UMA | AECOM

City of Winnipeg

Glacial Sand and Gravel

Pine Ridge Gravel Pit Aggregate Assessment

Prepared by:
UMA Engineering Ltd.
1479 Buffalo Place
Winnipeg, MB R3T 1L7

UMA Project No. 41 01 0265 381 00 (4.6.1)

March, 2006

Table of Contents

List of Tables

List of Drawings

List of Appendices

1.0 Introduction

UMA Engineering Ltd. was retained by the City of Winnipeg, Glacial Sand & Gravel to update the aggregate resource assessment of the Pine Ridge Gravel Pit property (Drawing No. 01) completed by UMA Engineering Ltd. in 1999. The purpose of this assessment is to develop a better understanding of the quantity and quality of aggregate material remaining on site so that informed decisions can be made concerning the future disposition of the operation.

1.1 Scope of Work

The scope of work for this assessment was presented in the UMA proposal dated October 6, 2005. As presented in the proposal, the scope of work included the following components:

1. A topographic survey of the areas mined since the last 1999 survey was carried out to determine the current configuration of the surface topography in the pit.
2. A test pit excavation program was conducted to get detailed information and samples from within the upper 5 metres of the soil profile.
3. A test hole drilling program was completed to obtain information and samples from the deeper portion of the soil profile inaccessible to the backhoe. Both solid stem auger and mud rotary drilling techniques were used.
4. Representative samples collected during the field program were submitted for laboratory gradation analysis to assess material quality.
5. The collected information from the current and previous investigations was analyzed and a reserve estimation prepared.

1.2 Site Location

The Pine Ridge Gravel Pit is located approximately 20 kilometres northeast of Winnipeg, near the south boundary of the Birds Hill Provincial Park. The property is located within Legal Subdivision 9 through 14, Section 5, Township 12, Range 5 East. The property is comprised of approximately 96 hectares (238 acres). The property is bounded to the west by Heatherdale Road, to the east by Veron Road and to the north by Hillside Road. Access to the gravel pit is from Heatherdale Road.

1.3 Classification of Aggregates

Gradation specifications for aggregates can be found in the American Society for Testing and Materials and the Canadian Standards Association manuals. In general, aggregates are classified by: silt content (percent by weight less than 80 um sieve); sand content (percent by weight between 80 um and 5 mm sieves); and gravel content (percent by weight greater than 5 mm sieve). Aggregates are also classified based on the uniformity of gradation depending on the intended end use.

For an aggregate to be free draining (ie: filter materials), the percent passing the 80 um sieve should be in the 0 to 5 percent range. Aggregates with greater than 15% passing the 80 um sieve will generally be poorly drained and susceptible to frost.

Four basic ranges of sand and gravel content based on the percent retained on the 5 mm sieve are used to generally classify aggregates for a variety of uses. These ranges are: 0 to 10 percent; 10 to 30 percent; 30 to 60 percent; and greater than 60 percent. The classification must also take into consideration the limitations presented above regarding the percent passing the 80 um sieve. Examples of typical aggregate uses based on the above ranges include:

- Aggregates with 0 to 10 percent retained on the 5 mm sieve are used in fine concrete, seal coat paving, plaster and masonry mortar, and as winter road sand.
- Aggregates with 10 to 30 percent retained on the 5 mm sieve are used to prepare concrete blocks and concrete culverts, and as granular backfill.
- Aggregates with 30 to 60 percent retained on the 5 mm sieve are used for railway sub-ballast, roadway base coarse, granular road surfacing, and bituminous paving mixtures.
- Aggregates with greater than 60 percent retained on the 5 mm sieve can be used for coarse filters, coarse concrete, or can be crushed and blended to give the required gradations.

Poor quality sand and gravel deposits (less than 20 percent retained on the 5 mm sieve) can be screened and blended to produce the required gradations.

2.0 Physiographic Setting

2.1 Topography and Vegetation

The topography of the Birds Hill area is generally rolling, rising approximately 20 metres above the local prairie level within regions to the west and south and up to 40 metres in the northern and eastern regions. Depressions up to 16 metres below prairie level exist in the southwest and middle portions of the region.

The natural vegetation in the general area of the Pine Ridge Gravel Pit consists of stands of native prairie grasses and forested areas containing trembling aspen, bur oak, white spruce, balsam poplar, willow and scrub brush.

2.2 Surficial Geology

The Pine Ridge Gravel Pit is contained within the Birds Hill Glaciofluvial Complex, an assemblage of aggregate materials ranging from fine sand to coarse gravels. The deposits are typically underlain by glacial till materials consisting of clays, silts, sands and gravels. The aggregates of the Birds Hill Glaciofluvial Complex were derived from the erosion of bedrock materials to the east and northeast, and consist primarily of varying combinations of limestone and granite.

2.3 Bedrock Geology

The bedrock beneath the Birds Hill Glaciofluvial Complex consists of limestones and dolomites of the Red River Formation underlain by shales and sandstones of the Winnipeg Formation. The depth to bedrock is highly variable, ranging from 5 metres in the northeast region of Birds Hill to greater than 40 metres beneath the main Birds Hill Complex.

2.4 Hydrogeology

While the full definition of the hydrogeology of the Pine Ridge Gravel Pit was beyond the scope of this study, it was noted that groundwater was encountered at two distinct elevations. Based on the observed water level within the ponds in Pit B and the observed depths to saturated soil conditions in the test holes drilled below Pit A, the current groundwater level is estimated to be at an elevation of approximately 247 metres (+/-) within Pit A and Pit B. In the area of the South Fine Sand Hole, saturated soil conditions and ponded water are at an elevation of approximately 262 metres (+/-). The review of the available information on the geology of this site indicates that groundwater in the area of the South Fine Sand Hole is perched on the underlying low permeability clays and tills. It is likely that as precipitation infiltrates into the area it accumulates as groundwater on the clay tills and eventually flows into the deep trough structure which hosts the bulk of the Pine Ridge aggregate resources. From there, it likely infiltrates into the underlying bedrock.

Relative to the potential development of the aggregate resources below the water table, a hydrogeologic assessment would be required to determine if the water table can be lowered by pumping or if it would be necessary to utilize a dredge or similar technology to access those resources below the water table. Any plan to lower the water table by pumping would require a Water Rights License from the province, and potentially an Environment Act license. Municipal approvals for the drainage of the discharge water may also be required.

3.0 Previous Work

3.1 1974 Pine Ridge Pit Survey (Drysdale Report)

A test drilling program was undertaken during November and December 1974 to evaluate the soil conditions within the area of Legal Subdivisions 11 and 12 at the Pine Ridge Gravel Pit. The area investigated was approximately 7.3 hectares (18 acres) in size and is located to the south/southwest of Pit A and extending to the southern boundary of the Pine Ridge Gravel Pit property.

Thirty-nine test holes were completed to depths ranging from about 3.6 to 11.0 metres below grade. Test hole logs and a sketch plan of the test hole locations were completed as part of the survey. In 1984, an assessment of the test drilling program was performed (see Glanville Report).

3.2 1984 Pine Ridge Pit Report (Glanville Report)

Mr. J.I. Glanville, P. Eng. was retained by the City of Winnipeg's Equipment and Material Services Branch in 1984 to assess the quantity of materials identified within the area of the 1974 survey. As part of the assessment, an attempt was made to locate and survey the 1974 test hole locations. Of the original 39 test holes, fifteen locations were positively identified. An additional 13 locations were assumed based on field observations. The remaining eleven locations could not be found.

Due to the lack of detailed soil information collected during the 1974 test drilling program, a gross estimate of material quantities was made. The calculated material quantities include:

- Stone (probably 25 to 100 mm): 70,000 m^3
- Gravel: 90,000 m^3
- Coarse Sand: 200,000 m^3
- Medium Sand: 35,000 m^3
- Fine Sand: Not Calculated

The results of the material assessment concluded that there appears to be a layer of coarse sand and/or gravel that is located in an approximate north-south direction through the study area. The layer appears to dip beneath an upper layer of sand to the south-southwest and extends beyond the study area to the north-northeast.

3.3 1987 Pine Ridge Pit Survey

A detailed site investigation was conducted between November 6 and December 11, 1987 to evaluate the soil conditions within the entire Pine Ridge Gravel Pit property with the exception of the area previously investigated during the 1974 survey. In total, an area of approximately 70.2 hectares (173.5 acres) in size was investigated.

The site investigation consisted of 136 test pit excavations and 3 test holes. The test pit excavations were completed to depths ranging from about 3.0 to 8.5 metres below grade. The test holes were completed to depths ranging from 4.0 to 16.2 metres in an area deemed to have potentially good gravel. The test pit excavations and test holes were all visually logged in the field. Samples of aggregate were collected from the test pit excavations to determine the amount of material retained on the 6.4 mm sieve. All material retained on the 6.4 mm sieve is referred to as stone. The location of the test pit excavations and test holes are shown on Drawing No. 02. Copies of the original site plans depicting the test pit locations,

stratigraphic information and gradation information are presented in the UMA Engineering report of the previous assessment of this property (UMA Engineering, 1999).

Based on the results of the area investigated, it was estimated that approximately 215,000 m^3 of good gravel (ie: greater than 25% stone) existed on the site and that the material was concentrated on only 3.3 hectares of the site. The remaining property, 66.9 hectares, was reported as containing mostly sand and hardpan to a depth of 7.0 metres with some intermittent pockets of stone.

3.4 1998 Pine Ridge Gravel Pit Property Assessment (UMA Engineering)

The most recent assessment of the aggregate resources available within the Pine Ridge Gravel Pit was completed by UMA Engineering Ltd. in 1998. The investigation included a survey of the topography of the property at that time, the completion of 30 test pit excavations, the drilling of 9 test holes, and the completion of gradation and petrographic analyses of collected samples. Copies of the 1998 test pit and test hole logs have been included in Appendix A. Copies of the 1998 gradation curves have been included in Appendix B

Based on the assessment of the information available at that time, the following reserves were estimated:

- Unprocessed Sand: 7,573,000 tonnes
- Processed Sand: 7,573,000 tonnes
- Pit Run: 1,644,000 tonnes
- Coarse Aggregate for Concrete/Asphalt: 3,350,000 tonnes

The results of the petrographic analyses completed on the samples from the pit indicate that the average composition is 27 percent granite and 71 percent limestone. The remaining 2 percent consists of sandstone and calcite cemented clastic material.

3.5 Birds Hill Mineral Management and Rehabilitation Study

The Birds Hill Mineral Management and Rehabilitation Study was undertaken to recommend a plan for extraction of aggregate resources and the rehabilitation of the subsequent pit landscapes in the Birds Hill area. The study was completed by UMA Engineering Ltd. on behalf of the Province of Manitoba Energy and Mines Branch in 1985. The study assessed the existing situation and considered the implications of future mineral extraction and land use development. Recommended policies and environmental standards were proposed for the Birds Hill area in order to develop controls for future aggregate extraction operations, post-extraction land uses and land uses on properties adjoining aggregate operations.

3.6 Aggregate Resources of the Winnipeg Region

The purpose of this study was to provide qualitative and quantitative estimates of aggregate potentially available to support construction requirements in the Capital Region over the long term. The study was completed by UMA Engineering Ltd. on behalf of the Province of Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division in 1976. The report included forecasts of aggregate demand, estimates of the quality and quantity of aggregate available in the region, an airborne resistivity survey east of Birds Hill, and a seismic survey in the RM of Rockwood area.

4.0 Site Investigation Program

The site investigation program undertaken at the Pine Ridge Gravel Pit included the completion of a topographic survey to establish the current surface elevations, a test pitting program to obtain detailed information and samples from the upper 5 metres of the soil profile, and a test hole drilling program to obtain information and disturbed samples from the deeper portion of the soil profile. Test pit and test hole locations were selected to enhance the information obtained from previous investigations.

All test pit excavations and test holes were visually logged in the field by UMA personnel for soil type, moisture content, consistency, density and composition. The description of the soils encountered and the sampling locations are included in the logs contained in Appendix C.

Representative samples were collected as grab or composite samples at selected locations using ASTM Standard D75-87 as a sampling guideline. Samples were placed in uniquely labelled sample bags and transported to the UMA geotechnical laboratory for gradation analysis. The gradation analysis results are included in Appendix D.

4.1 Topographic Surveying

In order to establish the current site topographic conditions, a topographic survey was completed by UMA Engineering personnel using GPS survey equipment on November 16 to 23, 2005. The base station used was a Trimble 4700 receiver and the rover unit was a Trimble 5800 receiver. The survey method used was real time kinematics. Specific activities completed as part of this survey and limitations to the survey include:

- The survey was limited to areas that had been mined since the last UMA survey, with sufficient overlap to allow the current survey to be merged with the previous survey.
- Any existing stockpiles within the gravel pit were excluded from the survey. The area surrounding the stockpiles was surveyed and the surface elevations assumed to project linearly between data points on opposite sides of the stockpiles.
- The gravel pit is being actively mined and variations from the conditions at the time of the survey are to be expected.

Following completion of the survey, the information was processed to prepare the surface topographic contour plot provided as Drawing No. 03.

4.2 Test Pitting

Twenty seven test pit excavations were completed on December 19 to 21, 2005 to evaluate the shallow soil conditions. The excavations were completed using a Cat 330B backhoe supplied by Borland Construction. The excavation depths ranged from 2.4 to 4.6 metres. All excavations were backfilled upon completion using the excavated material.

The locations of the test pits are shown on Drawing No. 02. The test pit investigations were focused primarily on the Pit A, Pit B and South Fine Sand Hole areas, as previous investigations had adequately investigated the shallow conditions in other areas.

4.3 Reconnaissance Auger Drilling Program

Seven reconnaissance auger test holes were completed at selected locations within the pit on January 11, 2006 using a Brat drilling rig owned and operated by Paddock Drilling Ltd. The test holes were drilled using 125 mm solid stem augers to depths ranging from 7.6 to 32 metres. The purpose of these test holes was to obtain additional information on the stratigraphy at depth at this site and the drilling conditions so that decisions could be made on the preferred drilling method for the follow-up depth drilling program. In general, it was found that sufficient cobbles and boulders were present to necessitate the use of mud rotary or dual rotary drilling methods. All test holes were backfilled with drill cuttings upon completion. The locations of the test holes completed as part of this program are shown on Drawing No. 02. In general, test holes were terminated when the basal clay or till materials were encountered, or when further progress could not be made due to the drilling conditions. The results of these test holes are provided on the logs included in Appendix C and are summarized as follows:

- Test hole TH06-28 was drilled on the west side of Pit A and adjacent to the main access road to the pit. The test hole encountered primarily sand to a depth of 6.1 metres followed by clay.

- Test hole TH06-29 was drilled from the base of the south-central portion of Pit A. The test hole encountered primarily gravel to a depth of 7.3 metres, followed by sand with decreasing gravel content with depth. The water table was encountered at a depth of approximately 14.3 metres below grade, and the test hole was extended to 32 metres without encountering the basal clay or till materials.

- Test hole TH06-30 was drilled on the ridge between Pits A and B. The test hole encountered gravelly sand to a depth of 12.2 metres followed by clay.

- Test hole TH06-31 was drilled from the base of the north-central portion of Pit A. The test hole encountered primarily gravel to a depth of 7.6 metres, followed by sand. The water table was encountered at a depth of approximately 14.8 metres below grade. The test hole was drilled to 15.2 metres without encountering the basal clay or till materials.

- Test hole TH06-32 was drilled to the west of the northern portion of Pit A. The test hole encountered sand with gravel to a depth of 4.6 metres followed by coarse grained sand with lesser amounts of gravel. The test hole was drilled to an auger refusal depth of 15.2 metres without encountering the basal clay or till materials.

- Test hole TH06-33 was drilled to the west of the northern-central portion of Pit A. The test hole encountered sand to a depth of 3.4 metres followed by gravel to a maximum refusal depth of drilling of 15.2 metres. Basal clay or till materials were not encountered.

4.4 Mud Rotary Drilling Program

On the basis of the results of the reconnaissance drilling program, and in consideration of the available budget for this investigation, the decision was made to proceed with the depth investigation using mud rotary drilling techniques. The technique is considered suitable to obtain information on the stratigraphy at depth, however, a significant amount of disturbance and sorting of the samples occurs during the drilling process. Therefore, the results of these test holes, and in particular the gradation analyses obtained must be considered in light of the drilling method used.

Five test holes were completed on February 1 to 6, 2006 using a Canterra mud rotary drill owned and operated by Maple Leaf Enterprises Ltd. The test holes were drilled to depths ranging from 13.7 to 60.7 metres and samples were collected periodically from the return cuttings. All holes were backfilled with drill

cuttings upon completion. The locations of the mud rotary test holes are shown on Drawing No. 02. The results of these test holes are provided on the logs included in Appendix C and are summarized as follows:

- Test hole TH06-34 was drilled from the base of the north-central portion of Pit A near test hole TH06-31 to obtain further information on the extent of granular materials at depths below 15.2 metres [Note: the information for the upper 15.2 metres on this test hole log was extracted from the more accurate auger test hole TH06-31]. Below 15.2 metres, the test hole encountered gravelly sand to a depth of 22.8 metres, followed by a gravel till material to a depth of 38.7 metres. The remainder of the test hole consisted of silt till to the limestone bedrock surface at a depth of 60.4 metres.

- Test hole TH06-35 was drilled to the west of the north-central portion of Pit A. The test hole encountered fill and clay material to a depth of 2.4 metres followed by sand and till to a depth of 18.9 metres. The remainder of the hole consisted of gravel to the maximum depth of drilling of 36.6 metres.

- Test hole TH06-36 was drilled at prairie level near the northwest corner of Pit A. The test hole encountered primarily gravel to the maximum depth of drilling of 13.7 metres.

- Test hole TH06-37 was drilled at prairie level near the northeast corner of Pit A. The test hole encountered gravelly sand to a depth of 6.1 metres followed primarily by sand to the maximum depth of drilling of 22.9 metres.

- Test hole TH06-38 was drilled to the west of the north-central portion of Pit A, near test hole TH06-33. The test hole encountered primarily gravel with varying amounts of sand to the maximum depth of drilling of 27.4 metres.

4.5 Gradation Analyses

Gradation analyses of selected samples from the investigation were completed at the UMA Engineering geotechnical laboratory using ASTM Standard C136-92 as a guideline for the analyses. The results of these analyses are summarized in Table 1 and the gradation curves are provided in Appendix D.

5.0 Quantification of Existing Reserves

5.1 Stratigraphic Interpretation

Based on the analysis of the information collected as part of this and previous investigations, the stratigraphy beneath the Pine Ridge Gravel Pit has been interpreted as shown in section on Drawing Nos. 04 to 08. For the purposes of estimating reserves, the stratigraphic interpretation has been simplified to show the major mineable units based on the predominant material type. Variations in the gradations and quality of material within the major units exist but cannot be subdivided with the available information. The interpretation of the economic value of these deposits must take into consideration these variations in material type and quality.

In general, the interpreted stratigraphy can be described as follows:

- The surficial soils beneath the property consist almost entirely of aggregates predominantly in the sand grain size range. The exception is the gravel that has been exposed beneath the entire length of Pit A (Section D, Drawing No. 07) and a small area of gravel that has been exposed in the southern portion of Pit B (Section E, Drawing No. 08). Gravel lenses and layers exist within the sand unit however they are either of insufficient size or there is insufficient information to subdivide these as mineable units. Based on the investigation results from the current and 1998 study, an estimated 15% of this material has a grain size greater than the 5 mm sieve. The sand is generally described as clean, well graded and locally can contain a significant proportion of gravel. Gradation analyses (Table 1) indicates the clay and silt content varies from 0.1 to 2.7%, the sand content varies from 63.0 to 99.5%, the gravel content varies from 0.5 to 32.5%, and the cobbles content varies from 0.0 to 18.0%. East and north of Pit B, and in the southwest corner of the property near the South Fine Sand Hole, the sand extends down to the underlying clay/till interface.

- Either exposed at surface in Pit A or underlying the sand to the west of the north half of Pit A is the only significant discrete gravel zone remaining on the property. This gravel zone is interpreted to dip to the west to northwest from the north half of Pit A towards the west and north west property boundaries. The available information indicates that this zone may be up to 22 metres thick and consists of gravel, sandy gravel and local layers and lenses of sand. Gradation analyses of samples collected from this unit (Table 1, Sample Nos. G17, 18, 30, 47 and 54) indicates the clay and silt content varies from 0.0 to 10.6%, the sand content varies from 14.1 to 35.0%, the gravel content varies from 64.8 to 83.2%, and the cobbles content varies from 0.0 to 11.0%. Lesser quantities of gravel are also present in the southern portions of Pit A and Pit B, and as small lenses and layers within the upper sand unit. Of the nine samples analyzed from the gravel unit (Table 1), two had a percent retained above the 5 mm sieve in the 30 to 60 percent range (38.1 and 53.1%), and seven had a percent retained above the 5 mm sieve in excess of 60% (62.5 to 82.7%).

- Underlying the gravel beneath Pit A and to the west is a lower sand unit (Section A, Drawing No. 04). Only a limited amount of information is available from this lower unit. It is described as ranging from fine to coarse sand and containing varying amounts of silt and gravel. Further investigation may obtain sufficient information to further subdivide this unit. However, given the significant depth of this unit, for the purposes of this assessment it has been included as a single unit.

- The base of the granular deposit is underlain by clay and/or clay/silt till to the bedrock surface at a depth of approximately 60.7 metres below the current base of Pit A. A contour plot of the interpreted upper surface of the clay/till layer is provided as Drawing No. 09. As can be seen on the drawing, a deep north-south trending channel in the clay/till surface exists beneath Pit A which has been infilled with the granular material that form the bulk of the remaining reserves at this property. The available information indicates that the channel widens in the northwest corner of the property, and the elevation of the top of the clay/till unit has not been established in this area. For the purposes of this assessment, it has been assumed that the top of the clay/till unit occurs at an elevation of 220 metres, or approximately 45 metres below the natural prairie level in this area. A similar smaller channel structure in the upper clay/till surface is also present below Pit B.

5.2 Reserve Estimation Procedures

The estimation of the volume of aggregate reserves remaining at the Pine Ridge Gravel Pit was made using the Autodesk Land Development Desktop digital terrain modeling software program. The software utilizes the information from the surface topography survey and the interpreted stratigraphy from the test pit/test hole program to develop a three dimensional model of the deposit and calculate the volumes of the various material types.

For the purposes of this volume estimation, the deposits have been subdivided into four material classifications above the assumed base of the aggregate materials at the clay/till interface. The material classifications used include:

- Accessible Gravel – This volume includes the readily accessible gravel beneath the developed portions of Pit A and Pit B.

- Undeveloped Gravel – This volume includes the gravel located to the west of the north portion of Pit A which is overlain by sand which would need to be removed to access the gravel.

- Sand Stripping – This is the estimated volume of sand which would need to be removed to expose the undeveloped gravel in the northwest portion of the property.

- Other Sand – This is the estimated volume of sand remaining elsewhere on the property, including the surficial sand that covers most of the eastern portion of the property and the sand which occurs at depth below the gravel. Gravel lenses and layers are present within this volume however they are either too small or there is insufficient information available to subdivide this unit for volume estimation purposes.

In preparing this volume estimate, a number of assumptions were made concerning the lateral extents of the various material classifications. These assumptions were made to facilitate the volume estimation process and do not substantially affect the overall estimates. The assumptions include:

- The interpreted geology of the dipping gravel deposit has been simplified to that shown on Drawing Nos. 04 and 05 for volume estimation purposes. The geology in this area is likely more complex than that shown however there is insufficient information to refine the interpretation further. This simplification does not substantially affect the overall volume estimate, however further investigations are warranted before a mining plan is developed to extract the aggregates from this area.

- All existing stockpiles have been excluded from the estimate. The estimate only includes in-situ material.

- All granular materials below the gravel layer have been included under the volume estimation for other sand due to the indicated predominant presence of sand. This unit contains varying amounts of silt and/or gravel and further investigations would be required in future to further subdivide this unit so that a refined estimate of volumes can be prepared. The material is present at depth, primarily below Pit A and further investigations are not considered warranted at this time.

- A water table at 247.0 metres has been assumed in order to estimate reserves above and below the water table.

- The northwest corner of the property from the south limit of the cleared hydro line right of way (Drawing No. 02) has been excluded from the reserve estimate due to the presence of hydro towers. It may be possible to access portions of the reserves in this area while maintaining adequate setbacks from the tower foundations. Development of a mining plan to confirm the feasibility of this was beyond the scope of this study.

5.3 Estimated Reserves

The estimated remaining in-situ reserves (excluding stockpiles) have been estimated as follows:

Material Classification	**Above Water Table**		**Below Water Table**		**Total**	
	(Cubic Metres)	Tonnes[1]	(Cubic Metres)	Tonnes[1]	(Cubic Metres)	Tonnes[1]
Accessible Gravel	1,266,000	2,785,200	29,000	63,800	1,295,000	2,849,000
Undeveloped Gravel	755,000	1,661,000	287,000	631,400	1,042,000	2,292,400
Sand Stripping	360,000	720,000	0	0	360,000	720,000
Other Shallow Sand	7,214,000[2]	14,428,000	0	0	7,214,000[2]	14,428,000
Deep Sand	0	0	3,000,000	6,000,000	3,000,000	6,000,000
Totals	**9,595,000**	**19,594,200**	**3,316,000**	**6,695,200**	**12,911,000**	**26,289,400**

Notes:
1. A material unit weight of approximately 2.0 (sand) to 2.2 (gravel) tonnes/m^3 has been used to estimate the tonnage of in-situ material remaining.
2. The shallow sand reserve includes an estimated 15% of aggregate with a gradation greater than the 5 mm sieve which could potentially be mined as discrete lenses and layers, or which could potentially be processed to separate it from the finer grained material.

Petrographic analyses of samples recovered during the 1998 study indicate that the mineralogy is primarily limestone and dolomite (71%) and granite (27%), with minor amounts (2%) of sandstone.

6.0 Summary

The City of Winnipeg currently operates an aggregate extraction facility at the Pine Ridge Gravel Pit located northeast of the city. Aggregate materials have historically been mined primarily from two pits on the property, Pit A and Pit B. Historically, material has also been mined from the North and South Fine Sand Holes located on the west side of the property. As part of deliberations concerning the future disposition of the property, UMA Engineering was retained to update the previous UMA Engineering 1998 estimate. As part of its assessment, UMA Engineering completed a number of site activities to obtain information on the current status of the site. These activities included: a topographic survey, the excavation of 27 test pits, and the drilling of 7 solid stem auger test holes and 5 mud rotary test holes. This information was assessed in conjunction with information from previous studies to develop an updated interpretation of the nature and extent of aggregate materials remaining on the site.

Beneath the undeveloped portion of the property, the predominant aggregate is in the sand grain size range, with varying amounts of gravel. The review of the investigation results from the current and 1998 study indicates that an estimated 15% of this material has a grain size greater than the 5 mm sieve. This coarser material occurs as gravel lenses and layers within this unit that are either of insufficient size to subdivide them into mappable units or there is insufficient information to reliably subdivide these zones, or it occurs intermixed with the finer material and would need to be processed to extract it. This sand unit typically extends down to the underlying clay/till interface.

Beneath the developed portion of the property, the remaining aggregate material consists primarily of gravel with areas of sand. The most significant discrete gravel zone on the property is located beneath the length of Pit A and dips beneath a sand cover unit to the west and northwest. . Gradation analyses of samples collected from this unit indicates the clay and silt content varies from 0.0 to 10.6%, the sand content varies from 14.1 to 35.0%, the gravel content varies from 64.8 to 83.2%, and the cobbles content varies from 0.0 to 11.0%. The majority of the gravel is in the greater than 60% retained above the 5 mm sieve range.

Digital terrain modelling procedures were used to estimate the remaining volume of the various materials at this site. On the basis of the interpreted limits of the various major material types, the reserve estimation was subdivided into 4 categories: accessible gravel, undeveloped gravel, sand stripping, and other sand. Based on the available information, the estimated remaining in-situ reserves (excluding stockpiles) is as follows:

Material Classification	**Above Water Table**		**Below Water Table**		**Total**	
	(Cubic Metres)	Tonnes[1]	(Cubic Metres)	Tonnes[1]	(Cubic Metres)	Tonnes[1]
Accessible Gravel	1,266,000	2,785,200	29,000	63,800	1,295,000	2,849,000
Undeveloped Gravel	755,000	1,661,000	287,000	631,400	1,042,000	2,292,400
Sand Stripping	360,000	720,000	0	0	360,000	720,000
Other Shallow Sand	7,214,000[2]	14,428,000	0	0	7,214,000[2]	14,428,000
Deep Sand	0	0	3,000,000	6,000,000	3,000,000	6,000,000
Totals	**9,595,000**	**15,594,200**	**3,316,000**	**6,695,200**	**12,911,000**	**26,289,400**

Notes:
1. A material unit weight of approximately 2.0 (sand) to 2.2 (gravel) tonnes/m^3 has been used to estimate the tonnage of in-situ material remaining.
2. The shallow sand reserve includes an estimated 15% of aggregate with a gradation greater than the 5 mm sieve which could potentially be mined as discrete lenses and layers, or which could potentially be processed to separate it from the finer grained material.

Petrographic analyses of samples recovered during the 1998 study indicate that the mineralogy is primarily limestone and dolomite (71%) and granite (27%), with minor amounts (2%) of sandstone.

7.0 Limitations

The information and data contained in this report, including without limitation the results of any sampling and analyses conducted by UMA Engineering Ltd. ("UMA") pursuant to its Agreement with the Client, have been developed or obtained through the exercise of UMA's professional judgement and are set forth to the best of UMA's knowledge, information and belief. Although every effort has been made to confirm that this information is factual, complete and accurate, UMA makes no guarantees or warranties whatsoever, whether express or implied, with respect to such information or data.

UMA shall not by act of issuing this report to be deemed to have represented thereby that any sampling and analyses conducted by it have been exhaustive, and persons relying on the results thereof do so at their own risk.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by the Client, their officers and employees, and others having legitimate business relations with the Client. Any such use and reliance shall be subject to the limitations set forth in the preceding paragraphs.

Respectfully Submitted,

UMA Engineering Ltd.

PROVINCE OF MANITOBA
S. J. WIECEK
24/03/06
REGISTERED PROFESSIONAL ENGINEER

Steve Wiecek, P.Eng., P.Geo.
Senior Hydrogeologist
Earth and Water

Table 1
City of Winnipeg - Pine Ridge Pit Aggregate Assessment
Test Pit/Test Hole Samples - Gradation Analyses

Test Pit Number	Sample Number	Soil Type	Grain Size Distribution				% Above 5 mm Size
			Clay and Silt	Sand	Gravel	Cobbles	
TP05-01	G2	Sand	1.0	75.4	23.6	0.0	13.5
TP05-02	G3	Sand	2.7	87.0	10.3	0.0	4.6
TP05-03	G5	Gravel	0.7	15.2	73.3	10.8	74.5
TP05-04	G7	Sand	0.3	63.0	28.7	8.0	32.2
TP05-07	G10	Sand	0.1	88.1	11.8	0.0	6.6
TP05-10	G11	Sand	0.6	66.9	32.5	0.0	25.7
TP05-11	G12	Sand and Gravel	0.2	61.6	38.2	0.0	29.9
TP05-13	G14	Gravel	0.3	16.6	72.1	11.0	62.5
TP05-14	G15	Gravel	0.2	39.2	60.6	0.0	53.1
TP05-14	G16	Gravel	0.2	11.1	84.7	4.0	82.7
TP05-15	G17	Gravel	0.0	23.6	65.4	11.0	71.8
TP05-16	G18	Sand and Gravel	0.2	35.0	64.8	0.0	45.8
TP05-18	G22	Gravel	0.3	17.4	69.3	13.0	68.3
TP05-19	G23	Sand	0.1	99.5	0.5	0.0	0.0
TP05-26	G28	Sand	0.2	63.6	18.2	18.0	33.4
TP05-27	G29	Sand	0.7	69.9	29.4	0.0	19.3
Test Hole Number [1]	Sample Number	Soil Type	Grain Size Distribution				% Above 5 mm Size
			Clay and Silt	Sand	Gravel	Cobbles	
TH06-34	G30	Gravel	2.3	20.9	76.8	0.0	38.1
TH06-35	G39	Sand (Till)	20.9	70.5	8.6	0.0	0.2
TH06-36	G47	Gravel	2.7	14.1	83.2	0.0	69.1
TH06-37	G50	Sand and Gravel	1.9	36.0	62.1	0.0	31.2
TH06-38	G54	Gravel	10.6	14.3	75.1	0.0	48.5

Notes: 1. All test hole samples were collected using mud rotary drilling methods and may not be fully representative of the in-situ gradation (i.e. fines may have been removed during drilling).

B SIZE 11" x 17" (278.4mm x 431.6mm)

PINE RIDGE GRAVEL PIT

TRANSCONA GRAVEL PIT

0 1000 2000 m SCALE 1:100000

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Location Plan

Drawing - 01

UMA | AECOM

PLOT: 06-03-22 9:41:55 AM Saved By: mhadfiel

UMA FILE NAME: 0265-381-00_01-B-F001_RX.dwg

AREA EXCLUDED FROM RESERVE ESTIMATE

PIT A

PIT B

SOUTH FINE SAND HOLE (PIT C)

SCALE 1:5000

0 50 100 m

LEGEND

- TH — TEST HOLE 2006
- TP — TEST PIT 2005
- 98 — TEST HOLE 1998
- 98 — TEST PIT 1998

NOTES:

1. 1987 TEST PIT AND TEST HOLE LOCATIONS NOT SHOWN FOR CLARITY. REFER TO UMA ENGINEERING 1999 REPORT FOR LOCATIONS AND DETAILS

UMA | AECOM

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Test Pit / Test Hole Location Plan

Drawing - 02

0 50 100 m SCALE 1:5000

LEGEND

- TH — TEST HOLE 2006
- TP — TEST PIT 2005
- 98 — TEST HOLE 1998
- 98 — TEST PIT 1998

NOTES:

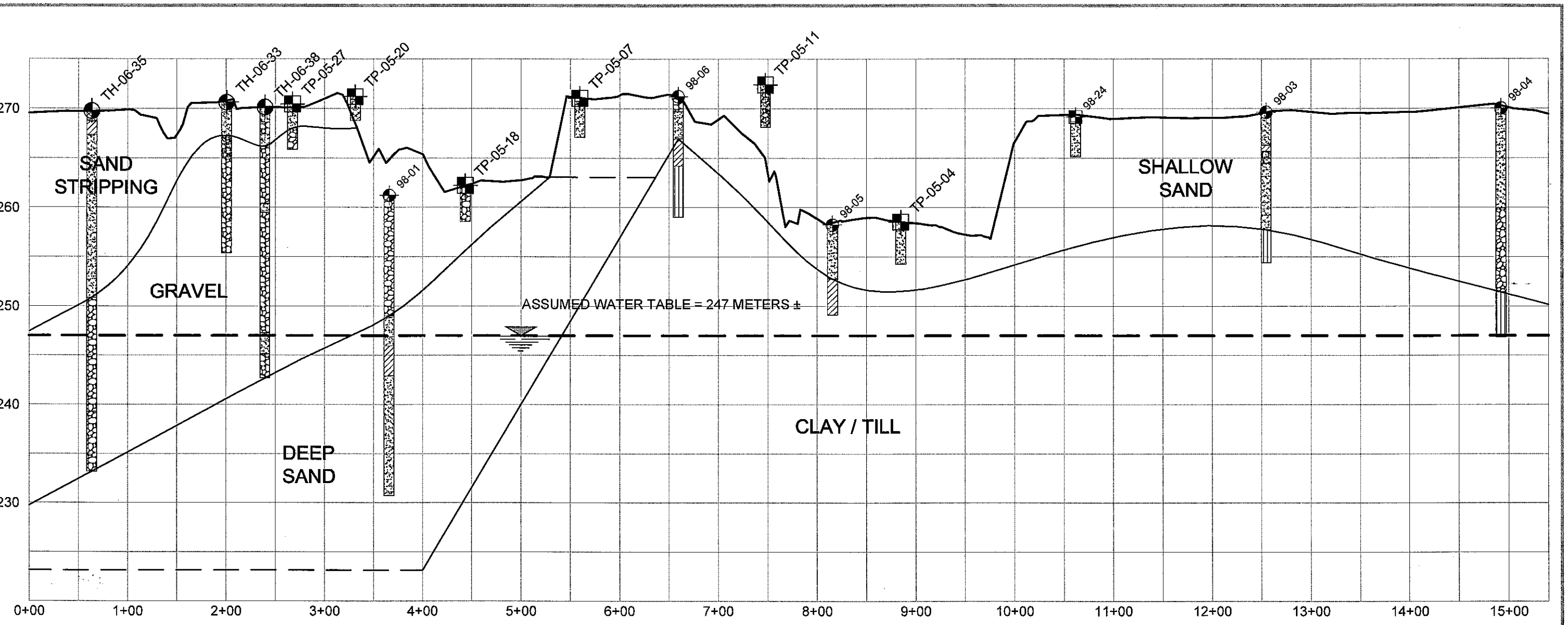
1. SURFACE TOPOGRAPHIC CONTOURS ARE BASED ON THE UMA ENGINEERING 1998 SURVEY COMBINED WITH THE UMA ENGINEERING 2005 SURVEY FOR ACTIVE AREAS.

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Topographic Survey

UMA | AECOM

Drawing - 03



SECTION A 02

0 40 80 120 m H=1:4000
0 4 8 12 V=1:400

10:1 VERTICAL EXAGGERATION

LEGEND

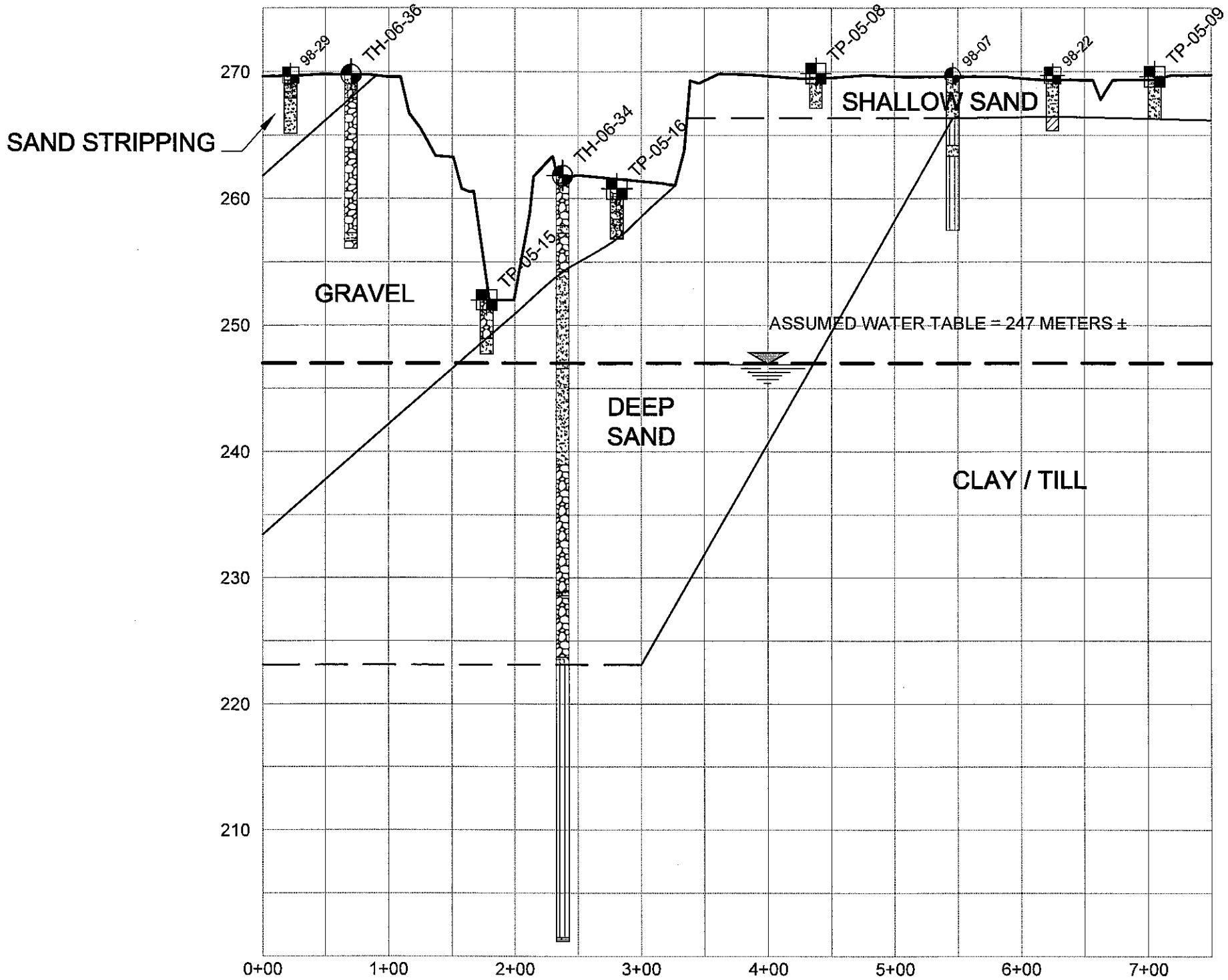
- SAND
- GRAVEL
- CLAY
- SILT
- MAJOR STRATIGRAPHIC CONTACT
- ASSUMED STRATIGRAPHIC CONTACT

NOTES:

1. ONLY INTERPRETED MAJOR STRATIGRAPHIC CONTACTS ARE SHOWN. MAJOR STRATIGRAPHIC UNITS MAY CONTAIN SUB UNITS (IE: SAND LENSES AND LAYERS WITHIN GRAVEL). INTERPRETATIONS OF MINEABILITY AND ECONOMIC VALUE MUST TAKE INTO CONSIDERATION THESE VARIATIONS.
2. TEST HOLE / TEST PIT INFORMATION HAS BEEN PROJECTED ONTO THE SECTION. REFER TO DRAWING NO. 02 FOR THE ACTUAL LOCATION RELATIVE TO THE SECTION LINE.

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Section A



LEGEND

- SAND
- GRAVEL
- CLAY
- SILT
- MAJOR STRATIGRAPHIC CONTACT
- ASSUMED STRATIGRAPHIC CONTACT

NOTES:

1. ONLY INTERPRETED MAJOR STRATIGRAPHIC CONTACTS ARE SHOWN. MAJOR STRATIGRAPHIC UNITS MAY CONTAIN SUB UNITS (IE: SAND LENSES AND LAYERS WITHIN GRAVEL). INTERPRETATIONS OF MINEABILITY AND ECONOMIC VALUE MUST TAKE INTO CONSIDERATION THESE VARIATIONS.
2. TEST HOLE / TEST PIT INFORMATION HAS BEEN PROJECTED ONTO THE SECTION. REFER TO DRAWING NO. 02 FOR THE ACTUAL LOCATION RELATIVE TO THE SECTION LINE.

SECTION B — 02

0 40 80 120 m H=1:4000
0 4 8 12 V=1:400

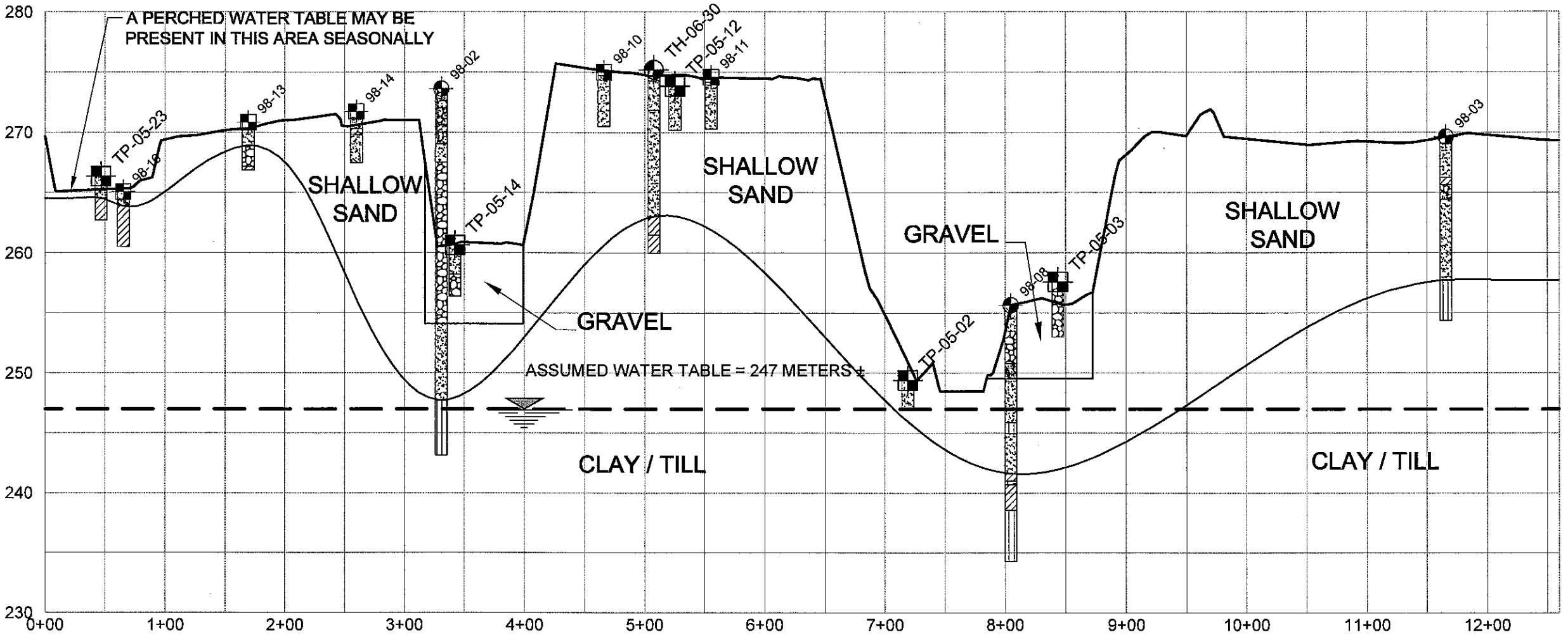
10:1 VERTICAL EXAGGERATION

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Section B

UMA | AECOM

Drawing - 05



SECTION C 02

0 40 80 120 m H=1:4000
0 4 8 12 V=1:400

10:1 VERTICAL EXAGGERATION

LEGEND

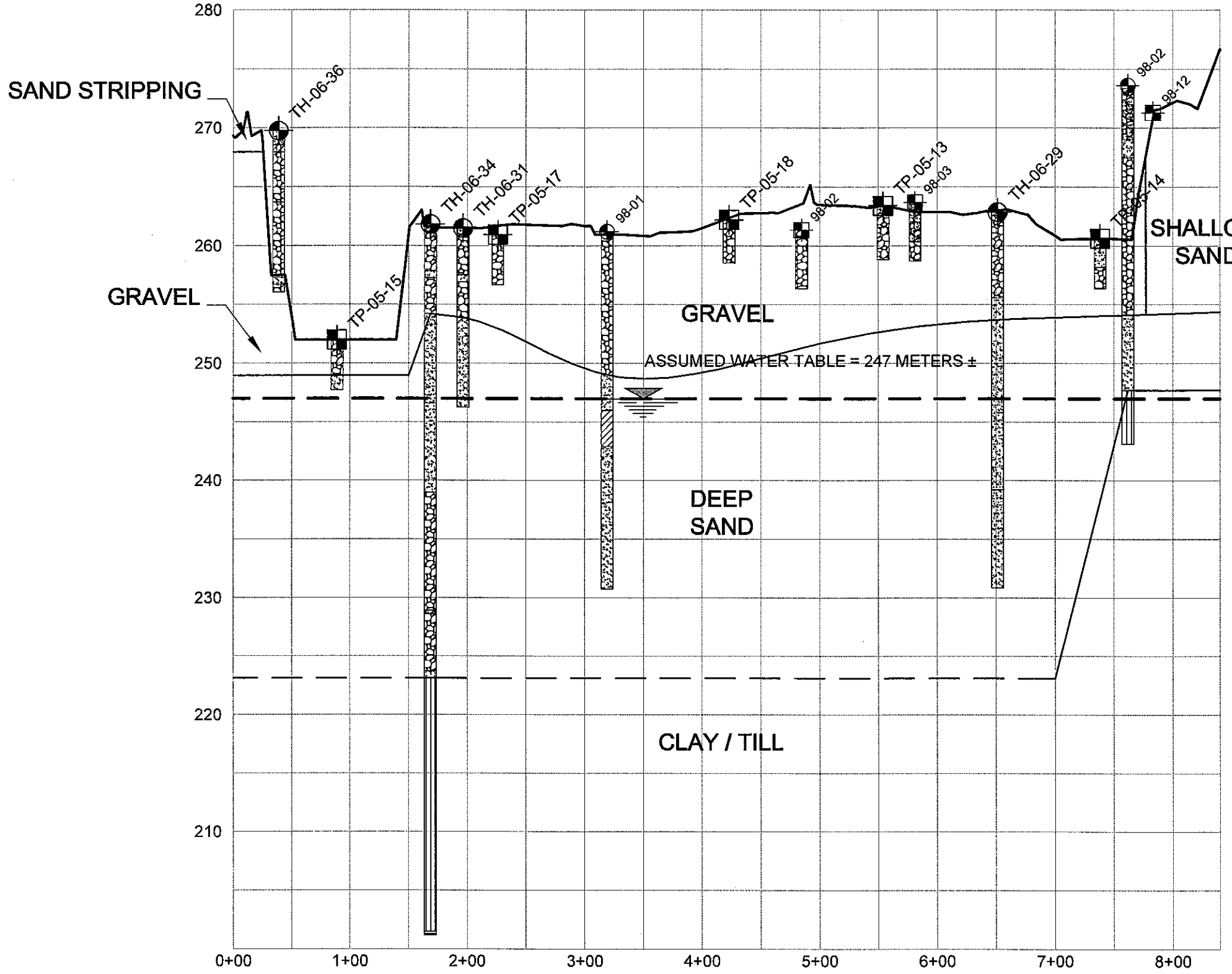
- SAND
- GRAVEL
- CLAY
- SILT
- MAJOR STRATIGRAPHIC CONTACT
- ASSUMED STRATIGRAPHIC CONTACT

NOTES:

1. ONLY INTERPRETED MAJOR STRATIGRAPHIC CONTACTS ARE SHOWN. MAJOR STRATIGRAPHIC UNITS MAY CONTAIN SUB UNITS (IE: SAND LENSES AND LAYERS WITHIN GRAVEL). INTERPRETATIONS OF MINEABILITY AND ECONOMIC VALUE MUST TAKE INTO CONSIDERATION THESE VARIATIONS.
2. TEST HOLE / TEST PIT INFORMATION HAS BEEN PROJECTED ONTO THE SECTION. REFER TO DRAWING NO. 02 FOR THE ACTUAL LOCATION RELATIVE TO THE SECTION LINE.

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Section C



LEGEND

- SAND
- GRAVEL
- CLAY
- SILT
- MAJOR STRATIGRAPHIC CONTACT
- ASSUMED STRATIGRAPHI CONTACT

NOTES:

1. ONLY INTERPRETED MAJOR STRATIGRAPHIC CONTACTS ARE SHOWN. MAJOR STRATIGRAPHIC UNITS MAY CONTAIN SUB UNITS (IE: SAND LENSES AND LAYERS WITHIN GRAVEL). INTERPRETATIONS OF MINEABILITY AND ECONOMIC VALUE MUST TAKE INTO CONSIDERATION THESE VARIATIONS.
2. TEST HOLE / TEST PIT INFORMATION HAS BEEN PROJECTED ONTO THE SECTION. REFER TO DRAWING NO. 02 FOR THE ACTUAL LOCATION RELATIVE TO THE SECTION LINE.

SECTION D

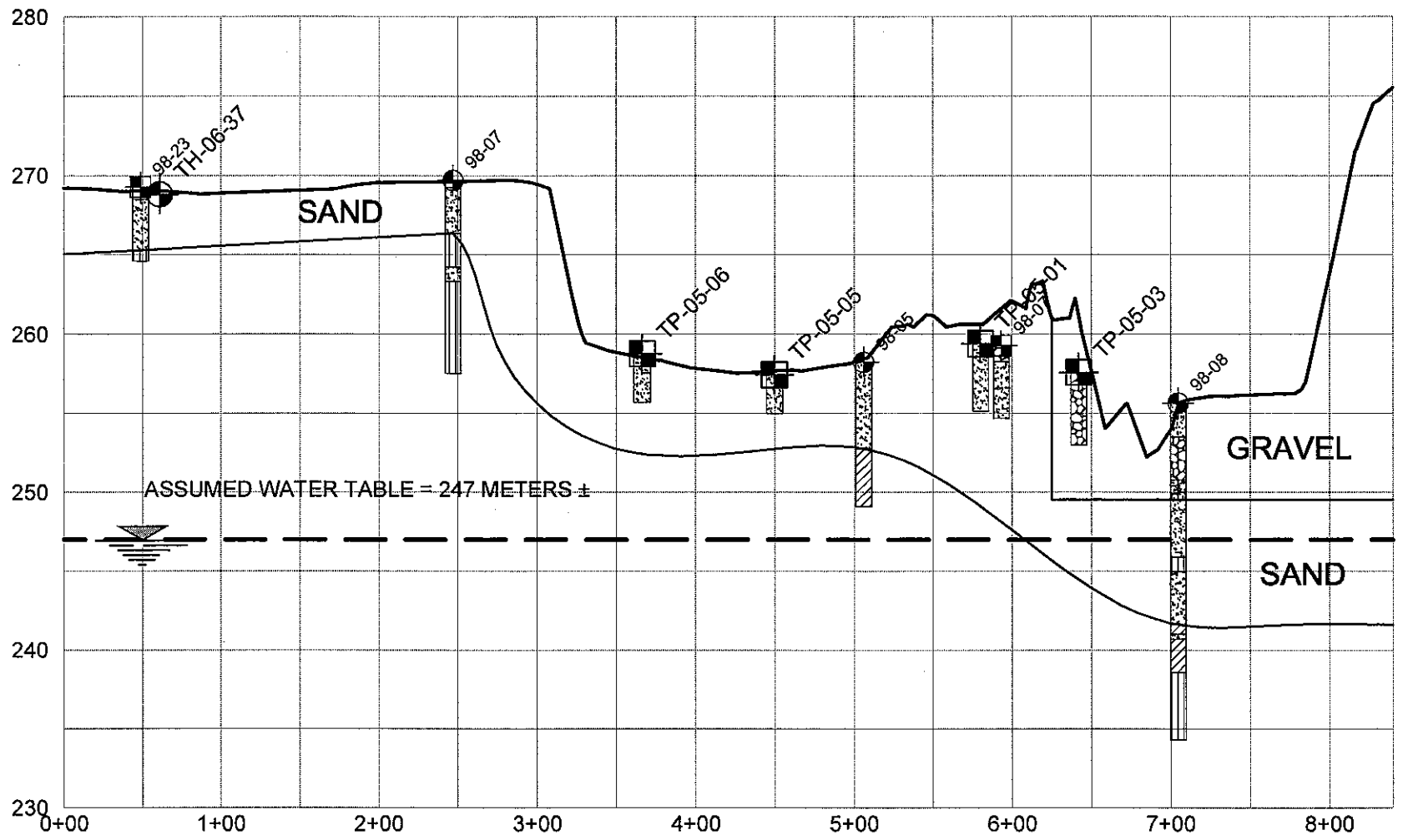
0 40 80 120 m H=1:4000
0 4 8 12 V=1:400

10:1 VERTICAL EXAGGERATION

02

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Section D



SECTION E

0 40 80 120 m H=1:4000

0 4 8 12 V=1:400

02

10:1 VERTICAL EXAGGERATION

LEGEND

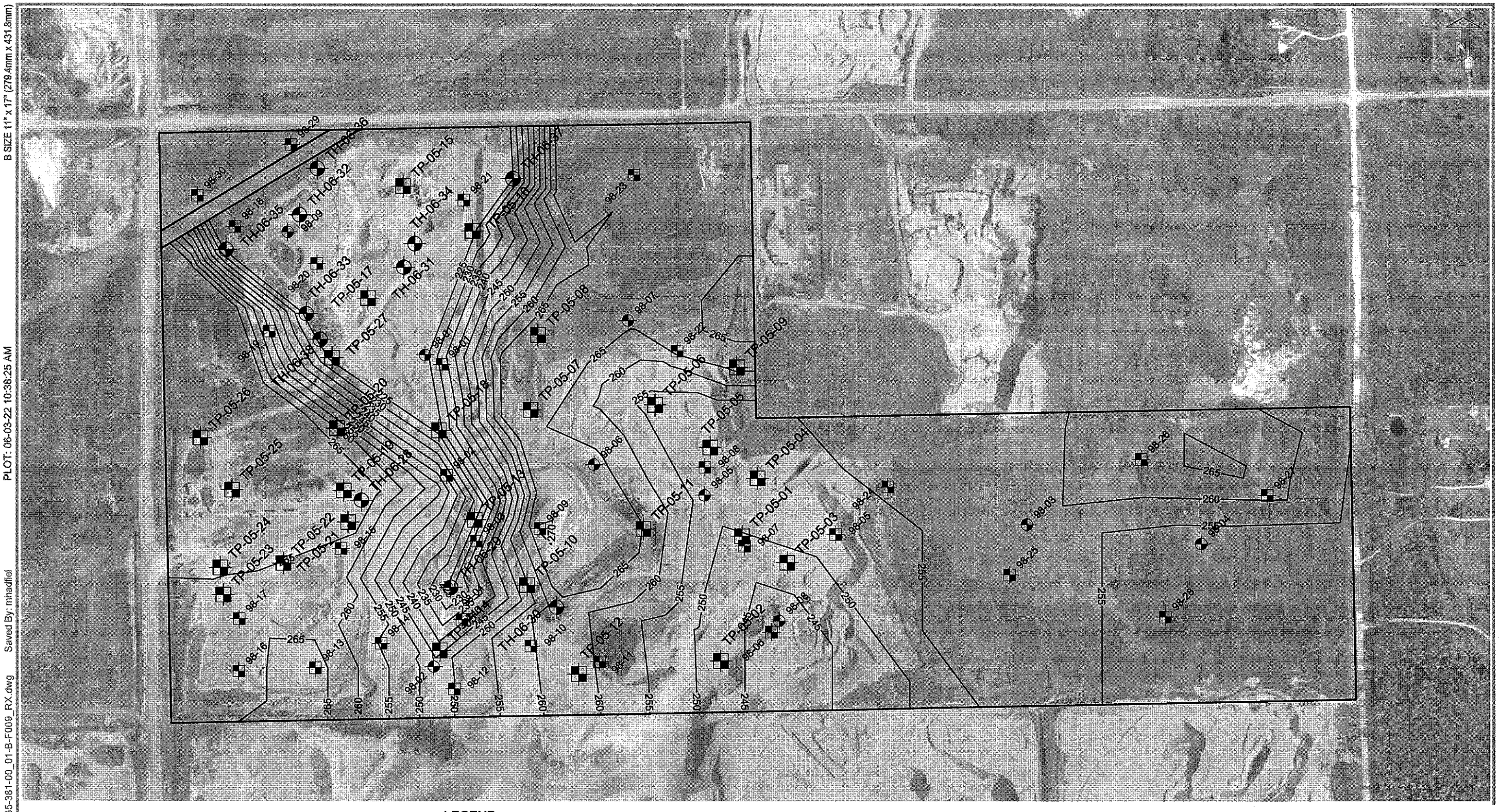
- SAND
- GRAVEL
- CLAY
- SILT
- MAJOR STRATIGRAPHIC CONTACT
- ASSUMED STRATIGRAPHIC CONTACT

NOTES:

1. ONLY INTERPRETED MAJOR STRATIGRAPHIC CONTACTS ARE SHOWN. MAJOR STRATIGRAPHIC UNITS MAY CONTAIN SUB UNITS (IE: SAND LENSES AND LAYERS WITHIN GRAVEL). INTERPRETATIONS OF MINEABILITY AND ECONOMIC VALUE MUST TAKE INTO CONSIDERATION THESE VARIATIONS.
2. TEST HOLE / TEST PIT INFORMATION HAS BEEN PROJECTED ONTO THE SECTION. REFER TO DRAWING NO. 02 FOR THE ACTUAL LOCATION RELATIVE TO THE SECTION LINE.

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Section E



LEGEND

- TH — TEST HOLE 2006
- TP — TEST PIT 2005
- 98 — TEST HOLE 1998
- 98 — TEST PIT 1998

0 50 100 m SCALE 1:5000

UMA | AECOM

City of Winnipeg
Pine Ridge Gravel Pit
Aggregate Assessment

Clay / Till Elevations

Drawing - 09

Appendix A
1998 Test Pit/Test Hole Logs

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-1
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 261.2 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ▩ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND AND GRAVEL -trace silt and cobbles -well graded -maximum size 20cm -moisture stains below 0.8 metres			856.0
1.0					855.0
					854.0
					853.0
					852.0
		SAND -fine grained			851.0
2.0					850.0
		GRAVEL -sandy, some cobbles -maximum size 13cm	■	1	849.0
					848.0
3.0					847.0
					846.0
					845.0
4.0					844.0
					843.0
					842.0
					841.0
5.0					840.0
		END OF TESTPIT AT 5.2 METRES IN SAND AND GRAVEL -no seepage or sloughing			839.0
6.0					838.0

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 5.2 m
	REVIEWED BY: LF	COMPLETE: 09/09/98
	Fig. No:	Page 1 of 1

98/12/01 09:57AM (PREVIEW)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterpirses Ltd.	TEST PIT NO: TP-2
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 263 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ▩ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		GRAVEL(STOCKPILE) -20mm size clean gravel			862.0
		GRAVEL -sandy, some cobbles -maximum size 13cm ->40% granite, decreasing with depth -moist below 0.6 metres			861.0
1.0					860.0
					859.0
					858.0
					857.0
2.0					856.0
		-wet below 2.4 metres			855.0
					854.0
3.0					853.0
				1	852.0
					851.0
4.0					850.0
					849.0
					848.0
					847.0
5.0		END OF TESTPIT AT 4.9 METRES IN SAND AND GRAVEL -no seepage or sloughing			846.0
					845.0
					844.0
6.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.9 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/11/30 04:59PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-3
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 263.73 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND AND GRAVEL -trace cobbles and boulders -maximum size 36cm -moist			865.0
1.0					864.0
					863.0
					862.0
					861.0
					860.0
2.0					859.0
					858.0
					857.0
					856.0
3.0					855.0
					854.0
		GRAVEL -sandy, trace cobbles -wet			853.0
4.0				1	852.0
					851.0
					850.0
					849.0
5.0		END OF TESTPIT AT 4.9 METRES IN SAND -no seepage or sloughing			848.0
					847.0
6.0					846.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.9 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/12/22 09:40AM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-4
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 274.14 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND –peaty			899.0
		GRAVEL –sandy, trace cobbles			898.0
1.0					897.0
		SAND –gravelly, trace cobbles			896.0
					895.0
2.0					894.0
					893.0
					892.0
					891.0
		SAND AND GRAVEL –trace cobbles –moist		1	890.0
3.0					889.0
					888.0
					887.0
4.0					886.0
					885.0
					884.0
5.0		END OF TESTPIT AT 4.9 METRES IN SAND AND GRAVEL –no seepage or sloughing			883.0
					882.0
					881.0
6.0					880.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.9 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/12/22 09:39AM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-5
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 256.14 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND AND GRAVEL -trace cobbles -maximum size 13cm			840.0
		-wet below 0.6 metres			839.0
1.0					838.0
					837.0
					836.0
					835.0
2.0				1	834.0
		-flow of water and sand into pit below 2.13 metres			833.0
					832.0
		-trace to some silt below 2.7 metres			831.0
3.0		-maximum size 20cm below 3.0 metres		2	830.0
		END OF TESTPIT AT 3.4 METRES IN SAND -seepage and sloughing below 2.1 metres			829.0
					828.0
4.0					827.0
					826.0
					825.0
5.0					824.0
					823.0
					822.0
6.0					821.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 3.4 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/11/30 04:57PM (FINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-6
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 255.6 (m)

SAMPLE TYPE ■ COMPOSITE ⧄ SHELBY TUBE ⊠ DISTURBED ☰ NO RECOVERY ▯▯ CORE BARREL ▮▯ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND -trace gravel and cobbles -maximum size 8cm -moist below 0.3 metres -trace gravel below 0.6 metres	■	1	838.0
1.0					837.0
					836.0
					835.0
					834.0
					833.0
2.0					832.0
					831.0
					830.0
					829.0
3.0					828.0
					827.0
					826.0
4.0		-some silt below 4.1 metres			825.0
					824.0
		END OF TESTPIT AT 4.5 METRES IN SAND -no seepage or sloughing			823.0
5.0					822.0
					821.0
					820.0
6.0					819.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/11/30 04:57PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-7
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 259.28 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		COBBLES(STOCKPILE) -100 mm screened stone			850.0
		GRAVEL -some sand, trace cobbles -well graded -maximum size 18cm -becoming finer with depth -trace gravel below 0.6 metres			849.0
1.0		SAND -some gravel -moist below 1.2 metres		1	848.0
2.0					847.0
					846.0
					845.0
3.0					844.0
					843.0
					842.0
4.0					841.0
					840.0
					839.0
					838.0
		END OF TESTPIT AT 4.6 METRES IN SAND -no seepage or sloughing			837.0
					836.0
5.0					835.0
					834.0
					833.0
6.0					832.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/11/30 04:57PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-8
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 257.59 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND -trace gravel -moist, cross bedded			845.0
1.0		-increase in gravel below 1.2 metres		1	844.0 843.0 842.0 841.0
2.0					840.0 839.0 838.0 837.0
		-seepage and sloughing below 2.7 metres			836.0
3.0		END OF TESTPIT AT 2.7 METRES IN SAND -seepage and sloughing below 2.7 metres			835.0 834.0 833.0
4.0					832.0 831.0 830.0
5.0					829.0 828.0 827.0
6.0					826.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 2.7 m
REVIEWED BY: LF	COMPLETE: 09/09/98
Fig. No:	Page 1 of 1

98/12/01 09:58AM (PREVIEW)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-9
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 274.18 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -some gravel, trace rootlets -loose, dry			899.0
		SAND -gravelly -maximum size 5cm -dry			898.0
1.0		SAND AND GRAVEL -trace cobbles -well graded, loose -maximum size 10cm		1	897.0
2.0		SAND -gravelly, trace cobbles -compact -maximum size 18cm -gravel occurs in 3cm thick seams		2	896.0
3.0		CLAY -some sand, trace gravel		3	895.0
		END OF TESTPIT AT 3.7 METRES IN CLAY -no seepage or sloughing			894.0
4.0					893.0
					892.0
					891.0
					890.0
					889.0
					888.0
					887.0
					886.0
					885.0
					884.0
5.0					883.0
					882.0
					881.0
6.0					880.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 3.7 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:57PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-10
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 275.52 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ▩ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▧ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, trace gravel –loose, dry			903.0
		SAND –trace gravel and cobbles –compact –maximum size 10cm –moist			902.0
1.0					901.0
					900.0
					899.0
					898.0
2.0					897.0
				1	896.0
					895.0
3.0					894.0
					893.0
					892.0
4.0					891.0
					890.0
		END OF TESTPIT AT 4.6 METRES IN SAND –no seepage or sloughing			889.0
					888.0
5.0					887.0
					886.0
					885.0
6.0					

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
	REVIEWED BY: LF	COMPLETE: 09/10/98
	Fig. No:	Page 1 of 1

98/11/30 04:57PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-11
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 273.81 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace rootlets -light grey to brown -loose, dry			898.0
		SAND -some gravel -moist		1	897.0
1.0					896.0
					895.0
2.0					894.0
					893.0
				2	892.0
3.0					891.0
					890.0
					889.0
4.0					888.0
					887.0
					886.0
					885.0
		END OF TESTPIT AT 4.3 METRES IN SAND -no seepage or sloughing			884.0
					883.0
5.0					882.0
					881.0
					880.0
6.0					879.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.3 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-12
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 274.36 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, trace rootlets –light grey to brown –loose, dry			900.0
		GRAVEL –some sand –loose –well graded –maximum size 6cm –dry			899.0
1.0					898.0
					897.0
					896.0
					895.0
					894.0
2.0		SAND –trace gravel –sloughing below 1.8 metres			893.0
		SAND –gravelly, trace cobbles –well graded –maximum size 15cm			892.0
					891.0
3.0		GRAVEL AND SAND –trace cobbles and boulders –cobbles, maximum size 10cm –boulders, maximum size 50cm		1	890.0
					889.0
					888.0
4.0					887.0
		END OF TESTPIT AT 4.3 METRES IN SAND –no seepage, sloughing below 1.8 metres			886.0
					885.0
5.0					884.0
					883.0
					882.0
6.0					881.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.3 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-13
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 270.83 (m)

SAMPLE TYPE: COMPOSITE; SHELBY TUBE; DISTURBED; NO RECOVERY; CORE BARREL; WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, trace rootlets –light grey to brown –loose, dry			888.0
		SAND –fine grained, trace gravel –moist		1	887.0
1.0					886.0
					885.0
					884.0
2.0		GRAVEL –sandy, trace cobbles –maximum size 10cm			883.0
				2	882.0
					881.0
3.0					880.0
					879.0
					878.0
4.0		CLAY –silty, some sand –light brown, moist –medium plasticity			877.0
		END OF TESTPIT AT 4.0 METRES IN CLAY –no seepage or sloughing			876.0
					875.0
					874.0
5.0					873.0
					872.0
					871.0
					870.0
6.0					869.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.0 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-14
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 271.99 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, trace rootlets –light grey to brown –loose, dry			892.0
		SAND –fine grained, trace gravel –dry			891.0
1.0					890.0
					889.0
					888.0
		GRAVEL –sandy –maximum size 6cm –moist			887.0
2.0		SAND –gravelly –gravel content increases with depth			886.0
					885.0
					884.0
				1	883.0
3.0					882.0
					881.0
					880.0
4.0					879.0
		END OF TESTPIT AT 4.3 METRES IN SAND –no seepage –sloughing above 1.98 metres			878.0
					877.0
5.0					876.0
					875.0
					874.0
6.0					873.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.3 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-15
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 271.6 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace rootlets -light grey to brown -loose, dry -layer of cobbles along base of unit			891.0
		SAND -fine to medium grain size, trace gravel -uniform with depth, moist -sloughing from 0.4 metres		1	890.0
1.0					889.0
					888.0
					887.0
					886.0
					885.0
2.0					884.0
					883.0
					882.0
3.0					881.0
					880.0
					879.0
4.0		END OF TESTPIT AT 4.0 METRES IN SAND -no seepage -sloughing of sidewalls below 0.4 metres			878.0
					877.0
					876.0
5.0					875.0
					874.0
					873.0
6.0					872.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.0 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-16
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 265.08 (m)

SAMPLE TYPE ■ COMPOSITE ⊘ SHELBY TUBE ⊠ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND -fine grained, trace gravel -compact, moist			869.0
		GRAVEL AND SAND -trace cobbles -well graded -maximum size 10cm -water table at 0.6 metres -sloughing of sidewall material below 0.6 metres	■	2	868.0
1.0		CLAY -grey -firm, moist to wet -high plasticity	■		867.0
			■		866.0
			■		865.0
			■		864.0
2.0			■		863.0
			■		862.0
			■		861.0
			■	1	860.0
3.0			■		859.0
			■		858.0
			■		857.0
4.0			■		856.0
			■		855.0
		END OF TESTPIT AT 4.6 METRES IN CLAY -water table at 0.6 metres -sloughing of sidewalls from 0.6 metres to 1.2 metres			854.0
5.0					853.0
					852.0
					851.0
6.0					

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
	REVIEWED BY: LF	COMPLETE: 09/10/98
	Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-17
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 265.17 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ⊠ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND -fine to medium grained, trace gravel -moist	■	1	870.0
1.0					869.0
					868.0
					867.0
					866.0
					865.0
		CLAY -grey -firm, moist to wet -high plasticity -seepage into the pit at 1.5 metres			864.0
2.0					863.0
					862.0
					861.0
3.0					860.0
					859.0
					858.0
					857.0
4.0					856.0
					855.0
					854.0
5.0		END OF TESTPIT AT 4.9 METRES IN CLAY -seepage at 1.5 metres -no sloughing			853.0
					852.0
					851.0
6.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.9 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:58PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-18
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.65 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ▩ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▥ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace rootlets, trace gravel -brown -loose, dry			884.0
		SAND -fine grained, trace silt, gravel and cobbles -light brown, compact, dry -maximum size 10cm			883.0
1.0					882.0
					881.0
					880.0
					879.0
2.0					878.0
				1	877.0
					876.0
		-gravel content increases below 2.7 metres			875.0
3.0					874.0
					873.0
					872.0
4.0					871.0
					870.0
		END OF TESTPIT AT 4.6 METRES IN SAND -no seepage or sloughing			869.0
5.0					868.0
					867.0
					866.0
6.0					

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
	REVIEWED BY: LF	COMPLETE: 09/10/98
	Fig. No:	Page 1 of 1

98/12/01 09:59AM (PREVIEW)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-19
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 261.89 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ▩ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND -fine to medium grained, trace silt and gravel -moist, dense -maximum size 4cm		1	859.0
1.0					856.0
2.0					853.0
3.0					849.0
4.0					846.0
5.0		END OF TESTPIT AT 5.0 METRES IN SAND -no seepage or sloughing			843.0
6.0					840.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 5.0 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:59PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-20
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 270.38 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ⊠ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		SAND -silty, some peat -light brown, loose, dry			887.0
		SAND -medium grained, trace gravel -maximum size 4cm -dry to moist			886.0
		SILT -light brown, dry	■	1	885.0
1.0					884.0
		SAND -medium grained, trace gravel -maximum size 4cm -dry to moist			883.0
2.0					882.0
		SILT -clayey, trace sand -dry, stiff, some oxidation stains	■	2	881.0
3.0					880.0
					879.0
					878.0
4.0					877.0
		SAND AND GRAVEL -maximum size 13cm	■	3	876.0
		END OF TESTPIT AT 4.6 METRES IN SAND AND GRAVEL -no seepage or sloughing			875.0
5.0					874.0
					873.0
					872.0
					871.0
					870.0
					869.0
6.0					868.0

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
	REVIEWED BY: LF	COMPLETE: 09/10/98
	Fig. No:	Page 1 of 1

98/11/30 04:59PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP--21
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.47 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, some gravel, trace rootlets –dark brown, dry			884.0
		SAND AND GRAVEL –trace cobbles and boulders –well graded –maximum cobble size 10cm –maximum boulder size 38cm –moist			883.0
1.0					882.0
					881.0
					880.0
		–reduction in coarse fraction from 1.5 metres to 2.7 metres			879.0
2.0					878.0
					877.0
				1	876.0
					875.0
3.0					874.0
					873.0
					872.0
4.0					871.0
					870.0
					869.0
		END OF TESTPIT AT 4.6 METRES IN SAND AND GRAVEL –no seepage or sloughing			868.0
5.0					867.0
					866.0
6.0					865.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/10/98
Fig. No:	Page 1 of 1

98/11/30 04:59PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-22
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.66 (m)

SAMPLE TYPE ■ COMPOSITE ⧄ SHELBY TUBE ⊠ DISTURBED ☰ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace gravel, trace rootlets -dark brown, loose, moist			884.0
1.0		SAND -medium to coarse grained, trace fine to medium gravel, trace boulders -loose, moist -maximum size 28cm	■	1	883.0 882.0 881.0 880.0 879.0
2.0					878.0 877.0 876.0
3.0		CLAY -sandy, some silt -mottled light and dark brown -firm, moist, low plasticity			875.0 874.0 873.0
4.0		END OF TESTPIT AT 4.3 METRES IN CLAY -no seepage or sloughing			872.0 871.0 870.0 869.0
5.0					868.0 867.0
6.0					866.0

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.3 m
	REVIEWED BY: LF	COMPLETE: 09/11/98
	Fig. No:	Page 1 of 1

98/11/30 04:59PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-23
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.15 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, some gravel, trace cobbles and rootlets -loose, dry -maximum grain size 8cm			883.0
1.0		SAND -medium grained, trace gravel -gravel size 1 to 4cm -moist			880.0
2.0		-becoming wet and compact below 2.4 metres -increase in gravel content below 2.4 metres		1	875.0
3.0					873.0
4.0		SILT -sandy, trace to some clay -wet, high plasticity			870.0
		END OF TESTPIT AT 4.6 METRES IN SILT -no seepage -sloughing at 4.6 metres			
5.0					866.0
6.0					864.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/11/98
Fig. No:	Page 1 of 1

98/12/01 10:00AM (PREVIEW)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-24
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 268.903 (m)

SAMPLE TYPE ■ COMPOSITE ⊘ SHELBY TUBE ⊠ DISTURBED ☰ NO RECOVERY ▯ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace gravel, trace rootlets -loose, dry			882.0
		SAND -some gravel, trace cobbles -moist, well graded -maximum size 10cm -sloughing below 0.4 metres	■	1	881.0
1.0					880.0
					879.0
					878.0
					877.0
2.0					876.0
					875.0
					874.0
					873.0
3.0					872.0
					871.0
					870.0
4.0		END OF TESTPIT AT 4.0 METRES IN SAND -no seepage -sloughing below 0.4 metres			869.0
					868.0
					867.0
5.0					866.0
					865.0
					864.0
6.0					863.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.0 m
REVIEWED BY: LF	COMPLETE: 09/11/98
Fig. No:	Page 1 of 1

98/11/30 04:59PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-25
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.506 (m)

SAMPLE TYPE ■ COMPOSITE ⊘ SHELBY TUBE ⊠ DISTURBED ☰ NO RECOVERY ||| CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace gravel, trace rootlets -dark brown to black, dry			884.0
					883.0
					882.0
1.0		SAND -medium to coarse grained, gravelly, trace cobbles -well graded, moist -maximum size 10cm -sloughing below 0.6 metres			881.0
					880.0
					879.0
					878.0
2.0					877.0
				1	876.0
					875.0
3.0					874.0
					873.0
					872.0
4.0					871.0
		END OF TESTPIT AT 4.3 METRES IN SAND -no seepage -sloughing below 0.6 metres			870.0
					869.0
5.0					868.0
					867.0
					866.0
6.0					865.0

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.3 m
	REVIEWED BY: LF	COMPLETE: 09/11/98
	Fig. No:	Page 1 of 1

98/11/30 05:00PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-26
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 267.997 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, trace gravel, trace rootlets –loose, dry			879.0
		GRAVEL AND SAND –trace cobbles –maximum size 20cm			878.0
1.0					877.0
					876.0
					875.0
					874.0
2.0					873.0
		–well graded below 2.1 metres		1	872.0
					871.0
					870.0
3.0					869.0
					868.0
					867.0
4.0		CLAY –silt seams –brown with grey mottling –firm, moist, low to medium plasticity			866.0
					865.0
					864.0
5.0		END OF TESTPIT AT 4.9 METRES IN CLAY –no seepage or sloughing			863.0
					862.0
					861.0
6.0					860.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.9 m
REVIEWED BY: LF	COMPLETE: 09/11/98
Fig. No:	Page 1 of 1

98/11/30 05:00PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-27
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 267.156 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sandy, trace gravel, trace rootlets -black -loose, dry			876.0
1.0		GRAVEL AND SAND -trace cobbles and boulders -loose, well graded, dry -maximum size 25cm		1	875.0 874.0 873.0
2.0		SAND -fine grained, trace gravel -loose, dry to moist		2	872.0 871.0 870.0
3.0					869.0 868.0 867.0
4.0					866.0 865.0 864.0
5.0		END OF TESTPIT AT 4.6 METRES IN SAND -no seepage or sloughing			863.0 862.0 861.0 860.0
6.0					859.0 858.0 857.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/11/98
Fig. No:	Page 1 of 1

98/11/30 05:00PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-28
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 272.053 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, trace gravel, trace rootlets –black –loose, dry			892.0
1.0		BOULDERS AND COBBLES –some sand and gravel –well graded –maximum boulder size 46cm –size decreasing gradually with depth to a maximum of 15cm at 2.1 metres			891.0 890.0 889.0 888.0 887.0
2.0		SAND –trace gravel –maximum size 4cm		1	886.0 885.0 884.0 883.0 882.0 881.0 880.0
4.0		END OF TESTPIT AT 4.6 METRES IN SAND –no seepage or sloughing			879.0 878.0 877.0 876.0 875.0 874.0
5.0					
6.0					873.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/11/98
Fig. No:	Page 1 of 1

98/12/01 10:00AM (PREVIEW)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-29
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.71 (m)

SAMPLE TYPE: COMPOSITE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT –sandy, gravelly –loose, dry			
0.4					
		GRAVEL AND SAND –trace cobbles –well graded, dry –maximum size 13cm		1	
1.0					
1.8					
		SAND –medium to coarse grained, gravelly, trace cobbles –well graded, moist –maximum size 13cm		2	
2.0					
3.0					
4.0					
4.6					
		END OF TESTPIT AT 4.6 METRES IN SAND –no seepage or sloughing			
5.0					
6.0					

884.0 883.0 882.0 881.0 880.0 879.0 878.0 877.0 876.0 875.0 874.0 873.0 872.0 871.0 870.0 869.0 868.0 867.0 866.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 4.6 m
REVIEWED BY: LF	COMPLETE: 09/11/98
Fig. No:	Page 1 of 1

98/11/30 05:00PM (PINERIDG)

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot Enterprises Ltd.	TEST PIT NO: TP-30
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mounted Cat 200	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB		ELEVATION: 269.5 (m)

SAMPLE TYPE ■ COMPOSITE ▨ SHELBY TUBE ▩ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▦ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ELEVATION(ft)
0.0		PEAT -sand, trace gravel and rootlets -dark brown, loose, dry			884.0
		SAND -medium to coarse grained, some gravel, trace cobbles -moist -maximum size 8cm -sloughing below 3cm			883.0
1.0					882.0
					881.0
					880.0
					879.0
2.0					878.0
					877.0
				1	876.0
					875.0
3.0					874.0
					873.0
					872.0
4.0					871.0
					870.0
					869.0
					868.0
5.0		END OF TESTPIT AT 4.9 METRES IN SAND -no seepage -sloughing below 3cm			867.0
					866.0
6.0					865.0

UMA Engineering Ltd. Winnipeg, Manitoba	LOGGED BY: JC	COMPLETION DEPTH: 4.9 m
	REVIEWED BY: LF	COMPLETE: 09/11/98
	Fig. No:	Page 1 of 1

98/11/30 04:55PM (PINERDG)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-1
CLIENT: CITY OF WINNIPEG	DRILL TYPE: TH 50 Cyclone Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 261.21 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		GRAVEL -some sand			0.0
1.0		-gap graded 0.25cm to 1.5cm		1	
2.0		-rounded, maximum size 3cm			
3.0		-maximum angular size 4cm		2	10.0
4.0		-60% limestone, 40% granite			
5.0				3	15.0
6.0				4	20.0
7.0				5	25.0
8.0					
9.0				6	30.0
10.0		SAND -gravelly			
11.0		-rounded, maximum size 5cm		7	35.0
12.0				8	40.0
13.0		-15cm gravel seams below 12.2 metres			
14.0				9	45.0
15.0				10	50.0
16.0		CLAY -stiff			
17.0				11	55.0
18.0		SAND -medium grained, trace gravel		12	60.0
19.0		-loose			
20.0		-sharp angular grains		13	65.0
21.0					
22.0				14	70.0
23.0				15	75.0
24.0					
25.0				16	80.0
26.0				17	85.0
27.0					
28.0				18	90.0
29.0				19	95.0
30.0					
31.0		END OF TESTHOLE AT 30.5 METRES IN SAND		20	100.0
32.0					105.0
33.0					
34.0					110.0
35.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 30.5 m
REVIEWED BY: LF	COMPLETE: 09/15/98
Fig. No:	Page 1 of 1

98/11/30 02:10PM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-2
CLIENT: CITY OF WINNIPEG	DRILL TYPE: TH 50 Cyclone Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 273.62 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND AND GRAVEL –fine gravel and coarse sand –rounded –maximum size 5cm		1 2 3	0.0
5.0		SAND –trace gravel –maximum size 2cm		4	5.0
6.0		GRAVEL –sandy –rounded, trace angular –maximum size 3cm –60% limestone, 40% granite		5 6 7 8 9 10	10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0
19.0		–cobble greater than 15cm diameter encountered at 16 metres		11 12	55.0 60.0
20.0		SAND –gravelly –well graded –rounded, trace to some angular –maximum angular size 2cm		13 14 15 16 17	65.0 70.0 75.0 80.0 85.0
26.0		SILT TILL –sandy –light brown		18 19	90.0 95.0
29.0		END OF TESTHOLE AT 29.0 METRES IN SILT TILL			100.0 105.0 110.0
35.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 29.0 m
REVIEWED BY: LF	COMPLETE: 09/15/98
Fig. No:	Page 1 of 1

98/11/30 02:10PM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-3
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 269.62 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND -trace gravel			0.0
1.0		-rounded, trace angular			5.0
2.0		-maximum size 3cm		1	
3.0		-50% limestone, 50% granite		2	10.0
4.0		CLAY			
4.0		SAND AND GRAVEL -rounded		3	15.0
5.0		-maximum size 2cm			
6.0		-60% limestone, 40% granite		4	20.0
7.0		SAND -trace gravel		5	25.0
8.0					
9.0		-increase in density and finer sand		6	30.0
10.0		at 8.8 metres		7	35.0
11.0					
12.0		-cobble of >10cm at 11.3 metres		8	40.0
12.0		-cobble of >10cm at 11.9 metres			
13.0		SILT TILL -sandy, trace clay		9	45.0
14.0		-light brown			
15.0				10	50.0
16.0		END OF TESTHOLE AT 15.2 METRES IN SILT TILL			55.0
17.0					60.0
18.0					
19.0					65.0
20.0					
21.0					70.0
22.0					
23.0					75.0
24.0					
25.0					80.0
26.0					
27.0					85.0
28.0					
29.0					90.0
30.0					
31.0					95.0
32.0					
33.0					100.0
34.0					
35.0					105.0
					110.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 15.2 m
REVIEWED BY: LF	COMPLETE: 09/16/98
Fig. No:	Page 1 of 1

98/11/30 02:10PM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-4
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 270.484 (m)

SAMPLE TYPE ■ GRAB SAMPLE ⊘ SHELBY TUBE ⊠ DISTURBED ▤ NO RECOVERY ▥ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND -trace gravel -rounded -maximum size 2.5cm -60% limestone, 40% granite	M	1	0.0
1.0			M	2	5.0
2.0			M	3	10.0
3.0			M	4	15.0
4.0			M	5	20.0
5.0			M	6	25.0
6.0			M	7	30.0
7.0			M	8	35.0
8.0			M	9	40.0
9.0			M	10	45.0
10.0			M	11	50.0
11.0		GRAVEL -sandy -well graded -rounded, some angular -maximum rounded size 2cm -maximum angular size 3cm -maximum size 4cm below 13.7 metres	M	12	55.0
12.0			M	13	60.0
13.0			M	14	65.0
14.0			M	15	70.0
15.0					75.0
16.0					80.0
17.0					85.0
18.0					90.0
19.0					95.0
20.0		SILT TILL -sandy, trace clay -light brown			100.0
21.0					105.0
22.0					110.0
23.0					
24.0		END OF TESTHOLE AT 23.2 METRES IN SILT TILL			
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0					
32.0					
33.0					
34.0					
35.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 23.2 m
REVIEWED BY: LF	COMPLETE: 09/16/98
Fig. No:	Page 1 of 1

98/11/30 02:10PM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-5
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 258.23 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND -trace gravel -loose -well graded -rounded -maximum size 1cm		1	0.0
1.0					5.0
2.0					
3.0				2	10.0
4.0					
5.0				3	15.0
6.0		CLAY -sandy -dark grey -wet, high plasticity		4	20.0
7.0					25.0
8.0				5	
9.0		END OF TESTHOLE AT 9.1 METRES IN CLAY			30.0
10.0					35.0
11.0					
12.0					40.0
13.0					
14.0					45.0
15.0					50.0
16.0					
17.0					55.0
18.0					60.0
19.0					
20.0					65.0
21.0					70.0
22.0					
23.0					75.0
24.0					80.0
25.0					
26.0					85.0
27.0					90.0
28.0					
29.0					95.0
30.0					100.0
31.0					
32.0					105.0
33.0					
34.0					110.0
35.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 9.1 m
REVIEWED BY: LF	COMPLETE: 09/16/98
Fig. No:	Page 1 of 1

98/11/30 02:10PM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-6
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 271.22 (m)

SAMPLE TYPE ■ GRAB SAMPLE ▨ SHELBY TUBE ☒ DISTURBED ☰ NO RECOVERY ▯ CORE BARREL ▮ WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND AND GRAVEL -gap graded 0.4 to 1cm			0.0
1.0		-rounded			
		-maximum size 3cm		1	5.0
2.0		-70% limestone, 30% granite			
3.0		SAND -trace to some gravel		2	10.0
4.0		CLAY -sandy, some silt		3	15.0
5.0		-dark grey			
6.0		-wet, high plasticity		4	20.0
7.0		SILT TILL -some clay		5	25.0
8.0		-light brown			
9.0				6	30.0
10.0					35.0
11.0				7	
12.0		END OF TESTHOLE AT 12.2 METRES IN SILT TILL			40.0
13.0					45.0
14.0					
15.0					50.0
16.0					55.0
17.0					
18.0					60.0
19.0					65.0
20.0					
21.0					70.0
22.0					75.0
23.0					
24.0					80.0
25.0					85.0
26.0					
27.0					90.0
28.0					95.0
29.0					
30.0					100.0
31.0					105.0
32.0					
33.0					110.0
34.0					
35.0					

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 12.2 m
REVIEWED BY: LF	COMPLETE: 09/17/98
Fig. No:	Page 1 of 1

98/11/30 02:11PM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-7
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 269.7 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND -fine to medium grained, trace gravel -rounded -maximum size 1cm		1	0.0
1.0					5.0
2.0					
3.0				2	10.0
4.0		SILT TILL -sandy -light brown		3	15.0
5.0					
6.0		SAND -fine to medium grained		4	20.0
7.0		SILT TILL -light brown		5	25.0
8.0					
9.0				6	30.0
10.0					
11.0				7	35.0
12.0				8	40.0
13.0		END OF TESTHOLE AT 12.2 METRES IN SILT TILL			45.0
14.0					
15.0					50.0
16.0					
17.0					55.0
18.0					
19.0					60.0
20.0					
21.0					65.0
22.0					
23.0					70.0
24.0					
25.0					75.0
26.0					
27.0					80.0
28.0					
29.0					85.0
30.0					
31.0					90.0
32.0					
33.0					95.0
34.0					
35.0					100.0
					105.0
					110.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 12.2 m
REVIEWED BY: LF	COMPLETE: 09/17/98
Fig. No:	Page 1 of 1

98/12/01 09:20AM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-8
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 255.64 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND -coarse grained, gravelly			0.0
1.0		-rounded, trace angular			
2.0		-maximum rounded size 5cm		1	5.0
3.0		-maximum angular size 3cm			
4.0		-70% limestone, 30% granite		2	10.0
5.0		GRAVEL -sandy, light brown			
6.0		-maximum size 2.5cm		3	15.0
7.0		-5cm thick sand lenses			
8.0		SAND AND GRAVEL -rounded		4	20.0
9.0		-maximum size 0.75cm			
10.0		-70% limestone, 30% gravel		5	25.0
11.0		SAND -fine grained, trace gravel			
12.0		-rounded, maximum size 0.5cm		6	30.0
13.0		-dense			
14.0		SILT TILL		7	35.0
15.0		SAND -fine grained			
16.0				8	40.0
17.0					
18.0				9	45.0
19.0		CLAY -silty, light grey			
20.0		SAND -fine grained		10	50.0
21.0		CLAY -stiff			
22.0				11	55.0
23.0					
24.0				12	60.0
25.0					
26.0		SILT TILL -light brown		13	65.0
27.0					
28.0				14	70.0
29.0					
30.0		END OF TESTHOLE AT 21.3 METRES IN SILT TILL			75.0
31.0					
32.0					80.0
33.0					
34.0					85.0
35.0					
					90.0
					95.0
					100.0
					105.0
					110.0

UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 21.3 m
REVIEWED BY: LF	COMPLETE: 09/17/98
Fig. No:	Page 1 of 1

98/12/11 09:20AM (PINERHOL)

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen Drillers Ltd.	TEST HOLE NO: TH-9
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Failing Rig	PROJECT NO: 0265-323-01-02
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm tricone bit	ELEVATION: 270.02 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	DEPTH(ft)
0.0		SAND -gravelly, well graded			0.0
1.0		-rounded, maximum size 1.5cm		1	
2.0		-layer of cobbles 20cm thick at 0.6 metres			5.0
3.0		-60% limestone, 40% granite		2	10.0
4.0		SAND AND GRAVEL -trace cobbles, light brown, well graded		3	15.0
5.0		-rounded, trace angular			
6.0		-maximum rounded size 3.5cm		4	20.0
7.0		-maximum angular size 8cm			
8.0		-65% limestone, 35% granite		5	25.0
9.0		-gravel, sandy below 7.9 metres		6	30.0
10.0		SILT TILL			
11.0		GRAVEL -some sand and cobbles		7	35.0
12.0		-rounded and angular		8	40.0
13.0		-maximum angular size 4cm			
14.0		-maximum rounded size 2.5cm		9	45.0
15.0		-65% limestone, 35% granite		10	50.0
16.0		-cobbles >13 cm from 12.2 metres to 15.2 metres			
17.0				11	55.0
18.0				12	60.0
19.0		SILT TILL -sandy, light brown			
20.0				13	65.0
21.0				14	70.0
22.0					
23.0				15	75.0
24.0				16	80.0
25.0					
26.0				17	85.0
27.0				18	90.0
28.0		END OF TESTHOLE AT 27.4 METRES IN SILT TILL			
29.0					95.0
30.0					
31.0					100.0
32.0					105.0
33.0					
34.0					110.0
35.0					

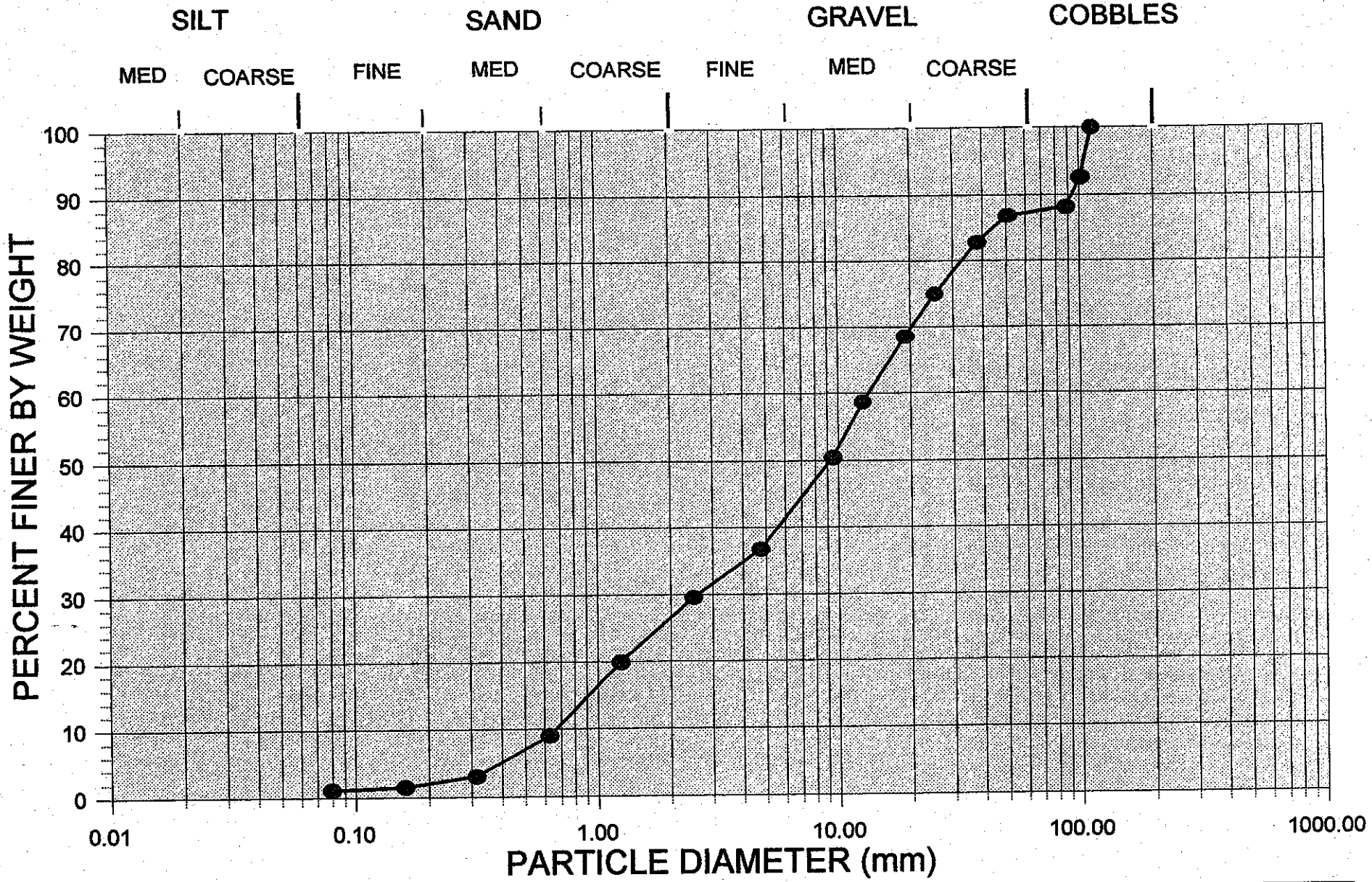
UMA Engineering Ltd.
Winnipeg, Manitoba

LOGGED BY: JC	COMPLETION DEPTH: 27.4 m
REVIEWED BY: LF	COMPLETE: 09/17/98
Fig. No:	Page 1 of 1

98/12/01 09:20AM (PINERHOL)

Appendix B
1998 Gradation Curves

UMA ENGINEERING - GRADATION ANALYSIS

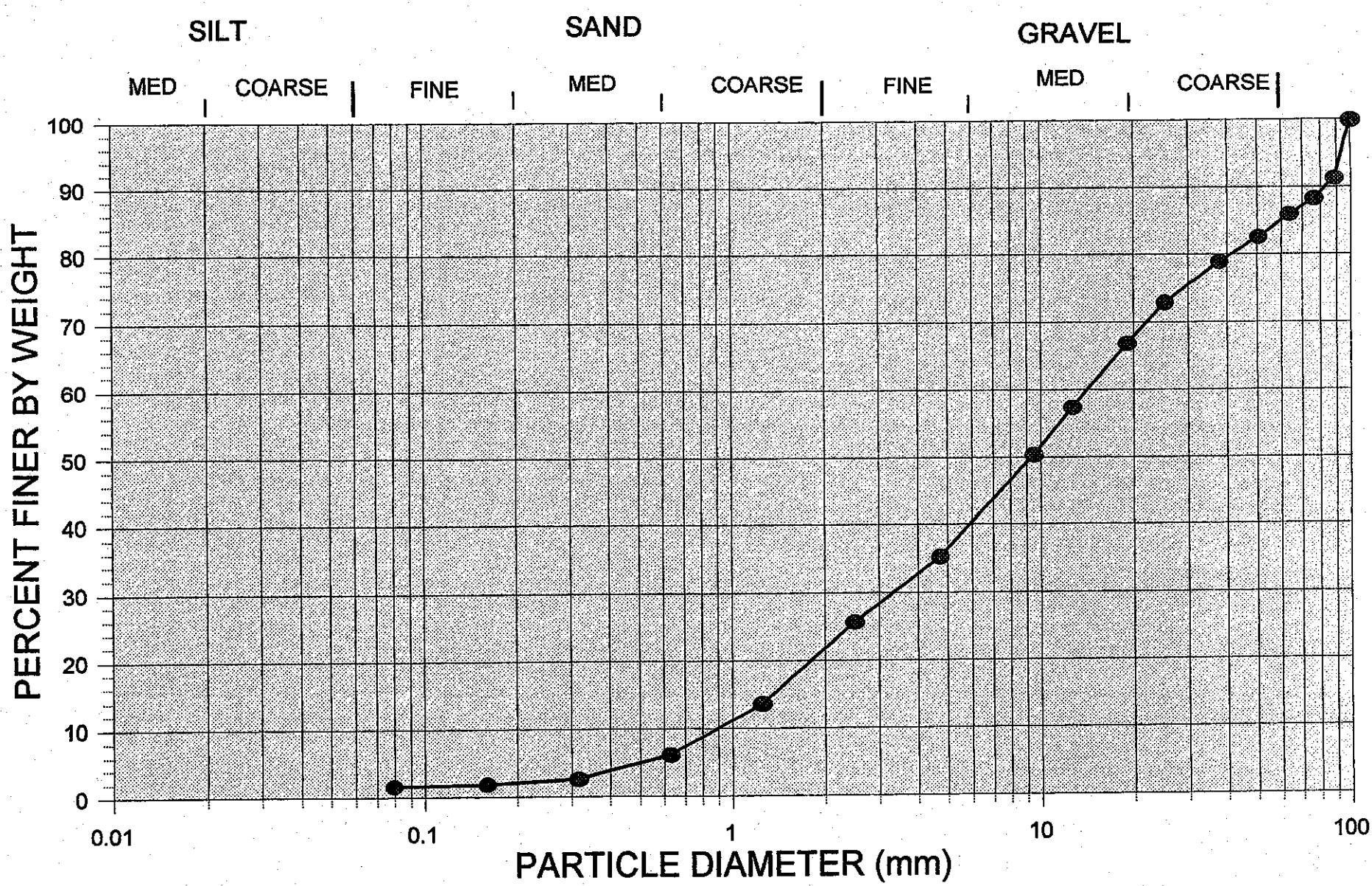


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-1
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Cobbles (12%), Gravel (62%), Sand (25%), Silt and Clay (1%)

UMA ENGINEERING - GRADATION ANALYSIS

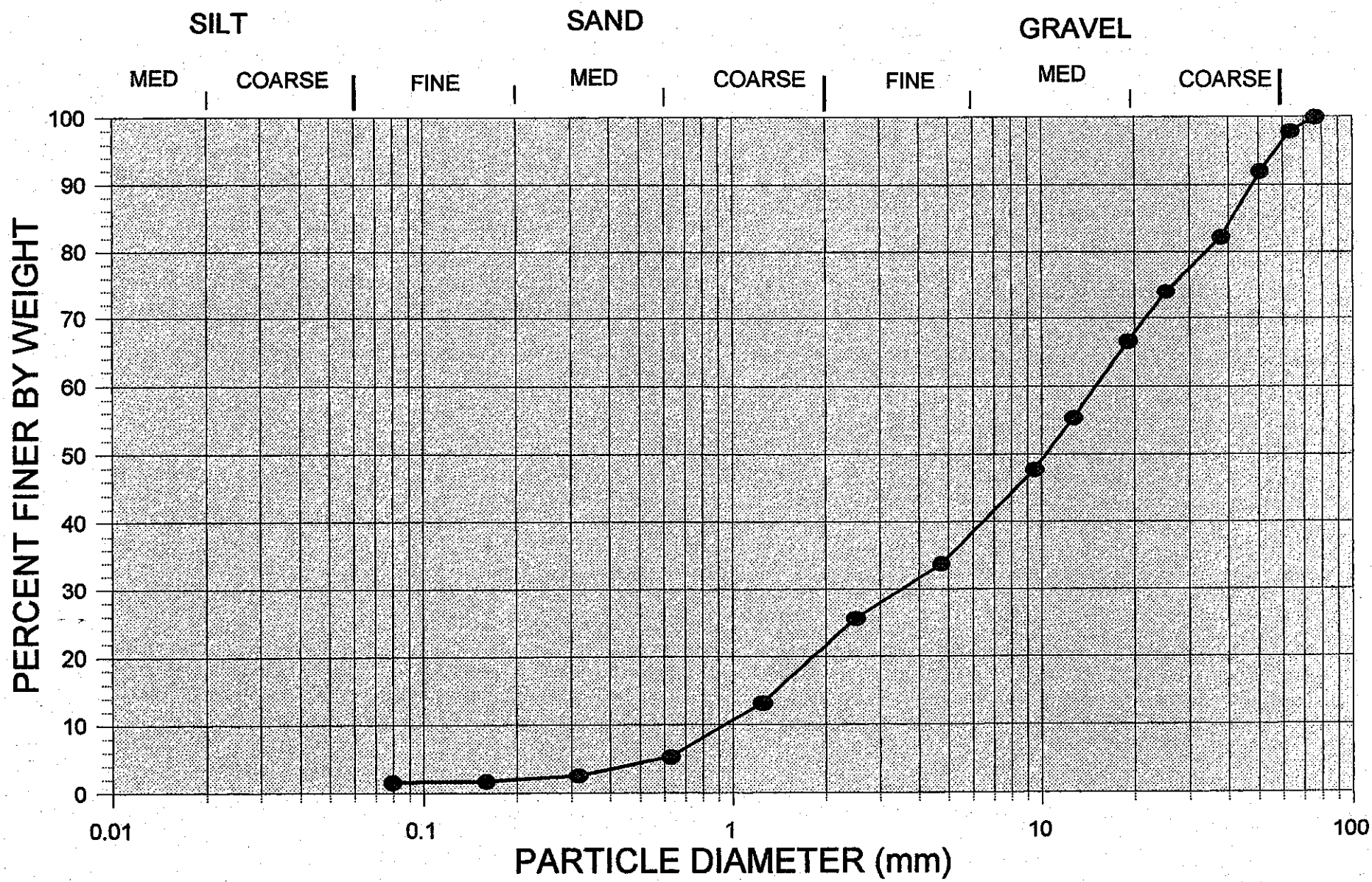


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-2
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Cobbles (14%), Gravel (64%), Sand (20.3%), Silt and Clay (1.7%)

UMA ENGINEERING - GRADATION ANALYSIS

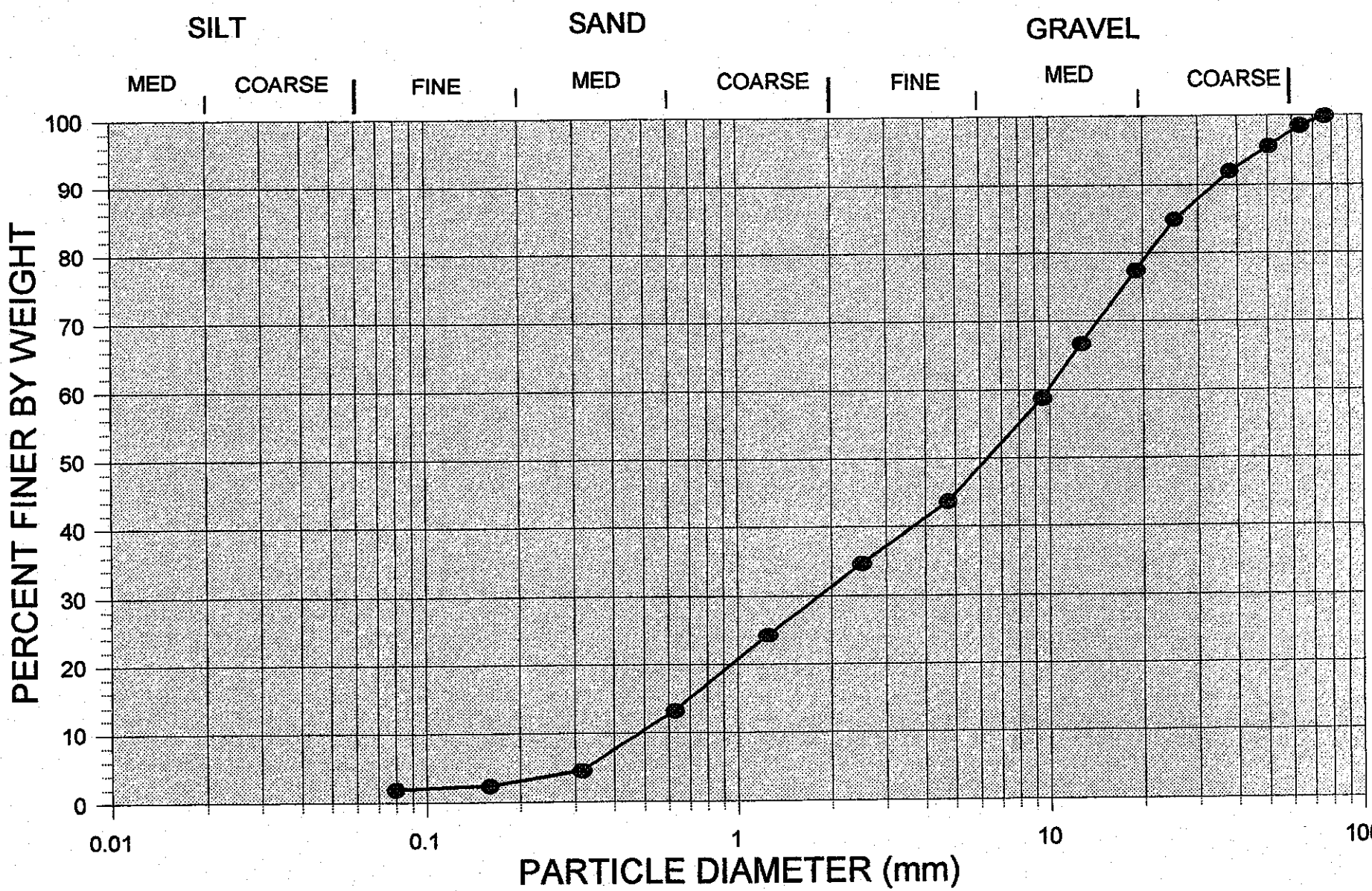


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-3
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Cobbles (2%), Gravel (76%), Sand (20.4%), Silt and Clay (1.6%)

UMA ENGINEERING - GRADATION ANALYSIS

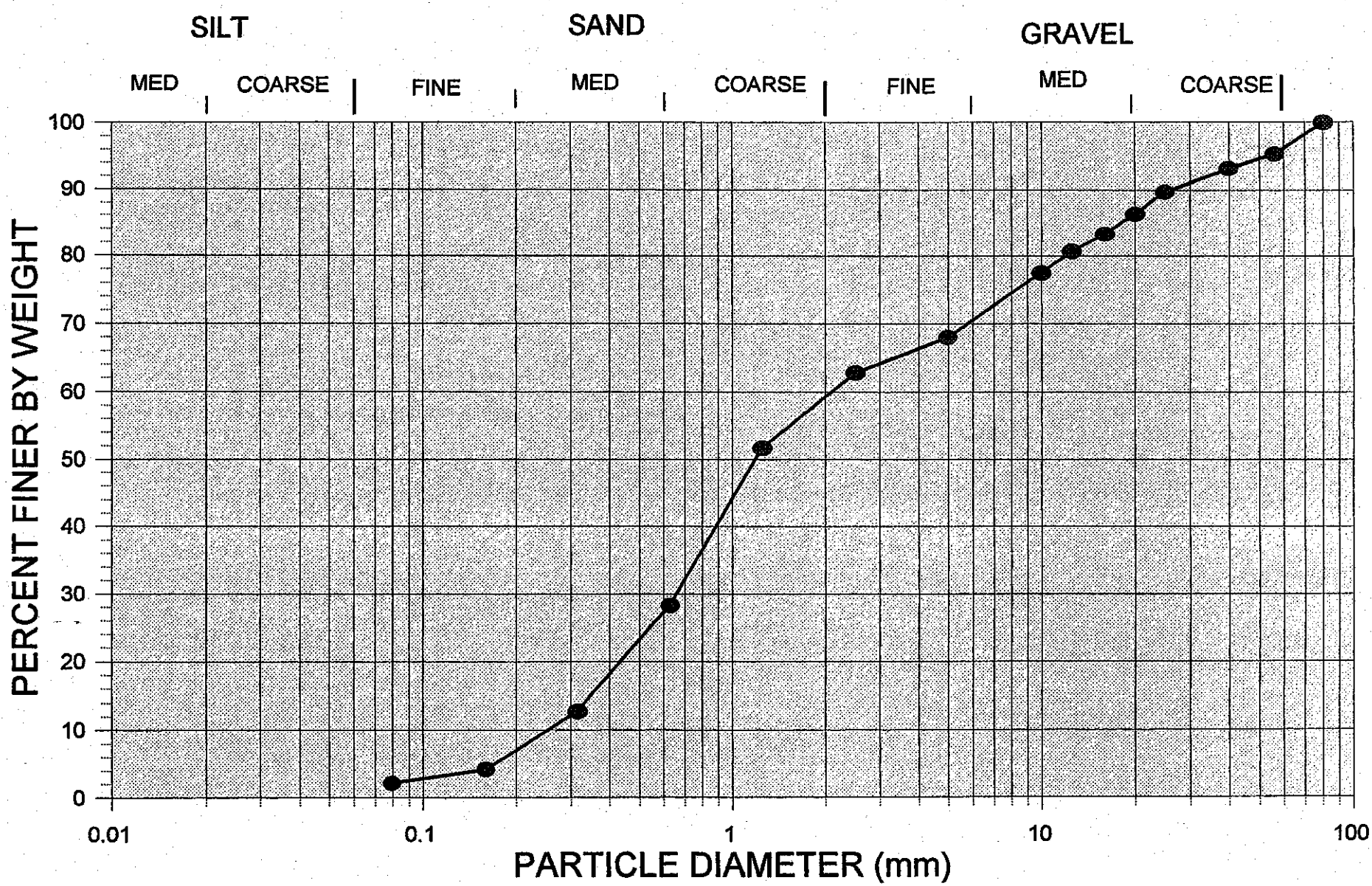


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-4
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Cobbles (2%), Gravel (66%), Sand (30.1%), Silt and Clay (1.9%)

UMA ENGINEERING - GRADATION ANALYSIS

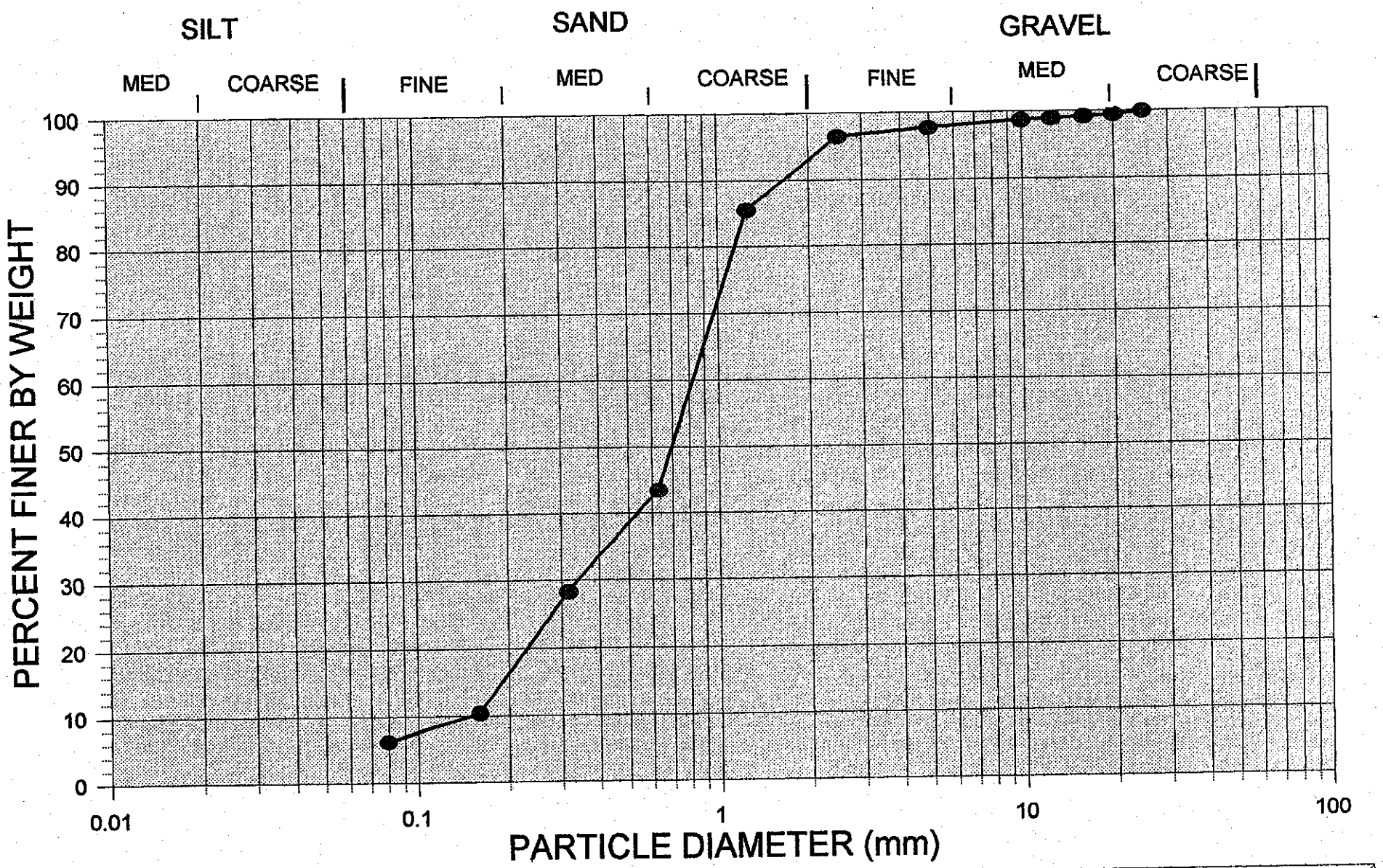


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-5
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Cobbles (4%), Gravel (38%), Sand (55.8%),
Silt and Clay (2.2%)

UMA ENGINEERING - GRADATION ANALYSIS

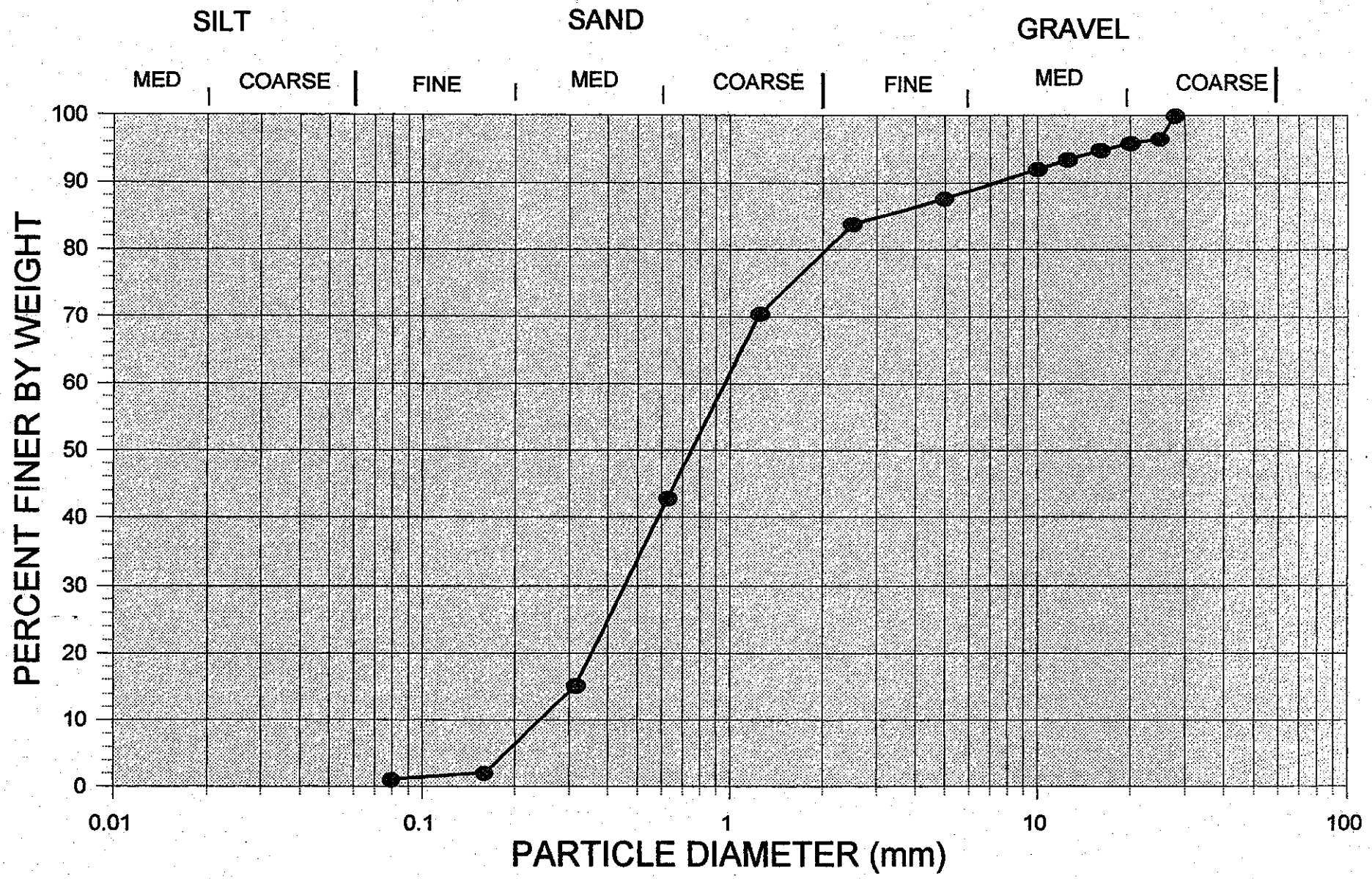


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-6
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

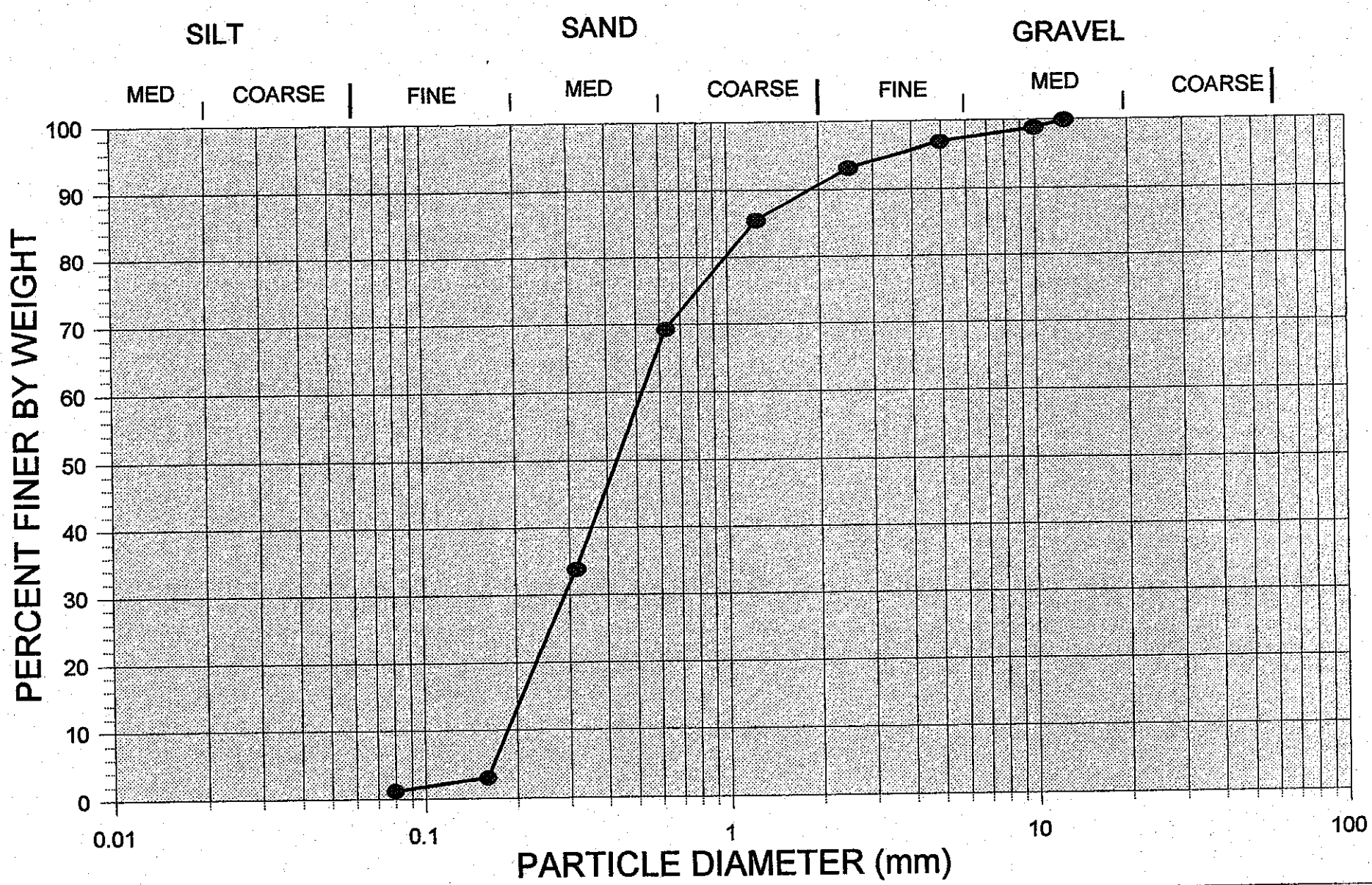
SAMPLE DESCRIPTION:
Gravel (6%), Sand (87.8%),
Silt and Clay (6.2%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-7 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (20%), Sand (79%), Silt and Clay (1%)

UMA ENGINEERING - GRADATION ANALYSIS

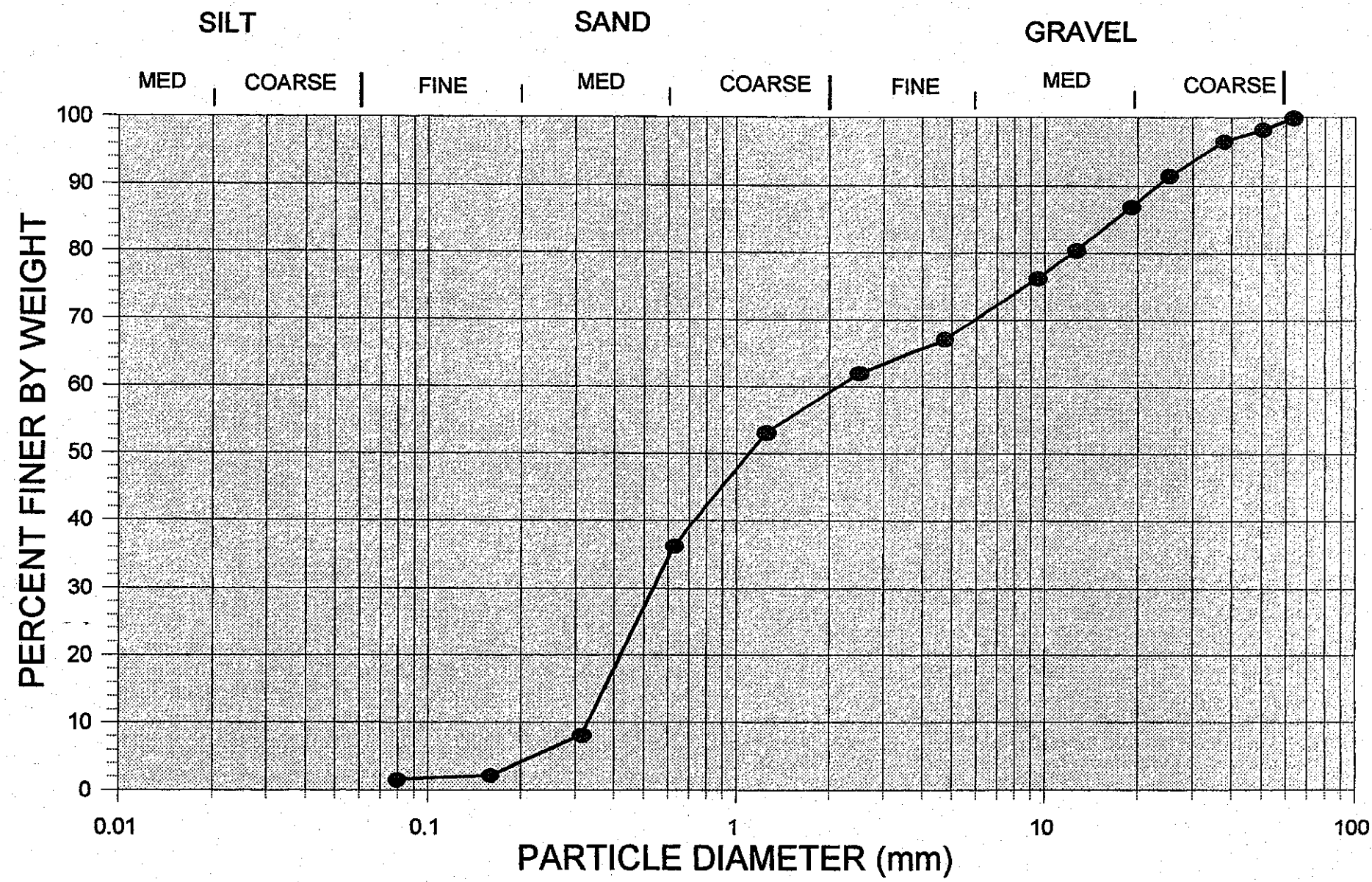


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-8
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

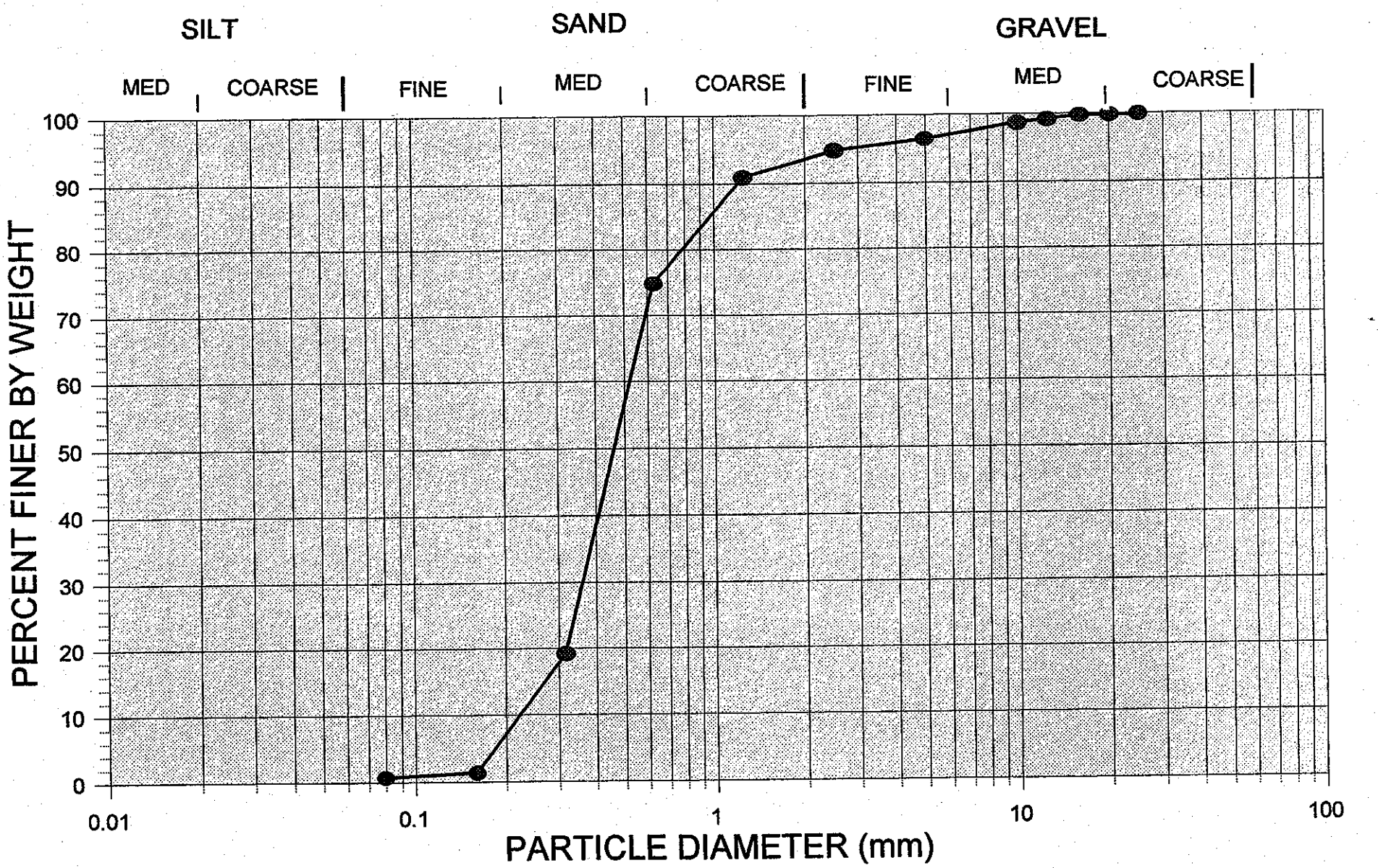
SAMPLE DESCRIPTION:
Gravel (10%), Sand (88.7%),
Silt and Clay (1.3%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-9 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (40%), Sand (58.5%), Silt and Clay (1.5%)

UMA ENGINEERING - GRADATION ANALYSIS

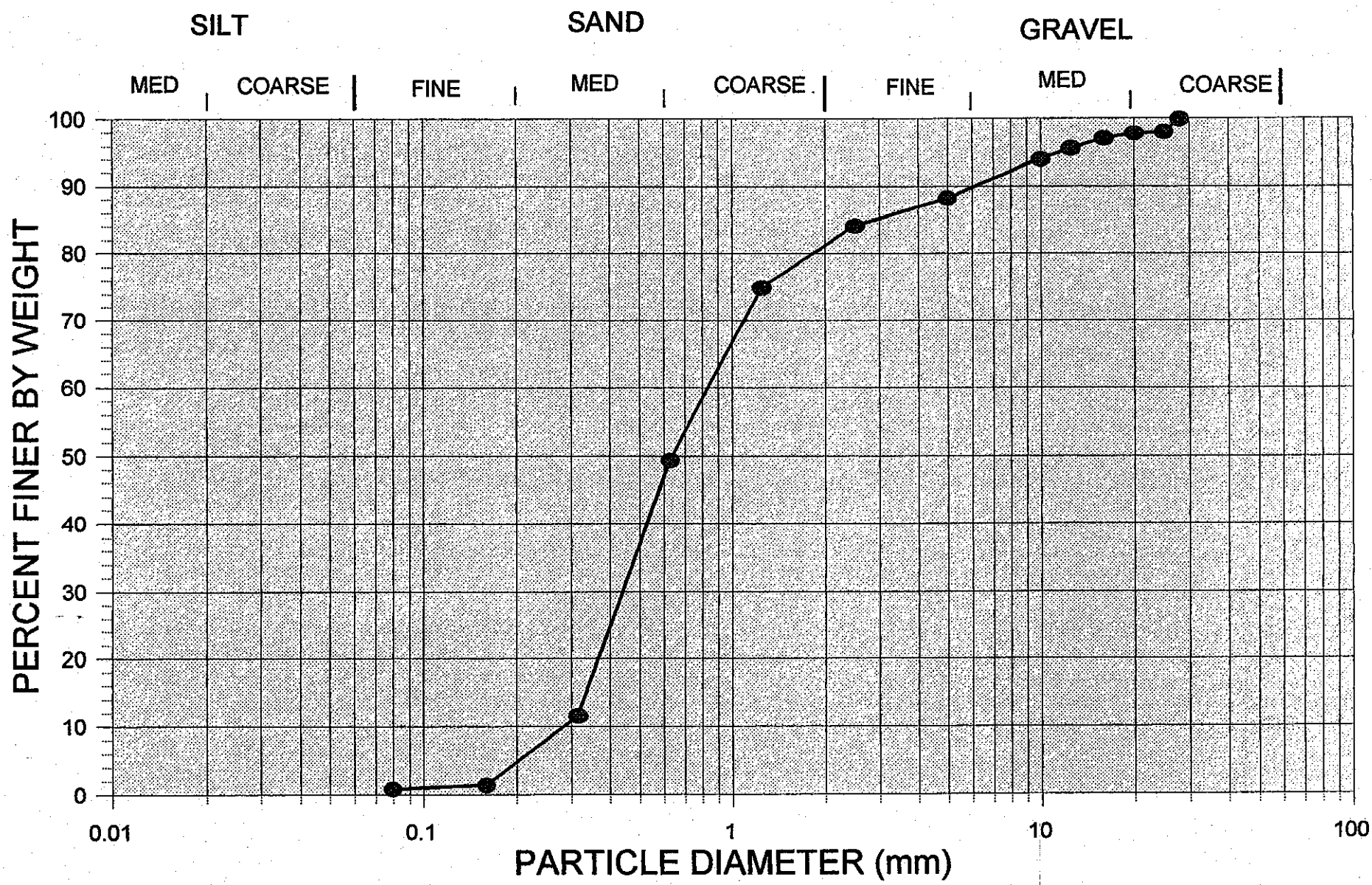


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-10
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

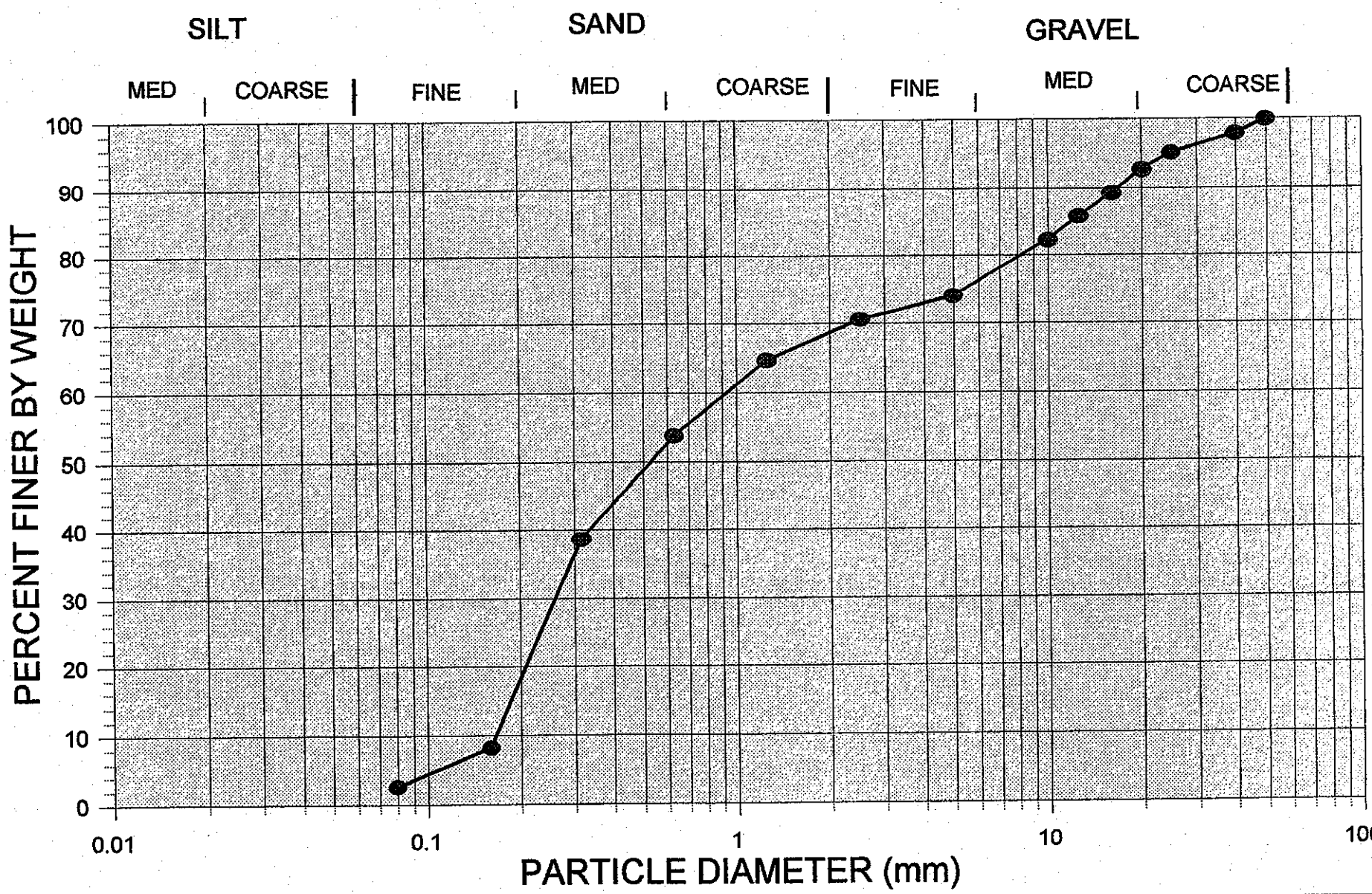
SAMPLE DESCRIPTION:
Gravel (6%), Sand (93.2%),
Silt and Clay (0.8%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-11 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (18%), Sand (81.1%), Silt and Clay (0.9%)

UMA ENGINEERING - GRADATION ANALYSIS

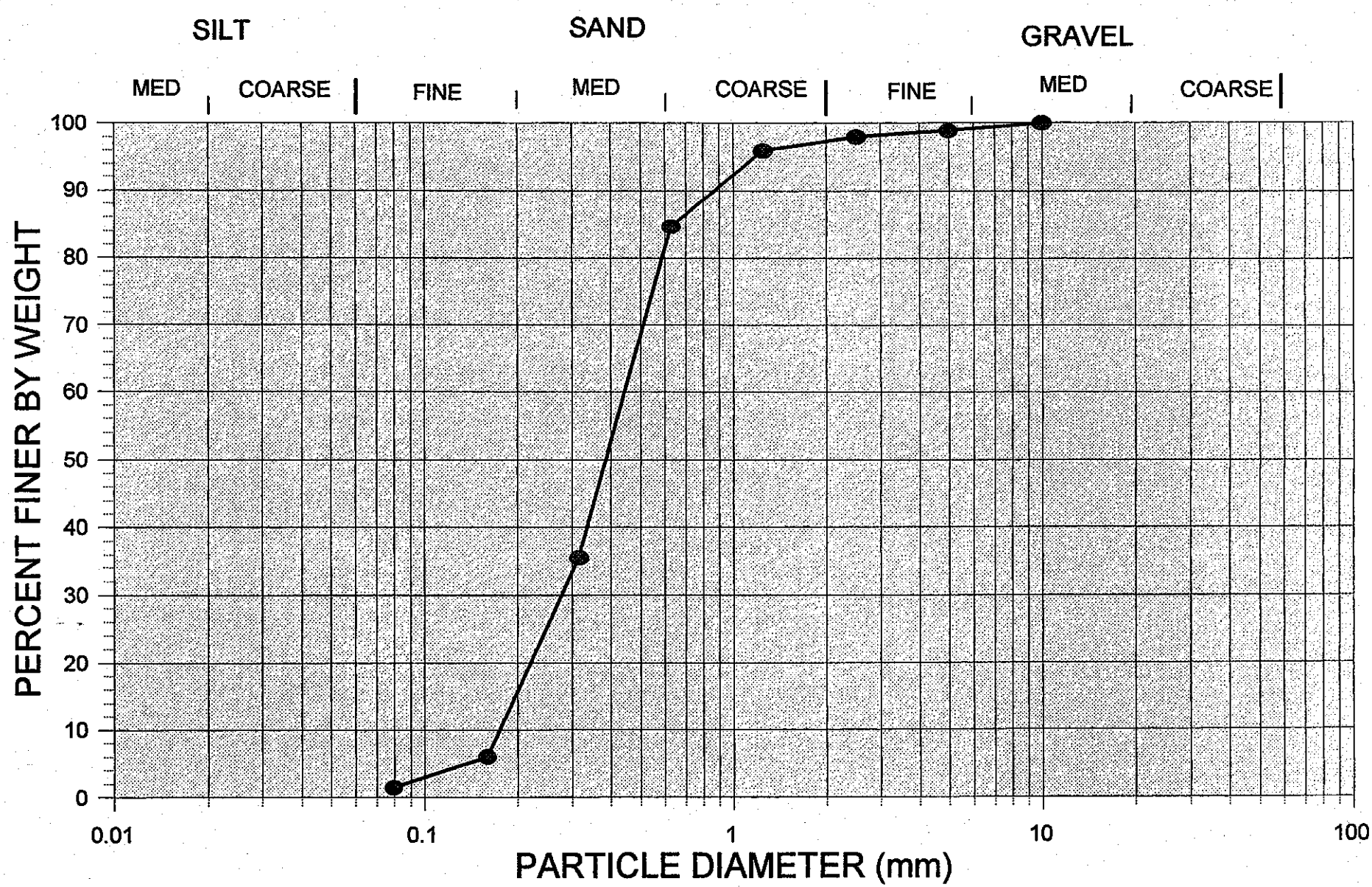


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-13
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Gravel (32%), Sand (65.3%),
Silt and Clay (2.7%)

UMA ENGINEERING - GRADATION ANALYSIS

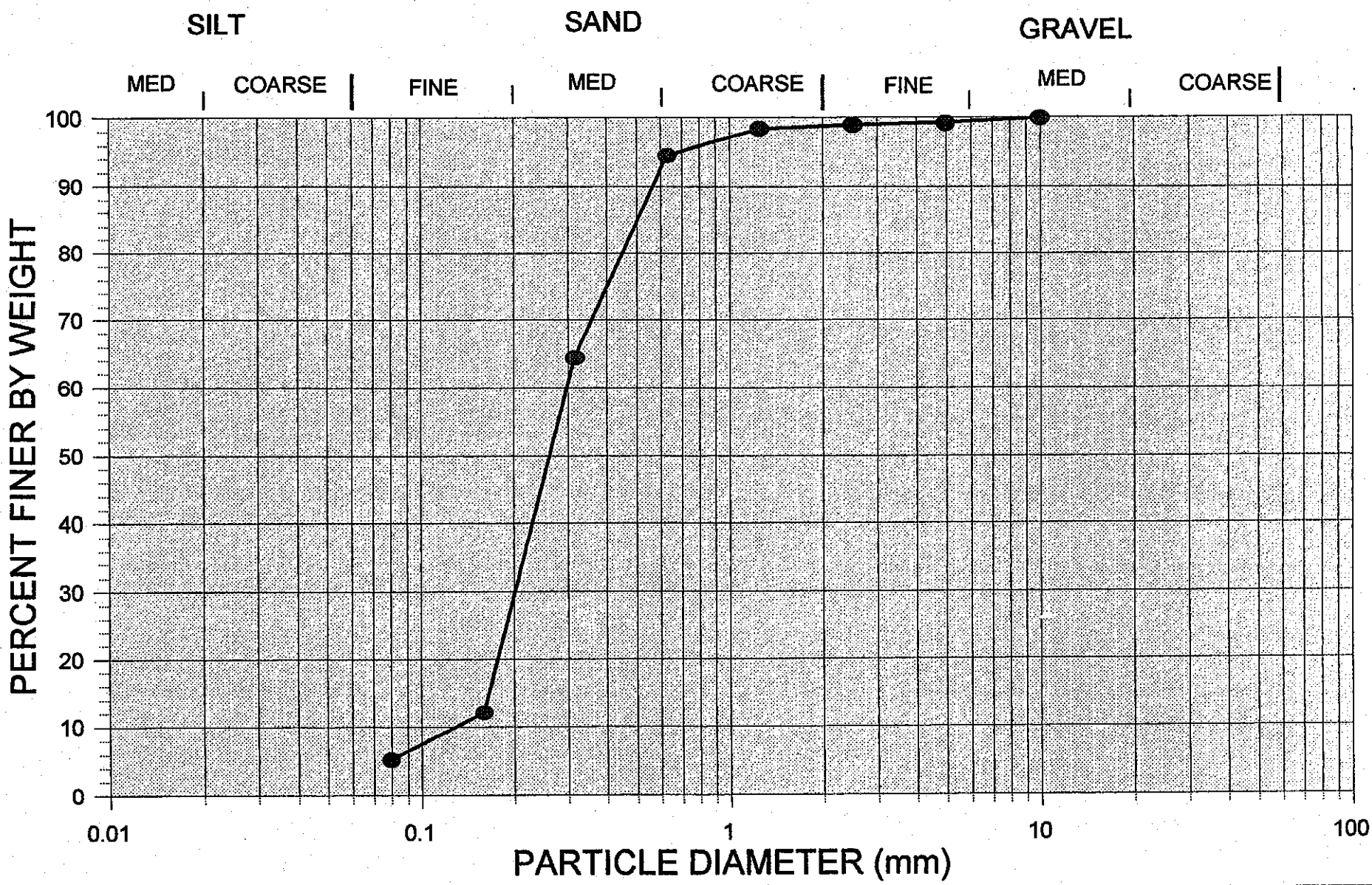


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-15
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Gravel (2%), Sand (96.5%),
Silt and Clay (1.5%)

UMA ENGINEERING - GRADATION ANALYSIS

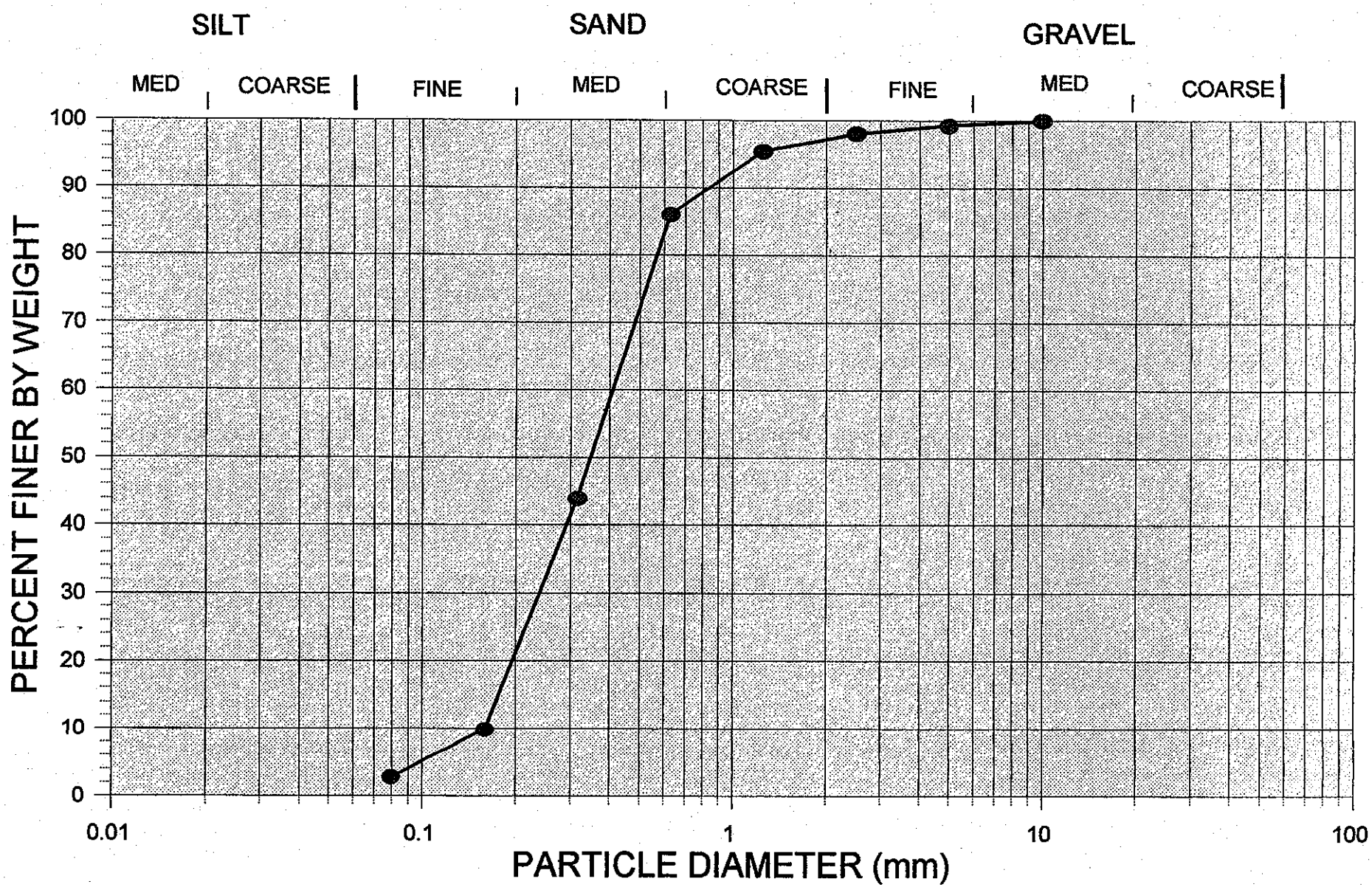


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-17
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

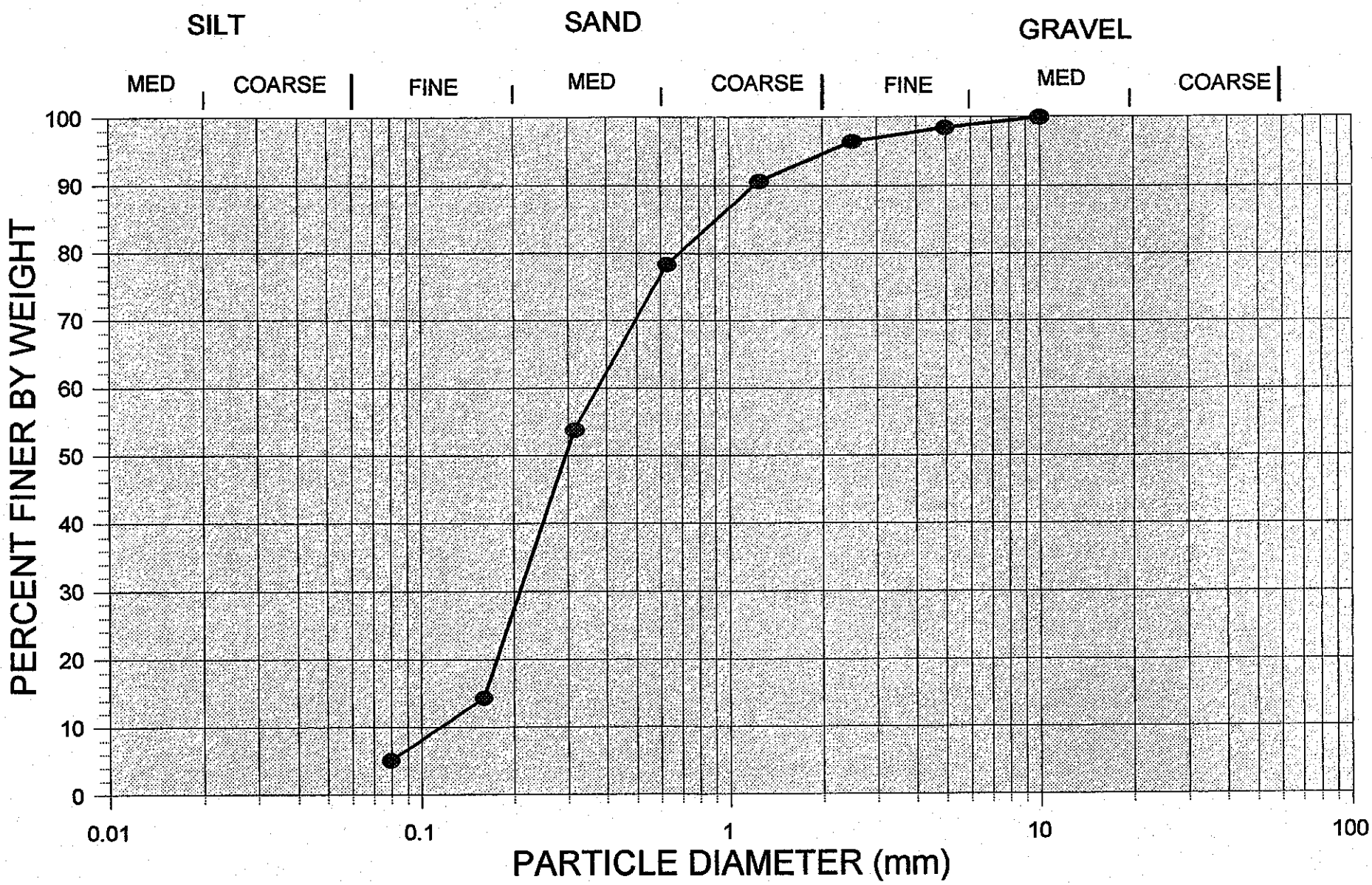
SAMPLE DESCRIPTION:
Gravel (0%), Sand (94.7%),
Silt and Clay (5.3%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-18 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (2%), Sand (95.2%), Silt and Clay (2.8%)

UMA ENGINEERING - GRADATION ANALYSIS

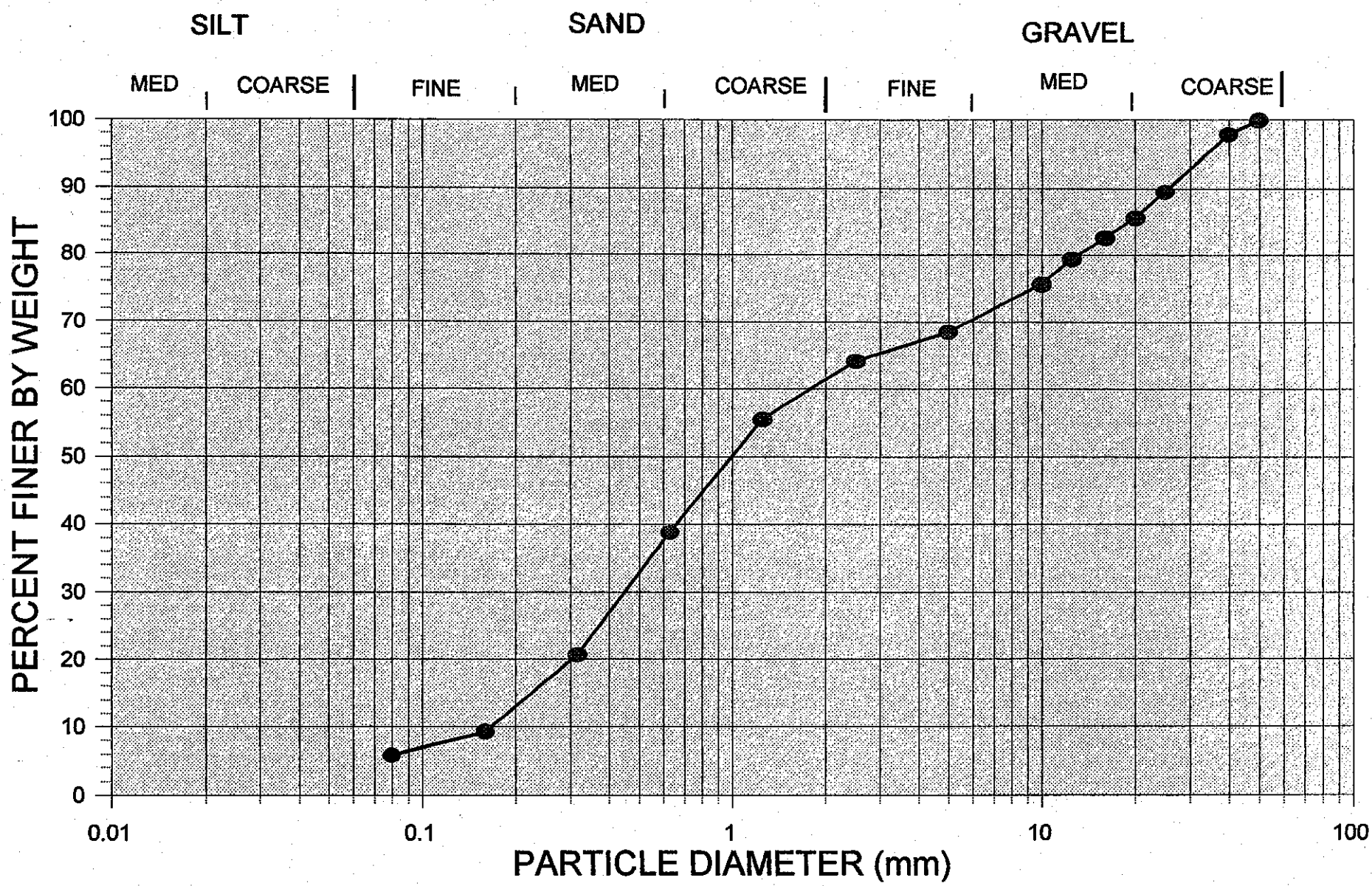


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-19
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Gravel (4%), Sand (90.9%),
Silt and Clay (5.1%)

UMA ENGINEERING - GRADATION ANALYSIS

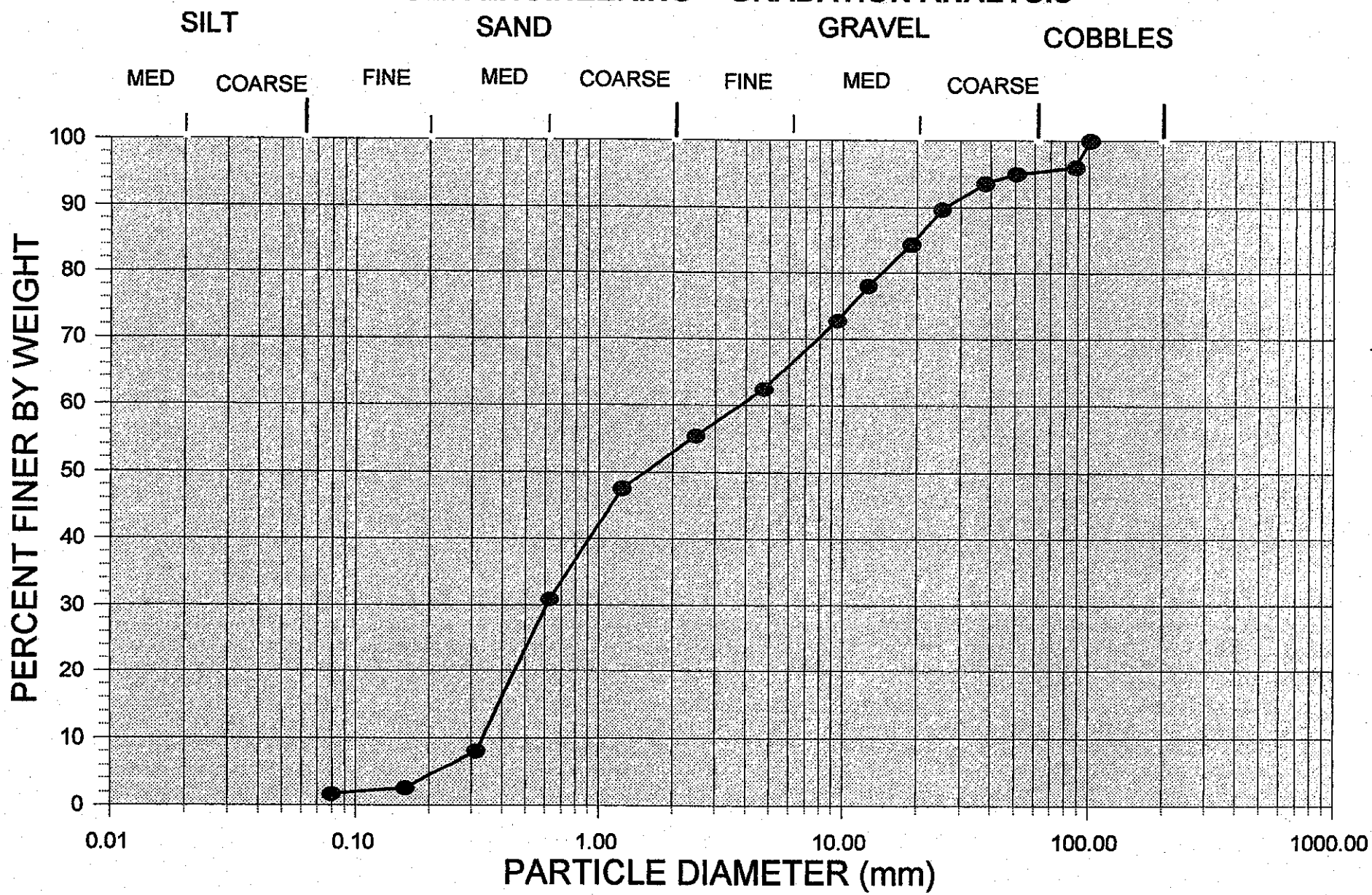


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-20
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

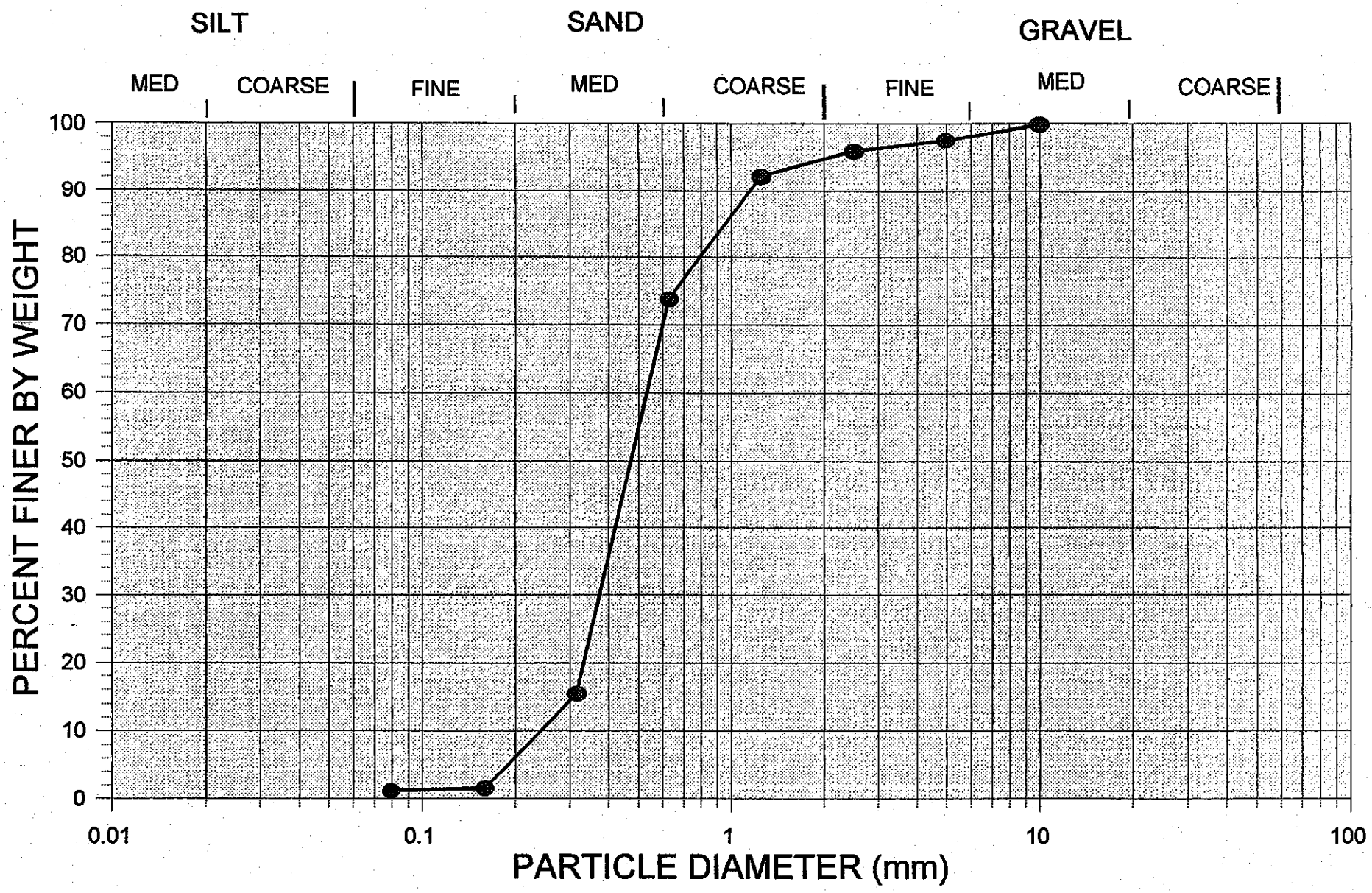
SAMPLE DESCRIPTION:
Gravel (40%), Sand (54.1%),
Silt and Clay (5.9%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-21 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Cobbles (4%) Gravel (42%), Sand (52.3%), Silt and Clay (1.7%)

UMA ENGINEERING - GRADATION ANALYSIS

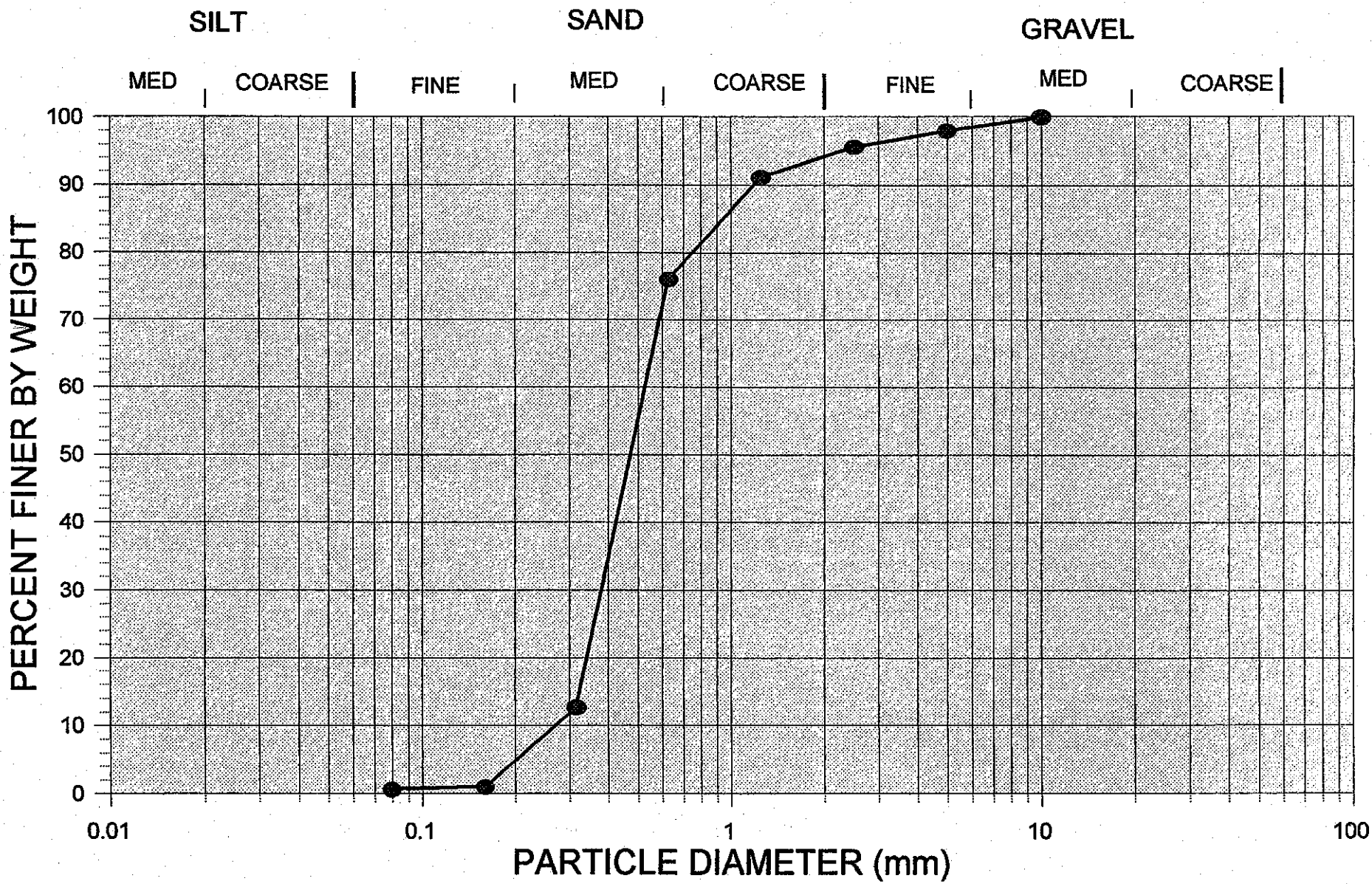


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-22
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Gravel (6%), Sand (93%),
Silt and Clay (1%)

UMA ENGINEERING - GRADATION ANALYSIS

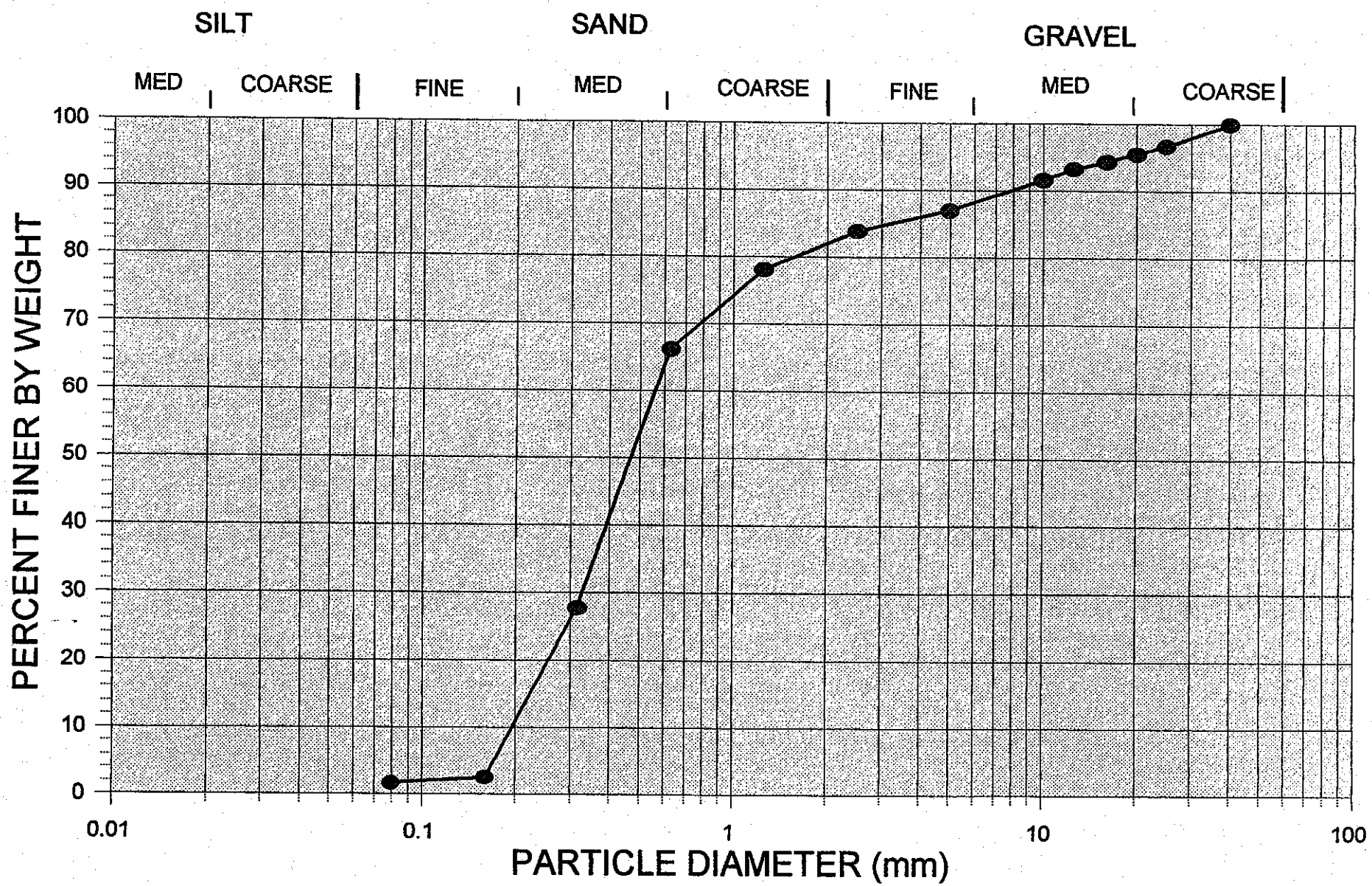


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-23
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

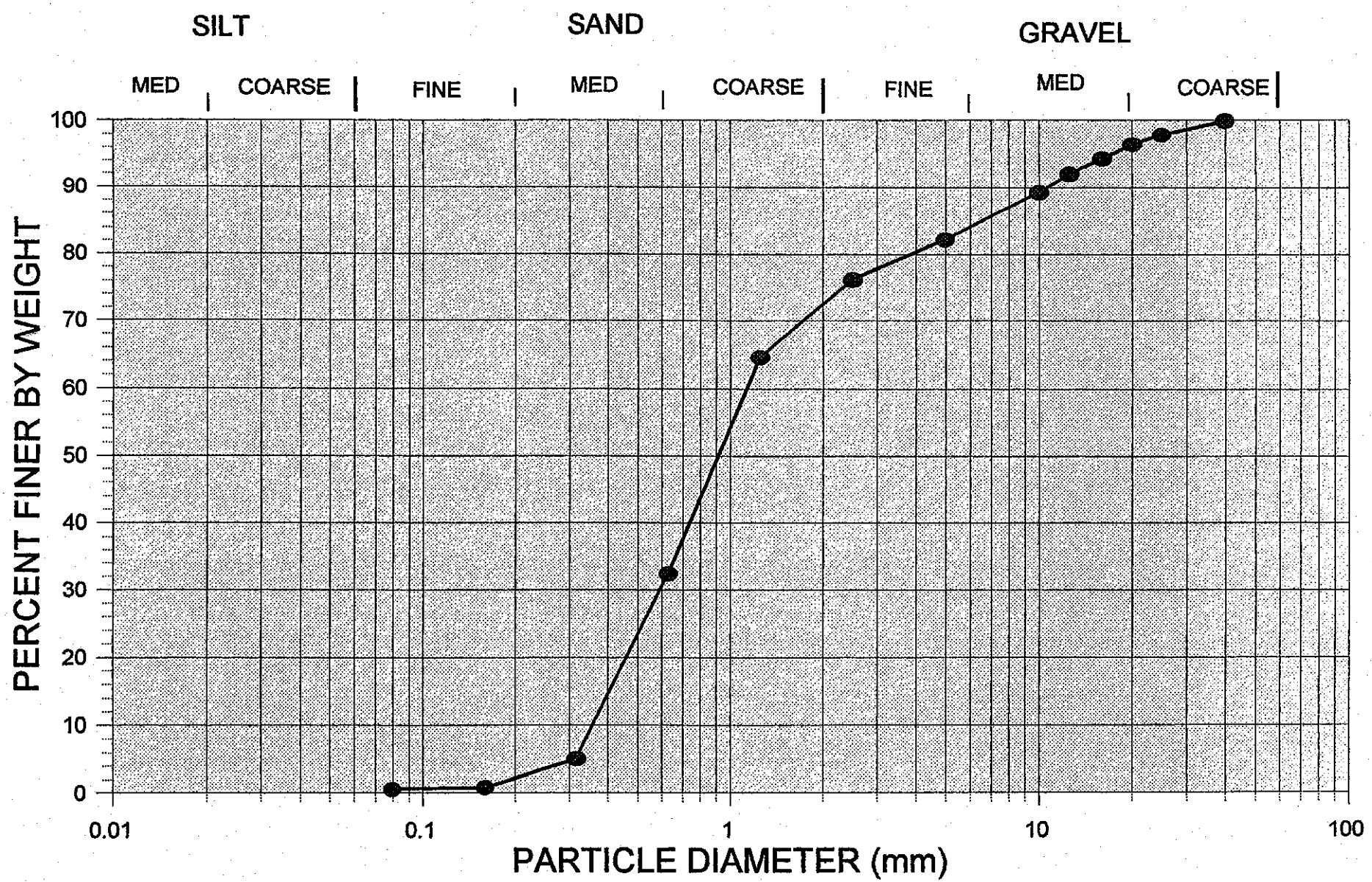
SAMPLE DESCRIPTION:
Gravel (5%), Sand (94.3%),
Silt and Clay (0.7%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-24 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (18%), Sand (80.3%), Silt and Clay (1.7%)

UMA ENGINEERING - GRADATION ANALYSIS

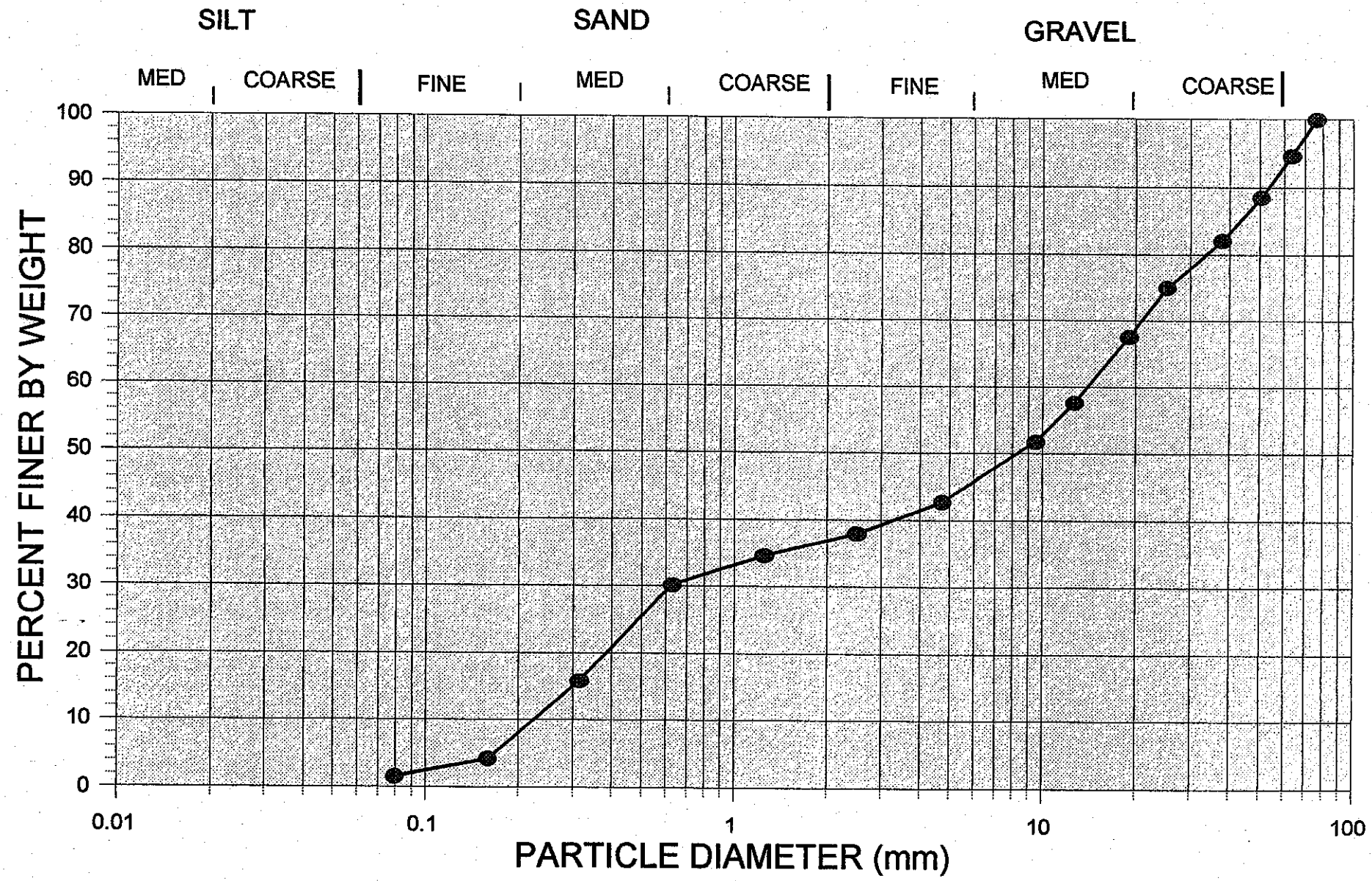


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-25
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

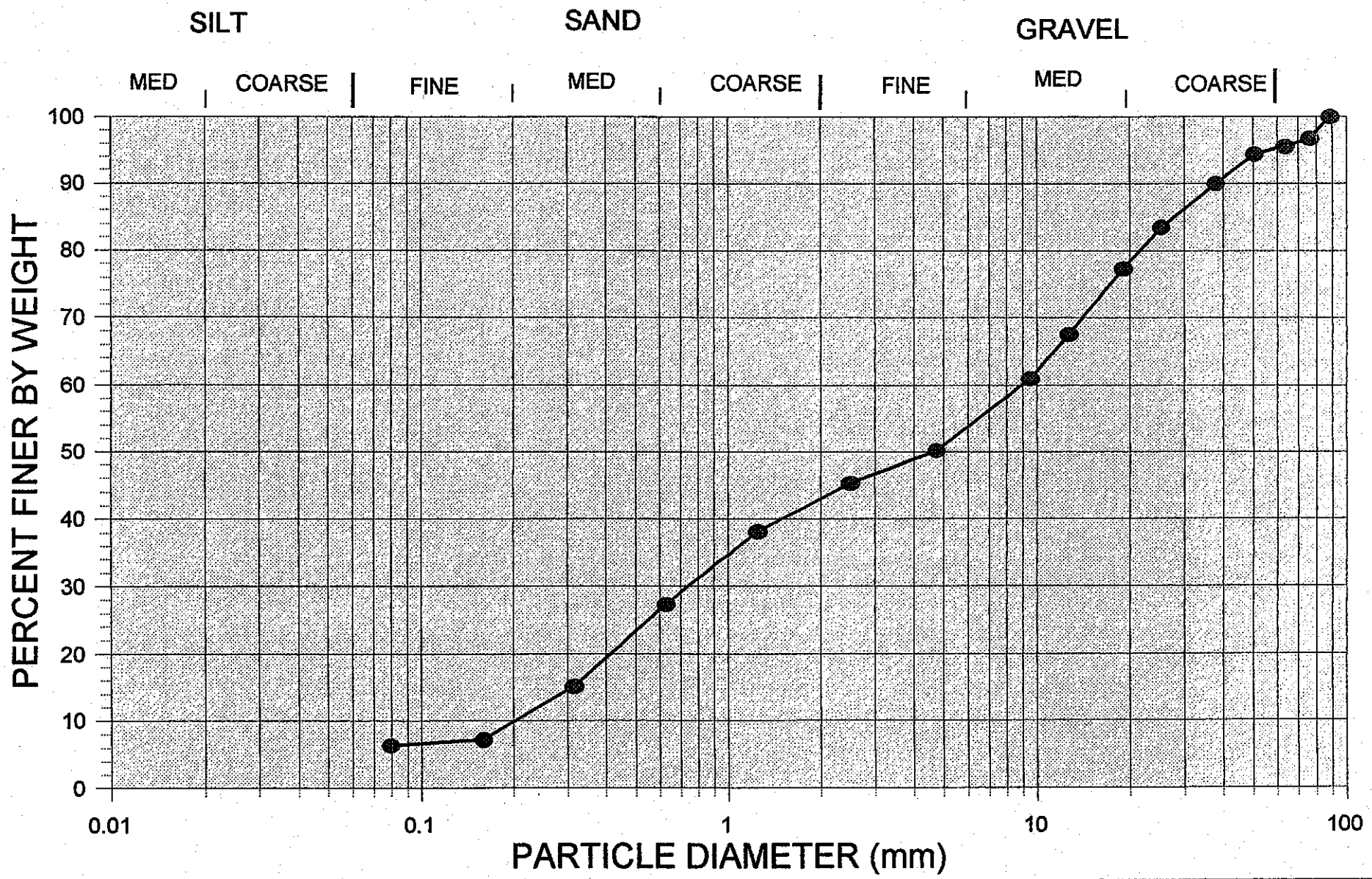
SAMPLE DESCRIPTION:
Gravel (28%), Sand (71.4%),
Silt and Clay (0.6%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-26 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Cobbles (6%) Gravel (56%), Sand (36.4%), Silt and Clay (1.6%)

UMA ENGINEERING - GRADATION ANALYSIS

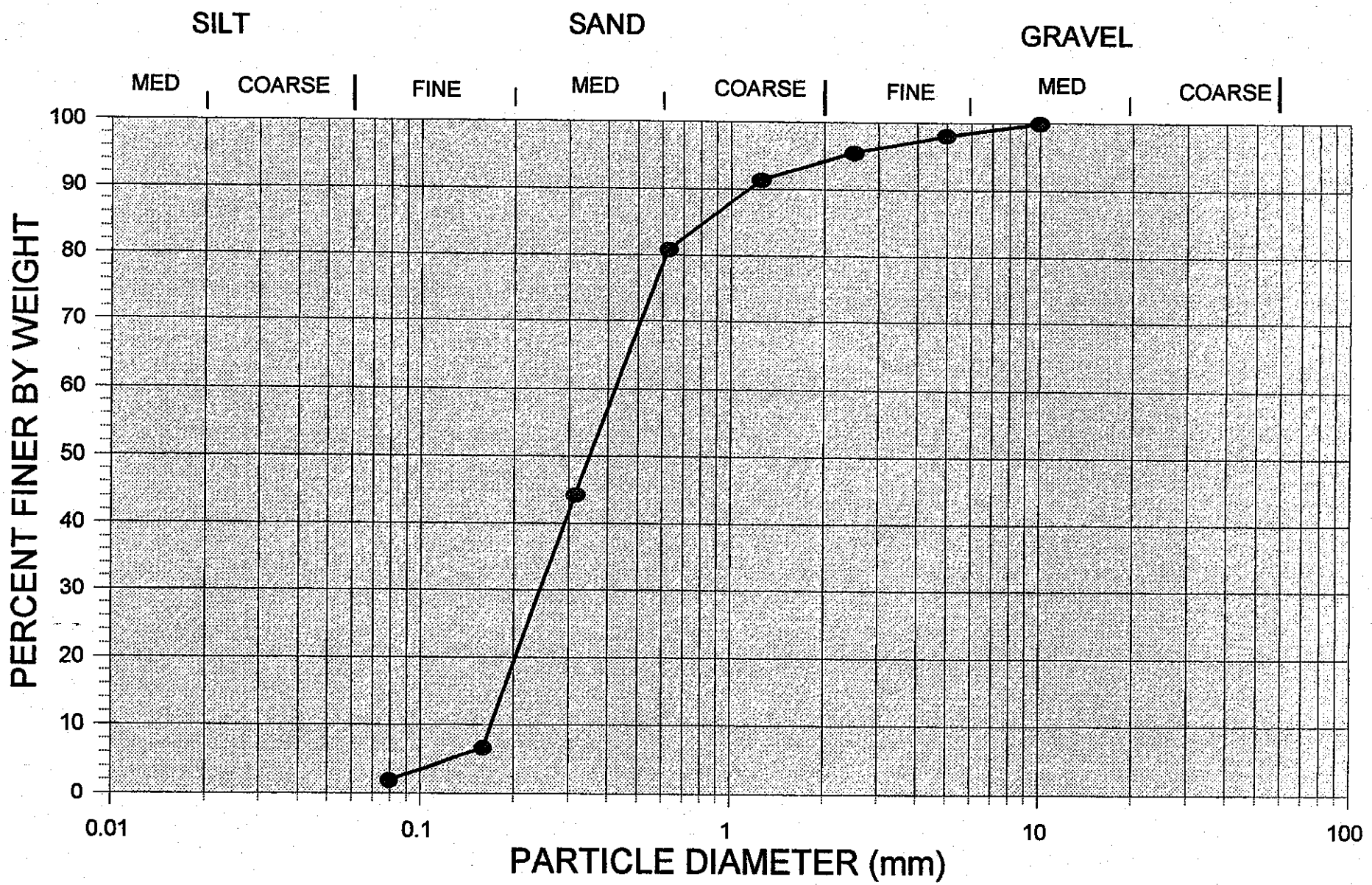


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-27
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

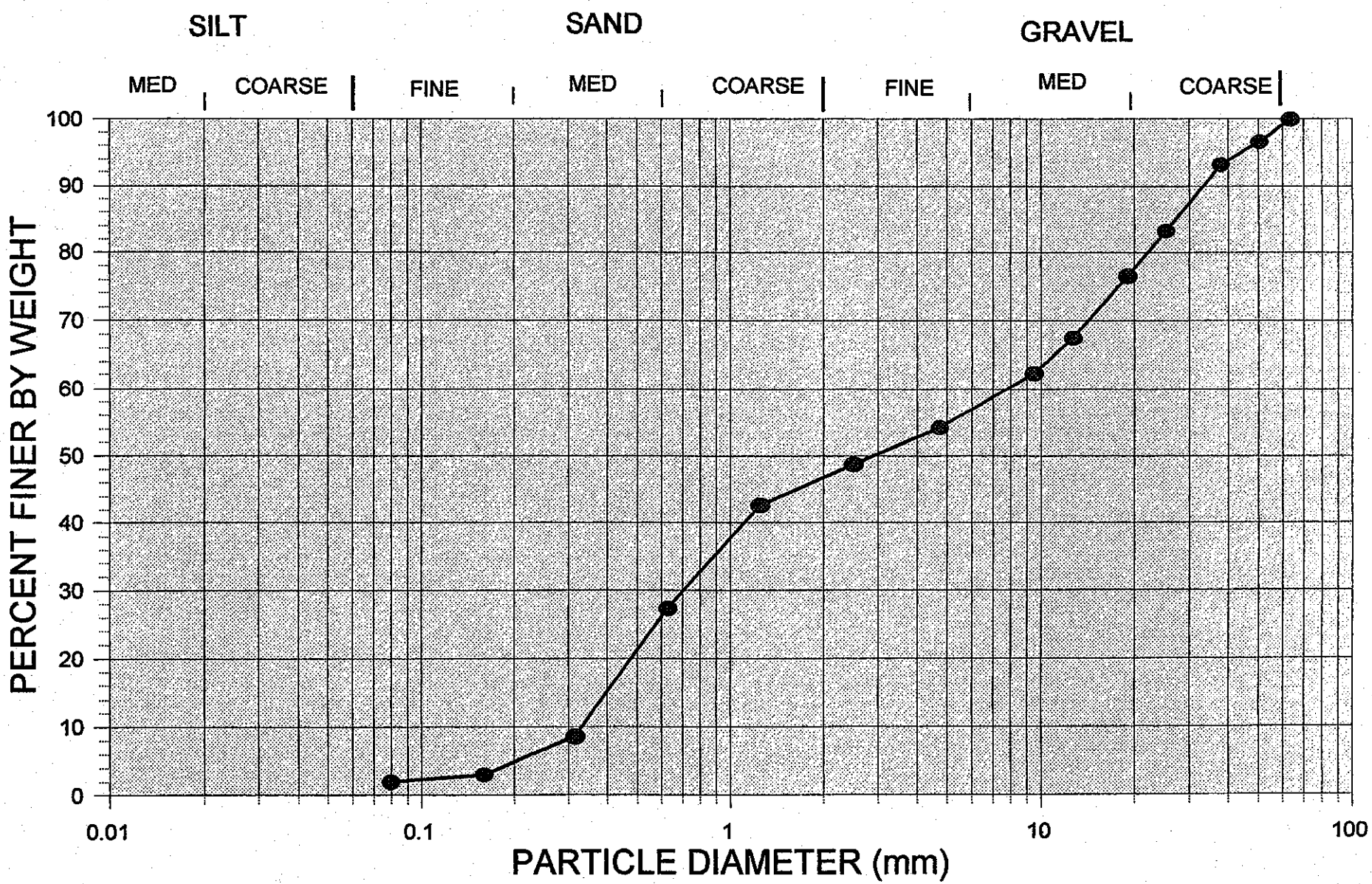
SAMPLE DESCRIPTION:
Cobbles (4%) Gravel (54%), Sand (35.6%), Silt and Clay (6.4%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-28 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (6%), Sand (92.1%), Silt and Clay (1.9%)

UMA ENGINEERING - GRADATION ANALYSIS

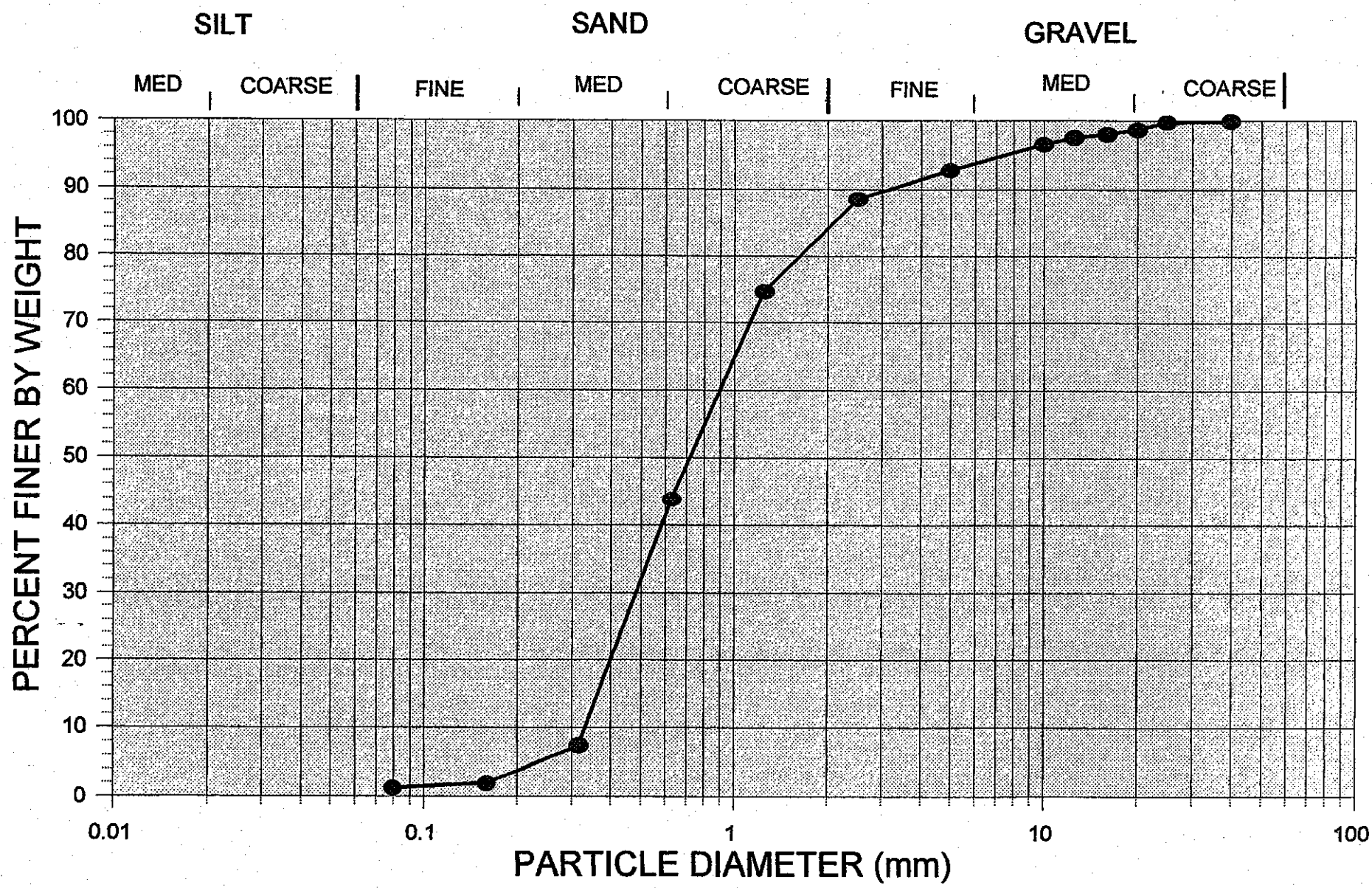


CLIENT: The City Of Winnipeg
PROJECT: Pine Ridge Gravel Pit
JOB No.: 0265-323-01-01

SAMPLE NO: TP-29
DATE SAMPLED: September 22, 1998
SAMPLED BY: JLC

SAMPLE DESCRIPTION:
Cobbles (2%) Gravel (50%), Sand (46%), Silt and Clay (2%)

UMA ENGINEERING - GRADATION ANALYSIS



CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01	SAMPLE NO: TP-30 DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC	SAMPLE DESCRIPTION: Gravel (16%), Sand (82.7%), Silt and Clay (1.3%)

Appendix C
2005/6 Test Pit/Test Hole Logs

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-01**
LOCATION: Centre of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - clean, well graded, 4% <0.075 mm, maximum size 0.9-2.3 cm, frozen to 0.9 m				0
			- moist, wet with depth				
1							1
				■	G1	Grain Size Analysis	
2	SA						2
			- trace (1-2%) gravel below 2.4 m				
3							3
				■	G2		
4							4
			End of hole at 4.3 m				
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.27 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/19/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-02**
LOCATION: Southwest Corner of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ▬ BULK ⁄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - gravelly, maximum size 3.8 cm (3 to 5%), gravel content decreases with depth, frozen to 0.9 m				0
			- very wet				
1	GRSA						1
				■	G3	Grain Size Analysis	
2							2
			End of hole at 2.4 m - water seepage and sloughing at 1.8 to 2.1 m				
3							3
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-03**
LOCATION: Centre of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		GRAVEL - sandy, maximum size 2.5 cm (1-2%), particle size increases with depth (5-10% of 2.5-10.2 cm material), well graded, moist				0
1							1
				GRAB	G4	Grain Size Analysis	
2							2
3			- 10-15% of 5.1-15.2 cm material beyond 3.0 m, wet with depth	GRAB	G5		3
4							4
5			End of hole at 4.6 m				5
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.57 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-04**
LOCATION: North-Central End of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - clean, well graded, 5% <0.075 mm, dry				0
1							1
				■	G6	Grain Size Analysis	
2	SA		- trace gravel (12%)				2
3			- 2% gravel sizes >10 cm, sand cleaner with depth				3
4				■	G7		4
			End of hole at 4.3 m				
5							5
6							6
6.1							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.27 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-05**
LOCATION: North-Central End of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	SA		SAND - beach sand, very clean, 3-5% <0.075 mm, very fine grained, maximum size 2 mm, moist to wet with depth		G8		0
1							1
2							2
			End of hole at 2.4 m due to sloughing of very wet material				
3							3
4							4
5							5
6.1							6

UMA | AECOM

LOGGED BY: D'arryl Schmidt	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-06**
LOCATION: North End of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	SA		SAND - very clean, 1-2% <0.075 mm, very fine grained, maximum size 2 mm, moist with depth				0
1							1
2				G	9		2
3			End of hole at 3.0 m due to sloughing				3
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.05 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-07**
LOCATION: East of Centre of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	OL		TOPSOIL - clay, with organics, black, trace roots				0
	SA		SAND - clean, 0.425 - 2 mm sizes, moist to wet with depth				
	GR		GRAVEL - maximum size 0.6 m				
			SAND - fine to coarse grained, trace gravel, clean				
1							1
				■	G10	Grain Size Analysis	
2							2
	SA						
3							3
4			End of hole at 4.0 m due to sloughing				4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.96 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-08**
LOCATION: East of Centre of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	OL		TOPSOIL - trace rootlets, black, moist				
	GRSA		SAND - gravelly, maximum size 15 cm, gap graded				
	SA		SAND - clean, maximum size 2 mm, moist				
1							1
2							2
3			End of hole at 2.7 m due to sloughing				3
4							4
5							5
6 / 6.1							6

UMA | AECOM

LOGGED BY: D'arryl Schmidt	COMPLETION DEPTH: 2.74 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-09**
LOCATION: Northeast of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ☰ BULK ☒ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		SAND - gravelly, maximum size 1.3-1.9 cm (2-3%)				0
1	SA		SAND - clean, well graded, maximum size 2 mm, 2-3% <0.075 mm, moist				1
2							2
3							3
			End of hole at 3.4 m				
4							4
5							5
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.35 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-10**
LOCATION: East of South End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	SA		SAND - trace gravel, maximum size 5 cm (2-3%)				0
	SA		SAND - well graded, maximum size 2 mm, fairly clean				
1	GRSA		SAND - gravelly, maximum size 10-15 cm (1-3%), gap graded from 4.75 - 50 mm, fairly clean, 2-4% <0.075 mm				1
2				■	G11	Grain Size Analysis	2
3							3
4			End of hole at 3.7 m				4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-11**
LOCATION: West Edge of Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: ■ GRAB | ▥ SHELBY TUBE | ☒ SPLIT SPOON | ▤ BULK | ⧄ NO RECOVERY | ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND AND GRAVEL - 97-98% passing 150-200 mm, 95% passing 50 mm				0
1				■	G12	Grain Size Analysis	1
2	GRSA		- maximum size 5 cm, 1-2% of 5 cm material, 1% of 2.5 cm material, 2-3% of 1.3 cm material				2
3							3
4							4
			End of hole at 4.3 m				
5							5
6							6
6.1							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.27 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-12**
LOCATION: East of South End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL		CLAY - some gravel, maximum size 5 cm (<5%), dark grey to black, frozen				0
			SAND - fairly clean, 2-3% <0.075 mm, well graded, maximum size 2 mm, moist to wet				
1							1
					G13		
2	SA						2
3							3
			End of hole at 3.7 m				
4							4
5							5
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-13**
LOCATION: South-Eastern Edge of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			GRAVEL - sandy, 7-8% <0.075 mm, well graded, 90-95% of <10 cm material, 5% of 10-20 cm material, 2-3% of 20-30 cm material, frozen to 1.0 m				0
1	GRSA		- moist				1
2			GRAVEL - coarser with depth				2
			- 20-25% granite, well graded, maximum size 20 cm (1-2%), 5-10% of 10-15 cm material, 5-10% of 5-10 cm material				
3	GR				G14	Grain Size Analysis	3
4							4
			End of hole at 4.6 m				
5							5
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.57 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-14**
LOCATION: South-Eastern Edge of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - some gravel, clean, maximum size 15-20 cm (1%), 2-4% of 5-10 cm material, 2-4% of 1.9-5 cm material, moist to wet with depth				
1	SA						1
					G15	Grain Size Analysis	
2							2
			GRAVEL - some sand, clean, wet				
3	GR				G16	Grain Size Analysis	3
4							4
			End of hole at 4.3 m				
5							5
6							6
6.1							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.27 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-15**
LOCATION: North End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			GRAVEL - coarse grained, 5% of 30 cm material, 3% of 25 cm material, 10-15% of 15 cm material, 5% of 10 cm material, 5% of 5 cm material				0
1	GR		- sand content increases with depth, maximum size 15 cm (1-2%), 10% of 3.8-10 cm material				1
2				■	G17	Grain Size Analysis	2
3	SA		SAND - gravelly, 35% gravel, well graded				3
4			End of hole at 4.3 m				4
5							5
6							6
6.1							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.27 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-16**
LOCATION: North-Eastern Edge of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		GRAVEL - sandy, maximum size 30 to 36 cm (1-2%)				0
1			SAND AND GRAVEL - well graded, 1-5% <0.075 mm, 10-15% granite, maximum size 20 cm, fines decreasing with depth				1
				GRAB	G18	Grain Size Analysis	
2	GRSA		- maximum size 5 cm below 2.4 m				2
3				GRAB	G19		3
4			End of hole at 4.0 m				4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.96 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/20/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-17**
LOCATION: East of North Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			GRAVEL - well graded 10-20% granite, maximum size 20 cm (1-2%), 4-5% of 15 cm material, frozen to 46 cm				0
			- wet with depth				
1							1
					G20		
			- no 20 cm sizes, less 15 cm sizes, clean with depth				
2	GR						2
			- increase in sand content from 2.4 to 2.6				
3					G21		3
4							4
			End of hole at 4.3 m				
5							5
6							6
6.1							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.27 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-18**
LOCATION: Centre of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GR		GRAVEL - well graded, 10-20% granite, 2-5% of 15 cm material, 1% of 61 cm diameter boulders, frozen to 1.0 m				0
1			- wet with depth				1
2					G22	Grain Size Analysis	2
3							3
3.7			End of hole at 3.7 m				
4							4
5							5
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-19**
LOCATION: West of Centre of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL		CLAY - some gravel, trace sand, frozen				0
1	SA		SAND - well graded, fine grained, frozen to 1.0 m, loose - moist	GRAB	G23	Grain Size Analysis	1
2							2
3			End of hole at 2.7 m due to sloughing				3
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 2.74 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-20**
LOCATION: West of Centre of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	OL		TOPSOIL AND CLAY - sandy, some rootlets, black				0
	SA		SAND - well graded, wet, loose				
1			- trace gravel layer, maximum size 10 cm diameter				1
			- boulders (1-2%)				
2							2
			End of hole at 2.4 m due to sloughing				
3							3
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-21**
LOCATION: West of Centre of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ▮ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL		CLAY, trace gravel, black, frozen				0
1	SA		SAND - well graded, moist, loose - small cobble layer 7.5 cm thick, 15 cm sizes				1
2							2
3			End of hole at 3.4 m				3
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.35 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-22**
LOCATION: North Edge of South Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - trace clay, trace gravel, frozen to 1.0 m				0
1	SA		- wet		G24		1
2			End of hole at 2.4 m - seepage at 1.2 m				2
3							3
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: D'arryl Schmidt	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-23**
LOCATION: Northwestern Edge of South Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - trace clay, frozen to 1.0 m, wet, loose				0
1	SA				G25		1
2	CH		CLAY - trace silt inclusions, dark grey, high plasticity, moist, firm				2
3							3
4			End of hole at 3.7 m - seepage at 1.8 m				4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: D'arryl Schmidt	COMPLETION DEPTH: 3.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-24**
LOCATION: Northwestern Edge of South Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	SA		SAND - trace gravel, poorly graded, frozen				0
			SAND - clean to very clean with depth, frozen to 1.0				
1			- dry				1
					G26		
	SA						
2							2
3							3
			End of hole at 3.4 m				
4							4
5							5
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.35 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-25**
LOCATION: East of Site Office		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL		CLAY - some gravel, trace sand, black/brown, low plasticity, frozen				0
	SA		SAND - clean, moist to wet with depth	GRAB	G27		
4			End of hole at 4.0 m				4
6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.96 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-26**
LOCATION: North of Site Office		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	OL		TOPSOIL AND CLAY - trace sand, some rootlets, black				
	GRSA		SAND - gravelly, poorly graded, maximum size 15 cm (2%)				
1							1
				GRAB	G28	Grain Size Analysis	
2							2
3							3
			End of hole at 3.7 m				
4							4
5							5
6 6.1							6

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 3.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TP-05-27**
LOCATION: East of North Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Borland Construction	METHOD: 330B CAT	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0			SAND - gravelly, maximum size 2.5 cm, frozen to 0.3 m				0
			- dry to moist with depth				
1	GRSA						1
				■	G29	Grain Size Analysis	
2							2
			GRAVEL - sandy, poorly graded, minimum size 0.25 mm, maximum size 15 cm (3-5%)				
3	GR						3
4							4
			End of hole at 4.6 m				
5							5
6 6.1							6

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 4.57 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 12/21/05
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-28**
LOCATION: West of Centre of Pit A - Beside TP-05-19		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GR		GRAVEL - some cobbles, maximum size 50 mm, frozen				0
1			SAND - fine grained, moist, loose				1
2							2
3	SA						3
4							4
5			- trace gravel, maximum size 20 mm - trace clay to 5.8 m				5
6			CLAY - silty, low to medium plasticity, brown/grey, moist to wet, soft				6
7	CI						7
8			End of hole at 7.6 m				8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							

UMA | AECOM

LOGGED BY: D'arryl Schmidt	COMPLETION DEPTH: 32.00 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-29**
LOCATION: Bottom of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		GRAVEL - sandy				0
			GRAVEL - some sand, sand content increases with depth, well graded, maximum size 20 mm				
1							1
2							2
3							3
4	GR						4
5							5
6			- rough drilling, estimated 7.6 to 10 cm diameter cobbles, dry				6
7							7
			SAND - some gravel, maximum size 7.6 cm				
8	SA						8
9							9
			SAND - trace gravel, maximum size 1.0 cm				
10							10
11							11
12							12
13							13
14							14
	SA		- wet, fines decreasing below 14.3 m				
15			- trace gravel, estimated 7.6-10 cm diameter cobbles				15
16							16
17							17
18							18
19							19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 15.24 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 2

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-29**
LOCATION: Bottom of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⁄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
20							
21							21
22	SA						22
23							23
24			SAND - very clean, fine grained				24
25							25
26							26
27							27
28	SA						28
29							29
30							30
31			- grey				31
32			End of hole at 32 m				32
33							33
34							34
35							35
36							36
37							37
38							38
39							39
40							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 15.24 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 2 of 2

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-30**
LOCATION: Between Pit A and Pit B		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		SAND - gravelly, maximum size 1.9 cm, frozen to 0.76 cm				0
1			- dry				1
			SAND - bedding sand, very fine grained, dry, loose				
2	SA						2
3							3
			SAND - gravelly, less than 5% gravel, dry				
4							4
5							5
6							6
7							7
8	GRSA						8
9							9
10							10
11							11
12							12
			CLAY - sandy, wet, very soft				
13	SACL						13
14			CLAY - trace till inclusions, medium plasticity, dark gray, moist, very soft				14
	CI						
15			End of hole at 15.2 m				15
16							16
17							17
18							18
19							19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 15.24 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-31**
LOCATION: North End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		SAND AND GRAVEL - frozen				0
1	GR		GRAVEL - well graded, very coarse grained, maximum size 3.8 cm, difficult drilling, frozen to 0.76 m - moist				1
2							2
3							3
4	SA		SAND - very fine grained, dry, loose				4
5	GR		GRAVEL - some cobbles (5-7.6 cm sizes), very coarse grained				5
6							6
7							7
8	SA		SAND - trace gravel, maximum size 0.9 cm, very fine grained, dry				8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16			End of hole at 15.2 m - seepage at 14.6 m				16
17							17
18							18
19							19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 15.24 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-32**
LOCATION: West of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		SAND - with gravel, mostly 1.3-2.0 cm sizes, very coarse grained, frozen to 0.3 m				0
5	SA		SAND - coarse grained, no cobbles, damp, loose				5
7	SA		SAND - some gravel (10-15%) - some cobbles/boulders, difficult drilling, increasing gravel content with depth				7
15			End of hole at 15.2 m due to auger refusal on boulders				15
20							20

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 15.24 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-33**
LOCATION: East of North Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Brat - 125 mm Solid Stem Auger	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GC		GRAVEL AND CLAY (Fill)				0
1			SAND - no gravel, very fine grained, dry, loose				1
2	SA						2
3							3
4			GRAVEL AND SAND - coarse grained, coarser with depth				4
5	GRSA						5
6			GRAVEL - sandy, some cobbles (maximum size 7.6 cm), very difficult drilling				6
7							7
8							8
9							9
10							10
11	GRSA						11
12							12
13							13
14							14
15							15
16			End of hole at 15.2 m				16
17							17
18							18
19							19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 15.24 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 1/11/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-34**
LOCATION: North End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GRSA		SAND AND GRAVEL - frozen				0
1	GR		GRAVEL - well graded, very coarse grained, maximum size 3.8 cm, difficult drilling, frozen to 0.76 m - moist				1
2	GR						2
3							3
4	SA		SAND - very fine grained, dry, loose				4
5			GRAVEL - some cobbles (5-7.6 cm sizes), very coarse grained	■	G30	Grain Size Analysis	5
6	GR						6
7							7
8			SAND - trace gravel, maximum size 0.9 cm, very fine grained, dry				8
9				■	G31		9
10							10
11	SA						11
12							12
13							13
14				■	G32		14
15			SAND - gravelly, maximum size 1.9 cm				15
16							16
17							17
18	GRSA						18
19				■	G33		19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 60.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/1/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 4

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-34**
LOCATION: North End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ⊠ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
20							20
21	GRSA						21
22							22
23			- trace silt till GRAVEL (Till) - silty				23
24							24
25							25
26							26
27							27
28	GT		- hole open	■	G34		28
29							29
30							30
31							31
32			- very easy drilling, loose	■	G35		32
33	GRSA		SAND AND GRAVEL GRAVEL (Till) - silty, white cemetacious material, hard, hole staying open				33
34							34
35							35
36	GT						36
37				■	G36		37
38	SA		SAND - easy drilling for 0.6 m				38
39	GM		SILT (Till) - trace to some gravel				39
40							

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 60.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/1/06
PROJECT ENGINEER: Steve Wiecek	Page 2 of 4

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-34**
LOCATION: North End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
40							40
41				■	G37		41
42							42
43							43
44							44
45							45
46				■	G38		46
47			- denser below 47.5 m				47
48							48
49							49
50	GM						50
51							51
52							52
53							53
54							54
55							55
56							56
57							57
58							58
59							59
60							

UMA | AECOM

LOGGED BY: D'arryl Schmidt	COMPLETION DEPTH: 60.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/1/06
PROJECT ENGINEER: Steve Wiecek	Page 3 of 4

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-34**
LOCATION: North End of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
60	GM						
	BE		BEDROCK - limestone				
61			End of hole at 60.7 m				61
62							62
63							63
64							64
65							65
66							66
67							67
68							68
69							69
70							70
71							71
72							72
73							73
74							74
75							75
76							76
77							77
78							78
79							79
80							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 60.66 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/1/06
PROJECT ENGINEER: Steve Wiecek	Page 4 of 4

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-35**
LOCATION: West of Pit A Near Hydro Lines		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GR		PIT STRIPPING GRAVEL - with clay, topsoil, roots, black sand				0
1	CI		CLAY - trace gravel, black				1
2							2
3			SAND AND TILL - trace gravel, fine grained, easy drilling		G39	Grain Size Analysis	3
4							4
5			some gravel, trace cobbles				5
6							6
7							7
8			- no cobbles				8
9					G40		9
10							10
11	SM						11
12							12
13							13
14					G41		14
15			- increase in till content				15
16							16
17							17
18					G42		18
19	GR		GRAVEL - coarse grained, some sand, difficult drilling				19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 36.58 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/2/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 2

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-35**
LOCATION: West of Pit A Near Hydro Lines		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
20							20
21							21
22							22
23			- 30-40% granite	■	G43		23
24							24
25	GR						25
26							26
27							27
28			- gravel size 0.6-0.9 cm	■	G44		28
29							29
30							30
31			GRAVEL - trace till, finer particles with depth, hole staying open				31
32			- trace cementacious material (1%)	■	G45		32
33							33
34	GR						34
35							35
36							36
37			End of hole at 36.6 m	■	G46		37
38							38
39							39
40							

UMA | AECOM

LOGGED BY: Darryl Schmidt
REVIEWED BY: Steve Wiecek
PROJECT ENGINEER: Steve Wiecek

COMPLETION DEPTH: 36.58 m
COMPLETION DATE: 2/2/06

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-36**
LOCATION: Northwest of Pit A Near Hydro Lines		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	SA		SAND -some gravel, trace clay				0
1	SICL		SILT AND CLAY - dark black				1
2			GRAVEL - sandy, some cobbles				2
3							3
4	GRSA						4
5					G47	Grain Size Analysis	5
6			GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling				6
7							7
8							8
9	GR				G48		9
10							10
11							11
12							12
13	GRSA		SAND - gravelly, trace cobbles				13
	GR		GRAVEL - 1.3-1.9 cm sizes, with boulders, 40% granite		G49		
14			End of hole at 13.7 m - sloughing below 9.1 m				14
15							15
16							16
17							17
18							18
19							19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 13.72 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/2/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-37**
LOCATION: Northeast of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	SA		SAND - clean, well graded				0
1							1
2			SAND - gravelly, 40% granite				2
3			- trace silt				3
4	GRSA						4
5				■	G50	Grain Size Analysis	5
6			SAND - trace gravel pockets(10-15 cm in size), trace cobbles, very easy drilling				6
7							7
8							8
9				■	G51		9
10	SA						10
11							11
12							12
13							13
14			SAND - trace gravel	■	G52		14
15							15
16							16
17	SA						17
18							18
19			- trace silt till	■	G53		19
20							

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 22.86 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/6/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 2

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-37**
LOCATION: Northeast of Pit A		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
20	SA		- some gravel, some silt till				20
21							21
22	GRSA		GRAVEL - sandy				22
23			End of hole at 22.9 m				23
24							24
25							25
26							26
27							27
28							28
29							29
30							30
31							31
32							32
33							33
34							34
35							35
36							36
37							37
38							38
39							39
40							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 22.86 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/6/06
PROJECT ENGINEER: Steve Wiecek	Page 2 of 2

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-38**
LOCATION: East of North Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ☰ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0							
1	SA		SAND - clean, fine grained, beach sand				1
2	GRSA		GRAVEL - sandy, 30% granite, maximum size 1.9 cm, no boulders				2
3	SA		SAND - fine grained				3
4			GRAVEL - sandy, 30% granite, maximum size 1.9 cm, no boulders				4
5				■	G54	Grain Size Analysis	5
6			- with coarse grained gravel, 2.5 cm sizes				6
7	GR						7
8							8
9				■	G55		9
10	SA		SAND				10
11			GRAVEL - sandy				11
12			- trace silt till				12
13							13
14				■	G56		14
15	GRSA						15
16							16
17							17
18							18
19			- gravel/cobble content increases below 18.5 m	■	G57		19
20							

UMA | AECOM

LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 27.43 m
REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/6/06
PROJECT ENGINEER: Steve Wiecek	Page 1 of 2

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

PROJECT: Pine Ridge Pit Aggregate Assessment	CLIENT: City of Winnipeg	TESTPIT NO: **TH-06-38**
LOCATION: East of North Fine Sand Hole		PROJECT NO.: 0265-381-00-02
CONTRACTOR: Maple Leaf Enterprises Ltd.	METHOD: Canterra Drill Rig - Mud Rotary	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⧄ NO RECOVERY ◧ CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
20							20
21	GRSA						21
22							22
23			SAND - gravelly, 1.9 cm sizes (rounded)	■	G58		23
24	GRSA		- gravel content decreases below 24.1 m				24
25			GRAVEL - some sand, maximum size 6 mm				25
26	GR						26
27							27
			End of hole at 27.4 m				
28							28
29							29
30							30
31							31
32							32
33							33
34							34
35							35
36							36
37							37
38							38
39							39
40							

UMA | AECOM	LOGGED BY: Darryl Schmidt	COMPLETION DEPTH: 27.43 m
	REVIEWED BY: Steve Wiecek	COMPLETION DATE: 2/6/06
	PROJECT ENGINEER: Steve Wiecek	Page 2 of 2

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

Appendix D
2005/6 Gradation Curves

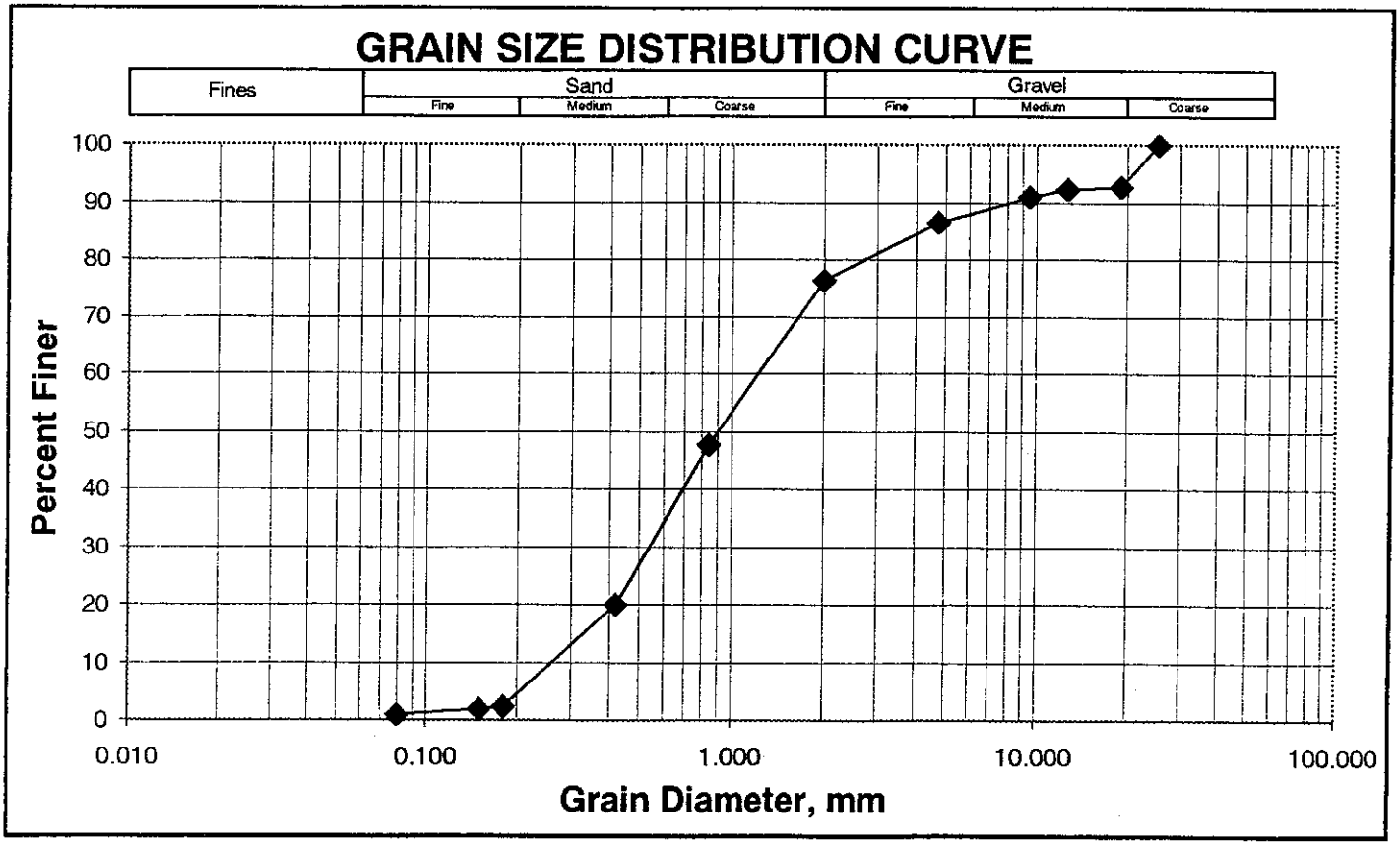
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 13-Jan-06

Contractor
Sample No. SO5-162
Depth: 12ft.
Sample Description: TP 1, G2

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"	100.0	
19.1	3/4"	92.8	
12.7	1/2"	92.4	
9.500	3/8"	91.0	
4.750	No. 4	86.5	
2.000	No. 10	76.4	
0.841	No. 20	47.7	
0.420	No. 40	20.0	
0.180	No. 80	2.4	
0.150	No. 100	1.9	
0.080	No. 200	1.0	

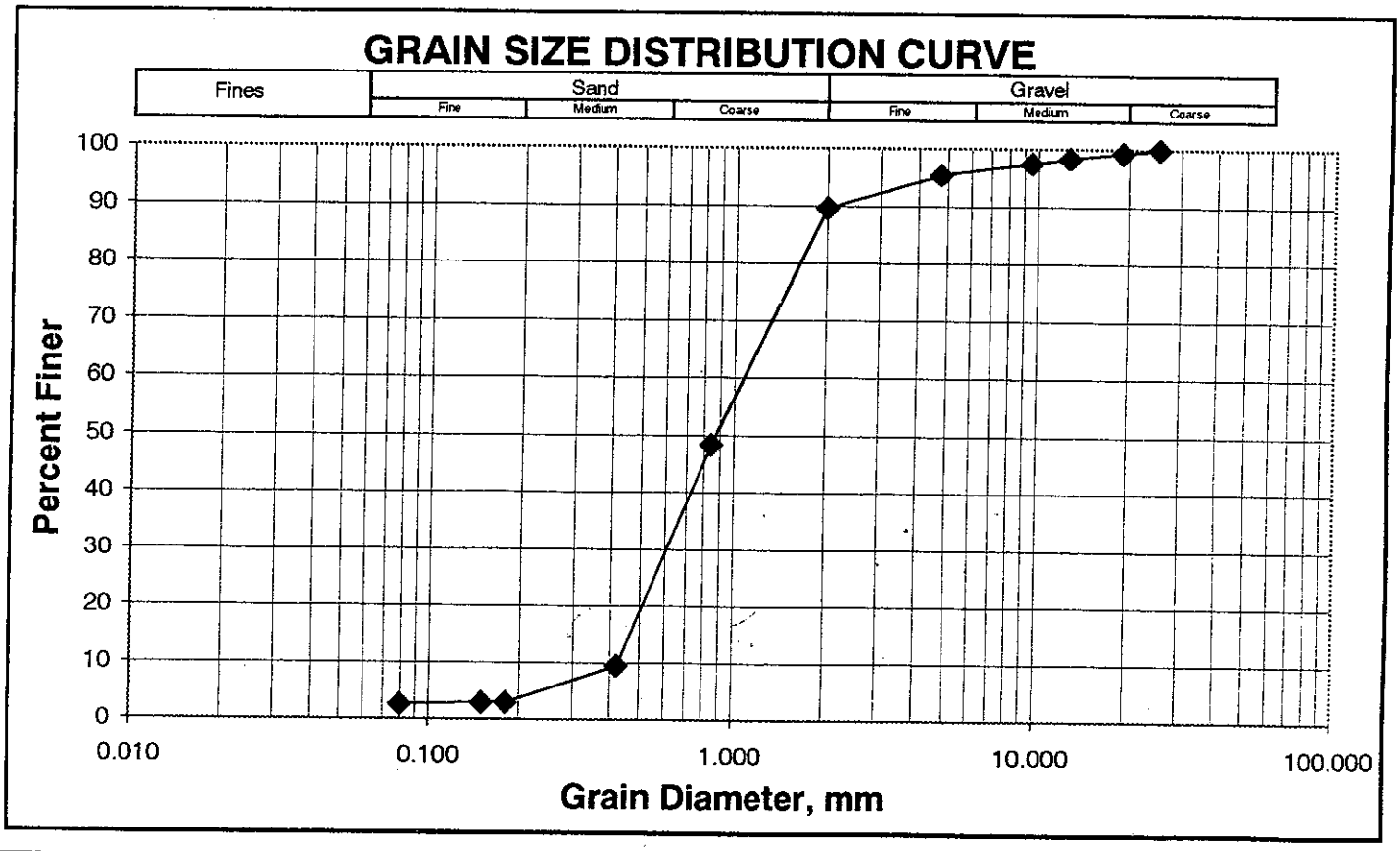


GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client:	City Of Winnipeg	Contractor	
Project:	Pine Ridge Pit	Sample No.	SO5-162
Job No:	0265-381-02	Depth:	5ft.
Date :	10-Jan-06	Sample Description:	TP 2, G3

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"	100.0	
19.1	3/4"	99.3	
12.7	1/2"	98.4	
9.500	3/8"	97.5	
4.750	No. 4	95.4	
2.000	No. 10	89.7	
0.841	No. 20	48.4	
0.420	No. 40	9.5	
0.180	No. 80	3.0	
0.150	No. 100	2.9	
0.080	No. 200	2.7	



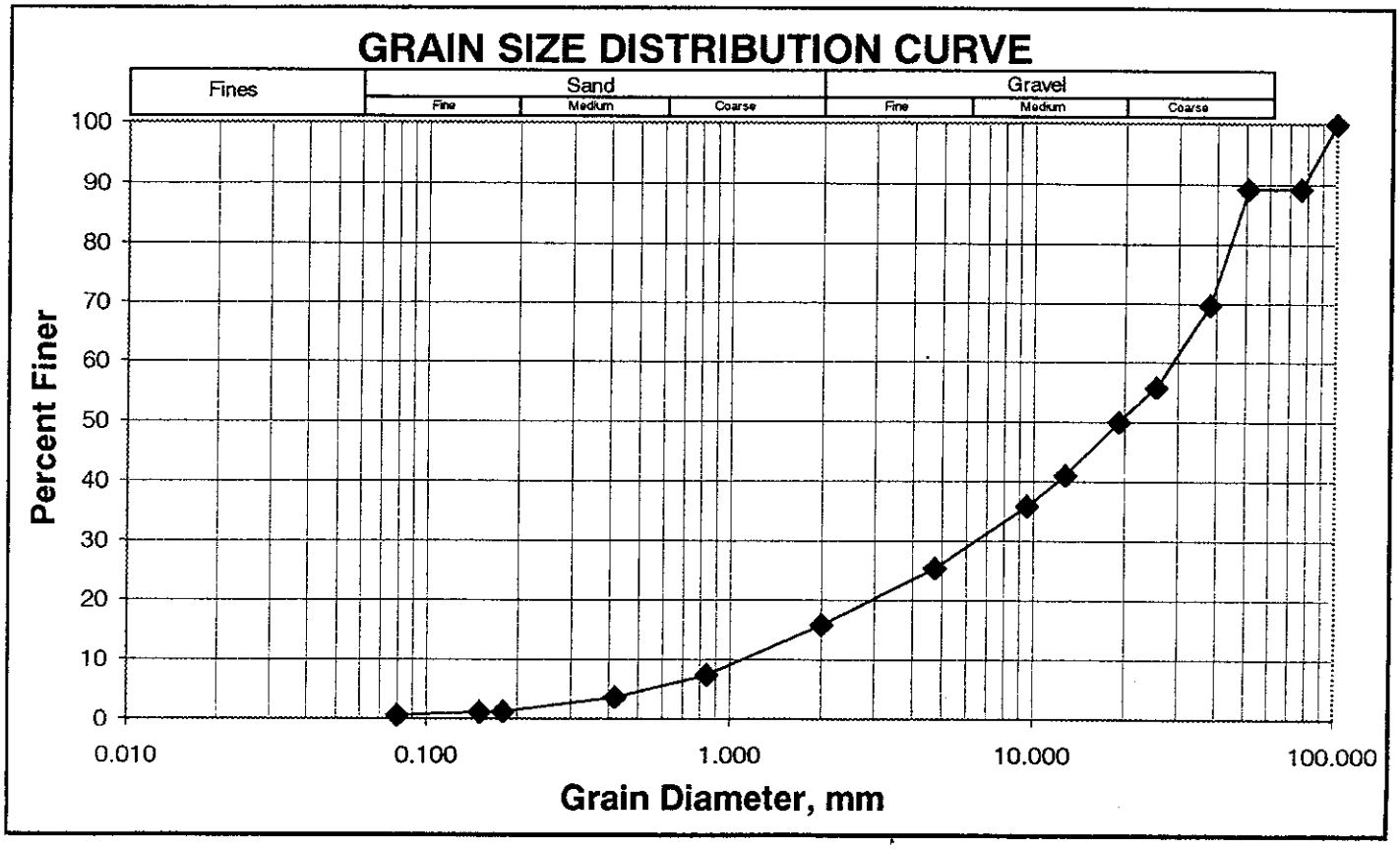
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 16-Jan-06

Contractor
Sample No. SO5-162
Depth: 10ft.
Sample Description: TP 3, G5

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
100.0	4"	100.0	
76.2	3"	89.2	
50.8	2"	89.2	
25.4	1"	55.8	
19.1	3/4"	50.0	
12.7	1/2"	41.0	
9.500	3/8"	35.9	
4.750	No. 4	25.5	
2.000	No. 10	15.9	
0.841	No. 20	7.5	
0.420	No. 40	3.7	
0.180	No. 80	1.3	
0.150	No. 100	1.2	
0.080	No. 200	0.7	



GRAIN SIZE DISTRIBUTION

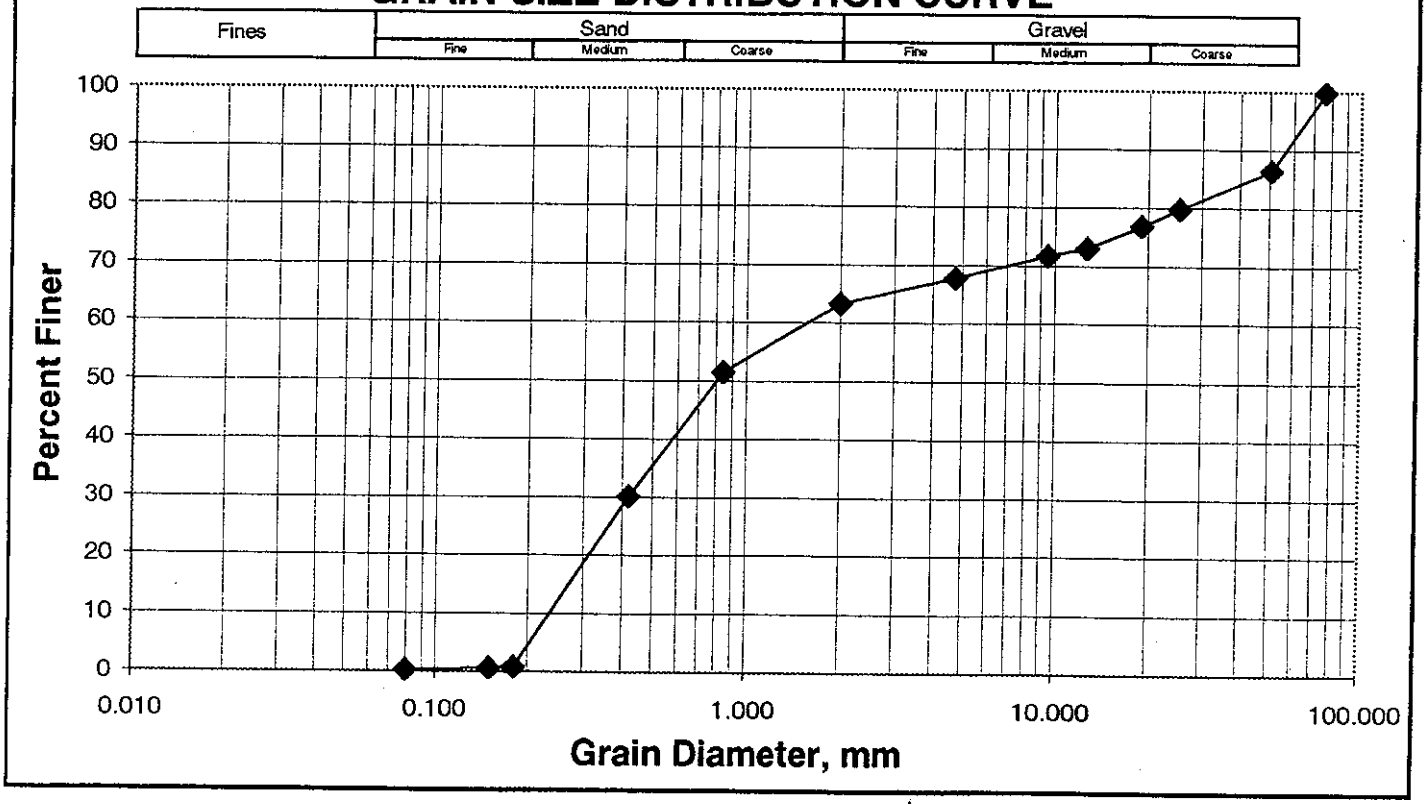
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 10-Jan-06

Contractor
Sample No. SO5-162
Depth: 13ft.
Sample Description: TP 4, G7

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"	100.0	
50.8	2"	86.4	
25.4	1"	79.8	
19.1	3/4"	76.8	
12.7	1/2"	73.0	
9.500	3/8"	71.7	
4.750	No. 4	67.8	
2.000	No. 10	63.3	
0.841	No. 20	51.5	
0.420	No. 40	30.2	
0.180	No. 80	0.9	
0.150	No. 100	0.7	
0.080	No. 200	0.3	

GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION

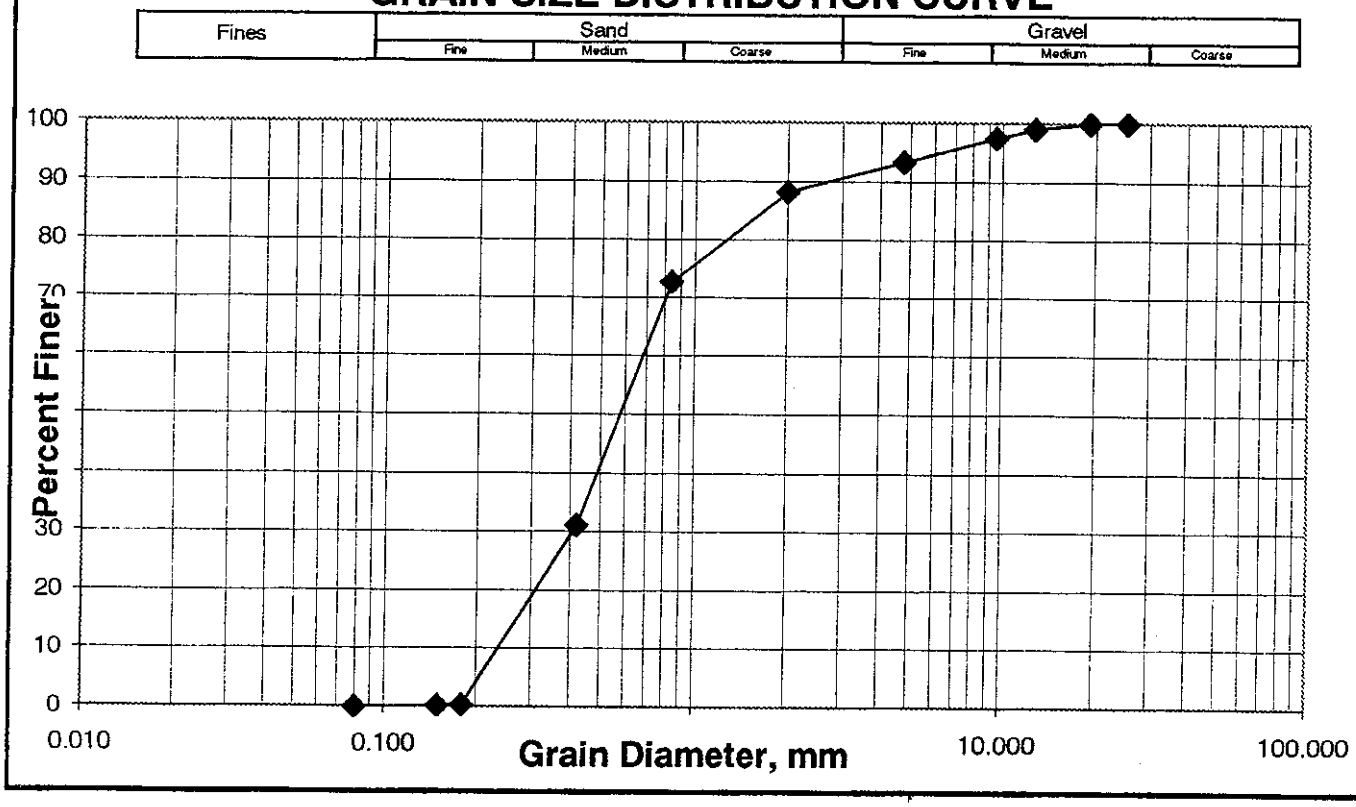
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 10-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 7, G10

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"	100.0	
12.7	1/2"	99.1	
9.500	3/8"	97.5	
4.750	No. 4	93.4	
2.000	No. 10	88.2	
0.841	No. 20	72.7	
0.420	No. 40	31.1	
0.180	No. 80	0.3	
0.150	No. 100	0.2	
0.080	No. 200	0.1	

GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION

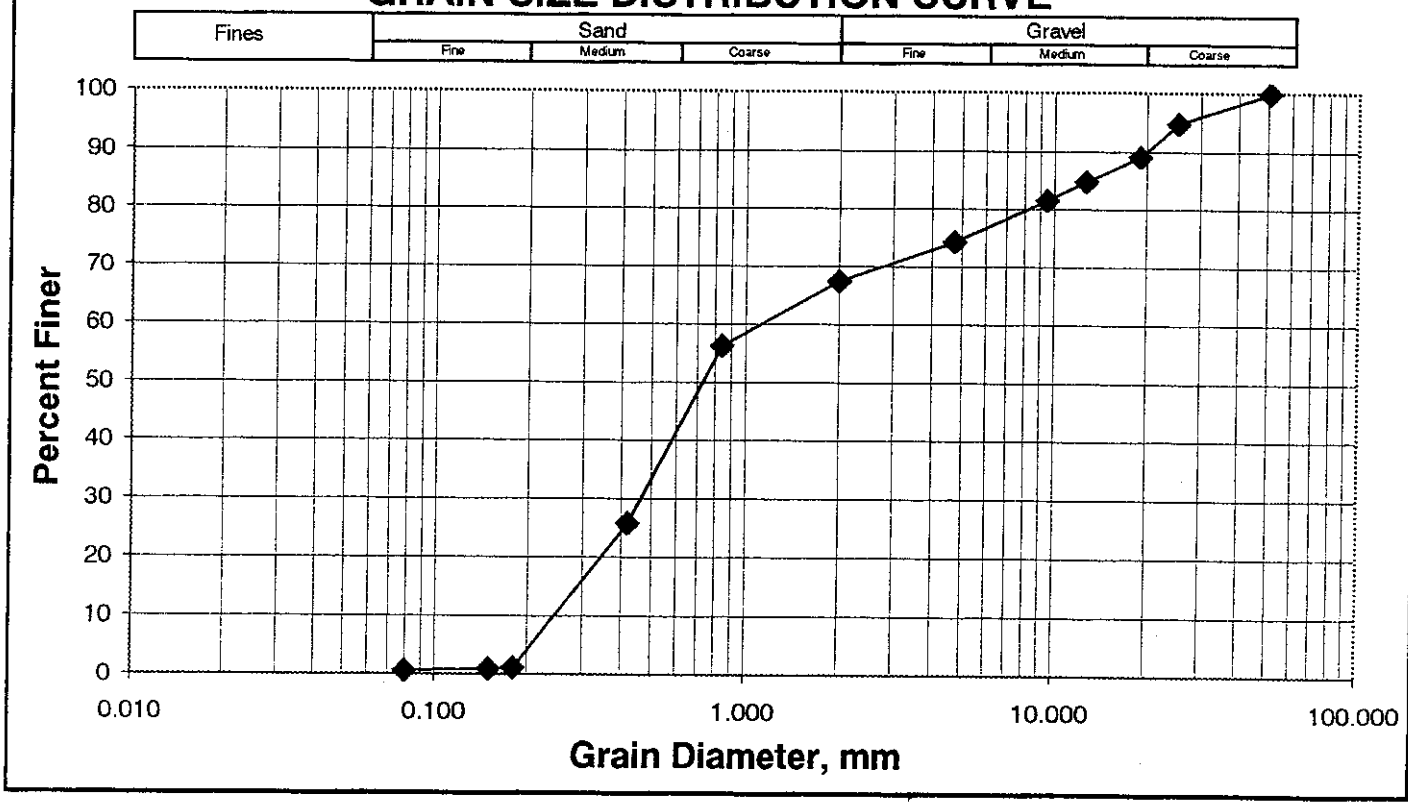
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 10-Jan-06

Contractor
Sample No. SO5-162
Depth: 6ft.
Sample Description: TP 10, G11

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	94.8	
19.1	3/4"	89.1	
12.7	1/2"	84.8	
9.500	3/8"	81.6	
4.750	No. 4	74.3	
2.000	No. 10	67.5	
0.841	No. 20	56.3	
0.420	No. 40	25.8	
0.180	No. 80	1.2	
0.150	No. 100	1.0	
0.080	No. 200	0.6	

GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION

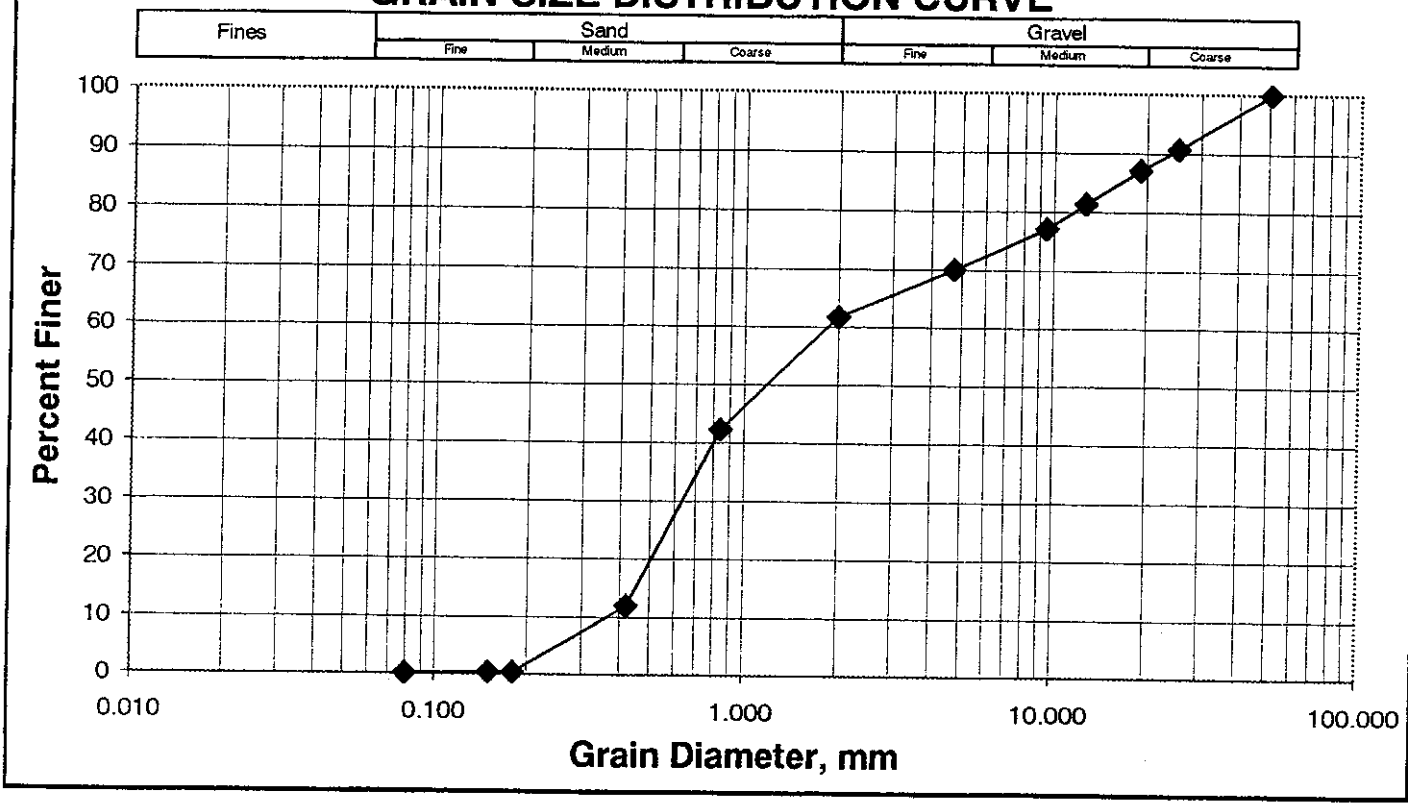
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 13-Jan-06

Contractor
Sample No. SO5-162
Depth: 4ft.
Sample Description: TP 11, G12

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	90.7	
19.1	3/4"	87.1	
12.7	1/2"	81.4	
9.500	3/8"	77.2	
4.750	No. 4	70.1	
2.000	No. 10	61.8	
0.841	No. 20	42.3	
0.420	No. 40	12.0	
0.180	No. 80	0.5	
0.150	No. 100	0.4	
0.080	No. 200	0.2	

GRAIN SIZE DISTRIBUTION CURVE



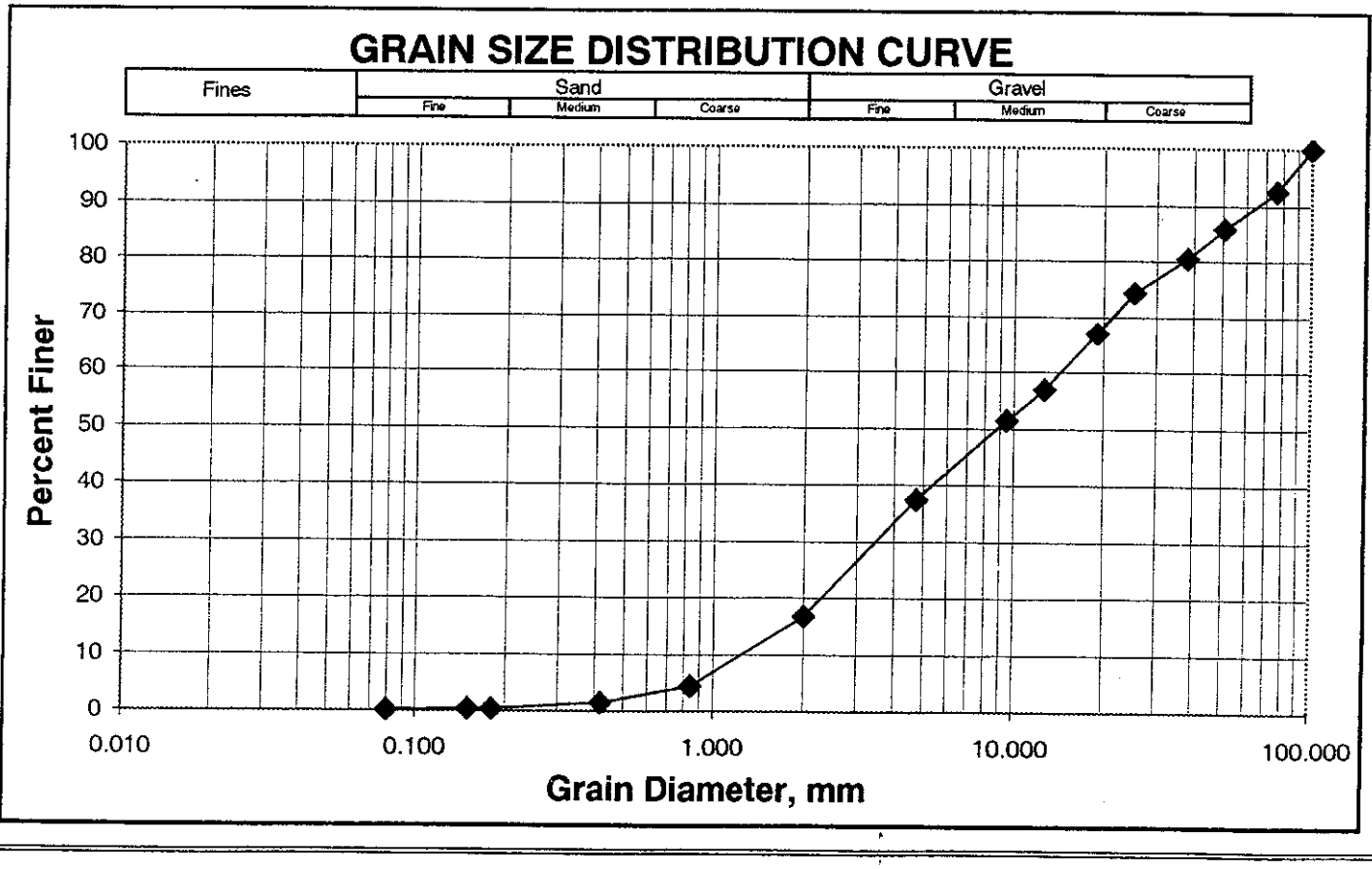
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 13-Jan-06

Contractor
Sample No. SO5-162
Depth: 10ft.
Sample Description: TP 13, G14

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
100.0	4"	100.0	
76.2	3"	92.5	
50.8	2"	85.9	
25.4	1"	74.4	
19.1	3/4"	67.0	
12.7	1/2"	57.0	
9.500	3/8"	51.5	
4.750	No. 4	37.5	
2.000	No. 10	16.9	
0.841	No. 20	4.5	
0.420	No. 40	1.5	
0.180	No. 80	0.5	
0.150	No. 100	0.4	
0.080	No. 200	0.3	



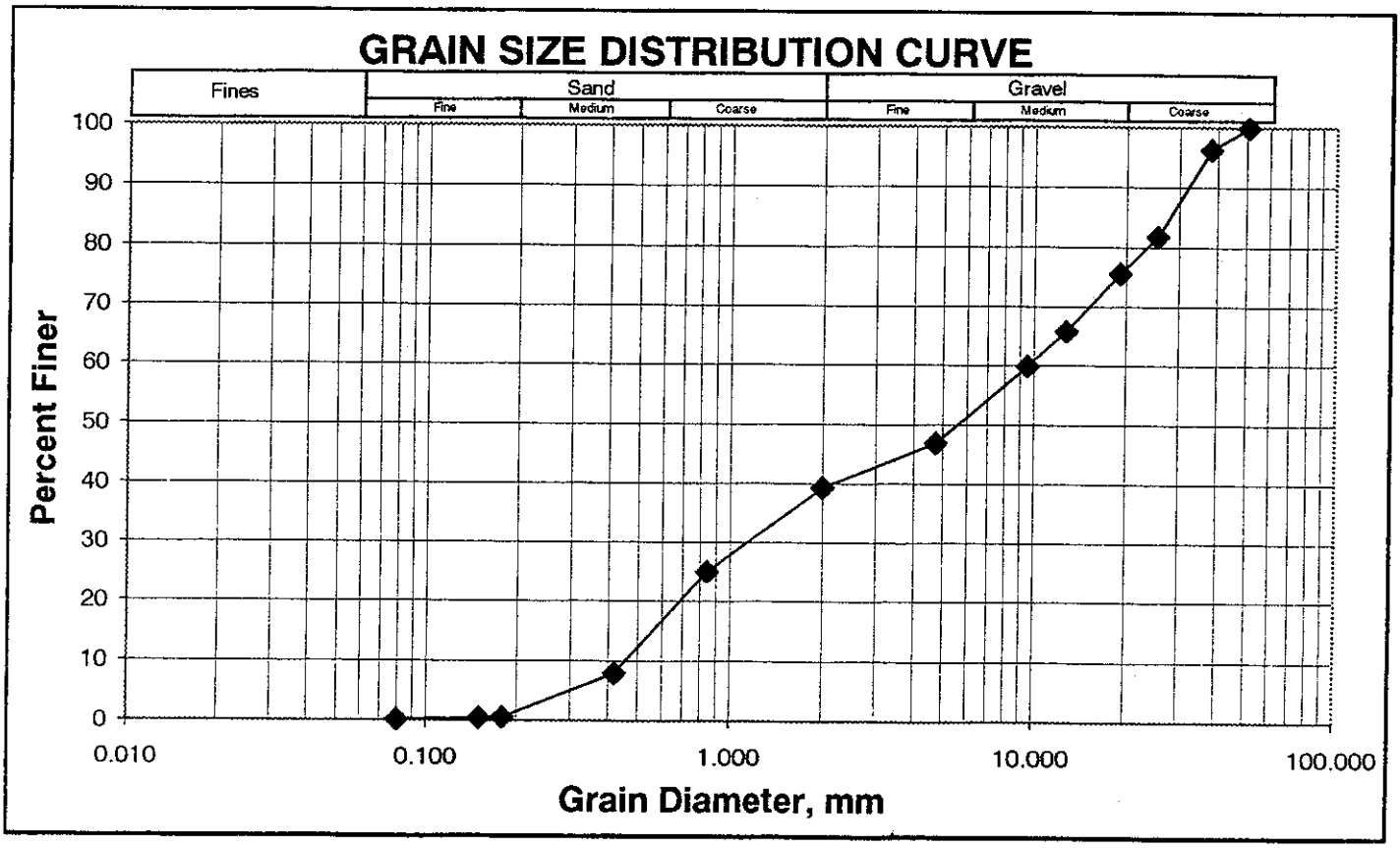
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 13-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 14, G15

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
100.0	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	81.7	
19.1	3/4"	75.6	
12.7	1/2"	65.8	
9.500	3/8"	59.9	
4.750	No. 4	46.9	
2.000	No. 10	39.4	
0.841	No. 20	25.0	
0.420	No. 40	8.0	
0.180	No. 80	0.7	
0.150	No. 100	0.6	
0.080	No. 200	0.2	



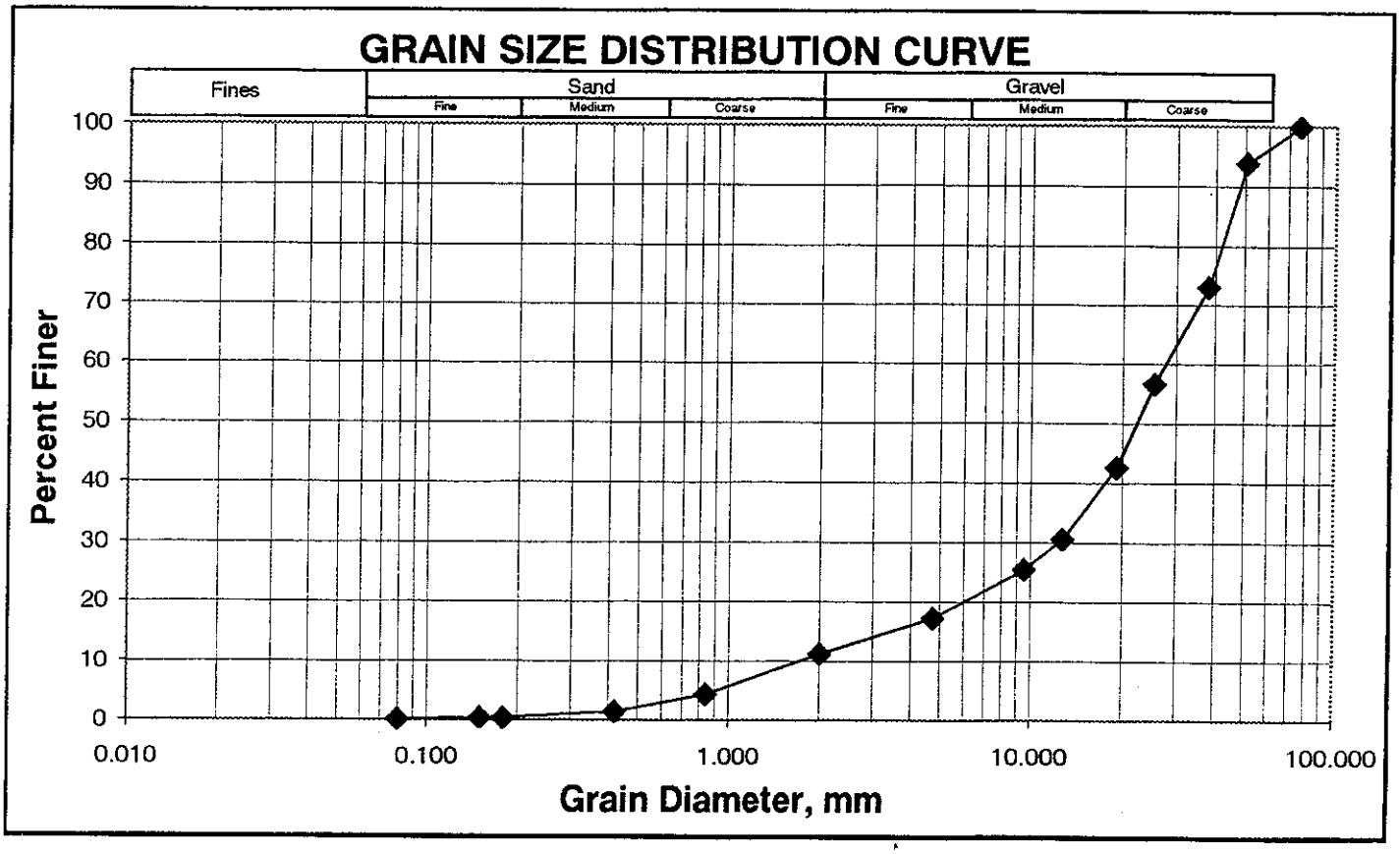
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 16-Jan-06

Contractor
Sample No. SO5-162
Depth: 10ft.
Sample Description: TP 14, G16

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
100.0	4"		
76.2	3"	100.0	
50.8	2"	93.9	
25.4	1"	56.7	
19.1	3/4"	42.6	
12.7	1/2"	30.6	
9.500	3/8"	25.5	
4.750	No. 4	17.3	
2.000	No. 10	11.3	
0.841	No. 20	4.4	
0.420	No. 40	1.5	
0.180	No. 80	0.4	
0.150	No. 100	0.4	
0.080	No. 200	0.2	



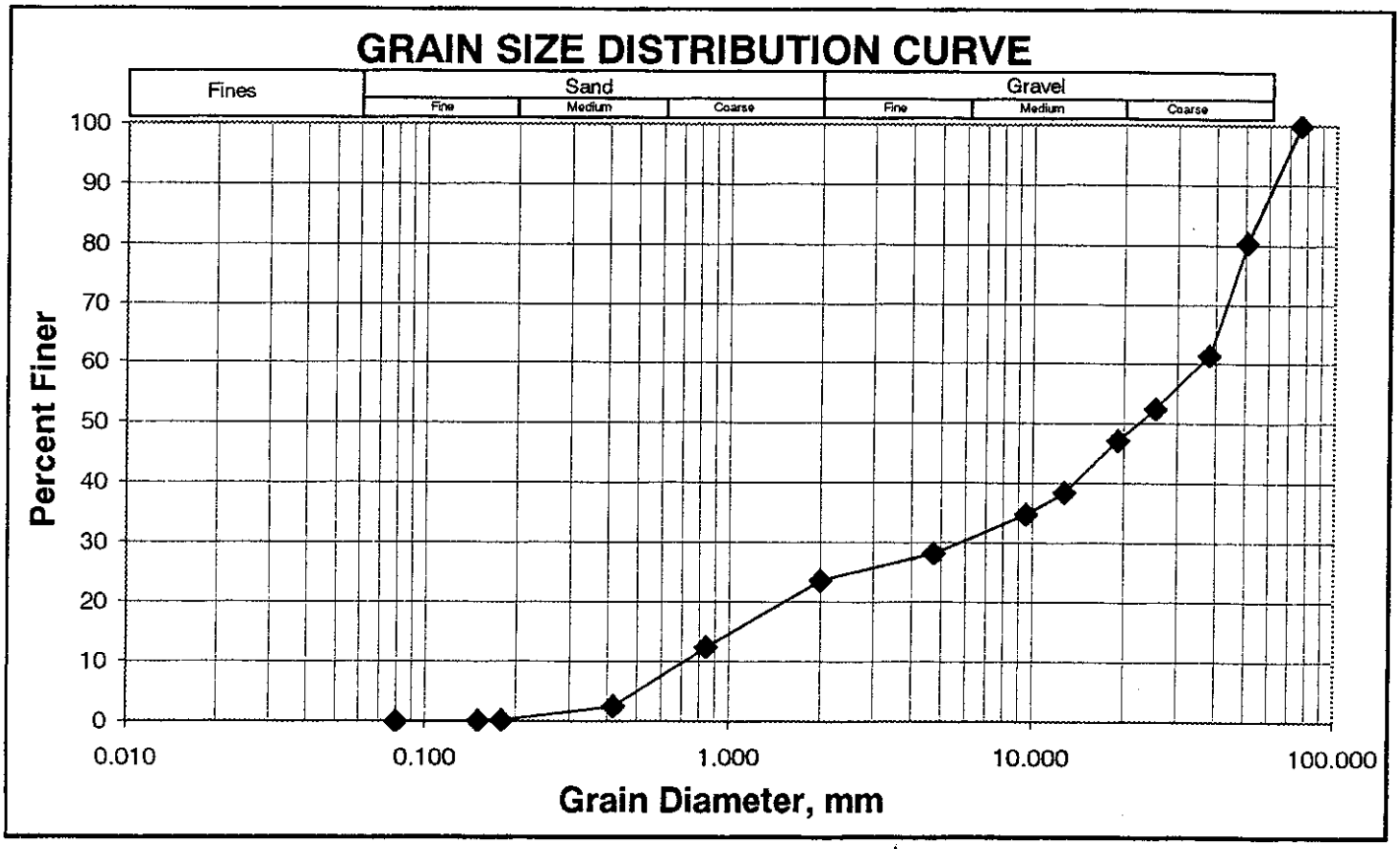
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 16-Jan-06

Contractor
Sample No. SO5-162
Depth: 7ft.
Sample Description: TP 15, G17

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
100.0	4"		
76.2	3"	100.0	
50.8	2"	80.3	
25.4	1"	52.5	
19.1	3/4"	47.1	
12.7	1/2"	38.4	
9.500	3/8"	34.7	
4.750	No. 4	28.2	
2.000	No. 10	23.6	
0.841	No. 20	12.4	
0.420	No. 40	2.5	
0.180	No. 80	0.2	
0.150	No. 100	0.1	
0.080	No. 200	0.0	



GRAIN SIZE DISTRIBUTION

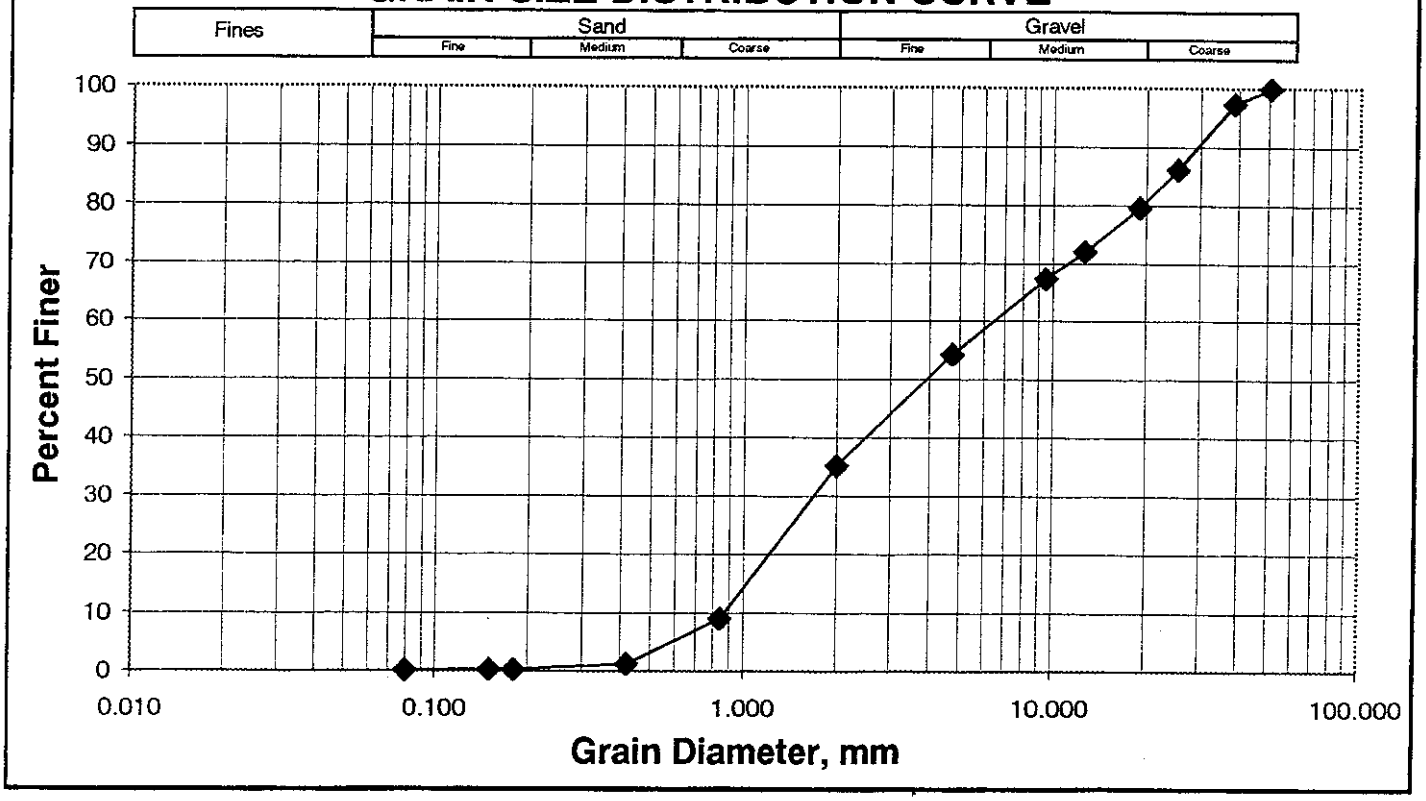
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 13-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 16, G18

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	86.1	
19.1	3/4"	79.6	
12.7	1/2"	72.1	
9.500	3/8"	67.4	
4.750	No. 4	54.2	
2.000	No. 10	35.2	
0.841	No. 20	9.1	
0.420	No. 40	1.3	
0.180	No. 80	0.3	
0.150	No. 100	0.3	
0.080	No. 200	0.2	

GRAIN SIZE DISTRIBUTION CURVE



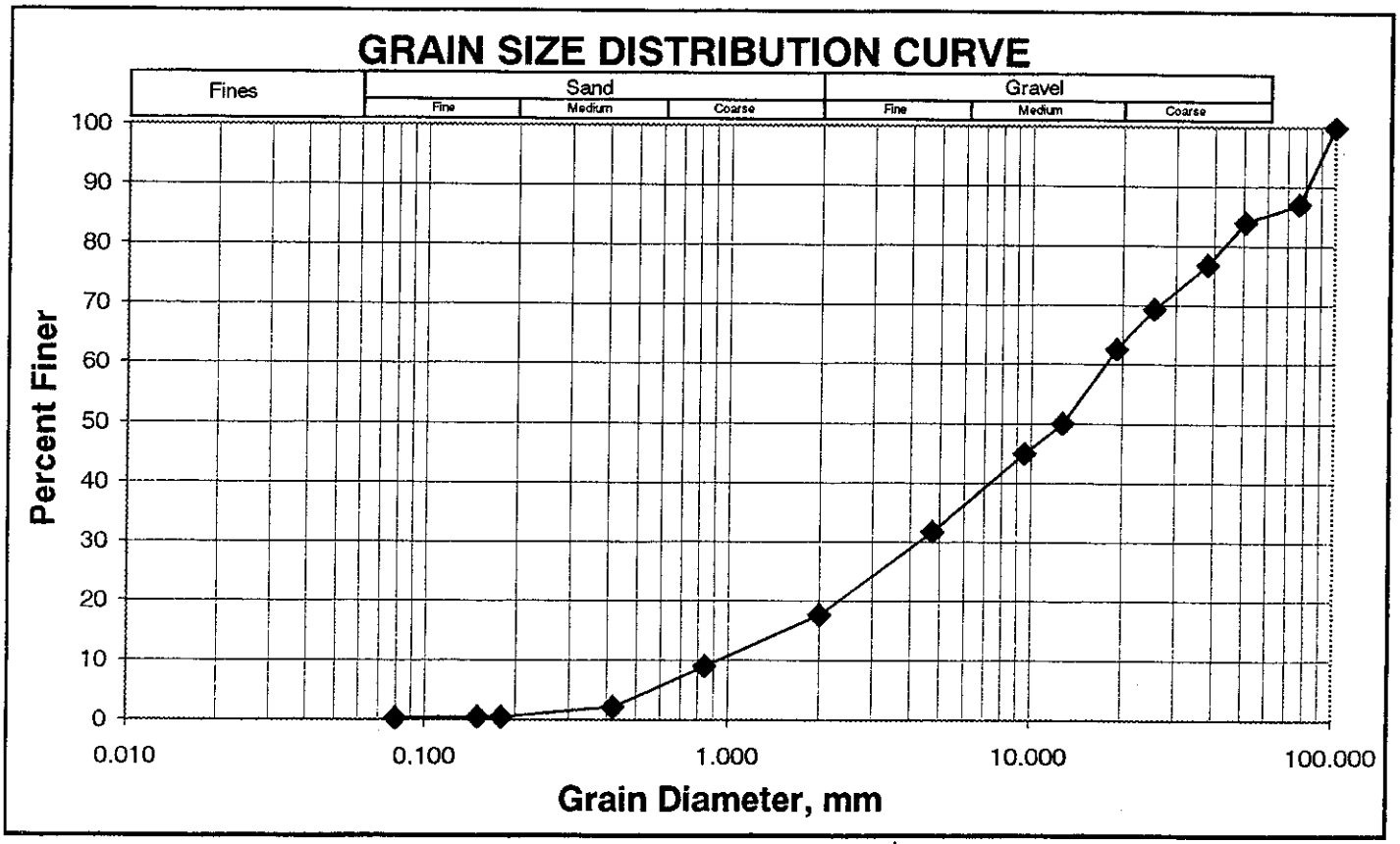
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 16-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 18, G22

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
100.0	4"	100.0	
76.2	3"	87.0	
50.8	2"	84.0	
25.4	1"	69.4	
19.1	3/4"	62.5	
12.7	1/2"	50.1	
9.500	3/8"	45.0	
4.750	No. 4	31.7	
2.000	No. 10	17.7	
0.841	No. 20	9.1	
0.420	No. 40	2.2	
0.180	No. 80	0.5	
0.150	No. 100	0.5	
0.080	No. 200	0.3	



GRAIN SIZE DISTRIBUTION

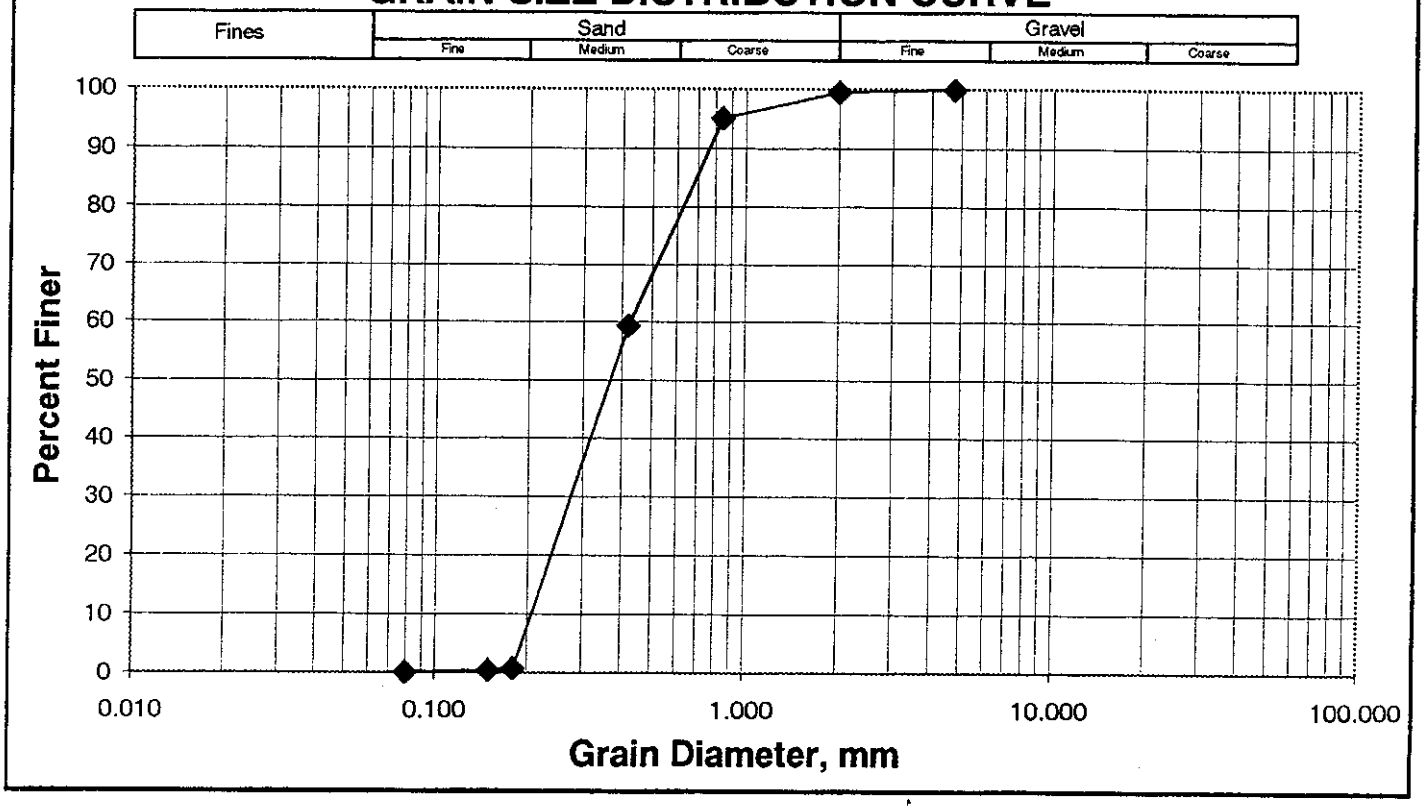
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 10-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 19, G23

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"		
9.500	3/8"		
4.750	No. 4	100.0	
2.000	No. 10	99.5	
0.841	No. 20	95.1	
0.420	No. 40	59.4	
0.180	No. 80	0.8	
0.150	No. 100	0.5	
0.080	No. 200	0.1	

GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION

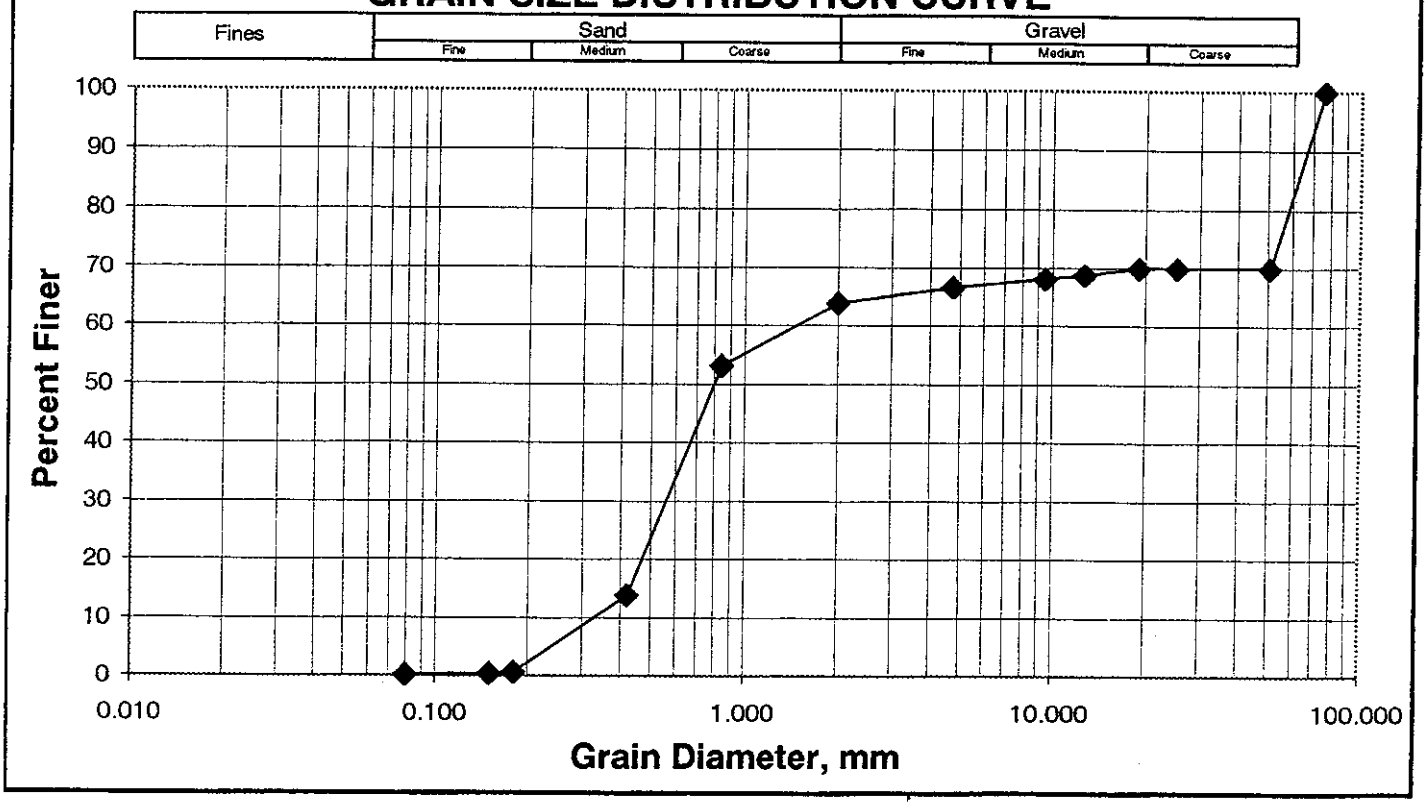
UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 13-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 26, G28

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"	100.0	
50.8	2"	69.9	
25.4	1"	69.9	
19.1	3/4"	69.9	
12.7	1/2"	68.8	
9.500	3/8"	68.1	
4.750	No. 4	66.6	
2.000	No. 10	63.8	
0.841	No. 20	53.1	
0.420	No. 40	13.9	
0.180	No. 80	0.6	
0.150	No. 100	0.5	
0.080	No. 200	0.2	

GRAIN SIZE DISTRIBUTION CURVE



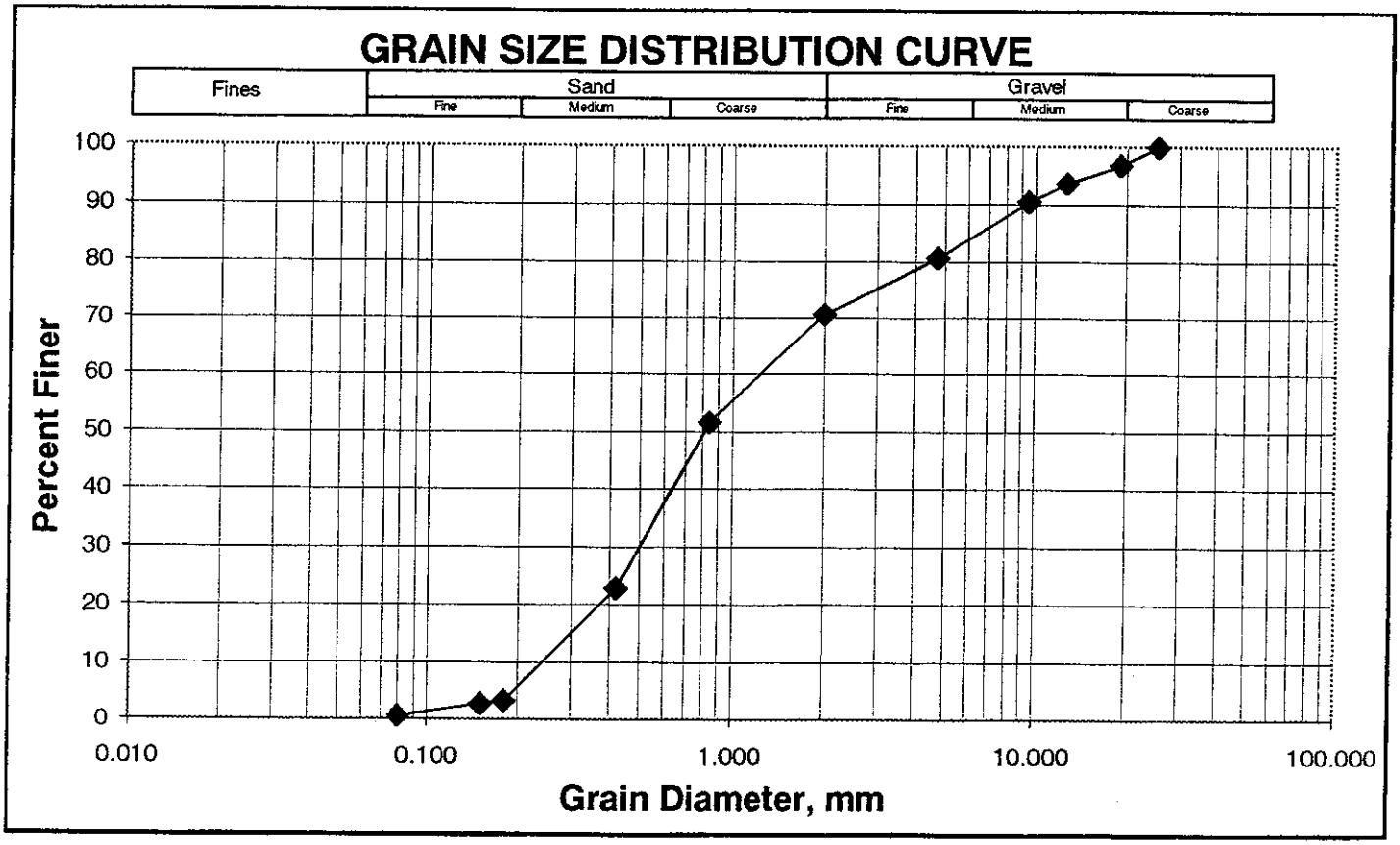
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 10-Jan-06

Contractor
Sample No. SO5-162
Depth: 5ft.
Sample Description: TP 27, G29

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"	100.0	
19.1	3/4"	96.8	
12.7	1/2"	93.6	
9.500	3/8"	90.5	
4.750	No. 4	80.7	
2.000	No. 10	70.6	
0.841	No. 20	51.6	
0.420	No. 40	22.8	
0.180	No. 80	3.3	
0.150	No. 100	2.7	
0.080	No. 200	0.7	



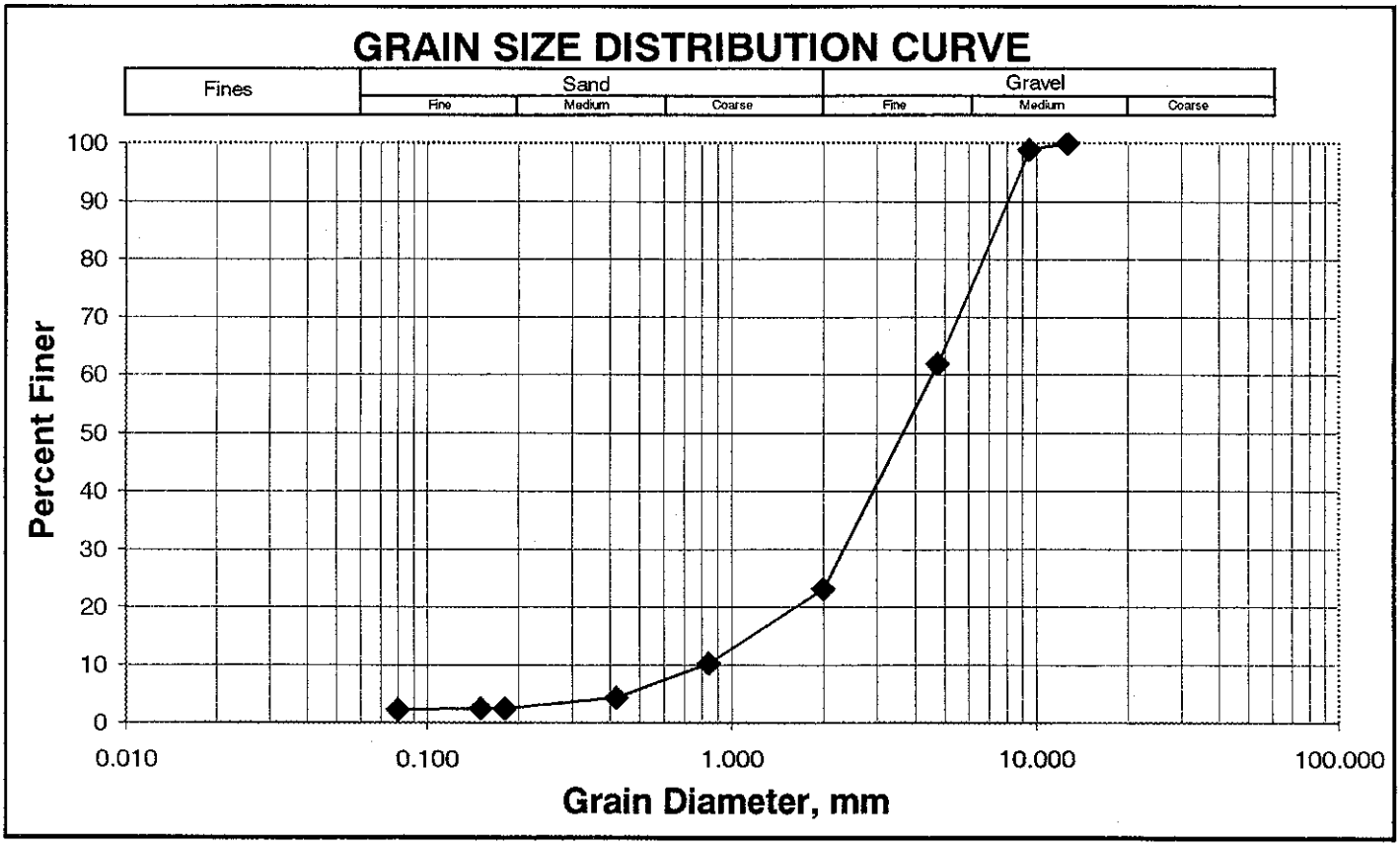
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 6-Mar-06

Mud Rotary Drilling
Sample No. SO6-05
Depth: 15ft.
Sample Description: TH 34, G30

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"	100.0	
9.500	3/8"	98.9	
4.750	No. 4	61.9	
2.000	No. 10	23.2	
0.841	No. 20	10.3	
0.420	No. 40	4.4	
0.180	No. 80	2.6	
0.150	No. 100	2.5	
0.080	No. 200	2.3	



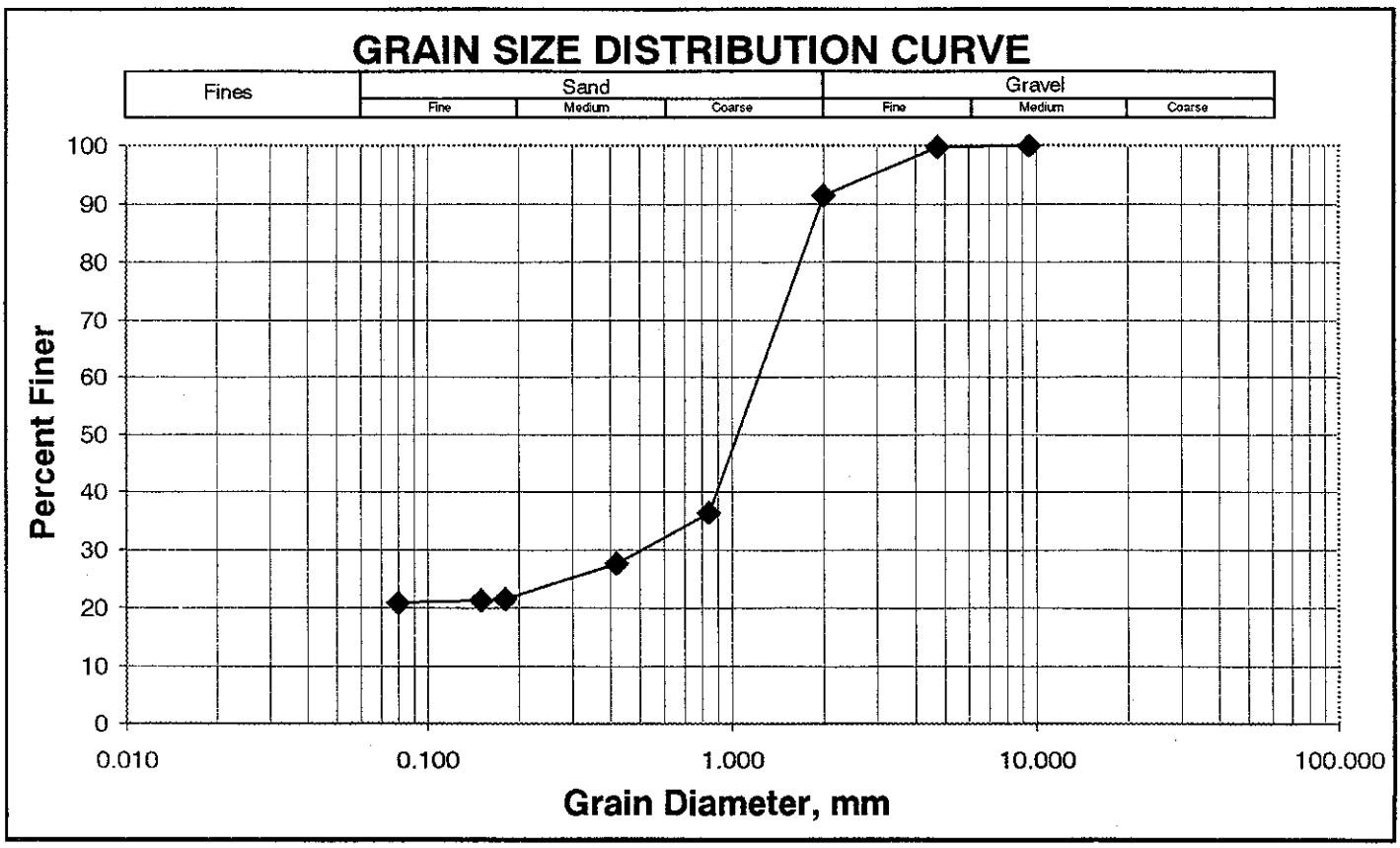
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 6-Mar-06

Mud Rotary Drilling
Sample No. SO6-05
Depth: 10ft.
Sample Description: TH 35, G39

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"		
9.500	3/8"	100.0	
4.750	No. 4	99.8	
2.000	No. 10	91.4	
0.841	No. 20	36.4	
0.420	No. 40	27.7	
0.180	No. 80	21.6	
0.150	No. 100	21.4	
0.080	No. 200	20.9	



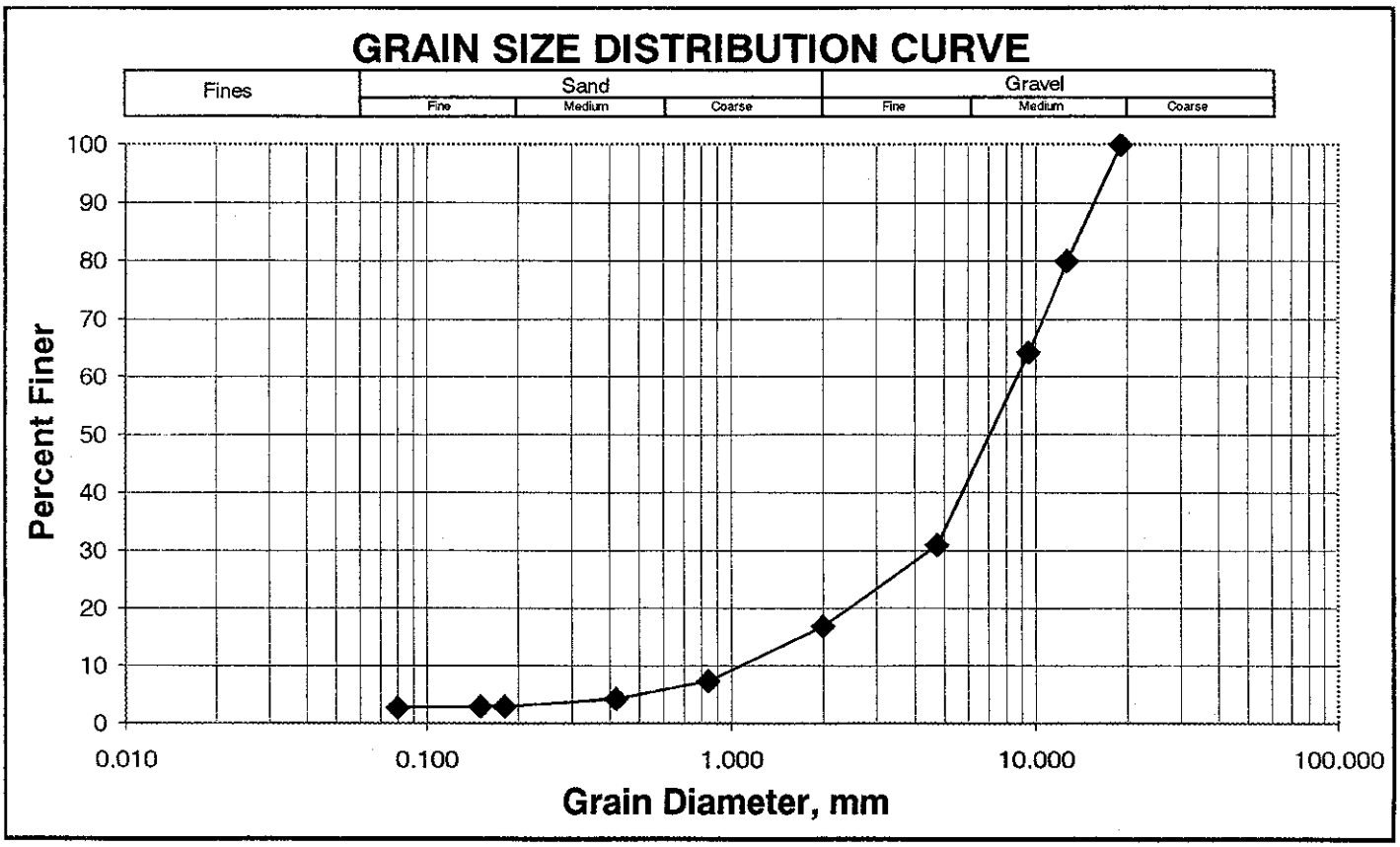
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 6-Mar-06

Mud Rotary Drilling
Sample No. SO6-05
Depth: 15ft.
Sample Description: TH 36, G47

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"	100.0	
12.7	1/2"	79.9	
9.500	3/8"	64.2	
4.750	No. 4	30.9	
2.000	No. 10	16.8	
0.841	No. 20	7.3	
0.420	No. 40	4.3	
0.180	No. 80	3.0	
0.150	No. 100	2.9	
0.080	No. 200	2.7	



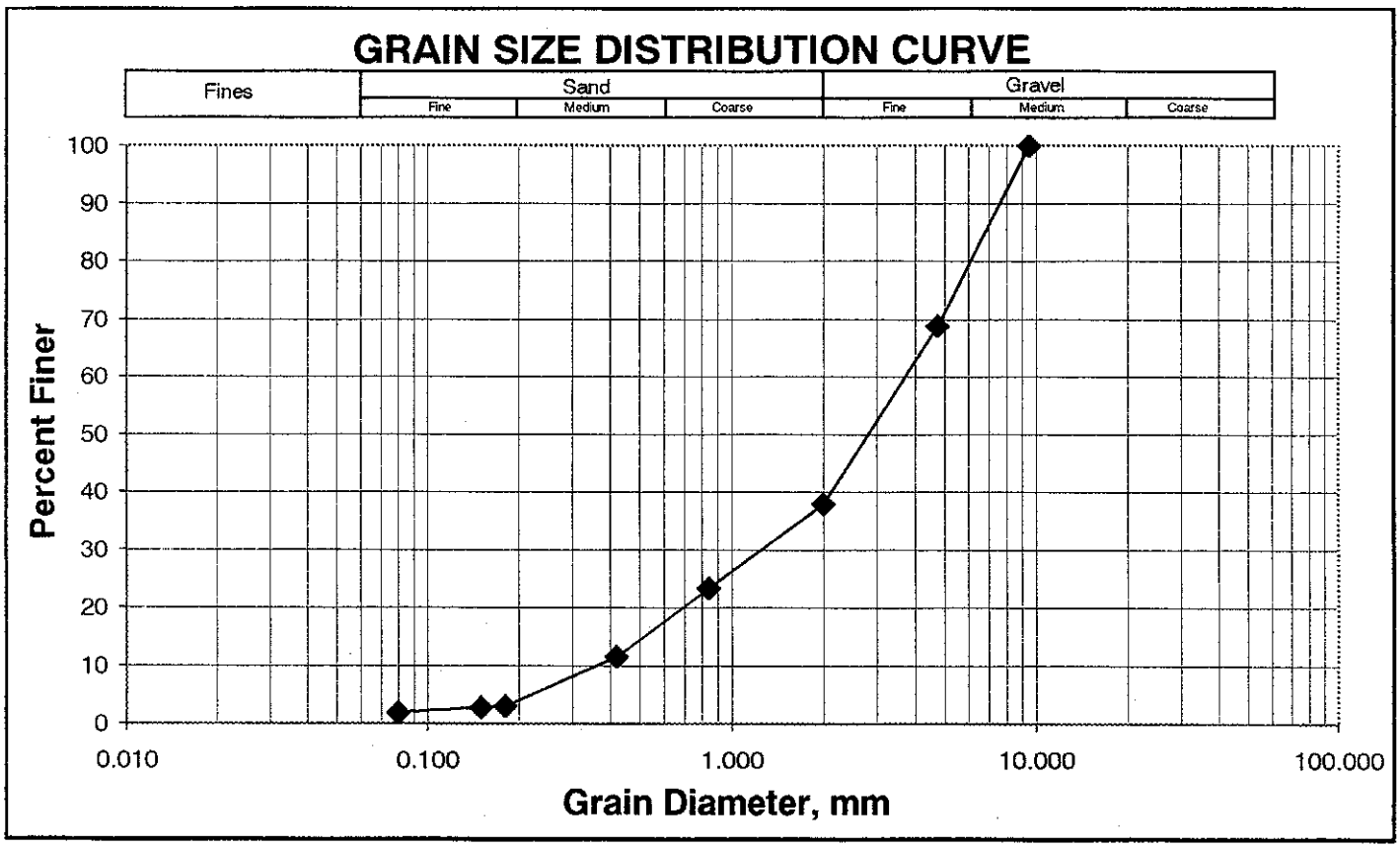
GRAIN SIZE DISTRIBUTION

UMA | AECOM
MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 6-Mar-06

Mud Rotary Drilling
Sample No. SO6-05
Depth: 15ft.
Sample Description: TH 37, G50

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"		
9.500	3/8"	100.0	
4.750	No. 4	68.8	
2.000	No. 10	37.9	
0.841	No. 20	23.4	
0.420	No. 40	11.5	
0.180	No. 80	3.1	
0.150	No. 100	2.8	
0.080	No. 200	1.9	



GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02
Date : 6-Mar-06

Mud Rotary Drilling
Sample No. SO6-05
Depth: 15ft.
Sample Description: TH 38, G54

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"	100.0	
12.7	1/2"	99.2	
9.500	3/8"	93.6	
4.750	No. 4	51.5	
2.000	No. 10	24.9	
0.841	No. 20	18.4	
0.420	No. 40	15.0	
0.180	No. 80	11.5	
0.150	No. 100	11.3	
0.080	No. 200	10.6