continuously to their respective refusal depth.

The advantages of this piling system are its very heavy allowable axial compressive capacities and minimal magnitude of modeled long-term foundation settlement. The disadvantages of this piling system are its frequently greater cost per foot of pile and the potentially variable depths to practical refusal across this site.

4.4 DRILLED SPREAD BORE CONCRETE FRICTIONAL & END-BEARING PILES

Alternatively, drilled spread bore concrete end-bearing and frictional piles should only be implemented as the foundation design for any lightly loaded and/or unheated structures, such as, large signs and facility lighting to be located at this site. These piles shall only be constructed on the stiff, glaciolacustrine silty clay, at 93.67 m, where the allowable bearing pressure on the soil, once mechanically-cleaned, and the piling installation supervised by qualified geotechnical personnel, would be 115 kPa. The allowable downward frictional component of this foundation type is described in detail in section 4.2 of this geotechnical report. In addition, in order to avoid reducing the piles' net efficiency, they must be spaced at least two-and-a-half bell and three shaft diameters, on center, from each other.

In order to protect these short piles from frost jacking stresses in unheated applications, only, they shall have sono-tube casings installed along their upper 3.0 m of embedment length. Furthermore, the sono-tube shall be wrapped in 6 mil poly and completely greased on its inside. In addition, full-length reinforcing steel shall also be installed in all the piles implemented in an unheated service condition.

The foundation contractor shall be fully cognizant that the soft, saturated, sandy silt stratum will slough and seep severely into many or all of the piles' excavations during most seasons and/or years. Therefore, should that situation transpire, steel casing through that entire deposition would then be required. Since soil sloughing during concreting may cause improper foundation performance, special care must be given when removing the steel sleeve not to cause sloughing soil from entering a pile's excavation from in behind it. As such, the foundation contractor should be diligent when removing the steel sleeve not to cause sloughing soil from entering the pile's excavation from in behind it. In addition, the top 2.1 m of embedment length in every concrete pile shall be mechanically vibrated.

The advantages of this piling system are its relatively short pile length, moderate allowable axial compressive, tensile and frost jacking resistances, the many piling businesses located in the vicinity and minimal magnitude of modeled long-term foundation settlement. The disadvantages of this piling system are its higher cost and longer foundation installation time per pile associated with mechanically constructing the bell and steel sleeving, if necessary, and the potential for pile settlement, if incorrectly constructed.

5.0 CONCRETE DESIGN

Due to the visibly high concentration of sulphate in the glaciolacustrine deposition at this site, Sulphate Resisting Cement shall be used in all the concrete implemented for the aforementioned concrete foundation systems. Its concrete shall have a minimum 28-Day laboratory compressive strength of 32 mPa. Furthermore, the concrete shall contain at least 550 pounds of cement per cubic yard, have a maximum water cement ratio, a plastic concrete air content and slump of 0.45, 4 to 6 percent and 60 mm to 100 mm, respectively.

Alternatively, due to the higher elevation of the proposed structure in relation to the elevations of these test holes and the likely low concentration of sulphate in the alluvial and filled depositions traversed across this site, Normal Portland Cement could be used in all the concrete implemented for the structure's pile caps, grade beams and floor slabs.

All other concrete exposed to freezing and thawing cycles shall contain an air entraining admixture that corresponds to the applicable class of exposure listed in tables 2-4 of the recent addition of CSA. Concrete poured in cold weather shall be heated and protected in accordance with CSA A23.1-00 clause 21.2.3.

In addition, all concrete poured shall be tested in accordance with CSA A23.1-00 every day and at least once every 50 m^3 per day by a CSA certified concrete testing laboratory.

6.0 SURFACE SLAB ON GRADE CONCRETE FLOOR SLAB DESIGN FOR MPR & BAR

All the soil located above the project's recommended working sub-grade elevation of 99.57 m shall be excavated and then transported off of the property. In addition, all the deleterious soil encountered at the working sub-grade elevation, if any, shall also be stripped and then transported off of the site. Next, prior to placing the proposed concrete floor slab's granular base structure, the in-situ fine-grained fill, with a high plasticity index, located at the working sub-grade elevation shall then be proof-rolled by a heavy sheepsfoot roller until it has at least 95 % of its standard proctor density (SPD). Areas failing the aforementioned proof-roll test and any other deleterious material encountered at the working sub-grade elevation shall be verified and documented by the geotechnical engineer's personnel. Predicated upon this consultant's recommendations, the project's slab on grade sub-contractor shall then excavate and replace the documented failed proof-rolled soil and the other deleterious material encountered at the working sub-grade elevation with 50 mm down crushed limestone fill or another pre-approved equivalent bridging material placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

Next, any segments of the proposed building's footprint naturally lower than the proposed sub-grade elevation, if any, shall then be brought up to the sub-grade elevation implementing either a 100 mm or 50 mm down crushed limestone fill, granular C-Base fill or another pre-approved equivalent bridging material, placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

In order to raise the proposed slab on grade up to the underside of the granular base course elevation, the sub-base, consisting of sufficient lifts of C-Base, 50 mm or 20 mm down crushed limestone fill or another pre-approved equivalent material shall be placed in 150 mm deep layers and compacted until every lift has at least 98 % of its SPD. Finally, the granular base course, composed of a 150 mm deep lift of A-Base, shall be placed and compacted until it has at least 100 % of its SPD. The 150 mm deep reinforced concrete floor slab shall then be poured having a slump in the range of 70 mm to 100 mm. The concrete shall have a maximum water cement ratio of 0.45 and contain a water reducing admixture. An elevation drawing of the building's slab on grade base structure is illustrated on page 20 of this report.

However, if the structural engineer or owner cannot accept the possibility of differential slab displacement of up to 50 mm and 75 mm, in heated and unheated applications, respectively, then a structurally supported concrete floor slab shall be implemented for this project.

7.0 RECOMMENDATIONS

Predicated upon the soils' aforementioned respective strength parameters, lithology and physical properties, the current groundwater elevations, the field and laboratory test data, and the proposed addition's anticipated moderate applied foundation stresses, drilled cast in place concrete friction piles or driven pre-cast concrete end-bearing piles could be implemented as the foundation design for the proposed 10,000 ft^2 addition to the Norberry-Glenlee Community Centre located at 26 Molgat Ave. in Winnipeg, Manitoba. Based upon the aforementioned advantages and disadvantages of these foundation systems, a drilled cast in place concrete friction piled foundation design would likely be a well performing, more economical and efficient one for the proposed moderately-loaded, one-storey, steel-frame addition placed on a property with the aforementioned geotechnical design parameters and implemented in a heated service condition. However, the choice of foundation type implemented for this project will ultimately depend upon their respective, previously described, advantages and disadvantages, estimated installation costs and the applied foundation loads that will be calculated by the project's structural engineering consultant.

It is recommended in the strongest of terms that the geotechnical engineer's personnel inspect the installation of all the foundation elements in order to verify that they all conform with the contents of this report, the structural drawings and the project's specifications.

Any areas of the yard naturally lower in elevation, if any, shall be brought up to its future grade implementing a highly plastic silty clay fill, 50 mm down crushed limestone fill, granular C-Base fill or another pre-approved equivalent material, placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

In order to minimize frost penetration under the building, 50 mm thick rigid horizontal insulation, or another pre-approved equivalent frost protection, shall be placed around the exterior of the entire structure. This insulation shall be placed along the face of the proposed building out to a distance 1200 mm away from it at a depth of 300 mm below future ground elevation and also along the outside faces of the structure's exterior concrete grade beams.

The backfill material around the perimeter of the proposed structure shall be brought up to its future grade implementing either a 20 mm down crushed limestone fill, granular C-Base fill or another pre-approved equivalent material, placed in sufficient 150 mm deep lifts and compacted until each layer has densities in the range of 92 % to 97 % of its SPD.

The selected 50 mm down and 20 mm down crushed limestone, A-Base and C-Base gravels implemented for this project shall all meet the following gradation specifications:

METRIC SIEVE SIZE (µm)	20 mm Limestone (% Passing)	50 mm Limestone (% Passing)	A-BASE (% Passing)	C-BASE (% Passing)
50,000		100		
25,000			100	100
20,000	100		80 – 100	
5,000	40 – 70	25 – 80	40 – 70	25 – 80
2,500	25 – 60		25 – 55	
315	8 - 25		13 – 30	
80	6 - 17	5 – 18	5 – 15	5 – 18

The proposed MPR's and bar's surface concrete slab on grade shall be constructed as per the recommendations outlined in section 6.0 of this report. If the owner or structural engineer cannot accept the possibility of the aforementioned differential slab on grade displacement, then a structurally supported floor slab shall be implemented for this project. Furthermore, the surface slab on grade contractor shall also take precautions to prevent the fine-grained sub-grade soil from the following conditions; freezing, excessive soil moisture loss or gain, water ponding and heavily loaded axle traffic. In addition, the granular fill placed for this project shall be free of frost, frozen material and placed at an ambient air temperature of at least 6° Celsius. In order to verify compliance with the aforementioned standard proctor specifications, field compaction tests shall be taken on every lift of granular material placed for this project. All concrete poured shall be tested in accordance with CSA A23.1-00 every day and at least once every 50 m^3 per day by a CSA Certified concrete testing laboratory.

Alternatively, the building's superstructure and suspended concrete gym floor shall be entirely structurally supported by only one of the aforementioned approved foundation systems. In addition, in all the aforementioned feasible piled foundation designs, a void space, of at least 150 mm in thickness, shall be constructed under all pile caps, grade beams and/or walls to allow for the potential expansive capability of the stiff glaciolacustrine silty clay deposition underlying this site. The structurally supported concrete main floor shall overlay either a minimum 300 mm deep vented crawlspace or a minimum 150 mm thick biodegradable void form. The surface of the crawlspace shall be covered by a minimum 100 mm deep layer of clean sand fill overlying a 6 mm thick impervious poly vapour barrier. Lastly, the writer understands that a basement is not intended for the proposed structure.

Predicated upon the new National Building Code's geotechnical seismic analysis, the contents of this project's geotechnical report, the estimated depth and compressive strength of the limestone bedrock, it is the writer's professional opinion that ***the upper 30 m of modeled soil and bedrock*** at this site has an average strength significantly in excess of 100 kPa. Therefore, predicated upon this analysis, the geotechnical site classification for seismic site response on this property would be, at a minimum, Class C.

If any of the aforementioned design elements are modified or deleted, please contact the undersigned to determine if that course of action will be acceptable.

In addition, MBA respectfully requests an opportunity to review all the relevant finalized structural drawings and the project's foundation and materials testing specifications for this project in order to verify their conformance with the contents of this report.

The test holes drilled during the investigation represent only those specific areas tested. The soil conditions on this site may vary from that described in this report. Should that situation occur, please contact this office for further instructions.

All the geotechnical engineering design recommendations presented in this report are predicated upon the assumption that a sufficient degree of inspection will be provided during the project's construction and that a qualified and experienced foundation contractor properly installs an aforementioned pre-approved, engineered and sealed foundation type.

Any uses which a third party makes of this report, or any reliance on decisions to be made based on it, are the sole responsibility of such third parties. MBA accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this report.

Yours Truly,
M. Block & Associates Ltd.

PROVINCE OF MANITOBA
11/30/2007
S. J. BLOCK
REGISTERED PROFESSIONAL ENGINEER

APEGM
Certificate of Authorization
M. Block & Associates Ltd.
No. 1527 Expiry: April 30, 2008

Jeffrey Block, P. Eng., Senior Geotechnical Engineer

M. Block & Associates Ltd.

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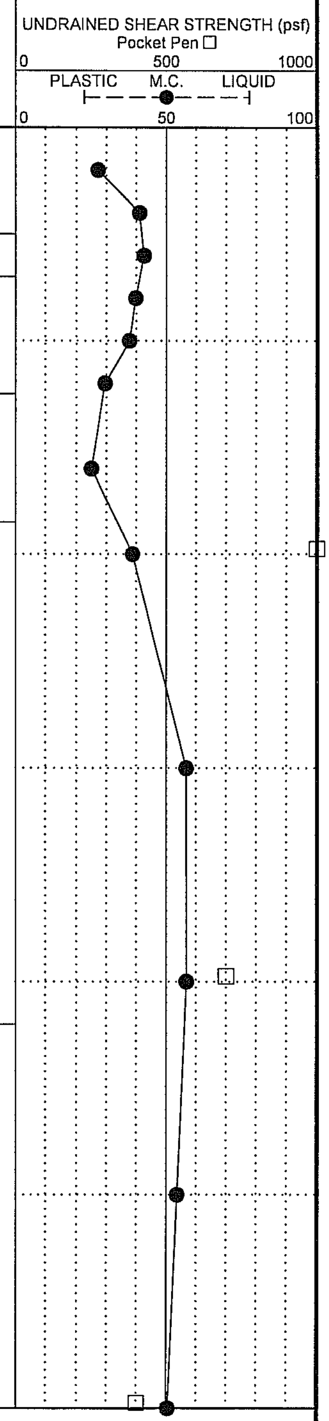
TEST HOLE NO.: 1

Client: Calnitsky Associates Architects	Job No.: 768-2007	Logged By: J. Block, P. Eng.	Date: 28/11/07
Project: Norberry-Glenlee Community Centre addition		Reviewed By: J. Block, P. Eng.	Time: 8:30 AM
Location: 26 Molgat Avenue, Winnipeg, Manitoba	Elevation: 99.67m	Drawing Number: 5293	

Depth, ft	Sample Type	Sample Number	U S C S	Graphic Log	MATERIAL DESCRIPTION
0			CH		Black/brown, stiff, moist, silty CLAY FILL
		1			
		2			
		3	CH		Grey, alluvially deposited, firm, moist, silty CLAY
		4	CH		Brown, alluvially deposited, firm, moist, silty CLAY
5		5			
∇		6			
			ML		Brown, alluvially deposited, soft, saturated, sandy SILT - Severe groundwater seepage and soil sloughing
		7			
10		8	CH		Brown, glaciolacustrine, stiff, moist, silty CLAY with silt and gypsum inclusions
15		9			
20		10			
			CH		Grey, glaciolacustrine, firm, moist, silty clay with silt inclusions
25		11			
30					



Continued Next Page

SAMPLE TYPE SYMBOLS

Split Spoon
Shelby Tube
Vane Shear
Auger Cuttings
Grab Sample
Rock Core

Drill Rig:	B-40 truck mounted drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

∇ Phreatic Surface #1:	6.3 ft
▼ Phreatic Surface #2:	51.0 ft

TEST HOLE LOG 768-2007 - CALNITSKY ASSOCIATES - 26 MOLGAT.GPJ M BLOCK ASSOC.GDT 29/11/07

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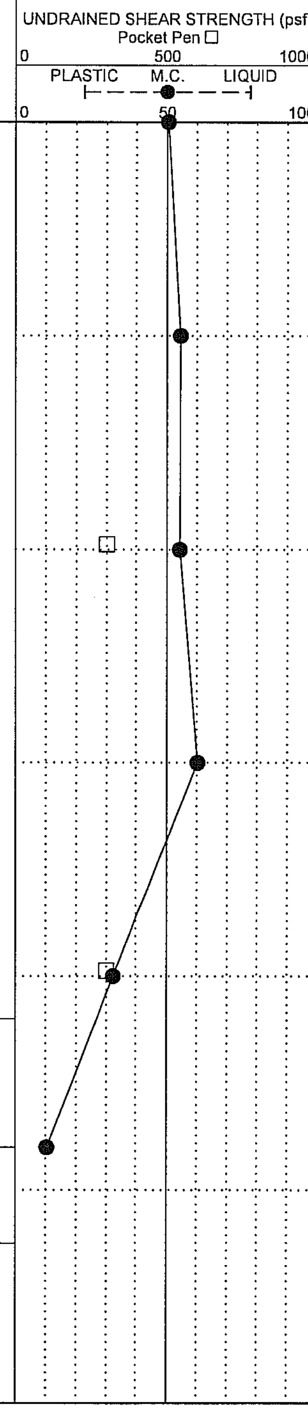
TEST HOLE NO.: 1

Client: Calnitsky Associates Architects	Job No.: 768-2007	Logged By: J. Block, P. Eng.	Date: 28/11/07
Project: Norberry-Glenlee Community Centre addition		Reviewed By: J. Block, P. Eng.	Time: 8:30 AM
Location: 26 Molgat Avenue, Winnipeg, Manitoba	Elevation: 99.67m	Drawing Number: 5293	

Depth, ft	Sample Type	Sample Number	U S C S	Graphic Log	MATERIAL DESCRIPTION
30		12	CH		Grey, glaciolacustrine, firm, moist, silty clay with silt inclusions *(continued)*
35		13			
40		14			
45		15			
50		16			
			CL-ML		Brown, soft, saturated, compact, gravelly sandy SILT with cobbles and boulders (GLACIAL TILL)
		17	BLDRCBB		Suspected FRACTURED LIMESTONE BEDROCK - Saturated sand, gravel, cobbles and boulders - Severe soil sloughing and groundwater seepage
55					
					56'3" - Auger refusal on suspected LIMESTONE BEDROCK; - Upon completion, the groundwater & sloughed soil was measured at the 7' depth
60					



SAMPLE TYPE SYMBOLS

- Split Spoon
- Vane Shear
- Grab Sample
- Shelby Tube
- Auger Cuttings
- Rock Core

Drill Rig:	B-40 truck mounted drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

Phreatic Surface #1:	6.3 ft
Phreatic Surface #2:	51.0 ft

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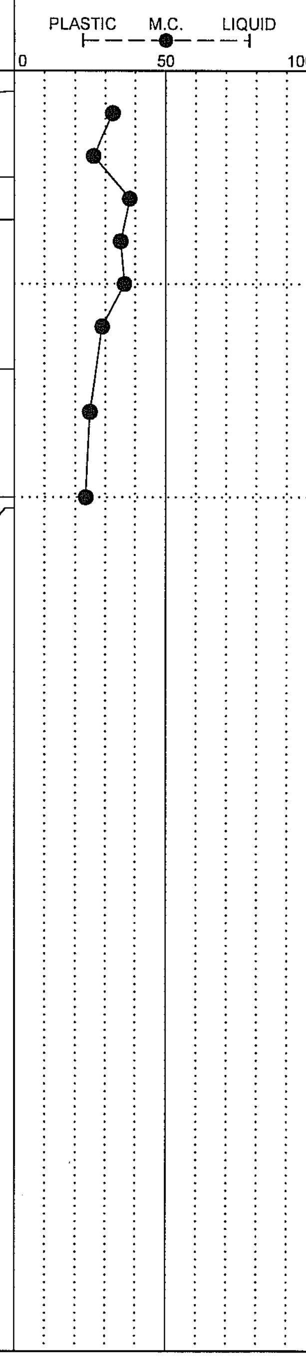
TEST HOLE NO.: 2

Sheet 1 of 1

Client: Calnitsky Associates Architects	Job No.: 768-2007	Logged By: J. Block, P. Eng.	Date: 28/11/07
Project: Norberry-Glenlee Community Centre addition		Reviewed By: J. Block, P. Eng.	Time: 10:35 AM
Location: 26 Molgat Avenue, Winnipeg, Manitoba	Elevation: 99.79m	Drawing Number: 5293	

Depth, ft	Sample Type	Sample Number	U S C S	Graphic Log	MATERIAL DESCRIPTION
0			SP		Brown, damp, very dense, silty gravelly SAND FILL
		18	CH		Black/brown, stiff, moist, silty CLAY FILL
		19			
		20	CH		Grey, alluvially deposited, firm, moist, silty CLAY
		21	CH		Brown, alluvially deposited, stiff, moist, silty CLAY
5		22			
		23			
∇					
			ML		Brown, alluvially deposited, soft, saturated, sandy SILT - Severe groundwater seepage and soil sloughing
		24			
10		25			
			CH		Brown, glaciolacustrine, stiff, moist, silty CLAY with silt and gypsum inclusions 10'3" - End of test hole
15					
20					
25					
30					



SAMPLE TYPE SYMBOLS

Split Spoon
Shelby Tube
Vane Shear
Auger Cuttings
Grab Sample
Rock Core

Drill Rig:	B-40 truck mounted drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

∇ Phreatic Surface #1: 7.0 ft

TEST HOLE LOG 768-2007 - CALNITSKY ASSOCIATES - 26 MOLGAT.GPJ M BLOCK ASSOC.GDT 29/11/07

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Dryden, Ontario P8N 2W4
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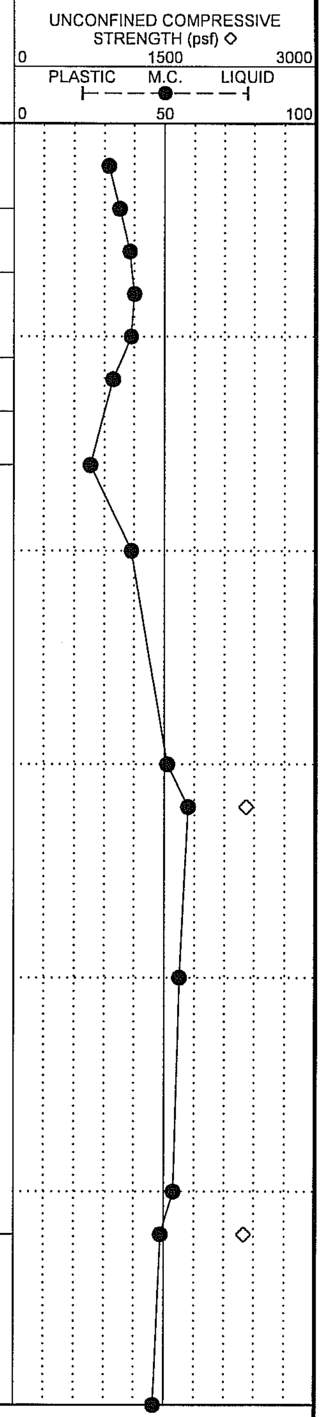
TEST HOLE NO.: 3

Client: Calnitsky Associates Architects	Job No.: 768-2007	Logged By: J. Block, P. Eng.	Date: 28/11/07
Project: Norberry-Glenlee Community Centre addition		Reviewed By: J. Block, P. Eng.	Time: 10:50 AM
Location: 26 Molgat Avenue, Winnipeg, Manitoba	Elevation: 99.74m	Drawing Number: 5293	

Depth, ft	Sample Type	Sample Number	USCS	Graphic Log	MATERIAL DESCRIPTION
0	Split Spoon	26, 27	CH	Fill	Black/brown, firm, moist, silty CLAY FILL
	Split Spoon	28	CH	Clay	Black, alluvially deposited, stiff, moist, silty CLAY
5	Split Spoon	29, 30	CH	Clay	Grey, alluvially deposited, firm, moist, silty CLAY
	Split Spoon	31	CH	Clay	Brown, alluvially deposited, firm, moist, silty CLAY
▽			ML	Silt	Brown, alluvially deposited, soft, saturated, sandy SILT - Moderate groundwater seepage and soil sloughing
10, 15, 20, 25	Split Spoon / Shelby Tube	32, 33, 34, 35, 36, 37	CH	Clay	Brown, glaciolacustrine, stiff, moist, silty CLAY with silt and gypsum inclusions
30	Shelby Tube / Split Spoon	38	CH	Clay	Grey, glaciolacustrine, firm, moist, silty clay with silt inclusions



Continued Next Page

SAMPLE TYPE SYMBOLS

- Split Spoon
- Shelby Tube
- Vane Shear
- Auger Cuttings
- Grab Sample
- Rock Core

Drill Rig:	B-40 truck mounted drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

▽ Phreatic Surface #1:	6.8 ft
▼ Phreatic Surface #2:	48.0 ft

M. Block & Associates Ltd.

2484 Ferrier Street	129 Grand Trunk Street
Winnipeg, Manitoba, R2V 4P6	Dryden, Ontario P8N 2W4
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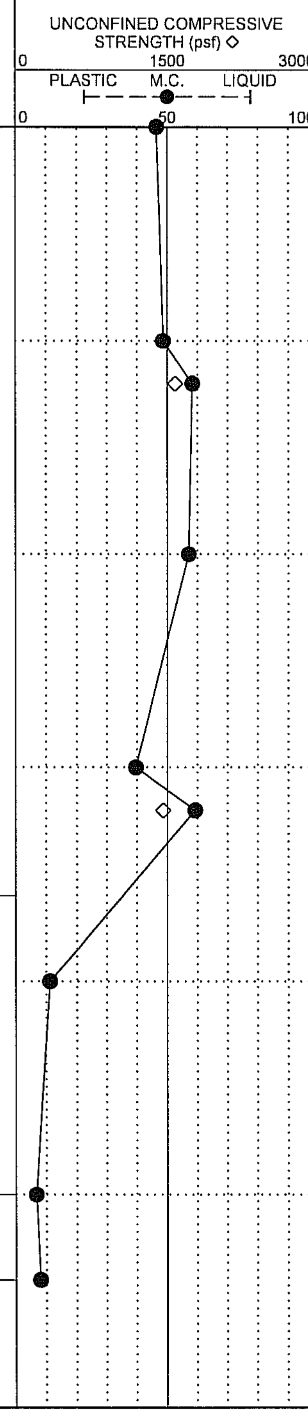
TEST HOLE NO.: 3

Sheet 2 of 2

Client: Calnitsky Associates Architects	Job No.: 768-2007	Logged By: J. Block, P. Eng.	Date: 28/11/07
Project: Norberry-Glenlee Community Centre addition		Reviewed By: J. Block, P. Eng.	Time: 10:50 AM
Location: 26 Molgat Avenue, Winnipeg, Manitoba	Elevation: 99.74m	Drawing Number: 5293	

Depth, ft	Sample Type	Sample Number	U S C S	Graphic Log	MATERIAL DESCRIPTION
30		39	CH		Grey, glaciolacustrine, firm, moist, silty clay with silt inclusions *(continued)*
35		40			
	Shelby Tube	41			
40		42			
45		43			
	Shelby Tube	44			
			CL-ML		Brown, soft, saturated, compact, gravelly sandy SILT with cobbles and boulders (GLACIAL TILL)
50		45			
55		46			
			CL-ML		Brown, hard, dry, very dense, gravelly sandy SILT with frequent cobbles and boulders (GLACIAL TILL)
		47			
					57' - Auger refusal on suspected boulders in hard glacial till matrix - Upon completion, the groundwater & sloughed soil was measured at the 7' depth
60					



SAMPLE TYPE SYMBOLS

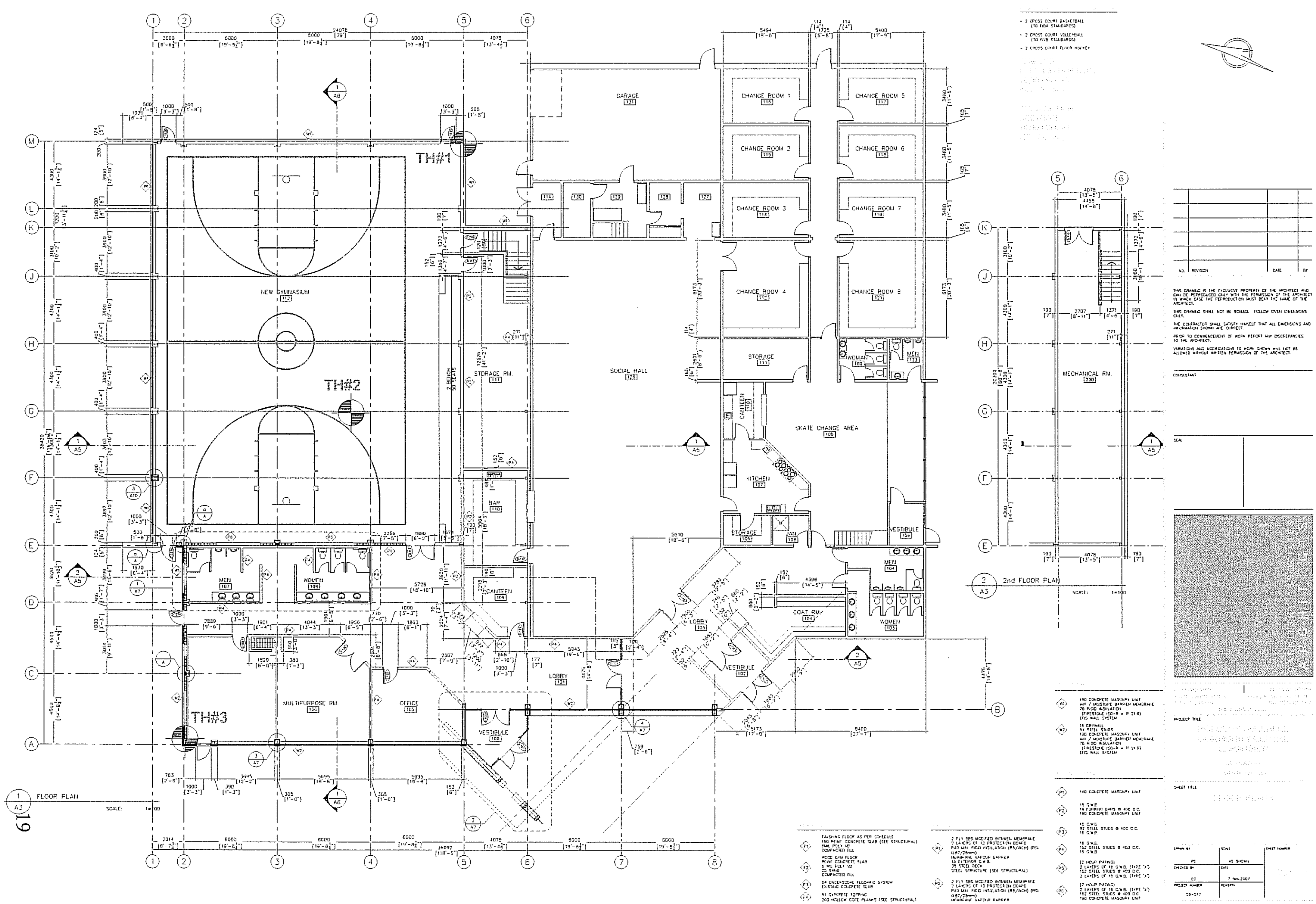
Split Spoon | Shelby Tube | Vane Shear | Auger Cuttings | Grab Sample | Rock Core

Drill Rig:	B-40 truck mounted drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

∇ Phreatic Surface #1:	6.8 ft
▼ Phreatic Surface #2:	48.0 ft

TEST HOLE LOG 768-2007 - CALNITSKY ASSOCIATES - 26 MOLGAT.GPJ M BLOCK ASSOC.GDT 29/11/07



FLOOR PLAN
2nd FLOOR PLAN
NEW GYMNASIUM
TH#1
TH#2
TH#3
GARAGE
CHANGE ROOM 1
CHANGE ROOM 2
CHANGE ROOM 3
CHANGE ROOM 4
CHANGE ROOM 5
CHANGE ROOM 6
CHANGE ROOM 7
CHANGE ROOM 8
STORAGE
STORAGE RM.
SOCIAL HALL
SKATE CHANGE AREA
CANTEEN
KITCHEN
BAR
MEN
WOMEN
WOMAN
JAN.
VESTIBULE
COAT RM.
LOBBY
MULTIPURPOSE RM.
OFFICE
MECHANICAL RM.
2 BENCH 50 SEATS
- 2 CROSS COURT BASKETBALL (TO FIBA STANDARDS)
- 2 CROSS COURT VOLLEYBALL (TO FIVB STANDARDS)
- 2 CROSS COURT FLOOR HOCKEY
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF THE ARCHITECT AND CAN BE REPRODUCED ONLY WITH THE PERMISSION OF THE ARCHITECT IN WHICH CASE THE REPRODUCTION MUST BEAR THE NAME OF THE ARCHITECT.
THIS DRAWING SHALL NOT BE SCALED. FOLLOW GIVEN DIMENSIONS ONLY.
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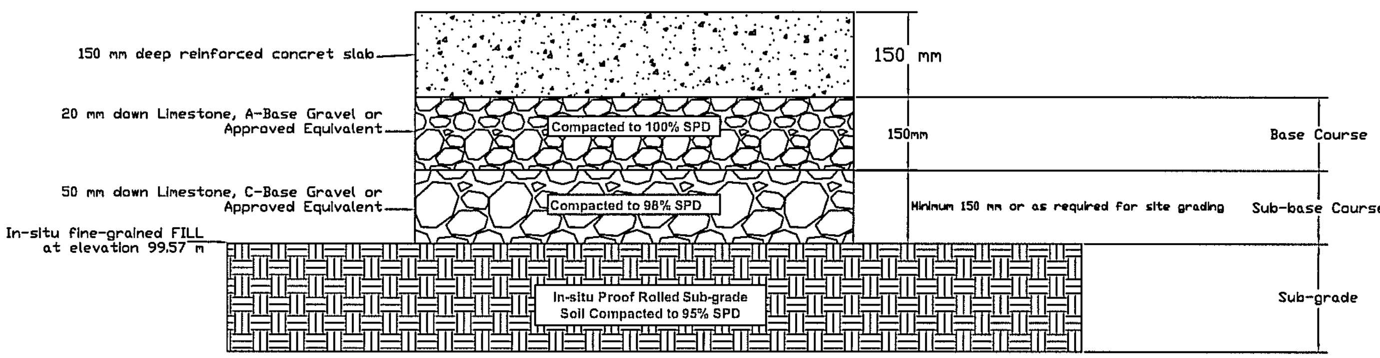
VARIATIONS AND MODIFICATIONS TO WORK SHOWN WILL NOT BE ALLOWED WITHOUT WRITTEN PERMISSION OF THE ARCHITECT.
CONSULTANT
SEAL
PROJECT TITLE
SHEET TITLE
SCALE: 1=100

SURFACE CONCRETE SLAB-ON-GRADE DESIGN



	M. Block & Associates Ltd. 2484 Ferrier Street Winnipeg, Manitoba R2V 4P6 Phone: (204)-334-5356 Fax: (204)-339-7976	Drawing: Surface Slab-on-grade Design Drawn By: J. Block, P. Eng. Reviewed By: J. Block, P. Eng. Project: Norberry-Glenlee Community Centre Project Number: 768-2007 Drawing Number: 5293

Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
1	1.0							27.2			
1	2.0							41.0			
1	3.0							42.5			
1	4.0							39.7			
1	5.0							37.6			
1	6.0							29.5			
1	8.0							24.9			
1	10.0							38.7			
1	15.0							56.7			
1	20.0							56.7			
1	25.0							53.6			
1	30.0							50.4			
1	35.0							54.5			
1	40.0							54.2			
1	45.0							60.1			
1	50.0							32.2			
1	54.0							10.3			
2	1.0							32.4			
2	2.0							26.0			
2	3.0							38.0			
2	4.0							35.0			
2	5.0							36.3			
2	6.0							28.8			
2	8.0							24.7			
2	10.0							23.4			
3	1.0							31.4			
3	2.0							35.0			
3	3.0							38.4			
3	4.0							40.0			
3	5.0							38.9			
3	6.0							32.8			
3	8.0							25.3			
3	10.0							39.0			
3	15.0							50.9			
3	16.0							57.8			
3	20.0							55.0			
3	25.0							53.0			
3	26.0							48.8			
3	30.0							46.4			
3	35.0							48.6			
3	36.0							58.2			
3	40.0							57.0			
3	45.0							39.5			

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Summary of Laboratory Results

Client: Calnitsky Associates Architects
Project: Norberry-Glenlee Community Centre addition
Location: 26 Molgat Avenue, Winnipeg, Manitoba
Number: 768-2007

Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
3	46.0							59.1			
3	50.0							11.2			
3	55.0							6.7			
3	57.0							8.0			

CAN EM LAB SUMMARY 768-2007 - CALNITSKY ASSOCIATES - 26 MOLGAT.GPJ M BLOCK ASSOC.GDT 29/11/07

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Summary of Laboratory Results

Client: Calnitsky Associates Architects
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