

**DATE:** February 10, 2014

**FILE:** 131-20672-00

**TO:** **Bruce Emberly, C.E.T.**  
 Director, Buildings Department  
 WSP Canada Inc.  
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**PAGES:**

**RE: Pavement Recommendations for Seven Oaks Pool Parking Lot Reconstruction in Winnipeg, MB.**

**PAVEMENT RECOMMENDATIONS**

A pavement investigation was conducted to assess the general subsurface conditions for the proposed Seven Oaks Pool parking lot reconstruction. It was requested that pavement recommendations for the existing structures be provided. A total of five testholes drilled between 3m depth and 7.6m depth revealed a general soil profile of a layer of fill that ranged from 0.9m to 1.8m followed by an upper thin clay over a SILT layer followed by a lower soft clay layer, which extended to the depth explored. Detailed descriptions of the testhole logs are attached. Seepage and caving conditions were observed from the SILT layer during our investigation.

The pavement recommendation for light duty and heavy-duty traffic at the existing parking lot is discussed below. Based on the Equivalent Single Axle Load (ESAL) of about 22,000 for light duty and 261,705 for heavy duty, the recommended pavement structure at this site should be as follows:

**Pavement Thicknesses**

	<b>Light Duty Traffic</b>	<b>Heavy Duty</b>	<b>% Compaction</b>
Asphaltic Concrete	75 mm	100 mm	98% Marshall
Base Course	150mm	300mm	98% Std Proctor
Subbase(Class"C")	450mm	500mm	98% Std Proctor

The above pavement structures should be constructed on a prepared clay fill subgrade. The approximate site stripping is 675 to 900mm as per depth of pavement structure. The prepared subgrade should be proof rolled with a heavy sheepsfoot roller (min. 20 passes) which

translates to at least 95% Std Proctor and inspected by qualified geotechnical engineer prior to the placement of the overlying granular fill.

The granular base course and subbase materials should include organic-free, non-frozen, aggregate conforming to the City of Winnipeg gradation limits. The existing granular fill at the parking lot could be reused as subbase material provided that it is free from organic.

Where soft but dry spots are encountered at the subgrade level, construction traffic should be restricted. Soft but dry spots should be excavated with a large backhoe fitted with a smooth bucket and covered with non-woven geotextile, to at least 300mm below the underside of the subbase and replaced with a 300mm thick layer of 100mm crushed limestone. In this regard, the total granular fill thickness would be 975mm for light-duty traffic.

Any saturated subgrade conditions should be dried off quickly by excavation of sump pit or installation of permanent subdrains (600mm below the subgrade level) connected to positive outlet (catch basin) prior to placing the granular fill structure with geotextile. At these locations, the placing of granular fill should follow the geotextile specifications for soft grounds.

The combined aggregate gradation limits and physical requirements of the asphaltic concrete should be in accordance with the City of Winnipeg specification.

For the hot mix asphaltic concrete, gradation analysis of the aggregates (i.e. stone, fines and additive), compaction testing and sampling of at least one representative hot mix asphalt mixture (during construction) for laboratory Marshall testing should be undertaken. This will provide data to confirm that the asphaltic concrete pavement complies with the project specification. Hot mix asphaltic concrete should not be placed at ambient temperatures lower than +4°C. During placement, the temperature of the paving mix should be in the range of +120°C to +150°C and compaction should not take place at paving mix temperatures lower than +85°C.

Sieve analysis and compaction testing of the granular base and subgrade materials should be conducted by qualified geotechnical personnel to confirm that the materials supplied and percent compactions are in accordance with design specifications.

#### **CONCRETE PAD**

For any concrete pad, sidewalk, curbs, the pavement structure should consist of 200mm reinforced concrete followed by 300mm of compacted (98% Standard Proctor Density) base course over the compacted subgrade. If a silt layer is encountered as subgrade, the application of non-woven geotextile over the silt layer is recommended. Exterior, grade supported concrete slabs will be subjected to some seasonal vertical movements related to frost. Exterior concrete slabs should not be tied into rigid structures. In addition, localized subsurface drainage should be provided around the structure.

#### **LIGHT STANDARDS**

Due to significant presence of FILL layer, the light standard should be supported on cast-in-place friction piles. *Seepage and sloughing conditions should be expected from the SILT layer,*

*if encountered, during the pile installation. Depth of temporary sleeve is entirely dependent on the foundation contractor.*

An allowable shaft adhesion values of 8.6 kPa (180 psf) applied to the pile circumference within the native clay was calculated. These numbers may be used for the pile design using a pile length of 7.6m (25 ft); pile length of 7.6m from grade should not be exceeded due to unknown conditions beyond the 7.6m depth. With Limit State Design (LSD), the bearing resistances at Unfactored Ultimate Limit State (ULS) and Serviceability Limit State (SLS) are 21.5 kPa and 8.6 kPa, respectively. To determine the factored ULS, the unfactored ULS should be multiplied with the appropriate resistance factor of 0.55.

**CLOSURE**

The findings and recommendations provided in this report were prepared by WSP Canada Inc. (the Consultant) in accordance with generally accepted professional engineering principles and practices. The recommendations are based on the results of field and laboratory investigations and are reflective only of the actual testhole(s) and/or excavation(s) examined. If conditions encountered during construction appear to be different than those shown by the testhole(s) and/or excavation(s) at this site, the Consultant should be notified immediately in order that the recommendations can be reviewed and modified as necessary to address actual site conditions.

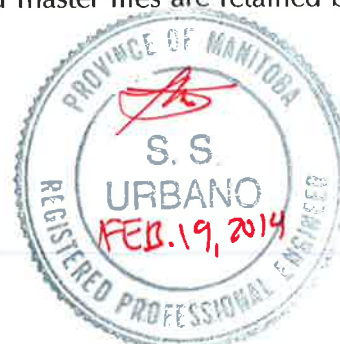
This report is limited in scope to only those items that are specifically referenced in this report. There may be existing conditions that were not recorded in this report. Such conditions were not apparent to the Consultant due to the limitations imposed by the scope of work. The Consultant, therefore, accepts no liability for any costs incurred by the Client for subsequent discovery, manifestation or rectification of such conditions.

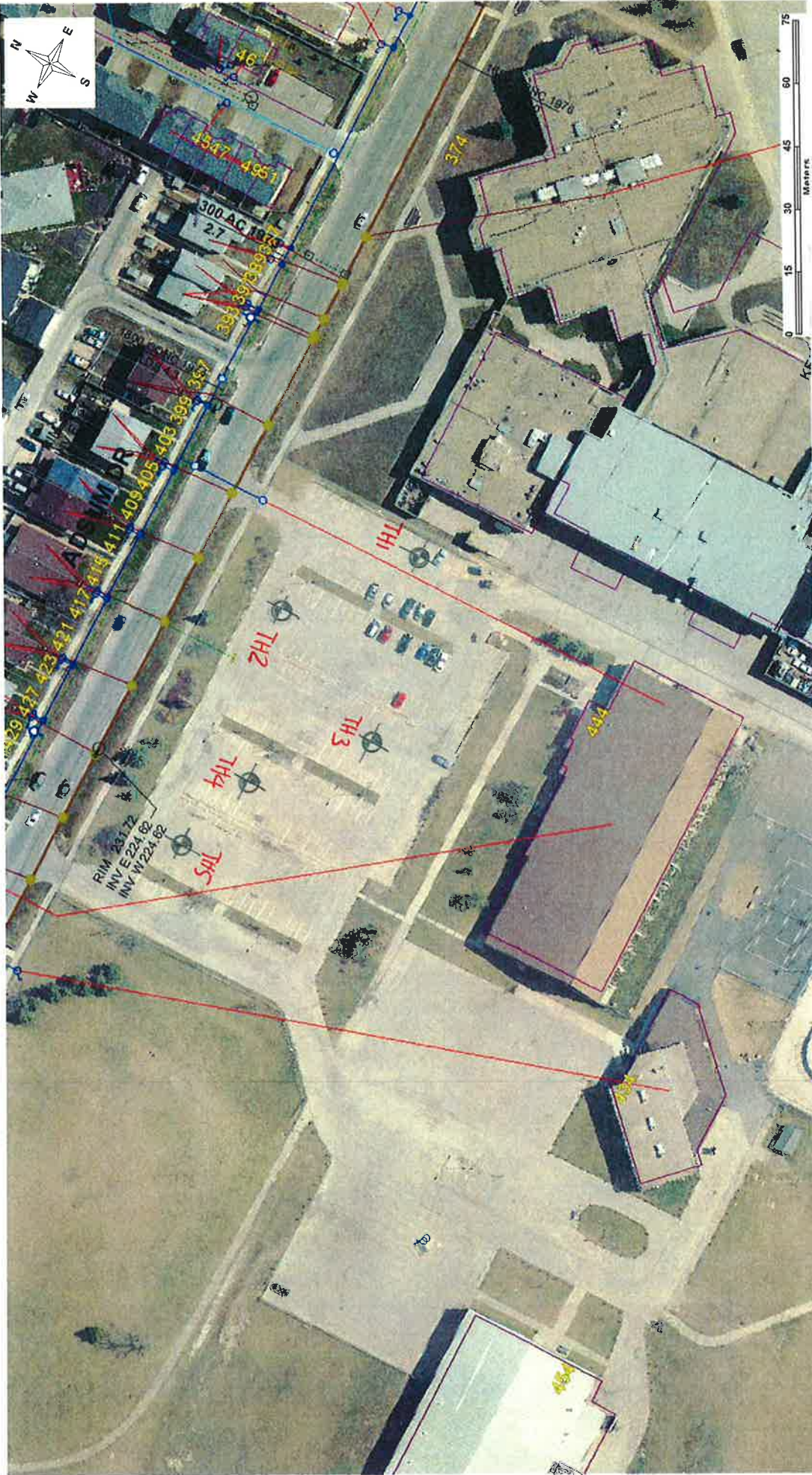
This report is intended solely for the Client named as a general indication of the visible or reported physical condition of the items addressed in the report at the time of the geotechnical investigation. The material in this report reflects the Consultant's best judgment in light of the information available to it at the time of preparation.

This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The report has been written to be read in its entirety, do not use any part of this report as a separate entity.

All files, notes, source data, test results and master files are retained by the Consultant and remain the property of the Consultant.





Note – this is for information only. There is no guarantee as to the accuracy or completeness of the data.  
 For record drawing information, please contact the Underground Structures Branch at 986-6401.

Project No: 131-20672-00

Client: City of Winnipeg Planning Department

TH1

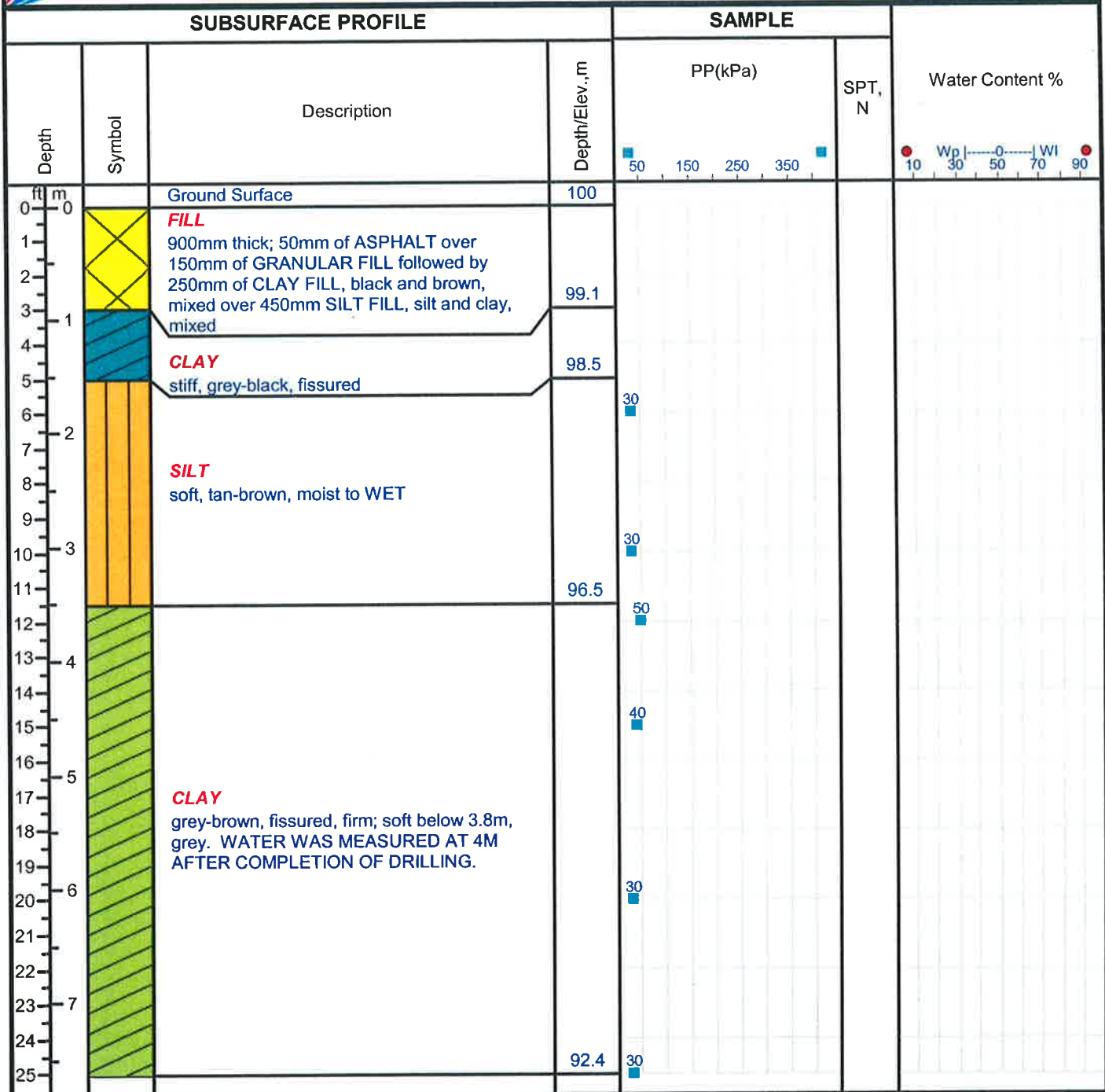
Project: Seven Oaks Pool Parking Lot

Location: 444 Adsum Drive



Enclosure:

Engineer: SSU



Drill Method: S/S Auger

WSP Canada Inc.  
1600 Buffalo Place  
Winnipeg, MB.  
R3T 6B8

Elevation: Assumed 100.0 m

Drill Date: 10/21/13

Checked by: SSU

Hole Size: 125mm

Sheet: 1 of 1

Project No: 131-20672-00

Client: City of Winnipeg Planning Department

TH2

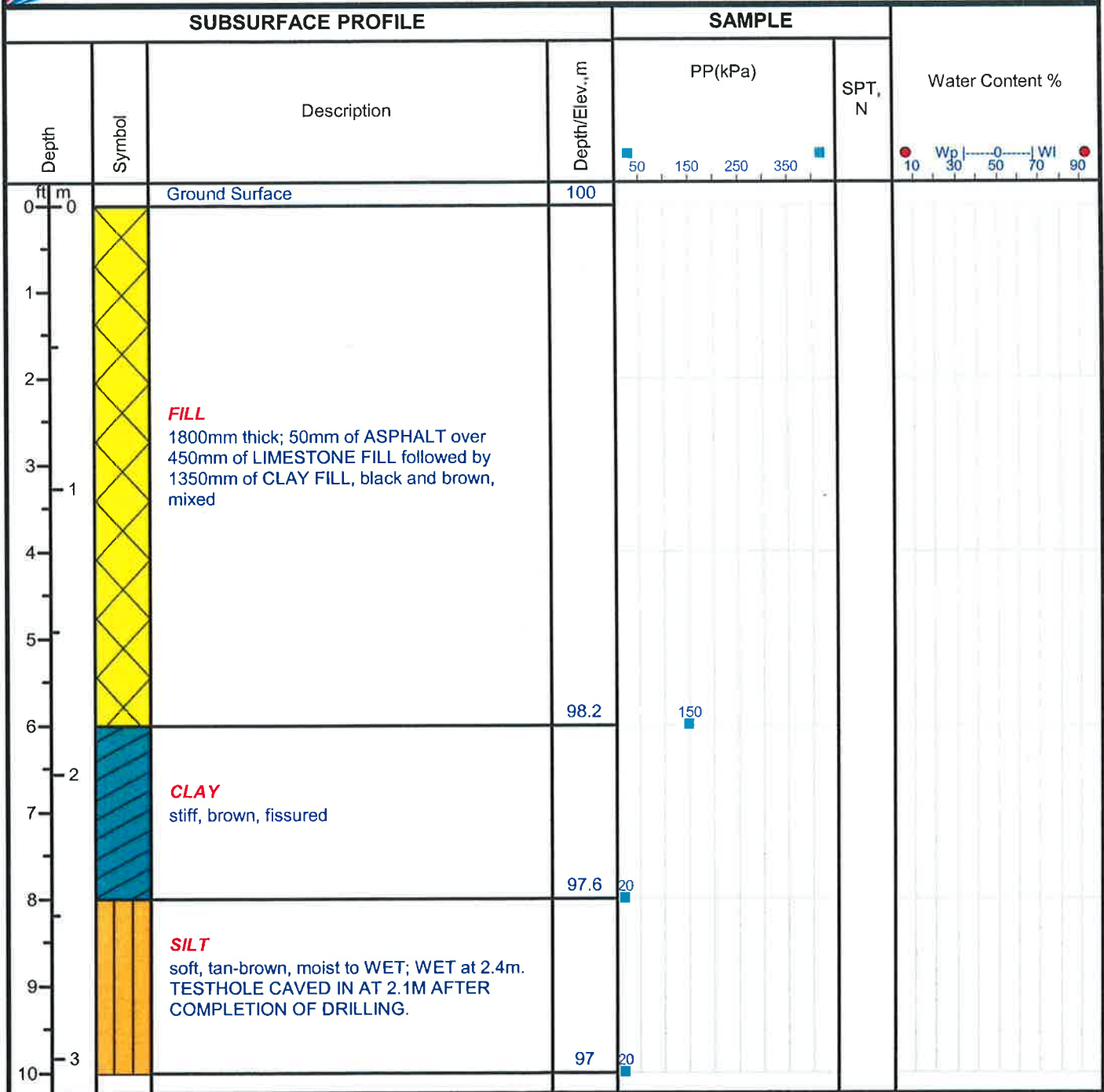
Project: Seven Oaks Pool Parking Lot

Location: 444 Adsum Drive



Enclosure:

Engineer: SSU



Drill Method: S/S Auger

WSP Canada Inc.  
1600 Buffalo Place  
Winnipeg, MB.  
R3T 6B8

Elevation: Assumed 100.0 m

Drill Date: 10/21/13

Checked by: SSU

Hole Size: 125mm

Sheet: 1 of 1

Project No: 131-20672-00

Client: City of Winnipeg Planning Department

**TH3**

Project: Seven Oaks Pool Parking Lot

Location: 444 Adsum Drive



Enclosure:

Engineer: SSU

SUBSURFACE PROFILE				SAMPLE		Water Content %
Depth	Symbol	Description	Depth/Elev.,m	PP(kPa)	SPT, N	
0		Ground Surface	100			
0 to 4		<b>FILL</b> 1200mm thick; 50mm of ASPHALT over 125mm of GRANULAR FILL followed by 1025mm of CLAY FILL, black and brown, mixed				
4 to 5		<b>CLAY</b> stiff, grey-black, fissured	98.8	200		
5 to 6		<b>SILT</b> soft, tan-brown, moist to WET	98.5			
6 to 10		<b>CLAY</b> stiff, brown, fissured. TESTHOLE IS DRY AFTER COMPLETION OF DRILLING.	98.2	150		
10			97	125		

Drill Method: S/S Auger

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Elevation: Assumed 100.0 m

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Hole Size: 125mm

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**TH4**

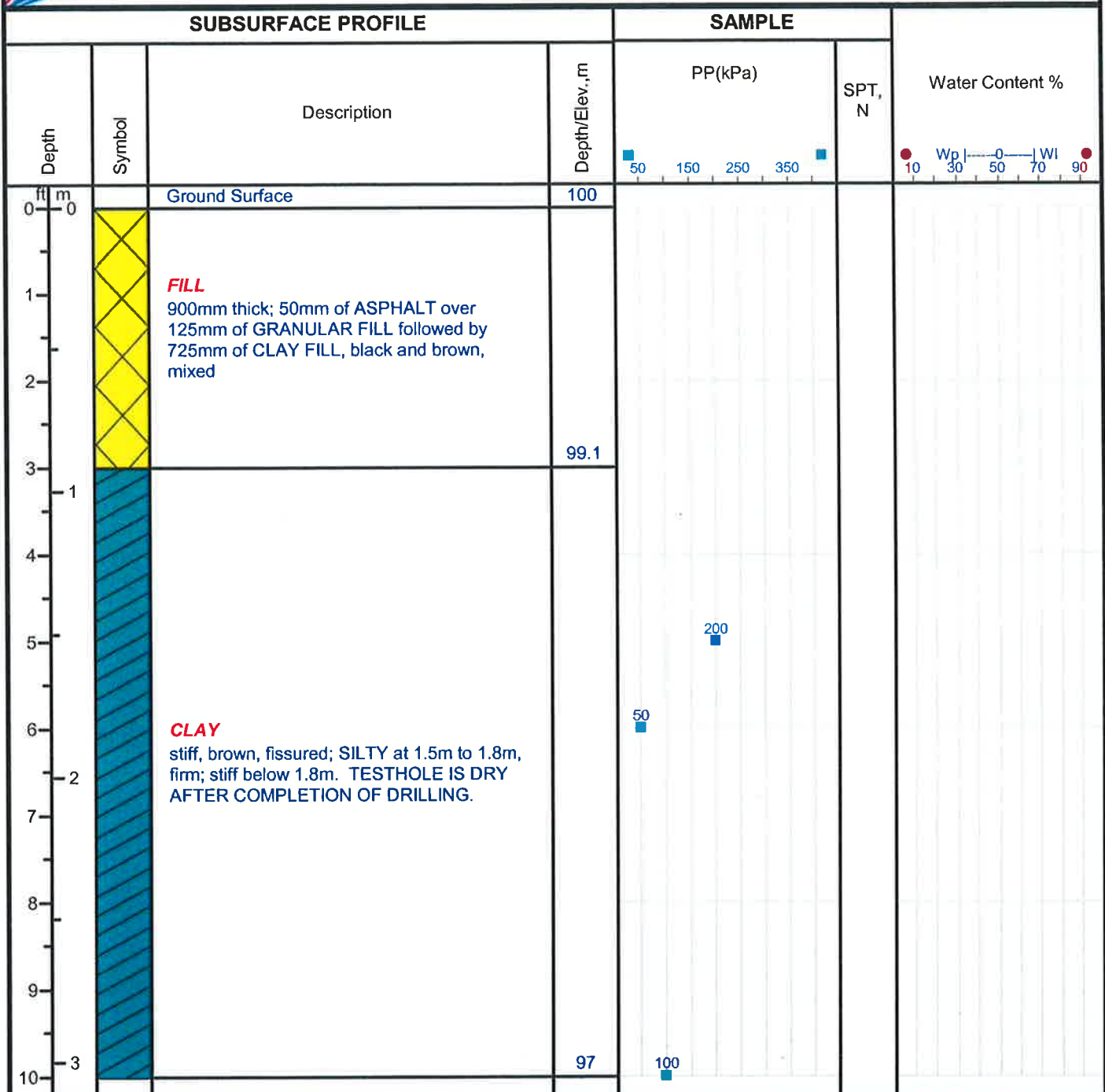
Project: Seven Oaks Pool Parking Lot

Location: 444 Adsum Drive



Enclosure:

Engineer: SSU



Drill Method: S/S Auger

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Drill Date: 10/21/13

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Hole Size: 125mm

Sheet: 1 of 1



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**TH5**

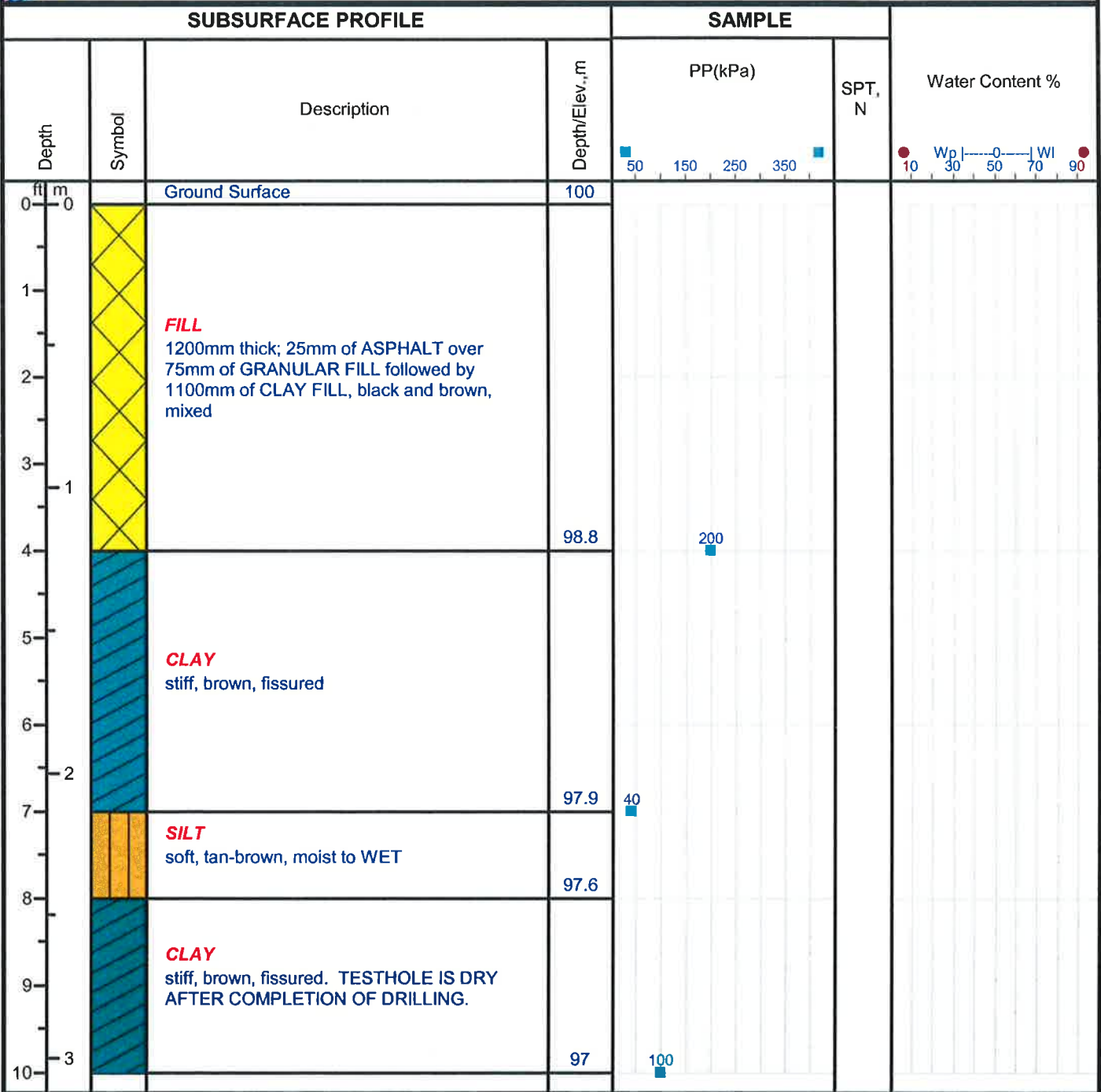
Project: Seven Oaks Pool Parking Lot

Location: 444 Adsum Drive



Enclosure:

Engineer: SSU



Drill Method: S/S Auger

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Elevation: Assumed 100.0 m

Drill Date: 10/21/13

Checked by: SSU

Hole Size: 125mm

Sheet: 1 of 1