The Afghanistan Engineering Support Program assembled this deliverable. It is an approved, official USAID document. Budget information contained herein is for illustrative purposes. All policy, personal, financial, and procurement sensitive information has been removed. Additional information on the report can be obtained from Firouz Rooyani, Tetra Tech Sr. VP International Operations, (703) 387-2151.

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ENGINEERING SUPPORT PROGRAM

WO-LT-0005
GEOTECHNICAL INVESTIGATION REPORT
GHAZI BOYS HIGH SCHOOL

September 12, 2010

This publication was produced for review by the United States Agency for International Development. It was prepared by Tetra Tech, Inc.

This report was prepared for the United States Agency for International Development, Contract No. EDH-I-00-08-00027-00, Task Order 01, Afghanistan Engineering Support Program.

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TETRA TECH

September 12, 2010

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U.S. Embassy
Great Masood Road Kabul, Afghanistan

Re:: Geotechnical Exploration Program
Ghazi Boys High School Administration Building
Ghazi High School Campus
Kabul, Afghanistan
Work Order # WO-LT-0005

[redacted];

Tetra Tech is pleased to submit the results of our geotechnical exploration program for the above referenced project. The geotechnical work was performed in accordance with your written authorization dated July 22, 2010.

Representative samples of the soils obtained during our field operations will be retained for a period of 60 days and will then be discarded. Please advise us in writing if you wish to have the samples retained for a longer period of time.

Thank you for the opportunity to perform these services for you on this project. If you have any questions regarding the contents of this report, please contact us.

Sincerely,

[redacted], P.E.
Chief of Party (OIEE-AESP)
Tetra Tech, Inc.

Cc: [redacted] (USAID-OIEE)

AFGHANISTAN ENGINEERING SUPPORT PROGRAM

WO-LT-0005
GEOTECHNICAL INVESTIGATION REPORT
GHAZI BOYS HIGH SCHOOL ADMINISTRATION BUILDING

September 12, 2010

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EXECUTIVE SUMMARY

The following is a general summary of the recommendations contained in this report. This summary is for your convenience only, and it is recommended that the entire contents of this report be reviewed for specific recommendations.

- **Foundation type:** Spread footing (ref. page 6)

- **Seismic Activity Classification:** Class E (ref. page 6)

- **Depth of Frostline:** 800 mm (Minimum) below existing grade (ref. page 6)

- **Allowable Soil Bearing pressure:** 1.0 Kg/cm^2 (2000 psf) (ref. page 8)

- **Estimated settlement:** Less than 25mm total and 13mm differential (ref. page 8)

- **Water level measurements:** 2.6 meters below ground surface (ref. page 4)

- **Type of engineered fill below foundation:** (ref. page 7)
  - -In dry excavated areas: Pit run sand or gravel

- **Percent compaction of engineered fill:** (ref. pages 7 & 8)
  - -Below foundation: - 95% of the Modified Proctor density (ASTM:D1557)
  - -Exterior backfill:
    - -Structural areas - 95% of the Modified Proctor density (ASTM:D1557)
    - -Nonstructural areas - 90% of the Modified Proctor density (ASTM:D1557)

1.0 INTRODUCTION

1.1 Project Information

The project will consist of the construction of an attached administration wing to the new Ghazi Boys High School building, located in Kabul, Afghanistan. The structure is designed as a three story slab-on-grade building with a rectangular footprint area of approximately 1100 sq. meters.

1.2 Scope of Services

In accordance with the authorized Statement of Work (SOW), Tetra Tech has conducted a geotechnical exploration program for the proposed project. The scope of our work under this work order is limited to the following:

- Advance five (5) soil borings to explore the subsurface soil and groundwater conditions.
- Install two (2) piezometer wells in two of the completed borings.
- Advance four (4) test pit excavations to explore the subsurface soil and groundwater conditions.
- Conduct soil resistivity tests to determine in-situ soil resistivity.
- Conduct laboratory tests to characterize the physical, chemical and engineering properties of the soils encountered.
- Provide a geotechnical investigation report including results of the field and laboratory tests as well as construction recommendations and considerations.

1.3 Purpose of Report

The purpose of this report is to present the results of the field and laboratory tests as well as the geotechnical engineering review and recommendations for the project. The following concerns are addressed in the report:

- Site preparation
- Possible foundation types and depths, allowable bearing capabilities and estimated potential settlement
- Exterior backfill
- Construction and post-construction groundwater control
- Construction considerations
- Construction observations and testing

It should be noted that Tetra Tech's work is intended for geotechnical purposes only and not to document the presence or extent of any contamination at the site.

2.0 EXPLORATION PROGRAM RESULTS

2.1 Scope of Exploration

A series of five (5) soil borings were advanced at the site on August 3 through August 7, 2010. Four (4) of the borings (BH-1 through BH-4) were positioned at the perimeter foundation corners, and the fifth boring (BH-5) was located at the approximate center of the building area. All five borings were terminated at 10 meters below existing grade.

Two of the borehole locations (BH-1 and BH-4) were subsequently completed as piezometer wells to allow future groundwater elevation measurement.

A continuous sample of the soil encountered at each borehole was collected and logged. Standard Penetration Testing (SPT) was performed per ASTM D-1586 at 1.5 meter intervals in all boreholes. A split barrel sampler of standard dimensions was driven into the soil from the borehole bottom using a 63.5 kg hammer falling from a height of 76 cm. The SPT hammer was mechanically lifted to the specified height and allowed to fall freely on the anvil, using an auto-trip device, ensuring a consistent application of energy to the driven sampler.

In conjunction with the boring program, a series of four (4) test pits were excavated along the perimeter of the proposed foundation. These pits were excavated to a depth of approximately two (2) meters below existing grade. The test pits were excavated manually using picks and shovels. Disturbed bulk samples were collected at 1-meter intervals and an insitu density test was performed at the bottom of each excavation.

The backfill of the boreholes and test pits was not placed in a controlled manner, and some settlement of the soils should be anticipated. Final closure of the holes is the responsibility of the client or property owner.

2.2 Site Surface Conditions

The proposed building is located on the existing Ghazi Boys High School campus, situated in central Kabul, Afghanistan. The site surface consisted primarily of exposed soil at the time of the investigation. The general topography of the site was level. The surface elevations at the boring locations ranged from 98.97m to 99.49m, based on a reference datum of 100.00 meters assigned to the first floor finished elevation of the existing linkway. The relative elevations of the test borings were obtained using a Sokkia B20 Auto-level. The locations of the test borings and test pits were obtained using a Magellan Explorist 300 handheld GPS.

The following table summarizes the borehole and test pit elevation data:

LOCATION I.D.	ELEVATION (meters)
LINKWAY FIRST FLOOR	100 (REF)
BH-1	99.34
BH-2	99.44
BH-3	99.45
BH-4	99.26
BH-5	99.49
TP-1	99.40
TP-2	99.43
TP-3	99.25
TP-4	98.97

2.3 Site Subsurface Conditions

A review of the soil boring and test pit logs suggests a general soil profile consisting of 0.5 meters of sandy silt topsoil overlying sandy silt soils to the limits of the investigation (approximately 10 m). The sandy silt soils encountered during the investigation exhibited a density of “loose” to “medium dense”. The density of the soils is estimated by the "N" values (penetration resistance) shown on the attached boring logs.

In the test pits, the stratigraphy of the excavation sidewalls was consistent with the stratigraphy and soil type observed in the drilling program.

Graphical representations of the subsurface conditions encountered at the boring and test pit location are presented in Appendix B.

2.4 Water Levels

Groundwater was encountered in all five boring locations at a depth of approximately 2.6 meters below existing ground level during this investigation. Groundwater conditions at the investigation site will likely vary seasonally, following precipitation events. Additionally, changes in groundwater elevation can occur due to construction and site grading, local irrigation practices, and changes in surface and subsurface drainage.

2.5 Laboratory Test Program

Soil samples were selected for laboratory testing to determine the physical, chemical and engineering properties of the soils. Tests included:

- Sieve Analysis for Soil Particle Size Distribution (ASTM D-422)
- Plasticity Index (PI) Determination, Liquid and Plastic limits (ASTM D-4318)
- Particle Size Analysis by Hydrometer (ASTM D-422)
- Unified Soil Classification System (ASTM D-2487)
- Moisture Content Determination (ASTM D-2216)
- Specific Gravity by Pycnometer (ASTM D-854)
- Modified Proctor Test (ASTM D-1557)
- In-Situ Moisture density test results (ASTM D-2937)
- Expansion Index of soil (ASTM D-4829)
- Permeability Test (Constant head) (ASTM D-2434)
- Unconfined Compressive Strength of Cohesive Soils (ASTM D2166)
- Direct Shear (ASTM D-3080)
- One-dimensional Consolidation (ASTM D-2435)
- pH (ASTM F-51)
- Sulfate Content (ASTM C1580)
- Chloride Content (ASTM D 1411)

Where applicable, the tests were performed in accordance with the American Society for Testing and Materials (ASTM) procedures. The laboratory data is presented in Appendix C.

3.0 ENGINEERING REVIEW

3.1 Project Data

The engineering recommendations provided in this report are based on the understanding of the project as described in the following paragraphs. The recommendations are valid for a specific set of project conditions. If the characteristics of the project change from those indicated in this section, it is necessary that Tetra Tech be notified so that it can be determined whether the new conditions affect the recommendations.

It is understood that the project will consist of the construction of a three story administration building using slab-on-grade building techniques. The building will have an area of approximately 1100 sq. meters. Specific foundation loadings have not been established at this time. However, for the purpose of Tetra Tech's analysis, it is assumed the foundation loads will be on the order of 4 to 6 kips per lineal foot with column loads of up to 250 kips. Floor slab loadings exerted on the underlying soils are assumed to be less than 1220 Kg/m2 (250 pounds per square foot).

For the purpose of this analysis, foundation loadings of 1.0 Kg/cm^2 (2000 psf) for the proposed structure using a spread footing foundation system are anticipated. The finished pad of the proposed structure is assumed to be constructed at an elevation between 99.5 meters and 100.5 meters, based on the referenced elevation used for the borehole elevations.

The design assumptions include a theoretical safety factor on the order of three, including wind load, with respect to shearing or base failure assuming a spread footing foundation system will be used. In addition, an allowable total settlement and differential settlement of up to 25mm and 13mm, respectively, was assumed.

3.2 Discussion

It appears the site will benefit from ground improvement in the form of a 600mm over-excavation and engineered fill placement in the foundation excavations. This ground improvement will allow the underlying soils to support the proposed structure on spread footing foundations with acceptable settlement. The sandy silt soils are suitable for slab on grade construction.

As noted in the geotechnical subsurface conditions and as shown on the boring and test pit logs, the general soil profile encountered at the site consists of sandy silt topsoil, overlying sandy silt soils to the limits of the investigation program (approximately 10 meters)

It is important to note that the sandy silt soils encountered at the site may be sensitive to disturbance and strength loss under construction traffic and/or excessive moisture. Disturbance of these soils should be prohibited. Water should not be allowed to pond on these soils for any length of time.

From the findings of this investigation, the spread footing foundation should be designed using an allowable soil bearing pressure of up to 1.0 Kg/cm^2 (2000 psf) if the site is prepared as recommended below. The allowable soil bearing pressure is based on judgment of the soil conditions at the boring locations along with the penetration resistance values ("N" values), laboratory test results, recommended compaction levels and experience with similar soil conditions. The allowable soil bearing pressure is a net pressure and can be increased 30% for short term loadings such as wind loads.

The recommendations in this report provide a theoretical safety factor of at least three against localized shear failure. Unusual settlements are not anticipated. Total settlements of the foundation are expected to be less than 25 mm with differential settlements less than 13 mm.

The concentration of water soluble sulfates measured in samples obtained from the borings range from 80 to 200 mg/l or ppm. This concentration of water soluble sulfates indicated a negligible degree of sulfate attack on concrete exposed to these materials. The degree of attack is based on a range of negligible, moderate, severe, and very severe as presented in the Uniform Building Code, Table 19-A-4. Based on this information, No restrictions are necessary for the type of cement used.

This site is located in a region of Afghanistan that is classified as Seismic Class E, per the 2006 International Building Code (IBC). See Appendix B for details regarding seismic data.

3.3 Site Preparations

For site preparation, the spread footing and column excavations are recommended to be over excavated a minimum of 600mm below bottom of footing design grade, and then backfilled with compacted engineered fill beneath the bottom of the footings. The engineered fill should consist of a clean granular fill with a maximum size of 75 mm and containing less than 5% passing the #200 sieve by weight. Engineered fill compacted with heavy, selfpropelled compaction equipment should be placed in loose lifts of 300 mm or less. Engineered fill compacted with hand-operated compaction equipment should be placed in loose lifts of 150 mm or less. Vibratory compaction equipment should be used for compaction of granular engineered fill soils. All engineered fill placed below the footings should receive a compaction of at least 95% of the Modified Proctor density (ASTM:D1557). The excavation for the footings should be laterally oversized 600 mm plus an additional 300 mm laterally for each foot of fill placed beneath the footings.

All perimeter footings and any unheated interior footings shall be placed at a sufficient depth for frost protection. For heated structures in this area, a minimum frost depth of 800 mm is recommended. For unheated structures and canopies, or footings not artificially protected from frost during construction, a minimum frost depth of 1000 mm should be used. For perimeter footings, the depth of embedment should be measured from the finished exterior grade to the bottom of the footings. For interior footings, the depth should be measured from the interior finished grade to the bottom of the interior footings.

Final excavation depths should be observed in the field by a geotechnical engineer to judge the suitability of the exposed soils for support of the proposed structure. Soft or otherwise unsatisfactory soil conditions should be removed and replaced with an engineered fill as directed by a geotechnical engineer.

Engineered fill placed in dry excavations for support of the structure foundation can consist of a granular material. The granular fill can consist of a pit run sand or gravel having a maximum size of 75 mm. Granular fill soils should be placed at a moisture content ranging from -2% to +2% of the optimum moisture content as determined by the Modified Proctor (ASTM D:1557). Clay fill soils should be placed at a moisture content ranging from -3% to +2% of the optimum moisture content as determined by the Modified Proctor (ASTM:D1557). Vibratory compaction equipment should be used for compaction of granular engineered fill soils.

In the floor slab area, it is recommended that the floor slab be supported on a minimum of 600 mm of compacted engineered fill. The engineered fill should consist of a a relatively free-draining granular soil having a maximum size of 25 mm with less than 10% material passing the #200 sieve by weight. The purpose of the granular cushion is to serve as a capillary barrier.

If desired, a polyethylene vapor membrane may be added beneath the floor slab, especially if moisture-sensitive floor coverings are planned. The membrane should be placed at least 50 mm beneath the surface of the granular layer to minimize the potential for curling of the concrete floor slab.

3.4 Foundation Recommendations

As noted above, the proposed structure can be supported on a spread footing foundation. The foundation should be designed using an allowable soil bearing pressure of up to 1.0 Kg/cm^2 (2000 psf) if the site is prepared as recommended above. The allowable soil bearing pressure is based on findings of the soil conditions at the boring locations along with the penetration resistance values ("N" values), laboratory test results, recommended compaction levels and experience with similar soil conditions. The allowable soil bearing pressure is a net pressure and can be increased 30% for short term loadings such as wind loads.

Recommendations in this report provide a theoretical safety factor of at least three against localized shear failure. Unusual settlements are not anticipated. Total long term settlements should be less than 25mm with long term differential settlements less than 13mm.

It may be possible to use earth forming methods for placement of the concrete spread footing foundations. If earth forming methods are used, measures must be taken to insure that adequate distance is maintained between the structural steel and the earth forms prior to and during placement of the concrete. Typically, structural plans call for a 75 mm concrete cover to be provided over the structural steel. Because of the bending and potential movement of the structural steel during its placement, the earth formed excavation will likely need to be oversized at least 600mm (300 mm on each side) to accomplish and maintain the 75 mm distance between the structural steel and the earth forming.

3.5 Exterior Backfill

Granular fill is suitable for exterior backfill material for the proposed structure. Organic soils should not be used for exterior backfill, except for cover material. If granular backfill soils are used, placement of at least a 500 mm clay cap or an asphalt or concrete pavement at the surface of the backfill is recommended to help minimize surface water from reaching the foundation soils.

Granular exterior backfill soils should be placed in maximum 200 mm loose lifts. Clay exterior backfill soils should be placed at a moisture content ranging from $\pm$ 3% of the optimum moisture content as determined by the Modified Proctor density (ASTM:D1557). Exterior backfill soils placed along foundations and in structural areas, such as beneath sidewalks or light traffic areas should be compacted to at least 95% of the Modified Proctor density (ASTM:D1557). Other exterior backfill soils placed in nonstructural areas, such as beneath landscaping, should receive a compaction of at least 90% of the Modified Proctor density (ASTM:D1557).

3.6 Lateral Earth Pressures

Assuming those portions of the structure that will experience lateral earth pressures will be rigid and no deflection can take place during or following backfilling, an at rest equivalent fluid pressure of 960 Kg/m^3 (60 pounds per cubic foot, or pcf) is recommended for the on-site silt soils as well as any new engineered fill soils above the groundwater level. If an active equivalent fluid pressure is desired, a 640 Kg/m^3 (40 pcf) for the on-site silt soils or new granular engineered fill soils above the groundwater level is recommended. For submerged conditions, an at rest equivalent fluid pressure of 1600 Kg/m^3 (100 pcf) or an active equivalent fluid pressure of 1440 Kg/m^3 (90 pcf) is recommended for the on-site silt soils or new granular engineered fill soils.

The values calculated for the above parameters would provide ultimate values. A minimum safety factor of at least 1.5 is recommended to be applied to the calculated lateral values. The above noted equivalent fluid pressures assume the backfill soils adjacent to the walls will be compacted to a range of between 90% and 100% of the Modified Proctor density (ASTM D1557).

3.7 Site Drainage

Proper drainage should be maintained during and after construction. General site grading should not allow water to pond in the foundation area or in the excavation. Any ponded water should be removed as soon as possible.

Finished grades around the perimeter of the structure should also be sloped away from the structure with a minimum slope of 2% for at least 3 meters beyond the excavation line. In addition, roof drainage should be appropriately controlled and directed away from the structure.

3.8 Pavement Construction

We recommend that site preparation for the proposed parking lot and driveway areas consist of the excavation (subcutting) of the existing silty topsoil to a depth that would provide for the placement of the recommended pavement sections listed below. At a minimum, the top 150mm of the existing surface soils should be excavated before placement of any new base materials. The purpose of the excavation of the top 150 mm is to remove the majority of the higher organic material that is likely to exist at the surface of the soils. Final excavation depths should be determined in the field by a geotechnical engineer.

Following the subcutting operations, we recommend scarifying the subgrade soils to a depth of 150 mm and re-compacting them to a minimum of 95% of the Modified Proctor density (ASTM: D1557). The moisture content of the subgrade soils at the time of scarifying/re-compaction should be at or below the optimum moisture content as determined by the Modified Proctor. If soft areas develop during scarifying/recompaction, they should be removed and replaced with a granular fill or, alternatively, a non-organic lean clay fill having a liquid limit of 45 or less. Adequate stability of the subgrade soils must exist before the placement of the pavement section.

If additional subgrade fill is required to meet design elevations of the proposed parking lot and driveway areas, we recommend a granular subgrade material be used. Alternatively, but less desirable, a non-organic lean clay having a liquid limit of 45 or less could possibly be used. The subgrade fill soils should be placed in maximum 200 mm loose lifts and be compacted to 95% of the Modified Proctor density. If the subgrade fill placed under the pavement section exceeds 300 mm, it may be possible to reduce the depth of granular subbase required. Please contact us for further recommendations in this regard.

Following the site preparation, we recommend the placement of one of the following pavement sections.

TABLE 1

Pavement Description	Pavement Surfacing	Aggregate Base Course	Granular Subbase
Standard Duty Pavement (cars and light trucks)			
Asphalt:	75 mm	200 mm	None*
Concrete:	150 mm	100 mm	None*
Heavy Duty Pavement (heavy trucks-forklift)			
Asphalt:	125 mm	150 mm	None*
Concrete:	175 mm	200 mm	None*

*If wet soil conditions exist at the time of construction, additional subbase material and/or geotextile fabric may be needed in some areas to stabilize existing subgrade soil conditions.

The aggregate base course and granular subbase materials along with the bituminous asphalt used for the pavement sections should meet approved Department of Transportation Standard Specifications. Aggregate base course and granular subbase material should be compacted to at least 95% of the Modified Proctor density.

The concrete paving products should also be composed of a quality mix. The mix should have a proven success or a mix design should be established for proper proportions of aggregate, cement, water and any admixtures. The concrete should be handled, placed and cured according to current ACI Guidelines and Specifications for Exterior Concrete. The concrete should have a minimum compressive strength of 280 Kg/cm^2 (4000 psi), be placed with a maximum slump of 75 mm, and should have air entrainment between 5% and 7%.

Relative to saw joints, a maximum width in the longitudinal and transverse directions should be provided as per ACI guidelines. All saw joints should be made within 24 hours of casting or as soon as the surface is sufficiently hard to support equipment. All joints should be adequately sealed with proper joint sealer.

If any exposed soils are sensitive to disturbance, scarifying and re-compacting them may be detrimental for subgrade support of the proposed pavement section. If areas of sensitive soils are encountered, we recommend a geotechnical engineer observe these soil conditions and make further recommendations to stabilize the soil for support of the pavement sections. As noted above, adequate stability of the subgrade soils is necessary for support of the pavement section.

We recommend that extra care be taken in the design and construction process to insure that adequate subgrade and surface drainage is maintained throughout the parking lot and driveway areas. The subgrade surface should be uniformly sloped to facilitate drainage of the base material within the pavement system and to avoid any ponding of water beneath the pavement. The purpose of the drainage is to minimize saturation of the subgrade soils and to minimize potential distress due to frost movement of the underlying soils. We wish to note that routine maintenance such as crack filling, seal coats and localized patching should be expected for all pavements in our recommendations

4.0 CONSTRUCTION CONSIDERATIONS (CONSTRUCTABILITY)

4.1 Site Excavation

Based on conditions encountered during the investigation, all excavations can be constructed with standard earthmoving equipment. All excavations must comply with the requirements of OSHA 29 CFR Part 1926, Subpart P, "Excavations.", or equivalent. Reference to this requirement should be included in the project specifications.

4.2 Fill Placement

Performance of the engineered fill and backfill at the site is dependent upon removing all unsuitable soils prior to fill placement and maintaining adequate compaction as the fill is placed. All excavations shall be observed by a qualified geotechnical engineer, or his representative, prior to fill placement, and density testing shall be performed within the fill sequence.

4.3 Site Dewatering

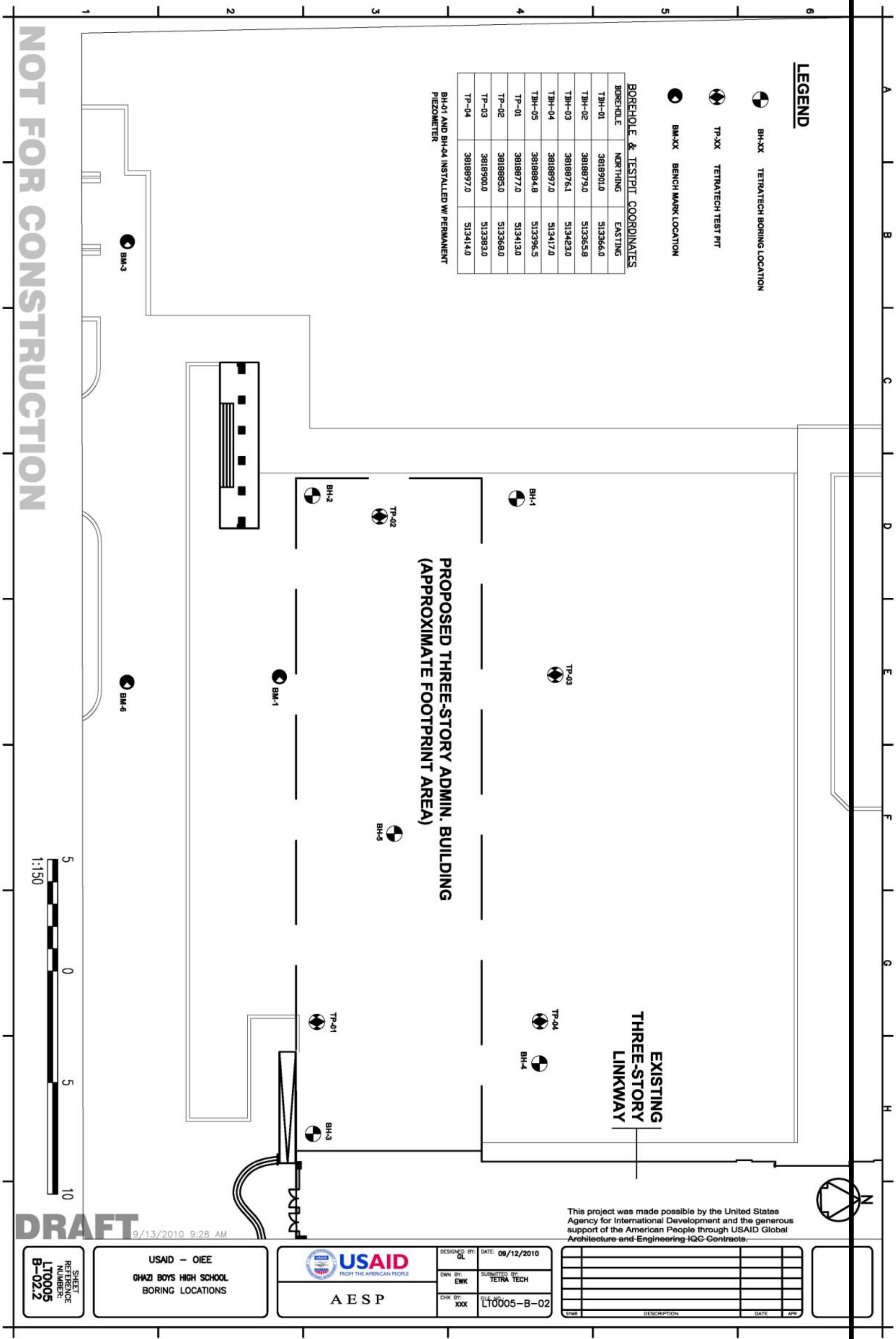
Portions of the excavations may extend beneath the groundwater level at the site especially in early spring. The amount of water encountered in the excavation at the site will be dependent upon seasonal fluctuations, the excavation depths required and the type of soils encountered. Because of the moderately impermeable nature of much of the subsurface soils present at the boring locations, it is likely that water entering the excavation may be controlled with normal sump pumping procedures. Any water that does collect in the open excavation should be quickly removed. Upon removal of the groundwater from the excavation, immediate placement of the first lift of the engineered fill should be performed. In addition, surface drainage away from the excavation should be provided during construction.

5.0 STANDARD OF CARE

This report has been prepared in accordance with generally accepted geotechnical engineering practices in this area for use by the client for design purposes. The analyses and recommendation presented in this report are based upon our data obtained from the borings and test pit locations shown in Appendix A, field observations, laboratory testing, our understanding of the proposed construction and other information discussed in this report. This report is not to be relied on by others nor is it to be relied upon for designs or structures differing from those described herein. It is possible that subsurface conditions may vary between or beyond the points explored. The nature and extent of such variations may not become evident until construction. Tetra Tech recommends that all geotechnically related work, including foundation construction, subgrade preparation, and engineered fill placement, be observed by a representative of the project geotechnical engineer. The geotechnical engineer representative will perform appropriate testing to verify the geotechnical conditions which have been anticipated during the preparation of this report.

APPENDIX A

SITE LOCATION MAP



Tetra Tech, Inc	**Date: September 12, 2010**
GHAZI BOYS HIGH SCHOOL	**FIGURE 1**
Project # WOLT0005	**Site Location Map**

APPENDIX B

SUB-CONTRACTOR GEOTECHNICAL REPORT

Revised Geotechnical Report for

New Administration Building of Ghazi Boys High School

Kabul, Afghanistan

USAID
FROM THE AMERICAN PEOPLE

USAID Afghanistan

Prepared & Submitted By:

OMRAN GEOTECHNICAL CO.

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Date: August 25, 2010

Submitted To:

TETRA TECH INC.

TETRA TECH

GEOTECHNICAL REPORT OF

SITE INVESTIGATION,

FIELD AND LABORATORY SOIL TEST RESULTS &

GEOTECHNICAL RECOMMENDATIONS

FOR

NEW ADMINISTRATION BUILDING,

GHAZI BOYS HIGH SCHOOL

Kabul, Afghanistan

Prepared By:

Omran Geotechnical Company

Under the Direction of:

[redacted]
Geologist, Tetra Tech Inc.
&
[redacted]
Water Resource Lead/Dam Specialist, Tetra Tech Inc.

August 2010

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C	Field Test Results
D	Laboratory test results of test pits
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G	Photos
H	Lab Certificate

1. Project Description and Background

The proposed project includes the construction of a new administration building for Ghazi Boys High School in Kabul Province, Afghanistan.

- **USAID - Afghanistan** is the Client for the project.
- **TETRA TECH INC.** is the Contractor for the project.
- **OMRAN GEOTECHNICAL COMPANY (OGC)** is the subcontractor performing the geotechnical Investigation and providing the geotechnical report for this project.

OGC carried out the field geotechnical investigation from August 03 through August 07, 2010. The investigation included field testing, engineering observation, borehole drilling, test pit excavation, sample collection and laboratory testing of representative soil samples.

This geotechnical report consists of a summary of field investigation, subsurface soil description of project area, field and laboratory test results, engineering evaluation and geotechnical recommendation for foundations and other engineering evaluations and recommendations.

2. Objectives of Geotechnical Investigation

The purpose of this geotechnical exploration was to determine the general subsurface soil and groundwater conditions at the site, evaluate these conditions with respect to the proposed construction, and prepare geotechnical recommendations for site preparation and the design of foundations.

3. Methodology of Geotechnical Investigations

To investigate the subsurface soil conditions at the project area adequately, the boring quantity, locations and laboratory tests were determined by the Contractor.

The scope of work for the field investigation included the following:

- Five (5) boreholes drilled to depths of 10.0 meters below the existing ground surface.
- Disturbed Split Spoon samples and Undisturbed Shelby Tube samples were achieved from various depths of borings during the drilling. Also, continuous soil samples were collected in wooden boxes from all boreholes for subsequent laboratory testing.
- All borings encountered groundwater at a depth of 2.6 meters below ground surface. Boreholes BH-1 and BH-4 were subsequently completed as a piezometer to be used for future groundwater monitoring.
- Four (4) tests pit excavations to approximately 2.0 meters depth for the purpose of subsurface soil classification, grab soil sampling, field density testing and lab soil tests.
- Field soil resistivity testing was performed in accordance with ASTM D-57-06 on the purposed area.
- Standard Penetration Testing was performed per ASTM D-1586 at 1.5 meter intervals in all boreholes. A split barrel sampler of standard dimensions was driven into the soil from the borehole bottom using a 63.5 kg hammer falling from a height of 76 cm. The SPT hammer was mechanically lifted to the specified height and allowed to fall freely on the anvil, using an auto-trip device, ensuring a consistent application of energy to the driven sampler. The number of blows required to penetrate each 15 cm interval was recorded. The total number of blows required to penetrate the last 30 cm was recorded and is known as the "N-Value" (the

the first 15 cm penetration is known as the “seating drive” and is not used for N-value determinations).

- For natural moisture content determination, the weight of soil samples were recorded in the field, using a digital scale. The moisture content was then determined by drying the sample in the lab, using the Oven method (ASTM D-2216).
- Drilling and sampling were performed under the direction and field supervision of Tetra Tech.
- Borehole and test pit logs are presented in Appendix B. These logs provide detailed data such as material description lithology, field SPT results (N-Values) at various depths, soil sampling types and groundwater information.

4. Field and Laboratory soil tests

The following field and laboratory tests were performed during this investigation:

A) Field Soil Tests

- Standard Penetration Test (ASTM D-1586)
- Field Density test by Sand Cone Method (ASTM D-1556)

Results of field tests are presented in Appendix C.

B) Laboratory Soil Tests

Disturbed and undisturbed soil samples from the test pits 1 through 4 and boreholes BH-1 through BH-5 were collected in the field and transferred to special bags and wooden boxes. All soil samples were submitted to the laboratory, where representative soil samples were selected for analysis based on changes in type, gradation and color.

According to design requirements and type of soil samples, the following tests were performed on representative soil samples of the boreholes and test pits at the Omran Geotechnical Company laboratory:

- Sieve Analysis for Soil Particle Size Distribution (ASTM D-422)
- Plasticity Index (PI), Liquid and Plastic limits (ASTM D-4318)
- Particle Size Analysis by Hydrometer (ASTM D-422)
- Soil Engineering Classification by Unified system (ASTM D-2487)
- Moisture Content Determination (ASTM D-2216)
- Specific Gravity by Pycnometer (ASTM D-854)
- Modified Proctor Test (ASTM D-1557)
- Moisture Density test results (ASTM D-2937)
- Expansion Index of soil (ASTM D-4829)
- Permeability of Granular Soil (Constant Head) (ASTM D-2434)
- Unconfined Compressive Strength of Cohesive Soil (ASTM D-2166)
- Direct Shear Test of Soils Under Consolidated Drained Conditions (ASTM D-1883)
- One-Dimensional Consolidation Properties of Soils Using Incremental Loading (ASTM D-2435)
- pH of Soil
- Sulfate Content
- Chloride Content

Laboratory test results of soil samples are presented in Appendices D and E.

5. Findings

5.1. Subsurface Conditions

To investigate the subsurface condition of the project area, the following field work was performed:

- 5 boreholes were drilled to depths of 10.0 meters below existing ground surface.
- 4 test pits were excavated to depths approximately 2.0 meters below existing ground surface.
- SPT tests were performed every 1.5 meter intervals on all boreholes

The results of the exploratory drilling provided the following soil data:

- The predominant soil type encountered at this site is classified as sandy silt (CL-ML and ML) based on the Unified Soil Classification System.
- Relative Soil Density at all split barrel sampling intervals was categorized as “Loose to Medium Dense for Non-Plastic Silts”, where SPT Blows were achieved in range of 6 to 26 blows counts.

5.2. Groundwater Elevation

Groundwater was encountered in all boreholes during the investigation. Depth to groundwater measured at 2.6 meters below existing ground surface on August 03 through August 07, 2010.

Note: The month of August is not rainy season in Kabul area, so, groundwater table will coming up slightly more in rainy seasons.

5.3. Summary Results of Field Tests

5.3.1. Standard Penetration Test (SPT) per ASTM D-1586

The penetration resistances of soil, or N-value, were obtained from SPT test via ASTM D 1586 test procedure on different depth of boreholes on building footprints area, as a result:

- The predominant soil type is non plastic to very low plastic sandy silt
- The range of N-Values are between 6 to 26 Blows Count,
- N-Values correlated in non plastic silt soils to Loose to Medium Dense soil as shown in Table 1.

Table 1. Relative Density of Soil for Non Plastic Silts, Sands and Gravels

Relative Density	SPT N Value (ASTM D-1586)
Very loose	0 to 4 Blows
Loose	5 to 10 Blows
Medium	11 to 30 Blows
Dense	31 to 50 Blows
Very Dense	Above 50

5.3.2. Field Density Test (FDT)

To determine the Unite Weight of soil in field, Field Density Test "FDT" has been done as per ASTM D-1556. See FDT detail results in appendix C.
Summary results shows:

- Field Wet Density of soil is between 1.82 to 1.99 gm/cc.
- Dry Density of soil is between 1.51 to 167 gm/cc.

5.4. Summary Results of laboratory tests

5.4.1. Summary Results of Soil Classification

Summary results of laboratory soil classification on representative soil samples from boreholes and test pits have shown on Tables 2 and 3 as below:

Table 2. Summary results of soil classifications of soil samples of boreholes

Sample No	Borehole No	Depth(m)	Particle Size Analysis (Standard)			Atterberg Limits (Standard)			Soil Classification
			%Gravel (>4.75 mm)	%Sand (0.075-4.75mm)	%Silt & clay (<0.075mm)	%LL	%PL	%PI	USCS
1	1	1.5	0.19%	23.14%	76.67%	25.14%	20.45%	4.69%	CL-ML
2	1	4	4.62%	12.64%	82.73%	Non Plastics			ML
3	1	5	0.27%	6.65%	93.08%	24.99%	18.75%	6.24%	CL-ML
4	1	6	1.10%	6.98%	91.92%	Non Plastics			ML
5	1	6.7	7.40%	22.21%	70.39%	22.83%	16.33%	6.50%	CL-ML
6	1	7.5	0.15%	32.29%	67.56%	Non Plastics			ML
7	1	10	1.33%	25.65%	73.03%	Non Plastics			ML
8	2	1.5	0.13%	33.45%	66.42%	23.38%	17.78%	5.60%	CL-ML
9	2	4	1.02%	11.62%	87.35%	Non Plastics			ML
10	2	7	0.09%	40.40%	59.51%	Non Plastics			ML
11	2	8	0.80%	3.85%	95.35%	Non Plastics			ML
12	2	9.5	1.18%	17.31%	81.51%	Non Plastics			ML
13	3	1	0.11%	18.86%	81.04%	Non Plastics			ML
14	3	3.5	3.50%	10.40%	86.10%	29.93%	25.00%	4.93%	CL-ML
15	3	6.5	2.98%	4.19%	92.63%	Non Plastics			ML
16	3	10	0.00%	13.53%	86.47%	Non Plastics			ML
17	4	0.75	6.28%	18.98%	74.74%	Non Plastics			ML
18	4	1.4	0.09%	23.97%	75.94%	27.19%	22.22%	4.97%	CL-ML
19	4	2	1.25%	11.86%	86.89%	28.38%	21.62%	6.76%	CL-ML
20	4	2.7	3.82%	19.74%	76.44%	25.21%	20.00%	5.21%	CL-ML

Continue of Table 2. (Soil Classification Results)

Sample No	Borehole No	Depth(m)	Particle Size Analysis (Standard)			Atterberg Limits (Standard)			Soil Classification
			%Gravel (>4.75 mm)	%Sand (0.075-4.75mm)	%Silt & clay (<0.075mm)	%LL	%PL	%PI	USCS
21	4	3.5	0.67%	7.82%	91.51%	25.28%	19.57%	5.71%	CL-ML
22	4	5.5	1.27%	15.50%	83.23%	Non Plastics			ML
23	4	8	1.45%	2.63%	95.92%	25.97%	20.59%	5.38%	CL-ML
24	4	9.5	3.68%	9.58%	86.74%	Non Plastics			ML
25	5	0.75	2.75%	12.20%	85.06%	Non Plastics			ML
26	5	1.3	0.51%	21.07%	78.42%	22.71%	17.14%	5.57%	CL-ML
27	5	2	0.00%	7.06%	92.94%	25.55%	20.51%	5.04%	CL-ML
28	5	2.5	0.00%	5.92%	94.08%	29.18%	23.53%	5.65%	CL-ML
29	5	3.4	4.72%	10.88%	84.40%	25.48%	17.91%	7.57%	CL
30	5	4.2	1.79%	10.21%	88.01%	Non Plastics			ML
31	5	5	4.82%	5.81%	89.37%	25.51%	19.15%	6.36%	CL-ML
32	5	5.7	1.61%	6.42%	91.97%	Non Plastics			ML
33	5	6.5	1.04%	6.99%	91.97%	24.74%	19.72%	5.02%	CL-ML
34	5	7.2	1.50%	5.48%	93.03%	27.34%	20.83%	6.51%	CL-ML
35	5	8.2	1.61%	17.84%	80.55%	Non Plastics			ML
36	5	9.3	0.36%	77.95%	21.68%	Non Plastics			SM

Table 3. Summary results of soil classifications of soil samples of Test Pits

OMRAN GEOTECHNICAL COMPANY

Soil Sample General Classification

Sample No	Test Pit No	Depth(m)	Particle Size Analysis (Standard)			Atterberg Limits (Standard)			Soil Classification
			%Gravel (>4.75 mm)	%Sand (0.075-4.75mm)	%Silt & clay (<0.075mm)	%LL	%PL	%PI	USCS
1	1	1	0.27%	17.59%	82.14%	28.18%	21.43%	6.75%	CL-ML
2	1	2	0.23%	10.21%	89.56%	29.51%	25.00%	4.51%	CL-ML
3	2	1	0.19%	29.56%	70.25%	25.94%	20.29%	5.65%	CL-ML
4	2	2	0.03%	3.45%	96.52%	28.74%	23.81%	4.93%	CL-ML
5	3	1	0.97%	32.66%	66.38%	23.50%	16.90%	6.60%	CL-ML
6	3	2	1.60%	23.62%	74.79%	25.82%	20.93%	4.89%	CL-ML
7	4	1	0.36%	23.27%	76.37%	23.96%	17.65%	6.31%	CL-ML
8	4	2	0.52%	18.24%	81.24%	28.18%	21.24%	6.94%	CL-ML

5.4.2. Laboratory test results on soil samples of boreholes

Summary results of other laboratory tests such as Specific Gravity (GS), Moisture Content, Hydrometer tests, Dry Density, Expansion Index and Permeability tests on representative soil samples of boreholes are presented in Table 4 as below:

Table 4. Summary results of laboratory soil tests on soil samples of boreholes

OMRAN GEOTECHNICAL COMPANY

Sample No	Borehole No	Depth (m)	Dry Density By Cylinder (Mg/m^3)	Moisture %	GS	Expansion Index	Permeability (Cm/sec)	Hydrometer	
								Silt (%)	Clay (%)
1	1	1	1.575						
2	1	1.5			2.66	62.12			
3	1	2	1.549						
4	1	3.5	1.559						
5	1	4			2.74			63	37
6	1	4.5	1.469						
7	1	5			2.68	42.72			
8	1	5.5	1.584						
9	1	7.5			2.68			85	15
10	2	1	1.627						
11	2	1.5			2.67	63.48			
12	2	3		26.07					
13	2	3.5	1.484						
14	2	4		26.37	2.7		6.1×10^{-3}	62	38
15	2	5		28.93					
16	2	8			2.6	41.4		73	27
17	3	1	1.638	16.61	2.68	53.44			
18	3	3		23.65					
19	3	3.5			2.65			53	47
20	3	4		28.41					

Continue of Table 4. (Laboratory test results)

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Sample No	Borehole No	Depth (m)	Dry Density By Cylinder (Mg/m^3)	Moisture %	GS	Expansion Index	Permeability (Cm/sec)	Hydrometer	
								Silt (%)	Clay (%)
21	3	5		27.27					
22	3	6.5			2.66	56.32			
23	3	7		28.54					
24	3	9		26.68					
25	3	10			2.66			85	15
26	4	0.75			2.71				
27	4	1	1.619	15.91					
28	4	1.4			2.67	54.24			
29	4	2		23.08	2.68				
30	4	3		23.75					
31	4	3.5			2.75			66	34
32	4	4					6.62×10^{-3}		
33	4	5		25.46					
34	4	6		18.57					
35	4	8			2.66	57.44			
36	4	9.5			2.73			70	30
37	5	1	1.635	14.95					
38	5	1.3			2.61			61	39
39	5	2		17.74					
40	5	2.5			2.68	69.44			

Continue of Table 4. (Laboratory test results)

OMRAN GEOTECHNICAL COMPANY

Sample No	Borehole No	Depth (m)	Dry Density By Cylinder (Mg/m^3)	Moisture %	GS	Expansion Index	Permeability (Cm/sec)	Hydrometer	
								Silt (%)	Clay (%)
41	5	3		11.07			8.17×10^{-3}		
42	5	3.6			2.66				
43	5	4.5	1.479						
44	5	5		18.28					
45	5	5.7			2.64				
46	5	6		23.33					
47	5	6.5			2.65	43.52			
48	5	7.2			2.7			57	43
49	5	9.3			2.72				

5.4.3. Laboratory test results on soil samples of test pits

Summary results of other laboratory tests such as Specific Gravity (GS), Field Density, Dry Density, Maximum Dry Density and Optimum Moisture Content laboratory tests on representative soil samples of test pits are presented in Table 5 as below:

Table 5. Summary results of laboratory soil tests on soil samples of Test Pits

OMRAN GEOTECHNICAL COMPANY

Sample No	Test Pit No	Depth (m)	GS	Dry Density By Cylinder (Mg/m^3)	Field Density By Sand Cone (gm/cc)	Proctor Modified	
						M.D.D	O.M.C
1	1	1		1.569		1.928	12.5
2	1	2	2.7		1.67	1.89	13
3	2	1		1.551		1.954	11.1
4	2	2	2.6		1.63	1.894	12.6
5	3	1		1.577		2.01	10.9
6	3	2	2.7		1.63	1.931	11.7
7	4	1		1.584		1.97	12.8
8	4	2	2.73		1.51	1.948	11.9

In Summary, Table 5 shows below summary results:

- Maximum Dry Density of soil is between 1.89 to 2.01 (gr/cm3).
- Optimum Moisture Content of soil is between 10.9 to 13 percent (%).

5.4.4 Summary results of Direct Shear and Consolidation tests

Summary results of Direct Shear and Consolidation laboratory tests on representative soil samples are presented in Table 6 and 7 as below:

Table 6. Summary results of Direct Shear test results (ASTM D-3080)

OMRAN GEOTECHNICAL COMPANY

Direct Shear Results

Sample No	Borehole No	Depth(m)	Cohesion	Min Angle ϕ
1	1	1.5	0.017	27.44°
2	3	1	0	28.02°
3	5	1.3	0.02	26.26°

Table 7. Summary results of Consolidation test results (ASTM D-2435)

OMRAN GEOTECHNICAL COMPANY

Consolidation Results

Sample No	Borehole No	Depth(m)	Cc	Cr	Pc (Kpa)	Cv (cm^2 / Min)
1	1	5	0.266	0.04791	320	0.3298 to 0.8450
2	3	6.5	0.6104	0.024	370	0.1246 to 0.5349
3	5	3.6	0.2166	0.02397	400	0.1834 to 0.4630

5.5. Seismic Soil Site Class

According to Table 8 of the IBC (2006), and the site soil properties and N-Values determined in the field, the project is classified as Class E.

Table 8. Site Class Definition, [IBC 2006, Page 303, Table 1613.5.2]

SITE CLASS	SOIL PROFILE NAME	AVERAGE PROPERTIES IN TOP 100 feet, SEE SECTION 1613.5.5		
		Soil shear wave velocity, $\bar{v}_s$, (ft/s)	Standard penetration resistance, $\bar{N}$	Soil undrained shear strength, $\bar{s}_u$, (psf)
A	Hard rock	$\bar{v}_s > 5{,}000$	N/A	N/A
B	Rock	$2{,}500 < \bar{v}_s \le 5{,}000$	N/A	N/A
C	Very dense soil and soft rock	$1{,}200 < \bar{v}_s \le 2{,}500$	$\bar{N} > 50$	$\bar{s}_u \ge 2{,}000$
D	Stiff soil profile	$600 \le \bar{v}_s \le 1{,}200$	$15 \le \bar{N} \le 50$	$1{,}000 \le \bar{s}_u \le 2{,}000$
E	Soft soil profile	$\bar{v}_s < 600$	$\bar{N} < 15$	$\bar{s}_u < 1{,}000$
E	—	Any profile with more than 10 feet of soil having the following characteristics: 1. Plasticity index $PI > 20$, 2. Moisture content $w \ge 40\%$, and 3. Undrained shear strength $\bar{s}_u < 500$ psf		
F	—	Any profile containing soils having one or more of the following characteristics: 1. Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils, quick and highly sensitive clays, collapsible weakly cemented soils. 2. Peats and/or highly organic clays ($H >$ 10 feet of peat and/or highly organic clay where H = thickness of soil) 3. Very high plasticity clays ($H >$25 feet with plasticity index $PI >$75) 4. Very thick soft/medium stiff clays ($H >$120 feet)		

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square foot = 0.0479 kPa. N/A = Not applicable

5.6. Seismic Coefficients

Seismic Coefficients S1 and Ss, can be defined based on the Preliminary Earthquake Hazard Map of Afghanistan (2007 edition) prepared under the auspices of the U.S. Agency for International Development (USAID).

So, suggests below Seismic Coefficients for this project in Kabul Province, Afghanistan: (See Figure 1)

Ss = 1.28 **S1 = 0.51** **10/50 Ss = 0.64** **10/50 S1 = 0.26**

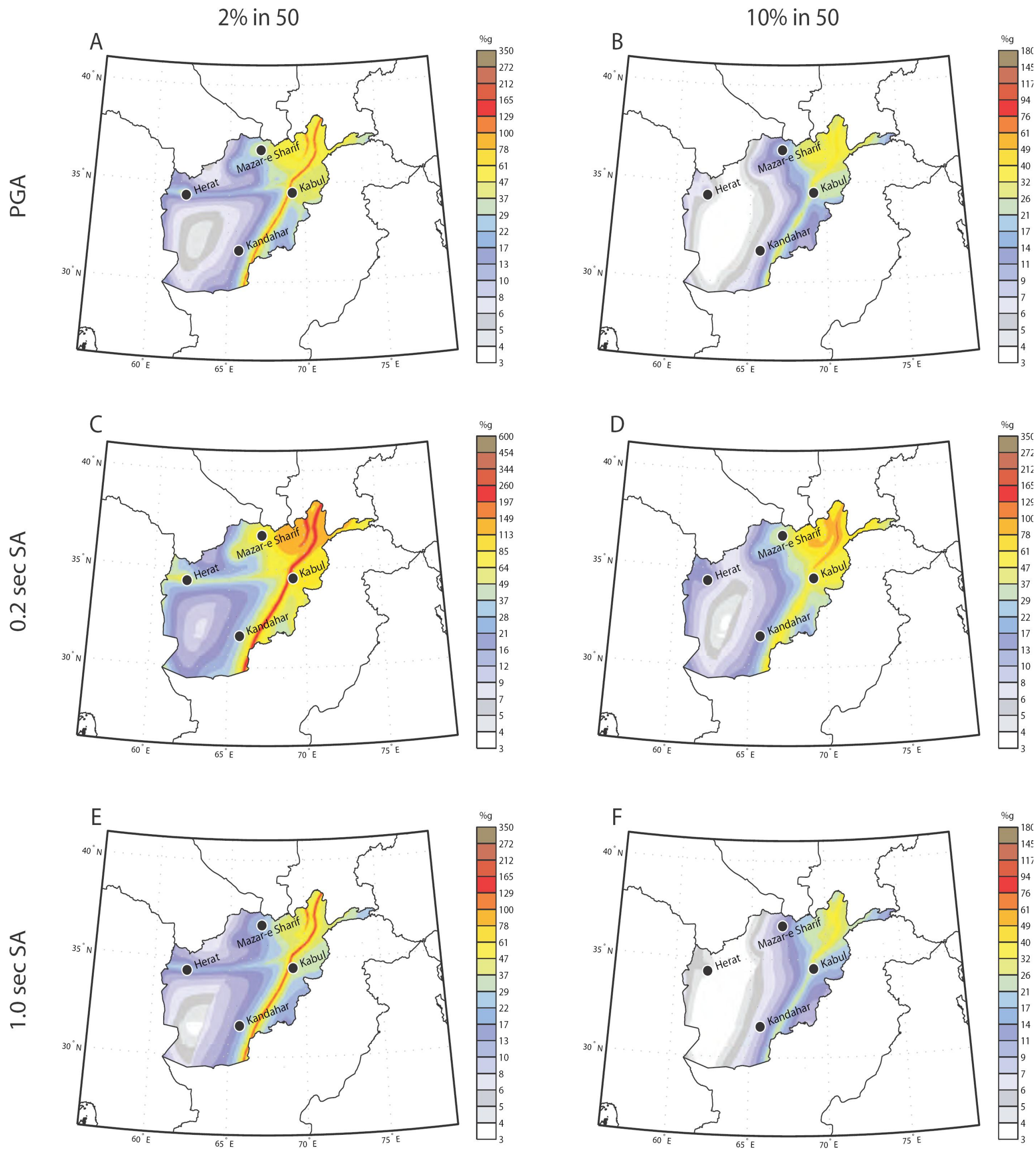


Figure 1. Ground motions for all modeled sources for PGA (A, B), 0.2-second SA (C, D), and 1.0-second SA (E, F) at 2-percent (A, C, E) and 10-percent (B, D, F) probability of exceedance in 50 years. [Reference: Preliminary Earthquake Hazard Map of Afghanistan, 2007 edition, USAID]

6. Geotechnical Recommendations

6.1. Foundations Evaluations

6.1.1. General

In designing foundations, the engineer must satisfy several independent foundation stability requirements, which must be met simultaneously:

- ❖ There should be an adequate safety factor against shear failure within the soil mass. (The working loads should not exceed the allowable bearing capacity of the soil).
- ❖ The probable maximum and differential settlements of the soil under any part of the foundations must be limited to safe and tolerable limits.
- ❖ All footings shall be located below the frost line and topsoil depth.

6.1.2. Foundations Level

- ❖ Based on site investigation and soil test results, all footings shall be located below the frost line at minimum 800 mm.
- ❖ Based on the field investigation, topsoil thickness in the project area is maximum 500 mm.
- ❖ Therefore, minimum foundation level in all area should be located at minimum 800 mm in depth from Finished Grade.
- ❖ Soil improvement under the subgrade foundation is suggested for this site. Overexcavation of 60 cm of natural soil in the building footprint area is recommended. The overexcavated material should be replaced with engineered fill, compacted to 95 % of the Modified proctor Value (ASTM D-1557).

6.1.3. Choice the Type of Foundations

The choice of particular type of foundation depends upon the character of the soil, the presence of ground water at the site, the magnitude of the imposed loads, and the project characteristics.

Single, Strip or Mat foundation types are recommended for the proposed building with combined Reinforced concrete (R.C) with considering the evaluated Allowable Bearing Capacity and Settlement of soil.

6.2. Compaction Requirement

6.2.1. General

The compaction requirements for clean, cohesionless, granular materials will be generally higher than those for cohesive materials, because cohesionless materials more readily consolidate, or liquefy, when subjected to vibration. For structures with unusual stability requirements and settlement limitations, the minimum density requirements indicated in followed table should be increased (See Table 9).

Table 9. Compaction Density as a Percent of ASTM D 1557
[Reference: UFC 3-220-03FA, table 15.2, Page 15.4]

	ASTM D 1557 Maximum Density, in Percentage	
	Cohesive Soils	Cohesionless Soils
Fill/Embankment/Backfill		
Under proposed structures, building Slabs, steps, paved areas	90	95[a]
Under sidewalks and grassed areas	85	90
Sub-grade		
Under building slabs, steps and Paved areas / top 300 mm (12inches)	90	95
Under sidewalks, top 150 mm (6 inches)	85	90

6.2.2. Compaction Requirement

- Soil improvement under the subgrade foundation is suggested for this site. Overexcavation of 60 cm of natural soil in the building footprint area is recommended.
- The overexcavated material should be replaced with engineered fill, compacted to 95 % of the Modified proctor Value (ASTM D-1557).
- Selected material should be compacted to a dry density not less than 95% of the maximum dry density as obtained by modified proctor test (ASTM D-1557) in each layers with maximum thickness of 150 mm.
- All specification criteria per section “Excavation, Filling and Backfilling for Buildings” of the project specification should be followed.

6.3. Select Material Specification

Exploratory investigations needed to determine the suitable sources of select material. Laboratory tests are needed to determine the suitability of available materials including natural water content, compaction characteristics, grain-size distribution, Atterberg limits, shear strength, and consolidation. The susceptibility to frost action should also be considered in analyzing the potential behavior of fill material. The scope of laboratory testing for soil characterization will depend on the size and cost of the structure, thickness and extent of the fill, and the strength and compressibility of the underlying soils. Coarse-grained soils are preferred for fill; however, most fine-grained soils can be used advantageously if attention is given to drainage, compaction requirements, moisture, and density control.

The Select materials to be used shall be:

- Free of organic matter or other deleterious substances.
- Well graded granular mixture with no particles larger than 75 mm and at least 80% of materials are smaller than 19mm in size.

- ❖ Materials passing sieve No.200 shall be less than or equal 20%.
- ❖ Plasticity index less than or equal 5.
- ❖ Materials under foundations shall be compacted to 95% of maximum dry density as obtained by modified proctor (ASTM 1557).

6.4. Excavations Recommendations

In selecting and designing the excavation system, the primary controlling factors will include:

- ❖ soil type and soil strength parameters
- ❖ groundwater conditions
- ❖ slope protection
- ❖ side and bottom stability
- ❖ vertical and lateral movements of adjacent areas, and effects on existing structures

General Recommendations for excavations:

- ❖ Excavate to dimensions and elevations given by the foundation designer, allowing additional space as required for construction operations and inspection of foundations.
- ❖ Remove existing building construction and other materials concealed beneath present grade, where required to execute work.
- ❖ Properly level the bottom of excavation.
- ❖ Do not carry out excavations lower than indicated, except when directed by the geotechnical consultants.
- ❖ Unauthorized excavations carried below indicated level shall be filled with well graded granular soil and compacted to 95% of maximum dry density as determined by modified proctor (ASTM 1557).

- Excavations can be accomplished without bracing where a minimum slope of 30 degrees can be achieved. Ultimately, hazardous and dangerous conditions shall be prevented and safety of personnel shall be maintained.

6.5. Backfilling Recommendations

6.5.1. Backfill Material Specification

- **Satisfactory Materials**

  Satisfactory materials comprise any materials classified by ASTM D 2487 as GW, GP, GM, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC. Satisfactory materials for grading comprise stone less than 75 mm, except for fill material for pavement and building areas.

- **Unsatisfactory Materials**

  Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials include trash; refuse; man-made fills and backfills containing debris from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. Notify the Client immediately when encountering any contaminated materials.
- The materials to be used for general backfilling purposes shall be of selected fill composed of sand and or granular mixture free from organic matter or other deleterious substances, the plasticity index of the backfill material shall not exceed 15 percent. It shall be spread in lifts not exceeding 15cm in compact thickness, moisture conditioned to its optimum moisture content, and compacted to a dry density not less than 90% of the maximum dry density as obtained by modified proctor test (ASTM D-1557).

6.5.2. General Backfilling Criteria

- Above the foundation level and under slabs on grade, coarse grained soil used for filling shall be clean and free from clay lumps and organic matter.
- Sand and gravel shall be brought from quarries approved by the consultant.
- At least 95% of maximum dry density with ASTM D1557 standard must be achieved for the Replacement layer.
- Above foundations, place the fill material in 0.3 meters lifts and compact material to average relative density of 95% with no individual test less than 95% maximum density in accordance with ASTM D1557 standard.
- Compact the fill using suitable mechanical tamping equipment (such as steel drum, or rubber-tired rollers) to obtain specified density.
- Perform field density control test for every 150.00 square meters of fill at locations specified by consultant.
- Correct and/or re-compact materials that do not meet specified compaction requirements. Continue corrective measures until required density has been achieved.
- Care shall be taken during filling, so as not to damage concrete surfaces, water proofing materials, joints or membranes that have been applied to concrete surfaces.
- The boundary of any compacted back-fill material shall extend at least 1.00 meters (0.60 meters from each side) beyond the foundation footprint.
- Do not fill against any part of walls, or columns until each part has reached the required design strength and has been approved by the consultant.
- Bring backfill up uniformly around building and individual wall units.
- Do not fill against foundations, walls, footing, and other area until concrete forms have been removed, masonry work has been pointed and protected, and concrete finishing, damp proofing, and waterproofing have been completed and approved.

6.6. Allowable Bearing Capacity of soil

The ultimate bearing capacity is the loading intensity that causes failure and lateral displacement of foundation materials and rapid settlement. The ultimate bearing capacity depends on the size and shape of the loaded area, the depth of the loaded area below the ground surface, groundwater conditions, the type and strength of foundation materials, and the manner in which the load is applied. The design bearing pressure equals the ultimate bearing capacity divided by a suitable factor of safety.

For evaluating the Allowable bearing capacity of soil in subject site and providing the support calculations, several methods were used for bearing capacity evaluation as below:

1) Estimation of Allowable Bearing Capacity based on IBC reference table

2) Calculation of Allowable Bearing Capacity based on new edition Terzaghi equation (Braja, M.Das, Principle of Geotechnical Engineering, 5th edition, 2002).

3) Calculation of Allowable Bearing Capacity based on pre-calculated equations of Terzaghi, Meyerhof, Hansen and Vesic methods provided in software.

1. Allowable Bearing Capacity based on IBC Table

For the preliminary estimation, to determine the allowable bearing capacity of soil with respect to the type of soil, IBC (2006) reference table 10 was used.

The predominant soil type encountered at this site is classified as Sandy Silt (ML and CL-ML) Based on the Unified Soil Classification system.

Table 10. Suggestion for Allowable Foundation Pressure and Lateral Pressure

[Reference: International Building Code (IBC) 2006, section 1804, page 345, Table 1804.2]

ALLOWABLE FOUNDATION AND LATERAL PRESSURE

CLASS OF MATERIALS	ALLOWABLE FOUNDATION PRESSURE (psf)[d]	LATERAL BEARING (psf/f below natural grade)[d]	LATERAL SLIDING Coefficient of friction[a]	LATERAL SLIDING Resistance (psf)[b]
1. Crystalline bedrock	12,000	1,200	0.70	—
2. Sedimentary and foliated rock	4,000	400	0.35	—
3. Sandy gravel and/or gravel (GW and GP)	3,000	200	0.35	—
4. Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000	150	0.25	—
5. Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CL, ML, MH and CH)	1,500[c]	100	—	130

For SI: 1 pound per square foot = 0.0479 kPa, 1 pound per square foot per foot = 0.157 kPa/m.

a. Coefficient to be multiplied by the dead load.

b. Lateral sliding resistance value to be multiplied by the contact area, as limited by Section 1804.3.

c. Where the building official determines that in-place soils with an allowable bearing capacity of less than 1,500 psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.

d. An increase of one-third is permitted when using the alternate load combinations in Section 1605.3.2 that include wind or earthquake loads.

As a preliminary estimation, according to soil classification, Allowable Bearing Capacity for foundations designing in this project is 1500 psf (0.73 Kg/cm2 or 71.82 KN/m2).

Also, the following recommendations are extracted from the table:

- A lateral bearing pressure value of 100 psf/f below natural grade is recommended.
- A maximum value of 0.25 is recommended for the coefficient of friction for lateral sliding.

2. Allowable Bearing Capacity based on the New Edition Terzaghi Equation

For calculation of the Allowable bearing capacity based on the physical and mechanical parameters of soil and foundation dimensions, we have used the new edition of the Terzaghi ultimate bearing capacity equation.
Terzaghi suggests the following equation for calculation of Ultimate Bearing Capacity in general shear failure condition for Shallow Single Foundations:

- **Qu = 1.3 c Nc + q Nq + 0.4 γ B Nγ**

Where:

Qu= Ultimate Bearing Capacity (KN/m2)

c= Cohesion of soil (KN/m2),

φ= Angle of internal friction (Degrees),

And:

N_c, N_q ,N_γ = Coefficients have selected from the table [Reference: Terzaghi, 2002]

γ = Effective unit weight of soil (KN/m3),

B = Width of footing (m),

q = γ D_f

D_f = depth of foundation = 0.85m based on design information

And:

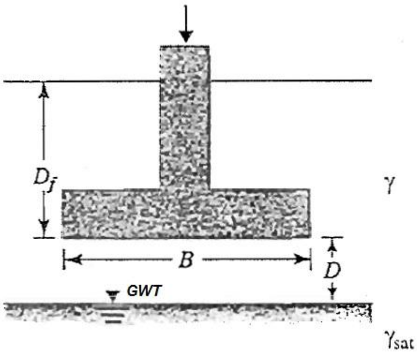
Qa = Qu /SF

Where:

Qa= Allowable Bearing Capacity (KN/m2)

SF (Safety Factor) = 3

According to dimensions of foundation and depth of groundwater table in this site, groundwater table is close to the footing about 2.6 to 2.7 meters below existing ground surface, so some changes are required in the third term of equation. Groundwater table will be at approximately 1.9 m below the bottom of the foundation, therefore $q = \gamma D_f$ and the magnitude of γ in the third term of the bearing capacity equations should be replaced by γ_{ave} , according to following equation:



- $\gamma_{ave} = \frac{1}{B}[\gamma D + \gamma'(B - D)]$ for D ≤ B and $\gamma' = \gamma_{sat} - \gamma_w$

Where:

γ' = Effective unit weight of soil below water table (KN/m3),

γ_{sat} = Saturated unit weight of soil (KN/m3),

γ = Natural unit weight of soil (KN/m3),

γ_w = Unit weight of water (KN/m3),

Based on Density of soil in place and specific gravity test results:

γ = 15.45 KN/m3, γ_w = 9.8 KN/m3, γ_{sat} = 19.47 KN/m3, γ' = 9.67 KN/m3,

And:

B = 3.35 m , D_f = 0.85 m

Therefore:

γ_{ave} = 12.86 KN/m3,

Based on direct shear test results:

C=0 (Kg/cm2) Minimum φ=26.26 º

Based on Terzaghi Coefficients Table for φ = 26.26 º:

N_c = 25.1 N_q = 12.7 N_γ = 9.7

$q = \gamma D_f$ = 12.86× 0.85 = 13.13 KN/m2

- Back to Equation:

Qu = 1.3 ć Nc + q Nq + 0.4 γ_{ave} B Nγ

Qu = (1.3×0×15.3) + (13.13×12.7) + (0.4×12.86×B×9.7)

Qu = (166.75 + 49.9 B) KN/m2

And:

Qa = Qu /3= (55.58 + 16.63 B) KN/m2

- According to design information: B=3.35m
- Qa= 111.3 KN/m2

Note:

The above value for soil bearing capacity is calculated assuming a footing wide (B) of 3.35 meters. If final footing wide is different, the bearing capacity will change according to the below formula:

Qa = (55.58 + 16.63 B) KN/m2

3. Calculation of Allowable Bearing Capacity from pre-calculated equations of Terzaghi, Meyerhof, Hansen and Vesic methods are available in Excel software

To simplify the calculation of bearing capacity of soil, there are software programs available based on the Terzaghi, Meyerhof, Hansen and Vesic equations.

Results of calculations and output of software are provided in the below figures:

Figure 2. Input and Output of Terzaghi equation for Allowable Bearing Capacity

BEARING CAPACITY OF SHALLOW FOUNDATIONS
Terzaghi Method

Date	8/25/2010
Identification	Ghazi high school

INPUT

Units of Measurement

	SI	SI or E

Foundation Information

Shape	SQ	SQ, CI, CO, or RE
B =	3.35	m
L =	3.35	m
D =	0.85	m

Soil Information

C =	0	kPa
φ =	26.26	deg
γ =	15.45	kN/m^3
Dw =	2.7	m

Factor of Safety

F =	3

OUTPUT

Terzaghi Results

Bearing Capacity

Q ult =	**333.91**	**kPa**
Q a =	**111.30**	**kPa**

Allowable Column Load

P =	1,024	kN

Terzaghi Computations

Unit conversion	1	a_θ =	2.855931431
γ_w =	9.8	N_c =	25.10
ϕ (radians)	0.45832346	N_q =	12.70
$W_{footing}$	225	N_γ =	9.70
γ conc	23.6	γ' =	12.86
		coefficient #1	1.3
		coefficient #3	0.4
		σ_{zD}' =	13.13

Figure 3. Input and Output of Meyerhof equation for Allowable Bearing Capacity

BEARING CAPACITY OF SHALLOW FOUNDATIONS
Meyerhof Method

Date	8/25/2010	
Identification	Ghazi high school	

INPUT

Units of Measurement

	SI	SI or E

Foundation Information

Shape	SQ	SQ, CI, CO, or RE
B =	3.35	m
L =	3.35	m
D =	0.85	m

Soil Information

C =	0	kPa
φ =	26.26	deg
γ =	15.45	kN/m^3
Dw =	2.7	m

Factor of Safety

F =	3

OUTPUT

Meyerhof Results
(Vertical Load)

Bearing Capacity

Q ult =	**492.19**	**kPa**
Q a =	**164.06**	**kPa**

Allowable Column Load

P =	1,563	kN

Meyerhof Computations

Unit conversion	1	N_c =	25.10	s_γ =	1.26
γ_w =	9.8	s_c =	1.52	d_γ =	1.04
ϕ (radians)	0.458323	d_c =	1.08	γ' =	12.86
$W_{footing}$	278	N_q =	12.70	Kp =	2.587091461
γ conc	23.6	s_q =	1.26	B/L =	1
		d_q =	1.04	D/B =	0.253731343
		N_γ =	9.70	$\sigma_{zD'}$ =	13.13

Figure 4. Input and Output of Hansen equation for Allowable Bearing Capacity

BEARING CAPACITY OF SHALLOW FOUNDATIONS
Hansen Method

Date	8/25/2010
Identification	Ghazi high school

INPUT

Units of Measurement

	SI	SI or E

Foundation Information

Shape	SQ	SQ, CI, CO, or RE
B =	3.35	m
L =	3.35	m
D =	0.85	m

Soil Information

c =	0	kPa
ϕ =	26.26	deg
γ =	15.45	kN/m^3
Dw =	2.7	m

Factor of Safety

F =	3

OUTPUT

Hansen Results

Bearing Capacity

Q ult =	**384.62**	**kPa**
Q a =	**128.21**	**kPa**

Allowable Column Load

P =	1,214	kN

Hansen Computations

				k =	0.25373
Unit conversion	1	N_c =	25.10	i_c =	1
γ_w =	9.8	s_c =	1.51	g_c =	1
ϕ (radians)	0.458323	d_c =	1.10	b_c =	1
$W_{footing}$	225	N_q =	12.70	i_q =	1
γ conc	23.6	s_q =	1.44	g_q =	1
		d_q =	1.08	b_q =	1
		N_γ =	9.70	i_γ =	1
		s_γ =	0.60	g_γ =	1
		d_γ =	1.00	b_γ =	1
		B/L =	1	γ' =	12.86
		D/B =	0.253731	$\sigma_{zD'}$ =	13.13

Figure 5. Input and Output of Vesic equation for Allowable Bearing Capacity

BEARING CAPACITY OF SHALLOW FOUNDATIONS
Vesic Method

Date	8/25/2010
Identification	Ghazi high school

INPUT

Units of Measurement

	SI	SI or E

Foundation Information

Shape	SQ	SQ, CI, CO, or RE
B =	3.35	m
L =	3.35	m
D =	0.85	m

Soil Information

c =	0	kPa
phi =	26.26	deg
gamma =	15.45	kN/m^3
Dw =	2.7	m

Factor of Safety

F =	3

OUTPUT

Vesic Results

Bearing Capacity

Q ult =	**393.77**	**kPa**
Q a =	**131.26**	**kPa**

Allowable Column Load

P =	1,248	kN

Vesic Computation

				N_γ =	9.70
Unit conversion	1	N_c =	25.10	s_γ =	0.60
γ_w =	9.8	s_c =	1.51	d_γ =	1.00
ϕ (radians)	0.45832	d_c =	1.10	B/L =	1
$W_{footing}$	225	N_q =	12.70	k =	0.2537313
γ conc	23.6	s_q =	1.49	σ_{zD}' =	13.13
		d_q =	1.08	γ' =	12.86

Final Suggestion for Allowable Bearing Capacity of soil:

Based on different methods, maximum allowable bearing capacity of 2325 (psf) equal 1.13 (Kg/cm2) or 111.3 KPa suggested for designing the foundation in subject site.

6.7. Settlement Estimation

Table 11 lists conditions that cause settlements which occur during construction and result in only minor problems and post-construction settlements which occur after a structure is completed or after critical features are completed. Differential settlements distort a structure. A structure can generally tolerate large uniform, or nearly uniform, settlements.

Generally, essential conditions for occurrence the consolidated Settlement are:

1. High Percent of clay soils
2. Shallow water table level

According to lab test results of sieve analysis and atterberg limits, below results are achieved:

- The predominant soil type encountered at this site is classified as sandy silt (CL-ML and ML) based on the Unified Soil Classification System.
- Depth to groundwater measured at 2.6 meters below existing ground surface on August 03 through August 07, 2010.
- Note: The month of August is not rainy season in Kabul area, so groundwater table will coming up slightly more in rainy seasons.

Therefore, according to available conditions of the soil type and groundwater table at the project area, the possibility of occurrence consolidated settlement is probable. Support calculations are provided in follow.

Table 11. Causes of Settlements
[Reference: UFC 3-220-03FA, table 5.1, Page 5.2]

Cause	Comment
Compression of foundation soils under static loads.	Soft, normally consolidated clays and peaty soils are most compressible. Loose silts, sands, and gravels are also quite compressible.
Compression of soft clays due to lowering ground-water table.	Increased effective stress causes settlement with no increase in surface load.
Compression of cohesionless soils due to vibrations.	Loose sands and gravels are most susceptible.Settlement can be caused by machine vibrations, earthquakes, and blasts.
Compression of foundation soil due to wetting.	Loose silty sands and gravels are most susceptible.Settlements can be caused by rise in groundwater table or by infiltration.
Shrinkage of cohesive soils caused by drying.	Highly plastic clays are most susceptible.Increase in temperature under buildings containing ovens or furnaces may accelerate drying. Wetting of highly plastic clays can cause swelling and heave of foundations.
Loss of foundation support due to erosion.	Waterfront foundations must extend below maximum erosion depth.
Loss of foundation support due to excavation of adjacent ground.	Most pronounced in soft, saturated clays.
Loss of support due to lateral shifting of the adjacent ground	Lateral shifting may result from landslides, slow downhill creep, or movement of retaining structures.
Loss of support due to formation of sinkhole.	Soils overlying cavernous limestone and broken conduits are susceptible.
Loss of support due to thawing of permafrost.foundation heat.	Permafrost should be insulated from
Loss of support due to partial or complete liquefaction.	Loose, saturated sands are most susceptible.
Downdrag on piles driven through soft clay.	Loading on piles is increased by negative skin friction if soil around upper part of pile settles.

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For single foundation, Total Settlement has calculated as below equation form Principles of Geotechnical Engineering, Braja M. Das, 2nd and 5th edition, 2002 reference:

$$S_t = S_e + S_c + S_s$$

Where:

- S_t = Total Settlement
- S_e = Immediate Settlement
- S_c = Primary Consolidation Settlement
- S_s = Secondary Consolidation Settlement

A) Immediate Settlement (S_e):

<u>1st Method:</u>

(Principles of Geotechnical Engineering, Braja M. Das, 2nd edition):

$$S_e = \frac{Bq_0}{E_s}(1-\mu^2)\alpha_{av}$$

B = Width of Footing (m)

q_0 = *Qa* = Allowable Bearing Capacity (KN/m2)

μ_s = Poisson's Ratio

E_s = Elasticity Modulus (KN/m2)

α_{av} = Coefficient has selected from referenced Figure 6

$$Qa = \frac{(156.97 + 52.73\ B)}{3}\ (\mathrm{KN/m2})$$

- Back to Equation:

$$S_e = \frac{Bq_0}{E_s}(1-\mu^2)\alpha_{av}$$

q_0 = 100 KN/m2 (According to suggestion bearing capacity value)

Es (KN/m2) = module of elasticity (from Foundation Analysis and Design, J. Bowles, 5th edition, 1996, p316, table 5-6)

And Es for soft clays via N $_{spt}$ → Es =300 (N+6) and average N is 11

→ Es =5100 (KN/m2)

μ = 0.2 (Braja. M. Das, p262, table 10-3)

α_{av} = 0.95 from table (L/B =1) where L (length) and B (width) of foundation.

Now, Immediate Settlement has calculated base on coefficient of B (Wide of foundation) and α_r .

- $$S_e = \frac{Bq_0}{5100}(1-0.2^2)0.95$$

For examples: B= 3.35 m → S_e = 60 mm

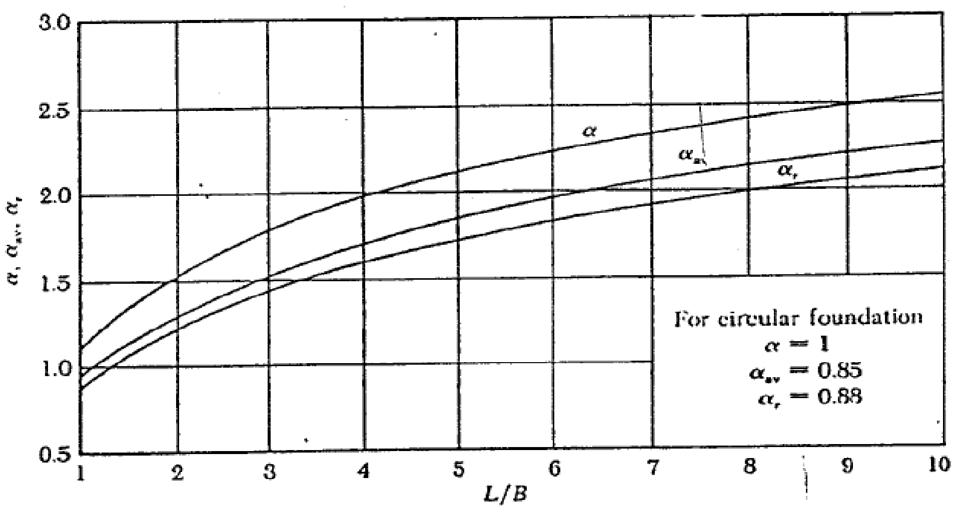


Figure 6. The values of α_r for various types of foundation

[Reverence: Berja. M. Das, 1941]

2nd Method:

(Principles of Geotechnical Engineering, Braja M. Das, 5th edition, 2002):

$$S_e = \Delta\sigma B \frac{1-\eta^2}{E_s} I_p$$

$\Delta\sigma$ = Net Pressure Applied (KN/m2) → $\Delta\sigma = \frac{(156.97 + 52.73\ B)}{3}$ (KN/m2)

B = Width of Foundation (m)

Es= Module of Elasticity (from Foundation Analysis and Design, J. Bowles, 5th edition, 1996, p316, table 5-6)

And Es for soft clays via N $_{spt}$ → Es = 300 (N+6) and average N is 11

μ= Poisson's Ratio (Braja. M. Das, p262, table 10-3)

I_p = Non dimensional influence factor (for m=1 and center loading flexible foundation= 1.12) from Braja. M. Das, p262, table 10-2.

- $S_e = \Delta\sigma B \frac{1-0.2^2}{5100} 1.12$

For examples: B= 3.35 m → S_e = 70 mm

Table 12. Values of Elasticity Modulus for soils

[Reference: Berja. M. Das, 1941]

Soil Type	Elasticity Modulus (Es)	
	Kg/cm2	kN/m2
Soft Silt and clay	17.5-35	3000-4500
Medium clay and sand	60-140	6000-14000
Hard clay and Dense sand	105-280	10500-28000
Very Dense sand	350-700	35000-70000

Table 13. Values of Poisson's Ratio for soils

[Reference: Berja. M. Das, 1941]

Soil type	Poisson's Ratio (µ**s)**
Loose sand	0.2-0.4
Medium dense sand	0.25-0.4
Dense sand	0.3-0.45
Silty sand	0.2-0.4
Soft clay	0.15-0.25
Medium dense clay	0.2-0.5

Table 14. Influence factors for Foundations

[Reference: Berja. M. Das, 1941]

		I_p		
		Flexible		
Shape	m_1	Center	Corner	Rigid
Circle	—	1.00	0.64	0.79
Rectangle	1	1.12	0.56	0.88
	1.5	1.36	0.68	1.07
	2	1.53	0.77	1.21
	3	1.78	0.89	1.42
	5	2.10	1.05	1.70
	10	2.54	1.27	2.10
	20	2.99	1.49	2.46
	50	3.57	1.8	3.0
	100	4.01	2.0	3.43

B) Primary Consolidation Settlement (S_c):

$$S_c = \frac{C_S H_0}{1+e_0} \log \frac{\sigma'_0 + \Delta\sigma'_{avg}}{\sigma'_0}$$

→ (if the soil be Over Consolidated and $P_c > \sigma'_0 + \Delta\sigma'_{avg}$)

- Clay layer is located in BH#05, depth of 2.8 to 4 meter. (See borehole log)

P_c= pre-consolidation pressure= 400 KN/m2 (from consolidation test result)

1) P_0 (to 4 meter)

(From BH#05, 0-4m and γ=1.57 gm/cc Equals 15.45KN/m3, γ_w=9.81 KN/m3 and γ_{sat}= 19.47 KN/ m3) → P_0=∑YH = (2.8 x 15.45) + {1.2(19.47 - 9.81)}

→ P_0 (to 4 meter) = 54.86 KN/m2

2) P_0 (to GWL)

(From BH#05, 0-2.8m and γ=1.57gm/cc Equals 15.45KN/m3, γ_w =9.81 KN/m3)

→ P_0 (to GWL) = ∑YH = 2.8 x 15.45 → P_0 (to GWL) = 43.26 KN/m2

- OCR=P_c / p_0 = (7.29 to 9.24)>1 → the soil is Over Consolidation

$\Delta\sigma'_{avg}$ = load over clay layer = $q_{0/}$ A, A is Area of Foundation.

For example: If B=3.35 → $\Delta\sigma'_{avg}$ = 71.82 KN/m2

Therefore:

400 > 54.86 + 71.82 → $P_c > \sigma'_0 + \Delta\sigma'_{avg}$ → the soil is Over consolidated

- **Back to Equation:**

$$S_c = \frac{C_S H_0}{1+e_0} \log \frac{\sigma'_0 + \Delta\sigma'_{avg}}{\sigma'_0}$$

C_S = Cr = recompression index = 0.0239 (from consolidation test result)

H_0 = clay layer thickness = 1.2 m

e_0 = void ratio = 0.735 (from consolidation test result)

- calculation for bottom of clay layer at depth of 4 m:

$$s_c = \frac{0.0239(1.2)}{1+0.735} log \frac{54.86 + \Delta\sigma_{avg}}{54.86}$$

→ If B=3.35 m, S_c = 6 mm

- Calculation for depth of ground water level (3.35 meter):

$$s_c = \frac{0.0239(1.2)}{1+0.735} log \frac{43.26 + \Delta\sigma_{avg}}{43.26}$$

→ If B=3.35 m, S_c = 7 mm

C) Secondary Consolidation Settlement (S_s):

$$S_s = C'\alpha H \log \frac{t_2}{t_1}$$

This parameter is not important for over consolidated clay soils; because S_s (secondary consolidation settlement) is very low for this kind of soils and this very low settlement is negligible.

Total Settlement (S_t)

$$S_t = S_e + S_c$$

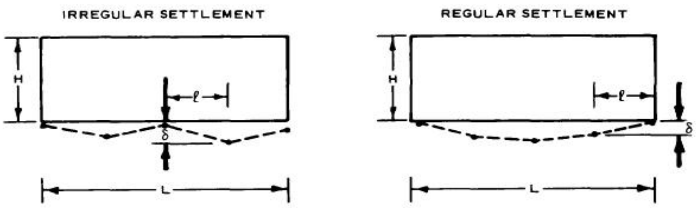
S_t = 60 + 6 = 66 mm ……………………… B=3.35 and P_0 (end of clay layer)

S_t = 60 + 7 = 67 mm ……………………… B= 3.35 and P_0 (to GWL)

6.8. Allowable Settlement

Tolerable angular distortions are listed in table 15, and empirical correlations that may be used to estimate probable angular distortions based on calculated maximum settlements are summarized in table 16. Because of the natural variability of soils, differential settlement will occur though total settlements are calculated to be uniform. An indirect means for controlling differential settlement is to limit total settlement to 3 inches for structures on clay and to 1 1/2 inches for structures on sand. [Reference: UFC 3-220-03FA, Chapter 5, Page 5.1]
For the soils encountered at this site, settlement estimated 2 to 2.5 Inches.

Table 15. Value of Angular Distortion (δ/ϑ) That Can Be Tolerated Without Cracking
[Reference: UFC 3-220-03FA, table 5.2, Page 5.3]



Type of Building	L/H	Allowable δ/ϑ
Steel frame with flexible siding	--	0.008
Steel or reinforced concrete frame with insensitive finish such as dry wall, glass, or moveable panels	--	0.002 to 0.003
Steel or reinforced concrete frame with brick, block, plaster, or stucco finish	≥ 5	0.002
	≤ 3	0.001
Load-bearing brick, tile, or concrete block walls	≥ 5	0.0008
	≤ 3	0.0004
Circular steel tanks on flexible base, with fixed top	--	0.008
Circular steel tanks on flexible base, with floating top		0.002 to 0.003
Tall slender structures, such as stacks, silos, and water tanks, with rigid mat foundations	--	0.002

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Table 16. Empirical Correlations between Maximum (Δ) And Angular Distortion (δ/ϑ)

[Reference: UFC 3-220-03FA, table 5.3, Page 5.4]

Type of Foundation	Approximate Value of δ/ϑ for[a] Δ= 1 in.
Mats on sand	1/750(0.0013)
Rectangular mats on varved silt	1/1000 to 1/2000 (0.001 to 0.0005)
Square mats on varved silt (0.0005 to 0.0003)	1/2000 to 1/3000
Mats on clay	1/1250(0.0008)
Spread footings on sand	1/600(0.0017)
Spread footings on varved silt	1/600(0.0017)
Spread footings on clay	1/1000(0.0010)

a δ/ϑ increases roughly in proportion with Δ. For Δ = 2 in., values of δ/ϑ would be about twice as large as shown, for Δ = 3 inches, three times as large, etc.

(Courtesy ofJ. P. Gould and J. D. Parsons, "Long - Term Performance of Tall Buildings of New York City Varied Silts, " Proceedings, International Conference on Planning and Design of Tall Buildings , Lehigh University, Bethlehem, Pa., 1975. Reprinted by permission of American Society of Civil Engineers, New York.)

7. Liquefaction Hazard Evaluation

7.1. General

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading.

Soil liquefaction occurs in loose, saturated cohesionless soil units (sands and silts) and sensitive clays when a sudden loss of strength and loss of stiffness is experienced, sometimes resulting in large, permanent displacements of the ground. Even thin lenses of loose saturated silts and sands may cause an overlying sloping soil mass to slide laterally along the liquefied layer during earthquakes.

Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other.

When liquefaction occurs, the strength of the soil decreases and, the ability of a soil deposit to support foundations for buildings and bridges are reduced.

According to the site investigation and subsequent soil classification, the most soil type for this project is classified as Silt with Clay and Sand (ML and CL-ML).

Criteria for excluding need for detailed liquefaction analyses (from UFC 3-220-01N)

1. CL, CH, SC or GC Soils
2. GW or GP soils or materials consisting of cobbles, boulders, uniform rock fill, which have a free-draining boundaries that are large enough to preclude the development of excess pore properties
3. SP, SW or SM soils that have an average density equal to or greater than 85 percent, provided that the minimum relative density is not less than 80 percent
4. ML or SM soils in which the dry density is equal to or greater than 95 percent of the modified Proctor (ASTM D 1557) density
5. Soils of pre-Holocene age, with natural over consolidation ratio equall to or greater than 16 and with relative density greater than 70 percent
6. Soils located above the highest potential groundwater table
7. Sands in which the N value is greater than three times the depth in feet, or greater than 75; provided that 75 percent of the values meet this criterion, the minimum N value is not less than one times the depth in feet, that there are no consistent patterns of low values in definable zones or layers, and that the maximum particle size is not greater than one inch. Large gravel particles may affect N values so that the results of the SPT are not reliable
8. Soils in which the shear wave velocity is equal to or greater than 2000 fps. Geophysical survey data and site geology should be reviewed in detail to verify that the possibility of included zones of low velocity is precluded
9. Soils that, in undrained cycle triaxial tests, under isotropically consolidated, stress controlled conditions, and with cyclic stress ratios equal to or greater than 0.45, reach 50 or more with peak-to-peak strains not greater than 5 percent; provided that methods of specimem preparation and testing conform to specified guidelines

7.2. Screening Criteria for Liquefaction Potential

1- Geologic age and origin

If a soil layer is a Fluvial, Lacustrine or Aeolian deposit of Holocene age, a greater potential for liquefaction exists than for till, residual deposits, or older deposits.

Ground Group Classification (after Tokida et. al., 1991)

Ground Group		Liquefaction Potential
Group I	Rock, Diluvial Ground (firm)	Low Liquefaction Potential
Group II	Alluvial Ground (medium-stiff)	High Liquefaction Potential
Group III	Soft and Thick Alluvial Ground (soft)	High Liquefaction Potential

Topographical Group Classification (Tokida et. al., 1991) [sic]

Groups		Topographical Condition
A	High Liquefaction Potential	Reclaimed/Filled-up land Banked-up ground on the alluvial low ground Banked-up ground on the former water/sea area Slight heights on the former river bed Land by drainage Tidal Flat Coastal plain Delta Natural levee Former river bed (Former) marsh (Former) moat Flood plain Sand dune Sand bar Back low land
B	Medium Liquefaction Potential	Except for Group A and Group C (Banked-up ground except for A, Fan etc.)
C	Low Liquefaction Potential	Terrace Plateau Heights Hill Slope Mountain

2- Fines content and plasticity index

Liquefaction potential in a soil layer increases with decreasing fines content and plasticity of the soil. Cohesionless soils having less than 15 percent (by weight) of particles smaller than 0.005 mm, a liquid limit less than 35 percent, and an in situ water content greater than 0.9 times the liquid limit may be susceptible to liquefaction (Seed and Idriss, 1982).

Liquefaction susceptibility of silty and clayey sands (Andrew and Martins, 2000)

	Liquid limit < 32	Liquid limit ≥ 32
Clay content < 10 %	Susceptible	Further studies required (Considering plastic non-clay sized grains such as Mica)
Clay content > 10 %	Further studies required (Considering non-plastic clay sized grains such as mine and quarry tailings	Not susceptible

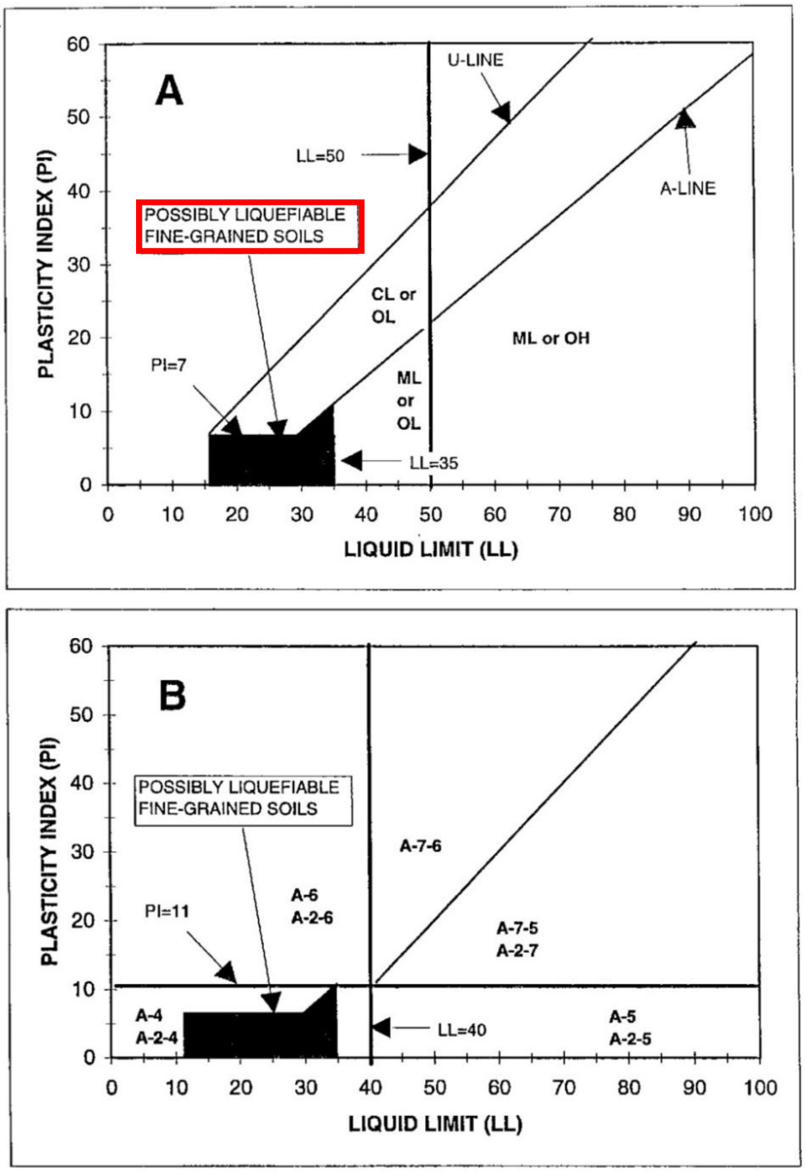


Chart showing (A) Unified Soil Classification System (USCS) and (B) AASHTO classification system for fine-grained soils with shaded region of chart indicative of liquefiable soils (after Youd, 1998).

3- Saturation

Although low water content soils have been reported to liquefy, at least 80 to 85 percent
Saturation is generally deemed to be a necessary condition for soil liquefaction.

Relative liquefaction susceptibility as a function of groundwater table depth (after Youd, 1998)

Groundwater Table Depth	Relative Liquefaction Susceptibility
< 3 m	Very High
3 m to 6 m	High
6 m to10 m	Moderate
10 m to 15 m	Low
> 15 m	Very Low

4- Depth below ground surface

If a soil layer is within 15 meter of the ground surface, it is more likely to liquefy than deeper layers.

5- Soil Penetration Resistance

Seed et al, 1985, state that soil layers with a normalized SPT blow count [(N1)60] **less than 22** have been known to liquefy. Marcuson et al, 1990, suggest an SPT value of [(N1)60] less than 30 as the threshold to use for suspecting liquefaction potential. Liquefaction has also been shown to occur if the normalized CPT cone resistance (*qc*) is less than 157 tsf (15 MPa) (Shibata and Taparaska, 1988).

7.3. Liquefaction Potential Analysis

The most common procedure used in practice for liquefaction potential analysis, the" Simplified Procedure," was developed by H. B. Seed &I. M. Idriss. The following section discusses the Simplified Procedure as proposed by the 1996 NCEER and 1998 NCEER/NSF Liquefaction Workshops (Liquefaction Resistance of soils, Youd, et al., 2001).

This method defines two variables used in calculating the factor of safety; the cyclic stress ratio generated by the earthquake (CSR), and the cyclic liquefaction resistance ratio of the soil (CRR). The factor of safety against liquefaction is the ratio of the soil' resistance to liquefaction to the earthquake-induced stress driving the liquefaction.

Calculation of CSR:

$$CSR_{7.5} = \frac{\tau_{av}}{\sigma'_o} = 0.65\left(\frac{a_{\max}}{g}\right)\left(\frac{\sigma_o}{\sigma'_o}\right)r_d$$

τ_{av} = average cyclic shear stress generated by the earthquake

σ'_o = the pre-earthquake effective overburden stress

σ_o = total vertical stress

a_{max} = peak horizontal acceleration at ground surface

g = acceleration of gravity in same units as a_{max}

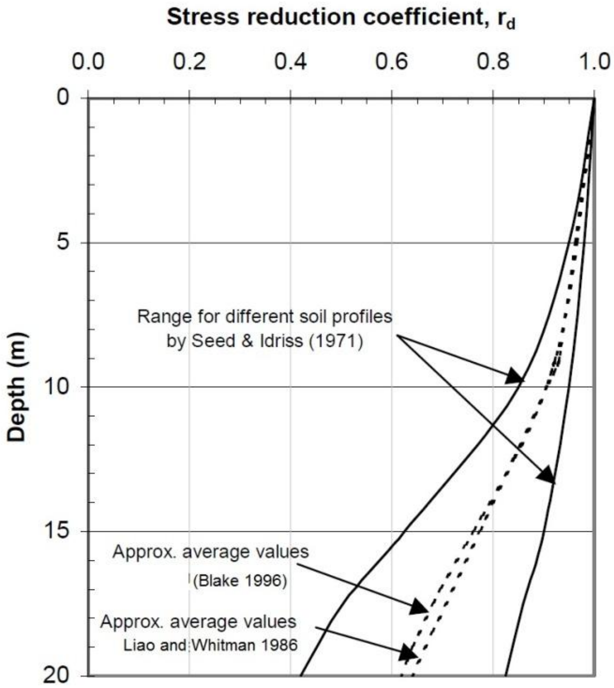
r_d = depth-related stress reduction factor

The value of the stress reduction coefficient decreases with depth as shown on figure. The average value of r_d can be estimated with the following equations (Liao and Whitman 1986a):

$$r_d = 1.0 - 0.00765\,z \quad \text{for} \quad z \leq 9.15\text{ m}$$
$$r_d = 1.174 - 0.0267\,z \quad \text{for} \quad 9.15\text{ m} < z \leq 23\text{ m}$$

Where:

z = depth of interest in meter



Values of stress reduction coefficient versus depth

Back to equation:

$$CSR_{7.5} = \frac{\tau_{av}}{\sigma'_o} = 0.65\left(\frac{a_{max}}{g}\right)\left(\frac{\sigma_o}{\sigma'_o}\right)r_d$$

This calculation applied for ML (Loose to medium dense Silt) layer form borehole number #02, depth of 4 meters.)

$r_d = 1.0 - 0.00765 \times 4.0 = 0.969$
$a_{max} = 0.5g$
$\sigma_o = 67.03$ KN/ m^2
$\sigma'_o = 54.28$ KN/ m^2

$$CSR_{7.5} = 0.65\left(\frac{0.5g}{g}\right)\left(\frac{67.03}{54.28}\right)0.969$$

$CSR_{7.5}$= 0.39

Calculation of CRR:

The most common method for calculating the $CRR_{7.5}$ is the empirical relationship shown in figure. This figure shows the three curves (35 percent, 15 percent, and ≤ 5 percent). Using these curves, $CRR_{7.5}$ can be found for any given $(N_1)_{60}$ by extending a line vertically from the $(N_1)_{60}$ abscissa to the corresponding fines content curve and then horizontally from that intersection over to the CRR & CSR axis.

$(N_1)_{60}$ is the SPT blow count corrected to an effective overburden pressure of 100 kPa and to a hammer energy efficiency of 60%.

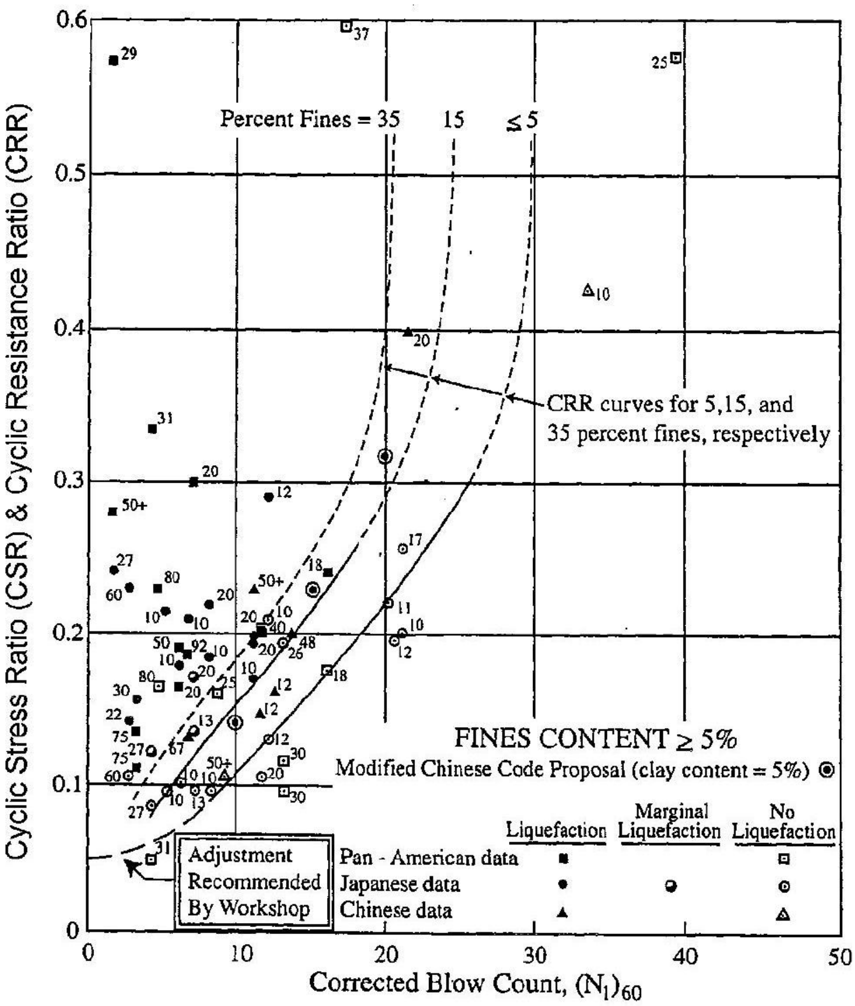
$CRR_{7.5}$, however, is only valid for a magnitude of 7.5 and must be corrected for other magnitudes using the magnitude scaling factors, MSF.

Rauch (1998) suggested that these curves could be approximated by the following equation:

$$CRR_{M=7.5} = \frac{1}{34-(N_1)_{60cs}} + \frac{(N_1)_{60cs}}{135} + \frac{50}{[10*(N_1)_{60cs}+45]^2} - \frac{1}{200}$$

Where:

$(N_1)_{60cs}$ = equivalent clean sand value of (N1)60



Relationship between CRS, CRR and $(N_1)_{60}$ for sands and silty sands and magnitude 7.5 earthquakes (after Youd and Idriss, 1997)

This can be done by applying constants, α and β that are functions of fines content. Hence, the effect of fines content (FC) on the value of CRR is included as:

$$(N_1)_{60cs} = \alpha + \beta (N_1)_{60}$$

Where α and β can be determined as follows:

FC%	α	β
FC ≤ 5%	0	1.0
5% < FC < 35%	Exp[1.76 - (190/ FC^2)]	[0.99 + ($FC^{1.5}$/1000)]
FC ≥ 35%	5.0	1.2

As noted previously, the values of SPT blow counts should be corrected as summarized on below table. The corrected blow count $(N_1)_{60}$ should be determined as follows:

$$(N_1)_{60} = N_m C_N C_E C_B C_R C_S$$

Factor	Equipment variable	Term	Correction
Overburden pressure	-	C_N	$(P_a/\sigma_0')^{0.5} \leq 1.7$
Energy ratio	Donut hammer	C_E	0.5 – 1.0
	Safety hammer	C_E	0.7 – 1.2
	Automatic-trip Donut-type hammer	C_E	0.8 – 1.3
Borehole diameter	65-115 mm	C_B	1.0
	150 mm	C_B	1.05
	200 mm	C_B	1.15
Rod length	< 3m	C_R	0.75
	3-4 m	C_R	0.8
	4 – 6 m	C_R	0.85
	6 – 10 m	C_R	0.95
	10 – 30 m	C_R	1.0
Sampling method	Standard sampler	C_S	1.0
	Sampler without liners	C_S	1.1 – 1.3

The correction factor for effective overburden pressure (C_N) can be determined using either of the following equations (Liao and Whitman, 1986):

$$C_N = \sqrt{\frac{P_a}{\sigma_0'}}$$

Where:

σ_o'=effective overburden pressure

P_a = atmospheric pressure in the same unit as σ_o'

Note:

The Simplified Procedure applies foe level to gently slope sites and for depths less than 15 m.

For this site:

P_a = 94.4 Kpa and σ_o' = 54.28 Kpa therefore: $C_N = \sqrt{\frac{94.4}{54.28}} =$ 1.31

$(N_1)_{60} = 14\times1\times1\times1\times1\times1.31 = 18.34$

$(N_1)_{60cs} = 5 + (1.2\times18) = 27$

Back to equation:

$$CRR_{M=7.5} = \frac{1}{34-(N_1)_{60cs}} + \frac{(N_1)_{60cs}}{135} + \frac{50}{[10*(N_1)_{60cs}+45]^2} - \frac{1}{200}$$

$$CRR_{M=7.5} = \frac{1}{34-27} + \frac{27}{135} + \frac{50}{[10\times27+45]^2} - \frac{1}{200}$$

$CRR_{M=7.5}$= 0.34

The factor of safety against liquefaction can be written as: $FS_L = \frac{CRR}{CSR}$

Depending on the safety factor determined from the post-earthquake analysis, the following are recommended:

1. If FS > 1.2, No additional analysis are required, Non-liquefiable
2. If FS =1.2, Potentially sensitive
3. If FS <1.2, Liquefiable

Therefore: $FS_L = \frac{0.34}{0.39} = \mathbf{0.87}$

Result:

This factor of safety is less than 1.2; the layer was classed as potentially liquefiable.

8. References

- ASTM Standards

- ASTM D-422 - Standard Test Method for Particle-Size Analysis of Soils
- ASTM D-854 - Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
- ASTM D-2216 - Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D-2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D-4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D-1586 - Standard Test Methods for Penetration Test and Split-Barrel Sampling of Soils
- ASTM D-1557- Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)

- UNIFIED FACILITIES CRITERIA (UFC)

- UFC 3-220-01N, Geotechnical Engineering Procedures for Foundation Designs and Structures
- UFC 3-220-03FA, Soils and Geology Procedures for Foundation design Building and other Structures

- INTERNATIONAL BUILDING CODE (IBC)

International building code 2006, section 1804, page 345, Table 1804.2

- Engineering Reference Books

- Braja, M.Das, Principle of Geotechnical Engineering, 5th edition, 2002
- Youd, T. L., Idriss, I. M., 2001, "*Liquefaction Resistance of Soils: Summary report from the 1996 and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils.*" Journal of Geotechnical and Geoenvironmental Engineering, ASCE.
- United States EPA, Office of Research and Development, 1995, EPA/600/R-95/051, RCRA Subtitle D (258), *Seismic Design Guidance for Municipal Solid Waste Landfill Facilities*.

APPENDIX C

SUB-CONTRACTOR LABORATORY TEST DATA

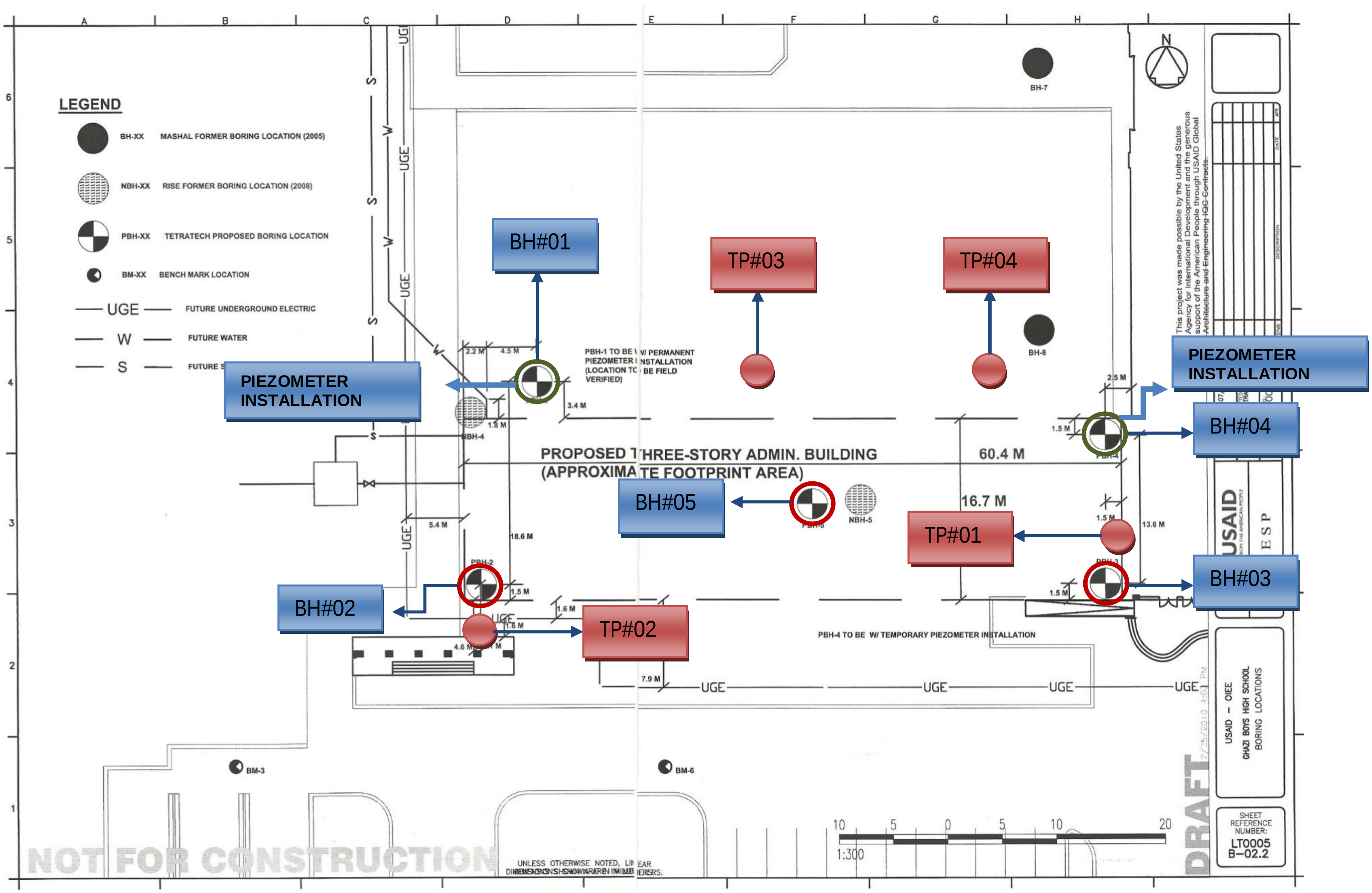
Omran Geotechnical Company

Appendix A

- ***Site Location Map***
- ***GPS Coordination Table for Boreholes***
- ***GPS Coordination Table for Test Pits***

Professional Geotechnical Services

Boreholes and Test Pits Location Map for New Admin Building, Ghazi Boys High School, Kabul Province



Boreholes and Test Pits Location (BH#01 through BH#05), (TP#01 through TP#04)

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

GPS Coordinates and Specification of Borehole

Client	**USAID**
contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School, Kabul**
Location	**Kabul Province**

Borehole No.	**Depth (m)**	**Elevation (m)**	**GPS Coordinates**		**Water Table**
			X	**Y**	
1	**10**	1816	34 30 42.0	69 08 44.4	2.67
2	**10**	1816	34 30 41.4	69 08 44.3	2.85
3	**10**	1816	34 30 41.3	69 08 46.5	2.68
4	**10**	1816	34 30 42.0	69 08 46.6	2.60
5	**10**	1816	34 30 41.6	69 08 45.6	2.80

Checked By:	Lab Manager

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

GPS Coordinates and Specification of Borehole

Client	**USAID**
contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School, Kabul**
Location	**Kabul Province**

Test Pit No.	**Depth (m)**	**Elevation (m)**	**GPS Coordinates**		**Water Table**
			E	**N**	
1	**2**	1816	69 08 46.3	34 30 41.4	**Dry**
2	**2**	1816	69 08 44.3	34 30 41.6	**Dry**
3	**2**	1816	69 08 44.9	34 30 42.1	**Dry**
4	**2**	1816	69 08 46.1	34 30 41.9	**Dry**

Checked By:	Lab Manager

Omran Geotechnical Company

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Geotechnical
Services

Appendix B

- ***Borehole Logs***
- ***Test Pit Logs***

Omran Geotechnical Company

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

LOG OF BH # 01

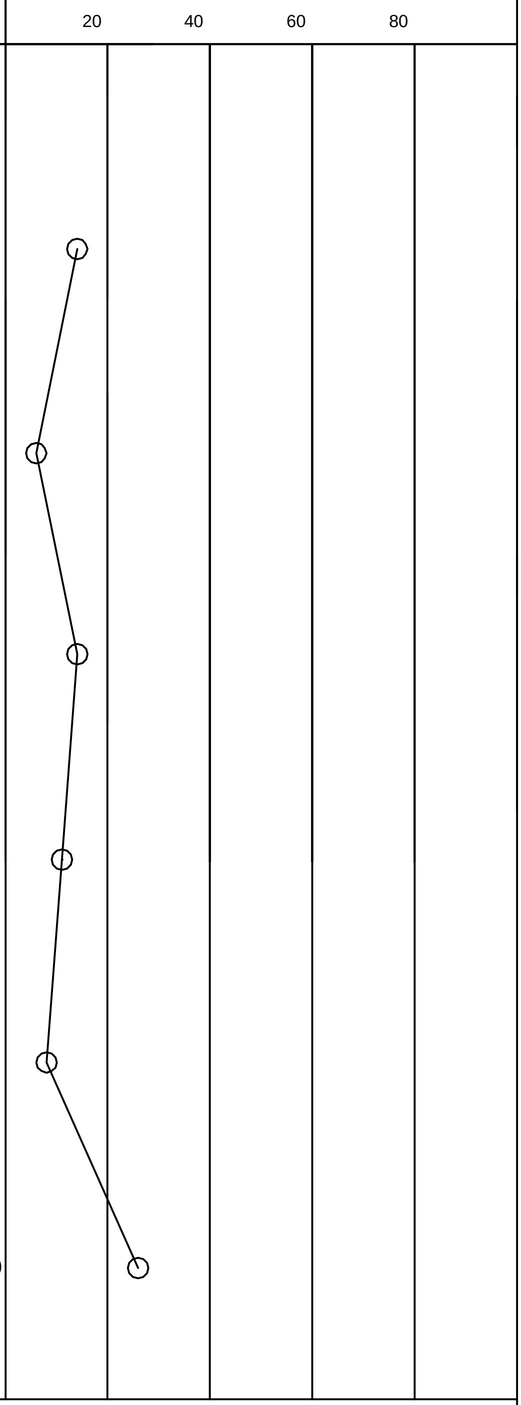
(ASTM D-5434)

Client: USAID	Location: Kabul Province	Drilling Method :	Geotechnical Rotary Core Drilling (ASTM D-2113)
Contractor: TETRA TECH Inc.	Borehole No: 01	Sampling Method :	Continous Soil Sampling - Split Spoon
Sub-Contractor: Omran Geotechnical Co.	Depth: 10 m	SPT Hammer :	140-lb/30in-Auto Drop
Project: New Admin Building, Ghazi Boys High School	Water Table: 2.67 m	SS:	Split Spoon soil Sampling (ASTM D-1586)

DEPTH (M)	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)
0.2	100	Top Soil (Silt, Clay and Sand), Brown			
1.7	100	Silty Clay With Sand Stiff, Brown	CL-ML	1.5	5-7-7-(14)
4.4	100	Silt With Sand Loose, Brown (Water Table)	ML	3	7-3-3-(6)
5.5	100	Silty Clay Stiff, Brown	CL-ML	4.5	3-7-7-(14)
6.4	100	Silt Medium Dense, Gray	ML	6	4-5-6-(11)
6.9	100	Silty Clay With Sand Stiff, Brown	CL-ML		
7.6	100	Sandy Silt Loose, Gray	ML	7.5	3-4-4-(8)
10	100	Silt With Sand Medium Dense, Gray	ML	9	9-12-14-(26)

End of BH # 01 at 10 m

SPT/ (N VALUE)



Drilling Started Date :	05/8/2010
Drilling Completed Date :	05/8/2010
Sub-Contractor :	OGC
Name of Driller :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng[redacted]

Sample Types :
- Split-Spoon (SS)
- Shelby Tube (SH)
- Continued Core Barrel Samples
- Cobble or Boulder

NOTE
1-CONTINUAL SOIL SAMPLE RECOVERED FROM BOREHOLE AND STORED IN WOODEN BOXES.

2-BOREHOLE WAS DRILLED FOR PIEZOMETER INSTALLATION PURPOSE TOO.

Omran Geotechnical Company
ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

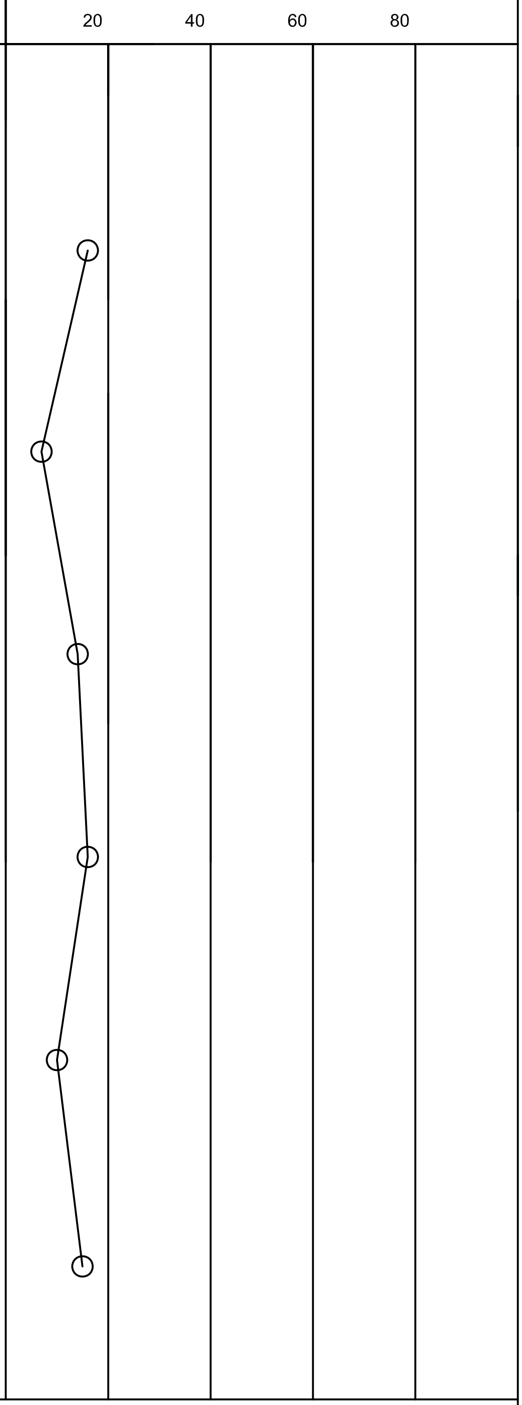
LOG OF BH # 02
(ASTM D-5434)

Client: USAID	Location: Kabul Province	Drilling Method :	Geotechnical Rotary Core Drilling (ASTM D-2113)
Contractor: TETRA TECH Inc.	Borehole No: 02	Sampling Method :	Continous Soil Sampling - Split Spoon
Sub-Contractor: Omran Geotechnical Co.	Depth: 10 m	SPT Hammer :	140-lb/30in-Auto Drop
Project: New Admin Building, Ghazi Boys High School	Water Table: 2.85 m	SS:	Split Spoon soil Sampling (ASTM D-1586)

DEPTH (M)	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)
0 – 0.5	100	Backfill Material			
0.5 – 2.7	100	Sandy Silty Clay Stiff, Brown	CL-ML	1.5	4-7-9-(16)
2.7 – 6.9	100	Silt Loose To Medium Dense, Brown (Water Table)	ML	3	2-3-4-(7)
				4.5	5-7-7-(14)
				6	5-7-9-(16)
6.9 – 7.4	100	Sandy Silt Medium Dense, Gray	ML		
7.4 – 8.5	100	Silt Loose, Gray	ML	7.5	4-5-5-(10)
8.5 – 10	100	Silt With Sand Medium Dense, Gray	ML	9	3-6-9-(15)

End of BH # 02 at 10 m

SPT/ (N VALUE)



Drilling Started Date :	04/8/2010
Drilling Completed Date :	04/8/2010
Sub-Contractor :	OGC
Name of Driller :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng.[redacted]

Sample Types :
- Split-Spoon (SS)
- Shelby Tube (SH)
- Continued Core Barrel Samples
- Cobble or Boulder

NOTE

1-CONTINUAL SOIL SAMPLE RECOVERED FROM BOREHOLE AND STORED IN WOODEN BOXES.

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

LOG OF BH # 03

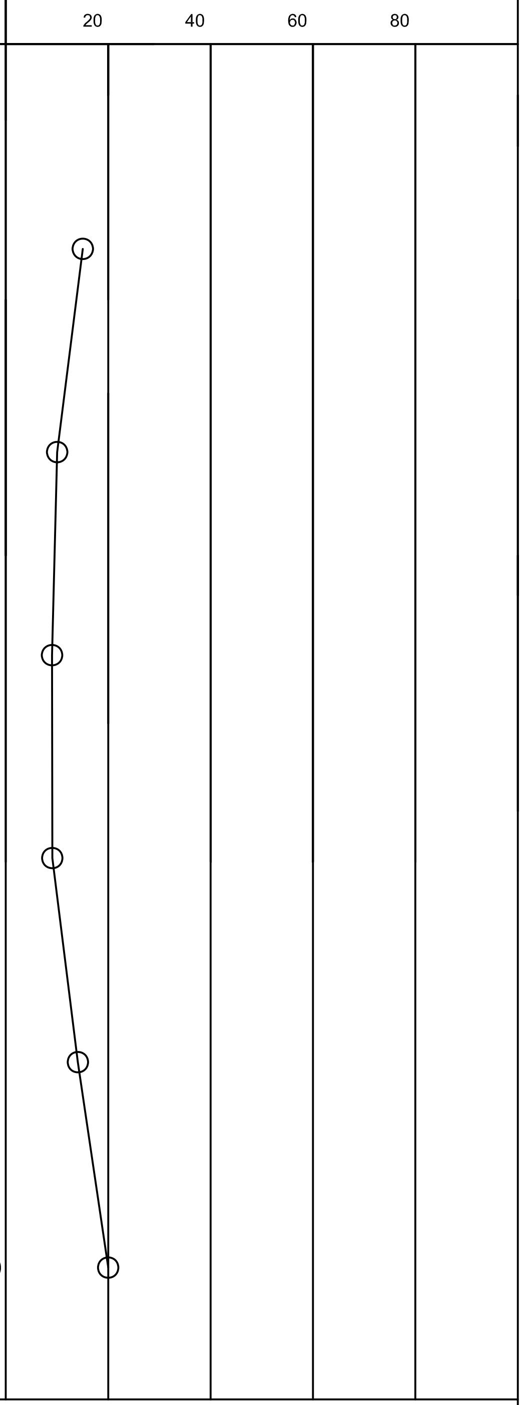
(ASTM D-5434)

Client: USAID	Location: Kabul Province	Drilling Method :	Geotechnical Rotary Core Drilling (ASTM D-2113)
Contractor: TETRA TECH Inc.	Borehole No: 03	Sampling Method :	Continous Soil Sampling - Split Spoon
Sub-Contractor: Omran Geotechnical Co.	Depth: 10 m	SPT Hammer :	140-lb/30in-Auto Drop
Project: New Admin Building, Ghazi Boys High School	Water Table: 2.68 m	SS:	Split Spoon soil Sampling (ASTM D-1586)

DEPTH (M)	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)
0.2	100	Top Soil (Silt, Clay and Sand), Brown			
1.5	100	Silt With Sand Brown	ML	1.5	5-7-8-(15)
4.6	100	Silty Clay Stiff, Brown (Water Table)	CL-ML	3	4-4-6-(10)
				4.5	2-4-5-(9)
10	100	Silt Loose To Medium Dense, Gray	ML	6	3-4-5-(9)
				7.5	5-6-8-(14)
				9	5-9-11-(20)

End of BH # 03 at 10 m

SPT/ (N VALUE)



Drilling Started Date :	04/8/2010
Drilling Completed Date :	04/8/2010
Sub-Contractor :	OGC
Name of Driller :	Noroddin
Geotechnical Eng:	Eng. Abdullah
Design By:	Eng[redacted]

Sample Types :

- Split-Spoon (SS)
- Shelby Tube (SH)
- Continued Core Barrel Samples
- Cobble or Boulder

NOTE

1-CONTINUAL SOIL SAMPLE RECOVERED FROM BOREHOLE AND STORED IN WOODEN BOXES.

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

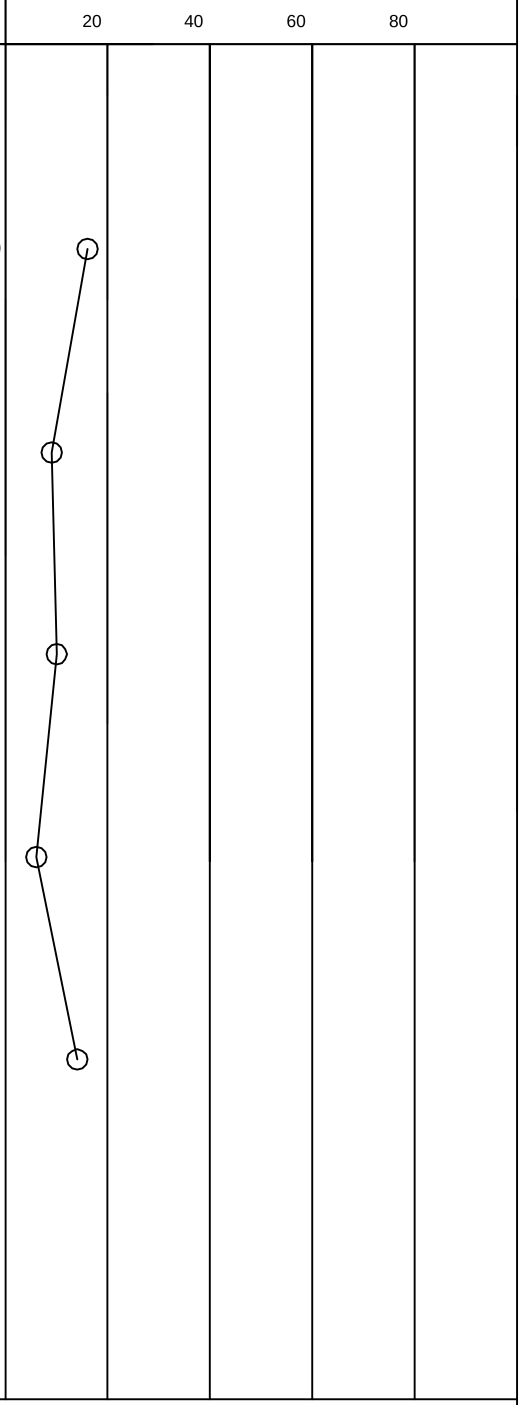
LOG OF BH # 04
(ASTM D-5434)

Client: USAID	Location: Kabul Province	Drilling Method :	Geotechnical Rotary Core Drilling (ASTM D-2113)
Contractor: TETRA TECH Inc.	Borehole No: 04	Sampling Method :	Continous Soil Sampling - Split Spoon
Sub-Contractor: Omran Geotechnical Co.	Depth: 10 m	SPT Hammer :	140-lb/30in-Auto Drop
Project: New Admin Building, Ghazi Boys High School	Water Table: 2.6 m	SS:	Split Spoon soil Sampling (ASTM D-1586)

DEPTH (M)	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)
0.4	100	Top Soil (Silt, Clay and Gravel) Brown			
0.9	100	Silt With Sand Brown	ML		
1.5	100	Silty Clay With Sand Stiff, Brown	CL-ML	1.5	4-6-10-(16)
2	100	Silty Clay Stiff, Brown	CL-ML		
2.4	100	Silty Clay With Sand Stiff, Brown	CL-ML		
4.5	100	Silty Clay Stiff, Brown (Water Table)	CL-ML	3	3-4-5-(9)
6.8	100	Silt With Sand Loose, Brown	ML	4.5 / 6	3-4-6-(10) / 4-3-3-(6)
8.2	100	Silty Clay Stiff, Brown	CL-ML	7.5	3-6-8-(14)
10	100	Silt Brown	ML		

End of BH # 04 at 10 m

SPT/ (N VALUE)



Drilling Started Date :	03/8/2010
Drilling Completed Date :	03/8/2010
Sub-Contractor :	OGC
Name of Driller :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng. [redacted]

Sample Types :
- Split-Spoon (SS)
- Shelby Tube (SH)
- Continued Core Barrel Samples
- Cobble or Boulder

NOTE
1-CONTINUAL SOIL SAMPLE RECOVERED FROM BOREHOLE AND STORED IN WOODEN BOXES.

2-BOREHOLE WAS DRILLED FOR PIEZOMETER INSTALLATION PURPOSE TOO.

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

Omran Geotechnical Company

LOG OF BH # 05

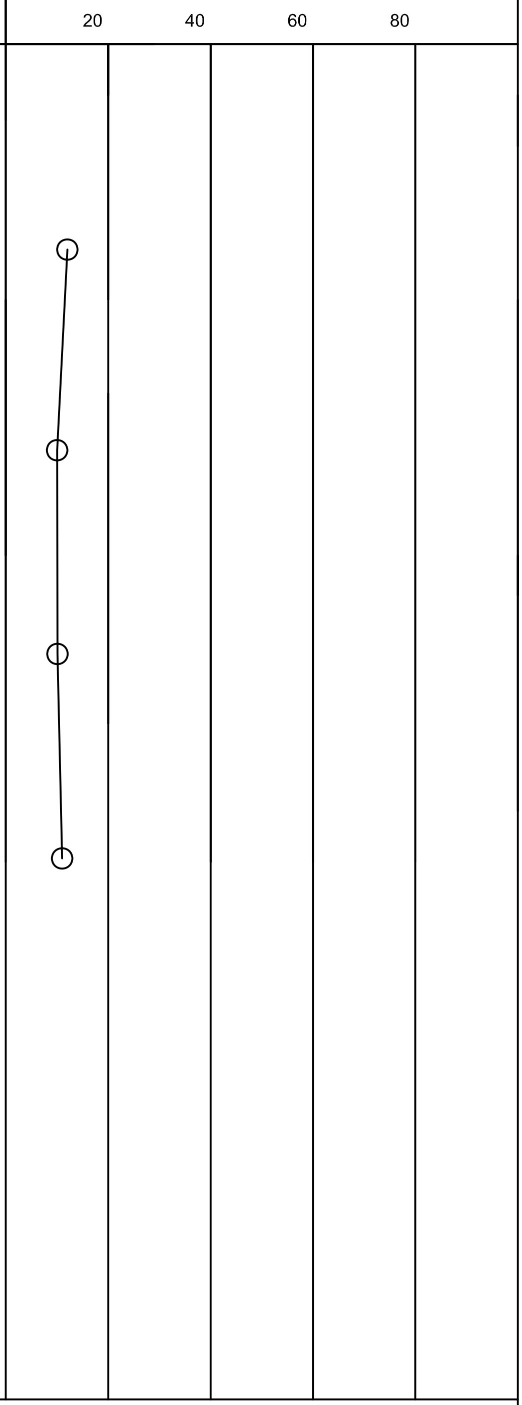
(ASTM D-5434)

Client: USAID	Location: Kabul Province	Drilling Method :	Geotechnical Rotary Core Drilling (ASTM D-2113)
Contractor: TETRA TECH Inc.	Borehole No: 05	Sampling Method :	Continous Soil Sampling - Split Spoon
Sub-Contractor: Omran Geotechnical Co.	Depth: 10 m	SPT Hammer :	140-lb/30in-Auto Drop
Project: New Admin Building, Ghazi Boys High School	Water Table: 2.8 m	SS:	Split Spoon soil Sampling (ASTM D-1586)

DEPTH (M)	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)
0.4	100	Top Soil (Silt, Clay and Gravel) Brown			
0.9	100	Silt Brown	ML		
1.6	100	Silty Clay With Sand Stiff, Brown	CL-ML	1.5	3-5-7-(12)
2.8	100	Silty Clay Stiff, Brown Water Table	CL-ML		
4	100	Lean Clay With Sand Stiff, Brown	CL	3	5-4-6-(10)
4.7	100	Silt Loose, Brown	ML	4.5	3-4-6-(10)
5.4	100	Silty Clay Stiff, Brown	CL-ML		
6.4	100	Silt Medium Dense, Brown	ML	6	4-5-6-(11)
8.1	100	Silty Clay Gray	CL-ML		
9.2	100	Silt With Sand Gray	ML		
10	100	Silty Sand Gray	SM		

End of BH # 05 at 10 m

SPT/ (N VALUE)



Drilling Started Date :	03/8/2010
Drilling Completed Date :	03/8/2010
Sub-Contractor :	OGC
Name of Driller :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng. [redacted]

Sample Types :
- Split-Spoon (SS)
- Shelby Tube (SH)
- Continued Core Barrel Samples
- Cobble or Boulder

NOTE

1-CONTINUAL SOIL SAMPLE RECOVERED FROM BOREHOLE AND STORED IN WOODEN BOXES.

Omran Geotechnical Company
ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

LOG OF TP # 01
(ASTM D-5434)

Client : USAID	Location : Kabul Province
Contractor: TETRA TECH Inc.	Test Pit No: 01
Sub-Contractor: Omran Geotechnical Co.	Depth: 2 m
Project: New Admin Building, Ghazi Boys High School, Kabul	Water Table: DRY

Excavation Method : By Excavator Machine
Sampling Method : By Hand / Field Technician

DEPTH (M)	GRAPHIC LOG	SAMPLING TYPE	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)	SPT/ (N VALUE) 20 40 60 80
0.5			100	Top Soil, (Silt, Clay,Sand With Back Fill Material) Brown				
0.9		By Hand	100	Silty Clay With Sand Brown	CL-ML			
1 2		By Hand	100	Silty Clay, Brown	CL-ML			

End of Test Pit # 01 at 2 m

Excavation Started Date :	04/08/2010
Excavation Completed Date :	04/08/2010
Sub-Contractor :	OGC
Feild Technician :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng. [redacted]

Sample Types :
- Split-Spoon (SS)
- By Hand

NOTE

1-PRIMARY LITHOLOGICAL LOG WAS PREPARED BY FIELD SITE ENGINEER.

2-FINAL LITHOLOGICAL LOG WAS COMPLETED AFTER LAB TESTING AND REVIWED BY LAB MANAGER.

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

LOG OF TP # 02

(ASTM D-5434)

Client : USAID
Contractor: TETRA TECH Inc.
Sub-Contractor: Omran Geotechnical Co.
Project: New Admin Building, Ghazi Boys High School, Kabul

Location : Kabul Province
Test Pit No: 02
Depth: 2 m
Water Table: DRY

Excavation Method : By Excavator Machine
Sampling Method : By Hand / Field Technician

DEPTH (M)	GRAPHIC LOG	SAMPLING TYPE	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)	SPT/ (N VALUE) 20 40 60 80
0–0.2			100	Top Soil, (Silt, Clay With Sand) Brown				
0.2–1		By Hand	100	Silty Clay With Sand Brown	CL-ML			
1–2		By Hand	100	Silty Clay, Brown	CL-ML			
2				End of Test Pit # 02 at 2 m				

Excavation Started Date : 04/08/2010
Excavation Completed Date : 04/08/2010
Sub-Contractor : OGC
Feild Technician : Noroddin
Site Eng: Eng. Abdullah
Design By: Eng. [redacted]

Sample Types :
- Split-Spoon (SS)
- By Hand

NOTE

1-PRIMARY LITHOLOGICAL LOG WAS PREPARED BY FIELD SITE ENGINEER.

2-FINAL LITHOLOGICAL LOG WAS COMPLETED AFTER LAB TESTING AND REVIEWED BY LAB MANAGER.

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

LOG OF TP # 03

(ASTM D-5434)

Client : USAID	Location : Kabul Province	Excavation Method :	By Excavator Machine
Contractor: TETRA TECH Inc.	Test Pit No: 03	Sampling Method :	By Hand / Field Technician
Sub-Contractor: Omran Geotechnical Co.	Depth: 2 m		
Project: New Admin Building, Ghazi Boys High School, Kabul	Water Table: DRY		

DEPTH (M)	GRAPHIC LOG	SAMPLING TYPE	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)	SPT/ (N VALUE) 20 40 60 80
0.2			100	Top Soil, (Silt, Clay With Sand) Brown				
1		By Hand	100	Sandy Silty Clay, Brown	CL-ML			
2		By Hand	100	Silty Clay With Sand, Brown	CL-ML			
				End of Test Pit # 03 at 2 m				

Excavation Started Date :	04/08/2010
Excavation Completed Date :	04/08/2010
Sub-Contractor :	OGC
Feild Technician :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng. [redacted]

Sample Types :

- Split-Spoon (SS)
- By Hand

NOTE

1-PRIMARY LITHOLOGICAL LOG WAS PREPARED BY FIELD SITE ENGINEER.

2-FINAL LITHOLOGICAL LOG WAS COMPLETED AFTER LAB TESTING AND REVIEWED BY LAB MANAGER.

ADD: HOUSE 627, STREET 10
KARTE 3,KABUL, AFGHANISTAN
PH: 0797175746
0774291405

LOG OF TP # 04
(ASTM D-5434)

Client : USAID Contractor: TETRA TECH Inc. Sub-Contractor: Omran Geotechnical Co. Project: New Admin Building, Ghazi Boys High School, Kabul	Location : Kabul Province Test Pit No: 04 Depth: 2 m Water Table: DRY	Excavation Method : By Excavator Machine Sampling Method : By Hand / Field Technician

DEPTH (M)	GRAPHIC LOG	SAMPLING TYPE	CORE RECOVERY (%)	MATERIAL DESCRIPTION	USCS CLASSIFICATION	Depth of SPT Test (m)	BLOW COUNTS (N VALUE)	SPT/ (N VALUE) 20 40 60 80
0.2			100	Top Soil, (Silt, Clay With Sand) Brown				
1		By Hand	100	Silty Clay With Sand, Brown	CL-ML			
2		By Hand		End of Test Pit # 04 at 2 m				

Excavation Started Date :	05/08/2010
Excavation Completed Date :	05/08/2010
Sub-Contractor :	OGC
Feild Technician :	Noroddin
Site Eng:	Eng. Abdullah
Design By:	Eng. [redacted]

Sample Types :

Split-Spoon (SS)

By Hand

NOTE

1-PRIMARY LITHOLOGICAL LOG WAS PREPARED BY FIELD SITE ENGINEER.

2-FINAL LITHOLOGICAL LOG WAS COMPLETED AFTER LAB TESTING AND REVIEWED BY LAB MANAGER.

Omran Geotechnical Company

Appendix C

Field Test Results

- SPT Test Results
- Field Density Test Results

Professional
Geotechnical
Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

SPT Test

ASTM D 1586

Client	**USAID**
Contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School, Kabul**
Location	**Kabul Province**

Bore hole No.	Depth (m)	Number of Blows			N-Value
		First 15 cm	Second 15 cm	Third 15 cm	
1	1.5	5	7	7	14
	3	7	3	3	6
	4.5	3	7	7	14
	6	4	5	6	11
	7.5	3	4	4	8
	9	9	12	14	26
2	1.5	4	7	9	16
	3	2	3	4	7
	4.5	5	7	7	14
	6	5	7	9	16
	7.5	4	5	5	10
	9	3	6	9	15
3	1.5	5	7	8	15
	3	4	4	6	10
	4.5	2	4	5	9

Remarks:

Tested by	Site Technician
Checked by	Jafari

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

SPT Test

ASTM D 1586

Client	**USAID**
Contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School, Kabul**
Location	**Kabul Province**

Bore hole No.	Depth (m)	Number of Blows			N-Value
		First 15 cm	Second 15 cm	Third 15 cm	
3	6	3	4	5	9
	7.5	5	6	8	14
	9	5	9	11	20
4	1.5	4	6	10	16
	3	3	4	5	9
	4.5	3	4	6	10
	6	4	3	3	6
	7.5	3	6	8	14
5	1.5	3	5	7	12
	3	5	4	6	10
	4.5	3	4	6	10
	6	4	5	6	11

Remarks:

Tested by	Site Technician
Checked by	Jafari

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ASTM D1556

FIELD DENSITY TEST

Client USAID Date 5/8/2010

Contactor TETRA TECH Inc.

Project: New Admin Building, Ghazi Boys High School

A	Location	Kabul Province	
B	Sampled by	Site Engineer	

MOISTURE CONTENT

1	CAN NO		1	2	3	4		
2	WT OF CAN	gm	34.7	42.8	40	41.3		
3	WT OF CAN + WET SOIL	gm	139	153.2	160.6	117.5		
4	WT OF CAN + DRY SOIL	gm	122.5	135	141.2	104.5		
5	WT OF WATER	gm	16.5	18.2	19.4	13		
6	WT OF DRY SOIL	gm	87.80	92.20	101.20	63.20		
7	% MOISTURE CONTENT	%	18.79	19.74	19.17	20.57		

FIELD DENSTIY

1	Test Pit No .		1	2	3	4		
2	Depth	m	2	2	2	2		
3	WET SOIL	gm	5614	5192	5514	4810		
4	WT OF SAND + CONE	gm	10620	10610	10600	10540		
5	WT OF RESIDUAL SAND	gm	5080	5300	5040	5256		
6	WT OF SAND + HOLE + CONE	gm	5540	5310	5560	5284		
7	WT OF SAND IN CONE	gm	1500	1500	1500	1500		
8	WT OF SAND IN HOLE	gm	4040	3810	4060	3784		
9	UNIT WT OF SAND	gm/cc	1.43	1.43	1.43	1.43		
10	GROSS VOL OF HOLE	cc	2,825.17	2,664.34	2,839.16	2,646.15		
11	WET DENSITY	gm/cc	1.99	1.95	1.94	1.82		
12	DRY DENSITY	gm/cc	1.67	1.63	1.63	1.51		
13	MAX DRY DENSITY	gm/cc						
14	OMC	%						
15	COMPACTION	%						
16	REQUIRED COMPATION	%						
17	RESULT	Pass/Fail						

Tested by Site Engineer

Checked by Jafari

Email address :
Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Appendix D

Lab Test Results of Test Pits

- ***Sieve Analysis Test Results***
- ***Atterberg Limit Test Results***
- ***Specific Gravity Test Results***
- ***Proctor Test Results***
- ***Moisture density Test Results***

Professional Geotechnical Services

Omran Geotechnical Company

Lab Test Results of Test Pits

Sieve Analysis Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	1

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

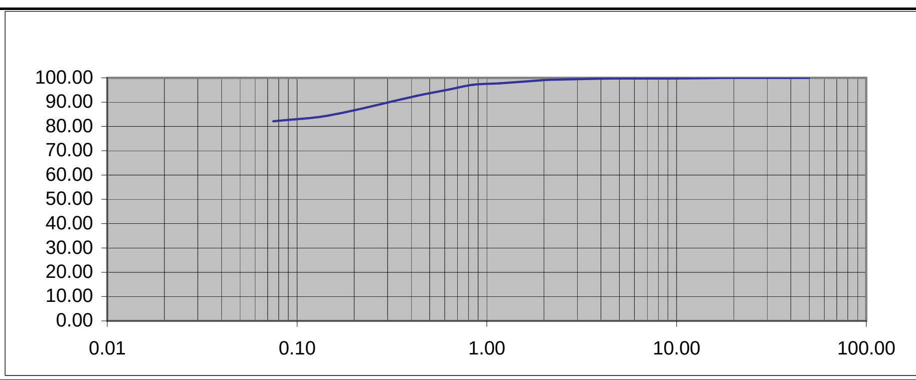
Location	Test Pit # 1			**Sampling Date**	04/08/2010
Weight (gr)	518	**Depth (m)**	1	**Testing Date**	07/08/2010

Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.27**
9.5 mm	**3/8 in**	1.20	1.20	0.23	99.77	
4.75 mm	**No. 4**	0.20	1.40	0.27	99.73	
2.36 mm	**No. 8**	2.50	3.90	0.75	99.25	
2.00 mm	**No. 10**	0.90	4.80	0.93	99.07	
1.18 mm	**No. 16**	6.90	11.70	2.26	97.74	
850 µm	**No. 20**	2.90	14.60	2.82	97.18	**17.59**
600 µm	**No. 30**	11.90	26.50	5.12	94.88	
425 µm	**No. 40**	12.10	38.60	7.45	92.55	
150 µm	**No. 100**	40.80	79.40	15.33	84.67	
75 µm	**No. 200**	13.10	92.50	17.86	82.14	**82.14**
Pan		425.50	518.00	100.00	0.00	
TOTAL		**518.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	28.18%	**21.43%**	**6.75%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.27	17.59	82.14

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	2

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

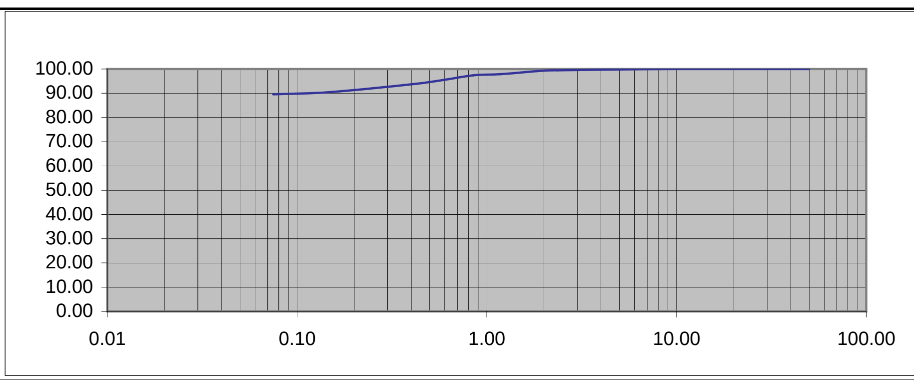
Location	**Test Pit # 1**			**Sampling Date**	04/08/2010
Weight (gr)	699	**Depth (m)**	2	**Testing Date**	07/08/2010

Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	Alternative	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.23**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	1.60	1.60	0.23	99.77	
2.36 mm	**No. 8**	2.10	3.70	0.53	99.47	
2.00 mm	**No. 10**	1.10	4.80	0.69	99.31	
1.18 mm	**No. 16**	9.80	14.60	2.09	97.91	
850 μm	**No. 20**	3.50	18.10	2.59	97.41	**10.21**
600 μm	**No. 30**	12.80	30.90	4.42	95.58	
425 μm	**No. 40**	11.50	42.40	6.07	93.93	
150 μm	**No. 100**	24.30	66.70	9.54	90.46	
75 μm	**No. 200**	6.30	73.00	10.44	89.56	**89.56**
Pan		626.00	699.00	100.00	0.00	
TOTAL		**699.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	29.51%	**25.00%**	**4.51%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.23	10.21	89.56

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No.	3

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	Test Pit # 2			Sampling Date	04/08/2010
Weight (gr)	570	Depth (m)	1	Testing Date	07/08/2010

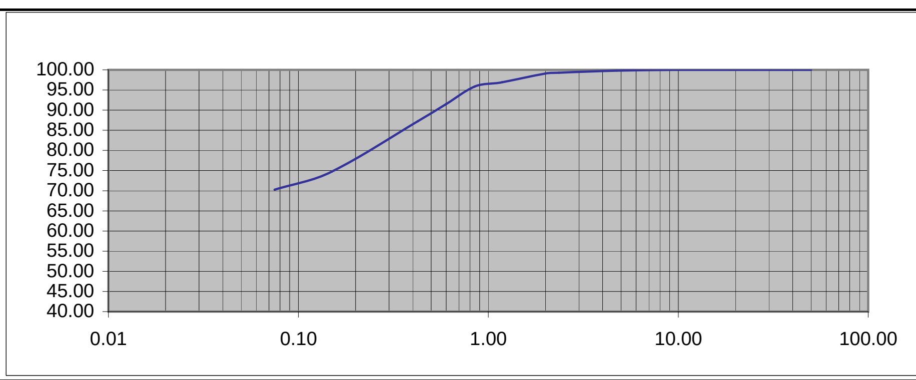
Sieve Size		Mass Retained (gr)	Cumulative			Specification Limits %
Standard	Alternative		Mass Retained (gr)	Retained %	Passing %	
50.0mm	2 in	0.00	0.00	0.00	100.00	0.19
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	1.10	1.10	0.19	99.81	
2.36 mm	No. 8	3.00	4.10	0.72	99.28	29.56
2.00 mm	No. 10	1.20	5.30	0.93	99.07	
1.18 mm	No. 16	12.40	17.70	3.11	96.89	
850 µm	No. 20	5.70	23.40	4.11	95.89	
600 µm	No. 30	24.90	48.30	8.47	91.53	
425 µm	No. 40	24.40	72.70	12.75	87.25	
150 µm	No. 100	71.40	144.10	25.28	74.72	
75 µm	No. 200	25.50	169.60	29.75	70.25	70.25
Pan		400.40	570.00	100.00	0.00	
TOTAL		570.00				

SOIL CLASSIFICATION	CL-ML	SILTY CLAY WITH SAND

Atteberg Limits	LL	PL	PI
	25.94%	20.29%	5.65%

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	0.19	29.56	70.25

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	4

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**Test Pit # 2**			**Sampling Date**	04/08/2010
Weight (gr)	696	**Depth (m)**	2	**Testing Date**	07/08/2010

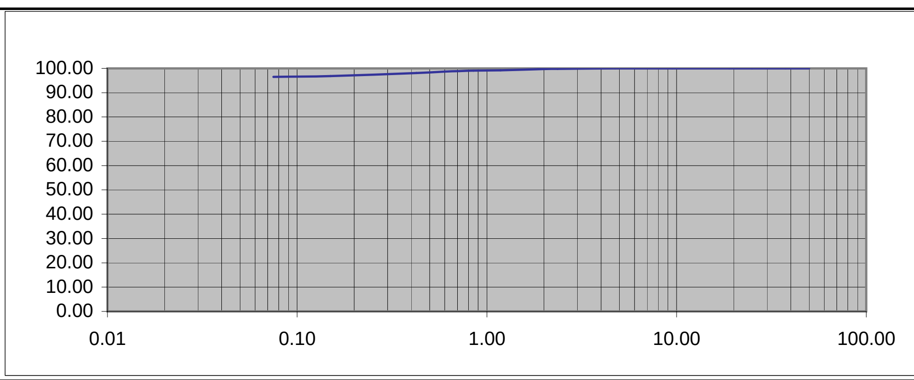
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.03**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	0.20	0.20	0.03	99.97	
2.36 mm	**No. 8**	1.20	1.40	0.20	99.80	
2.00 mm	**No. 10**	0.60	2.00	0.29	99.71	
1.18 mm	**No. 16**	3.40	5.40	0.78	99.22	
850 µm	**No. 20**	1.00	6.40	0.92	99.08	**3.45**
600 µm	**No. 30**	3.00	9.40	1.35	98.65	
425 µm	**No. 40**	3.80	13.20	1.90	98.10	
150 µm	**No. 100**	8.80	22.00	3.16	96.84	
75 µm	**No. 200**	2.20	24.20	3.48	96.52	**96.52**
Pan		671.80	696.00	100.00	0.00	
TOTAL		**696.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	LL	PL	PI
	28.74%	**23.81%**	**4.93%**

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	0.03	3.45	96.52

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	5

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**Test Pit # 3**			**Sampling Date**	04/08/2010
Weight (gr)	941	**Depth (m)**	1	**Testing Date**	07/08/2010

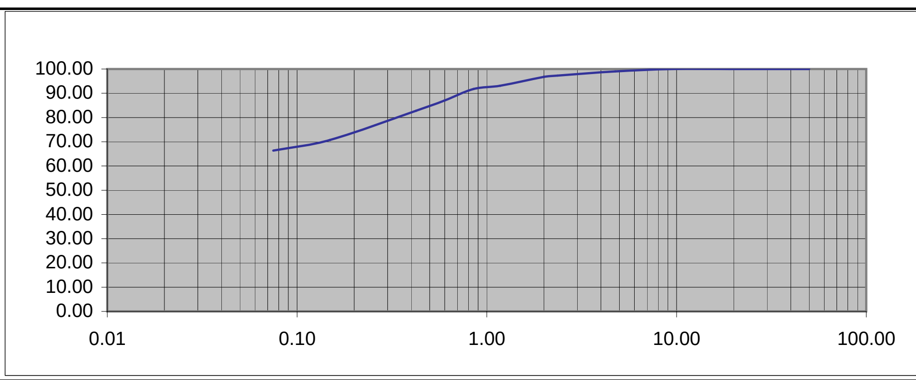
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.97**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	9.10	9.10	0.97	99.03	
2.36 mm	**No. 8**	16.30	25.40	2.70	97.30	
2.00 mm	**No. 10**	5.30	30.70	3.26	96.74	
1.18 mm	**No. 16**	34.00	64.70	6.88	93.12	
850 µm	**No. 20**	13.20	77.90	8.28	91.72	**32.66**
600 µm	**No. 30**	43.90	121.80	12.94	87.06	
425 µm	**No. 40**	39.80	161.60	17.17	82.83	
150 µm	**No. 100**	113.30	274.90	29.21	70.79	
75 µm	**No. 200**	41.50	316.40	33.62	66.38	**66.38**
Pan		624.60	941.00	100.00	0.00	
TOTAL		**941.00**				

SOIL CLASSIFICATION	**CL-ML**	**SANDY SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	23.50%	**16.90%**	**6.60%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.97	32.66	66.38

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	6

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

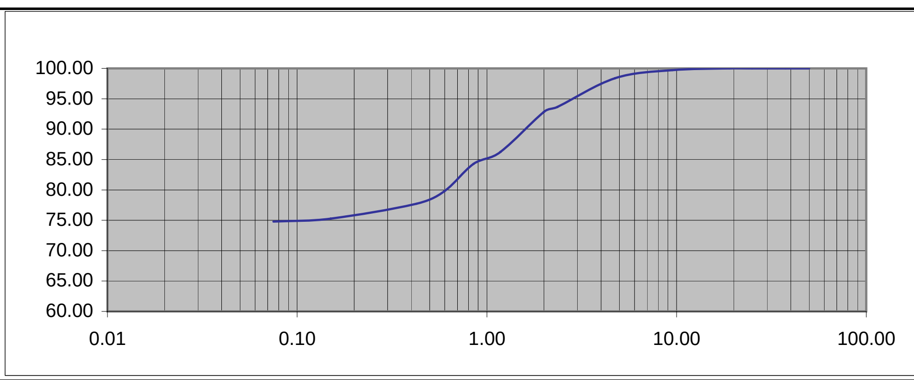
Location	Test Pit # 3			**Sampling Date**	04/08/2010
Weight (gr)	639	**Depth (m)**	2	**Testing Date**	07/08/2010

Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**1.60**
9.5 mm	3/8 in	1.80	1.80	0.28	99.72	
4.75 mm	No. 4	8.40	10.20	1.60	98.40	
2.36 mm	No. 8	30.20	40.40	6.32	93.68	
2.00 mm	No. 10	5.20	45.60	7.14	92.86	
1.18 mm	No. 16	42.10	87.70	13.72	86.28	
850 µm	No. 20	12.80	100.50	15.73	84.27	**23.62**
600 µm	No. 30	28.40	128.90	20.17	79.83	
425 µm	No. 40	13.40	142.30	22.27	77.73	
150 µm	No. 100	15.80	158.10	24.74	75.26	
75 µm	No. 200	3.00	161.10	25.21	74.79	**74.79**
Pan		477.90	639.00	100.00	0.00	
TOTAL		**639.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	25.82%	**20.93%**	**4.89%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.60	23.62	74.79

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	7

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**Test Pit # 4**			**Sampling Date**	04/08/2010
Weight (gr)	743	**Depth (m)**	1	**Testing Date**	07/08/2010

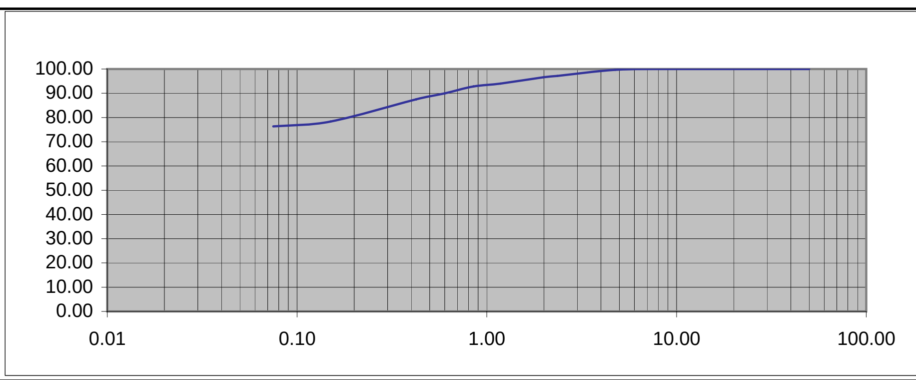
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.36**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	2.70	2.70	0.36	99.64	
2.36 mm	**No. 8**	18.30	21.00	2.83	97.17	
2.00 mm	**No. 10**	4.10	25.10	3.38	96.62	
1.18 mm	**No. 16**	19.50	44.60	6.00	94.00	
850 µm	**No. 20**	9.00	53.60	7.21	92.79	**23.27**
600 µm	**No. 30**	21.00	74.60	10.04	89.96	
425 µm	**No. 40**	18.30	92.90	12.50	87.50	
150 µm	**No. 100**	68.30	161.20	21.70	78.30	
75 µm	**No. 200**	14.40	175.60	23.63	76.37	**76.37**
Pan		567.40	743.00	100.00	0.00	
TOTAL		**743.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	23.96%	**17.65%**	**6.31%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.36	23.27	76.37

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Sample No.**	8

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**Test Pit # 4**			**Sampling Date**	04/08/2010
Weight (gr)	822	**Depth (m)**	2	**Testing Date**	07/08/2010

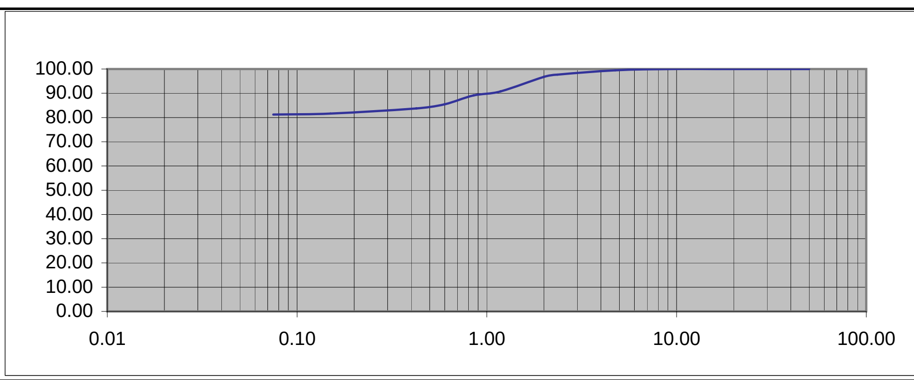
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.52**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	4.30	4.30	0.52	99.48	
2.36 mm	**No. 8**	14.90	19.20	2.34	97.66	
2.00 mm	**No. 10**	7.60	26.80	3.26	96.74	
1.18 mm	**No. 16**	49.10	75.90	9.23	90.77	
850 µm	**No. 20**	14.00	89.90	10.94	89.06	**18.24**
600 µm	**No. 30**	29.70	119.60	14.55	85.45	
425 µm	**No. 40**	14.30	133.90	16.29	83.71	
150 µm	**No. 100**	17.20	151.10	18.38	81.62	
75 µm	**No. 200**	3.10	154.20	18.76	81.24	**81.24**
Pan		667.80	822.00	100.00	0.00	
TOTAL		**822.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	28.18%	**21.24%**	**6.94%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.52	18.24	81.24

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Lab Test Results of Test Pits

Atterberg Limit Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

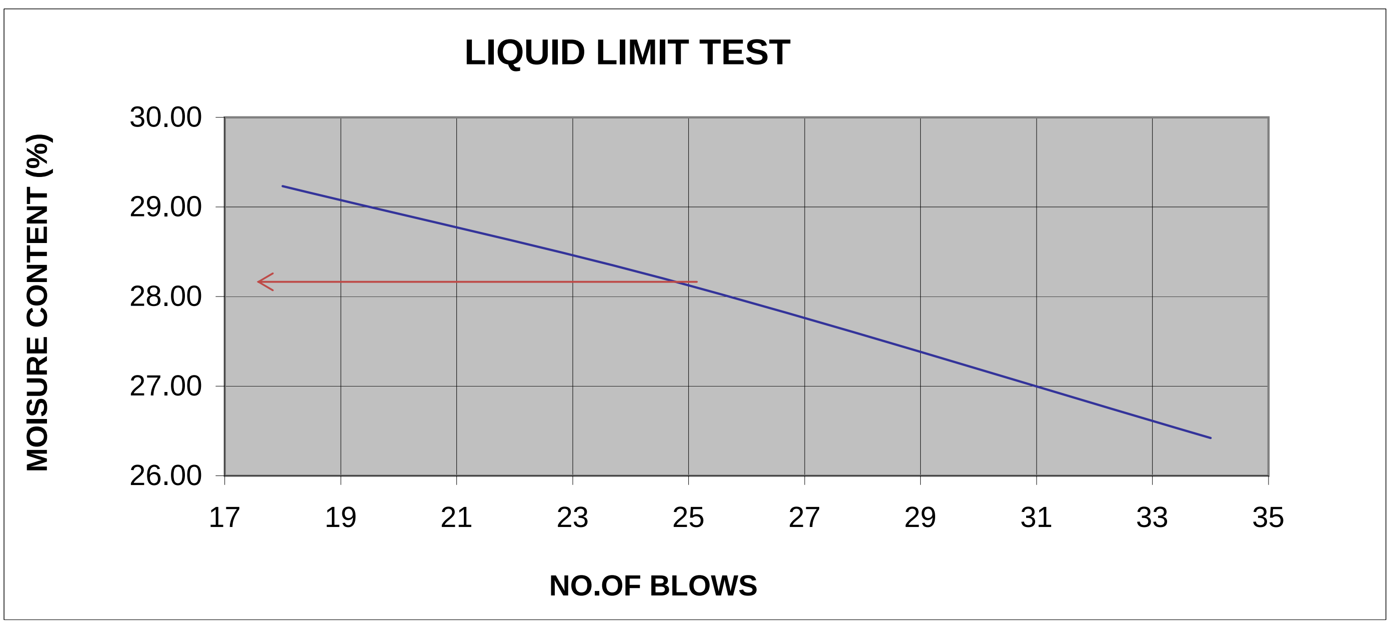
Omran Geotechnical Company

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	1
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	Test Pit # 01	Depth: m	1

Description	Liquid Limit			Plastic Limit
No of Blows	18	25	34	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	21.8	21.5	24	15.2
Wt of Dry soil + Container W2 (g)	19.9	19.7	22	14.6
Wt of container W3 (g)	13.4	13.3	14.43	11.8
Wt. of water (a) W1 - W2 (g)	1.9	1.8	2	0.6
Wt. of Dry soil (b) W2 - W3 (g)	6.5	6.4	7.57	2.8
Moisture Content (w)= a/b x 100 (%)	29.23	28.13	26.42	21.43



LL= 28.18% **PL=** 21.43% **PI=** 6.75%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

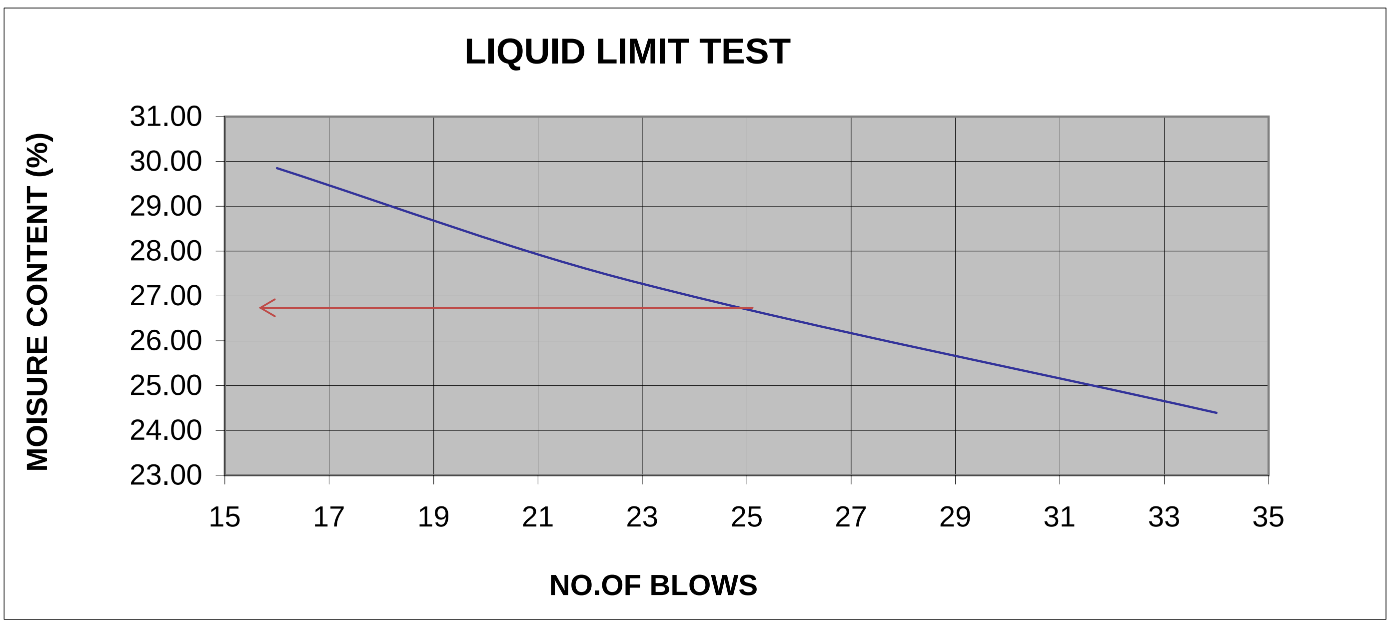
Omran Geotechnical Company

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	2
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	Test Pit # 01	Depth: m	2

Description	Liquid Limit			Plastic Limit
No of Blows	16	23	34	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	31.7	28.7	29.1	26.3
Wt of Dry soil + Container W2 (g)	29.7	27.5	28.1	25.8
Wt of container W3 (g)	23	23.1	24	23.5
Wt. of water (a) W1 - W2 (g)	2	1.2	1	0.5
Wt. of Dry soil (b) W2 - W3 (g)	6.7	4.4	4.1	2.3
Moisture Content (w)= a/b x 100 (%)	29.85	27.27	24.39	21.74



LL= 26.67% **PL=** 21.74% **PI=** 4.93%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

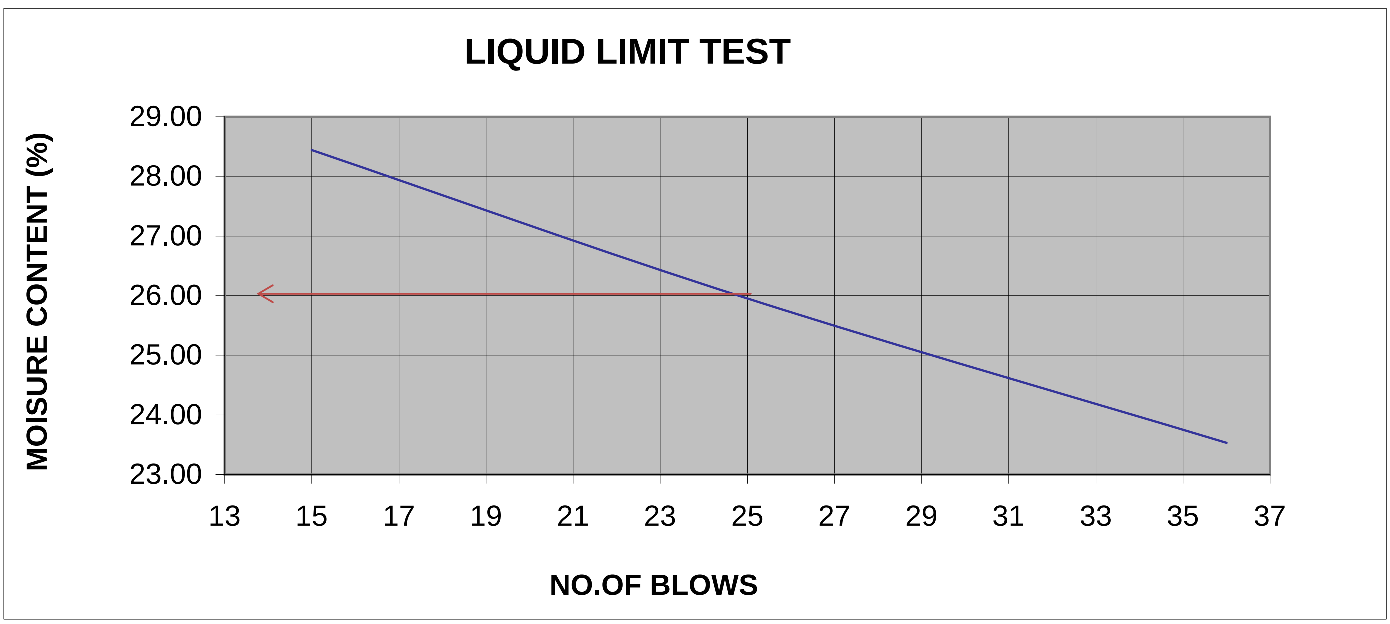
Omran Geotechnical Company

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	3
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	Test Pit # 02	Depth: m	1

Description	Liquid Limit			Plastic Limit
No of Blows	15	25	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	27.9	30.6	27.6	21.3
Wt of Dry soil + Container W2 (g)	24.8	27.2	24.8	19.9
Wt of container W3 (g)	13.9	14.1	12.9	13
Wt. of water (a) W1 - W2 (g)	3.1	3.4	2.8	1.4
Wt. of Dry soil (b) W2 - W3 (g)	10.9	13.1	11.9	6.9
Moisture Content (w)= a/b x 100 (%)	28.44	25.95	23.53	20.29



LL= 25.94% **PL=** 20.29% **PI=** 5.65%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

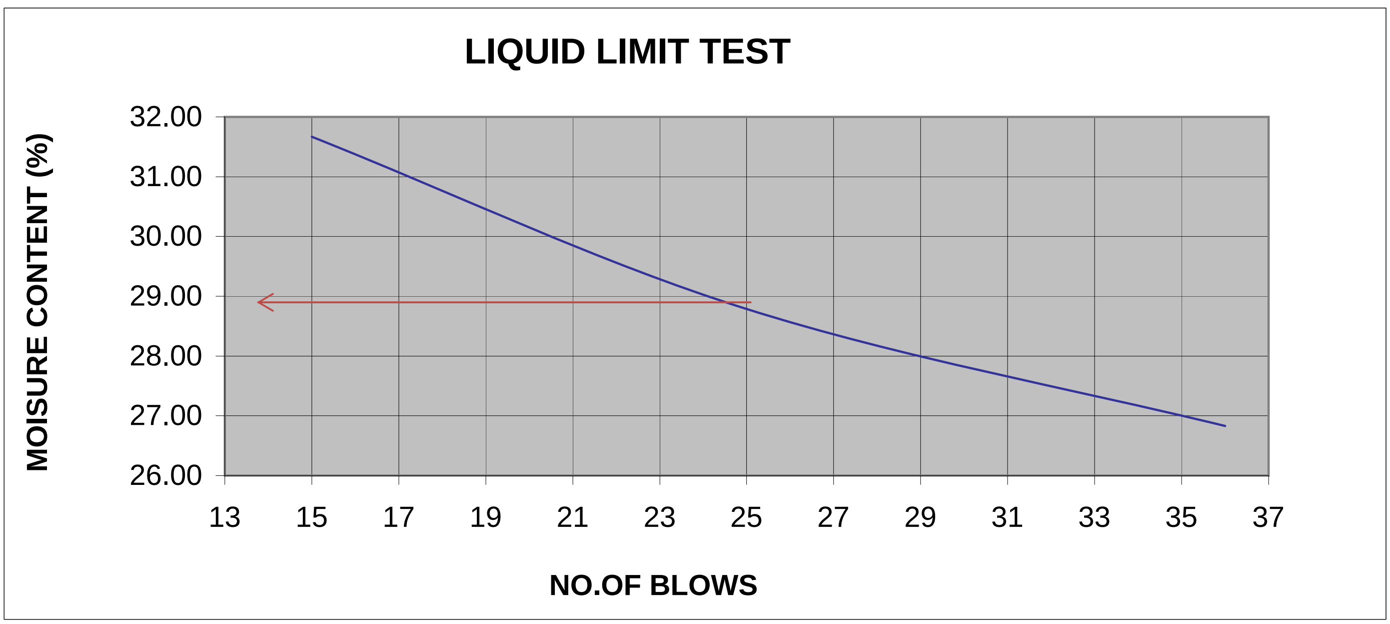
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	4
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	8.08.2010
Location:	Test Pit # 02	Depth: m	2

Description	Liquid Limit			Plastic Limit
No of Blows	15	25	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	31.3	31.5	29.5	26.4
Wt of Dry soil + Container W2 (g)	29.4	29.6	28.4	25.9
Wt of container W3 (g)	23.4	23	24.3	23.8
Wt. of water (a) W1 - W2 (g)	1.9	1.9	1.1	0.5
Wt. of Dry soil (b) W2 - W3 (g)	6	6.6	4.1	2.1
Moisture Content (w)= a/b x 100 (%)	31.67	28.79	26.83	23.81



LL= 28.74% **PL=** 23.81% **PI=** 4.93%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

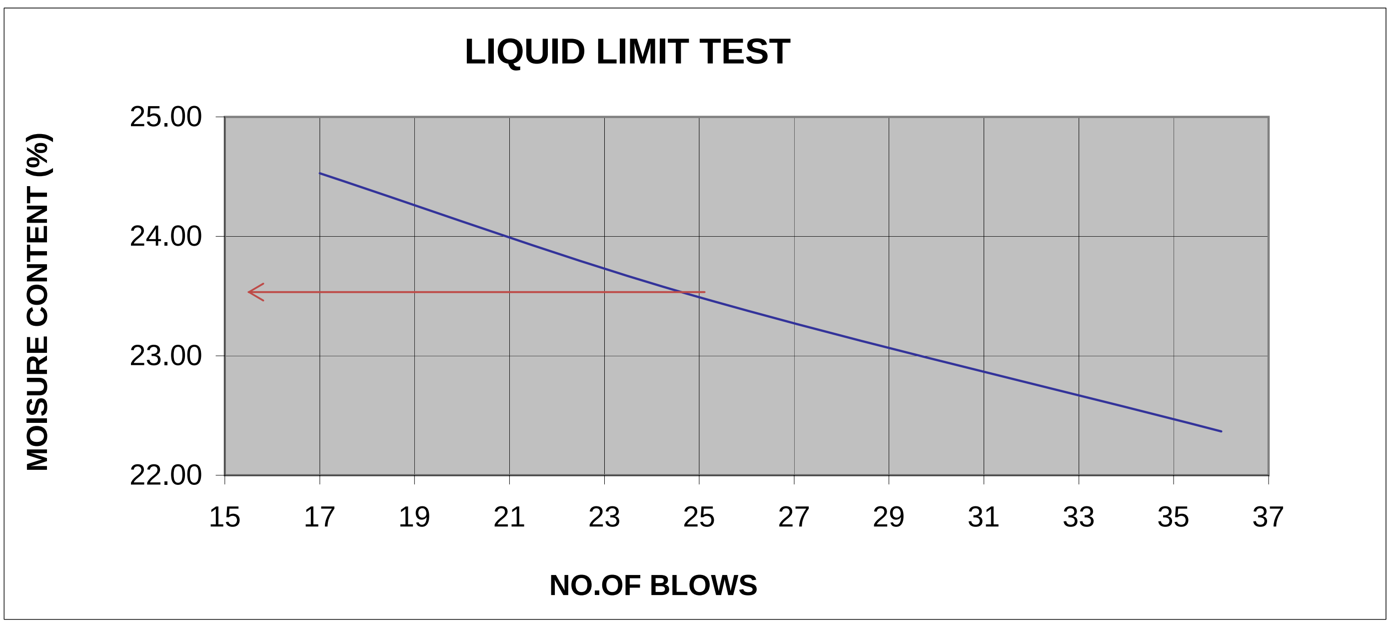
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	5
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	8.08.2010
Location:	Test Pit # 03	Depth: m	1

Description	Liquid Limit			Plastic Limit
No of Blows	17	25	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	35.4	40.9	31.2	30.1
Wt of Dry soil + Container W2 (g)	32.8	37.4	29.5	28.9
Wt of container W3 (g)	22.2	22.5	21.9	21.8
Wt. of water (a) W1 - W2 (g)	2.6	3.5	1.7	1.2
Wt. of Dry soil (b) W2 - W3 (g)	10.6	14.9	7.6	7.1
Moisture Content (w)= a/b x 100 (%)	24.53	23.49	22.37	16.90



LL= 23.50% **PL=** 16.90% **PI=** 6.60%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

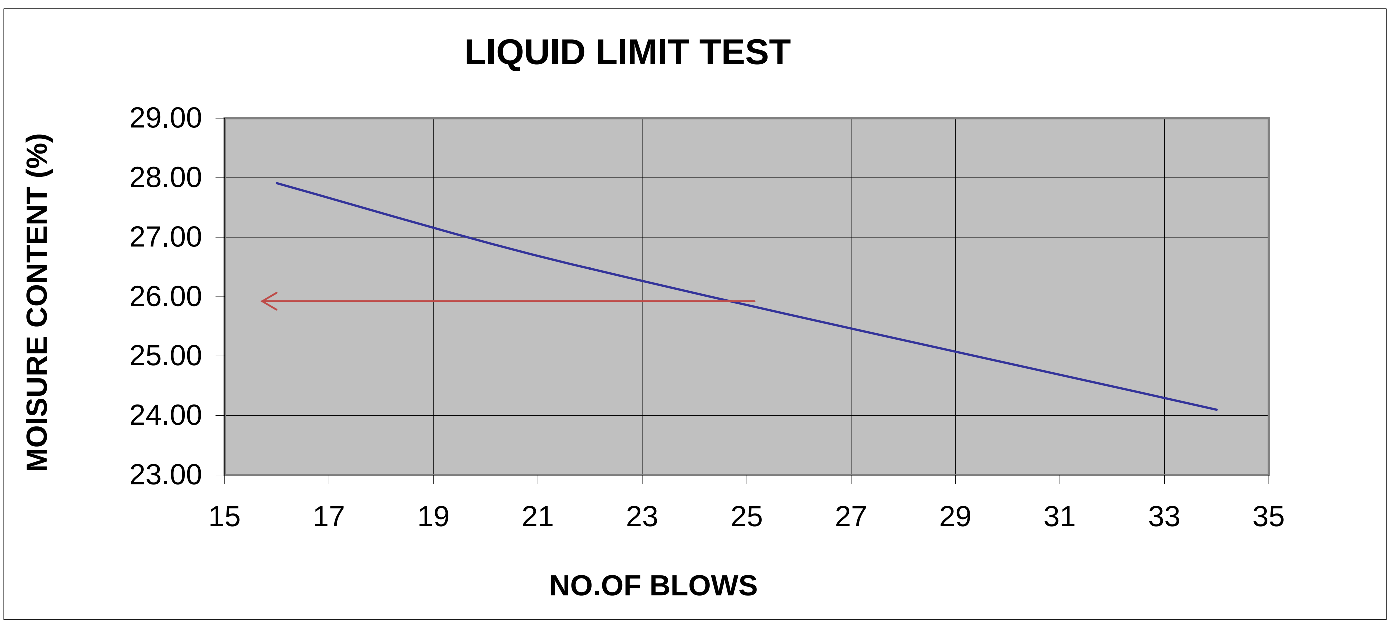
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	6
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	8.08.2010
Location:	Test Pit # 03	Depth: m	2

Description	Liquid Limit			Plastic Limit
No of Blows	16	22	34	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	34.2	32.7	34.2	28.4
Wt of Dry soil + Container W2 (g)	31.8	30.9	32.2	27.5
Wt of container W3 (g)	23.2	24.1	23.9	23.2
Wt. of water (a) W1 - W2 (g)	2.4	1.8	2	0.9
Wt. of Dry soil (b) W2 - W3 (g)	8.6	6.8	8.3	4.3
Moisture Content (w)= a/b x 100 (%)	27.91	26.47	24.10	20.93



LL= 25.82% **PL=** 20.93% **PI=** 4.89%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

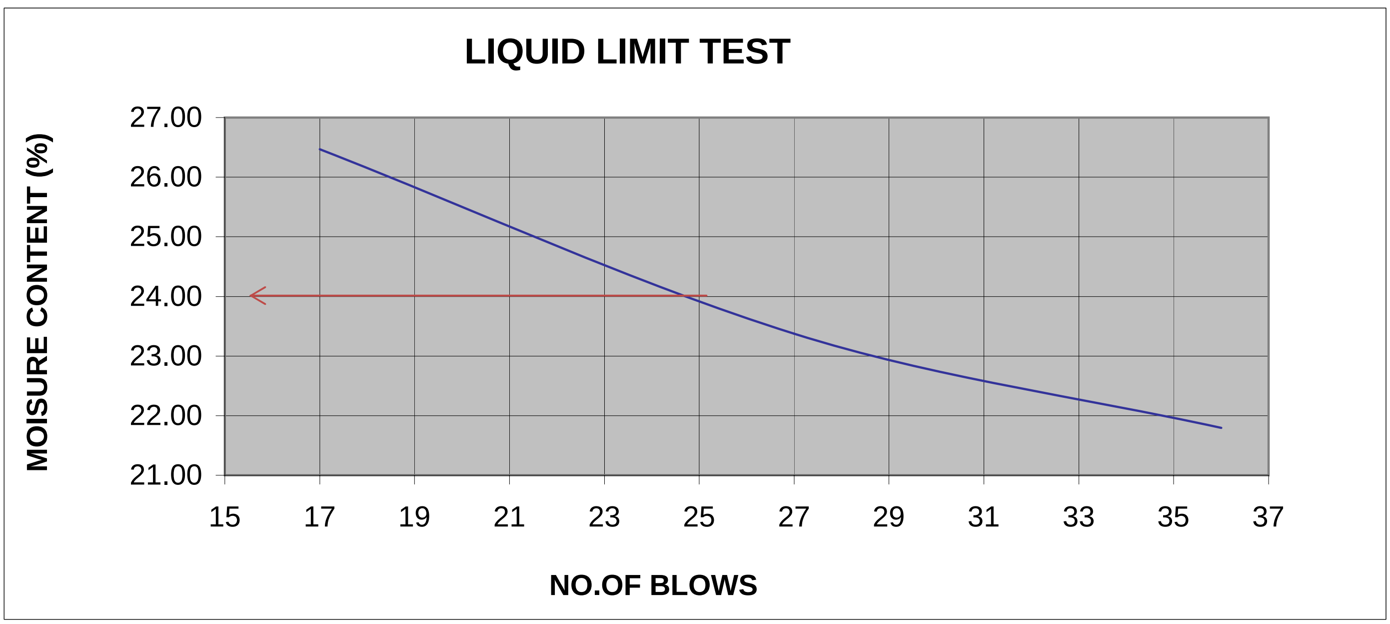
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	7
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	8.08.2010
Location:	Test Pit # 04	Depth: m	1

Description	Liquid Limit			Plastic Limit
No of Blows	17	27	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	32.3	33.2	32.3	29.1
Wt of Dry soil + Container W2 (g)	30.5	31.4	30.6	28.2
Wt of container W3 (g)	23.7	23.7	22.8	23.1
Wt. of water (a) W1 - W2 (g)	1.8	1.8	1.7	0.9
Wt. of Dry soil (b) W2 - W3 (g)	6.8	7.7	7.8	5.1
Moisture Content (w)= a/b x 100 (%)	26.47	23.38	21.79	17.65



LL= 23.96% **PL=** 17.65% **PI=** 6.31%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

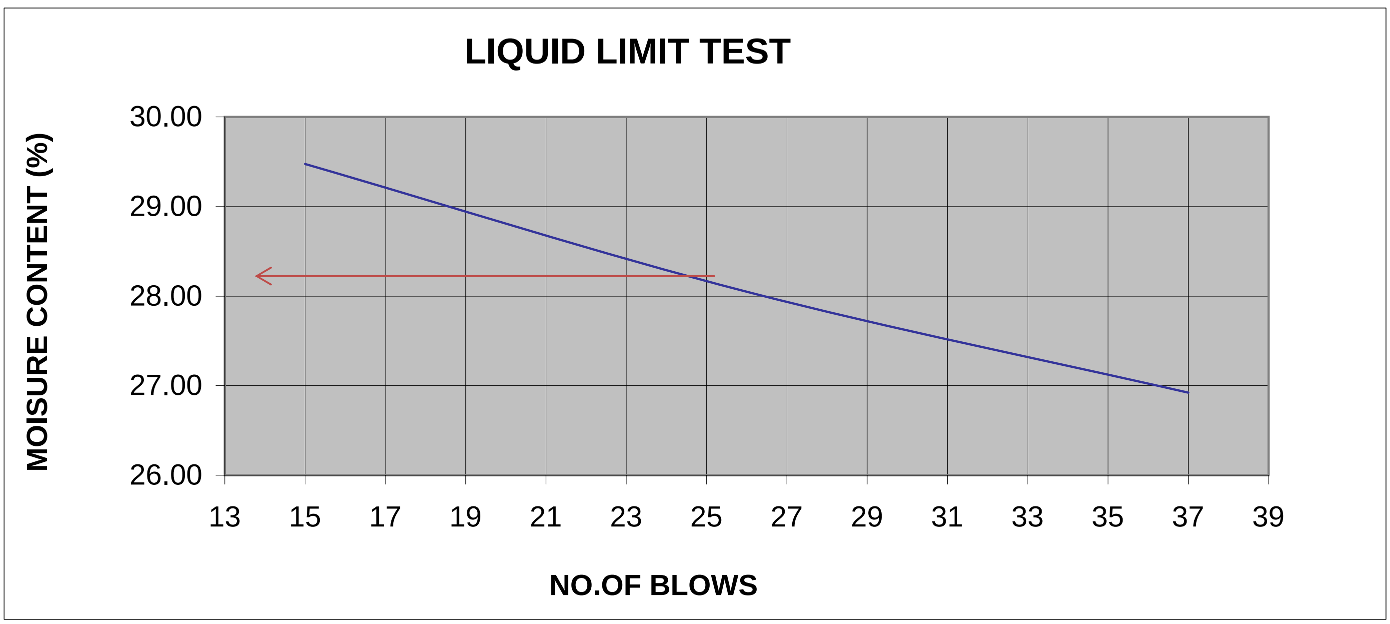
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	04.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	8
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	8.08.2010
Location:	Test Pit # 04	Depth: m	2

Description	Liquid Limit			Plastic Limit
No of Blows	15	26	37	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	36.6	34.4	33.5	30.3
Wt of Dry soil + Container W2 (g)	33.8	32.1	31.4	29.1
Wt of container W3 (g)	24.3	23.9	23.6	23.45
Wt. of water (a) W1 - W2 (g)	2.8	2.3	2.1	1.2
Wt. of Dry soil (b) W2 - W3 (g)	9.5	8.2	7.8	5.65
Moisture Content (w)= a/b x 100 (%)	29.47	28.05	26.92	21.24



LL= 28.18% **PL=** 21.24% **PI=** 6.94%

Remarks:

Tested by:	Hayat		
Checked by:	Jafari	E-mail:	
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com	

Omran Geotechnical Company

Lab Test Results of Test Pits

Specific Gravity Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

Specific Gravity

ASTM D - 854

Email	Omran.geotechnic@yahoo.com	Add:	Karte 3, Kabul, Afghanistan
To :	**USAID**	**Sampling Date:**	5/8/2010
Contractor:	**TETRA TECH Inc.**	**Location:**	Kabul Province
Project:	**New Admin Building, Ghazi Boys High School, Kabul**	**Temperature**	**25 c˚**

Test PIt No.	1	2	3	4	
Depth (m)	2.0	2.00	2.0	2.0	
Sample No.	1	2	3	4	
Weight of Flask Plus Water (gr)	678.40	699.50	679.20	698.40	
Weight of Flask Plus Water Plus Material (gr)	741.40	761.10	742.20	761.80	
Weight of Dry Oven Soil (gr)	100.00	100.00	100.00	100.00	
Specific Gravity (GS)	2.70	2.60	2.70	2.73	
Testing Date	10.08.2010	10.08.2010	10.08.2010	10.08.2010	

Remarks:

Tested By	Hayat
Checked By	Jafari
Lab manager	A.Najafi

Omran Geotechnical Company

Lab Test Results of Test Pits

Proctor Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

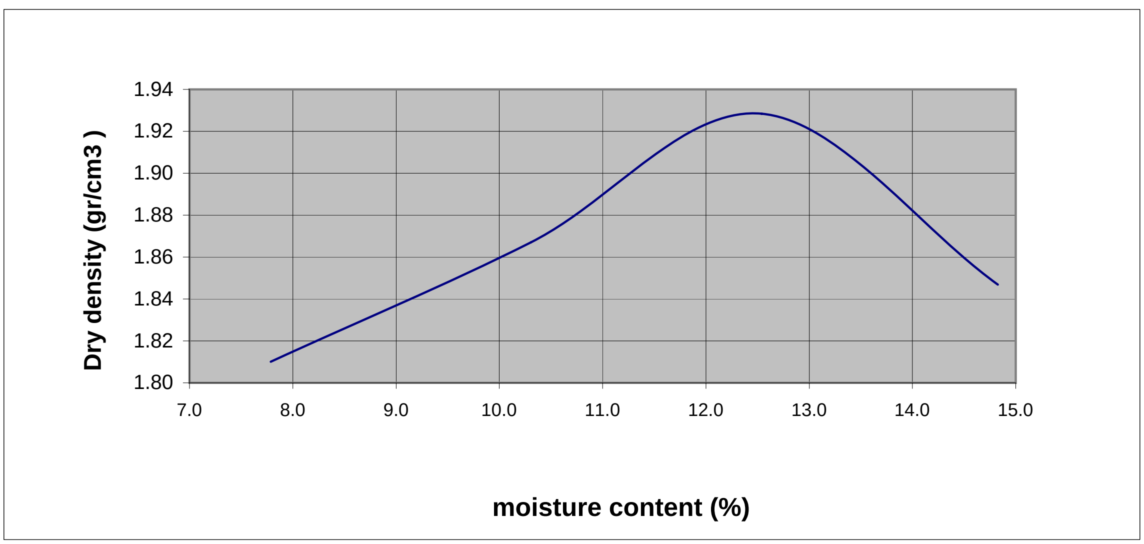
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	1	Location	Test Pit # 01	Date of Sampled:	4/8/2010
Material	SILTY CLAY WITH SAND	Depth: (m)	1	Date of Test:	8/8/2010
Method	Modified	Mould Wt. g	**7135**	Mould vol cm^3	2122

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	11275	11505	11740	11635			
Wt. of wet soil g	4140	4370	4605	4500			
Wet density Mg/m^3	1.951	2.059	2.170	2.121			
Dry density (γ) Mg/m^3	1.810	1.867	1.928	1.847			

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**		
Wt. of container g	56	53	52.8	58			
Wt. of wet soil + Container g	187.5	161.65	199.1	191.2			
Wt. of dry soil + Container g	178	151.5	182.8	174			
Wt. of dry soil g	122.0	98.5	130.0	116.0			
Wt. of water g	9.5	10.15	16.3	17.2			
Moisture content %	7.8	10.3	12.5	14.8			



M.D.D (Mg/m^3)	**1.928**	O.M.C (%)	**12.5**

Remarks :	**Checked by :**	**Jafari**

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

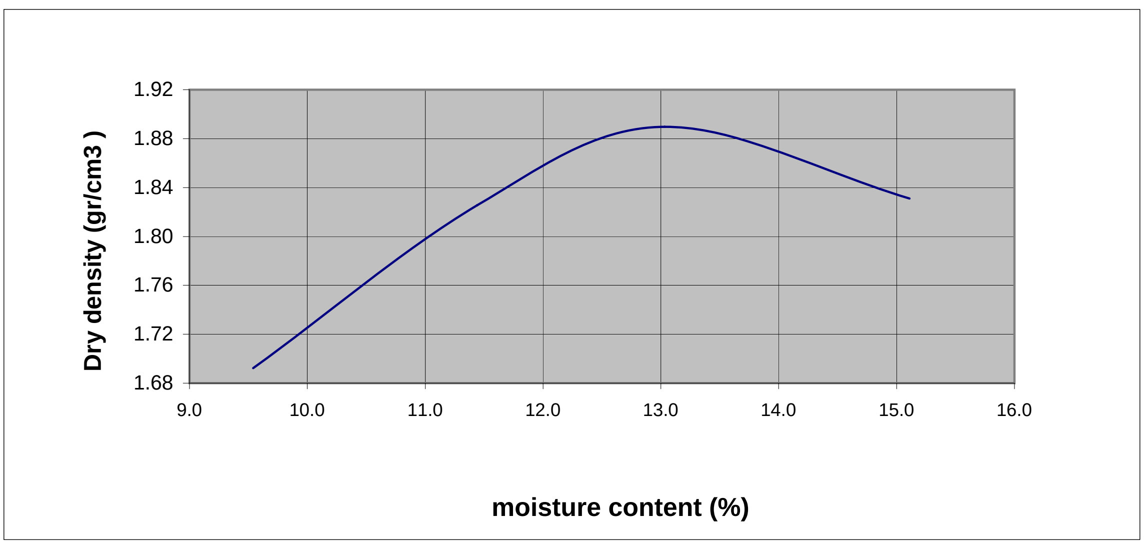
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	2	Location	Test Pit # 01	Date of Sampled:	4/8/2010
Material	SILTY CLAY	Depth: (m)	2	Date of Test:	8/8/2010
Method	Modified	Mould Wt. g	**4956**	Mould vol cm^3	2133

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	8910	9295	9512	9452			
Wt. of wet soil g	3954	4339	4556	4496			
Wet density Mg/m^3	1.854	2.034	2.136	2.108			
Dry density (γ) Mg/m^3	1.692	1.825	1.890	1.831			

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**		
Wt. of container g	37.4	59.5	46.8	40.6			
Wt. of wet soil + Container g	128.1	198.8	189.9	218.1			
Wt. of dry soil + Container g	120.2	184.5	173.4	194.8			
Wt. of dry soil g	82.8	125.0	126.6	154.2			
Wt. of water g	7.9	14.3	16.5	23.3			
Moisture content %	9.5	11.4	13.0	15.1			



M.D.D (Mg/m^3)	**1.890**	O.M.C (%)	**13**

Remarks :	**Checked by :**	**Jafari**
	Omran.geotechnic@yahoo.com	

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

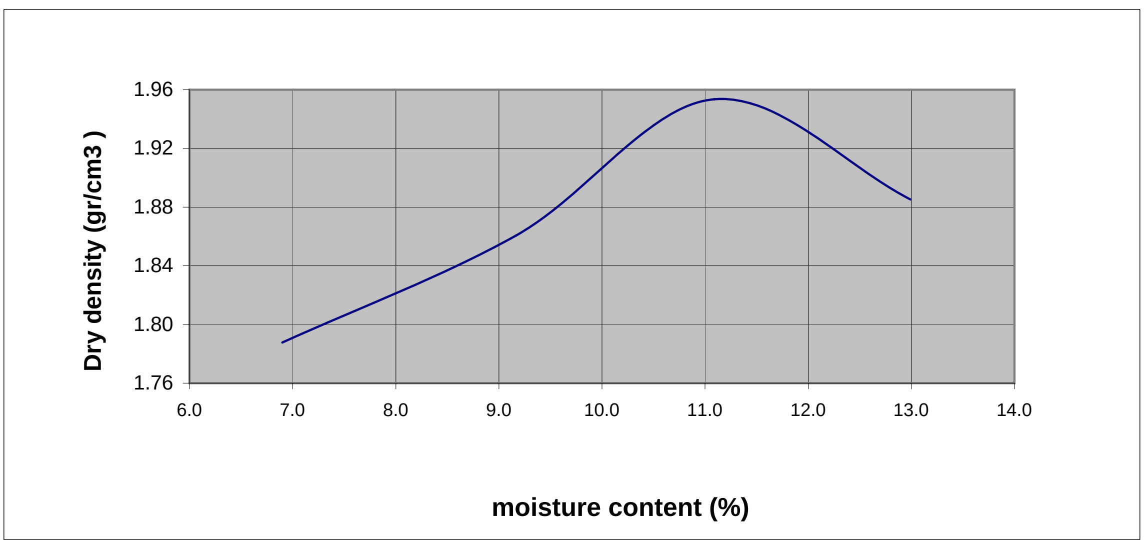
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	3	Location	Test Pit # 02	Date of Sampled:	4/8/2010
Material	SILTY CLAY WITH SAND	Depth: (m)	1	Date of Test:	9/8/2010
Method	Modified	Mould Wt. g	**7135**	Mould vol cm^3	2122

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	11190	11445	11740	11655			
Wt. of wet soil g	4055	4310	4605	4520			
Wet density Mg/m^3	1.911	2.031	2.170	2.130			
Dry density (γ) Mg/m^3	1.788	1.861	1.954	1.885			

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**		
Wt. of container g	42.8	43	42.4	42.3			
Wt. of wet soil + Container g	152.8	160.9	142.6	137.1			
Wt. of dry soil + Container g	145.7	151	132.6	126.2			
Wt. of dry soil g	102.9	108.0	90.2	83.9			
Wt. of water g	7.1	9.9	10	10.9			
Moisture content %	6.9	9.2	11.1	13.0			



M.D.D (Mg/m^3)	**1.954**	O.M.C (%)	**11.1**

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OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	**USAID**
Contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School**

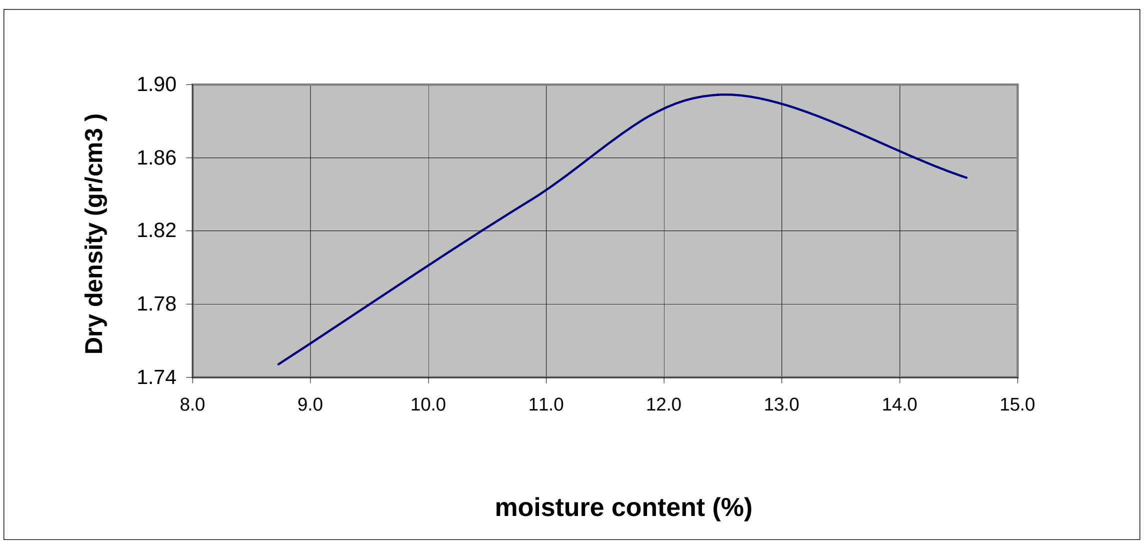
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	4	Location	Test Pit # 02	Date of Sampled:	4/8/2010
Material	SILTY CLAY	Depth: (m)	2	Date of Test:	9/8/2010
Method	Modified	Mould Wt. g	**4850**	Mould vol cm^3	2103

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	8845	9130	9330	9305			
Wt. of wet soil g	3995	4280	4480	4455			
Wet density Mg/m^3	1.900	2.035	2.130	2.118			
Dry density (γ) Mg/m^3	1.747	1.836	1.894	1.849			

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**		
Wt. of container g	56	53	54	60			
Wt. of wet soil + Container g	184.3	197.1	182.2	218.1			
Wt. of dry soil + Container g	174	183	168	198			
Wt. of dry soil g	118.0	130.0	114.0	138.0			
Wt. of water g	10.3	14.1	14.2	20.1			
Moisture content %	8.7	10.8	12.5	14.6			



M.D.D (Mg/m^3)	**1.894**	O.M.C (%)	**12.6**

Remarks :	**Checked by :**	**Jafari**

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OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	**USAID**
Contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School**

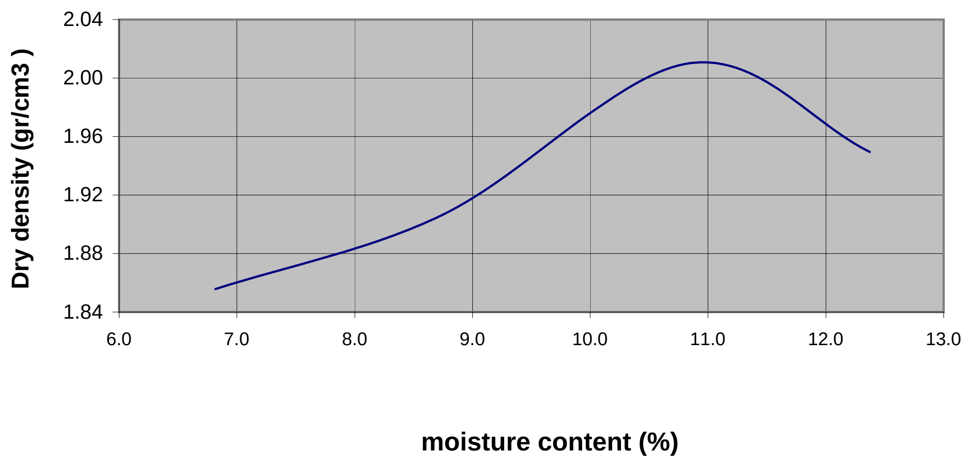
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	5	Location	Test Pit # 03	Date of Sampled:	4/8/2010
Material	SANDY SILTY CLAY	Depth: (m)	1	Date of Test:	10/8/2010
Method	Modified	Mould Wt. g	**4950**	Mould vol cm^3	2133

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	9178	9372	9702	9623			
Wt. of wet soil g	4228	4422	4752	4673			
Wet density Mg/m^3	1.982	2.073	2.228	2.191			
Dry density (γ) Mg/m^3	1.856	1.906	2.010	1.950			

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**		
Wt. of container g	40.5	37.4	39.7	57.4			
Wt. of wet soil + Container g	148.6	206.5	192.1	200.9			
Wt. of dry soil + Container g	141.7	192.9	177.2	185.1			
Wt. of dry soil g	101.2	155.5	137.5	127.7			
Wt. of water g	6.9	13.6	14.9	15.8			
Moisture content %	6.8	8.7	10.8	12.4			



M.D.D (Mg/m^3)	**2.010**	O.M.C (%)	**10.9**

Remarks :	**Checked by :**	**Jafari**

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OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

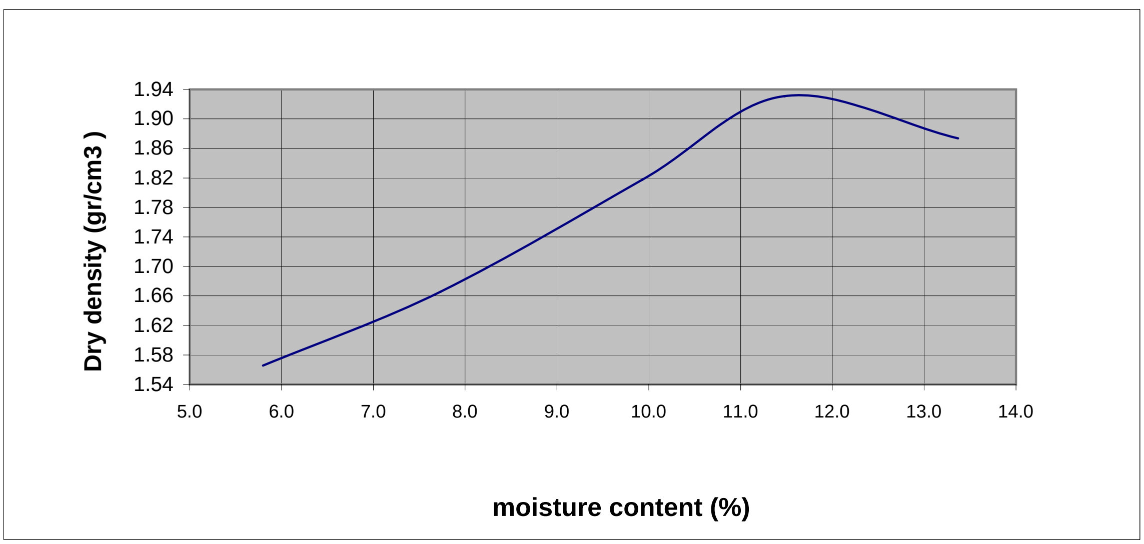
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	6	Location	Test Pit # 03	Date of Sampled:	4/8/2010
Material	SILTY CLAY WITH SAND	Depth: (m)	2	Date of Test:	10/8/2010
Method	Modified	Mould Wt. g	**7305**	Mould vol cm^3	2122

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	10820	11113	11545	11873	11812		
Wt. of wet soil g	3515	3808	4240	4568	4507		
Wet density Mg/m^3	1.656	1.795	1.998	2.153	2.124		
Dry density (γ) Mg/m^3	1.566	1.666	1.818	1.931	1.873		

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of container g	62.5	51.2	56.5	41.9	44.1		
Wt. of wet soil + Container g	159.2	168.2	152.8	135.1	150.1		
Wt. of dry soil + Container g	153.9	159.8	144.1	125.5	137.6		
Wt. of dry soil g	91.4	108.6	87.6	83.6	93.5		
Wt. of water g	5.3	8.4	8.7	9.6	12.5		
Moisture content %	5.8	7.7	9.9	11.5	13.4		



M.D.D (Mg/m^3)	**1.931**	O.M.C (%)	**11.7**

Remarks :	**Checked by :**	**Jafari**
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OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

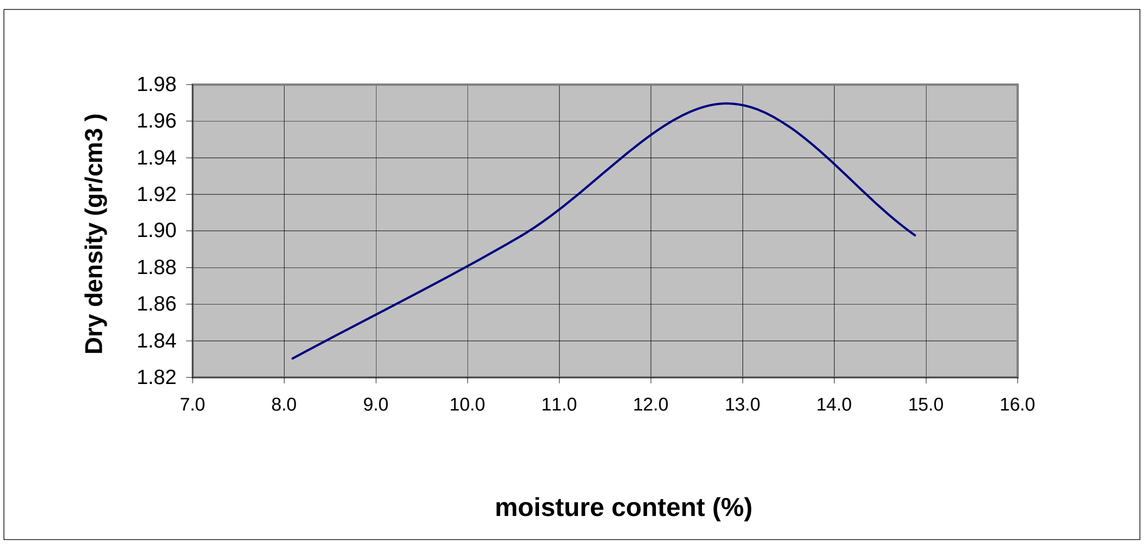
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	7	Location	Test Pit # 04	Date of Sampled:	4/8/2010
Material	SILTY CLAY WITH SAND	Depth: (m)	1	Date of Test:	11/8/2010
Method	Modified	Mould Wt. g	**4950**	Mould vol cm^3	2133

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	9170	9425	9690	9600			
Wt. of wet soil g	4220	4475	4740	4650			
Wet density Mg/m^3	1.978	2.098	2.222	2.180			
Dry density (γ) Mg/m^3	1.830	1.897	1.970	1.898			

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**		
Wt. of container g	43	42.8	39	41.5			
Wt. of wet soil + Container g	161.9	172.4	194.7	185.1			
Wt. of dry soil + Container g	153	160	177	166.5			
Wt. of dry soil g	110.0	117.2	138.0	125.0			
Wt. of water g	8.9	12.4	17.7	18.6			
Moisture content %	8.1	10.6	12.8	14.9			



M.D.D (Mg/m^3)	**1.970**	O.M.C (%)	**12.8**

Remarks :	**Checked by :**	**Jafari**
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OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

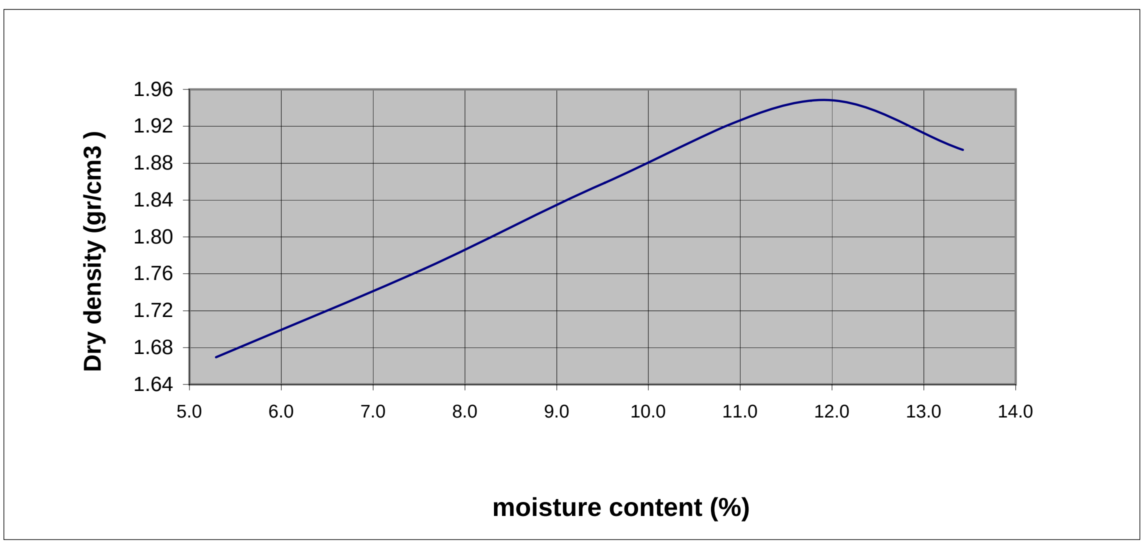
MOISTURE DENSITY RELATION

AASHTO T - 180 , ASTM D-1557

Sample No.	8	Location	Test Pit # 04	Date of Sampled:	4/8/2010
Material	SILTY CLAY WITH SAND	Depth: (m)	2	Date of Test:	11/8/2010
Method	Modified	Mould Wt. g	**7135**	Mould vol cm^3	2122

Determination No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of wet soil + Container g	10865	11165	11455	11755	11695		
Wt. of wet soil g	3730	4030	4320	4620	4560		
Wet density Mg/m^3	1.758	1.899	2.036	2.177	2.149		
Dry density (γ) Mg/m^3	1.669	1.766	1.859	1.948	1.895		

Moisture Content %							
Container No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wt. of container g	57.7	40.7	43.6	42.9	43.2		
Wt. of wet soil + Container g	161.2	143.1	142.5	129.3	165.7		
Wt. of dry soil + Container g	156	135.9	133.9	120.2	151.2		
Wt. of dry soil g	98.3	95.2	90.3	77.3	108.0		
Wt. of water g	5.2	7.2	8.6	9.1	14.5		
Moisture content %	5.3	7.6	9.5	11.8	13.4		



M.D.D (Mg/m^3)	**1.948**	O.M.C (%)	**11.9**

Remarks :	**Checked by :**	**Jafari**

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Omran Geotechnical Company

Lab Test Results of Test Pits

Moisture density Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

Density Of Soil in Place by the Drive Cylinder Method

ASTM D 2937

Location	Kabul Province	Date of Test:	4/8/2010	Date of Sampled:	5/8/2010
Method	Drive Cylinder	Mould Wt. g	**3340**	Mould vol cm^3	947.4

Borehole No.		**1**	**2**	**3**	**4**		**6**	**7**
Depth (m)		**1**	**1**	**1**	**1**			
Wt. of wet soil + Container	gr	5035	5039	5076	5069			
Wt. of wet soil	gr	1695	1699	1736	1729			
Wet density	Mg/m^3	1.789	1.793	1.832	1.825			
Dry density (γ)	Mg/m^3	1.569	1.551	1.577	1.584			

Moisture Content %								
Container No.		**1**	**2**	**3**	**4**			
Wt. of container	gr	34.4	42.5	39.7	41			
Wt. of wet soil + Container	gr	134.3	146.7	157.4	151			
Wt. of dry soil + Container	gr	122	132.6	141	136.5			
Wt. of dry soil	gr	87.6	90.1	101.3	95.5			
Wt. of water	gr	12.3	14.1	16.4	14.5			
Moisture content	%	14.0	15.6	16.2	15.2			

Remarks :	**Checked by :**	**Jafari**

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Omran Geotechnical Company

Appendix E

Lab Test Result of Boreholes

- Sieve Analysis Test Results
- Atterberg Limit Test Results
- Hydrometery Test Results
- Specific Gravity Test Results
- Moisture Content Test Results
- Moisture density Test Results
- Expansion Index Test Results
- Unconfined Test Results
- Direct Shear Test Results
- Consolidation Test Results
- Permeability Test Results
- Chemical Test Results

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Lab Test Result of Boreholes

Sieve Analysis Test Results

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	1

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 01**		**Sampling Date**	05/08/2010
Weight (gr)	523	**Depth (m)** 1.5	**Testing Date**	07/08/2010

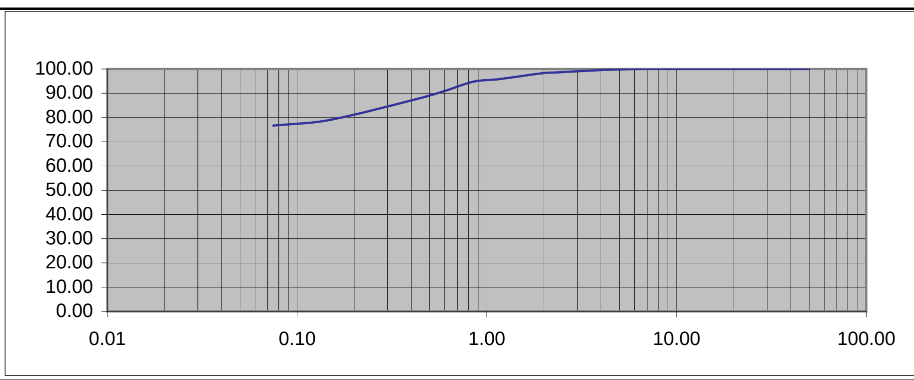
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**0.19**
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	1.00	1.00	0.19	99.81	
2.36 mm	No. 8	6.40	7.40	1.41	98.59	
2.00 mm	No. 10	1.30	8.70	1.66	98.34	
1.18 mm	No. 16	12.90	21.60	4.13	95.87	
850 µm	No. 20	5.70	27.30	5.22	94.78	**23.14**
600 µm	No. 30	20.20	47.50	9.08	90.92	
425 µm	No. 40	17.60	65.10	12.45	87.55	
150 µm	No. 100	44.40	109.50	20.94	79.06	
75 µm	No. 200	12.50	122.00	23.33	76.67	**76.67**
Pan		401.00	523.00	100.00	0.00	
TOTAL		**523.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITY SAND**

	LL	PL	PI
Atteberg Limits	**25.14%**	**20.45%**	**4.69%**

	%Gravel	%Sand	%Silt & Clay
Percentage of Contents	0.19	23.14	76.67

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	2

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 01**			**Sampling Date**	05/08/2010
Weight (gr)	795.7	**Depth (m)**	4	**Testing Date**	07/08/2010

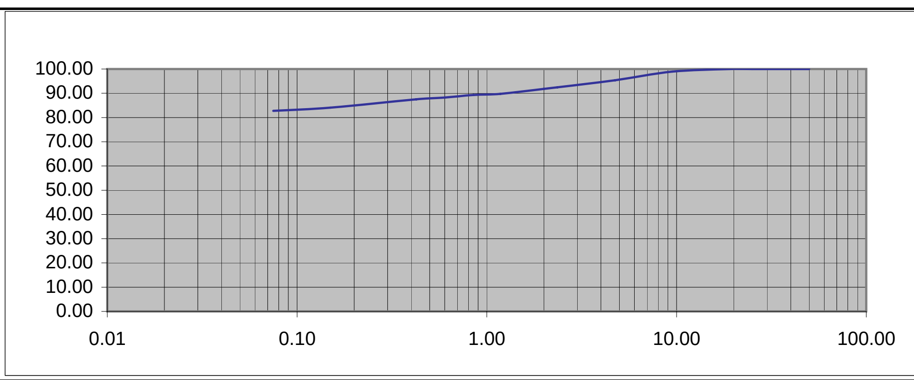
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**4.62**
9.5 mm	3/8 in	8.60	8.60	1.08	98.92	
4.75 mm	No. 4	28.20	36.80	4.62	95.38	
2.36 mm	No. 8	23.00	59.80	7.52	92.48	
2.00 mm	No. 10	5.40	65.20	8.19	91.81	
1.18 mm	No. 16	16.40	81.60	10.26	89.74	
850 µm	No. 20	3.40	85.00	10.68	89.32	**12.64**
600 µm	No. 30	8.80	93.80	11.79	88.21	
425 µm	No. 40	5.60	99.40	12.49	87.51	
150 µm	No. 100	27.20	126.60	15.91	84.09	
75 µm	No. 200	10.80	137.40	17.27	82.73	**82.73**
Pan		658.30	795.70	100.00	0.00	
TOTAL		**795.70**				

SOIL CLASSIFICATION	**ML**	**SILT WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	4.62	12.64	82.73

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	3

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

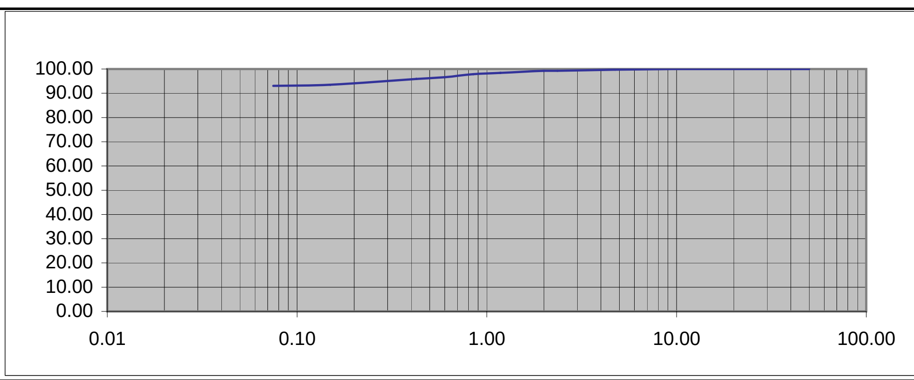
Location	**BH # 01**			**Sampling Date**	05/08/2010
Weight (gr)	371.6	**Depth (m)**	5	**Testing Date**	07/08/2010

Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**0.27**
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	1.00	1.00	0.27	99.73	
2.36 mm	No. 8	1.70	2.70	0.73	99.27	
2.00 mm	No. 10	0.00	2.70	0.73	99.27	
1.18 mm	No. 16	3.30	6.00	1.61	98.39	
850 µm	No. 20	1.90	7.90	2.13	97.87	**6.65**
600 µm	No. 30	4.60	12.50	3.36	96.64	
425 µm	No. 40	2.70	15.20	4.09	95.91	
150 µm	No. 100	8.80	24.00	6.46	93.54	
75 µm	No. 200	1.70	25.70	6.92	93.08	**93.08**
Pan		345.90	371.60	100.00	0.00	
TOTAL		**371.60**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	24.99%	**18.75%**	**6.24%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.27	6.65	93.08

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	4

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 01**			**Sampling Date**	05/08/2010
Weight (gr)	507.5	**Depth (m)**	6	**Testing Date**	07/08/2010

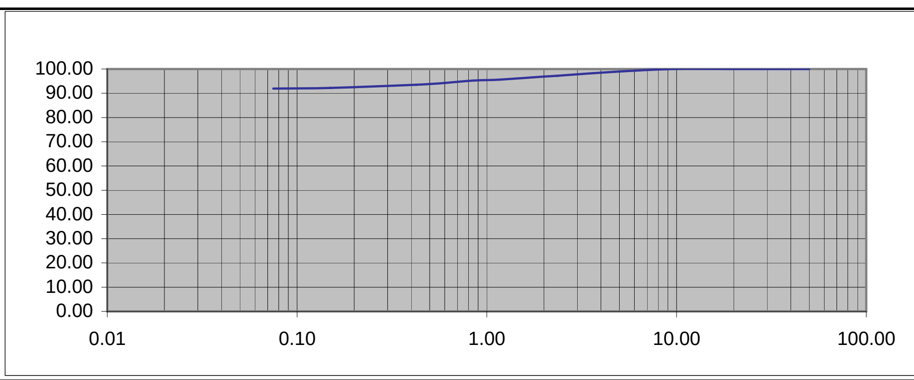
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**1.10**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	5.60	5.60	1.10	98.90	
2.36 mm	**No. 8**	8.40	14.00	2.76	97.24	
2.00 mm	**No. 10**	1.70	15.70	3.09	96.91	
1.18 mm	**No. 16**	6.60	22.30	4.39	95.61	
850 μm	**No. 20**	1.80	24.10	4.75	95.25	**6.98**
600 μm	**No. 30**	5.20	29.30	5.77	94.23	
425 μm	**No. 40**	3.50	32.80	6.46	93.54	
150 μm	**No. 100**	6.70	39.50	7.78	92.22	
75 μm	**No. 200**	1.50	41.00	8.08	91.92	**91.92**
Pan		466.50	507.50	100.00	0.00	
TOTAL		**507.50**				

SOIL CLASSIFICATION	**ML**	**SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.10	6.98	91.92

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	5

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 01**			**Sampling Date**	05/08/2010
Weight (gr)	562.3	**Depth (m)**	6.7	**Testing Date**	07/08/2010

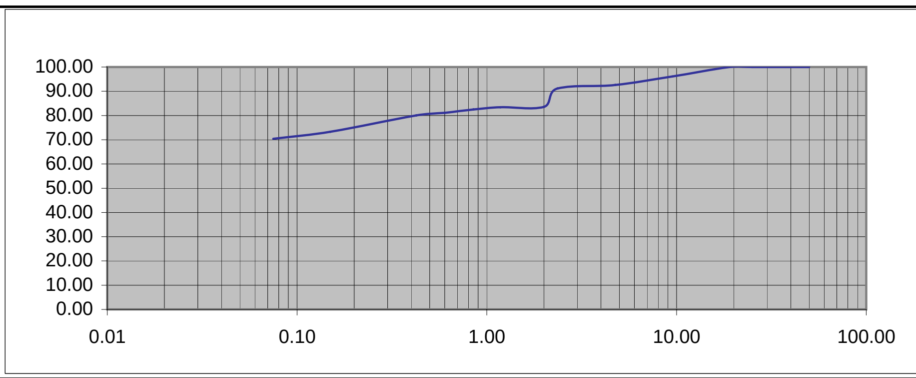
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**7.40**
9.5 mm	**3/8 in**	21.80	21.80	3.88	96.12	
4.75 mm	**No. 4**	19.80	41.60	7.40	92.60	
2.36 mm	**No. 8**	8.10	49.70	8.84	91.16	
2.00 mm	**No. 10**	42.90	92.60	16.47	83.53	
1.18 mm	**No. 16**	0.70	93.30	16.59	83.41	
850 μm	**No. 20**	5.20	98.50	17.52	82.48	**22.21**
600 μm	**No. 30**	7.80	106.30	18.90	81.10	
425 μm	**No. 40**	6.10	112.40	19.99	80.01	
150 μm	**No. 100**	37.80	150.20	26.71	73.29	
75 μm	**No. 200**	16.30	166.50	29.61	70.39	**70.39**
Pan		395.80	562.30	100.00	0.00	
TOTAL		**562.30**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITY SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	22.83%	**16.33%**	**6.50%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	7.40	22.21	70.39

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	6

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 01**		**Sampling Date**	05/08/2010
Weight (gr)	530.2	**Depth (m)** 7.5	**Testing Date**	07/08/2010

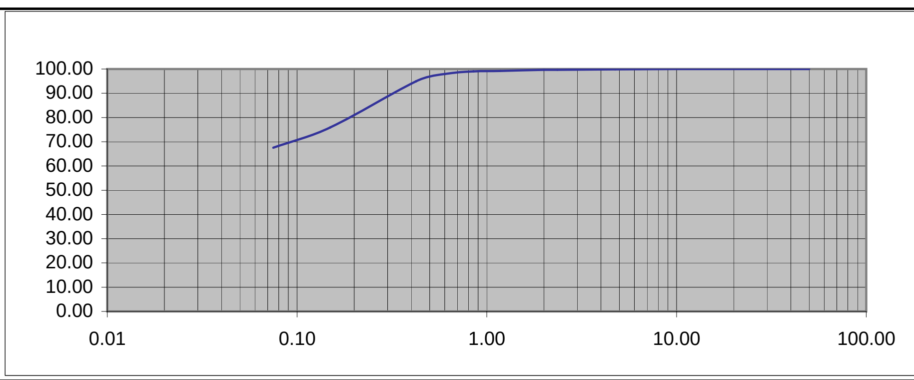
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	**Mass** Retained (gr)	**Retained** %	**Passing** %	**%**
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.15**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	0.80	0.80	0.15	99.85	
2.36 mm	**No. 8**	1.00	1.80	0.34	99.66	
2.00 mm	**No. 10**	0.00	1.80	0.34	99.66	
1.18 mm	**No. 16**	2.40	4.20	0.79	99.21	
850 µm	**No. 20**	1.20	5.40	1.02	98.98	**32.29**
600 µm	**No. 30**	5.60	11.00	2.07	97.93	
425 µm	**No. 40**	15.70	26.70	5.04	94.96	
150 µm	**No. 100**	101.00	127.70	24.09	75.91	
75 µm	**No. 200**	44.30	172.00	32.44	67.56	**67.56**
Pan		358.20	530.20	100.00	0.00	
TOTAL		**530.20**				

SOIL CLASSIFICATION	**ML**	**SANDY SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.15	32.29	67.56

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	7

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 01**		**Sampling Date**	05/08/2010
Weight (gr)	633.2	**Depth (m)** 10	**Testing Date**	07/08/2010

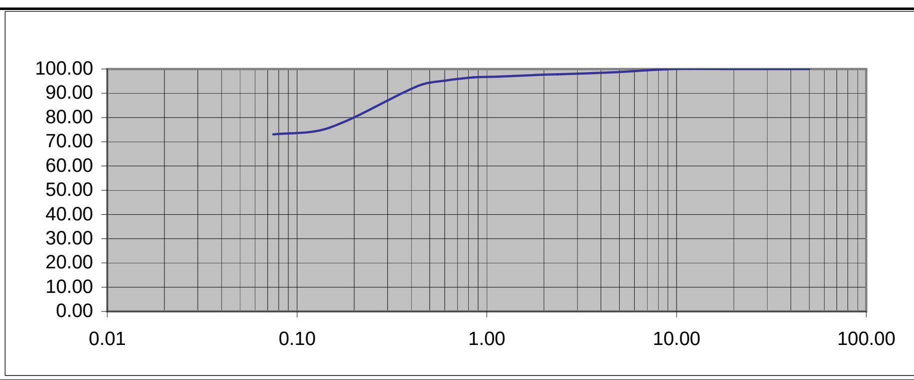
Sieve Size Standard	Sieve Size Alternative	Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.33
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	8.40	8.40	1.33	98.67	
2.36 mm	No. 8	5.30	13.70	2.16	97.84	
2.00 mm	No. 10	1.00	14.70	2.32	97.68	
1.18 mm	No. 16	5.10	19.80	3.13	96.87	
850 µm	No. 20	1.90	21.70	3.43	96.57	25.65
600 µm	No. 30	8.70	30.40	4.80	95.20	
425 µm	No. 40	15.50	45.90	7.25	92.75	
150 µm	No. 100	106.40	152.30	24.05	75.95	
75 µm	No. 200	18.50	170.80	26.97	73.03	73.03
Pan		462.40	633.20	100.00	0.00	
TOTAL		**633.20**				

SOIL CLASSIFICATION	**ML**	**SILT WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.33	25.65	73.03

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	8

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 02			Sampling Date	04/08/2010
Weight (gr)	600	Depth (m)	1.5	Testing Date	07/08/2010

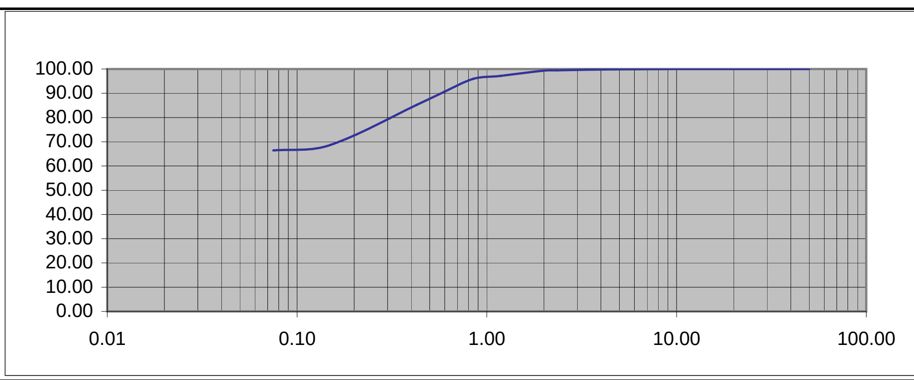
Sieve Size		Mass	Cumulative			Specification
		Retained	Mass	Retained	Passing	Limits
Standard	Alternative	(gr)	Retained (gr)	%	%	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	0.13
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	0.80	0.80	0.13	99.87	
2.36 mm	No. 8	2.20	3.00	0.50	99.50	
2.00 mm	No. 10	0.90	3.90	0.65	99.35	
1.18 mm	No. 16	13.10	17.00	2.83	97.17	
850 μm	No. 20	7.20	24.20	4.03	95.97	33.45
600 μm	No. 30	31.80	56.00	9.33	90.67	
425 μm	No. 40	33.30	89.30	14.88	85.12	
150 μm	No. 100	98.50	187.80	31.30	68.70	
75 μm	No. 200	13.70	201.50	33.58	66.42	66.42
Pan		398.50	600.00	100.00	0.00	
TOTAL		600.00				

SOIL CLASSIFICATION	CL-ML	SANDY SILTY CLAY

Atteberg Limits	LL	PL	PI
	23.38%	17.78%	5.60%

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	0.13	33.45	66.42

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	9

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 02**			**Sampling Date**	04/08/2010
Weight (gr)	714.85	**Depth (m)**	4	**Testing Date**	07/08/2010

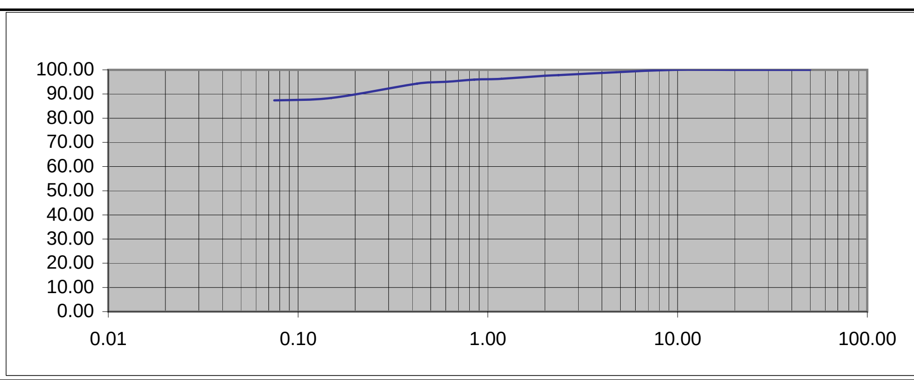
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**1.02**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	7.30	7.30	1.02	98.98	
2.36 mm	**No. 8**	8.30	15.60	2.18	97.82	
2.00 mm	**No. 10**	1.80	17.40	2.43	97.57	
1.18 mm	**No. 16**	9.10	26.50	3.71	96.29	
850 µm	**No. 20**	2.30	28.80	4.03	95.97	**11.62**
600 µm	**No. 30**	6.40	35.20	4.92	95.08	
425 µm	**No. 40**	5.20	40.40	5.65	94.35	
150 µm	**No. 100**	42.60	83.00	11.61	88.39	
75 µm	**No. 200**	7.40	90.40	12.65	87.35	**87.35**
Pan		624.45	714.85	100.00	0.00	
TOTAL		**714.85**				

SOIL CLASSIFICATION	**ML**	**SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.02	11.62	87.35

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	10

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 02**		**Sampling Date**	04/08/2010
Weight (gr)	538.4	**Depth (m)** 7	**Testing Date**	07/08/2010

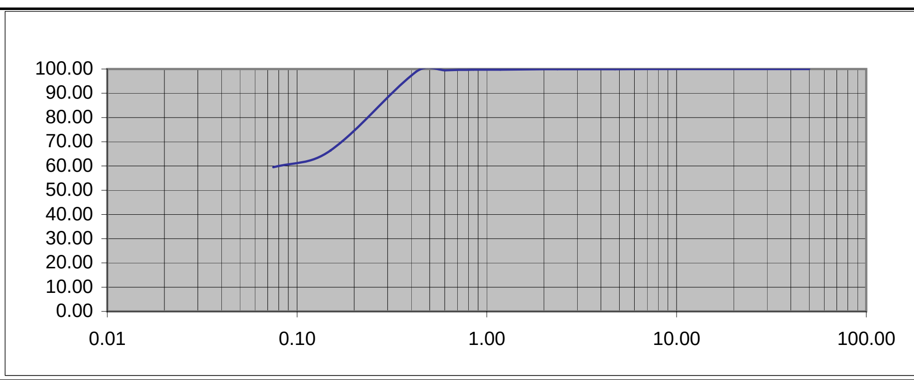
Sieve Size Standard	Sieve Size Alternative	Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**0.09**
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	0.50	0.50	0.09	99.91	
2.36 mm	No. 8	0.00	0.50	0.09	99.91	
2.00 mm	No. 10	0.00	0.50	0.09	99.91	
1.18 mm	No. 16	0.90	1.40	0.26	99.74	
850 µm	No. 20	0.00	1.40	0.26	99.74	**40.40**
600 µm	No. 30	1.40	2.80	0.52	99.48	
425 µm	No. 40	2.80	5.60	1.04	98.96	
150 µm	No. 100	175.40	181.00	33.62	66.38	
75 µm	No. 200	37.00	218.00	40.49	59.51	**59.51**
Pan		320.40	538.40	100.00	0.00	
TOTAL		**538.40**				

SOIL CLASSIFICATION	**ML**	**SANDY SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.09	40.40	59.51

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	11

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 02**			**Sampling Date**	04/08/2010
Weight (gr)	550	**Depth (m)**	8	**Testing Date**	07/08/2010

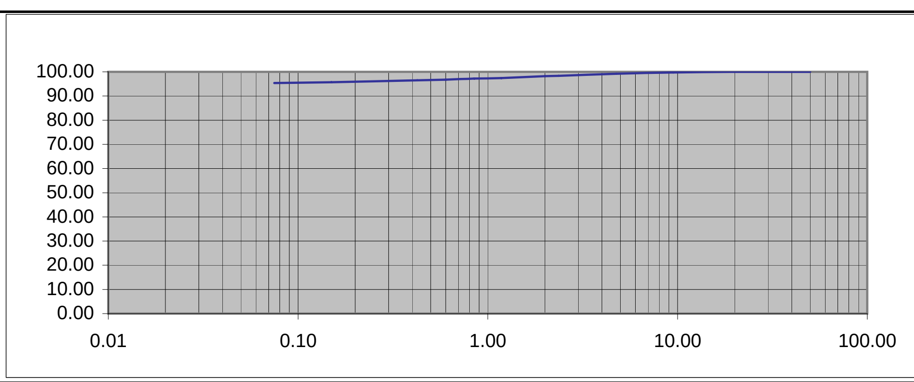
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.80**
9.5 mm	**3/8 in**	1.60	1.60	0.29	99.71	
4.75 mm	**No. 4**	2.80	4.40	0.80	99.20	
2.36 mm	**No. 8**	4.70	9.10	1.65	98.35	
2.00 mm	**No. 10**	0.80	9.90	1.80	98.20	
1.18 mm	**No. 16**	4.20	14.10	2.56	97.44	
850 µm	**No. 20**	1.10	15.20	2.76	97.24	**3.85**
600 µm	**No. 30**	2.50	17.70	3.22	96.78	
425 µm	**No. 40**	1.50	19.20	3.49	96.51	
150 µm	**No. 100**	4.40	23.60	4.29	95.71	
75 µm	**No. 200**	2.00	25.60	4.65	95.35	**95.35**
Pan		524.40	550.00	100.00	0.00	
TOTAL		**550.00**				

SOIL CLASSIFICATION	**ML**	**SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.80	3.85	95.35

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	12

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 02**			**Sampling Date**	04/08/2010
Weight (gr)	740	**Depth (m)**	9.5	**Testing Date**	07/08/2010

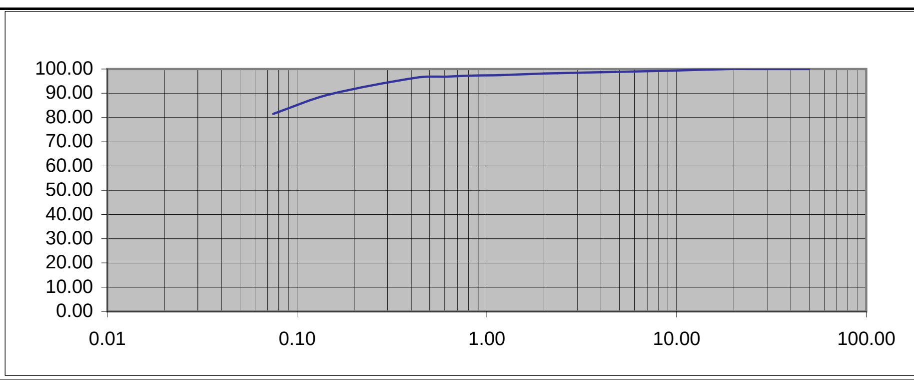
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**1.18**
9.5 mm	**3/8 in**	4.70	4.70	0.64	99.36	
4.75 mm	**No. 4**	4.00	8.70	1.18	98.82	
2.36 mm	**No. 8**	3.80	12.50	1.69	98.31	
2.00 mm	**No. 10**	1.00	13.50	1.82	98.18	
1.18 mm	**No. 16**	5.00	18.50	2.50	97.50	
850 μm	**No. 20**	1.40	19.90	2.69	97.31	**17.31**
600 μm	**No. 30**	3.70	23.60	3.19	96.81	
425 μm	**No. 40**	2.60	26.20	3.54	96.46	
150 μm	**No. 100**	50.80	77.00	10.41	89.59	
75 μm	**No. 200**	59.80	136.80	18.49	81.51	**81.51**
Pan		603.20	740.00	100.00	0.00	
TOTAL		**740.00**				

SOIL CLASSIFICATION	**ML**	**SILT WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.18	17.31	81.51

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	13

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 03**			**Sampling Date**	04/08/2010
Weight (gr)	664	**Depth (m)**	1	**Testing Date**	07/08/2010

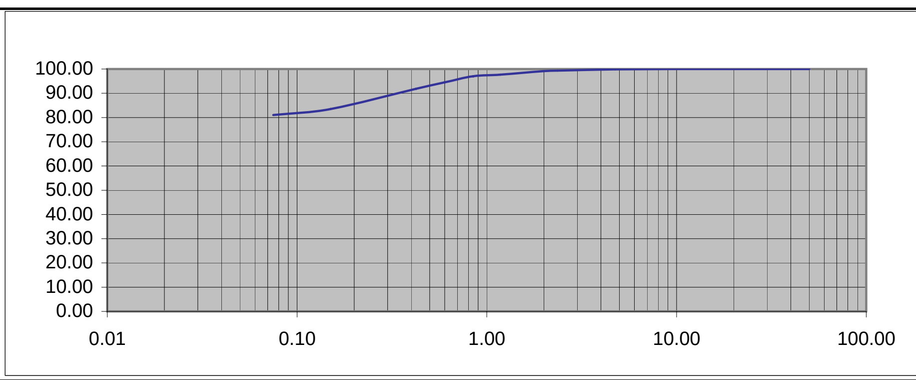
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.11**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	0.70	0.70	0.11	99.89	
2.36 mm	**No. 8**	3.80	4.50	0.68	99.32	
2.00 mm	**No. 10**	1.30	5.80	0.87	99.13	
1.18 mm	**No. 16**	9.60	15.40	2.32	97.68	
850 µm	**No. 20**	4.30	19.70	2.97	97.03	**18.86**
600 µm	**No. 30**	16.80	36.50	5.50	94.50	
425 µm	**No. 40**	17.50	54.00	8.13	91.87	
150 µm	**No. 100**	55.70	109.70	16.52	83.48	
75 µm	**No. 200**	16.20	125.90	18.96	81.04	**81.04**
Pan		538.10	664.00	100.00	0.00	
TOTAL		**664.00**				

SOIL CLASSIFICATION	**ML**	**SILT WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.11	18.86	81.04

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	14

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 03			Sampling Date	04/08/2010
Weight (gr)	520.1	Depth (m)	3.5	Testing Date	07/08/2010

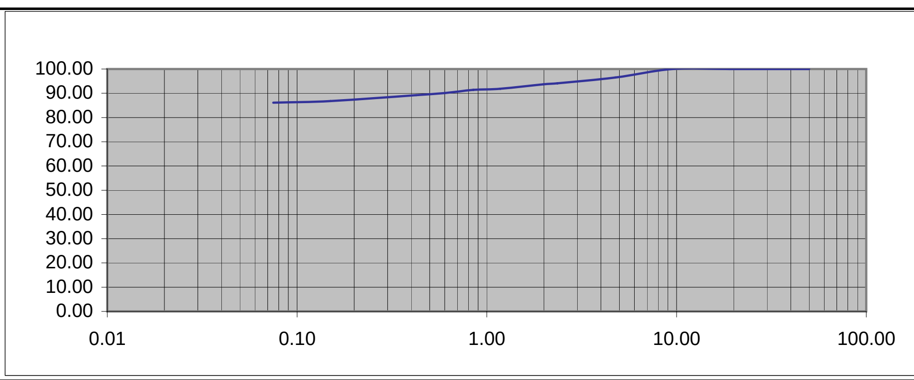
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	Alternative	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	3.50
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	18.20	18.20	3.50	96.50	
2.36 mm	No. 8	12.50	30.70	5.90	94.10	
2.00 mm	No. 10	2.00	32.70	6.29	93.71	
1.18 mm	No. 16	9.50	42.20	8.11	91.89	
850 µm	No. 20	2.60	44.80	8.61	91.39	10.40
600 µm	No. 30	6.80	51.60	9.92	90.08	
425 µm	No. 40	4.30	55.90	10.75	89.25	
150 µm	No. 100	13.00	68.90	13.25	86.75	
75 µm	No. 200	3.40	72.30	13.90	86.10	86.10
Pan		447.80	520.10	100.00	0.00	
TOTAL		520.10				

SOIL CLASSIFICATION	CL-ML	SILTY CLAY

Atteberg Limits	LL	PL	PI
	29.93%	25.00%	4.93%

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	3.50	10.40	86.10

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	15

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 03**			**Sampling Date**	04/08/2010
Weight (gr)	520	**Depth (m)**	6.5	**Testing Date**	07/08/2010

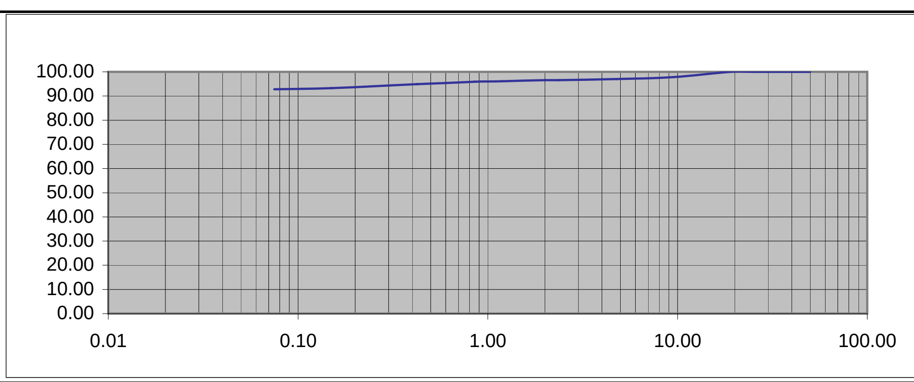
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**2.98**
9.5 mm	**3/8 in**	11.20	11.20	2.15	97.85	
4.75 mm	**No. 4**	4.30	15.50	2.98	97.02	
2.36 mm	**No. 8**	2.20	17.70	3.40	96.60	
2.00 mm	**No. 10**	0.00	17.70	3.40	96.60	
1.18 mm	**No. 16**	2.70	20.40	3.92	96.08	
850 µm	**No. 20**	0.90	21.30	4.10	95.90	**4.19**
600 µm	**No. 30**	2.90	24.20	4.65	95.35	
425 µm	**No. 40**	2.20	26.40	5.08	94.92	
150 µm	**No. 100**	8.60	35.00	6.73	93.27	
75 µm	**No. 200**	2.30	37.30	7.17	92.83	**92.83**
Pan		482.70	520.00	100.00	0.00	
TOTAL		**520.00**				

SOIL CLASSIFICATION	**ML**	**SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	2.98	4.19	92.83

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	16

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 03**			**Sampling Date**	04/08/2010
Weight (gr)	534.55	**Depth (m)**	10	**Testing Date**	07/08/2010

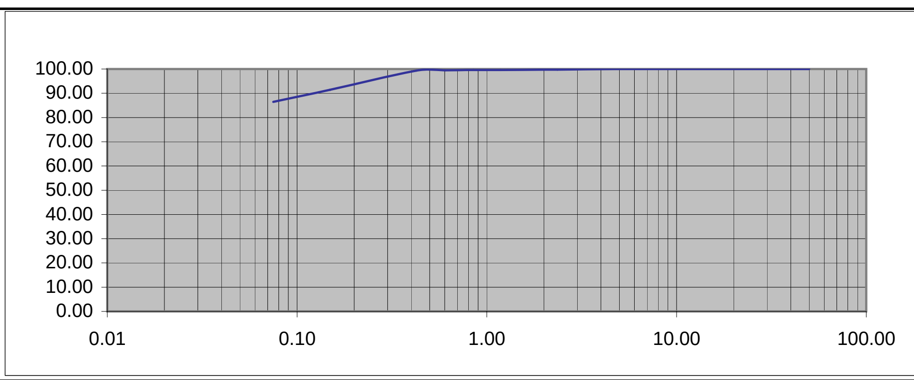
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	Alternative	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**0.00**
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	0.00	0.00	0.00	100.00	
2.36 mm	No. 8	1.40	1.40	0.26	99.74	
2.00 mm	No. 10	0.00	1.40	0.26	99.74	
1.18 mm	No. 16	0.70	2.10	0.39	99.61	
850 µm	No. 20	0.00	2.10	0.39	99.61	**13.53**
600 µm	No. 30	0.70	2.80	0.52	99.48	
425 µm	No. 40	0.70	3.50	0.65	99.35	
150 µm	No. 100	42.10	45.60	8.53	91.47	
75 µm	No. 200	26.70	72.30	13.53	86.47	**86.47**
Pan		462.25	534.55	100.00	0.00	
TOTAL		**534.55**				

SOIL CLASSIFICATION	**ML**	**SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.00	13.53	86.47

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	17

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 04**			**Sampling Date**	03/08/2010
Weight (gr)	605	**Depth (m)**	0.75	**Testing Date**	07/08/2010

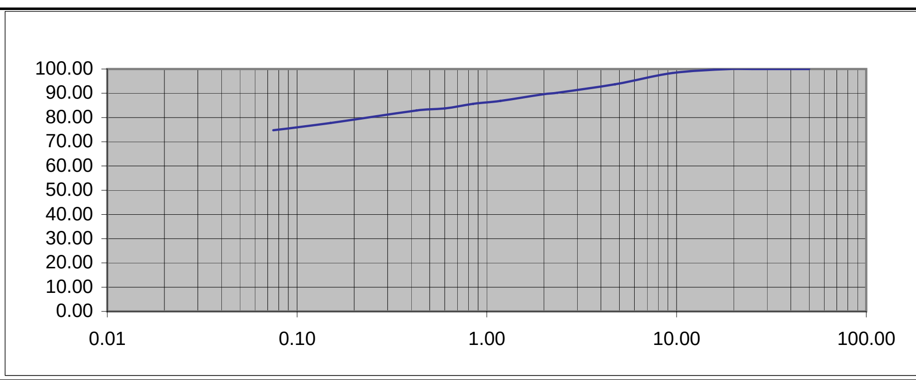
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**6.28**
9.5 mm	**3/8 in**	9.80	9.80	1.62	98.38	
4.75 mm	**No. 4**	28.20	38.00	6.28	93.72	
2.36 mm	**No. 8**	21.00	59.00	9.75	90.25	
2.00 mm	**No. 10**	3.80	62.80	10.38	89.62	
1.18 mm	**No. 16**	16.80	79.60	13.16	86.84	
850 µm	**No. 20**	7.20	86.80	14.35	85.65	**18.98**
600 µm	**No. 30**	11.50	98.30	16.25	83.75	
425 µm	**No. 40**	5.30	103.60	17.12	82.88	
150 µm	**No. 100**	31.30	134.90	22.30	77.70	
75 µm	**No. 200**	17.90	152.80	25.26	74.74	**74.74**
Pan		452.20	605.00	100.00	0.00	
TOTAL		**605.00**				

SOIL CLASSIFICATION	**ML**	**SILT WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	6.28	18.98	74.74

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	18

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 04**			**Sampling Date**	03/08/2010
Weight (gr)	680.9	**Depth (m)**	1.4	**Testing Date**	07/08/2010

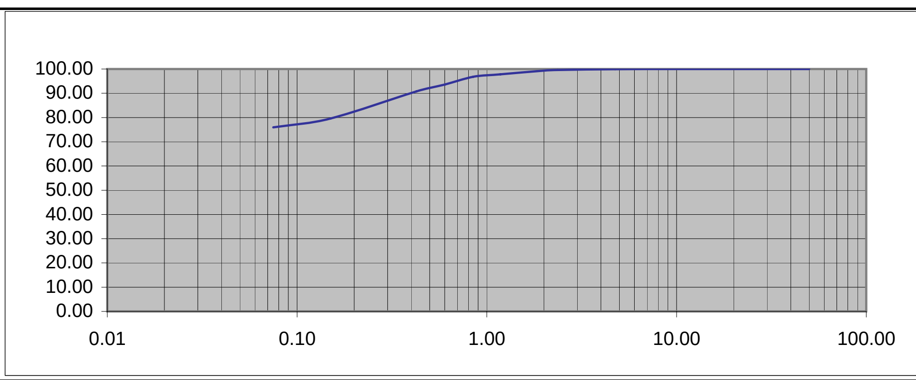
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.09**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	0.60	0.60	0.09	99.91	
2.36 mm	**No. 8**	2.20	2.80	0.41	99.59	
2.00 mm	**No. 10**	1.60	4.40	0.65	99.35	
1.18 mm	**No. 16**	10.60	15.00	2.20	97.80	
850 μm	**No. 20**	6.60	21.60	3.17	96.83	**23.97**
600 μm	**No. 30**	22.10	43.70	6.42	93.58	
425 μm	**No. 40**	19.50	63.20	9.28	90.72	
150 μm	**No. 100**	75.70	138.90	20.40	79.60	
75 μm	**No. 200**	24.90	163.80	24.06	75.94	**75.94**
Pan		517.10	680.90	100.00	0.00	
TOTAL		**680.90**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	27.19%	**22.22%**	**4.97%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.09	23.97	75.94

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	19

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 04	Sampling Date	03/08/2010
Weight (gr)	527.2	Depth (m)	2
Testing Date	07/08/2010		

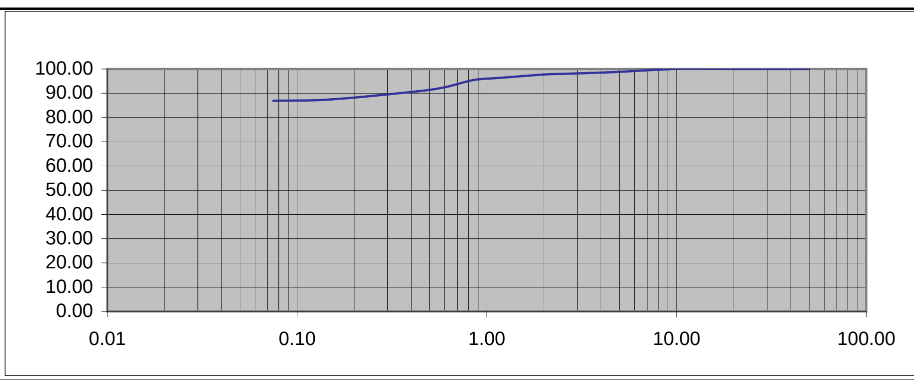
Sieve Size Standard	Sieve Size Alternative	Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.25
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	6.60	6.60	1.25	98.75	
2.36 mm	No. 8	4.30	10.90	2.07	97.93	
2.00 mm	No. 10	1.00	11.90	2.26	97.74	
1.18 mm	No. 16	7.30	19.20	3.64	96.36	
850 µm	No. 20	4.70	23.90	4.53	95.47	11.86
600 µm	No. 30	15.70	39.60	7.51	92.49	
425 µm	No. 40	9.20	48.80	9.26	90.74	
150 µm	No. 100	17.40	66.20	12.56	87.44	
75 µm	No. 200	2.90	69.10	13.11	86.89	86.89
Pan		458.10	527.20	100.00	0.00	
TOTAL		527.20				

SOIL CLASSIFICATION	CL-ML	SILTY CLAY

Atteberg Limits	LL	PL	PI
	28.38%	21.62%	6.76%

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	1.25	11.86	86.89

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	20

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 04**			**Sampling Date**	03/08/2010
Weight (gr)	620.1	**Depth (m)**	2.7	**Testing Date**	07/08/2010

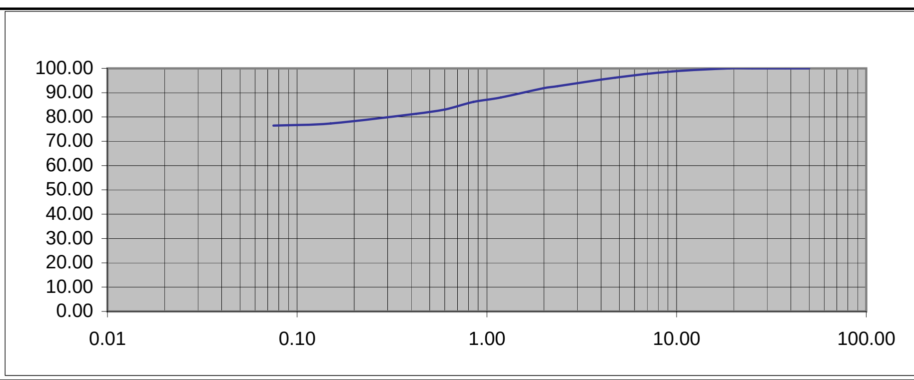
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**3.82**
9.5 mm	**3/8 in**	7.90	7.90	1.27	98.73	
4.75 mm	**No. 4**	15.80	23.70	3.82	96.18	
2.36 mm	**No. 8**	21.50	45.20	7.29	92.71	
2.00 mm	**No. 10**	5.00	50.20	8.10	91.90	
1.18 mm	**No. 16**	24.40	74.60	12.03	87.97	
850 µm	**No. 20**	10.90	85.50	13.79	86.21	**19.74**
600 µm	**No. 30**	19.70	105.20	16.97	83.03	
425 µm	**No. 40**	10.60	115.80	18.67	81.33	
150 µm	**No. 100**	24.80	140.60	22.67	77.33	
75 µm	**No. 200**	5.50	146.10	23.56	76.44	**76.44**
Pan		474.00	620.10	100.00	0.00	
TOTAL		**620.10**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	25.21%	**20.00%**	**5.21%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	3.82	19.74	76.44

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	21

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 04**			**Sampling Date**	03/08/2010
Weight (gr)	698.5	**Depth (m)**	3.5	**Testing Date**	07/08/2010

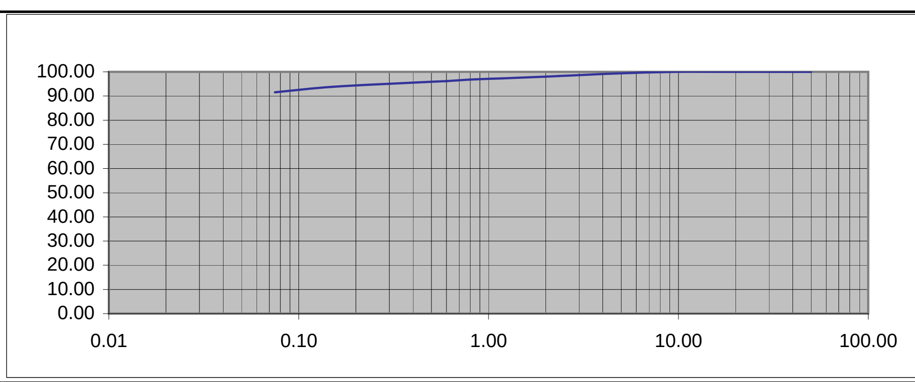
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.67**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	4.70	4.70	0.67	99.33	
2.36 mm	**No. 8**	7.20	11.90	1.70	98.30	
2.00 mm	**No. 10**	2.10	14.00	2.00	98.00	
1.18 mm	**No. 16**	5.10	19.10	2.73	97.27	
850 µm	**No. 20**	2.50	21.60	3.09	96.91	**7.82**
600 µm	**No. 30**	5.40	27.00	3.87	96.13	
425 µm	**No. 40**	3.30	30.30	4.34	95.66	
150 µm	**No. 100**	13.00	43.30	6.20	93.80	
75 µm	**No. 200**	16.00	59.30	8.49	91.51	**91.51**
Pan		639.20	698.50	100.00	0.00	
TOTAL		**698.50**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

	LL	PL	PI
Atteberg Limits	**25.28%**	**19.57%**	**5.71%**

	%Gravel	%Sand	%Silt & Clay
Percentage of Contents	0.67	7.82	91.51

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	22

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 04		Sampling Date	03/08/2010
Weight (gr)	606.3	Depth (m) 5.5	Testing Date	07/08/2010

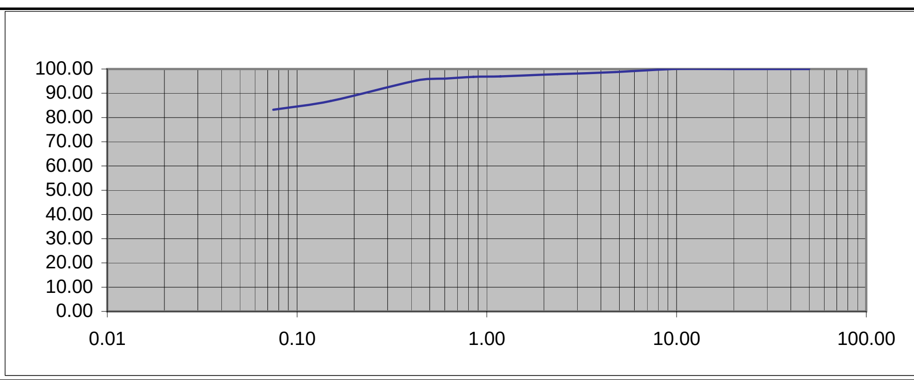
Sieve Size Standard	Sieve Size Alternative	Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.27
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	7.70	7.70	1.27	98.73	
2.36 mm	No. 8	5.30	13.00	2.14	97.86	
2.00 mm	No. 10	1.20	14.20	2.34	97.66	
1.18 mm	No. 16	4.20	18.40	3.03	96.97	
850 µm	No. 20	1.30	19.70	3.25	96.75	15.50
600 µm	No. 30	4.40	24.10	3.97	96.03	
425 µm	No. 40	4.80	28.90	4.77	95.23	
150 µm	No. 100	51.40	80.30	13.24	86.76	
75 µm	No. 200	21.40	101.70	16.77	83.23	83.23
Pan		504.60	606.30	100.00	0.00	
TOTAL		606.30				

SOIL CLASSIFICATION	ML	SILT WITH SAND

Atteberg Limits	LL	PL	PI
	Non Plastic		

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	1.27	15.50	83.23

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	23

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 04			**Sampling Date**	03/08/2010
Weight (gr)	552	**Depth (m)**	8	**Testing Date**	07/08/2010

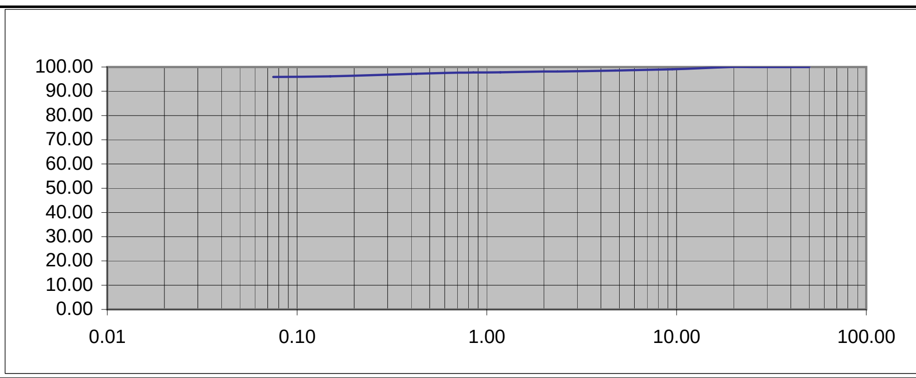
Sieve Size		Mass	Cumulative			Specification
		Retained	Mass	Retained	Passing	Limits
Standard	Alternative	(gr)	Retained (gr)	%	%	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.45
9.5 mm	3/8 in	5.20	5.20	0.94	99.06	
4.75 mm	No. 4	2.80	8.00	1.45	98.55	
2.36 mm	No. 8	2.10	10.10	1.83	98.17	
2.00 mm	No. 10	0.00	10.10	1.83	98.17	
1.18 mm	No. 16	1.90	12.00	2.17	97.83	
850 µm	No. 20	0.50	12.50	2.26	97.74	2.63
600 µm	No. 30	1.10	13.60	2.46	97.54	
425 µm	No. 40	1.70	15.30	2.77	97.23	
150 µm	No. 100	5.80	21.10	3.82	96.18	
75 µm	No. 200	1.40	22.50	4.08	95.92	95.92
Pan		529.50	552.00	100.00	0.00	
TOTAL		**552.00**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	25.97%	**20.59%**	**5.38%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.45	2.63	95.92

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	24

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 04**		**Sampling Date**	03/08/2010
Weight (gr)	525	**Depth (m)** 9.5	**Testing Date**	07/08/2010

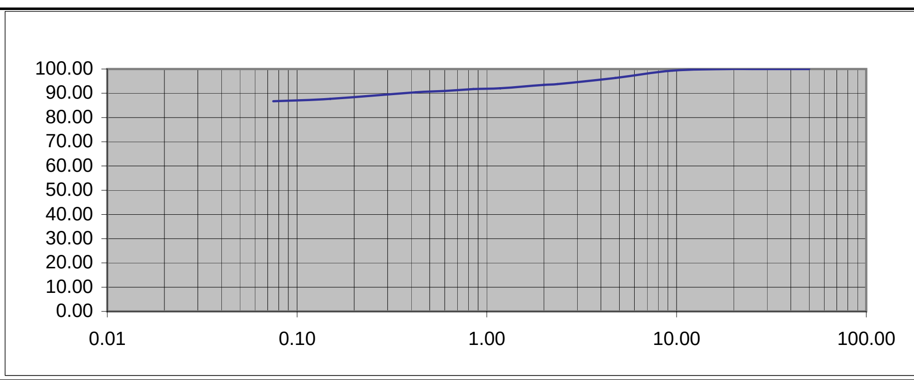
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	Alternative	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	3.68
9.5 mm	3/8 in	3.50	3.50	0.67	99.33	
4.75 mm	No. 4	15.80	19.30	3.68	96.32	
2.36 mm	No. 8	13.20	32.50	6.19	93.81	
2.00 mm	No. 10	1.70	34.20	6.51	93.49	
1.18 mm	No. 16	7.40	41.60	7.92	92.08	
850 µm	No. 20	1.80	43.40	8.27	91.73	9.58
600 µm	No. 30	4.20	47.60	9.07	90.93	
425 µm	No. 40	2.60	50.20	9.56	90.44	
150 µm	No. 100	14.40	64.60	12.30	87.70	
75 µm	No. 200	5.00	69.60	13.26	86.74	86.74
Pan		455.40	525.00	100.00	0.00	
TOTAL		**525.00**				

SOIL CLASSIFICATION	**ML**	**SILT**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	3.68	9.58	86.74

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	25

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 05			Sampling Date	03/08/2010
Weight (gr)	1972.8	Depth (m)	0.75	Testing Date	07/08/2010

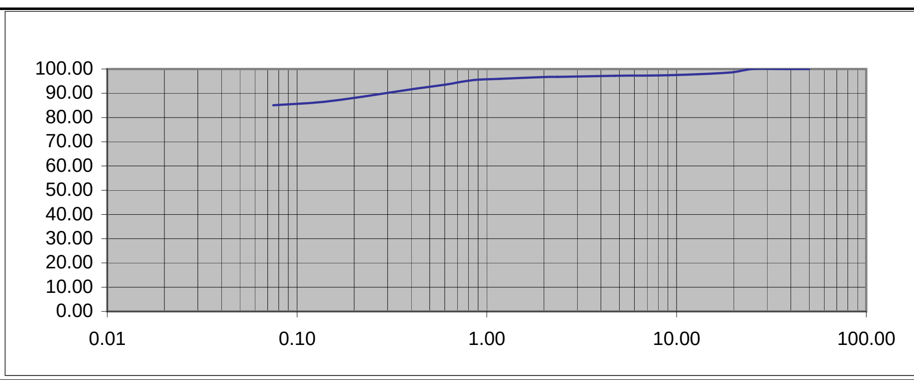
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	Alternative					
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	29.00	29.00	1.47	98.53	2.75
9.5 mm	3/8 in	21.00	50.00	2.53	97.47	
4.75 mm	No. 4	4.20	54.20	2.75	97.25	
2.36 mm	No. 8	9.20	63.40	3.21	96.79	
2.00 mm	No. 10	2.40	65.80	3.34	96.66	
1.18 mm	No. 16	13.80	79.60	4.03	95.97	
850 µm	No. 20	10.60	90.20	4.57	95.43	12.20
600 µm	No. 30	37.80	128.00	6.49	93.51	
425 µm	No. 40	31.40	159.40	8.08	91.92	
150 µm	No. 100	101.60	261.00	13.23	86.77	
75 µm	No. 200	33.80	294.80	14.94	85.06	85.06
Pan		1678.00	1972.80	100.00	0.00	
TOTAL		1972.80				

SOIL CLASSIFICATION	ML	SILT

Atteberg Limits	LL	PL	PI
	Non Plastic		

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	2.75	12.20	85.06

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	26

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

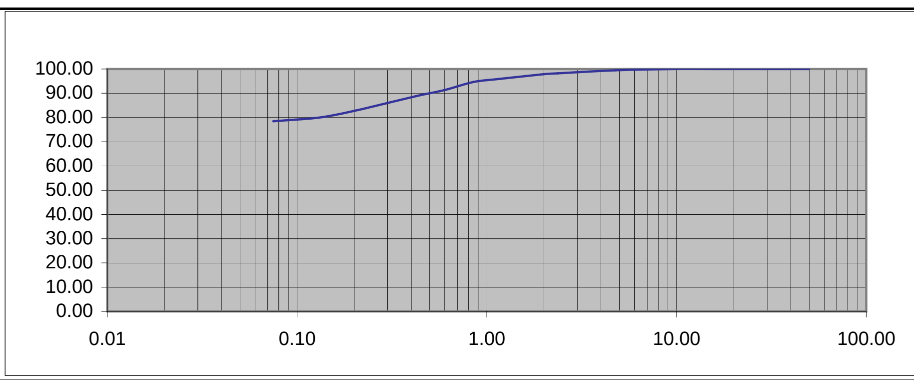
Location	**BH # 05**			**Sampling Date**	03/08/2010
Weight (gr)	769.8	**Depth (m)**	1.3	**Testing Date**	07/08/2010

Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.51**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	3.90	3.90	0.51	99.49	
2.36 mm	**No. 8**	10.00	13.90	1.81	98.19	
2.00 mm	**No. 10**	2.50	16.40	2.13	97.87	
1.18 mm	**No. 16**	14.80	31.20	4.05	95.95	
850 µm	**No. 20**	10.10	41.30	5.37	94.63	**21.07**
600 µm	**No. 30**	25.10	66.40	8.63	91.37	
425 µm	**No. 40**	19.70	86.10	11.18	88.82	
150 µm	**No. 100**	62.50	148.60	19.30	80.70	
75 µm	**No. 200**	17.50	166.10	21.58	78.42	**78.42**
Pan		603.70	769.80	100.00	0.00	
TOTAL		**769.80**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	22.71%	**17.14%**	**5.57%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.51	21.07	78.42

Remarks :



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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	27

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 05**			**Sampling Date**	03/08/2010
Weight (gr)	689.8	**Depth (m)**	2	**Testing Date**	07/08/2010

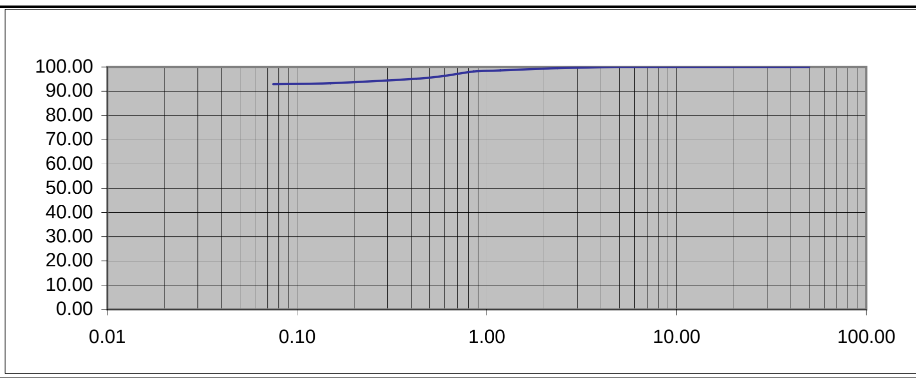
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	**Alternative**	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	**0.00**
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	0.00	0.00	0.00	100.00	
2.36 mm	No. 8	3.40	3.40	0.49	99.51	
2.00 mm	No. 10	1.10	4.50	0.65	99.35	
1.18 mm	No. 16	5.00	9.50	1.38	98.62	
850 µm	No. 20	3.40	12.90	1.87	98.13	**7.06**
600 µm	No. 30	12.20	25.10	3.64	96.36	
425 µm	No. 40	8.30	33.40	4.84	95.16	
150 µm	No. 100	12.70	46.10	6.68	93.32	
75 µm	No. 200	2.60	48.70	7.06	92.94	**92.94**
Pan		641.10	689.80	100.00	0.00	
TOTAL		**689.80**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	25.55%	**20.51%**	**5.04%**

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	0.00	7.06	92.94

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	28

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 05			Sampling Date	03/08/2010
Weight (gr)	400.6	Depth (m)	2.5	Testing Date	07/08/2010

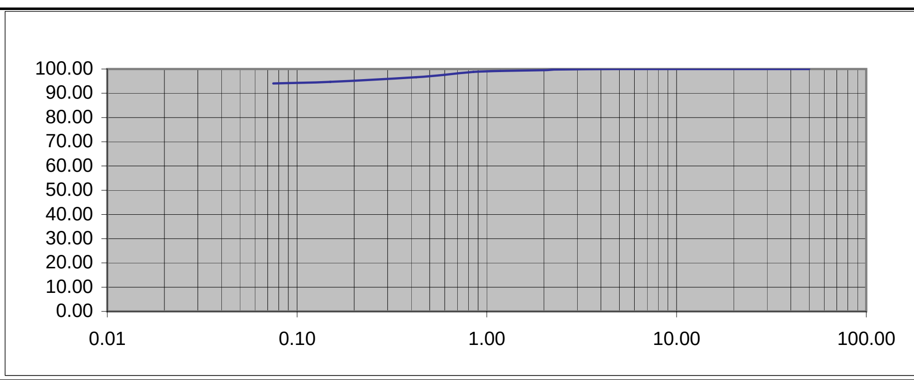
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	Alternative	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	0.00
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	0.00	0.00	0.00	100.00	
2.36 mm	No. 8	0.90	0.90	0.22	99.78	
2.00 mm	No. 10	1.00	1.90	0.47	99.53	
1.18 mm	No. 16	1.40	3.30	0.82	99.18	
850 µm	No. 20	1.50	4.80	1.20	98.80	5.92
600 µm	No. 30	4.60	9.40	2.35	97.65	
425 µm	No. 40	4.00	13.40	3.34	96.66	
150 µm	No. 100	7.90	21.30	5.32	94.68	
75 µm	No. 200	2.40	23.70	5.92	94.08	94.08
Pan		376.90	400.60	100.00	0.00	
TOTAL		400.60				

SOIL CLASSIFICATION	CL-ML	SILTY CLAY

Atteberg Limits	LL	PL	PI
	29.18%	23.53%	5.65%

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	0.00	5.92	94.08

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	29

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

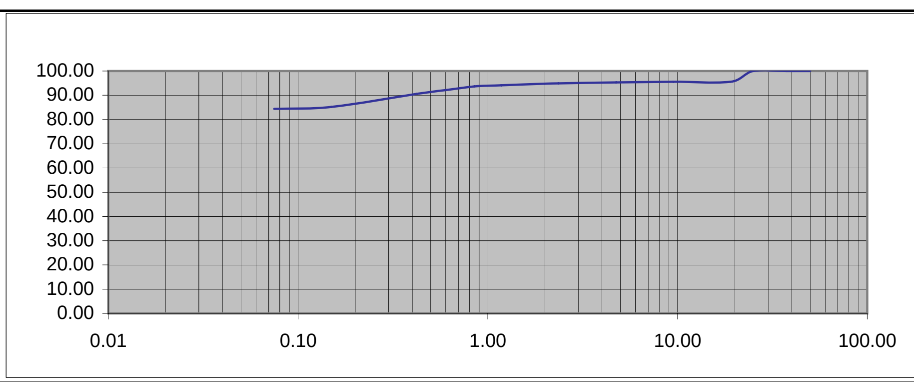
Location	**BH # 05**			**Sampling Date**	03/08/2010
Weight (gr)	1391.2	**Depth (m)**	3.4	**Testing Date**	07/08/2010

Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	62.00	62.00	4.46	95.54	**4.72**
9.5 mm	**3/8 in**	0.00	62.00	4.46	95.54	
4.75 mm	**No. 4**	3.60	65.60	4.72	95.28	
2.36 mm	**No. 8**	5.20	70.80	5.09	94.91	
2.00 mm	**No. 10**	1.80	72.60	5.22	94.78	
1.18 mm	**No. 16**	9.20	81.80	5.88	94.12	
850 µm	**No. 20**	6.40	88.20	6.34	93.66	**10.88**
600 µm	**No. 30**	21.20	109.40	7.86	92.14	
425 µm	**No. 40**	21.60	131.00	9.42	90.58	
150 µm	**No. 100**	74.60	205.60	14.78	85.22	
75 µm	**No. 200**	11.40	217.00	15.60	84.40	**84.40**
Pan		28.40	1391.20	100.00	0.00	
TOTAL		**1391.20**				

SOIL CLASSIFICATION	**CL**	**LEAN CLAY WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	25.48%	**17.91%**	**7.57%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	4.72	10.88	84.40

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	Sampled By	OGC
Contractor	**TETRA TECH Inc.**	Location	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	Sample No.	30

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 05		Sampling Date	03/08/2010
Weight (gr)	883.8	Depth (m) 4.2	Testing Date	07/08/2010

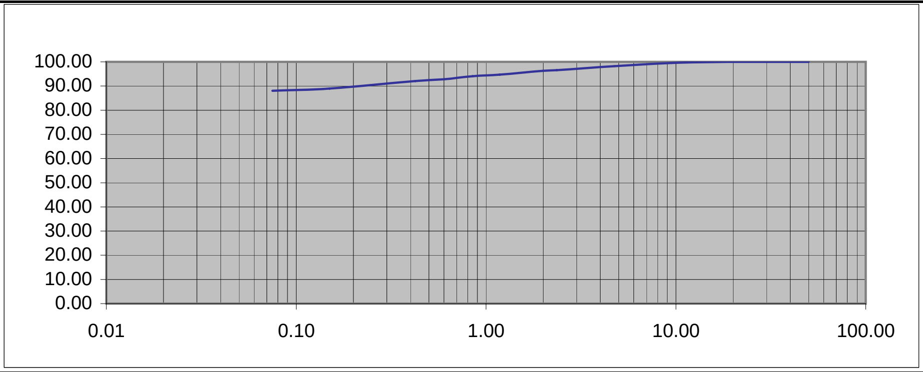
Sieve Size Standard	Sieve Size Alternative	Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.79
9.5 mm	3/8 in	3.80	3.80	0.43	99.57	
4.75 mm	No. 4	12.00	15.80	1.79	98.21	
2.36 mm	No. 8	14.40	30.20	3.42	96.58	
2.00 mm	No. 10	2.80	33.00	3.73	96.27	
1.18 mm	No. 16	13.70	46.70	5.28	94.72	
850 µm	No. 20	5.80	52.50	5.94	94.06	10.21
600 µm	No. 30	11.20	63.70	7.21	92.79	
425 µm	No. 40	6.30	70.00	7.92	92.08	
150 µm	No. 100	27.30	97.30	11.01	88.99	
75 µm	No. 200	8.70	106.00	11.99	88.01	88.01
Pan		28.40	883.80	100.00	0.00	
TOTAL		**883.80**				

SOIL CLASSIFICATION	ML	SILT

Atteberg Limits	LL	PL	PI
	Non Plastic		

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	1.79	10.21	88.01

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	31

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

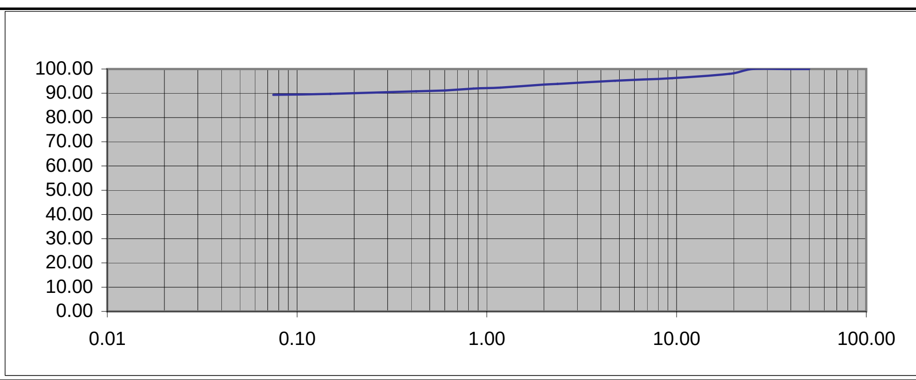
Location	**BH # 05**			**Sampling Date**	03/08/2010
Weight (gr)	1560.2	**Depth (m)**	5	**Testing Date**	07/08/2010

Sieve Size		Mass	Cumulative			Specification
		Retained	Mass	Retained	Passing	Limits
Standard	Alternative	(gr)	Retained (gr)	%	%	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	31.20	31.20	2.00	98.00	4.82
9.5 mm	3/8 in	28.00	59.20	3.79	96.21	
4.75 mm	No. 4	16.00	75.20	4.82	95.18	
2.36 mm	No. 8	20.80	96.00	6.15	93.85	
2.00 mm	No. 10	4.00	100.00	6.41	93.59	
1.18 mm	No. 16	19.20	119.20	7.64	92.36	
850 µm	No. 20	6.80	126.00	8.08	91.92	5.81
600 µm	No. 30	12.20	138.20	8.86	91.14	
425 µm	No. 40	5.60	143.80	9.22	90.78	
150 µm	No. 100	16.20	160.00	10.26	89.74	
75 µm	No. 200	5.80	165.80	10.63	89.37	89.37
Pan		28.40	1560.20	100.00	0.00	
TOTAL		**1560.20**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	25.51%	**19.15%**	**6.36%**
Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	4.82	5.81	89.37

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	32

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 05			Sampling Date	03/08/2010
Weight (gr)	824.3	Depth (m)	5.7	Testing Date	07/08/2010

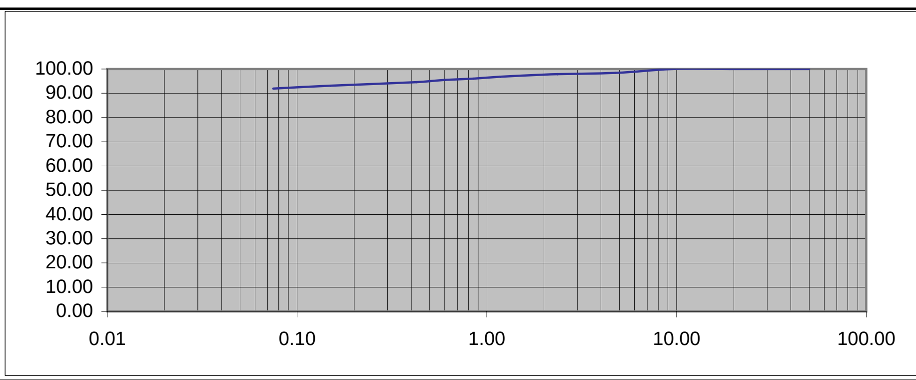
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	Alternative					
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.61
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	13.30	13.30	1.61	98.39	
2.36 mm	No. 8	4.40	17.70	2.15	97.85	
2.00 mm	No. 10	1.20	18.90	2.29	97.71	
1.18 mm	No. 16	7.20	26.10	3.17	96.83	
850 µm	No. 20	6.70	32.80	3.98	96.02	6.42
600 µm	No. 30	4.00	36.80	4.46	95.54	
425 µm	No. 40	8.10	44.90	5.45	94.55	
150 µm	No. 100	12.00	56.90	6.90	93.10	
75 µm	No. 200	9.30	66.20	8.03	91.97	91.97
Pan		28.40	824.30	100.00	0.00	
TOTAL		824.30				

SOIL CLASSIFICATION	ML	SILT

Atteberg Limits	LL	PL	PI
	Non Plastic		

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	1.61	6.42	91.97

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	33

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 05**			**Sampling Date**	03/08/2010
Weight (gr)	636.5	**Depth (m)**	6.5	**Testing Date**	07/08/2010

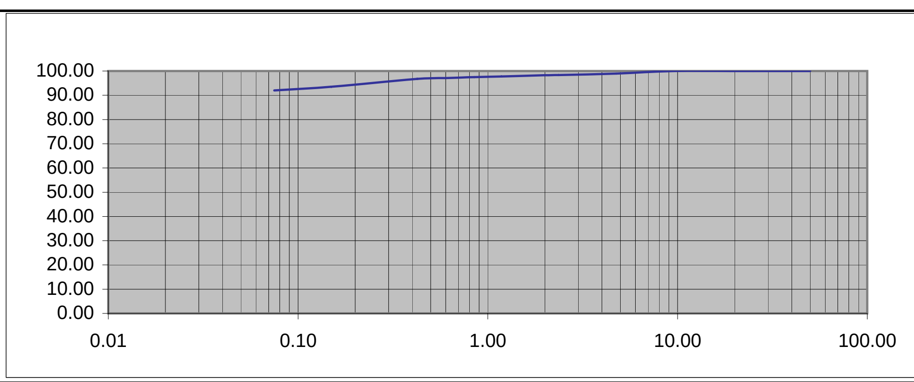
Sieve Size		Mass	Cumulative			Specification
		Retained	Mass	Retained	Passing	Limits
Standard	Alternative	(gr)	Retained (gr)	%	%	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	0.00	0.00	0.00	100.00	1.04
9.5 mm	3/8 in	0.00	0.00	0.00	100.00	
4.75 mm	No. 4	6.60	6.60	1.04	98.96	
2.36 mm	No. 8	3.80	10.40	1.63	98.37	
2.00 mm	No. 10	0.60	11.00	1.73	98.27	
1.18 mm	No. 16	3.40	14.40	2.26	97.74	
850 µm	No. 20	1.50	15.90	2.50	97.50	6.99
600 µm	No. 30	2.70	18.60	2.92	97.08	
425 µm	No. 40	2.20	20.80	3.27	96.73	
150 µm	No. 100	20.30	41.10	6.46	93.54	
75 µm	No. 200	10.00	51.10	8.03	91.97	91.97
Pan		28.40	636.50	100.00	0.00	
TOTAL		**636.50**				

SOIL CLASSIFICATION	**CL-ML**	**SILTY CLAY**

Atteberg Limits	**LL**	**PL**	**PI**
	24.74%	**19.72%**	**5.02%**

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.04	6.99	91.97

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	34

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	BH # 05			Sampling Date	03/08/2010
Weight (gr)	1270.4	Depth (m)	7.2	Testing Date	07/08/2010

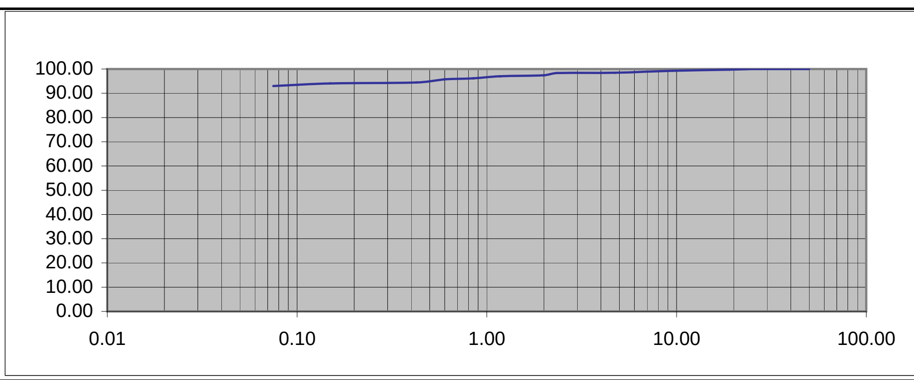
Sieve Size		Mass Retained	Cumulative			Specification Limits
Standard	Alternative	(gr)	Mass Retained (gr)	Retained %	Passing %	%
50.0mm	2 in	0.00	0.00	0.00	100.00	
37.5 mm	1.5 in	0.00	0.00	0.00	100.00	
25.0 mm	1 in	0.00	0.00	0.00	100.00	
19.0 mm	3/4 in	3.00	3.00	0.24	99.76	1.50
9.5 mm	3/8 in	6.60	9.60	0.76	99.24	
4.75 mm	No. 4	9.40	19.00	1.50	98.50	
2.36 mm	No. 8	2.00	21.00	1.65	98.35	
2.00 mm	No. 10	11.60	32.60	2.57	97.43	
1.18 mm	No. 16	5.20	37.80	2.98	97.02	
850 µm	No. 20	10.60	48.40	3.81	96.19	5.48
600 µm	No. 30	5.00	53.40	4.20	95.80	
425 µm	No. 40	17.20	70.60	5.56	94.44	
150 µm	No. 100	4.80	75.40	5.94	94.06	
75 µm	No. 200	13.20	88.60	6.97	93.03	93.03
Pan		28.40	1270.40	100.00	0.00	
TOTAL		1270.40				

SOIL CLASSIFICATION	CL-ML	SILTY CLAY

Atteberg Limits	LL	PL	PI
	27.34%	20.83%	6.51%

Percentage of Contents	%Gravel	%Sand	%Silt & Clay
	1.50	5.48	93.03

Remarks :



Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	35

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 05**		**Sampling Date**	03/08/2010
Weight (gr)	697.2	**Depth (m)** 8.2	**Testing Date**	07/08/2010

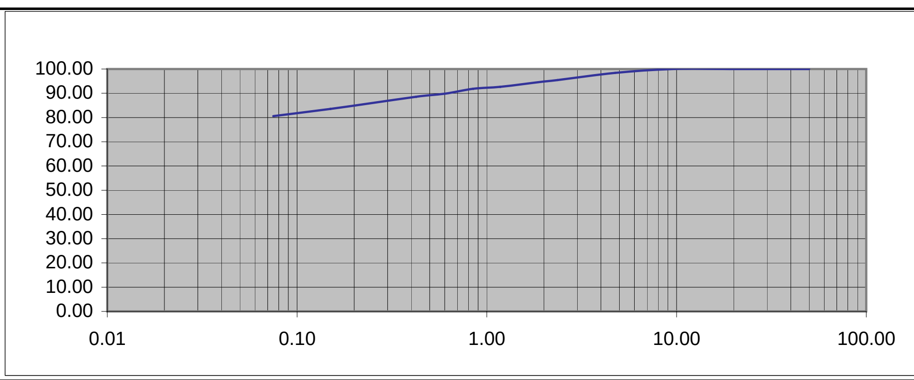
Sieve Size		Mass Retained (gr)	Cumulative Mass Retained (gr)	Cumulative Retained %	Cumulative Passing %	Specification Limits %
Standard	**Alternative**					
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**1.61**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	11.20	11.20	1.61	98.39	
2.36 mm	**No. 8**	20.50	31.70	4.55	95.45	
2.00 mm	**No. 10**	4.30	36.00	5.16	94.84	
1.18 mm	**No. 16**	15.20	51.20	7.34	92.66	
850 µm	**No. 20**	5.70	56.90	8.16	91.84	**17.84**
600 µm	**No. 30**	14.10	71.00	10.18	89.82	
425 µm	**No. 40**	8.60	79.60	11.42	88.58	
150 µm	**No. 100**	35.20	114.80	16.47	83.53	
75 µm	**No. 200**	20.80	135.60	19.45	80.55	**80.55**
Pan		28.40	697.20	100.00	0.00	
TOTAL		**697.20**				

SOIL CLASSIFICATION	**ML**	**SILT WITH SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	1.61	17.84	80.55

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**	**Sampled By**	OGC
Contractor	**TETRA TECH Inc.**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	36

SIEVE ANALYSIS, ATTERBERG LIMITS, SOIL CLASSIFICATION

ASTM D 422, ASTM D-4318, ASTM D-2487

Location	**BH # 05**			**Sampling Date**	03/08/2010
Weight (gr)	768.3	**Depth (m)**	9.3	**Testing Date**	07/08/2010

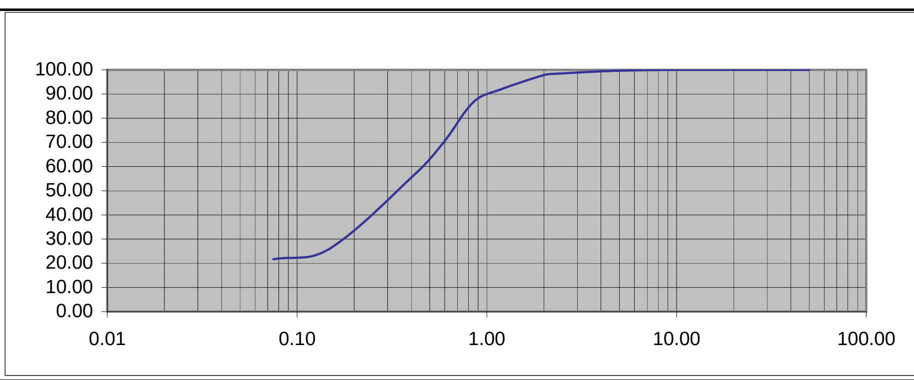
Sieve Size		Mass Retained	Cumulative			Specification Limits
			Mass	Retained	Passing	
Standard	**Alternative**	(gr)	Retained (gr)	%	%	**%**
50.0mm	**2 in**	0.00	0.00	0.00	100.00	
37.5 mm	**1.5 in**	0.00	0.00	0.00	100.00	
25.0 mm	**1 in**	0.00	0.00	0.00	100.00	
19.0 mm	**3/4 in**	0.00	0.00	0.00	100.00	**0.36**
9.5 mm	**3/8 in**	0.00	0.00	0.00	100.00	
4.75 mm	**No. 4**	2.80	2.80	0.36	99.64	
2.36 mm	**No. 8**	9.50	12.30	1.60	98.40	
2.00 mm	**No. 10**	4.30	16.60	2.16	97.84	
1.18 mm	**No. 16**	45.70	62.30	8.11	91.89	
850 µm	**No. 20**	40.20	102.50	13.34	86.66	**77.95**
600 µm	**No. 30**	123.60	226.10	29.43	70.57	
425 µm	**No. 40**	101.60	327.70	42.65	57.35	
150 µm	**No. 100**	239.60	567.30	73.84	26.16	
75 µm	**No. 200**	34.40	601.70	78.32	21.68	**21.68**
Pan		28.40	768.30	100.00	0.00	
TOTAL		**768.30**				

SOIL CLASSIFICATION	**SM**	**SILTY SAND**

Atteberg Limits	**LL**	**PL**	**PI**
	Non Plastic		

Percentage of Contents	**%Gravel**	**%Sand**	**%Silt & Clay**
	0.36	77.95	21.68

Remarks :



Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Lab Test Result of Boreholes

Atterberg Limit Test Results

Professional Geotechnical Services

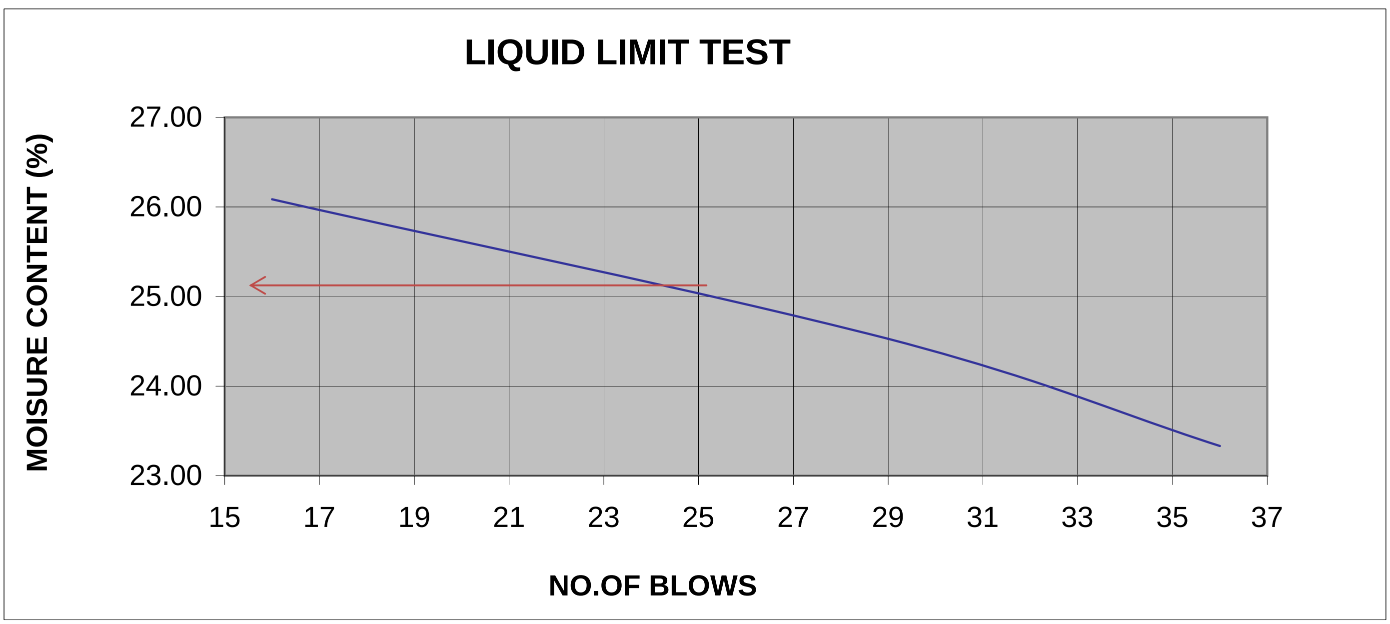
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	5.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	1
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	BH # 01	Depth: m	1.5

Description	Liquid Limit			Plastic Limit
No of Blows	16	29	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	19.3	20	20.2	18.8
Wt of Dry soil + Container W2 (g)	18.1	18.7	18.8	17.9
Wt of container W3 (g)	13.5	13.4	12.8	13.5
Wt. of water (a) W1 - W2 (g)	1.2	1.3	1.4	0.9
Wt. of Dry soil (b) W2 - W3 (g)	4.6	5.3	6	4.4
Moisture Content (w)= a/b x 100 (%)	26.09	24.53	23.33	20.45



LL= 25.14% **PL=** 20.45% **PI=** 4.69%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

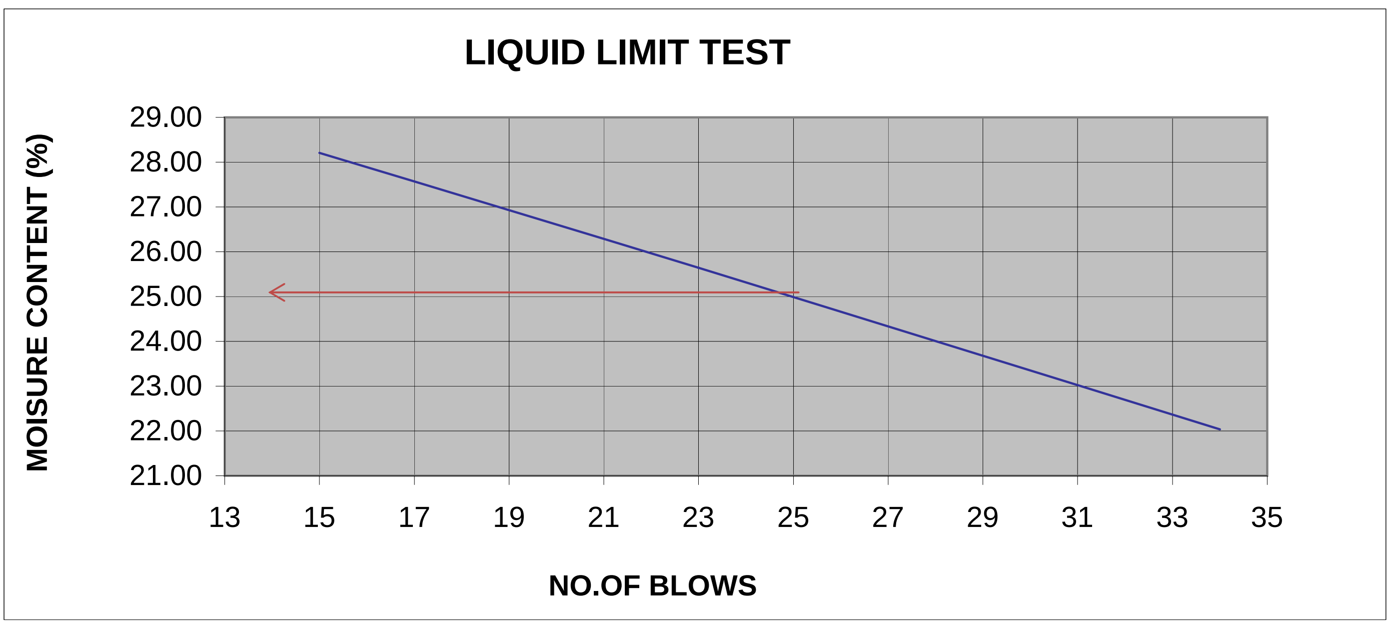
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	5.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	2
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	BH # 01	Depth: m	5

Description	Liquid Limit			Plastic Limit
No of Blows	15	23	34	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	29.1	28.6	29.9	24.7
Wt of Dry soil + Container W2 (g)	28	27.6	28.6	24.4
Wt of container W3 (g)	24.1	23.7	22.7	22.8
Wt. of water (a) W1 - W2 (g)	1.1	1.0	1.3	0.3
Wt. of Dry soil (b) W2 - W3 (g)	3.9	3.9	5.9	1.6
Moisture Content (w)= a/b x 100 (%)	28.21	25.64	22.03	18.75



LL= 24.99% **PL=** 18.75% **PI=** 6.24%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

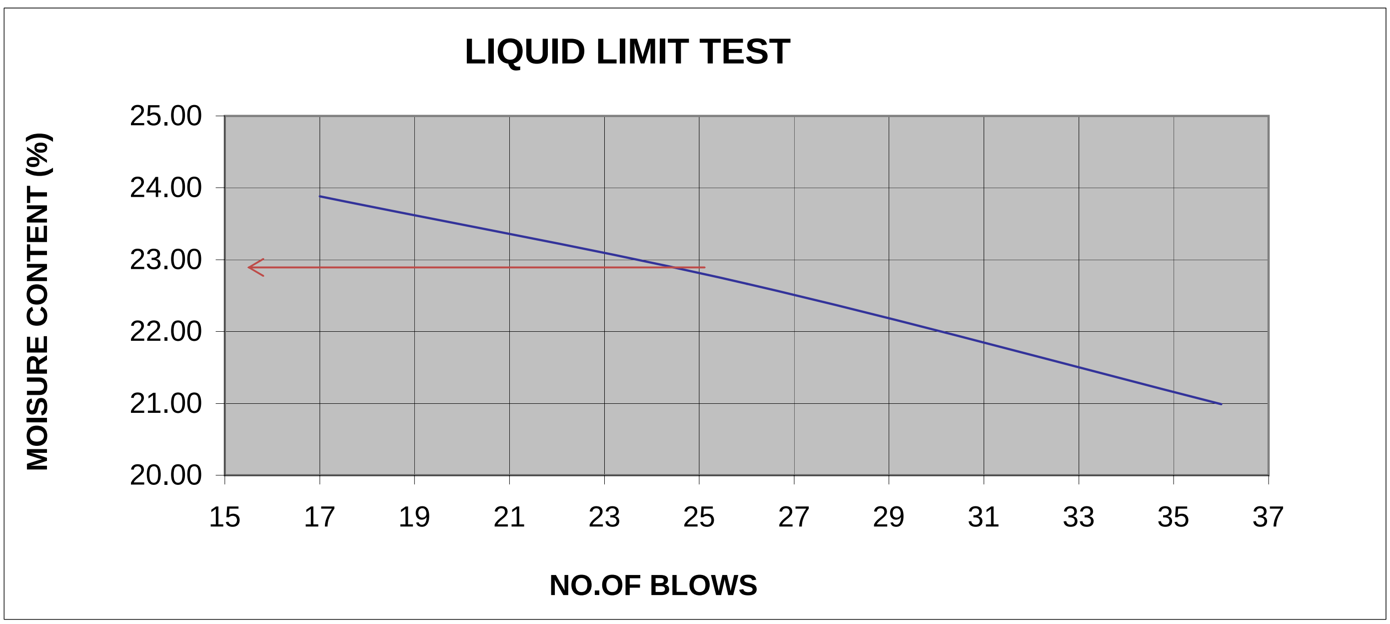
MATERIAL TESTING LAB

Omran Geotechnical Company

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	5.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	3
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	BH # 01	Depth: m	6.7

Description	Liquid Limit			Plastic Limit
No of Blows	17	26	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	31.3	32.8	32.6	29.3
Wt of Dry soil + Container W2 (g)	29.7	31.1	30.9	28.5
Wt of container W3 (g)	23	23.6	22.8	23.6
Wt. of water (a) W1 - W2 (g)	1.6	1.7	1.7	0.8
Wt. of Dry soil (b) W2 - W3 (g)	6.7	7.5	8.1	4.9
Moisture Content (w)= a/b x 100 (%)	23.88	22.67	20.99	16.33



LL= 22.83% **PL=** 16.33% **PI=** 6.50%

Remarks:		
Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

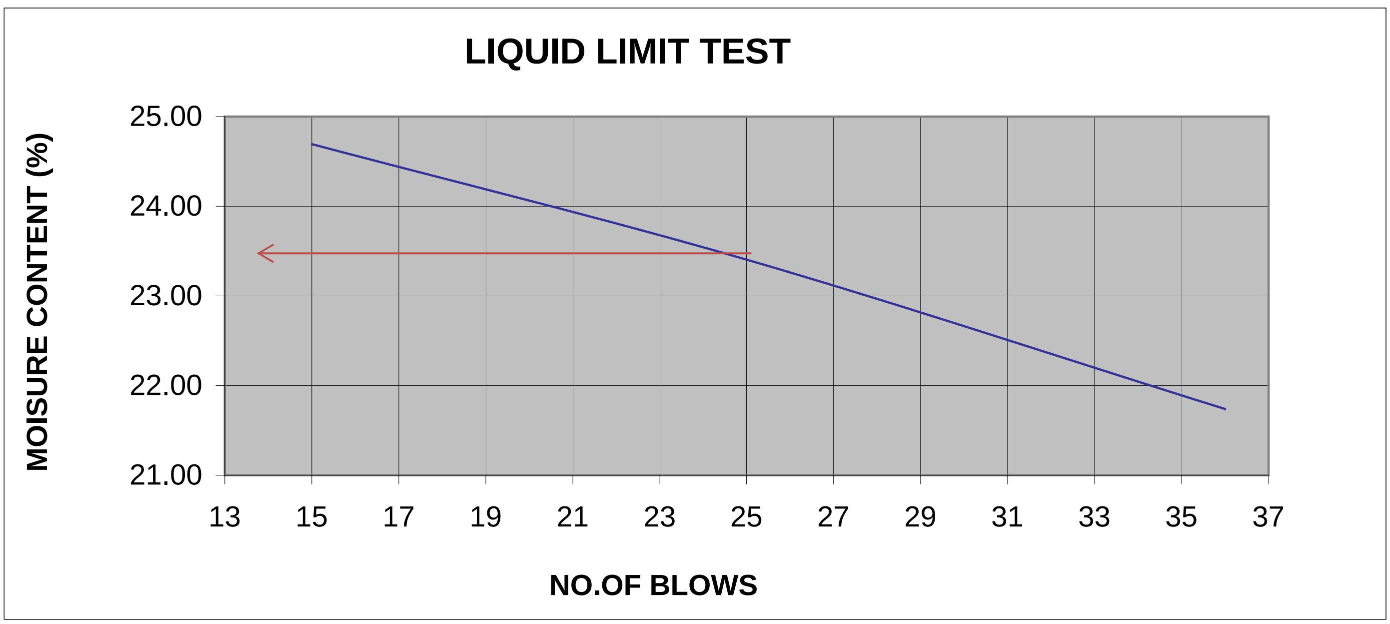
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	4.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	4
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	BH # 02	Depth: m	1.5

Description	Liquid Limit			Plastic Limit
No of Blows	15	25	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	34.4	28.9	32.4	28.7
Wt of Dry soil + Container W2 (g)	32.4	27.8	30.9	27.9
Wt of container W3 (g)	24.3	23.1	24	23.4
Wt. of water (a) W1 - W2 (g)	2	1.1	1.5	0.8
Wt. of Dry soil (b) W2 - W3 (g)	8.1	4.7	6.9	4.5
Moisture Content (w)= a/b x 100 (%)	24.69	23.40	21.74	17.78



LL= 23.38% **PL=** 17.78% **PI=** 5.60%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

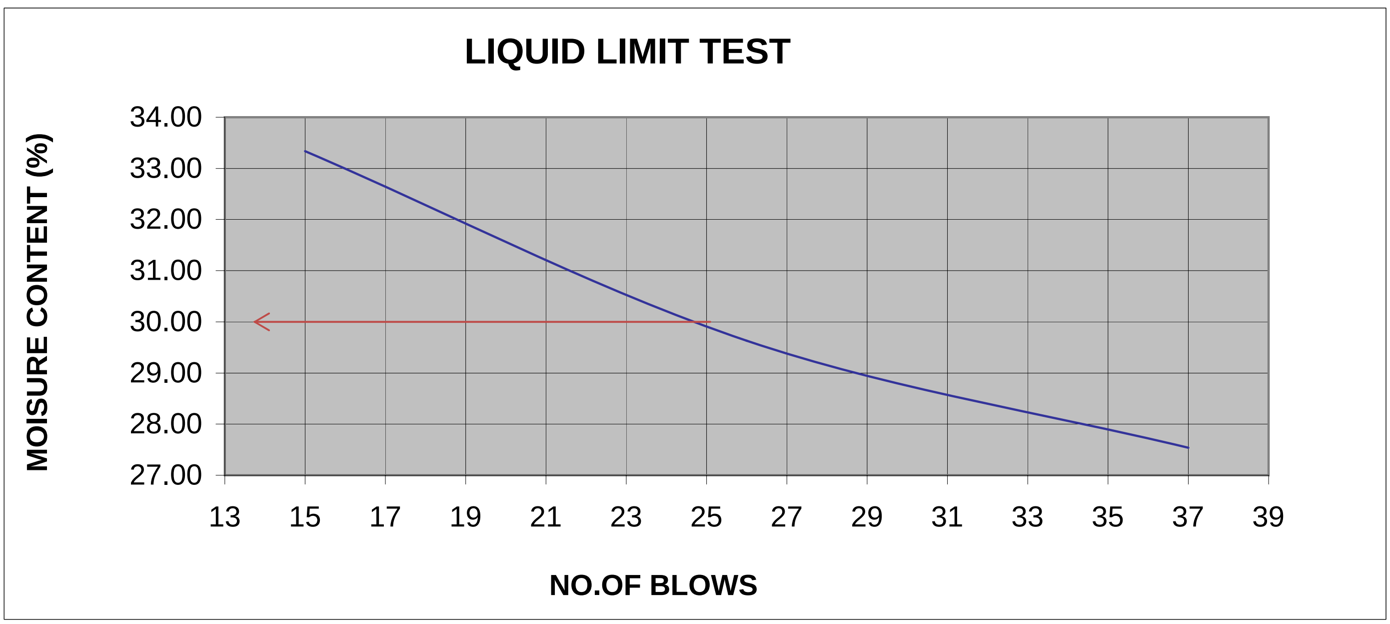
Omran Geotechnical Company

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	4.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	5
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	BH # 03	Depth: m	3.5

Description	Liquid Limit			Plastic Limit
No of Blows	15	26	37	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	28.9	29.3	30.4	27.9
Wt of Dry soil + Container W2 (g)	27.2	27.7	28.5	26.7
Wt of container W3 (g)	22.1	22.3	21.6	21.9
Wt. of water (a) W1 - W2 (g)	1.7	1.6	1.9	1.2
Wt. of Dry soil (b) W2 - W3 (g)	5.1	5.4	6.9	4.8
Moisture Content (w)= a/b x 100 (%)	33.33	29.63	27.54	25.00



LL= 29.93% **PL=** 25.00% **PI=** 4.93%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

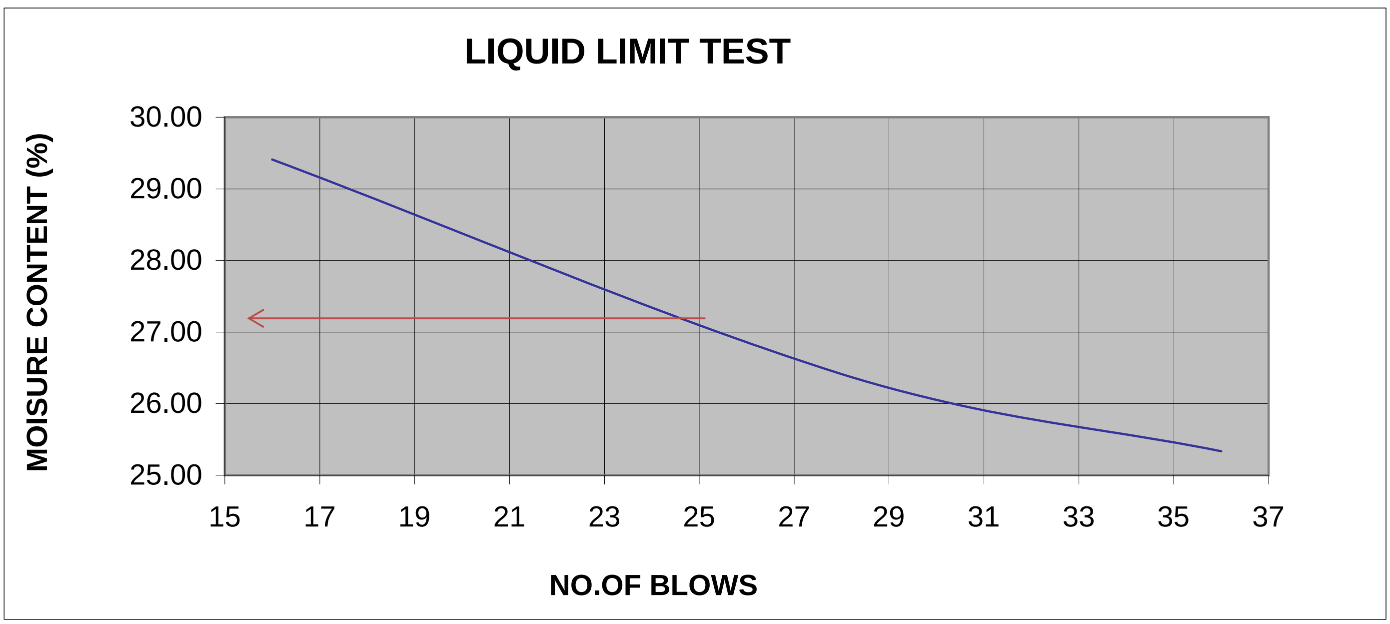
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	6
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 04	Depth: m	1.4

Description	Liquid Limit			Plastic Limit
No of Blows	16	28	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	19.8	20.1	22	18.8
Wt of Dry soil + Container W2 (g)	18.3	18.7	20.1	17.8
Wt of container W3 (g)	13.2	13.4	12.6	13.3
Wt. of water (a) W1 - W2 (g)	1.5	1.4	1.9	1
Wt. of Dry soil (b) W2 - W3 (g)	5.1	5.3	7.5	4.5
Moisture Content (w)= a/b x 100 (%)	29.41	26.42	25.33	22.22



LL= 27.19% **PL=** 22.22% **PI=** 4.97%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

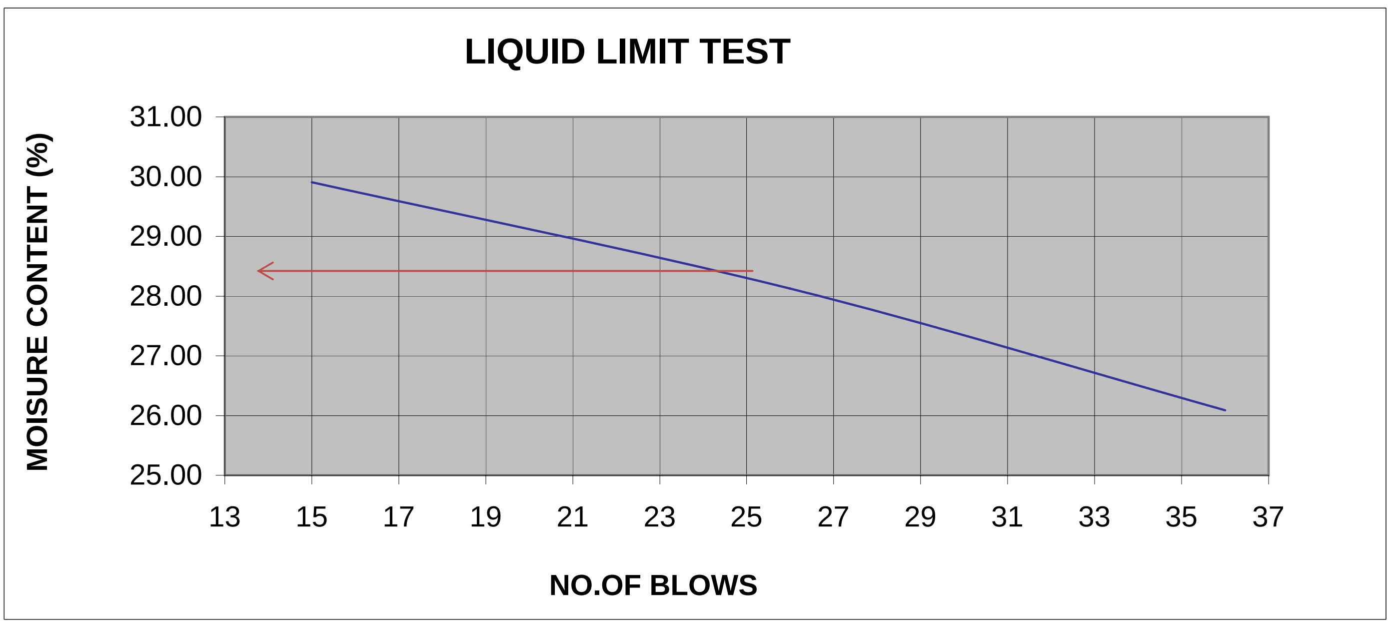
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	7
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 04	Depth: m	2

Description	Liquid Limit			Plastic Limit
No of Blows	15	26	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	21.1	18.3	18.3	11.2
Wt of Dry soil + Container W2 (g)	17.9	15.6	15.9	10.4
Wt of container W3 (g)	7.2	6	6.7	6.7
Wt. of water (a) W1 - W2 (g)	3.2	2.7	2.4	0.8
Wt. of Dry soil (b) W2 - W3 (g)	10.7	9.6	9.2	3.7
Moisture Content (w)= a/b x 100 (%)	29.91	28.13	26.09	21.62



LL= 28.38% **PL=** 21.62% **PI=** 6.76%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

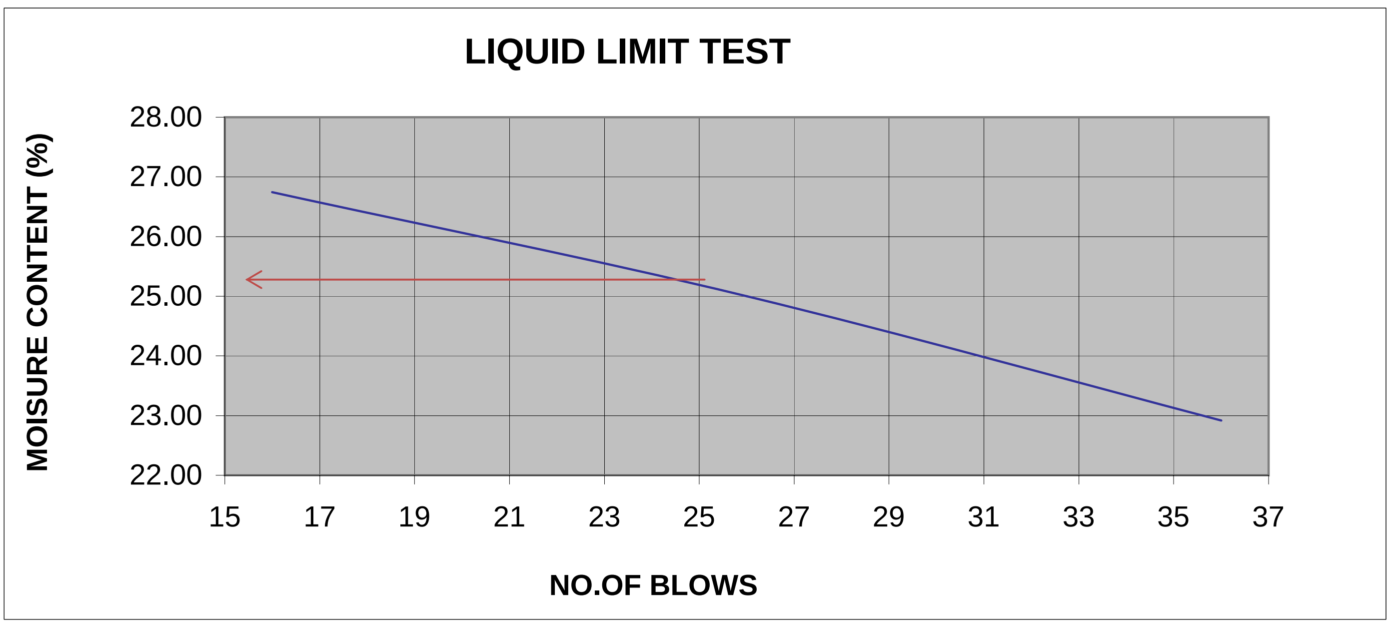
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	8
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 04	Depth: m	2.7

Description	Liquid Limit			Plastic Limit
No of Blows	16	26	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	33.1	30.5	29.9	28.1
Wt of Dry soil + Container W2 (g)	30.8	28.9	28.8	27.4
Wt of container W3 (g)	22.2	22.5	24	23.9
Wt. of water (a) W1 - W2 (g)	2.3	1.6	1.1	0.7
Wt. of Dry soil (b) W2 - W3 (g)	8.6	6.4	4.8	3.5
Moisture Content (w)= a/b x 100 (%)	26.74	25.00	22.92	20.00



LL= 25.21% **PL=** 20.00% **PI=** 5.21%

Remarks:

Tested by:	Hayat		
Checked by:	Jafari	E-mail:	
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com	

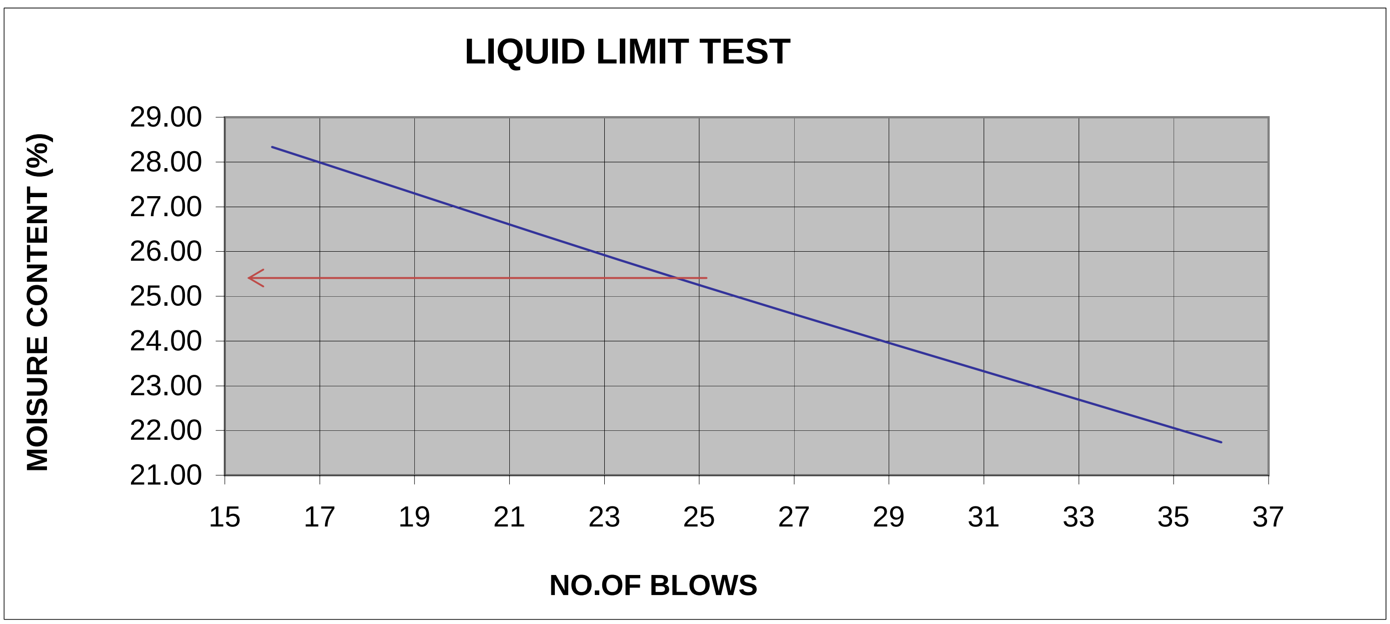
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	9
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 04	Depth: m	3.5

Description	Liquid Limit			Plastic Limit
No of Blows	16	25	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	21.7	26.8	22.4	17.2
Wt of Dry soil + Container W2 (g)	20	24.3	20.9	16.3
Wt of container W3 (g)	14	14.4	14	11.7
Wt. of water (a) W1 - W2 (g)	1.7	2.5	1.5	0.9
Wt. of Dry soil (b) W2 - W3 (g)	6	9.9	6.9	4.6
Moisture Content (w)= a/b x 100 (%)	28.33	25.25	21.74	19.57



LL= 25.28% **PL=** 19.57% **PI=** 5.71%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

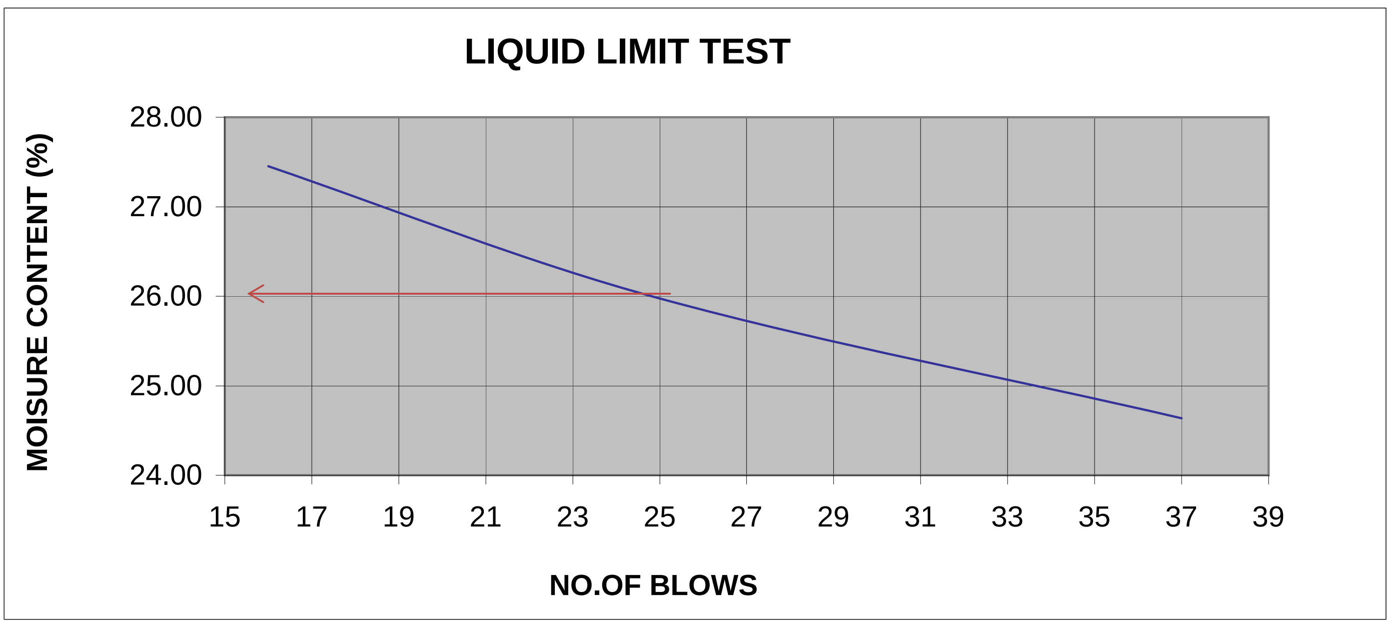
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	4.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	10
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	08.08.2010
Location:	BH # 04	Depth: m	8

Description	Liquid Limit			Plastic Limit
No of Blows	16	25	37	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	27	24	22.6	15.9
Wt of Dry soil + Container W2 (g)	24.2	22.0	20.9	15.2
Wt of container W3 (g)	14	14.3	14	11.8
Wt. of water (a) W1 - W2 (g)	2.8	2.0	1.7	0.7
Wt. of Dry soil (b) W2 - W3 (g)	10.2	7.7	6.9	3.4
Moisture Content (w)= a/b x 100 (%)	27.45	25.97	24.64	20.59



LL= 25.97% **PL=** 20.59% **PI=** 5.38%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

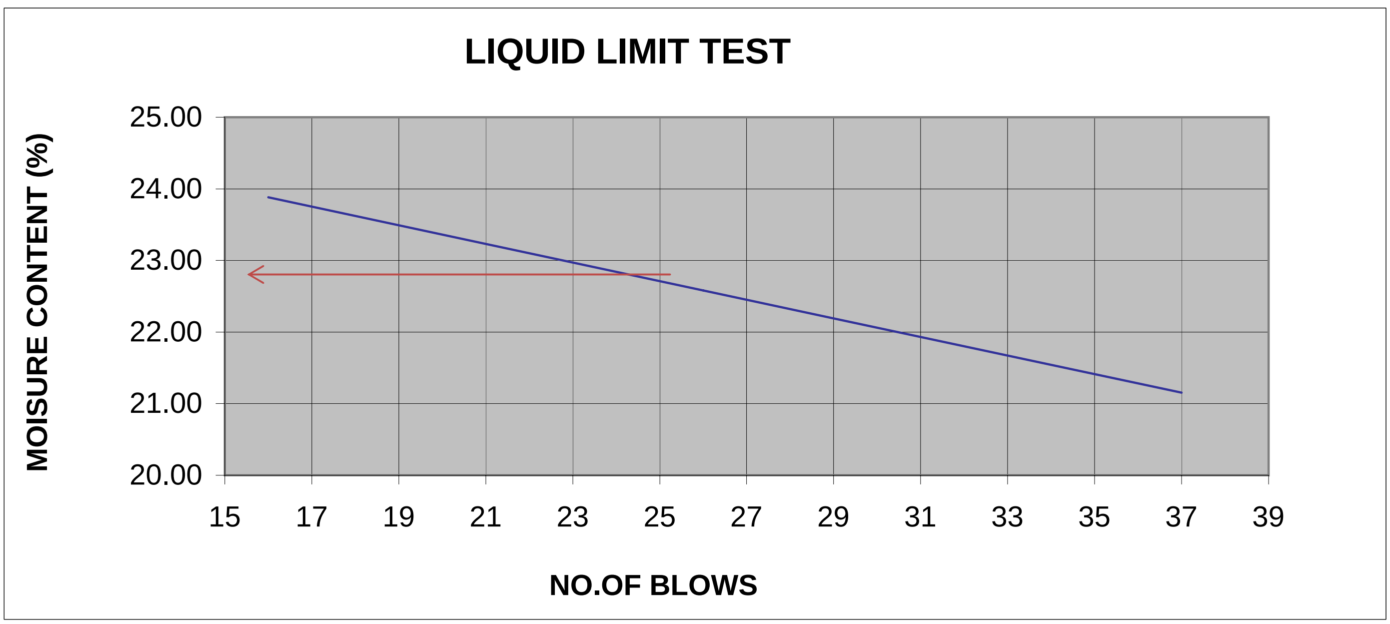
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	11
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	1.3

Description	Liquid Limit			Plastic Limit
No of Blows	16	26	37	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	30.4	30	34.4	29.9
Wt of Dry soil + Container W2 (g)	28.8	28.6	32.2	28.7
Wt of container W3 (g)	22.1	22.4	21.8	21.7
Wt. of water (a) W1 - W2 (g)	1.6	1.4	2.2	1.2
Wt. of Dry soil (b) W2 - W3 (g)	6.7	6.2	10.4	7
Moisture Content (w)= a/b x 100 (%)	23.88	22.58	21.15	17.14



LL= 22.71% **PL=** 17.14% **PI=** 5.57%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

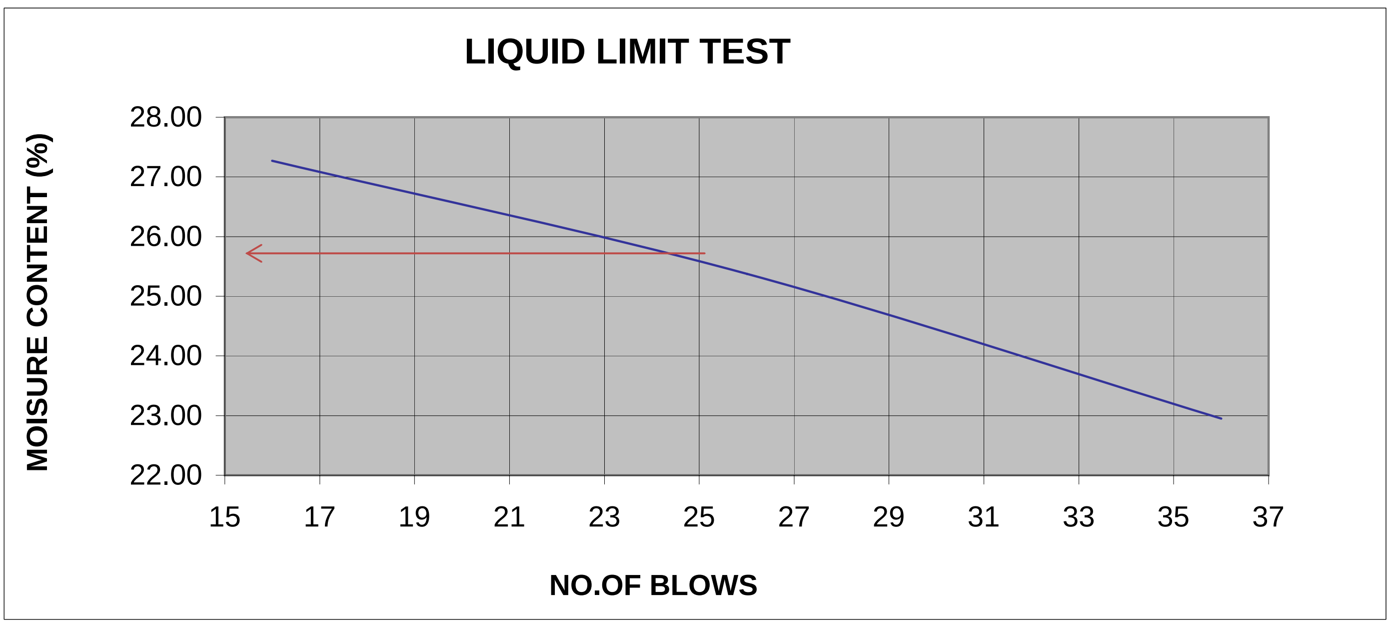
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	12
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	2

Description	Liquid Limit			Plastic Limit
No of Blows	16	26	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	32.8	31.4	30.9	28.3
Wt of Dry soil + Container W2 (g)	30.7	29.7	29.5	27.5
Wt of container W3 (g)	23	23	23.4	23.6
Wt. of water (a) W1 - W2 (g)	2.1	1.7	1.4	0.8
Wt. of Dry soil (b) W2 - W3 (g)	7.7	6.7	6.1	3.9
Moisture Content (w)= a/b x 100 (%)	27.27	25.37	22.95	20.51



LL= 25.55% **PL=** 20.51% **PI=** 5.04%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

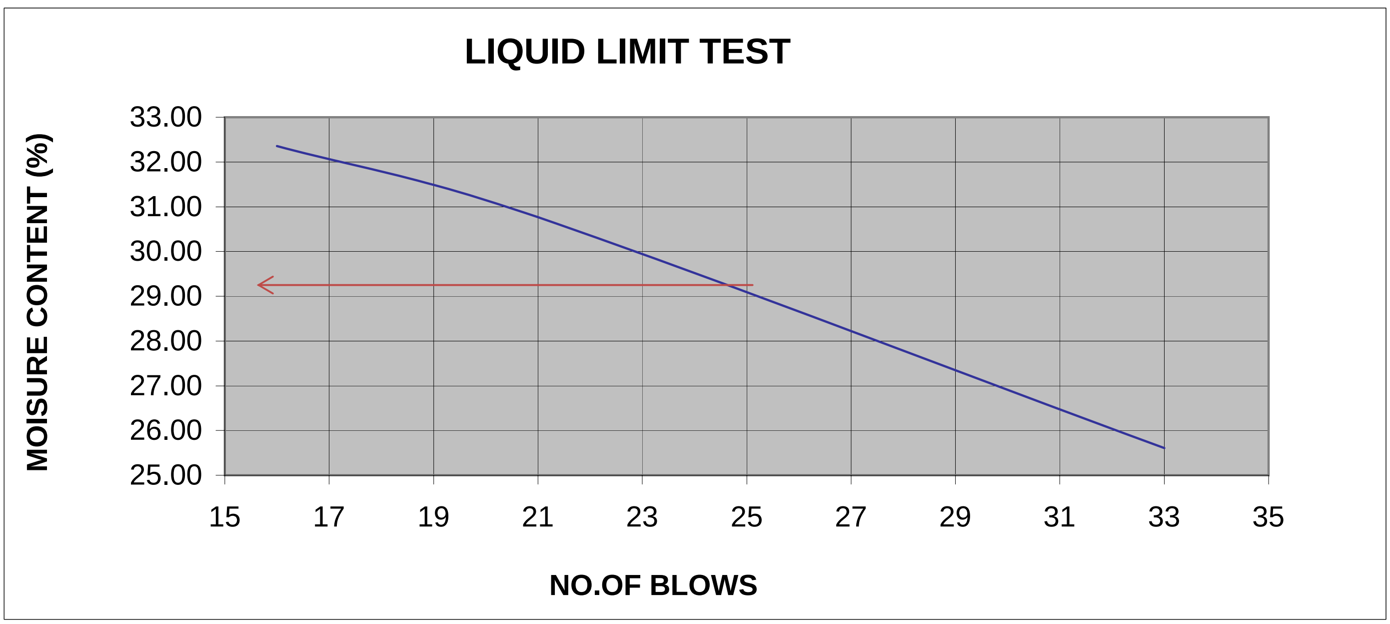
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	13
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	2.5

Description	Liquid Limit			Plastic Limit
No of Blows	16	21	33	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	16.7	12.8	16.2	7
Wt of Dry soil + Container W2 (g)	14.5	11.2	14.1	6.6
Wt of container W3 (g)	7.7	6	5.9	4.9
Wt. of water (a) W1 - W2 (g)	2.2	1.6	2.1	0.4
Wt. of Dry soil (b) W2 - W3 (g)	6.8	5.2	8.2	1.7
Moisture Content (w)= a/b x 100 (%)	32.35	30.77	25.61	23.53



LL= 29.18% **PL=** 23.53% **PI=** 5.65%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

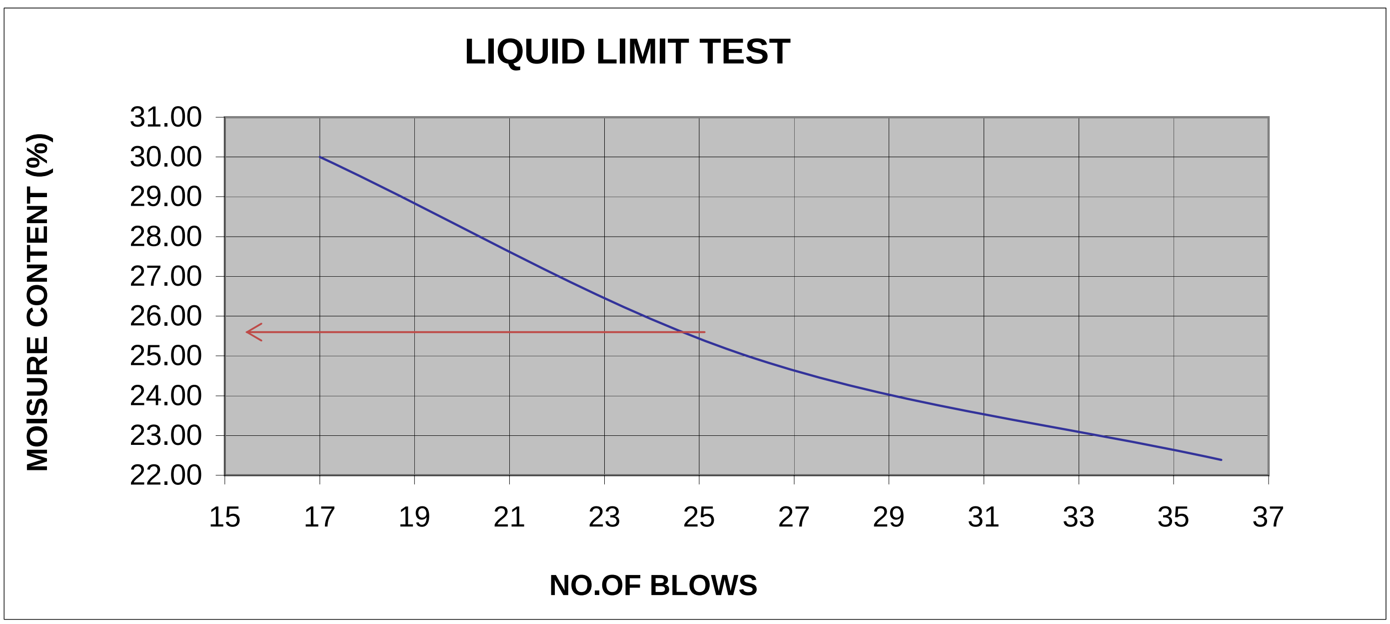
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	14
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	3.4

Description	Liquid Limit			Plastic Limit
No of Blows	17	26	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	35.2	32.2	31.3	31.4
Wt of Dry soil + Container W2 (g)	32.5	30.6	29.8	30.2
Wt of container W3 (g)	23.5	24.2	23.1	23.5
Wt. of water (a) W1 - W2 (g)	2.7	1.6	1.5	1.2
Wt. of Dry soil (b) W2 - W3 (g)	9	6.4	6.7	6.7
Moisture Content (w)= a/b x 100 (%)	30.00	25.00	22.39	17.91



LL= 25.48% **PL=** 17.91% **PI=** 7.57%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

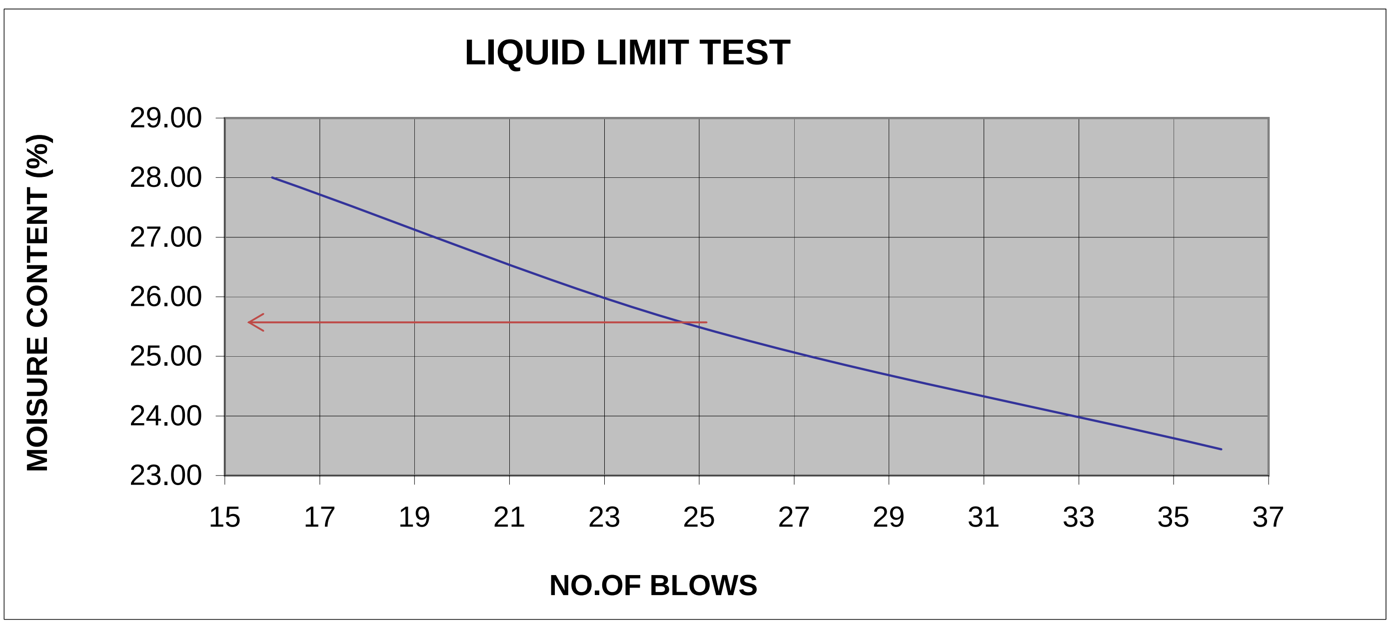
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ATTERBERG LIMITS
ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	15
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	5

Description	Liquid Limit			Plastic Limit
No of Blows	16	25	36	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	29.9	30.1	31.8	29.3
Wt of Dry soil + Container W2 (g)	28.5	28.8	30.3	28.4
Wt of container W3 (g)	23.5	23.7	23.9	23.7
Wt. of water (a) W1 - W2 (g)	1.4	1.3	1.5	0.9
Wt. of Dry soil (b) W2 - W3 (g)	5	5.1	6.4	4.7
Moisture Content (w)= a/b x 100 (%)	28.00	25.49	23.44	19.15



LL= 25.51% **PL=** 19.15% **PI=** 6.36%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

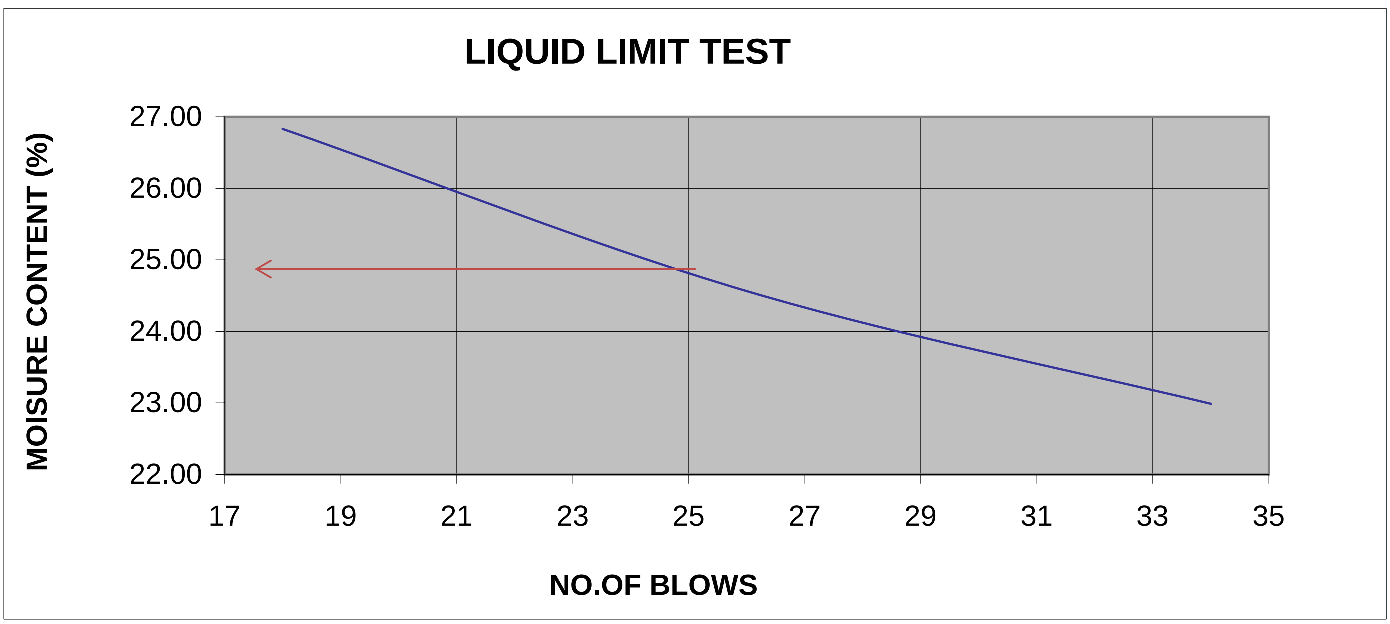
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	16
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	6.5

Description	Liquid Limit			Plastic Limit
No of Blows	18	26	34	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	25.1	21.2	27.6	25.2
Wt of Dry soil + Container W2 (g)	22.9	19.8	25.6	23.8
Wt of container W3 (g)	14.7	14.1	16.9	16.7
Wt. of water (a) W1 - W2 (g)	2.2	1.4	2	1.4
Wt. of Dry soil (b) W2 - W3 (g)	8.2	5.7	8.7	7.1
Moisture Content (w)= a/b x 100 (%)	26.83	24.56	22.99	19.72



LL= 24.74% **PL=** 19.72% **PI=** 5.02%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

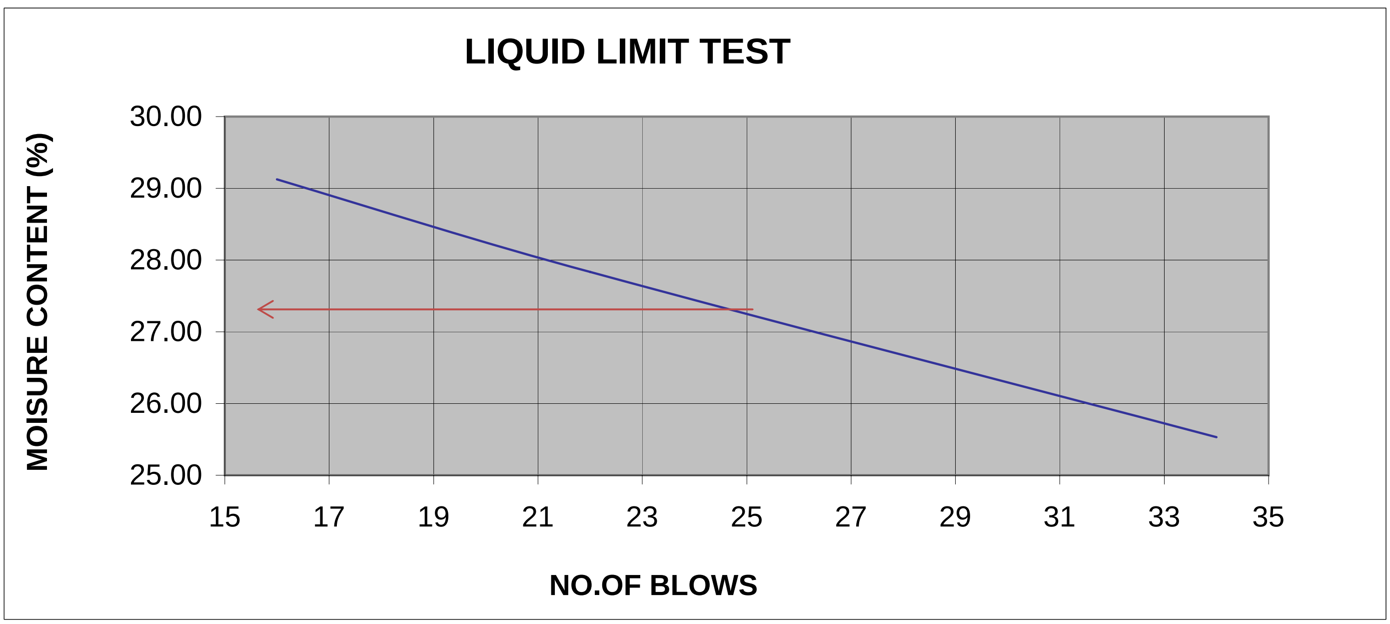
MATERIAL TESTING LAB

ATTERBERG LIMITS

ASTM D 4318

Client :	USAID	Date Sampled :	3.08.2010
Contractor:	TETRA TECH Inc.	Sample No :	17
Project:	New Admin Building, Ghazi Boys High School, Kabul	Date of Test :	07.08.2010
Location:	BH # 05	Depth: m	7.2

Description	Liquid Limit			Plastic Limit
No of Blows	16	22	34	
Container No	1	2	3	4
Wt. of wet soil + Container W1 (g)	37.3	36.1	35.5	26.3
Wt of Dry soil + Container W2 (g)	34.3	33.4	33.1	25.8
Wt of container W3 (g)	24	23.7	23.7	23.4
Wt. of water (a) W1 - W2 (g)	3	2.7	2.4	0.5
Wt. of Dry soil (b) W2 - W3 (g)	10.3	9.7	9.4	2.4
Moisture Content (w)= a/b x 100 (%)	29.13	27.84	25.53	20.83



LL= 27.34% **PL=** 20.83% **PI=** 6.51%

Remarks:

Tested by:	Hayat	
Checked by:	Jafari	E-mail:
Lab manager:	A.Najafi	Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Professional
Geotechnical
Services

Lab Test Result of Boreholes

Hydrometery Test Results

OMRAN GEOTECHNICAL COMPANY

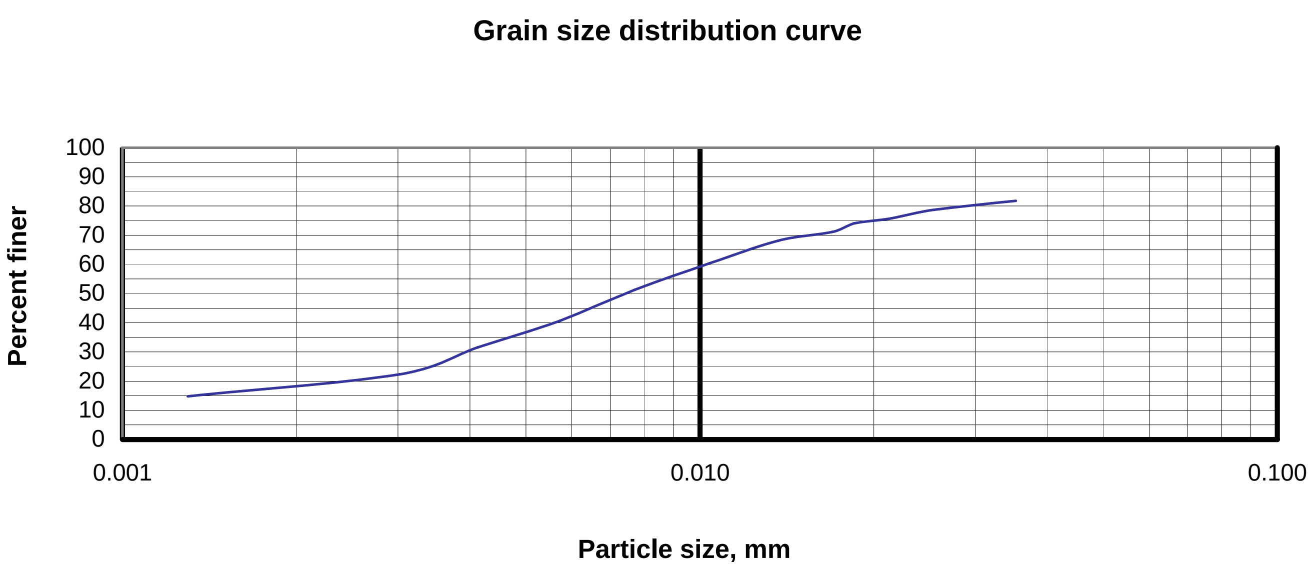
MATERIAL TESTING LAB

Hydrometer Analysis

ASTM D 422-63

Client	USAID				
Contractor	TETRA TECH Inc.				
Project	New Admin Building, Ghazi Boys High School, Kabul				
Location :	BH # 01	Depth :	4	Weight of Soil : 65 gr	
Temperature :	23 ˚c	Specific Gravity	2.74		

Time observation start: 1:40		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
1:41	**1**	57	53.70	81.79	58	7.6	7.6000	0.01279	0.0353
1:42	**2**	55	51.70	78.74	56	7.9	3.9500	0.01279	0.0254
1:43	**3**	53	49.70	75.70	54	8.3	2.7667	0.01279	0.0213
1:44	**4**	52	48.70	74.17	53	8.4	2.1000	0.01279	0.0185
1:45	**5**	50	46.70	71.13	51	8.8	1.7600	0.01279	0.0170
1:48	**8**	48	44.70	68.08	49	9.1	1.1375	0.01279	0.0136
1:55	**15**	43	39.70	60.47	44	9.9	0.6600	0.01279	0.0104
2:10	**30**	37	33.70	51.33	38	10.9	0.3633	0.01279	0.0077
2:40	**60**	30	26.70	40.67	31	12.0	0.2000	0.01279	0.0057
3:45	**125**	24	20.70	31.53	25	13.0	0.1040	0.01279	0.0041
5:50	**250**	18	14.70	22.39	19	14.0	0.0560	0.01279	0.0030
1:40	**1440**	13	9.70	14.77	14	14.8	0.0103	0.01279	0.0013



Precent of Silt : 63%	Percent of Clay and Colloide : 37 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

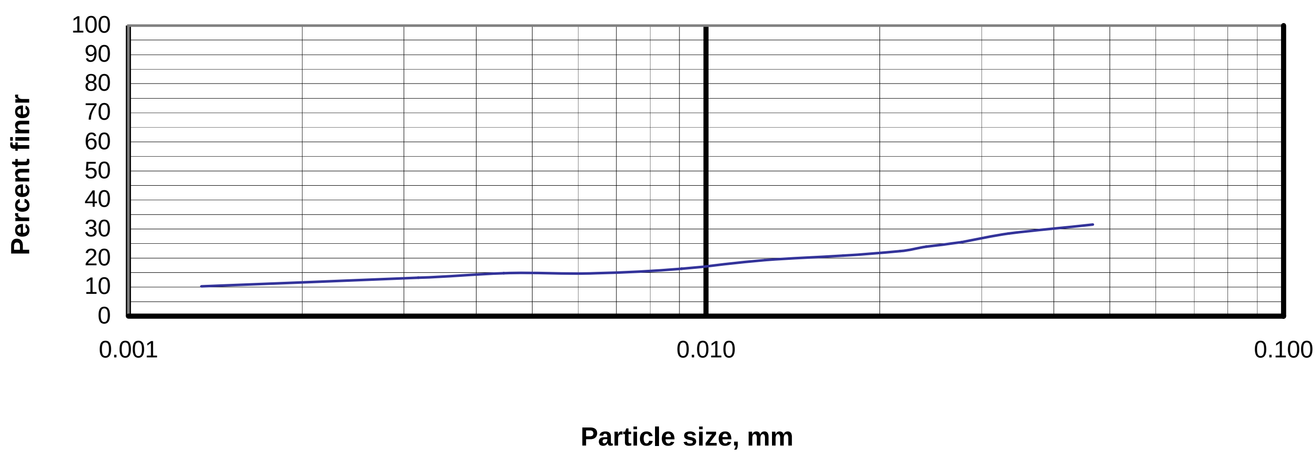
Hydrometer Analysis

ASTM D 422-63

Client	USAID		
Contractor	TETRA TECH Inc.		
Project	New Admin Building, Ghazi Boys High School, Kabul		
Location :	BH # 01	Depth : 7.5	Weight of Soil : 65 gr
Temperature :	23 ˚c	Specific Gravity	2.68

Time observation start: 1:18		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
1:19	**1**	24	20.70	31.53	25	13.0	13.0000	0.01297	0.0468
1:20	**2**	22	18.70	28.48	23	13.3	6.6500	0.01297	0.0334
1:21	**3**	20	16.70	25.44	21	13.7	4.5667	0.01297	0.0277
1:22	**4**	19	15.70	23.91	20	13.8	3.4500	0.01297	0.0241
1:23	**5**	18	14.70	22.39	19	14.0	2.8000	0.01297	0.0217
1:26	**8**	17	13.70	20.87	18	14.2	1.7750	0.01297	0.0173
1:33	**15**	16	12.70	19.34	17	14.3	0.9533	0.01297	0.0127
1:48	**30**	14	10.70	16.30	15	14.7	0.4900	0.01297	0.0091
2:18	**60**	13	9.70	14.77	14	14.8	0.2467	0.01297	0.0064
3:23	**125**	13	9.70	14.77	14	14.8	0.1184	0.01297	0.0045
5:28	**250**	12	8.70	13.25	13	15.0	0.0600	0.01297	0.0032
1:18	**1440**	10	6.70	10.20	11	15.3	0.0106	0.01297	0.0013

Grain size distribution curve



Precent of Silt : 85 %	Percent of Clay and Colloide : 15 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Hydrometer Analysis

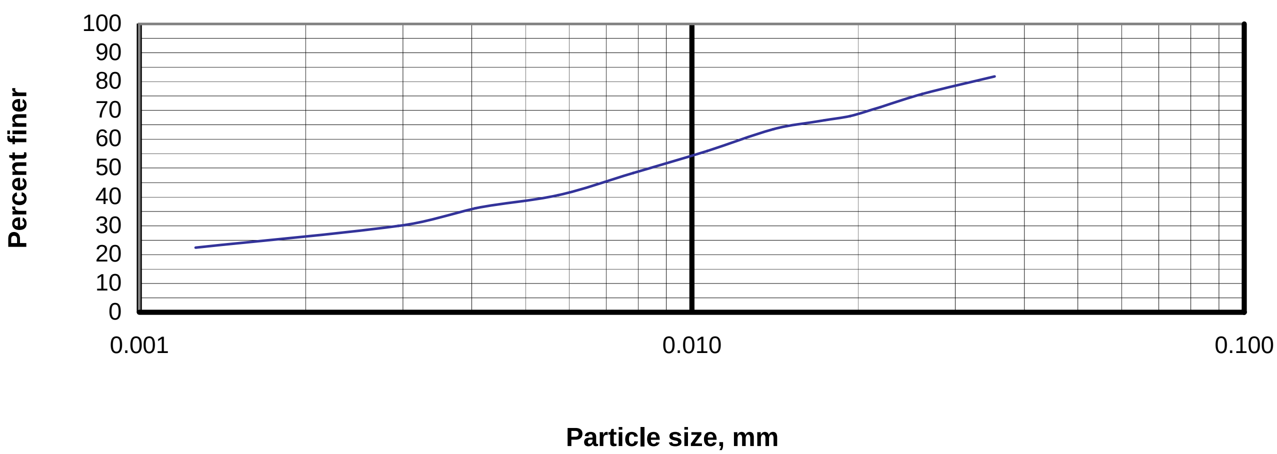
Omran Geotechnical Company

ASTM D 422-63

Client	USAID				
Contractor	TETRA TECH Inc.				
Project	New Admin Building, Ghazi Boys High School, Kabul				
Location :	BH # 02	Depth :	4	Weight of Soil : 65 gr	
Temperature :	24 c°	Specific Gravity		2.70	

Time observation start: 1:28		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
1:29	**1**	57	53.70	81.79	58	7.6	7.6000	0.01282	0.0353
1:30	**2**	53	49.70	75.70	54	8.3	4.1500	0.01282	0.0261
1:31	**3**	50	46.70	71.13	51	8.8	2.9333	0.01282	0.0220
1:32	**4**	48	44.70	68.08	49	9.1	2.2750	0.01282	0.0193
1:33	**5**	47	43.70	66.56	48	9.2	1.8400	0.01282	0.0174
1:36	**8**	45	41.70	63.51	46	9.6	1.2000	0.01282	0.0140
1:43	**15**	40	36.70	55.90	41	10.4	0.6933	0.01282	0.0107
1:58	**30**	35	31.70	48.28	36	11.2	0.3733	0.01282	0.0078
2:28	**60**	30	26.70	40.67	31	12.0	0.2000	0.01282	0.0057
3:33	**125**	27	23.70	36.10	28	12.5	0.1000	0.01282	0.0041
5:33	**250**	23	19.70	30.00	24	13.2	0.0528	0.01282	0.0029
1:28	**1440**	18	14.70	22.39	19	14.0	0.0097	0.01282	0.0013

Grain size distribution curve



Precent of Silt : 62 %	Percent of Clay and Colloide : 38 %
Checked By :	Jafari
Date :	10.08.2010

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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Hydrometer Analysis

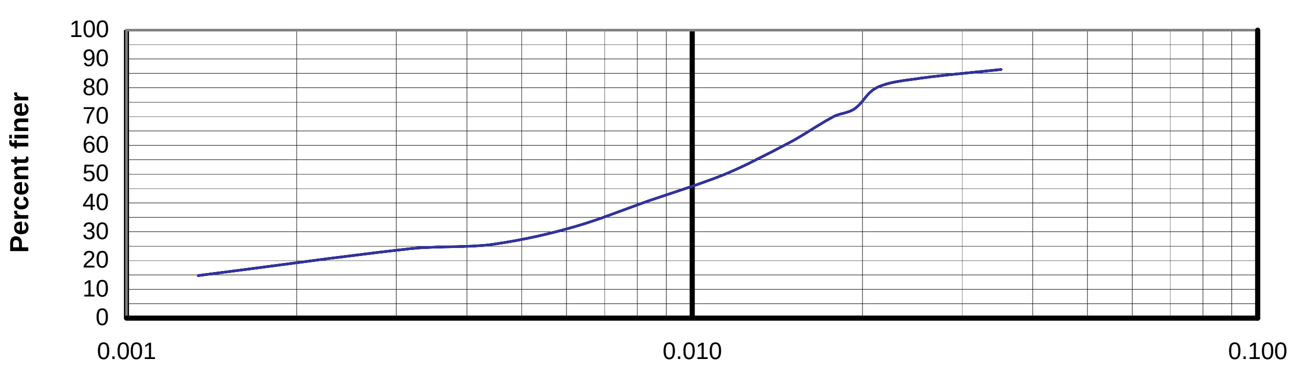
Omran Geotechnical Company

ASTM D 422-63

Client	USAID				
Contractor	TETRA TECH Inc.				
Project	New Admin Building, Ghazi Boys High School, Kabul				
Location :	BH # 02	Depth :	8	Weight of Soil : 65 gr	
Temperature :	24 c°	Specific Gravity		2.60	

Time observation start: 2.:14		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
2:15	1	60	56.70	86.36	61	7.1	7.1000	0.01321	0.0352
2:16	2	58	54.70	83.31	59	7.4	3.7000	0.01321	0.0254
2:17	3	56	52.70	80.27	57	7.8	2.6000	0.01321	0.0213
2:18	4	51	47.70	72.65	52	8.6	2.1500	0.01321	0.0194
2:19	5	49	45.70	69.60	50	8.9	1.7800	0.01321	0.0176
2:22	8	43	39.70	60.47	44	9.9	1.2375	0.01321	0.0147
2:29	15	36	32.70	49.80	37	11.1	0.7400	0.01321	0.0114
2:44	30	30	26.70	40.67	31	12.0	0.4000	0.01321	0.0084
3:14	60	24	20.70	31.53	25	13.0	0.2167	0.01321	0.0061
4:19	125	20	16.70	25.44	21	13.7	0.1096	0.01321	0.0044
6:24	250	19	15.70	23.91	20	13.8	0.0552	0.01321	0.0031
2:14	1440	13	9.70	14.77	14	14.8	0.0103	0.01321	0.0013

Grain size distribution curve



Precent of Silt :73 %	Percent of Clay and Colloide : 27%
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Hydrometer Analysis

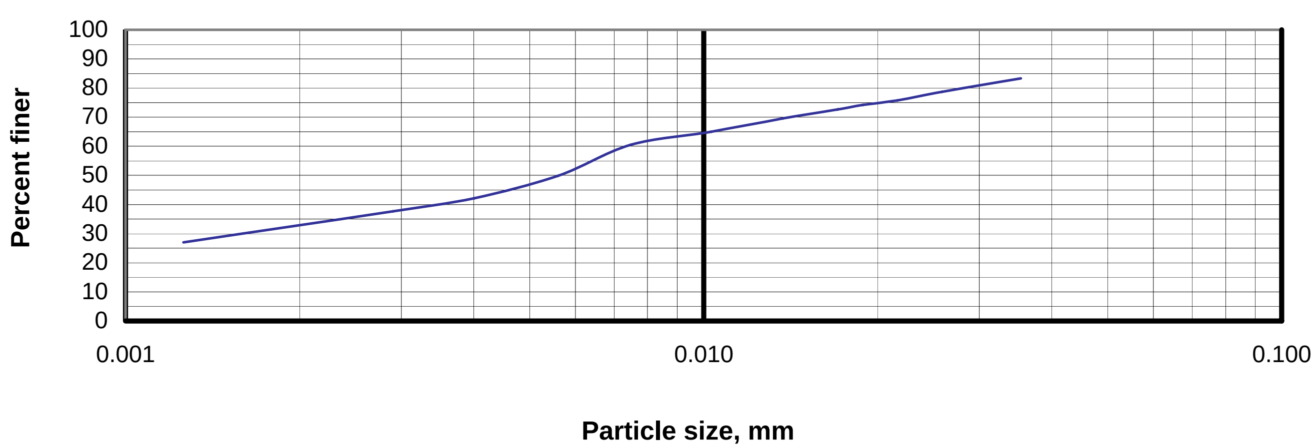
Omran Geotechnical Company

ASTM D 422-63

Client	USAID		
Contractor	TETRA TECH Inc.		
Project	New Admin Building, Ghazi Boys High School, Kabul		
Location :	BH # 3	Depth : 3.5 (m)	Weight of Soil : 65 gr
Temperature :	24 ˚c	Specific Gravity	2.65

Time observation start: 2:37		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
2:38	**1**	58	54.70	83.31	59	7.4	7.4000	0.01301	0.0354
2:39	**2**	55	51.70	78.74	56	7.9	3.9500	0.01301	0.0259
2:40	**3**	53	49.70	75.70	54	8.3	2.7667	0.01301	0.0216
2:41	**4**	52	48.70	74.17	53	8.4	2.1000	0.01301	0.0189
2:42	**5**	51	47.70	72.65	52	8.6	1.7200	0.01301	0.0171
2:45	**8**	49	45.70	69.60	50	8.9	1.1125	0.01301	0.0137
2:52	**15**	46	42.70	65.04	47	9.4	0.6267	0.01301	0.0103
3:07	**30**	43	39.70	60.47	44	9.9	0.3300	0.01301	0.0075
3:37	**60**	36	32.70	49.80	37	11.1	0.1850	0.01301	0.0056
4:42	**125**	31	27.70	42.19	32	11.9	0.0952	0.01301	0.0040
6:47	**250**	28	24.70	37.62	29	12.4	0.0496	0.01301	0.0029
2:37	**1440**	21	17.70	26.96	22	13.5	0.0094	0.01301	0.0013

Grain size distribution curve



Precent of Silt :53 %	Percent of Clay and Colloide : 47 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

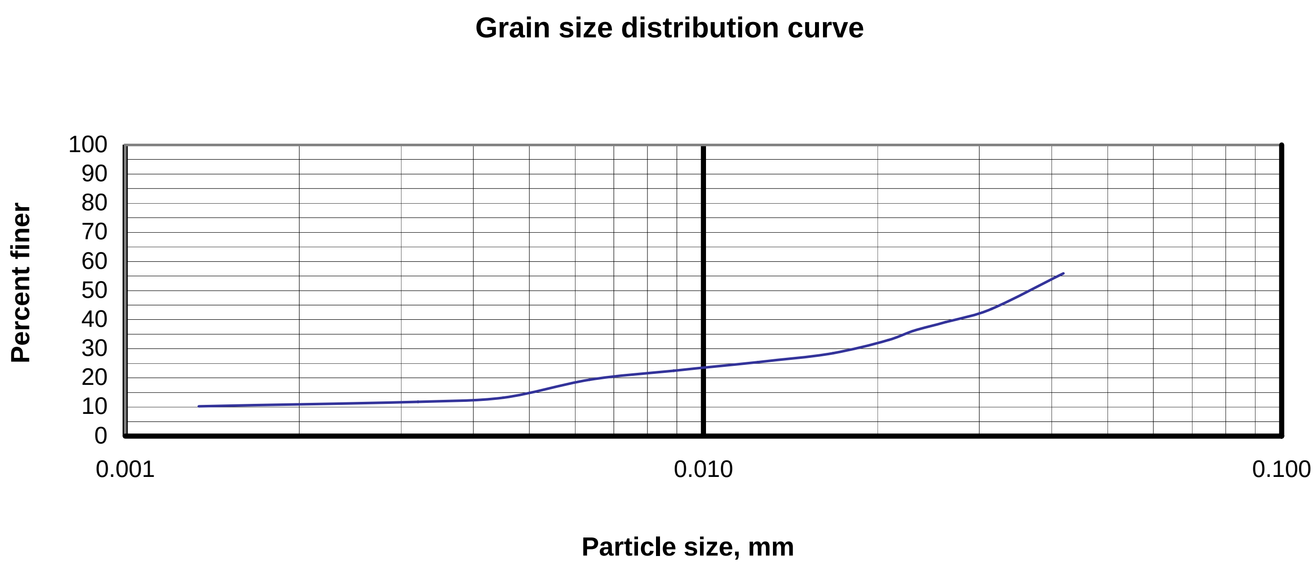
Hydrometer Analysis

ASTM D 422-63

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School, Kabul

Location :	BH # 3	Depth :	10 (m)	Weight of Soil : 65 gr
Temperature :	24 ˚c	Specific Gravity		2.66

Time observation start: 2:05		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
2:06	**1**	40	36.70	55.90	41	10.4	10.4000	0.01301	0.0420
2:07	**2**	32	28.70	43.71	33	11.7	5.8500	0.01301	0.0315
2:08	**3**	29	25.70	39.14	30	12.2	4.0667	0.01301	0.0262
2:09	**4**	27	23.70	36.10	28	12.5	3.1250	0.01301	0.0230
2:10	**5**	25	21.70	33.05	26	12.9	2.5800	0.01301	0.0209
2:13	**8**	22	18.70	28.48	23	13.3	1.6625	0.01301	0.0168
2:20	**15**	20	16.70	25.44	21	13.7	0.9133	0.01301	0.0124
2:35	**30**	18	14.70	22.39	19	14.0	0.4667	0.01301	0.0089
3:05	**60**	16	12.70	19.34	17	14.3	0.2383	0.01301	0.0064
4:10	**125**	12	8.70	13.25	13	15.0	0.1200	0.01301	0.0045
6:15	**250**	11	7.70	11.73	12	15.2	0.0608	0.01301	0.0032
2:05	**1440**	10	6.70	10.20	11	15.3	0.0106	0.01301	0.0013



Precent of Silt :85 %	Percent of Clay and Colloide : 15 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Hydrometer Analysis

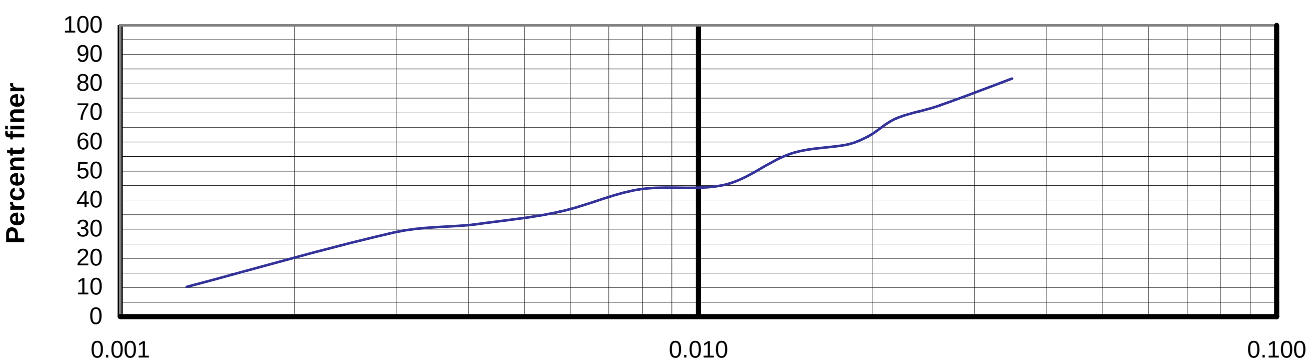
ASTM D 422-63

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School, Kabul

Location :	BH # 4	Depth :	3.5 (m)	Weight of Soil : 65 gr
Temperature :	24 ˚c	Specific Gravity		2.75

Time observation start: 1:48		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
1:49	**1**	57	53.70	81.79	58	7.6	7.6000	0.01264	0.0348
1:50	**2**	51	47.70	72.65	52	8.6	4.3000	0.01264	0.0262
1:51	**3**	48	44.70	68.08	49	9.1	3.0333	0.01264	0.0220
1:52	**4**	44	40.70	61.99	45	9.7	2.4250	0.01264	0.0197
1:53	**5**	42	38.70	58.94	43	10.1	2.0200	0.01264	0.0180
1:56	**8**	40	36.70	55.90	41	10.4	1.3000	0.01264	0.0144
2:03	**15**	33	29.70	45.24	34	11.5	0.7667	0.01264	0.0111
2:18	**30**	32	28.70	43.71	33	11.7	0.3900	0.01264	0.0079
2:48	**60**	27	23.70	36.10	28	12.5	0.2083	0.01264	0.0058
3:53	**125**	24	20.70	31.53	25	13.0	0.1040	0.01264	0.0041
5:58	**250**	22	18.70	28.48	23	13.3	0.0532	0.01264	0.0029
1:48	**1440**	10	6.70	10.20	11	15.3	0.0106	0.01264	0.0013

Grain size distribution curve



Particle size, mm

Precent of Silt :66 %	Percent of Clay and Colloide : 34 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

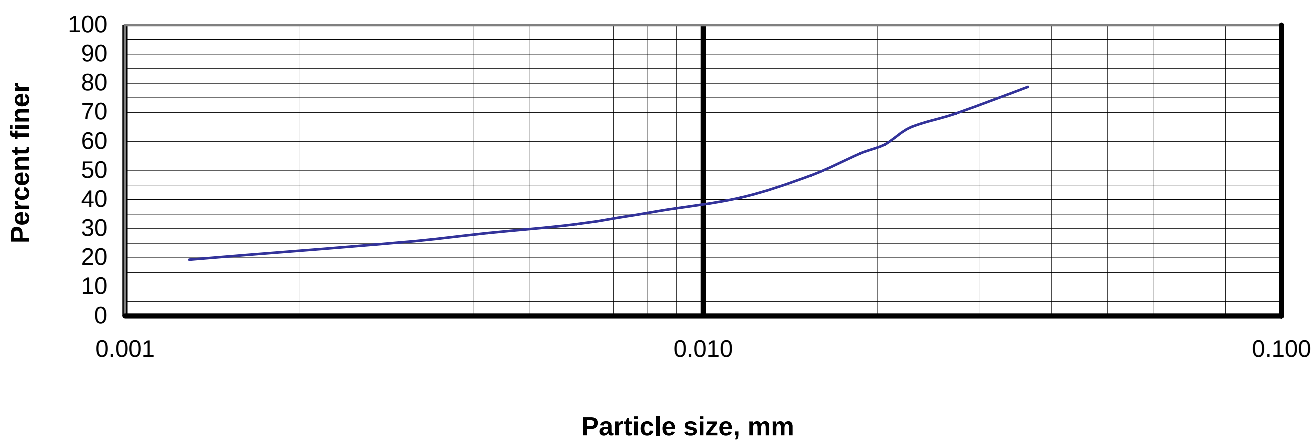
Hydrometer Analysis

ASTM D 422-63

Client	USAID		
Contractor	TETRA TECH Inc.		
Project	New Admin Building, Ghazi Boys High School, Kabul		
Location :	BH # 4	Depth : 9.5 (m)	Weight of Soil : 65 gr
Temperature :	23 ˚c	Specific Gravity	2.73

Time observation start: 1:57		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
1:58	**1**	55	51.70	78.74	56	7.9	7.9000	0.01297	0.0365
1:59	**2**	49	45.70	69.60	50	8.9	4.4500	0.01297	0.0274
2:00	**3**	46	42.70	65.04	47	9.4	3.1333	0.01297	0.0230
2:01	**4**	42	38.70	58.94	43	10.1	2.5250	0.01297	0.0206
2:02	**5**	40	36.70	55.90	41	10.4	2.0800	0.01297	0.0187
2:05	**8**	35	31.70	48.28	36	11.2	1.4000	0.01297	0.0153
2:12	**15**	30	26.70	40.67	31	12.0	0.8000	0.01297	0.0116
2:27	**30**	27	23.70	36.10	28	12.5	0.4167	0.01297	0.0084
2:57	**60**	24	20.70	31.53	25	13.0	0.2167	0.01297	0.0060
4:21	**125**	22	18.70	28.48	23	13.3	0.1064	0.01297	0.0042
6:08	**250**	20	16.70	25.44	21	13.7	0.0548	0.01297	0.0030
1:57	**1440**	16	12.70	19.34	17	14.3	0.0099	0.01297	0.0013

Grain size distribution curve



Precent of Silt :70 %	Percent of Clay and Colloide : 30 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

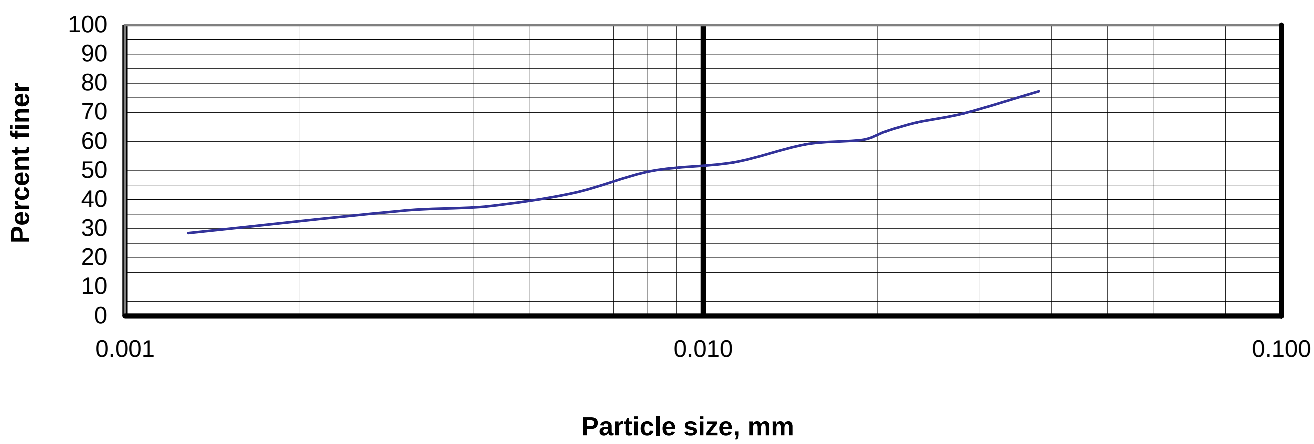
Hydrometer Analysis

ASTM D 422-63

Client	USAID				
Contractor	TETRA TECH Inc.				
Project	New Admin Building, Ghazi Boys High School, Kabul				
Location :	BH # 5	Depth :	1.3 (m)	Weight of Soil : 65 gr	
Temperature :	23 ˚c	Specific Gravity	2.61		

Time observation start: 1:58		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
1:59	**1**	54	50.70	77.22	55	8.1	8.1000	0.01337	0.0381
2:00	**2**	49	45.70	69.60	50	8.9	4.4500	0.01337	0.0282
2:01	**3**	47	43.70	66.56	48	9.2	3.0667	0.01337	0.0234
2:02	**4**	45	41.70	63.51	46	9.6	2.4000	0.01337	0.0207
2:03	**5**	43	39.70	60.47	44	9.9	1.9800	0.01337	0.0188
2:06	**8**	42	38.70	58.94	43	10.1	1.2625	0.01337	0.0150
2:13	**15**	38	34.70	52.85	39	10.7	0.7133	0.01337	0.0113
2:28	**30**	36	32.70	49.80	37	11.1	0.3700	0.01337	0.0081
2:58	**60**	31	27.70	42.19	32	11.9	0.1983	0.01337	0.0060
4:02	**125**	28	24.70	37.62	29	12.4	0.0992	0.01337	0.0042
6:08	**250**	27	23.70	36.10	28	12.5	0.0500	0.01337	0.0030
1:58	**1440**	22	18.70	28.48	23	13.3	0.0092	0.01337	0.0013

Grain size distribution curve



Precent of Silt :61 %	Percent of Clay and Colloide : 39 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

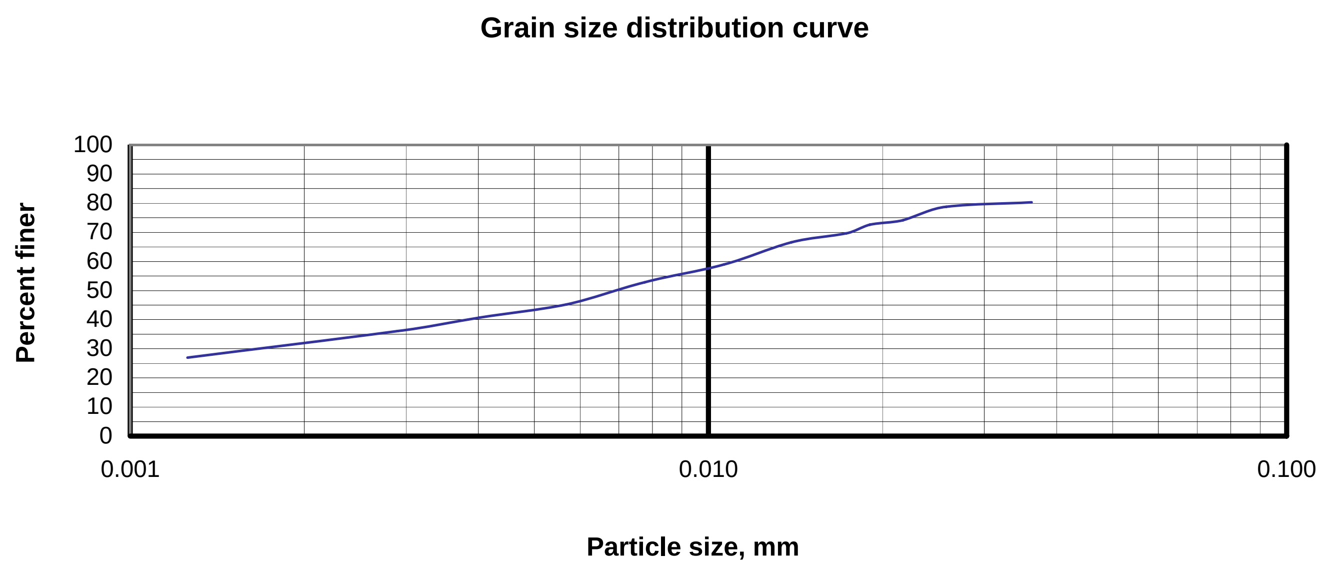
Hydrometer Analysis

ASTM D 422-63

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School, Kabul

Location :	BH # 5	Depth :	7.2 (m)	Weight of Soil : 65 gr
Temperature :	23 ˚c	Specific Gravity		2.70

Time observation start: 2:20		Ra hydrometer	Rc hydrometer correction	Fine grain percent	Hydrometer observed correction	L	L/t	K	D (mm)
2:21	**1**	56	52.70	80.27	57	7.8	7.8000	0.01297	0.0362
2:22	**2**	55	51.70	78.74	56	7.9	3.9500	0.01297	0.0258
2:23	**3**	52	48.70	74.17	53	8.4	2.8000	0.01297	0.0217
2:24	**4**	51	47.70	72.65	52	8.6	2.1500	0.01297	0.0190
2:25	**5**	49	45.70	69.60	50	8.9	1.7800	0.01297	0.0173
2:28	**8**	47	43.70	66.56	48	9.2	1.1500	0.01297	0.0139
2:35	**15**	42	38.70	58.94	43	10.1	0.6733	0.01297	0.0106
2:50	**30**	38	34.70	52.85	39	10.7	0.3567	0.01297	0.0077
3:20	**60**	33	29.70	45.24	34	11.5	0.1917	0.01297	0.0057
4:25	**125**	30	26.70	40.67	31	12.0	0.0960	0.01297	0.0040
6:30	**250**	27	23.70	36.10	28	12.5	0.0500	0.01297	0.0029
2:20	**1440**	21	17.70	26.96	22	13.5	0.0094	0.01297	0.0013



Precent of Silt :57 %	Percent of Clay and Colloide : 43 %
Checked By :	Jafari
Date :	10.08.2010

Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Professional
Geotechnical
Services

Lab Test Result of Boreholes

Specific Gravity Test Results

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Specific Gravity

ASTM D - 854

Email	Omran.geotechnic@yahoo.com	Add:	Karte 3, Kabul, Afghanistan
To :	**USAID**	**Sampling Date:**	4/8/2010
Contractor:	**TETRA TECH Inc.**	**Location:**	Kabul Province
Project:	**New Admin Building, Ghazi Boys High School, Kabul**	**Temperature**	**25 c°**

Borehole No.	1	1	1	1	2	2
Depth (m)	1.5	4.0	5.0	7.50	1.50	4.0
Sample No.	1	2	3	4	5	6
Weight of Flask Plus Water (gr)	699.70	698.20	653.70	679.00	662.50	678.80
Weight of Flask Plus Water Plus Material (gr)	762.10	761.70	716.40	741.70	725.00	741.80
Weight of Dry Oven Soil (gr)	100.00	100.00	100.00	100.00	100.00	100.00
Specific Gravity (GS)	2.66	2.74	2.68	2.68	2.67	2.70
Testing Date	07.08.2010	07.08.2010	07.08.2010	07.08.2010	07.08.2010	07.08.2010

Remarks:

Tested By	Hayat
Checked By	Jafari
Lab manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Specific Gravity

ASTM D - 854

Email	Omran.geotechnic@yahoo.com	Add:	Karte 3, Kabul, Afghanistan
To :	**USAID**	**Sampling Date:**	4/8/2010
Contractor:	**TETRA TECH Inc.**	**Location:**	Kabul Province
Project:	**New Admin Building, Ghazi Boys High School, Kabul**	**Temperature**	**25 c°**

Borehole No.	2	3	3	3	3
Depth (m)	8.0	1.0	3.5	6.50	10.0
Sample No.	7	8	9	10	11
Weight of Flask Plus Water (gr)	679.20	661.50	679.70	678.20	698.80
Weight of Flask Plus Water Plus Material (gr)	740.80	724.20	742.00	740.60	761.20
Weight of Dry Oven Soil (gr)	100.00	100.00	100.00	100.00	100.00
Specific Gravity (GS)	2.60	2.68	2.65	2.66	2.66
Testing Date	07.08.2010	07.08.2010	07.08.2010	07.08.2010	07.08.2010

Remarks:

Tested By	Hayat
Checked By	Jafari
Lab manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Specific Gravity

ASTM D - 854

Email	Omran.geotechnic@yahoo.com	Add:	Karte 3, Kabul, Afghanistan
To :	**USAID**	**Sampling Date:**	4/8/2010
Contractor:	**TETRA TECH Inc.**	**Location:**	Kabul Province
Project:	**New Admin Building, Ghazi Boys High School, Kabul**	**Temperature**	**25 c°**

Borehole No.	4	4	4	4	4	4
Depth (m)	0.75	1.40	2.00	3.50	8.00	9.5
Sample No.	12	13	14	15	16	17
Weight of Flask Plus Water (gr)	677.60	665.40	677.50	678.80	672.30	654.90
Weight of Flask Plus Water Plus Material (gr)	740.70	727.90	740.20	742.50	734.70	718.30
Weight of Dry Oven Soil (gr)	100.00	100.00	100.00	100.00	100.00	100.00
Specific Gravity (GS)	2.71	2.67	2.68	2.75	2.66	2.73
Testing Date	07.08.2010	07.08.2010	07.08.2010	07.08.2010	07.08.2010	07.08.2010

Remarks:

Tested By	Hayat
Checked By	Jafari
Lab manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Specific Gravity

ASTM D - 854

Email	Omran.geotechnic@yahoo.com	Add:	Karte 3, Kabul, Afghanistan
To :	**USAID**	**Sampling Date:**	4/8/2010
Contractor:	**TETRA TECH Inc.**	**Location:**	Kabul Province
Project:	**New Admin Building, Ghazi Boys High School, Kabul**	**Temperature**	**25 c°**

Borehole No.	5	5	5	5	5
Depth (m)	1.3	2.5	3.6	5.7	6.50
Sample No.	18	19	20	21	22
Weight of Flask Plus Water (gr)	698.80	696.90	677.50	654.70	661.50
Weight of Flask Plus Water Plus Material (gr)	760.50	759.60	739.90	716.80	723.70
Weight of Dry Oven Soil (gr)	100.00	100.00	100.00	100.00	100.00
Specific Gravity (GS)	2.61	2.68	2.66	2.64	2.65
Testing Date	07.08.2010	07.08.2010	07.08.2010	07.08.2010	07.08.2010

Remarks:

Tested By	Hayat
Checked By	Jafari
Lab manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Specific Gravity

ASTM D - 854

Email	Omran.geotechnic@yahoo.com	Add:	Karte 3, Kabul, Afghanistan
To :	**USAID**	**Sampling Date:**	4/8/2010
Contractor:	**TETRA TECH Inc.**	**Location:**	Kabul Province
Project:	**New Admin Building, Ghazi Boys High School, Kabul**	**Temperature**	**25 c˚**

Borehole No.	5	5			
Depth (m)	7.20	9.30			
Sample No.	23	24			
Weight of Flask Plus Water (gr)	665.30	655.30			
Weight of Flask Plus Water Plus Material (gr)	728.20	718.50			
Weight of Dry Oven Soil (gr)	100.00	100.00			
Specific Gravity (GS)	2.70	2.72			
Testing Date	07.08.2010	07.08.2010			

Remarks:

Tested By	Hayat
Checked By	Jafari
Lab manager	A.Najafi

Omran Geotechnical Company

Lab Test Result of Boreholes

Moisture Content Test Results

Professional
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OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

ASTM D 2216
Moisture Content Test

Client	USAID	Sampled by	OGC
Contractor	TETRA TECH Inc.	Testing Date	07.08.2010
Project	New Admin Building, Ghazi Boys High School, Kabul		
Location	Kabul Province		

Borehole No.	Depth (m)	Wt. of Can	Wt. of Can+wet sample (gr)	Wt. of Can+dry sample (gr)	Wt. of dry sample (gr)	Wt.of moist (gr)	Water content (%)
2	3	40	172	144.7	104.7	27.3	26.07
2	4	37.6	134.4	114.2	76.6	20.2	26.37
2	5	43.5	241.4	197	153.5	44.4	28.93
3	1	40.6	167	149	108.4	18	16.61
3	3	90	273	238	148	35	23.65
3	4	43	156	131	88	25	28.41
3	5	35	189	156	121	33	27.27
3	7	59.6	233	194.5	134.9	38.5	28.54
3	9	42.8	152	129	86.2	23	26.68

Remarks:

Checked by :	Jafari
E-Mail :	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

ASTM D 2216

Moisture Content Test

Client	**USAID**	**Sampled by**	OGC
Contractor	**TETRA TECH Inc.**	**Testing Date**	07.08.2010
Project	**New Admin Building, Ghazi Boys High School, Kabul**		
Location	**Kabul Province**		

Borehole No.	Depth (m)	Wt. of Can	Wt. of Can+wet sample (gr)	Wt. of Can+dry sample (gr)	Wt. of dry sample (gr)	Wt.of moist (gr)	Water content (%)
4	1	104	276.7	253	149	23.7	15.91
4	2	99	291	255	156	36	23.08
4	3	99.2	280	245.3	146.1	34.7	23.75
4	5	101.7	284	247	145.3	37	25.46
4	6	90	256	230	140	26	18.57
5	1	95.8	278	254.3	158.5	23.7	14.95
5	2	97.5	238.2	217	119.5	21.2	17.74
5	3	93.3	284	265	171.7	19	11.07
5	5	91.4	389	343	251.6	46	18.28
5	6	90.7	318	275	184.3	43	23.33

Remarks:

Checked by :	Jafari
E-Mail :	Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Lab Test Result of Boreholes

Moisture density Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	**USAID**
Contractor	**TETRA TECH Inc.**
Project	**New Admin Building, Ghazi Boys High School**

Density Of Soil in Place by the Drive Cylinder Method

ASTM D 2937

Location	Kabul Province	Date of Test:	5/8/2010	Date of Sampled:	5/8/2010
Method	Drive Cylinder	Mould Wt. g	**3340**	Mould vol cm^3	947.4

Borehole No.	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**3**
Depth (m)	**1**	**2**	**3.5**	**4.5**	**5.5**	**1**	**3.5**	**1**
Wt. of wet soil + Container gr	5019	5078	5056	5022	4998	5041	4992	5081
Wt. of wet soil gr	1679	1738	1716	1682	1658	1701	1652	1741
Wet density Mg/m^3	1.772	1.834	1.811	1.775	1.750	1.795	1.744	1.838
Dry density (γ) Mg/m^3	1.575	1.549	1.559	1.469	1.584	1.627	1.474	1.638

Moisture Content %								
Container No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Wt. of container gr	48.3	34.9	53.2	57.5	73.1	48.2	55.5	74.3
Wt. of wet soil + Container gr	273.4	169.8	192.5	165.4	183.5	240.4	172.5	142.5
Wt. of dry soil + Container gr	248.4	148.8	173.1	146.8	173	222.4	154.4	135.1
Wt. of dry soil gr	200.1	113.9	119.9	89.3	99.9	174.2	98.9	60.8
Wt. of water gr	25	21	19.4	18.6	10.5	18	18.1	7.4
Moisture content %	12.5	18.4	16.2	20.8	10.5	10.3	18.3	12.2

Remarks :	**Checked by :**	**Jafari**
		Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Client	USAID
Contractor	TETRA TECH Inc.
Project	New Admin Building, Ghazi Boys High School

Density Of Soil in Place by the Drive Cylinder Method

ASTM D 2937

Location	Kabul Province	Date of Test:	5/8/2010	Date of Sampled:	5/8/2010
Method	Drive Cylinder	Mould Wt. gr	**3340**	Mould vol cm^3	947.4

Borehole No.	**4**	**5**	**5**					
Depth (m)	**1**	**1**	**4.5**					
Wt. of wet soil + Container gr	5028	5034	5004					
Wt. of wet soil gr	1688	1694	1664					
Wet density Mg/m^3	1.782	1.788	1.756					
Dry density (γ) Mg/m^3	1.619	1.635	1.479					
Moisture Content %								
Container No.	**9**	**10**	**11**					
Wt. of container gr	49.4	49	40.6					
Wt. of wet soil + Container gr	209	156.7	148.4					
Wt. of dry soil + Container gr	194.4	147.5	131.4					
Wt. of dry soil gr	145.0	98.5	90.8					
Wt. of water gr	14.6	9.2	17					
Moisture content %	10.1	9.3	18.7					

Remarks :	**Checked by :**	**Jafari**
	Omran.geotechnic@yahoo.com	

Omran Geotechnical Company

Lab Test Result of Boreholes

Expansion Index Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	1
Location	BH # 01	Depth (m)	1.5

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	523		Initial	Final
Wt. Retained on # 4 Sieve	1	Wt. of Can+wet sample (gr)	135.5	126.1
% Retaind	0.19	Wt. of Can+dry samle (gr)	126.6	110.6
% Passing # 4 Sieve	99.81	Wt. of Can	45.6	44.1
Sample Dimensions		Wt. of dry sample (gr)	81	66.5
Hight(cm)	2.5	Wt.of Water (gr)	8.9	15.5
Diameter(cm)	10.2	Water content (%)	10.99	23.31

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	552.6	579.5
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	348.8	375.7
Wet Density (Mg/m3)	1.708	1.840
Dry Density (Mg/m3)	1.539	1.492
%Sat	40.13	79.21

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
7/8/2010	8:05	0.00	
	8:25	15.00	0.6
	11:49	35.00	1.4
	13:28	64.00	2.56
	17:30	98.50	3.94
8/8/2010	6:05	149.80	5.992
	8:05	162.80	6.512
Total Dial		6.512	

Expension Index: 65.12

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	2
Location	BH # 01	Depth (m)	5

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	371.6		Initial	Final
Wt. Retained on # 4 Sieve	1	Wt. of Can+wet sample (gr)	118.9	124.6
% Retaind	0.27	Wt. of Can+dry samle (gr)	108.7	107.2
% Passing # 4 Sieve	99.73	Wt. of Can	42.7	45.3
Sample Dimensions		Wt. of dry sample (gr)	66	61.9
Hight(cm)	2.5	Wt.of Water (gr)	10.2	17.4
Diameter(cm)	10.2	Water content (%)	15.45	28.11

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	570	588.2
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	366.2	384.4
Wet Density (Mg/m3)	1.793	1.882
Dry Density (Mg/m3)	1.553	1.469
%Sat	57.10	91.44

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
8/8/2010	8:05	0.00	
	8:25	12.00	0.48
	11:49	30.00	1.2
	13:28	65.18	2.6072
	17:30	83.90	3.356
9/8/2010	6:05	97.15	3.886
	8:05	106.80	4.272
Total Dial		4.272	

Expension Index: 42.72

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	3
Location	BH # 02	Depth (m)	1.5

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	600		Initial	Final
Wt. Retained on # 4 Sieve	0.8	Wt. of Can+wet sample (gr)	137.6	151.2
% Retaind	0.13	Wt. of Can+dry samle (gr)	128.6	130.6
% Passing # 4 Sieve	99.87	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	79.1	88
Hight(cm)	2.5	Wt.of Water (gr)	9	20.6
Diameter(cm)	10.2	Water content (%)	11.38	23.41

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	574.1	589.2
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	370.3	385.4
Wet Density (Mg/m3)	1.813	1.887
Dry Density (Mg/m3)	1.628	1.529
%Sat	47.48	83.80

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
9/8/2010	9:00	0.00	
	9:15	9.50	0.38
	12:25	39.50	1.58
	15:35	73.60	2.944
	19:20	99.40	3.976
10/8/2010	7:45	139.00	5.56
	9:00	158.70	6.348
Total Dial		6.348	

Expension Index: 63.48

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	4
Location	BH # 02	Depth (m)	8

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	550		Initial	Final
Wt. Retained on # 4 Sieve	4.4	Wt. of Can+wet sample (gr)	112.5	121.5
% Retaind	0.8	Wt. of Can+dry samle (gr)	103.5	104.12
% Passing # 4 Sieve	99.2	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	54	61.52
Hight(cm)	2.5	Wt.of Water (gr)	9	17.38
Diameter(cm)	10.2	Water content (%)	16.67	28.25

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	559.1	590.3
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	355.3	386.5
Wet Density (Mg/m3)	1.740	1.893
Dry Density (Mg/m3)	1.491	1.476
%Sat	58.30	96.43

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
9/8/2010	9:00	0.00	
	9:15	7.20	0.288
	12:25	20.60	0.824
	15:35	56.20	2.248
	19:20	75.80	3.032
10/8/2010	7:45	92.50	3.7
	9:00	103.50	4.14
Total Dial		4.14	

Expension Index: 41.4

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	5
Location	BH # 03	Depth (m)	1

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	664		Initial	Final
Wt. Retained on # 4 Sieve	0.7	Wt. of Can+wet sample (gr)	124.8	137.8
% Retaind	0.11	Wt. of Can+dry samle (gr)	118.3	121.9
% Passing # 4 Sieve	99.89	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	68.8	79.3
Hight(cm)	2.5	Wt.of Water (gr)	6.5	15.9
Diameter(cm)	10.2	Water content (%)	9.45	20.05

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	544.9	570.6
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	341.1	366.8
Wet Density (Mg/m3)	1.670	1.796
Dry Density (Mg/m3)	1.526	1.496
%Sat	33.49	67.92

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
10/8/2010	10:05	0.00	
	10:29	15.90	0.636
	13:51	39.70	1.588
	17:05	56.80	2.272
	20:22	80.70	3.228
11/8/2010	8:52	112.60	4.504
	10:05	133.60	5.344
Total Dial		5.344	

Expension Index: 53.44

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	6
Location	BH # 03	Depth (m)	6.5

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	520		Initial	Final
Wt. Retained on # 4 Sieve	15.5	Wt. of Can+wet sample (gr)	115.8	128.1
% Retaind	2.98	Wt. of Can+dry samle (gr)	108.3	111.9
% Passing # 4 Sieve	97.02	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	58.8	69.3
Hight(cm)	2.5	Wt.of Water (gr)	7.5	16.2
Diameter(cm)	10.2	Water content (%)	12.76	23.38

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	550.8	573.7
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	347	369.9
Wet Density (Mg/m3)	1.699	1.811
Dry Density (Mg/m3)	1.507	1.468
%Sat	44.35	76.61

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
10/8/2010	10:05	0.00	
	10:29	13.40	0.536
	13:51	41.50	1.66
	17:05	63.80	2.552
	20:22	88.70	3.548
11/8/2010	8:52	118.10	4.724
	10:05	140.80	5.632
Total Dial		5.632	

Expension Index: 56.32

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	7
Location	BH # 04	Depth (m)	1.4

Percent Passing # 4 Sieve		Moisture Content		
			Initial	Final
Total Weight	680.9	Wt. of Can+wet sample (gr)	131.5	145.8
Wt. Retained on # 4 Sieve	0.6	Wt. of Can+dry samle (gr)	123.3	126.8
% Retaind	0.09	Wt. of Can	49.5	42.6
% Passing # 4 Sieve	99.91	Wt. of dry sample (gr)	73.8	84.2
Sample Dimensions		Wt.of Water (gr)	8.2	19
Hight(cm)	2.5	Water content (%)	11.11	22.57
Diameter(cm)	10.2			

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	562.1	589.6
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	358.3	385.8
Wet Density (Mg/m3)	1.755	1.889
Dry Density (Mg/m3)	1.579	1.541
%Sat	42.95	82.30

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
11/8/2010	10:55	0.00	
	11:15	17.60	0.704
	14:08	46.20	1.848
	17:36	78.30	3.132
	20:55	99.10	3.964
12/8/2010	9:22	122.50	4.9
	10:55	135.60	5.424
Total Dial		5.424	

Expension Index: 54.24

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	**USAID**	**Sampled By**	OGC
Contractor	**Tetra Tech**	**Location**	Kabul Province
Project	**New Admin Building, Ghazi Boys High School**	**Sample No.**	8
Location	**BH # 04**	**Depth (m)**	8

Percent Passing # 4 Sieve		**Moisture Content**		
Total Weight	552		Initial	Final
Wt. Retained on # 4 Sieve	8	Wt. of Can+wet sample (gr)	135.8	131.1
% Retaind	1.45	Wt. of Can+dry samle (gr)	128.6	116.2
% Passing # 4 Sieve	98.55	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	79.1	73.6
Hight(cm)	2.5	Wt.of Water (gr)	7.2	14.9
Diameter(cm)	10.2	Water content (%)	9.10	20.24

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	570.7	592.6
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	366.9	388.8
Wet Density (Mg/m3)	1.797	1.904
Dry Density (Mg/m3)	1.647	1.583
%Sat	39.36	79.21

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
11/8/2010	10:55	0.00	
	11:15	16.00	0.64
	14:08	42.80	1.712
	17:36	76.10	3.044
	20:55	113.60	4.544
12/8/2010	9:22	132.20	5.288
	10:55	143.60	5.744
Total Dial		5.744	

Expension Index: 57.44

Tested By :	**Hayat**	
Checked by :	**Jafari**	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	9
Location	BH # 05	Depth (m)	2.5

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	400.6		Initial	Final
Wt. Retained on # 4 Sieve	0	Wt. of Can+wet sample (gr)	123.5	114.4
% Retaind	0	Wt. of Can+dry samle (gr)	116.6	102.3
% Passing # 4 Sieve	100	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	67.1	59.7
Hight(cm)	2.5	Wt.of Water (gr)	6.9	12.1
Diameter(cm)	10.2	Water content (%)	10.28	20.27

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	555.6	577.3
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	351.8	373.5
Wet Density (Mg/m3)	1.723	1.829
Dry Density (Mg/m3)	1.562	1.521
%Sat	38.72	71.62

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
12/8/2010	11:35	0.00	
	11:52	18.50	0.74
	14:52	47.10	1.884
	18:12	85.10	3.404
	21:35	122.90	4.916
13/8/2010	9:45	158.60	6.344
	11:35	173.60	6.944
Total Dial		6.944	

Expension Index: 69.44

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Expansion Index
ASTM D- 4829

Client	USAID	Sampled By	OGC
Contractor	Tetra Tech	Location	Kabul Province
Project	New Admin Building, Ghazi Boys High School	Sample No.	10
Location	BH # 05	Depth (m)	6.5

Percent Passing # 4 Sieve		Moisture Content		
Total Weight	636.5		Initial	Final
Wt. Retained on # 4 Sieve	6.6	Wt. of Can+wet sample (gr)	106.1	116.2
% Retaind	1.04	Wt. of Can+dry samle (gr)	98.8	100.6
% Passing # 4 Sieve	98.96	Wt. of Can	49.5	42.6
Sample Dimensions		Wt. of dry sample (gr)	49.3	58
Hight(cm)	2.5	Wt.of Water (gr)	7.3	15.6
Diameter(cm)	10.2	Water content (%)	14.81	26.90

Tamp Two lifts, 15 blows/lift slightly below optimum moisture content

	Initial	Final
Ring&Sample(gr)	560.8	589.8
Ring(gr)	203.8	203.8
Remolded Wet Wt(gr)	357	386
Wet Density (Mg/m3)	1.748	1.890
Dry Density (Mg/m3)	1.523	1.490
%Sat	53.01	91.50

Expansion Test

Date	Time	Dial(0.01mm)	Δh%
12/8/2010	11:35	0.00	
	11:52	12.20	0.488
	14:52	28.90	1.156
	18:12	46.60	1.864
	21:35	69.50	2.78
13/8/2010	9:45	90.60	3.624
	11:35	108.80	4.352
Total Dial		4.352	

Expension Index: 43.52

Tested By :	Hayat	
Checked by :	Jafari	Omran.geotechnic@yahoo.com

Omran Geotechnical Company

Lab Test Result of Boreholes

Unconfined Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	1
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	1
Location	Kabul - Province	Date of Test	07.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	145.2
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	21
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.16
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.78

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
1.5	0.50	0.71	9.679136691	0.007142857	1.65	0.17
4	1.00	1.43	9.749275362	0.014285714	4.40	0.45
7	1.50	2.14	9.820437956	0.021428571	7.70	0.78
10	2.00	2.86	9.892647059	0.028571429	11.00	1.11
13	2.50	3.57	9.965925926	0.035714286	14.30	1.43
15	3.00	4.29	10.04029851	0.042857143	16.50	1.64
16.5	3.50	5.00	10.11578947	0.05	18.15	1.79
14	4.00	5.71	10.19242424	0.057142857	15.40	1.51

Unconfined Compressive Strength (q_u) = ____ 1.79ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.895

OMRAN GEOTECHNICAL COMPANY

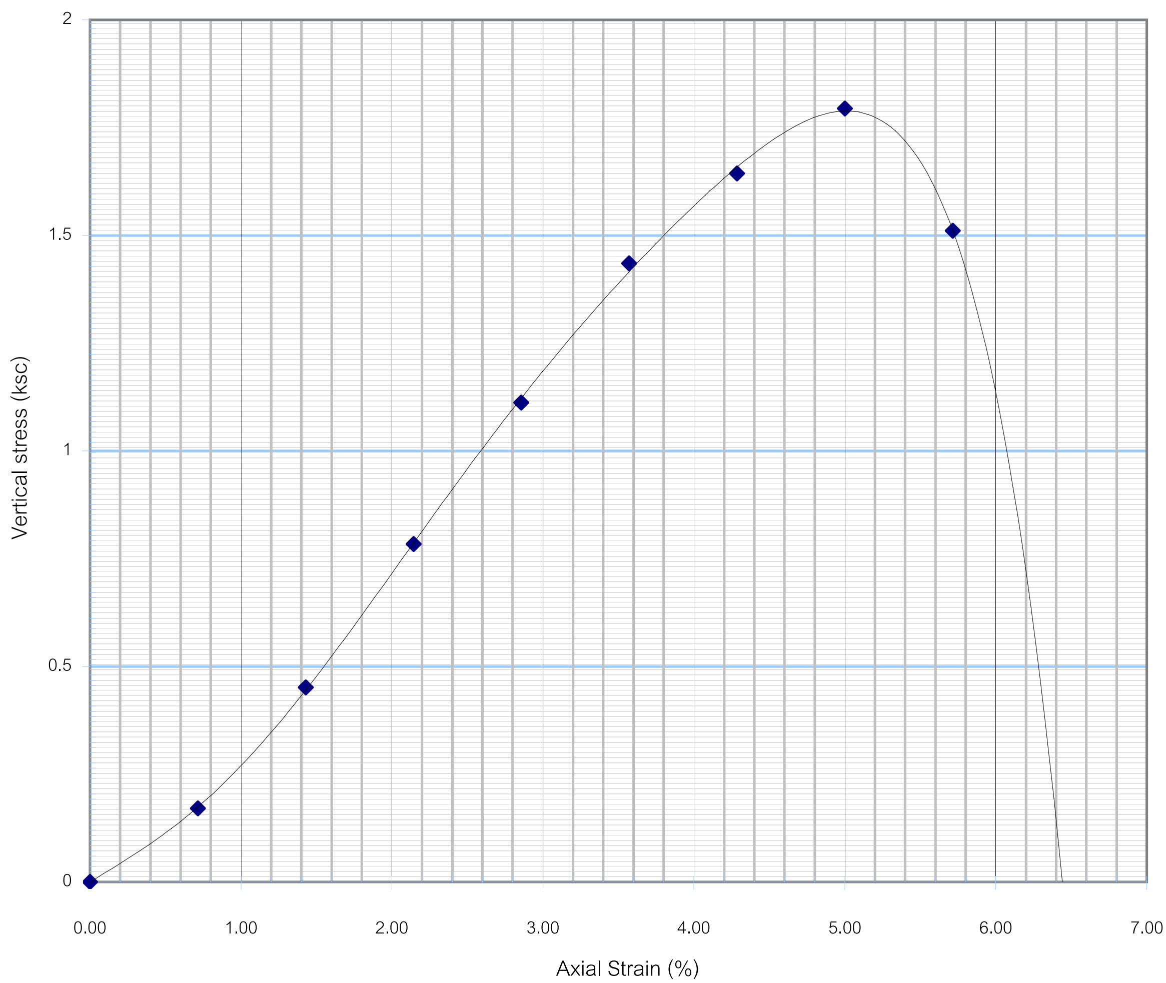
MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	1
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	1
Location	Kabul - Province	Date of Test	07.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength (S_u=q_u/2) ,ksc	0.895			
Water Content %	21			
Wet Unit Weight g/cm^3	2.16			
Dry Unit Weight g/cm^3	1.78		Tested by	Hayat
Strain at Failure %	5.00		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	1
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	2
Location	Kabul - Province	Date of Test	07.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	,mm	35.00	WEIGHT OF SAMPLE	g	145
SAMPLE AREA	,cm^2	9.61	WATER CONTENT	%	21.1
SAMPLE HEIGHT (L_0)	,mm	70.00	WET UNIT WEIGHT	g/cm^3	2.15
SAMPLE VOLUME	,cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.78

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
1	0.50	0.71	9.679136691	0.007142857	1.10	0.11
2.2	1.00	1.43	9.749275362	0.014285714	2.42	0.25
3.2	1.50	2.14	9.820437956	0.021428571	3.52	0.36
4.5	2.00	2.86	9.892647059	0.028571429	4.95	0.50
5.7	2.50	3.57	9.965925926	0.035714286	6.27	0.63
6.6	3.00	4.29	10.04029851	0.042857143	7.26	0.72
7.5	3.50	5.00	10.11578947	0.050000000	8.25	0.82
8	4.00	5.71	10.19242424	0.057142857	8.80	0.86
7	4.50	6.43	10.27022901	0.064285714	7.70	0.75

Unconfined Compressive Strength (q_u) = 0.86 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.43

OMRAN GEOTECHNICAL COMPANY

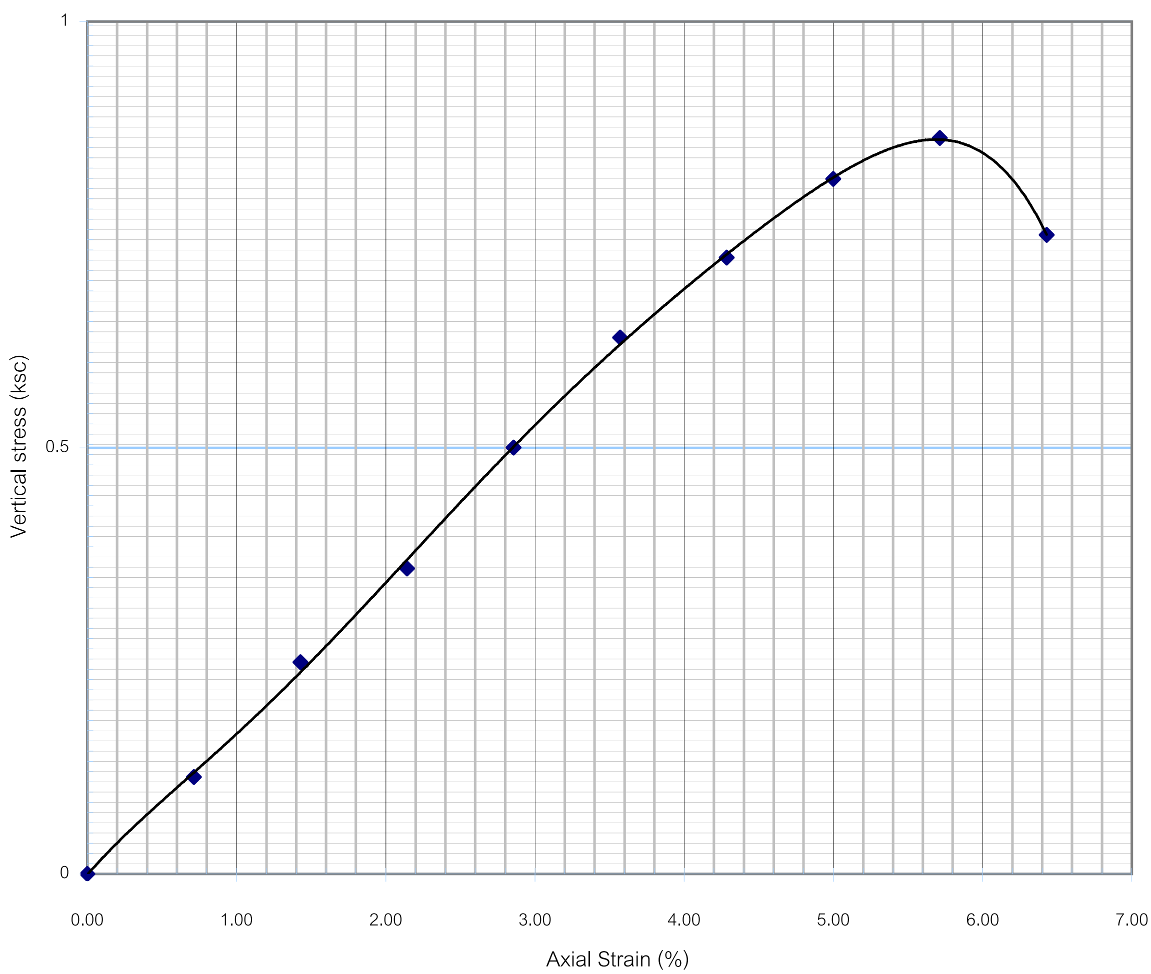
MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	1
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	2
Location	Kabul - Province	Date of Test	07.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength (S_u=q_u/2) ksc	0.430			
Water Content %	21.1			
Wet Unit Weight g/cm ^{3}	2.15			
Dry Unit Weight g/cm ^{3}	1.78		Tested by	Hayat
Strain at Failure %	5.71		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	2
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	3
Location	Kabul - Province	Date of Test	07.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	146
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	16
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.17
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.87

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
3	0.50	0.71	9.679136691	0.007142857	3.30	0.34
5.5	1.00	1.43	9.749275362	0.014285714	6.05	0.62
8	1.50	2.14	9.820437956	0.021428571	8.80	0.90
10	2.00	2.86	9.892647059	0.028571429	11.00	1.11
12	2.50	3.57	9.965925926	0.035714286	13.20	1.32
14	3.00	4.29	10.04029851	0.042857143	15.40	1.53
16	3.50	5.00	10.11578947	0.05	17.60	1.74
18	4.00	5.71	10.19242424	0.057142857	19.80	1.94
20.7	4.50	6.43	10.27022901	0.064285714	22.77	2.22
23	5.00	7.14	10.34923077	0.071428571	25.30	2.44
25	5.50	7.86	10.42945736	0.078571429	27.50	2.64
26.7	6.00	8.57	10.5109375	0.085714286	29.37	2.79
27.3	6.50	9.29	10.59370079	0.092857143	30.03	2.83
25	7.00	10.00	10.67777778	0.1	27.50	2.58

Unconfined Compressive Strength (q_u) = 2.83 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 1.415

OMRAN GEOTECHNICAL COMPANY

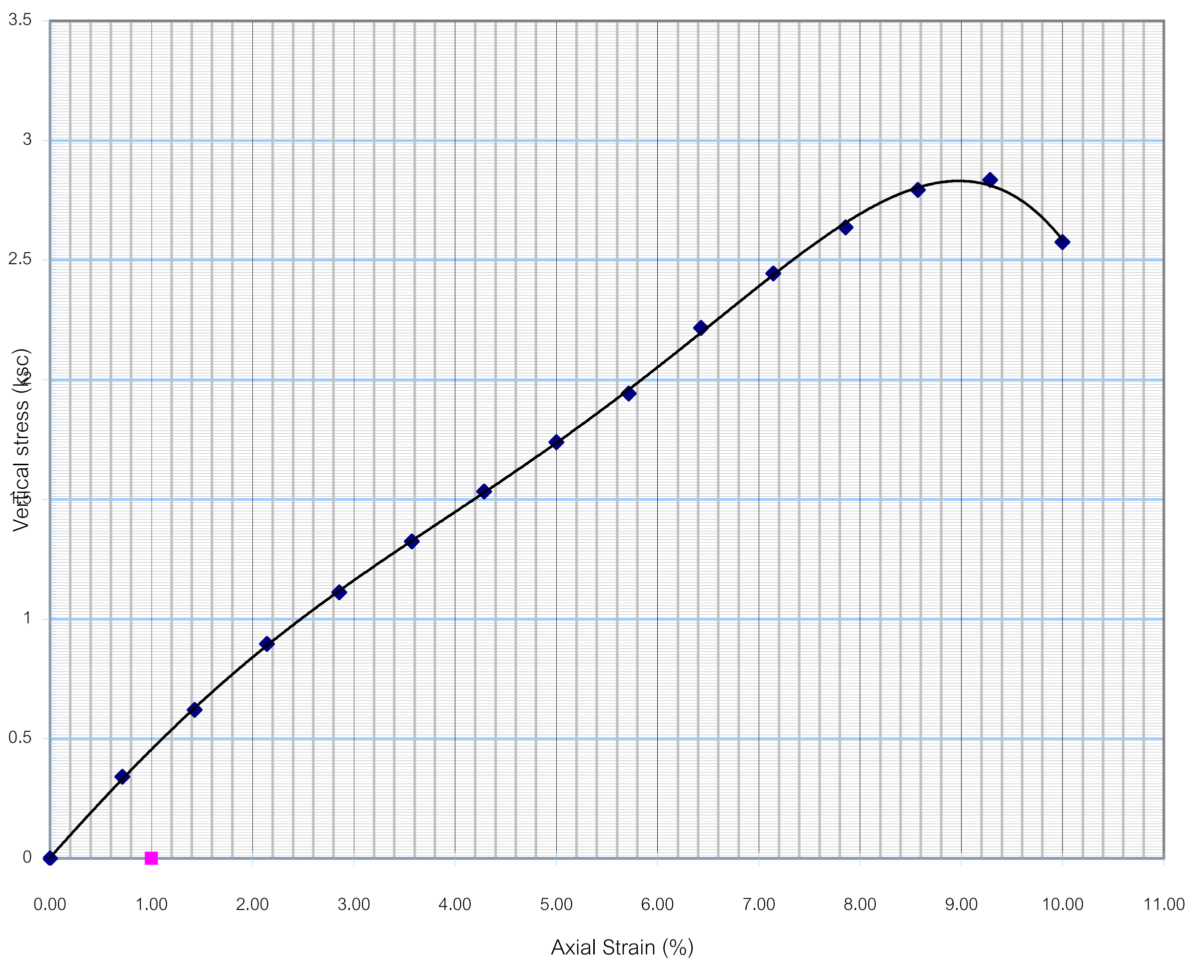
MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	2
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	3
Location	Kabul - Province	Date of Test	07.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength (S_u=q_u/2) ,ksc	1.415			
Water Content %	16			
Wet Unit Weight g/cm^3	2.17			
Dry Unit Weight g/cm^3	1.87		Tested by	Hayat
Strain at Failure %	9.29		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	2
Contractor	TETRA TECH Inc.	Sample Depth	7.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	4
Location	Kabul - Province	Date of Test	07.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	134.2
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	19
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	1.99
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.68

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.5	0.50	0.71	9.679136691	0.007142857	0.55	0.06
1	1.00	1.43	9.749275362	0.014285714	1.10	0.11
1.6	1.50	2.14	9.820437956	0.021428571	1.76	0.18
2.3	2.00	2.86	9.892647059	0.028571429	2.53	0.26
2.9	2.50	3.57	9.965925926	0.035714286	3.19	0.32
3.5	3.00	4.29	10.04029851	0.042857143	3.85	0.38
4	3.50	5.00	10.11578947	0.05	4.40	0.43
4.5	4.00	5.71	10.19242424	0.057142857	4.95	0.49
5	4.50	6.43	10.27022901	0.064285714	5.50	0.54
5.6	5.00	7.14	10.34923077	0.071428571	6.16	0.60
6.3	5.50	7.86	10.42945736	0.078571429	6.93	0.66
7	6.00	8.57	10.5109375	0.085714286	7.70	0.73
7.7	6.50	9.29	10.59370079	0.092857143	8.47	0.80
8.3	7.00	10.00	10.67777778	0.1	9.13	0.86
8.5	7.50	10.71	10.7632	0.107142857	9.35	0.87
8	8.00	11.43	10.85	0.114285714	8.80	0.81

Unconfined Compressive Strength (q_u) = 0.87 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.435

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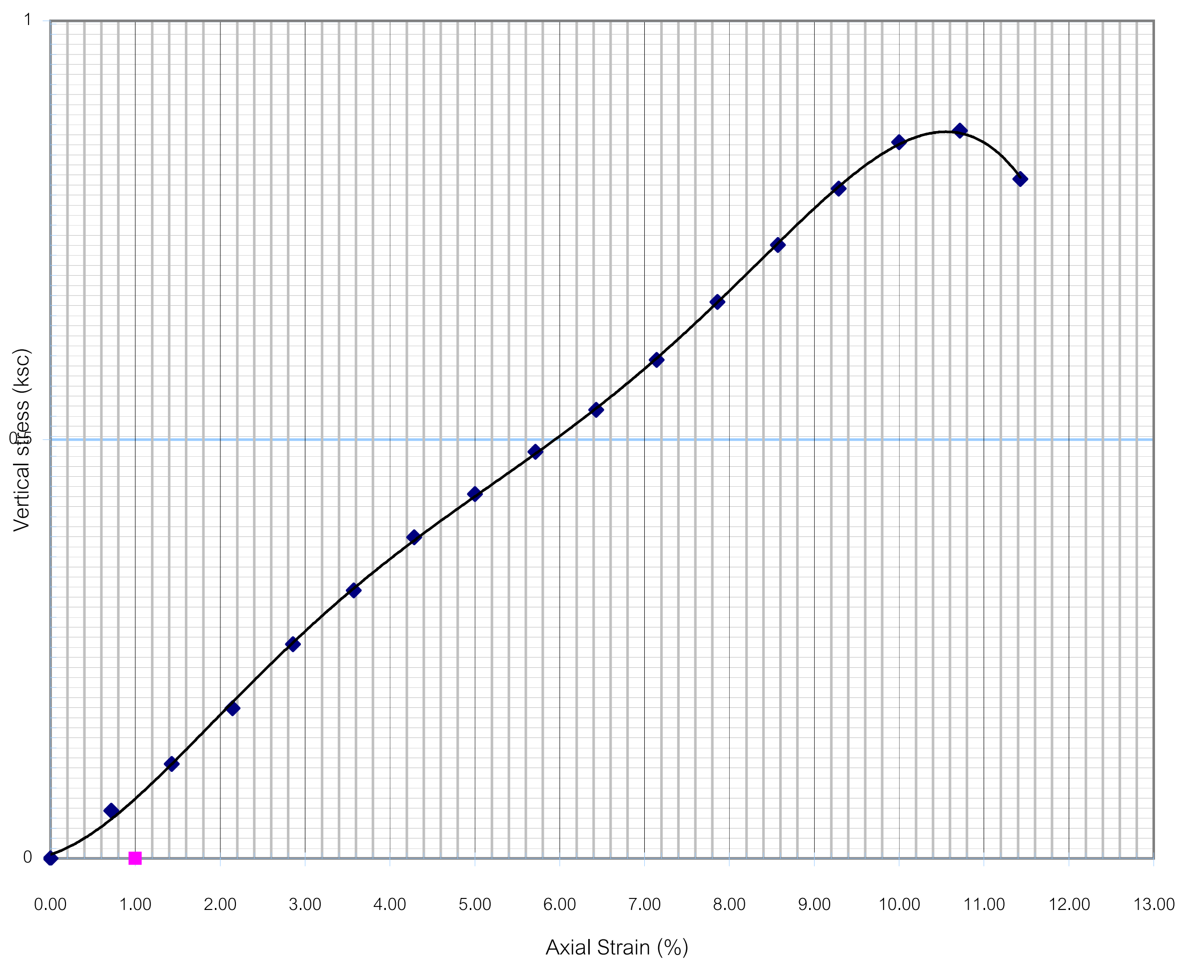
MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	2
Contractor	TETRA TECH Inc.	Sample Depth	7.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	4
Location	Kabul - Province	Date of Test	07.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.435			
Water Content %	19			
Wet Unit Weight g/cm^3	1.99			
Dry Unit Weight g/cm^3	1.68		Tested by	Hayat
Strain at Failure %	10.71		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	5
Location	Kabul - Province	Date of Test	05.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	147.2
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	21.3
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.19
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.80

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
1.9	0.50	0.71	9.679136691	0.007142857	2.09	0.22
3.5	1.00	1.43	9.749275362	0.014285714	3.85	0.39
5	1.50	2.14	9.820437956	0.021428571	5.50	0.56
6.8	2.00	2.86	9.892647059	0.028571429	7.48	0.76
8.5	2.50	3.57	9.965925926	0.035714286	9.35	0.94
10.5	3.00	4.29	10.04029851	0.042857143	11.55	1.15
12.5	3.50	5.00	10.11578947	0.05	13.75	1.36
14.3	4.00	5.71	10.19242424	0.057142857	15.73	1.54
16.2	4.50	6.43	10.27022901	0.064285714	17.82	1.74
18.5	5.00	7.14	10.34923077	0.071428571	20.35	1.97
20.2	5.50	7.86	10.42945736	0.078571429	22.22	2.13
22	6.00	8.57	10.5109375	0.085714286	24.20	2.30
24	6.50	9.29	10.59370079	0.092857143	26.40	2.49
25.5	7.00	10.00	10.67777778	0.1	28.05	2.63
26.6	7.50	10.71	10.7632	0.107142857	29.26	2.72
26.8	8.00	11.43	10.85	0.114285714	29.48	2.72
25.4	8.50	12.14	10.93821138	0.121428571	27.94	2.55

Unconfined Compressive Strength (q_u) = 2.72 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 1.36

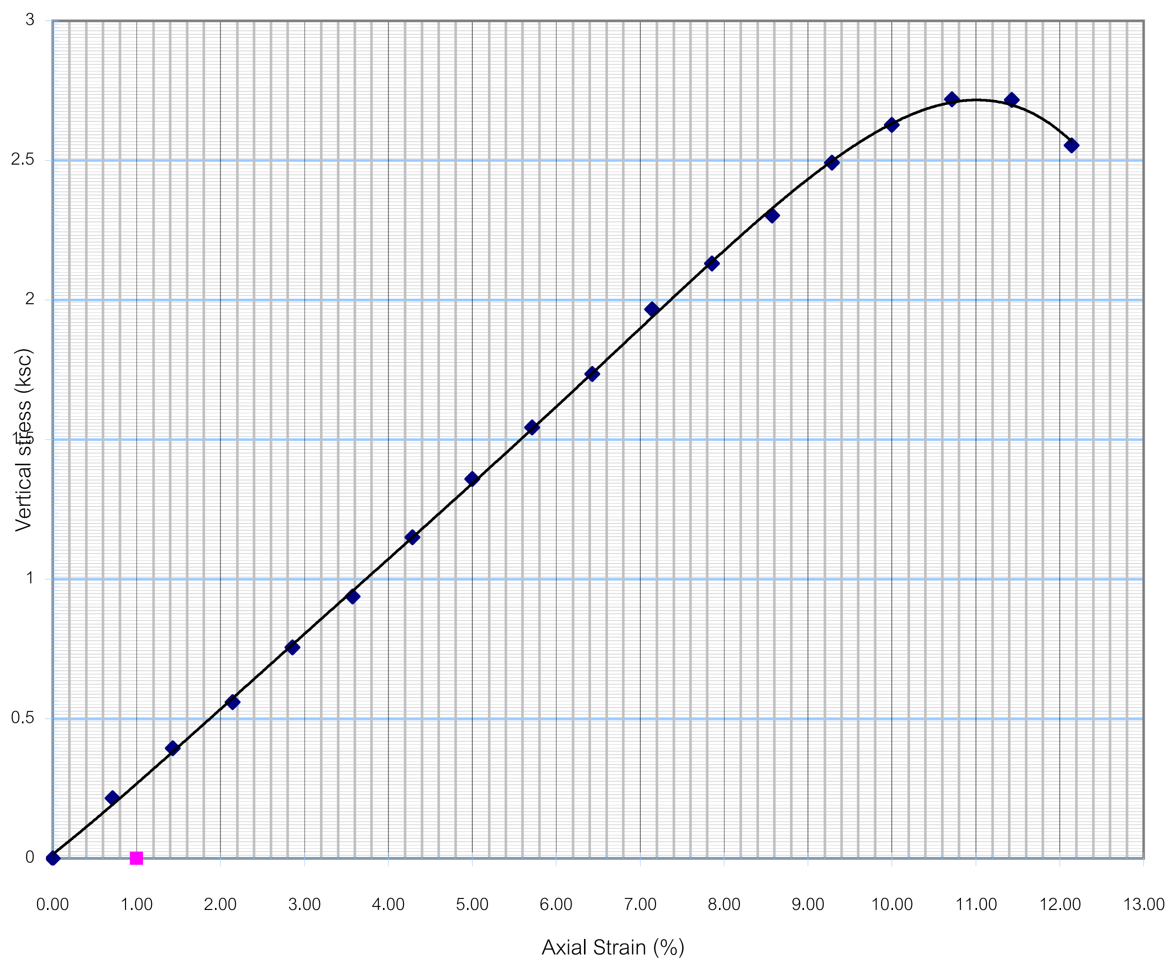
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	5
Location	Kabul - Province	Date of Test	05.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength (S_u=q_u/2) ,ksc	1.360			
Water Content %	21.3			
Wet Unit Weight g/cm^3	2.19			
Dry Unit Weight g/cm^3	1.8		Tested by	Hayat
Strain at Failure %	11.43		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Unconfined Compression Test
ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	3
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	6
Location	Kabul - Province	Date of Test	5.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	144.1
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	23.8
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.14
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.73

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
2.5	0.50	0.71	9.679136691	0.007142857	2.75	0.28
5	1.00	1.43	9.749275362	0.014285714	5.50	0.56
7	1.50	2.14	9.820437956	0.021428571	7.70	0.78
10	2.00	2.86	9.892647059	0.028571429	11.00	1.11
12	2.50	3.57	9.965925926	0.035714286	13.20	1.32
14	3.00	4.29	10.04029851	0.042857143	15.40	1.53
15	3.50	5.00	10.11578947	0.05	16.50	1.63
15.5	4.00	5.71	10.19242424	0.057142857	17.05	1.67
14	4.50	6.43	10.27022901	0.06428571	15.40	1.50

Unconfined Compressive Strength (q_u) = 1.67 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.835

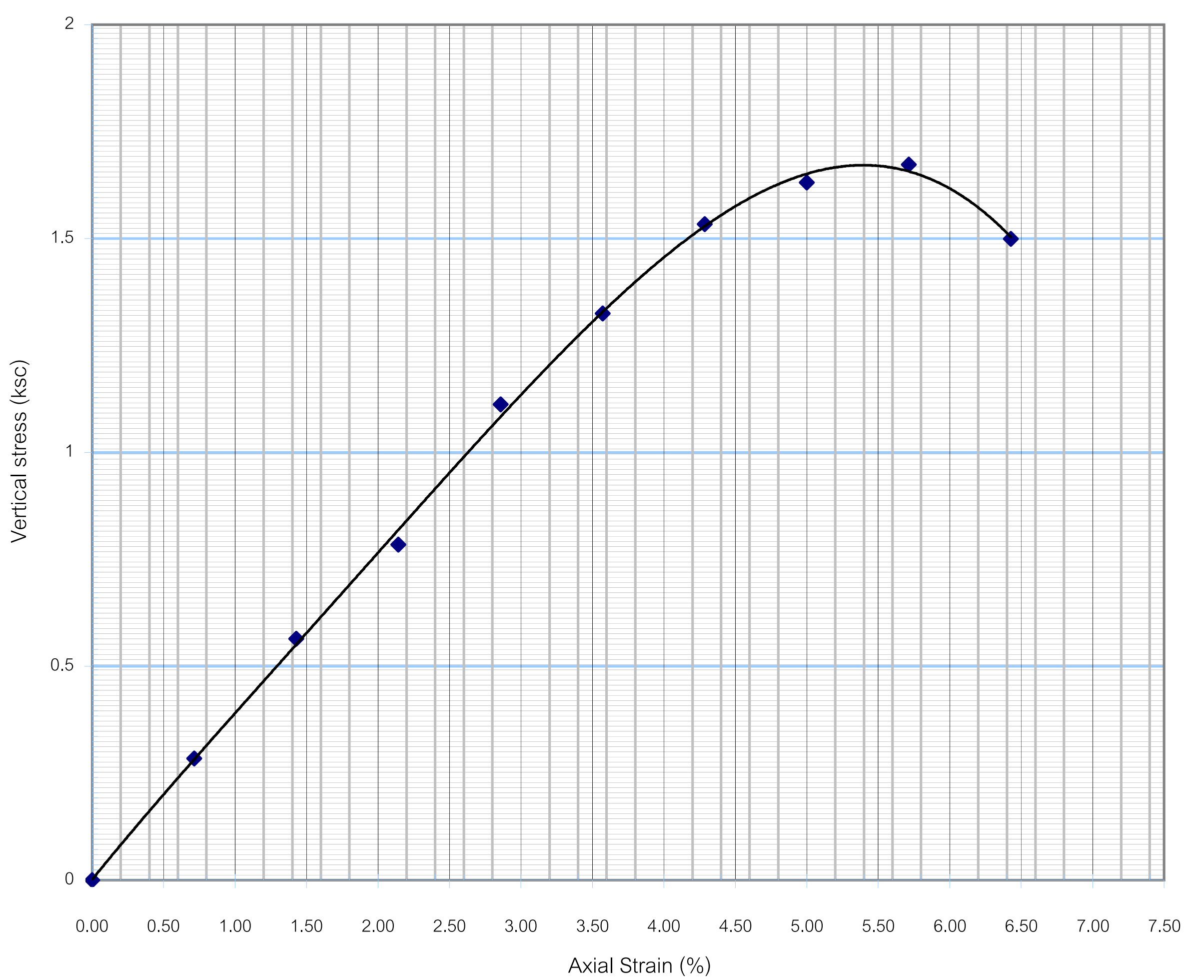
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	3
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	6
Location	Kabul - Province	Date of Test	5.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.835			
Water Content %	23.8			
Wet Unit Weight g/cm^3	2.14			
Dry Unit Weight g/cm^3	1.73		Tested by	Hayat
Strain at Failure %	5.71		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	4.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	7
Location	Kabul - Province	Date of Test	07.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	148.7
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	17.2
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.21
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.88

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.5	0.50	0.71	9.679136691	0.007142857	0.55	0.06
1	1.00	1.43	9.749275362	0.014285714	1.10	0.11
1.5	1.50	2.14	9.820437956	0.021428571	1.65	0.17
2.2	2.00	2.86	9.892647059	0.028571429	2.42	0.24
3	2.50	3.57	9.965925926	0.035714286	3.30	0.33
3.5	3.00	4.29	10.04029851	0.042857143	3.85	0.38
4	3.50	5.00	10.11578947	0.05	4.40	0.43
4.7	4.00	5.71	10.19242424	0.057142857	5.17	0.51
5.3	4.50	6.43	10.27022901	0.064285714	5.83	0.57
5.7	5.00	7.14	10.34923077	0.071428571	6.27	0.61
6	5.50	7.86	10.42945736	0.078571429	6.60	0.63
5	6.00	8.57	10.5109375	0.085714286	5.50	0.52

Unconfined Compressive Strength (q_u) = 0.63 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.315

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MATERIAL TESTING LAB

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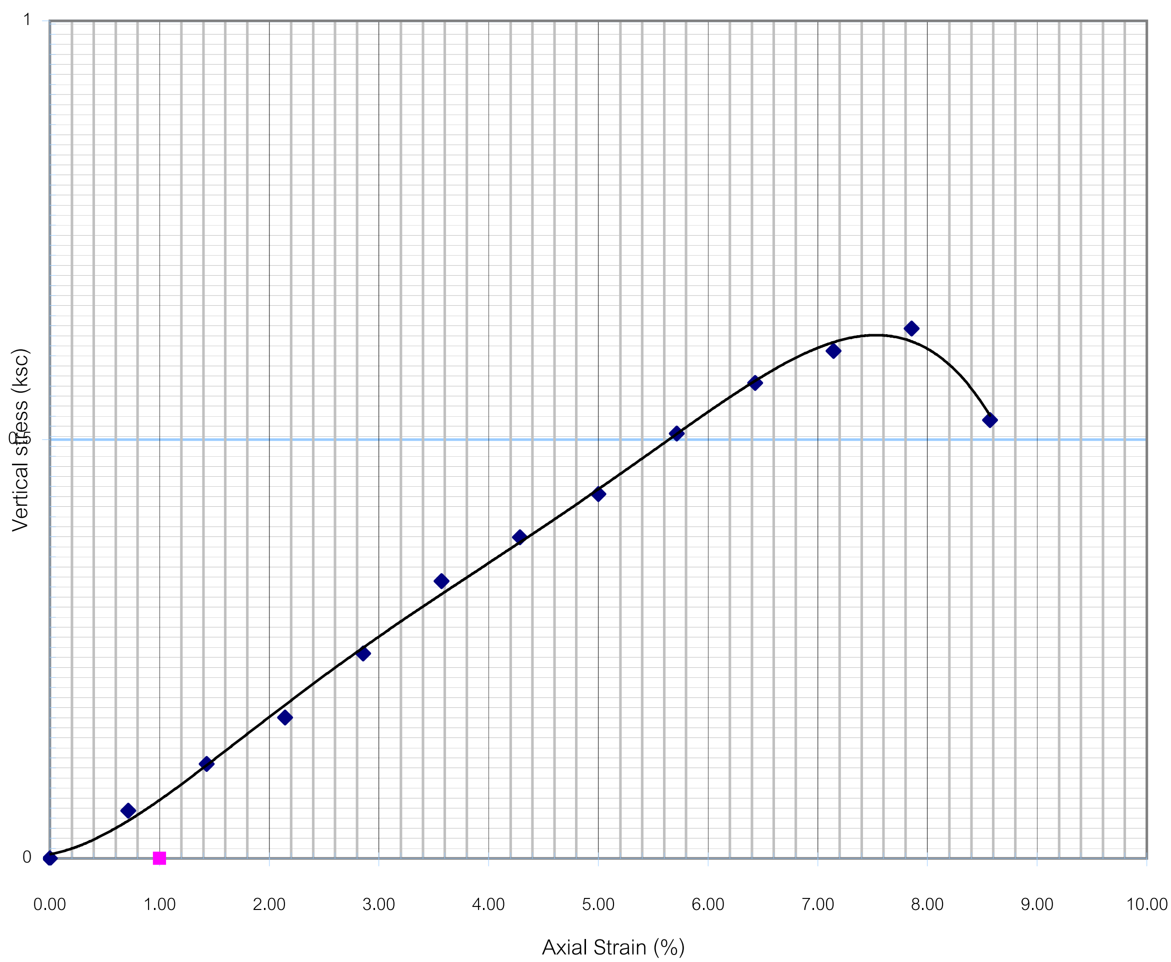
Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	4.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	7
Location	Kabul - Province	Date of Test	07.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.315			
Water Content %	17.2			
Wet Unit Weight g/cm^3	2.21			
Dry Unit Weight g/cm^3	1.88		Tested by	Hayat
Strain at Failure %	7.86		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	8
Location	Kabul - Province	Date of Test	05.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	156.8
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	19.4
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.33
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.95

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.6	0.50	0.71	9.679136691	0.007142857	0.66	0.07
1.8	1.00	1.43	9.749275362	0.014285714	1.98	0.20
3	1.50	2.14	9.820437956	0.021428571	3.30	0.34
4.5	2.00	2.86	9.892647059	0.028571429	4.95	0.50
5.8	2.50	3.57	9.965925926	0.035714286	6.38	0.64
7	3.00	4.29	10.04029851	0.042857143	7.70	0.77
8	3.50	5.00	10.11578947	0.05	8.80	0.87
8.8	4.00	5.71	10.19242424	0.057142857	9.68	0.95
8.9	4.50	6.43	10.27022901	0.064285714	9.79	0.95
8	5.00	7.14	10.34923077	0.071428571	8.80	0.85

Unconfined Compressive Strength (q_u) = 0.95 ksc

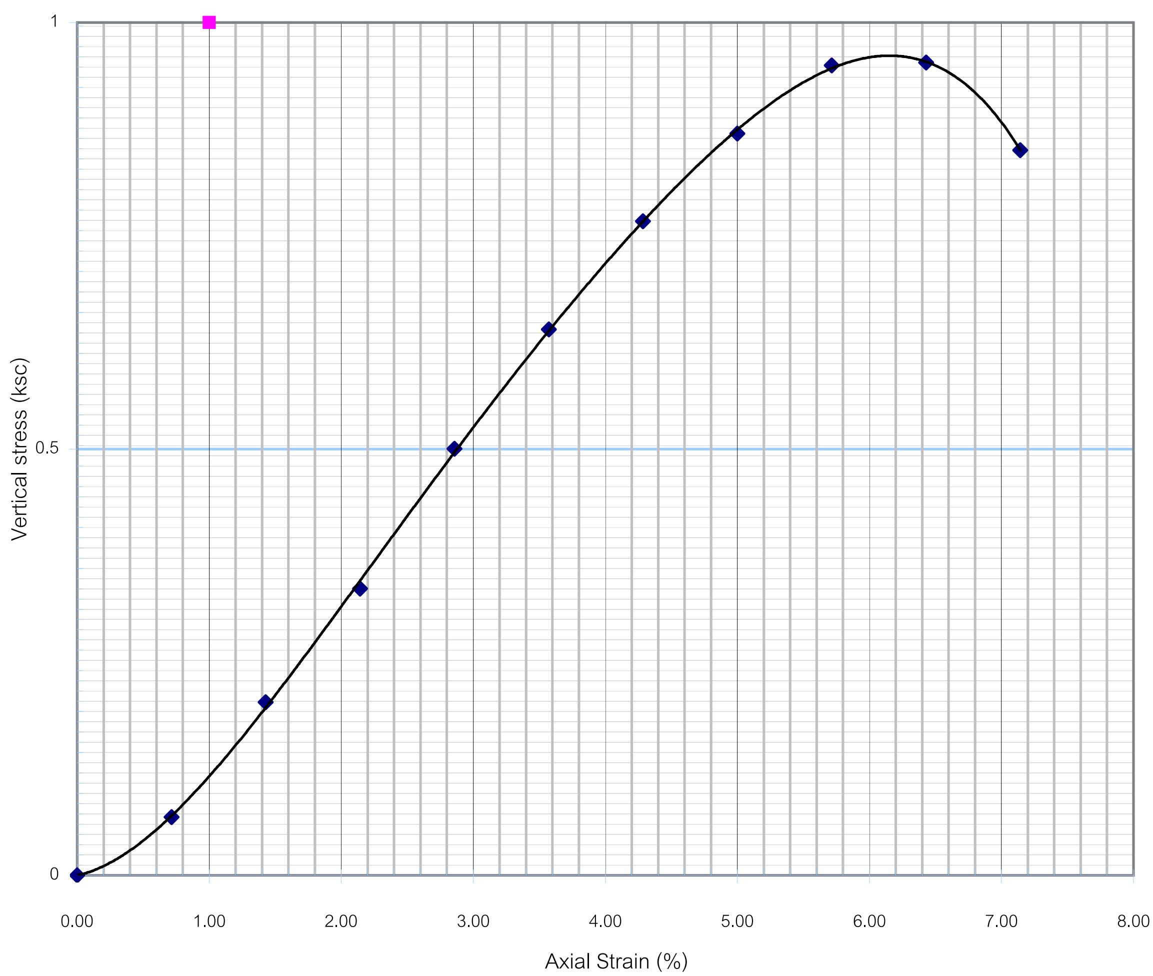
Undrained Shear Strength = Cohesion = $q_u/2$ = 0.475

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test
ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	8
Location	Kabul - Province	Date of Test	05.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.475			
Water Content %	19.4			
Wet Unit Weight g/cm^3	2.33			
Dry Unit Weight g/cm^3	1.95		Tested by	Hayat
Strain at Failure %	6.43		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	7.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	9
Location	Kabul - Province	Date of Test	05.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	147.7
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	22.6
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.19
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.79

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.5	0.50	0.71	9.679136691	0.007142857	0.55	0.06
1.3	1.00	1.43	9.749275362	0.014285714	1.43	0.15
2.3	1.50	2.14	9.820437956	0.021428571	2.53	0.26
3.5	2.00	2.86	9.892647059	0.028571429	3.85	0.39
4.8	2.50	3.57	9.965925926	0.035714286	5.28	0.53
6	3.00	4.29	10.04029851	0.042857143	6.60	0.66
7.4	3.50	5.00	10.11578947	0.05000000	8.14	0.80
8.5	4.00	5.71	10.19242424	0.057142857	9.35	0.92
9	4.50	6.43	10.27022901	0.064285714	9.90	0.96
8.5	5.00	7.14	10.34923077	0.071428571	9.35	0.90

Unconfined Compressive Strength (q_u) = 0.96 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.48

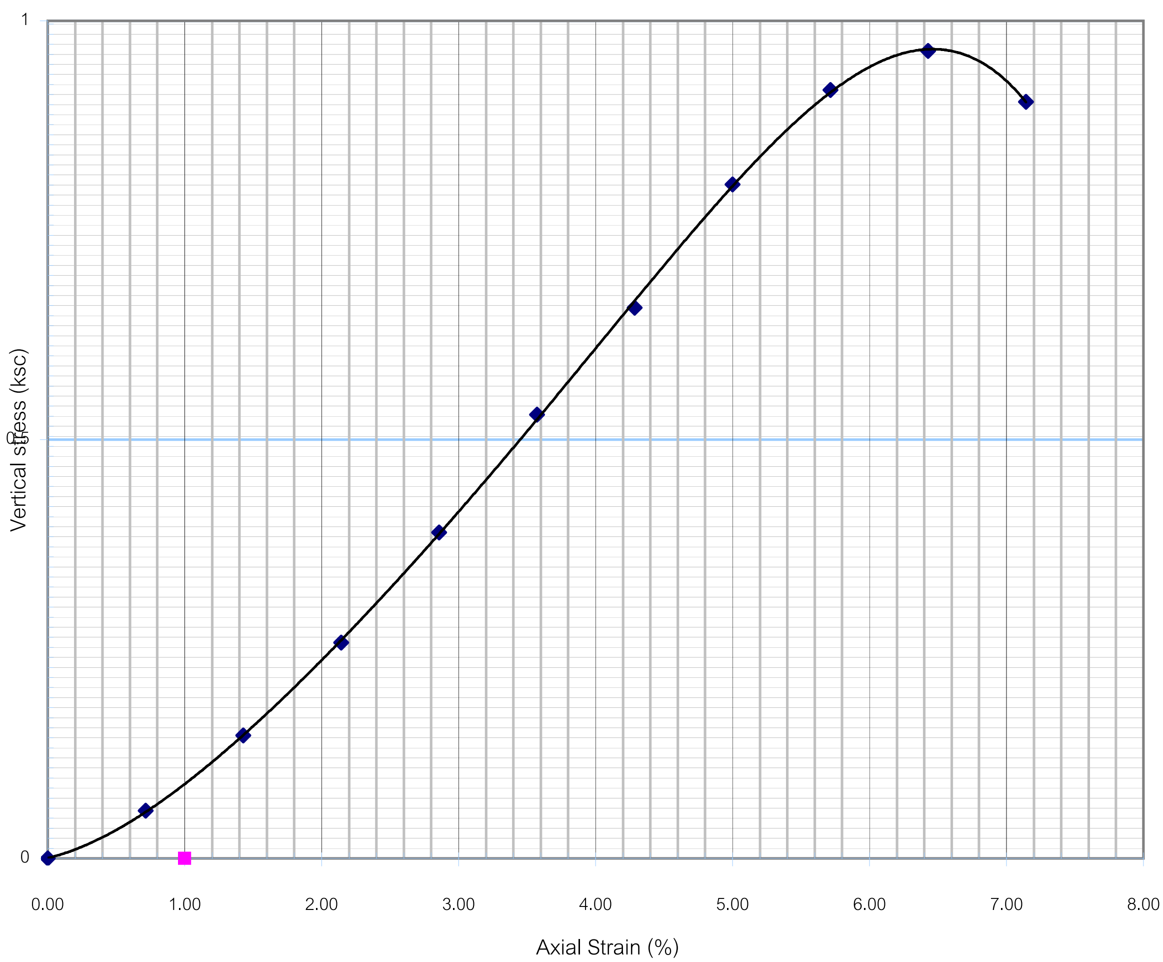
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	7.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	9
Location	Kabul - Province	Date of Test	05.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.480			
Water Content %	22.6			
Wet Unit Weight g/cm^3	2.19			
Dry Unit Weight g/cm^3	1.79		Tested by	Hayat
Strain at Failure %	6.43		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	9
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	10
Location	Kabul - Province	Date of Test	05.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	138.8
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	24.5
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.06
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.66

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.5	0.50	0.71	9.679136691	0.007142857	0.55	0.06
1	1.00	1.43	9.749275362	0.014285714	1.10	0.11
1.9	1.50	2.14	9.820437956	0.021428571	2.09	0.21
2.5	2.00	2.86	9.892647059	0.028571429	2.75	0.28
3.5	2.50	3.57	9.965925926	0.035714286	3.85	0.39
4.7	3.00	4.29	10.04029851	0.042857143	5.17	0.51
6.2	3.50	5.00	10.11578947	0.05	6.82	0.67
7.5	4.00	5.71	10.19242424	0.057142857	8.25	0.81
9	4.50	6.43	10.27022901	0.064285714	9.90	0.96
10.5	5.00	7.14	10.34923077	0.071428571	11.55	1.12
11.4	5.50	7.86	10.42945736	0.078571429	12.54	1.20
11.7	6.00	8.57	10.5109375	0.085714286	12.87	1.22
10.6	6.50	9.29	10.59370079	0.092857143	11.66	1.10

Unconfined Compressive Strength (q_u) = 1.22 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.61

OMRAN GEOTECHNICAL COMPANY

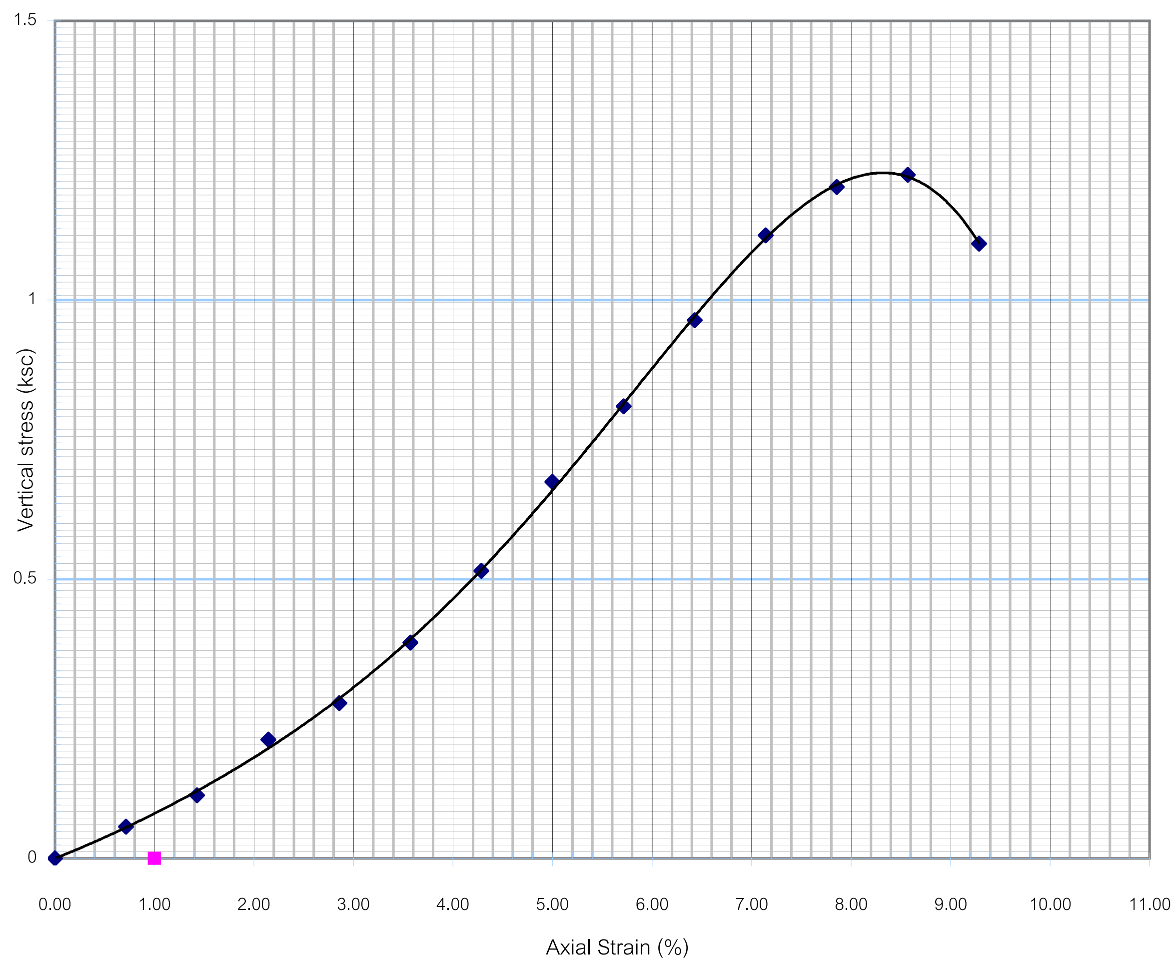
MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	3
Contractor	TETRA TECH Inc.	Sample Depth	9
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	10
Location	Kabul - Province	Date of Test	05.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u = q_u/2$) ,ksc	0.610			
Water Content %	24.5			
Wet Unit Weight g/cm^3	2.06			
Dry Unit Weight g/cm^3	1.66		Tested by	Hayat
Strain at Failure %	8.57		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	4
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	11
Location	Kabul - Province	Date of Test	04.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	156
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	17.02
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.32
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.98

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
2.3	0.50	0.71	9.679136691	0.007142857	2.53	0.26
5	1.00	1.43	9.749275362	0.014285714	5.50	0.56
7	1.50	2.14	9.820437956	0.021428571	7.70	0.78
9	2.00	2.86	9.892647059	0.028571429	9.90	1.00
11	2.50	3.57	9.965925926	0.035714286	12.10	1.21
13	3.00	4.29	10.04029851	0.042857143	14.30	1.42
15	3.50	5.00	10.11578947	0.05000000	16.50	1.63
16.5	4.00	5.71	10.19242424	0.057142857	18.15	1.78
18	4.50	6.43	10.27022901	0.064285714	19.80	1.93
19	5.00	7.14	10.34923077	0.071428571	20.90	2.02
20.5	5.50	7.86	10.42945736	0.078571429	22.55	2.16
21.7	6.00	8.57	10.5109375	0.085714286	23.87	2.27
22.8	6.50	9.29	10.59370079	0.092857143	25.08	2.37
23.1	7.00	10.00	10.67777778	0.10000000	25.41	2.38
22	7.50	10.71	10.76320000	0.107142857	24.20	2.25

Unconfined Compressive Strength (q_u) = 2.38 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 1.19

OMRAN GEOTECHNICAL COMPANY

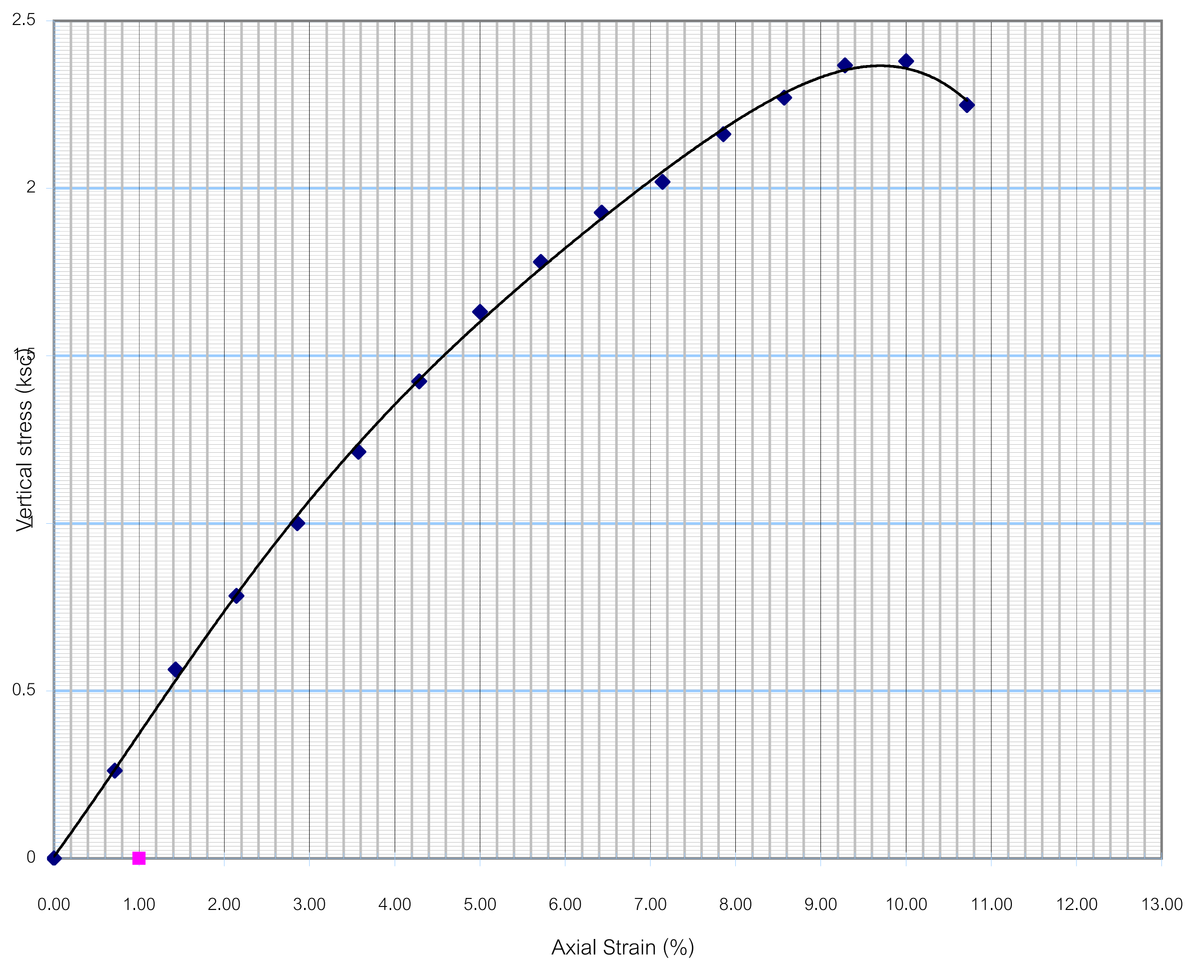
MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	4
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	11
Location	Kabul - Province	Date of Test	04.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength (S_u=q_u/2) ,ksc	1.190			
Water Content %	17.02			
Wet Unit Weight g/cm ^{3}	2.32			
Dry Unit Weight g/cm ^{3}	1.98		Tested by	Hayat
Strain at Failure %	10.00		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY
MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	4
Contractor	TETRA TECH Inc.	Sample Depth	3
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	12
Location	Kabul - Province	Date of Test	04.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	149.6
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	23.2
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.22
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.80

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.5	0.50	0.71	9.679136691	0.007142857	0.55	0.06
1	1.00	1.43	9.749275362	0.014285714	1.10	0.11
1.7	1.50	2.14	9.820437956	0.021428571	1.87	0.19
2.5	2.00	2.86	9.892647059	0.028571429	2.75	0.28
3.2	2.50	3.57	9.965925926	0.035714286	3.52	0.35
4	3.00	4.29	10.04029851	0.042857143	4.40	0.44
5	3.50	5.00	10.11578947	0.05000000	5.50	0.54
6	4.00	5.71	10.19242424	0.057142857	6.60	0.65
7	4.50	6.43	10.27022901	0.064285714	7.70	0.75
8	5.00	7.14	10.34923077	0.071428571	8.80	0.85
9	5.50	7.86	10.42945736	0.078571429	9.90	0.95
9.5	6.00	8.57	10.5109375	0.085714286	10.45	0.99
10.4	6.50	9.29	10.59370079	0.092857143	11.44	1.08
10.9	7.00	10.00	10.67777778	0.10000000	11.99	1.12
11.3	7.50	10.71	10.7632000	0.107142857	12.43	1.15
11.6	8.00	11.43	10.85000000	0.114285714	12.76	1.18
10.9	8.50	12.14	10.93821138	0.121428571	11.99	1.10

Unconfined Compressive Strength (q_u) = 1.18 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.59

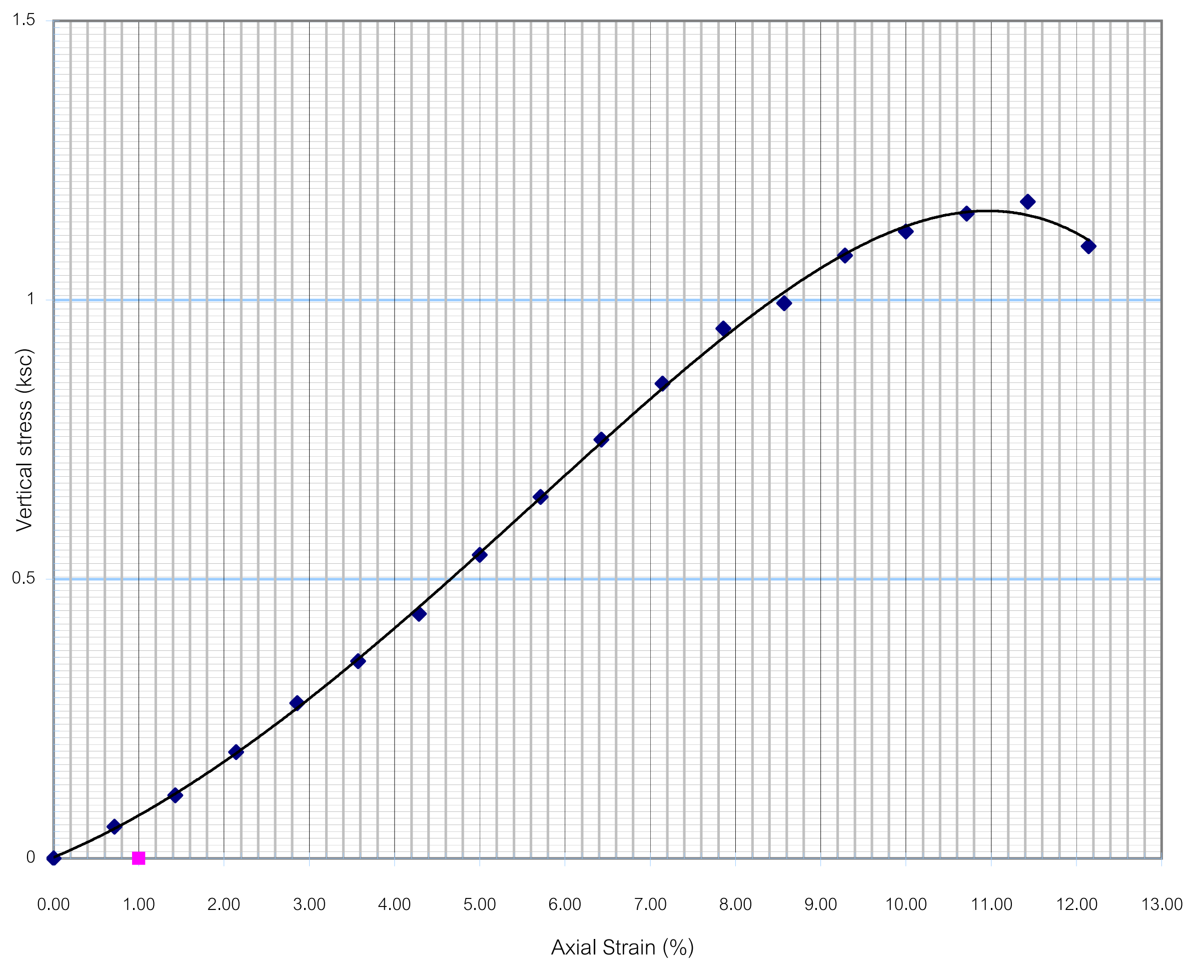
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	4
Contractor	TETRA TECH Inc.	Sample Depth	3
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	12
Location	Kabul - Province	Date of Test	04.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.590			
Water Content %	23.2			
Wet Unit Weight g/cm ^{3}	2.22			
Dry Unit Weight g/cm ^{3}	1.8		Tested by	Hayat
Strain at Failure %	11.43		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	4
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	13
Location	Kabul - Province	Date of Test	04.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	137.2
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	23.7
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.04
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.65

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.8	0.50	0.71	9.679136691	0.007142857	0.88	0.09
1.6	1.00	1.43	9.749275362	0.014285714	1.76	0.18
2.4	1.50	2.14	9.820437956	0.021428571	2.64	0.27
3.1	2.00	2.86	9.892647059	0.028571429	3.41	0.34
3.7	2.50	3.57	9.965925926	0.035714286	4.07	0.41
4.3	3.00	4.29	10.04029851	0.042857143	4.73	0.47
4.8	3.50	5.00	10.11578947	0.05	5.28	0.52
5.4	4.00	5.71	10.19242424	0.057142857	5.94	0.58
6	4.50	6.43	10.27022901	0.064285714	6.60	0.64
6.5	5.00	7.14	10.34923077	0.071428571	7.15	0.69
7.2	5.50	7.86	10.42945736	0.078571429	7.92	0.76
7.7	6.00	8.57	10.5109375	0.085714286	8.47	0.81
8.3	6.50	9.29	10.59370079	0.092857143	9.13	0.86
8.8	7.00	10.00	10.67777778	0.1	9.68	0.91
9.2	7.50	10.71	10.7632	0.107142857	10.12	0.94
9.4	8.00	11.43	10.85	0.114285714	10.34	0.95
8.8	8.50	12.14	10.93821138	0.121428571	9.68	0.88

Unconfined Compressive Strength (q_u) = 0.94 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.47

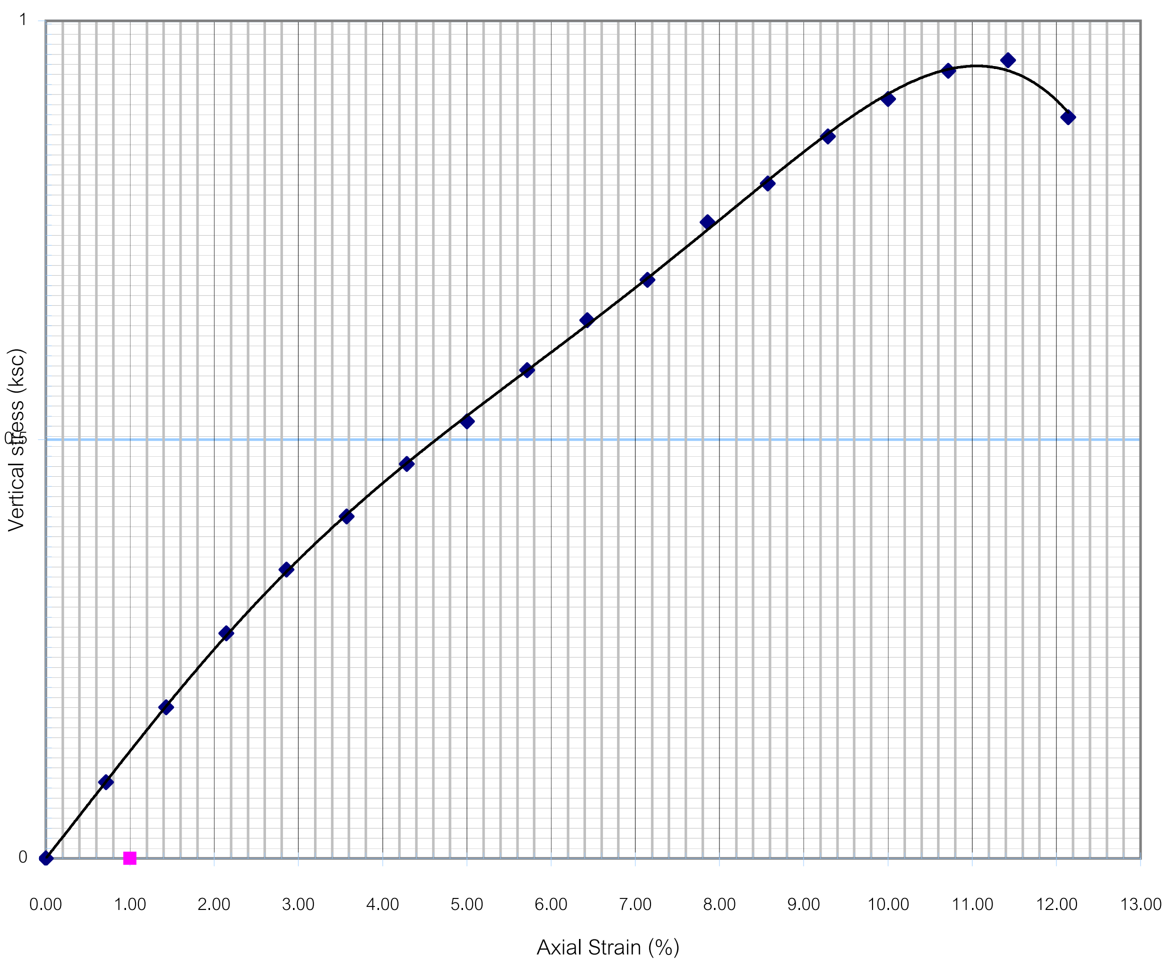
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	4
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	13
Location	Kabul - Province	Date of Test	04.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.470			
Water Content %	23.7			
Wet Unit Weight g/cm^3	2.04			
Dry Unit Weight g/cm^3	1.65		Tested by	Hayat
Strain at Failure %	11.43		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	5
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	14
Location	Kabul - Province	Date of Test	04.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	146.1
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	17.2
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.17
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.85

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
1.7	0.50	0.71	9.679136691	0.007142857	1.87	0.19
3	1.00	1.43	9.749275362	0.014285714	3.30	0.34
4	1.50	2.14	9.820437956	0.021428571	4.40	0.45
5	2.00	2.86	9.892647059	0.028571429	5.50	0.56
6	2.50	3.57	9.965925926	0.035714286	6.60	0.66
7	3.00	4.29	10.04029851	0.042857143	7.70	0.77
8	3.50	5.00	10.11578947	0.05	8.80	0.87
9.2	4.00	5.71	10.19242424	0.057142857	10.12	0.99
10.3	4.50	6.43	10.27022901	0.064285714	11.33	1.10
11.5	5.00	7.14	10.34923077	0.071428571	12.65	1.22
12.7	5.50	7.86	10.42945736	0.078571429	13.97	1.34
14.2	6.00	8.57	10.5109375	0.085714286	15.62	1.49
15.5	6.50	9.29	10.59370079	0.092857143	17.05	1.61
16.7	7.00	10.00	10.67777778	0.1	18.37	1.72
17	7.50	10.71	10.7632	0.107142857	18.70	1.74
15.8	8.00	11.43	10.85	0.114285714	17.38	1.60

Unconfined Compressive Strength (q_u) = 1.74 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.87

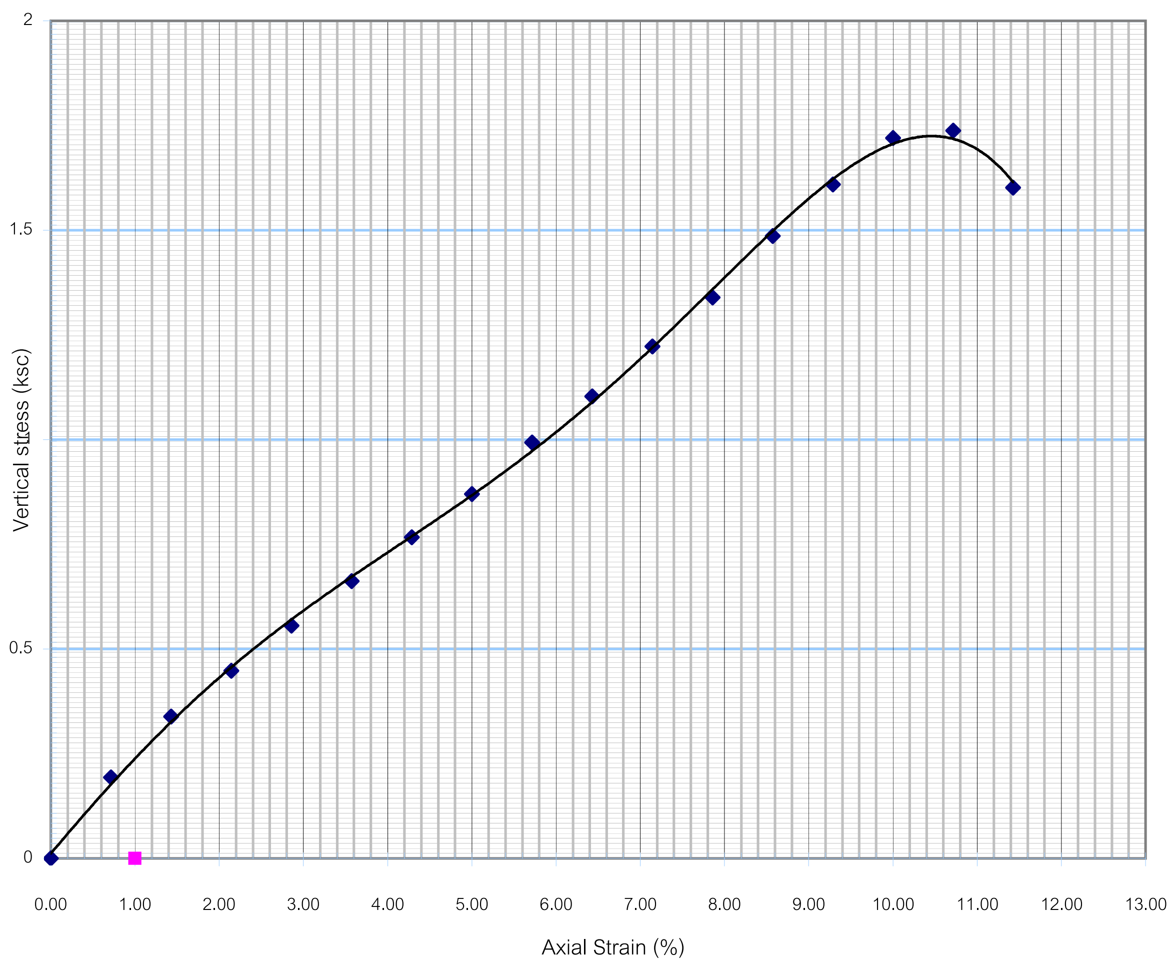
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	5
Contractor	TETRA TECH Inc.	Sample Depth	1.5
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	14
Location	Kabul - Province	Date of Test	04.08.2010



Description	Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength ($S_u=q_u/2$) ,ksc	0.870			
Water Content %	17.2			
Wet Unit Weight g/cm^3	2.17			
Dry Unit Weight g/cm^3	1.85		Tested by	Hayat
Strain at Failure %	10.71		Checked by	Jafari
omran.geotechnic@yahoo.com			Lab Manager	A.Najafi

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Omran Geotechnical Company

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	5
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	15
Location	Kabul - Province	Date of Test	04.08.2010

SAMPLE DATA:

SAMPLE DIAMETER	mm	35.00	WEIGHT OF SAMPLE	g	148.1
SAMPLE AREA	cm^2	9.61	WATER CONTENT	%	25
SAMPLE HEIGHT (L_0)	mm	70.00	WET UNIT WEIGHT	g/cm^3	2.20
SAMPLE VOLUME	cm^3	67.31	DRY UNIT WEIGHT	g/cm^3	1.76

UNCONFINED TEST RESULT:

Deformation dial reading (Div)	Vertical Deformation(mm)	Axial Strain (%)	Corrected Area (cm^2)	ε	Axial Load (kg)	Vertical Stress (ksc)
0	0.00	0	9.61	0	0.00	0.00
0.5	0.50	0.71	9.679136691	0.007142857	0.55	0.06
1	1.00	1.43	9.749275362	0.014285714	1.10	0.11
1.5	1.50	2.14	9.820437956	0.021428571	1.65	0.17
2	2.00	2.86	9.892647059	0.028571429	2.20	0.22
3	3.00	4.29	10.04029851	0.042857143	3.30	0.33
3.4	3.50	5.00	10.11578947	0.050000000	3.74	0.37
4	4.00	5.71	10.19242424	0.057142857	4.40	0.43
4.8	5.00	7.14	10.34923077	0.071428571	5.28	0.51
5.7	6.00	8.57	10.51093750	0.085714286	6.27	0.60
6.9	7.00	10.00	10.67777778	0.10000000	7.59	0.71
7.5	7.50	10.71	10.76320000	0.107142857	8.25	0.77
8	8.00	11.43	10.85000000	0.114285714	8.80	0.81
8.3	8.50	12.14	10.93821138	0.121428571	9.13	0.83
7.7	9.00	12.86	11.02786885	0.128571429	8.47	0.77

Unconfined Compressive Strength (q_u) = 0.83 ksc

Undrained Shear Strength = Cohesion = $q_u/2$ = 0.415

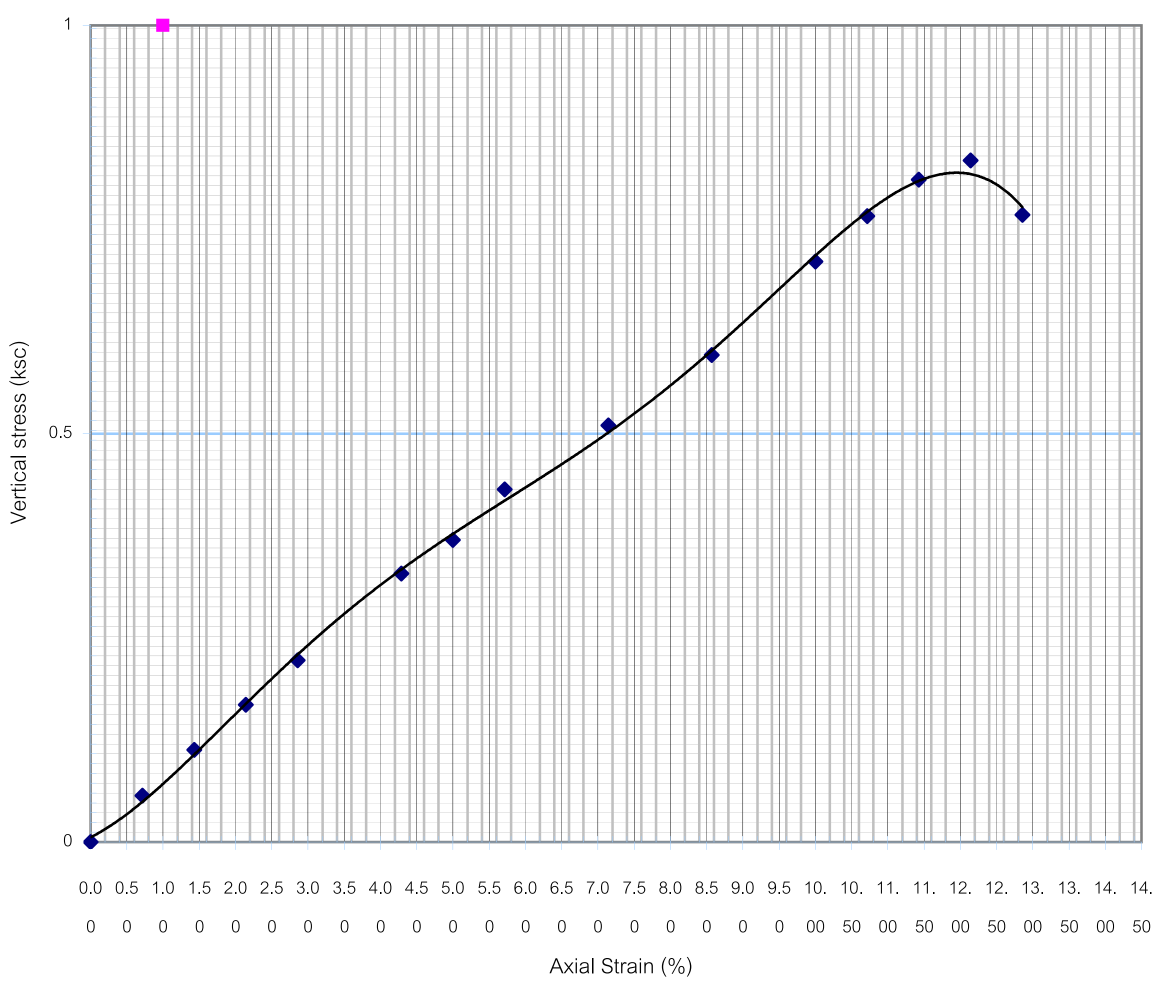
OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

Unconfined Compression Test

ASTM D- 2166

Client	USAID	Boring No	5
Contractor	TETRA TECH Inc.	Sample Depth	6
Project	New Admin Building, Ghazi Boys High School, Kabul	Sample No	15
Location	Kabul - Province	Date of Test	04.08.2010



Description		Undisturbed	Rebounded	REMARKS	
Undrained Shear Strength (S_u=q_u/2)	ksc	0.415			
Water Content	%	25			
Wet Unit Weight	g/cm^3	2.2			
Dry Unit Weight	g/cm^3	1.76		Tested by	Hayat
Strain at Failure	%	12.14		Checked by	Jafari
omran.geotechnic@yahoo.com				Lab Manager	A.Najafi

Omran Geotechnical Company

Lab Test Result of Boreholes

Direct Shear Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

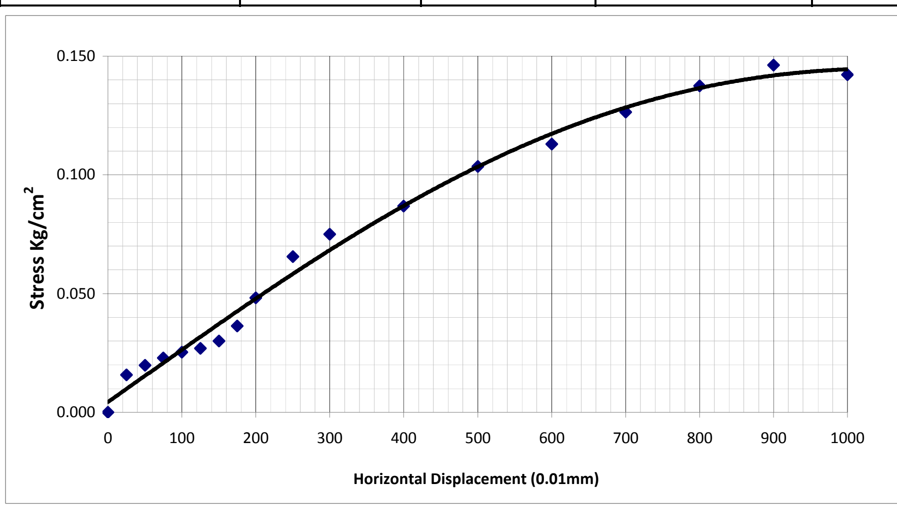
DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1.5m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.245 — Borehole # 01

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	2	3	4	5	6
1	0	0	102.01	0	0
2	25	2	102.01	1.612	0.015802372
3	50	2.5	102.01	2.015	0.019752965
4	75	2.9	102.01	2.3374	0.02291344
5	100	3.2	102.01	2.5792	0.025283796
6	125	3.4	102.01	2.7404	0.026864033
7	150	3.8	102.01	3.0628	0.030024507
8	175	4.6	102.01	3.7076	0.036345456
9	200	6.1	102.01	4.9166	0.048197236
10	250	8.3	102.01	6.6898	0.065579845
11	300	9.5	102.01	7.657	0.075061269
12	400	11	102.01	8.866	0.086913048
13	500	13.1	102.01	10.5586	0.103505539
14	600	14.3	102.01	11.5258	0.112986962
15	700	16	102.01	12.896	0.126418979
16	800	17.4	102.01	14.0244	0.137480639
17	900	18.5	102.01	14.911	0.146171944
18	1000	18	102.01	14.508	0.142221351



OMRAN GEOTECHNICAL COMPANY

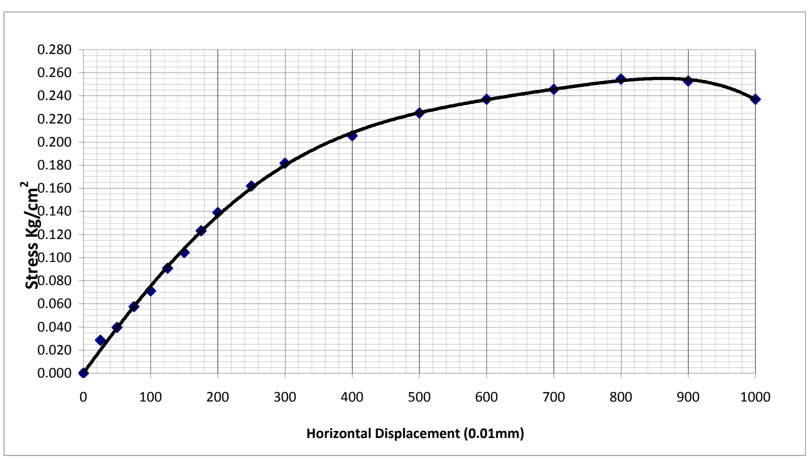
DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1.5m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.490 | Borehole # 01

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	2	3	4	5	6
1	0	**0**	102.01	0	**0**
2	25	3.6	102.01	2.9016	0.02844427
3	50	5	102.01	4.03	0.039505931
4	75	7.3	102.01	5.8838	0.057678659
5	100	9	102.01	7.254	0.071110675
6	125	11.5	102.01	9.269	0.090863641
7	150	13.2	102.01	10.6392	0.104295657
8	175	15.6	102.01	12.5736	0.123258504
9	200	17.6	102.01	14.1856	0.139060876
10	250	20.5	102.01	16.523	0.161974316
11	300	23	102.01	18.538	0.181727282
12	400	26	102.01	20.956	0.20543084
13	500	28.5	102.01	22.971	0.225183806
14	600	30	102.01	24.18	0.237035585
15	700	31.1	102.01	25.0666	0.24572689
16	800	32.2	102.01	25.9532	0.254418194
17	900	32	102.01	25.792	0.252837957
18	1000	30	102.01	24.18	0.237035585



OMRAN GEOTECHNICAL COMPANY

DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1.5m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.735	Borehole # 01	

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	2	3	4	5	6
1	0	**0**	102.01	0	**0**
2	25	6	102.01	4.836	0.047407117
3	50	8.5	102.01	6.851	0.067160082
4	75	11	102.01	8.866	0.086913048
5	100	15	102.01	12.09	0.118517792
6	125	19.2	102.01	15.4752	0.151702774
7	150	22.8	102.01	18.3768	0.180147044
8	175	25	102.01	20.15	0.197529654
9	200	29.5	102.01	23.777	0.233084992
10	250	34.5	102.01	27.807	0.272590922
11	300	38	102.01	30.628	0.300245074
12	400	41.6	102.01	33.5296	0.328689344
13	500	45	102.01	36.27	0.355553377
14	600	49.2	102.01	39.6552	0.388738359
15	700	50	102.01	40.3	0.395059308
16	800	50.8	102.01	40.9448	0.401380257
17	900	49.2	102.01	39.6552	0.388738359
18	1000	48	102.01	38.688	0.379256936

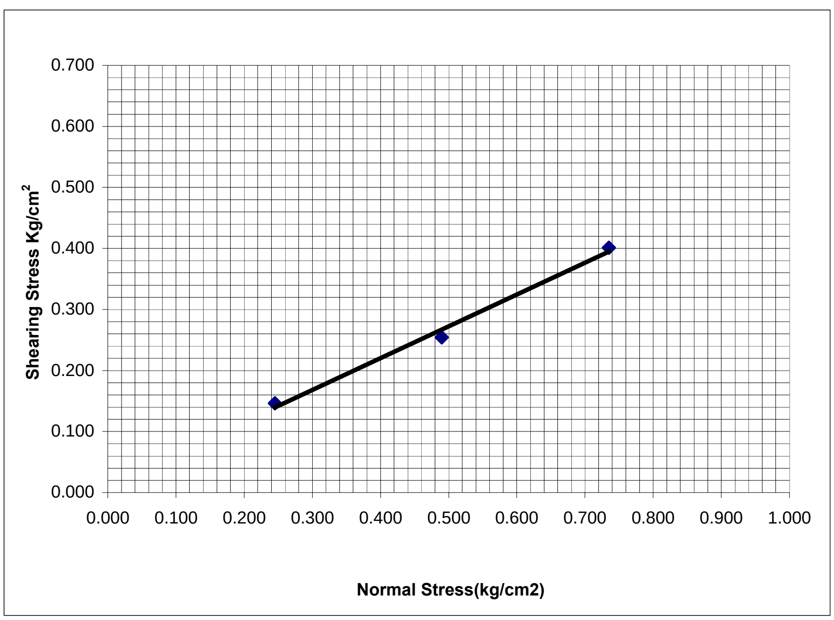
OMRAN GEOTECHNICAL COMPANY

Material Testing Laboratory

Direct Shear Test T-236 / D-6528

Client : USAID	Type of Test : CU
Contractor : TETRA TECH Inc.	Sampled By :OGC
Project Name : New Admin Building, Ghazi Boys High School	Depth # 1.5m
Proving Ring Calibration Factor 1 div : 0.806	Wet Unit Weight g/Cm^3 : 1.82
Discription of Soil : SILTY CLAY WITY SAND	Moisture Contant% : 16.29
Min of Friction Angle Φ : 27.44º Borehole # 01	Dry Unit Weight g/Cm^3 : 1.56
Cohesion : 0.017 Void Ratio : o.705	Specific Gravity : 2.66

No	Normal Stress Applied Kg/cm^2	Stress Dial Gauge Observation at Failure	Shear force Kg	Area (cm^2)	Shear Stress kg/cm^2	Calculate Φ
1	0.245	18.5	14.911	102.01	0.1462	30.83°
2	0.490	32.2	25.9532	102.01	0.2544	27.44°
3	0.735	50.8	40.9448	102.01	0.4014	28.64°



Tested By	**Hayat**
Checked By	**Jafari**

OMRAN GEOTECHNICAL COMPANY

Material Testing Laboratory

Direct Shear Test

Direct Shear Test T-236 / D-6528

Client	USAID	**Location**	Kabul Province, BH # 01, 1.5m
Contractor	**TETRA TECH Inc.**	**Date**	10/8/2010
Project	New Admin Building, Ghazi Boys High School		

Description of Soil	SILTY CLAY WITY SAND		
Type of Test	CU		
Strain Rate	0.5 mm/min		
Load Scale K	0.81 kg/Div		
Sample No.	1	2	3
Normal Stress, kg/cm2	0.245	0.49	0.735

Sample No.	Water Content (%)		Normal Stress (kg/cm2)	Max. Shearing Stress (kg/cm^2)
	berfor test	after test		
1	16.40	26	0.245	0.1462
2	17.09	27	0.49	0.2544
3	15.38	25.3	0.735	0.4014

Soil Specimen Measurements			
Length (cm)	10.1	10.1	10.1
Height (cm)	2	2	2
Area (cm)	102.01	102.01	102.01
Volume (cm3)	204.02	204.02	204.02
Weight of Soil + Split Former (gr)	498	495.8	499.5
Weight of Split Former (gr)	127	127	127
Weight of Soil (gr)	371	368.8	372.5
Wet Unit Weight (gr/cm3)	1.82	1.81	1.83
Dry Unit Weight (gr/cm3)	1.56	1.54	1.58

Water Content Determination			
Container No.	1	2	3
Weight of Wet Soil + Container	75.2	82.7	72
Weight of Dry Soil + Container	72.1	78	70
Weight of Water	3.1	4.7	2
Weight of Container	53.2	50.5	57
Weight of Dry Soil	18.9	27.5	13
Water Content	16.40	17.09	15.38

OMRAN GEOTECHNICAL COMPANY

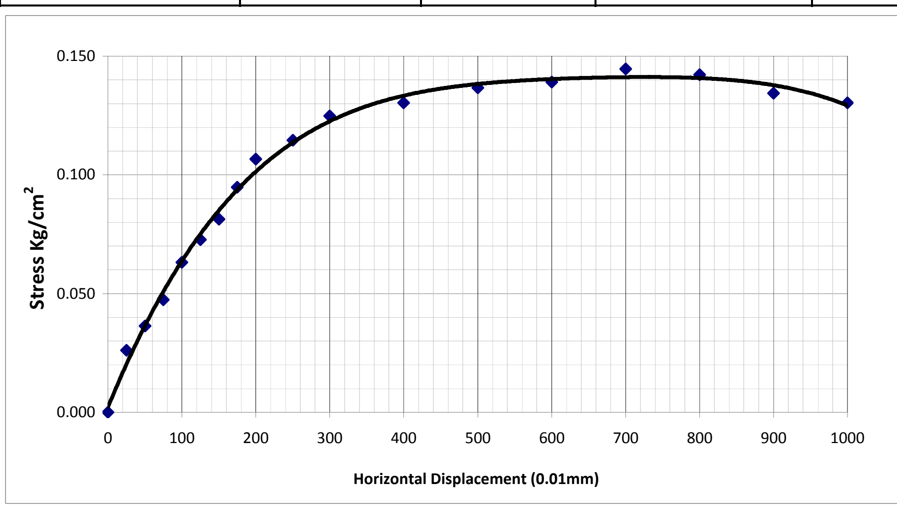
DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1.3m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.245	Borehole # 05	

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	2	3	4	5	6
1	0	0	102.01	0	0
2	25	3.3	102.01	2.6598	0.026073914
3	50	4.6	102.01	3.7076	0.036345456
4	75	6	102.01	4.836	0.047407117
5	100	8	102.01	6.448	0.063209489
6	125	9.2	102.01	7.4152	0.072690913
7	150	10.3	102.01	8.3018	0.081382217
8	175	12	102.01	9.672	0.094814234
9	200	13.5	102.01	10.881	0.106666013
10	250	14.5	102.01	11.687	0.114567199
11	300	15.8	102.01	12.7348	0.124838741
12	400	16.5	102.01	13.299	0.130369572
13	500	17.3	102.01	13.9438	0.136690521
14	600	17.6	102.01	14.1856	0.139060876
15	700	18.3	102.01	14.7498	0.144591707
16	800	18	102.01	14.508	0.142221351
17	900	17	102.01	13.702	0.134320165
18	1000	16.5	102.01	13.299	0.130369572



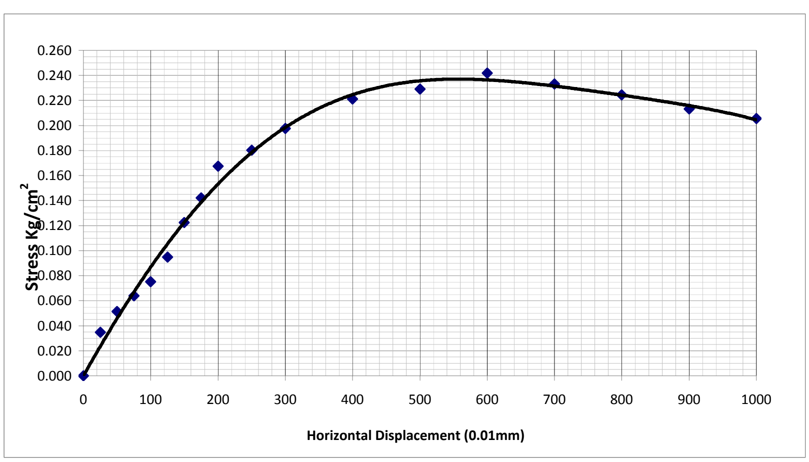
OMRAN GEOTECHNICAL COMPANY

DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1.3m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.490		Borehole # 05			
Sr No	**Horizontal Gage Reading (0.01 mm)**	**Proving Ring Reading**	**Area(Cm²)**	**Shear Force (Kg)**	**Shear Stress (Kg/Cm²)**
1	**2**	**3**	**4**	**5**	**6**
1	0	**0**	102.01	0	**0**
2	25	4.4	102.01	3.5464	0.034765219
3	50	6.5	102.01	5.239	0.05135771
4	75	8.1	102.01	6.5286	0.063999608
5	100	9.5	102.01	7.657	0.075061269
6	125	12	102.01	9.672	0.094814234
7	150	15.5	102.01	12.493	0.122468385
8	175	18	102.01	14.508	0.142221351
9	200	21.2	102.01	17.0872	0.167505147
10	250	22.8	102.01	18.3768	0.180147044
11	300	25	102.01	20.15	0.197529654
12	400	28	102.01	22.568	0.221233212
13	500	29	102.01	23.374	0.229134399
14	600	30.6	102.01	24.6636	0.241776296
15	700	29.5	102.01	23.777	0.233084992
16	800	28.4	102.01	22.8904	0.224393687
17	900	27	102.01	21.762	0.213332026
18	1000	26	102.01	20.956	0.20543084



OMRAN GEOTECHNICAL COMPANY

DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1.3m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.735 — Borehole # 05

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	**2**	**3**	**4**	**5**	**6**
1	0	**0**	102.01	0	**0**
2	25	8	102.01	6.448	0.063209489
3	50	10	102.01	8.06	0.079011862
4	75	13	102.01	10.478	0.10271542
5	100	16	102.01	12.896	0.126418979
6	125	19	102.01	15.314	0.150122537
7	150	23	102.01	18.538	0.181727282
8	175	26.1	102.01	21.0366	0.206220959
9	200	29	102.01	23.374	0.229134399
10	250	32.6	102.01	26.2756	0.257578669
11	300	36	102.01	29.016	0.284442702
12	400	39.1	102.01	31.5146	0.308936379
13	500	42.5	102.01	34.255	0.335800412
14	600	44.6	102.01	35.9476	0.352392903
15	700	47	102.01	37.882	0.371355749
16	800	48.5	102.01	39.091	0.383207529
17	900	47	102.01	37.882	0.371355749
18	1000	46	102.01	37.076	0.363454563

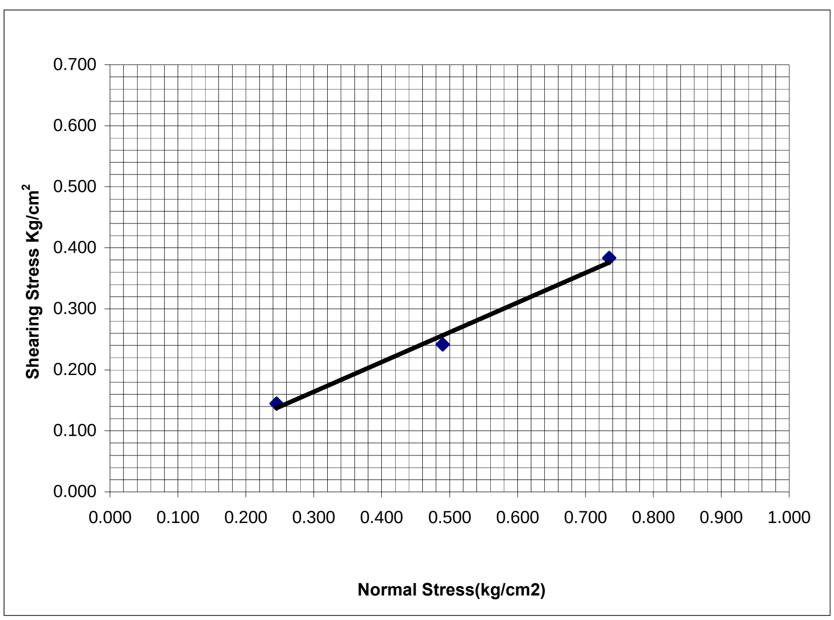
OMRAN GEOTECHNICAL COMPANY

Material Testing Laboratory

Direct Shear Test T-236 / D-6528

Client : USAID	Type of Test : CU
Contractor : TETRA TECH Inc.	Sampled By :OGC
Project Name : New Admin Building, Ghazi Boys High School	Depth # 1.3m
Proving Ring Calibration Factor 1 div : 0.806	Wet Unit Weight g/Cm^3 : 1.77
Discription of Soil : SILTY CLAY WITH SAND	Moisture Contant% : 17.78
Min of Friction Angle Φ : 26.26° Borehole # 05	Dry Unit Weight g/Cm^3 : 1.5
Cohesion : 0.02 Void Ratio : o.767	Specific Gravity : 2.65

No	Normal Stress Applied Kg/cm^2	Stress Dial Gauge Observation at Failure	Shear force Kg	Area (cm^2)	Shear Stress kg/cm^2	Calculate Φ
1	0.245	18.3	14.7498	102.01	0.1446	30.55°
2	0.490	30.6	24.6636	102.01	0.2418	26.26°
3	0.735	48.5	39.091	102.01	0.3832	27.54°



Tested By	**Hayat**	
Checked By	**Jafari**	

OMRAN GEOTECHNICAL COMPANY

Material Testing Laboratory

Direct Shear Test

Direct Shear Test T-236 / D-6528

Client	USAID	**Location**	Kabul Province, BH # 05, 1.3m
Contractor	**TETRA TECH Inc.**	**Date**	12/8/2010
Project	New Admin Building, Ghazi Boys High School		

Description of Soil	SILTY CLAY WITH SAND		
Type of Test	CU		
Strain Rate	0.5 mm/min		
Load Scale K	0.81 kg/Div		
Sample No.	1	2	3
Normal Stress, kg/cm2	0.245	0.49	0.735

Sample No.	Water Content (%)		Normal Stress (kg/cm2)	Max. Shearing Stress (kg/cm^2)
	berfor test	after test		
1	17.77	29	0.245	0.1446
2	18.06	30.5	0.49	0.2418
3	17.51	28.6	0.735	0.3832

Soil Specimen Measurements			
Length (cm)	10.1	10.1	10.1
Height (cm)	2	2	2
Area (cm)	102.01	102.01	102.01
Volume (cm3)	204.02	204.02	204.02
Weight of Soil + Split Former (gr)	483	491	489
Weight of Split Former (gr)	127	127	127
Weight of Soil (gr)	356	364	362
Wet Unit Weight (gr/cm3)	1.74	1.78	1.77
Dry Unit Weight (gr/cm3)	1.48	1.51	1.51

Water Content Determination			
Container No.	1	2	3
Weight of Wet Soil + Container	182.7	205.8	199
Weight of Dry Soil + Container	170.1	189	183.5
Weight of Water	12.6	16.8	15.5
Weight of Container	99.2	96	95
Weight of Dry Soil	70.9	93	88.5
Water Content	17.77	18.06	17.51

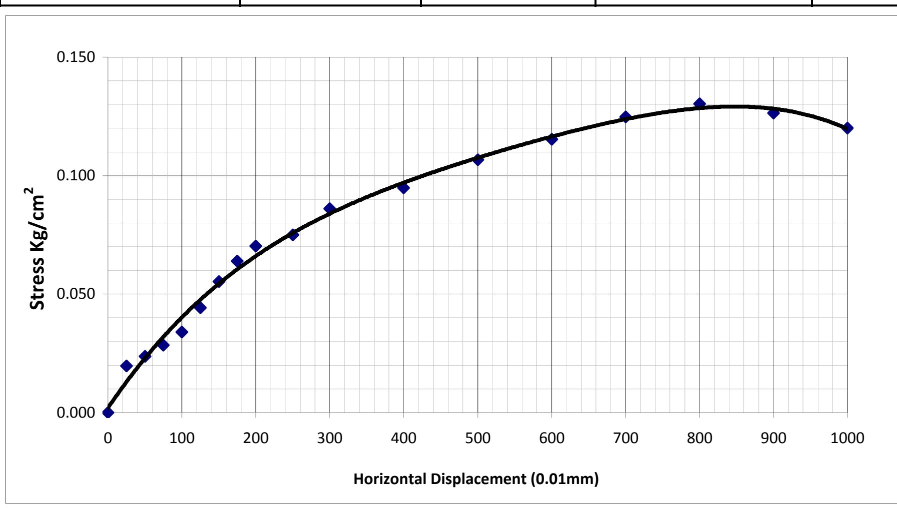
OMRAN GEOTECHNICAL COMPANY

DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.245		Borehole # 03			
Sr No	**Horizontal Gage Reading (0.01 mm)**	**Proving Ring Reading**	**Area(Cm²)**	**Shear Force (Kg)**	**Shear Stress (Kg/Cm²)**
1	**2**	**3**	**4**	**5**	**6**
1	0	0	102.01	0	0
2	25	2.5	102.01	2.015	0.019752965
3	50	3	102.01	2.418	0.023703558
4	75	3.6	102.01	2.9016	0.02844427
5	100	4.3	102.01	3.4658	0.0339751
6	125	5.6	102.01	4.5136	0.044246642
7	150	7	102.01	5.642	0.055308303
8	175	8.1	102.01	6.5286	0.063999608
9	200	8.9	102.01	7.1734	0.070320557
10	250	9.5	102.01	7.657	0.075061269
11	300	10.9	102.01	8.7854	0.086122929
12	400	12	102.01	9.672	0.094814234
13	500	13.5	102.01	10.881	0.106666013
14	600	14.6	102.01	11.7676	0.115357318
15	700	15.8	102.01	12.7348	0.124838741
16	800	16.5	102.01	13.299	0.130369572
17	900	16	102.01	12.896	0.126418979
18	1000	15.2	102.01	12.2512	0.12009803



OMRAN GEOTECHNICAL COMPANY

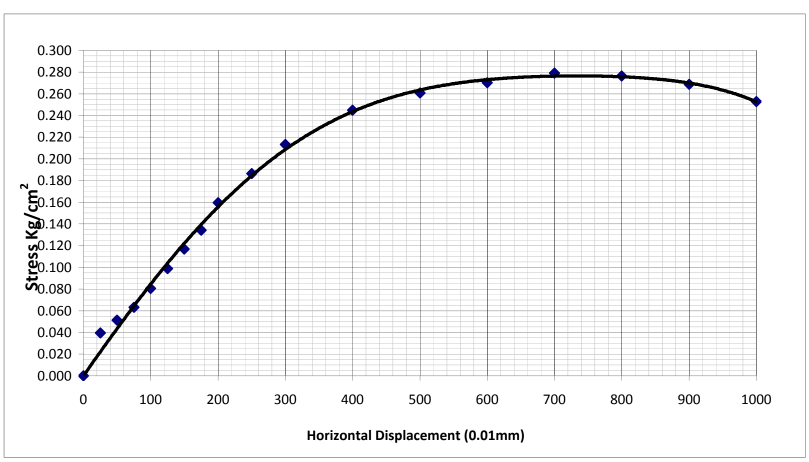
DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.490 | Borehole # 03

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	2	3	4	5	6
1	0	**0**	102.01	0	**0**
2	25	5	102.01	4.03	0.039505931
3	50	6.5	102.01	5.239	0.05135771
4	75	8	102.01	6.448	0.063209489
5	100	10.2	102.01	8.2212	0.080592099
6	125	12.5	102.01	10.075	0.098764827
7	150	14.8	102.01	11.9288	0.116937555
8	175	17	102.01	13.702	0.134320165
9	200	20.2	102.01	16.2812	0.15960396
10	250	23.6	102.01	19.0216	0.186467993
11	300	27	102.01	21.762	0.213332026
12	400	31	102.01	24.986	0.244936771
13	500	33	102.01	26.598	0.260739143
14	600	34.2	102.01	27.5652	0.270220567
15	700	35.3	102.01	28.4518	0.278911871
16	800	35	102.01	28.21	0.276541516
17	900	34	102.01	27.404	0.268640329
18	1000	32	102.01	25.792	0.252837957



OMRAN GEOTECHNICAL COMPANY

DIRECT SHEAR TEST

Direct Shear Test T-236 / D-6528

Client	USAID	Sampled By	OGC
Contractor	TETRA TECH Inc.	Depth	1m
Project	New Admin Building, Ghazi Boys High School		

Normal Stress (kg/cm^2) : 0.735 — Borehole # 03

Sr No	Horizontal Gage Reading (0.01 mm)	Proving Ring Reading	Area(Cm²)	Shear Force (Kg)	Shear Stress (Kg/Cm²)
1	2	3	4	5	6
1	0	**0**	102.01	0	**0**
2	25	7	102.01	5.642	0.055308303
3	50	10	102.01	8.06	0.079011862
4	75	14.5	102.01	11.687	0.114567199
5	100	18	102.01	14.508	0.142221351
6	125	22.5	102.01	18.135	0.177776689
7	150	26	102.01	20.956	0.20543084
8	175	30.2	102.01	24.3412	0.238615822
9	200	34.5	102.01	27.807	0.272590922
10	250	39	102.01	31.434	0.30814626
11	300	43.8	102.01	35.3028	0.346071954
12	400	48	102.01	38.688	0.379256936
13	500	51	102.01	41.106	0.402960494
14	600	54.5	102.01	43.927	0.430614646
15	700	57.2	102.01	46.1032	0.451947848
16	800	56	102.01	45.136	0.442466425
17	900	54	102.01	43.524	0.426664053
18	1000	52	102.01	41.912	0.41086168

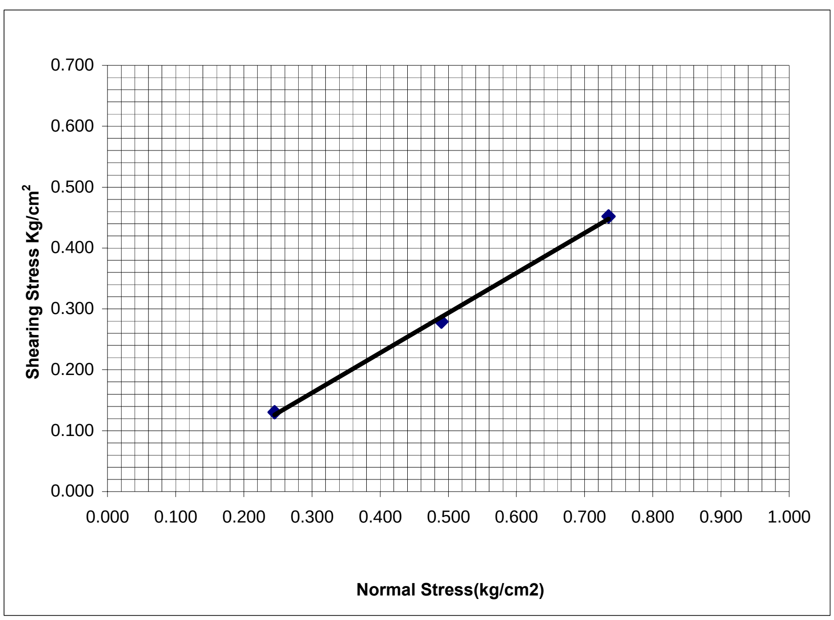
OMRAN GEOTECHNICAL COMPANY

Material Testing Laboratory

Direct Shear Test T-236 / D-6528

Client : USAID	Type of Test : CU
Contractor : TETRA TECH Inc.	Sampled By :OGC
Project Name : New Admin Building, Ghazi Boys High School	Depth # 1m
Proving Ring Calibration Factor 1 div : 0.806	Wet Unit Weight g/Cm^3 : 1.84
Discription of Soil : SILT WITH SAND	Moisture Contant% : 14.59
Min of Friction Angle Φ : 28.02 Borehole # 03	Dry Unit Weight g/Cm^3 : 1.6
Cohesion : 0 Void Ratio : o.675	Specific Gravity : 2.68

No	Normal Stress Applied Kg/cm^2	Stress Dial Gauge Observation at Failure	Shear force Kg	Area (cm^2)	Shear Stress kg/cm^2	Calculate Φ
1	0.245	16.5	13.299	102.01	0.1304	28.02°
2	0.490	35.3	28.4518	102.01	0.2789	29.65°
3	0.735	57.2	46.1032	102.01	0.4519	31.58°



Tested By	**Hayat**
Checked By	**Jafari**

OMRAN GEOTECHNICAL COMPANY

Material Testing Laboratory

Direct Shear Test

Direct Shear Test T-236 / D-6528

Client	USAID	**Location**	Kabul Province, BH # 03, 1m
Contractor	**TETRA TECH Inc.**	**Date**	11/8/2010
Project	New Admin Building, Ghazi Boys High School		

Description of Soil	SILT WITH SAND		
Type of Test	CU		
Strain Rate	0.5 mm/min		
Load Scale K	0.81 kg/Div		
Sample No.	1	2	3
Normal Stress, kg/cm2	0.245	0.49	0.735

Sample No.	Water Content (%)		Normal Stress (kg/cm2)	Max. Shearing Stress (kg/cm^2)
	berfor test	after test		
1	14.52	24	0.245	0.1304
2	14.82	24.5	0.49	0.2789
3	14.42	25.5	0.735	0.4519

Soil Specimen Measurements			
Length (cm)	10.1	10.1	10.1
Height (cm)	2	2	2
Area (cm)	102.01	102.01	102.01
Volume (cm3)	204.02	204.02	204.02
Weight of Soil + Split Former (gr)	499.5	503.6	501.2
Weight of Split Former (gr)	127	127	127
Weight of Soil (gr)	372.5	376.6	374.2
Wet Unit Weight (gr/cm3)	1.83	1.85	1.83
Dry Unit Weight (gr/cm3)	1.59	1.61	1.60

Water Content Determination			
Container No.	1	2	3
Weight of Wet Soil + Container	224.9	209.1	213.2
Weight of Dry Soil + Container	208.2	194.5	198.3
Weight of Water	16.7	14.6	14.9
Weight of Container	93.2	96	95
Weight of Dry Soil	115	98.5	103.3
Water Content	14.52	14.82	14.42

Omran Geotechnical Company

Lab Test Result of Boreholes

Consolidation Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

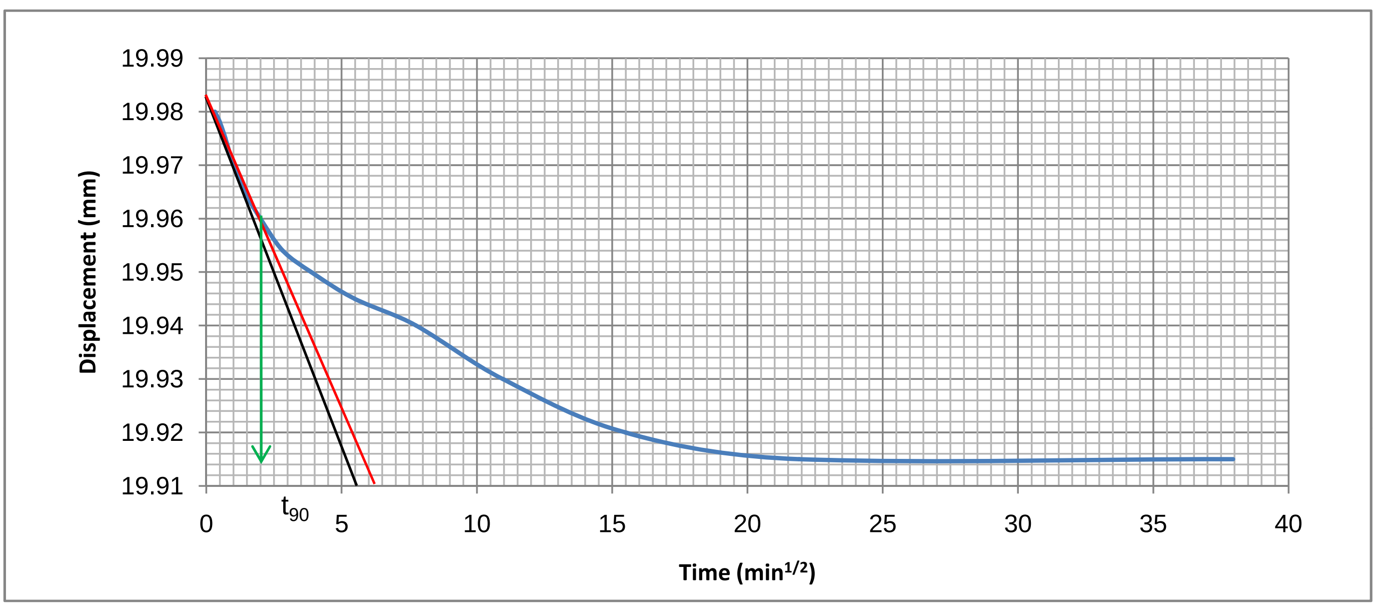
One-Dimensionla Consolidation Preperties of Soils

ASTM D 2435-96

Client	USAID	Sample No.	1
Project	New Admin Building, Ghazi Boys High School, Kabul	Location	BH # 1 (5m)
Contractor	Tetra Tech Inc.	Testing Date	5/8/2010

Applied pressure : 49.03 Kpa

Time(minutes)	Dial Reading(0.01mm)
0.1	2
0.25	2.2
0.5	2.5
1	3
2	3.5
4	4
8	4.6
15	5
30	5.5
60	6
120	7
240	8
480	8.5
1440	8.5



t_{90}=4

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

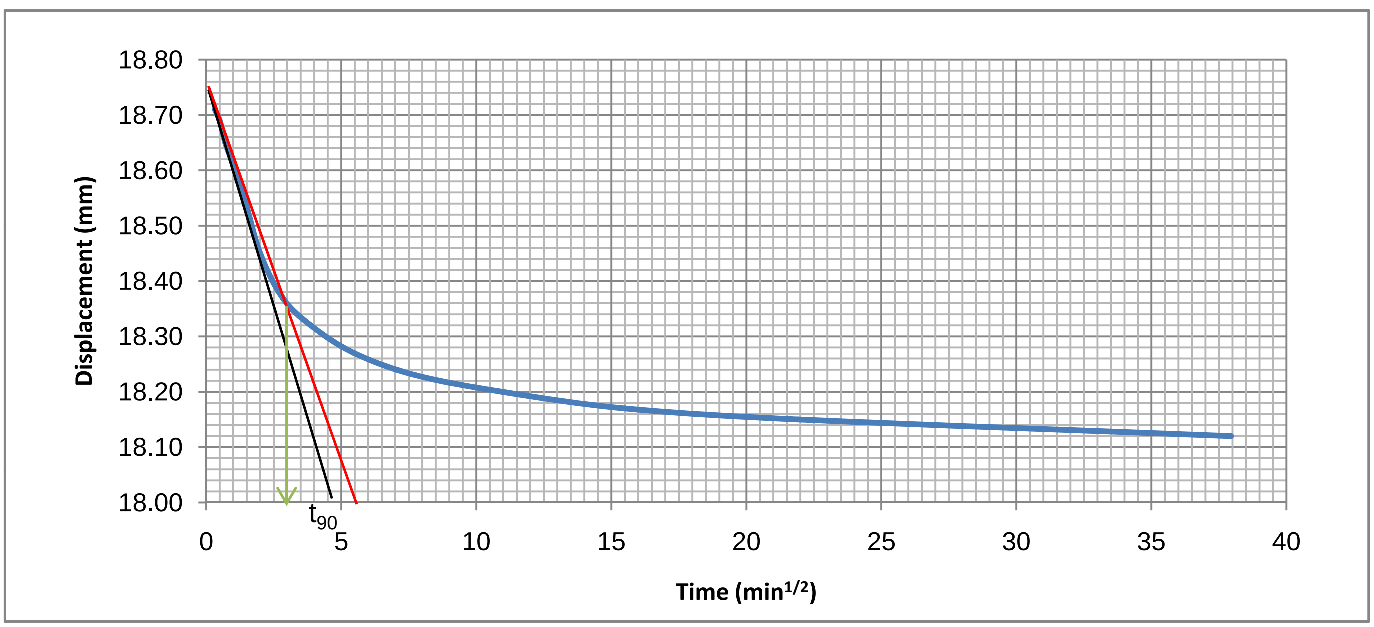
One-Dimensionla Consolidation Preperties of Soils

ASTM D 2435-96

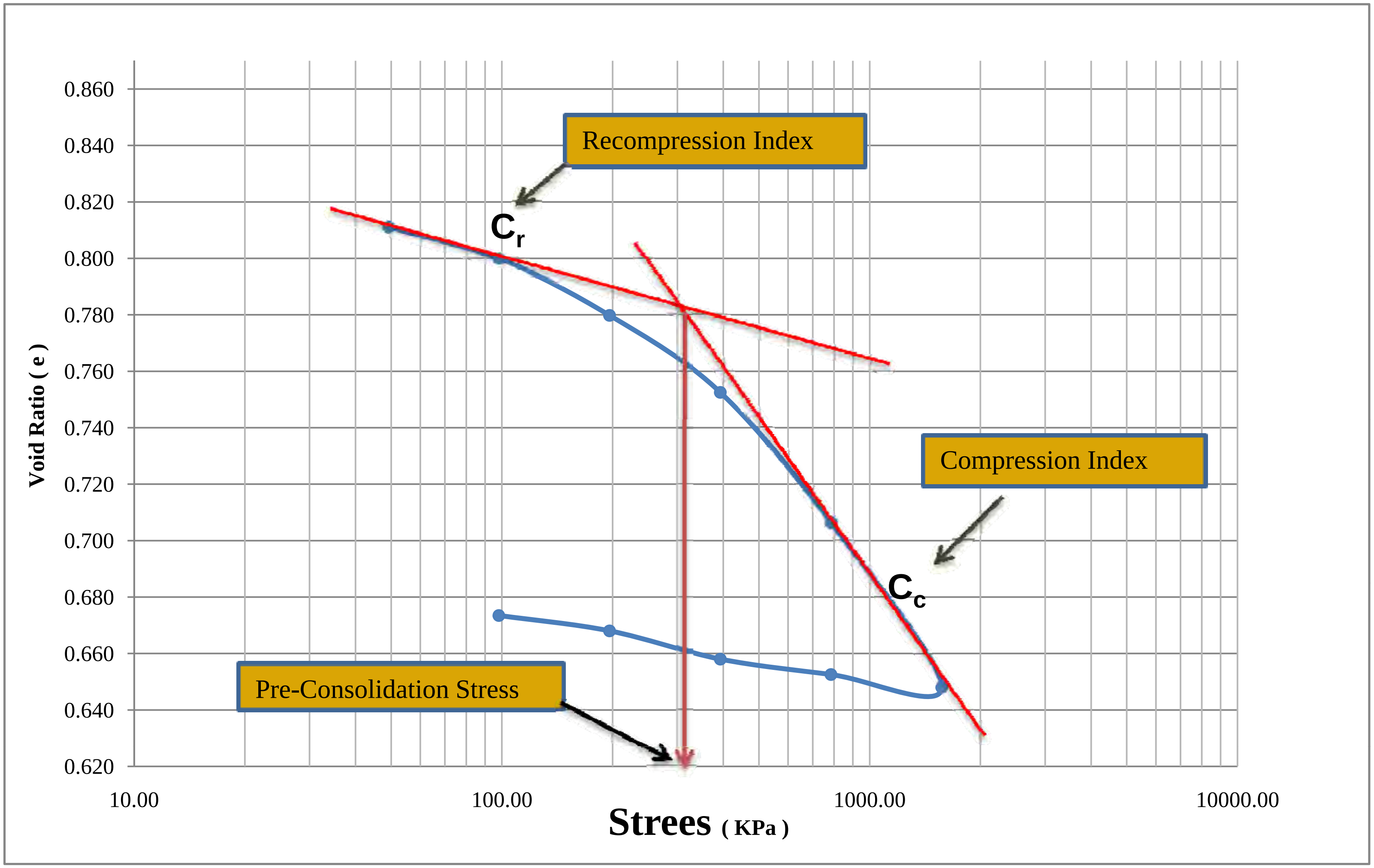
Client	USAID	**Sample No.**	**1**
Project	New Admin Building, Ghazi Boys High School, Kabul	**Location**	**BH # 1 (5m)**
Contractor	**Tetra Tech Inc.**	**Testing Date**	**5/8/2010**

Applied pressure : 1569.06 Kpa

Time(minutes)	Dial Reading(0.01mm)
0.1	129
0.25	131
0.5	135
1	139
2	145
4	155
8	163
15	168
30	173
60	177
120	180
240	183
480	185
1440	188



t_{90}=16



0.860
0.840
0.820
0.800
0.780
0.760
0.740
0.720
0.700
0.680
0.660
0.640
0.620
Void Ratio (e)
10.00
100.00
1000.00
10000.00
Strees (KPa)
Recompression Index
C_r
Compression Index
C_c
Pre-Consolidation Stress

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

One-Dimensionla Consolidation Preperties of Soils

ASTM D 2435-96

Client	USAID	Sample No	1
Project	New Admin Building, Ghazi Boys High School, Kabul	Locattion	BH # 1 (5m)
Contractor	Tetra Tech Inc.	Testing Date	5/8/2010

Analysis of Consolidation Test Data- Sample No 1, BH # 1, Depth 5 m

Applied pressure kPa	Final Dail Reading 0.01mm	Change in Specimen Height Cm	Final Specimen Height Hi Cm	Void Height Hv=Hi-Hs	Void Ratio e=Hv/Hs	Average Height during Condolidation Cm	Time (T90) min	Coefficient of Consolidation Cm2/min
0	1.5	0	2					
49.03	8.5	0.007	1.993	0.893	0.811	1.997	4	0.8450
98.06	21	0.0195	1.9805	0.880	0.800	1.987	4.25	0.7876
196.13	43	0.0415	1.9585	0.858	0.780	1.970	5.56	0.5916
392.27	73	0.0715	1.9285	0.828	0.753	1.944	8	0.4004
784.53	124	0.1225	1.8775	0.777	0.706	1.918	8.25	0.3781
1569.06	188	0.1865	1.8135	0.713	0.648	1.871	9	0.3298
Unloading								
784.53	183	0.1815	1.8185	0.718	0.653	1.848	8	0.3620
392.27	177	0.1755	1.8245	0.724	0.658	1.819	7.65	0.3668
196.13	166	0.1645	1.8355	0.735	0.668	1.830	7	0.4057
98.06	160	0.1585	1.8415	0.741	0.673	1.839	6.25	0.4586
49.03	160	0.1585	1.8415	0.741	0.673	1.842	4.75	0.6054

Sample+Mould (gr)	189
mould (gr)	114.4
Sample (gr)	74.6
Dried Sample (gr)	57.8
Gs	2.68
Height (cm)	2
Diameter (cm)	5
A (cm2)	19.6
V (cm3)	39.25
Hs(cm)=	$Ms/A*Gs*\rho_w$
Hs(cm)=	1.1004

Final Results:	
Compression Index	0.266
Recompression Index	0.04791
Preconsolidation Pressure (Pc) (δvmax)	320 Kpa
Coefficient of Consolidation	Cv=0.3298 to 0.8450 (Cm^2/Min)

Tested By	Hayat
Checked By	Jafari

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

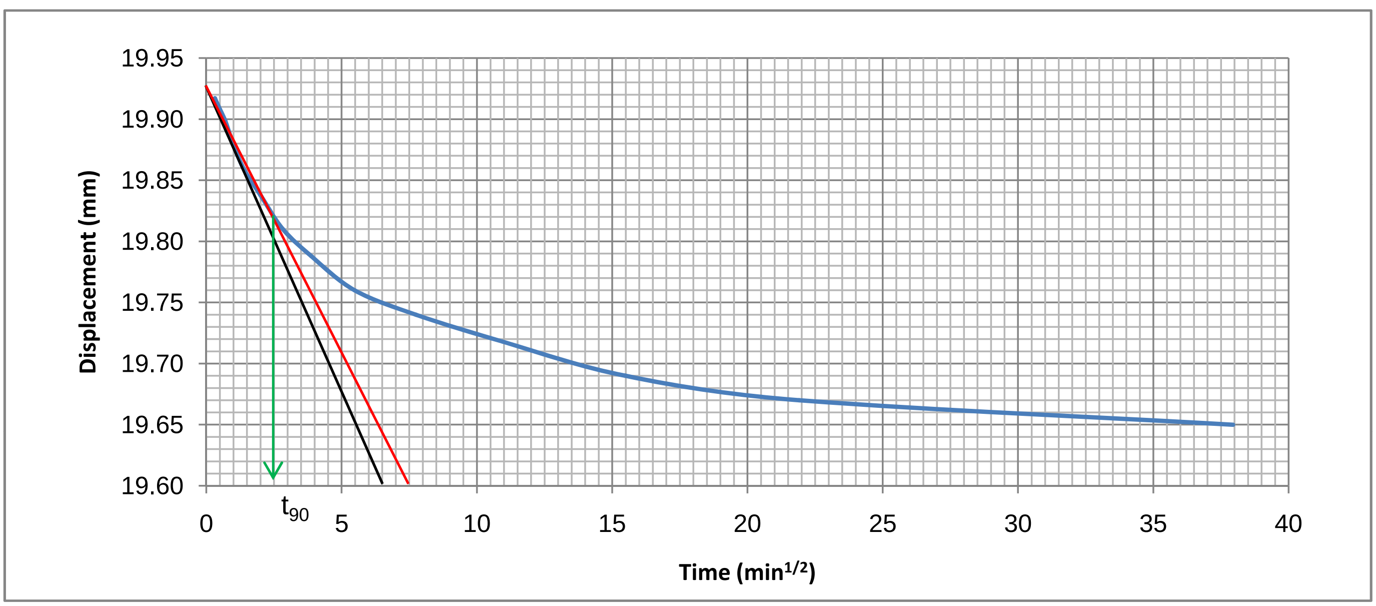
One-Dimensionla Consolidation Preperties of Soils

ASTM D 2435-96

Client	USAID	**Sample No.**	2
Project	New Admin Building, Ghazi Boys High School, Kabul	**Location**	BH # 3 (6.5m)
Contractor	Tetra Tech Inc.	**Testing Date**	5/8/2010

Applied pressure : 49.03 Kpa

Time(minutes)	Dial Reading(0.01mm)
0.1	8.3
0.25	9.2
0.5	10.2
1	12.1
2	14.2
4	16.2
8	19
15	21.2
30	24
60	26
120	28.2
240	31
480	33
1440	35



t_{90}=6.25

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

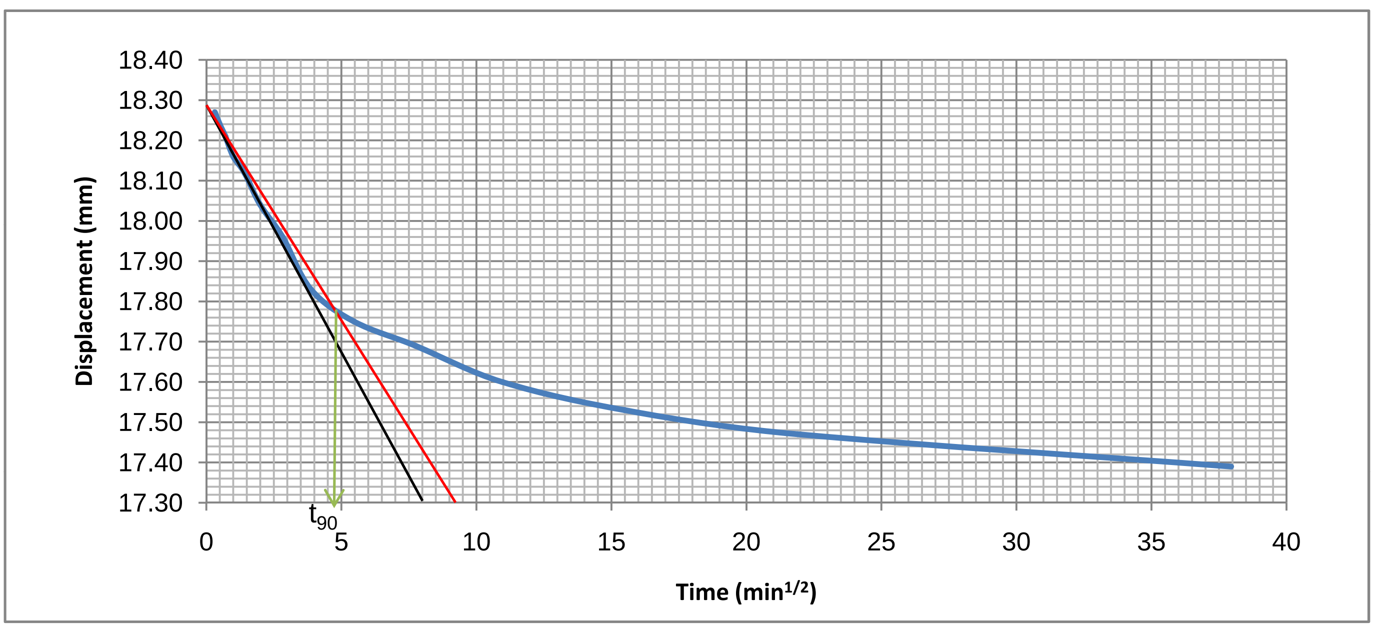
One-Dimensionla Consolidation Preperties of Soils

ASTM D 2435-96

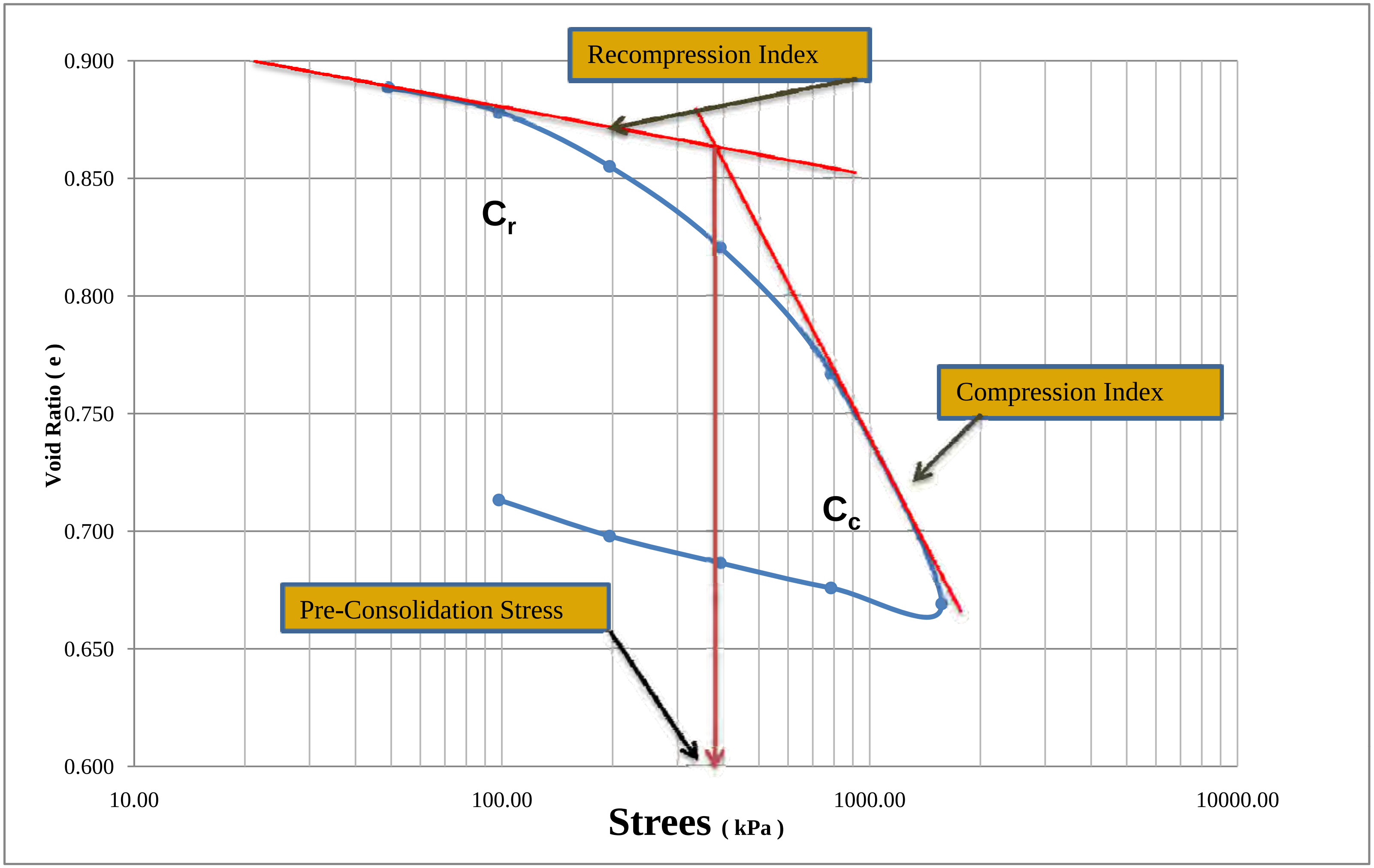
Client	USAID	**Sample No.**	**2**
Project	New Admin Building, Ghazi Boys High School, Kabul	**Location**	**BH # 3 (6.5m)**
Contractor	**Tetra Tech Inc.**	**Testing Date**	**5/8/2010**

Applied pressure : 1569.06 Kpa

Time(minutes)	Dial Reading(0.01mm)
0.1	173
0.25	176
0.5	179
1	184
2	188
4	196
8	204
15	217
30	225
60	231
120	240
240	247
480	253
1440	261



t_{90}=22.56



Recompression Index
Compression Index
Pre-Consolidation Stress
C_r
C_c
0.900
0.850
0.800
0.750
0.700
0.650
0.600
Void Ratio (e)
10.00
100.00
1000.00
10000.00
Strees (kPa)

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

One-Dimensionla Consolidation Preperties of Soils

ASTM D 2435-96

Client	**USAID**	**Sample No**	**2**
Project	**New Admin Building, Ghazi Boys High School, Kabul**	**Locattion**	**BH # 3 (6.5m)**
Contractor	**Tetra Tech Inc.**	**Testing Date**	**5/8/2010**

Analysis of Consolidation Test Data- Sample No 2, BH # 3, Depth 6.5 m

Applied pressure kPa	Final Dail Reading 0.01mm	Change in Specimen Height Cm	Final Specimen Height Hi Cm	Void Height Hv=Hi-Hs	Void Ratio e=Hv/Hs	Average Height during Condolidation Cm	Time (T90) min	Coefficient of Consolidation Cm2/min
0	6	0	2					
49.03	35	0.029	1.971	0.927	0.889	1.986	6.25	0.5349
98.06	46	0.04	1.96	0.916	0.878	1.966	8	0.4095
196.13	70	0.064	1.936	0.892	0.855	1.948	12.65	0.2544
392.27	106	0.1	1.9	0.856	0.821	1.918	16.88	0.1848
784.53	162	0.156	1.844	0.800	0.767	1.890	20.4	0.1485
1569.06	264	0.258	1.742	0.698	0.669	1.821	22.56	0.1246
Unloading								
784.53	257	0.251	1.749	0.705	0.676	1.797	20.25	0.1352
392.27	246	0.24	1.76	0.716	0.686	1.751	12.25	0.2122
196.13	234	0.228	1.772	0.728	0.698	1.766	10.24	0.2583
98.06	218	0.212	1.788	0.744	0.713	1.780	7.56	0.3554
49.03	198	0.192	1.808	0.764	0.732	1.798	7.25	0.3781

Sample+Mould (gr)	199
mould (gr)	127.3
Sample (gr)	71.7
Dried Sample (gr)	54
Gs	2.64
Height (cm)	2
Diameter (cm)	5
A (cm2)	19.6
V (cm3)	39.25
Hs(cm)=	$Ms/A*Gs*\rho_w$
Hs(cm)= 1.0436	

Final Results:	
Compression Index	**0.6104**
Recompression Index	**0.02400**
Preconsolidation Pressure (Pc) (δvmax)	**370 Kpa**
Coefficient of Consolidation	**Cv=0.1246 to 0.5349 (Cm2/Min)**

Tested By	Hayat
Checked By	Jafari

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

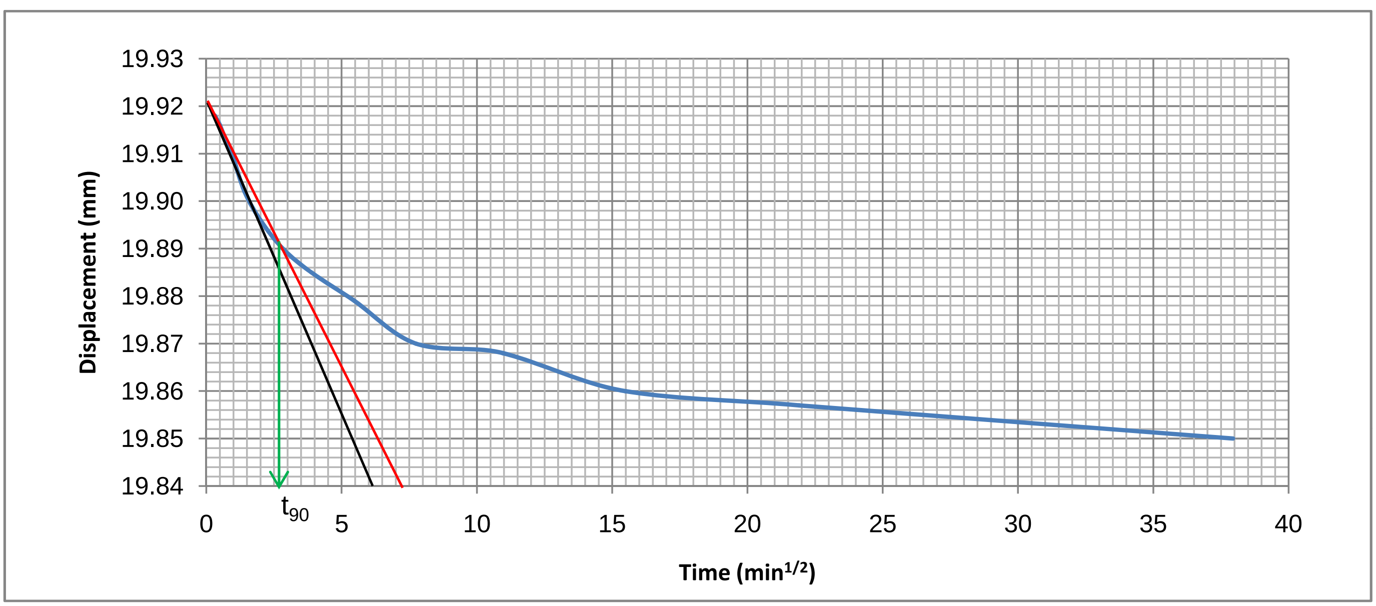
One-Dimensionla Consolidation Properties of Soils

ASTM D 2435-96

Client	USAID	**Sample No.**	3
Project	New Admin Building, Ghazi Boys High School, Kabul	**Location**	BH # 5 (3.6m)
Contractor	Tetra Tech Inc.	**Testing Date**	5/8/2010

Applied pressure : 49.03 Kpa

Time(minutes)	Dial Reading(0.01mm)
0.1	8.2
0.25	8.4
0.5	8.7
1	9.1
2	9.8
4	10.4
8	11
15	11.5
30	12.1
60	13
120	13.2
240	14
480	14.3
1440	15



t_{90}=7.29

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

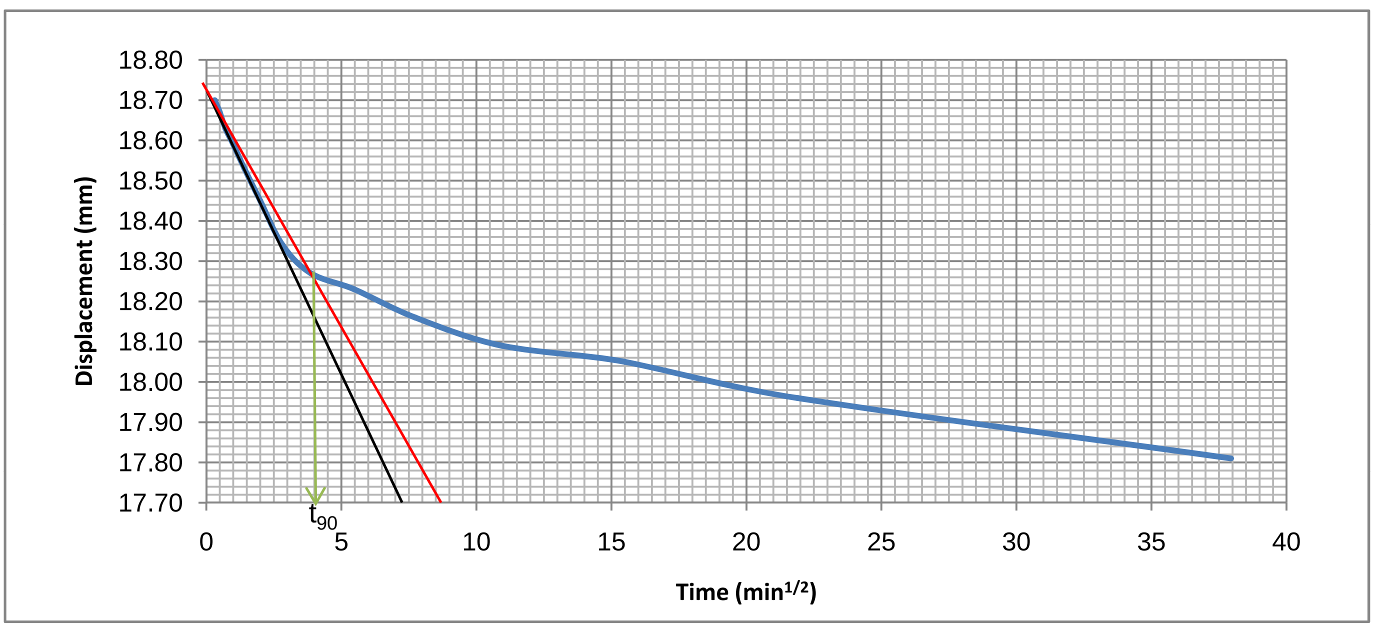
One-Dimensionla Consolidation Preporties of Soils

ASTM D 2435-96

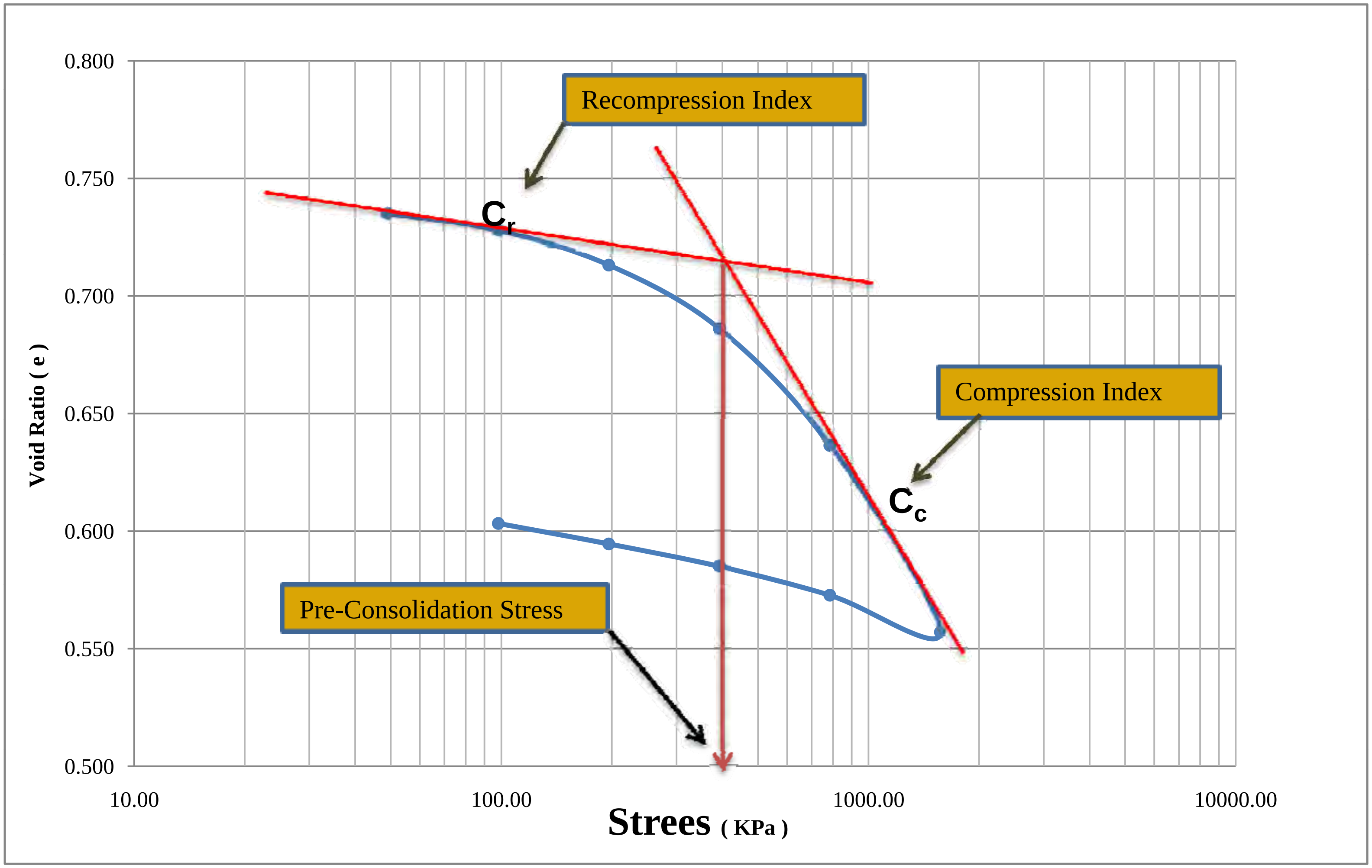
Client	USAID	Sample No.	3
Project	New Admin Building, Ghazi Boys High School, Kabul	Location	BH # 5 (3.6m)
Contractor	Tetra Tech Inc.	Testing Date	5/8/2010

Applied pressure : 1569.06 Kpa

Time(minutes)	Dial Reading(0.01mm)
0.1	130
0.25	133
0.5	137
1	141
2	147
4	155
8	166
15	173
30	177
60	184
120	191
240	195
480	204
1440	219



t_{90}=16



0.800
0.750
0.700
0.650
0.600
0.550
0.500
Void Ratio (e)
10.00
100.00
1000.00
10000.00
Strees (KPa)
Recompression Index
Cr
Compression Index
Cc
Pre-Consolidation Stress

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

One-Dimensionla Consolidation Properties of Soils

ASTM D 2435-96

Client	USAID	Sample No	3
Project	New Admin Building, Ghazi Boys High School, Kabul	Locattion	BH # 5 (3.6m)
Contractor	Tetra Tech Inc.	Testing Date	5/8/2010

Analysis of Consolidation Test Data- Sample No 3, BH # 5, Depth 3.6 m

Applied pressure kPa	Final Dail Reading 0.01mm	Change in Specimen Height Cm	Final Specimen Height Hi Cm	Void Height Hv=Hi-Hs	Void Ratio e=Hv/Hs	Average Height during Condolidation Cm	Time (T90) min	Coefficient of Consolidation Cm2/min
0	5	0	2					
49.03	15	0.01	1.99	0.843	0.735	1.995	7.29	0.4630
98.06	23	0.018	1.982	0.835	0.728	1.986	8.56	0.3907
196.13	40	0.035	1.965	0.818	0.713	1.974	10.25	0.3222
392.27	71	0.066	1.934	0.787	0.686	1.950	11	0.2930
784.53	128	0.123	1.877	0.730	0.636	1.921	13.56	0.2308
1569.06	219	0.214	1.786	0.639	0.557	1.860	16	0.1834
Unloading								
784.53	201	0.196	1.804	0.657	0.573	1.841	15	0.1915
392.27	187	0.182	1.818	0.671	0.585	1.802	12.56	0.2192
196.13	176	0.171	1.829	0.682	0.595	1.824	11.25	0.2506
98.06	166	0.161	1.839	0.692	0.603	1.834	9	0.3169
49.03	154	0.149	1.851	0.704	0.614	1.845	8.25	0.3499

Sample+Mould (gr)	185.7
mould (gr)	110.2
Sample (gr)	75.5
Dried Sample (gr)	59.8
Gs	2.66
Height (cm)	2
Diameter (cm)	5
A (cm2)	19.6
V (cm3)	39.25
Hs(cm)=	$Ms/A*Gs*\rho_w$
Hs(cm)= 1.1470	

Final Results:	
Compression Index	0.2166
Recompression Index	0.02397
Preconsolidation Pressure (Pc) (δvmax)	400 Kpa
Coefficient of Consolidation	Cv=0.1834 to 0.4630 (Cm^2/Min)

Tested By	Hayat
Checked By	Jafari

Omran Geotechnical Company

Lab Test Result of Boreholes

Permeability Test Results

Professional Geotechnical Services

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

CONSTANT HEAD PERMEABILITY TEST

ASTM D 2434-68

PROJECT	New Admin Building, Ghazi Boys High School, Kabul	**BH No.**	2
Client	USAID	**SAMPLE DEPTH**	4
Contractor	Tetra Tech Inc.	**SAMPLE NO.**	1
SOIL DESCRIPTION	Silt	**Location**	Kabul

SOIL SAMPLE DATA:

DIAMETER ,cm		INITIAL WT. OF SOIL + PAN ,g	
AREA ,cm^2		FINAL WT. OF SOIL + PAN ,g	
HEIGHT ,cm		WT. OF SAMPLE IN CELL ,g	
VOLUME ,cm^3		WET UNIT WEIGHT ,g/cm^3	
% WATER CONTENT		DRY UNIT WEIGHT ,g/cm^3	
MANOMETER DISTANCE (L) ,cm			

CONSTANT HEAD TEST DATA :

TEST NO.	HEAD (cm)	TIME (second)	WATER QUANTITY (cm^3)	Δh (cm)	TEMPERATURE (C)	k_T (cm/sec)
1						
2						
3						
4						

k_T (average) ______________ cm/sec

k_{20} ______________ cm/sec

FALLING HEAD PERMEABILITY TEST

PROJECT	New Admin Building, Ghazi Boys High School, Kabul	**BH No.**	2
Client	USAID	**SAMPLE DEPTH**	4
Contractor	Tetra Tech Inc.	**SAMPLE NO.**	1
SOIL DESCRIPTION	SILT	**Location**	Kabul

SOIL SAMPLE DATA

DIAMETER ,cm	10.00	INITIAL WT. OF SOIL + PAN ,g	4677
AREA ,cm^2	78.50	FINAL WT. OF SOIL + PAN ,g	4780
HEIGHT (L) ,cm	8.50	WT. OF SAMPLE IN CELL ,g	1270
VOLUME ,cm^3	667.25	WET UNIT WEIGHT ,g/cm^3	1.90
% WATER CONTENT	8.82	DRY UNIT WEIGHT ,g/cm^3	1.75
AREA OF STANDPIPE (a) ,cm^2	0.635	Q cm^3/s	0.899

FALLING HEAD TEST DATA :

TEST NO.	h1(cm)	h2(cm)	TIME (sec)	TEMPERATURE (C	k_T (cm/sec)
1	100	85	60	23°C	$6.4X10^{-3}$
2					
3					
4					

k_T (average) $6.4X10^{-3}$ cm/sec

k_{20} $6.1X10^{-3}$ cm/sec

Tested By	Hayat
Checked By	Jafari

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

CONSTANT HEAD PERMEABILITY TEST

ASTM D 2434-68

PROJECT	New Admin Building, Ghazi Boys High School, Kabul	**BH No.**	4
Client	USAID	**SAMPLE DEPTH**	4
Contractor	Tetra Tech Inc.	**SAMPLE NO.**	2
SOIL DESCRIPTION	Silty Clay	**Location**	Kabul

SOIL SAMPLE DATA:

DIAMETER ,cm		INITIAL WT. OF SOIL + PAN ,g	
AREA $,cm^2$		FINAL WT. OF SOIL + PAN ,g	
HEIGHT ,cm		WT. OF SAMPLE IN CELL ,g	
VOLUME $,cm^3$		WET UNIT WEIGHT $,g/cm^3$	
% WATER CONTENT		DRY UNIT WEIGHT $,g/cm^3$	
IANOMETER DISTANCE (L) ,cr			

CONSTANT HEAD TEST DATA :

TEST NO.	HEAD (cm)	TIME (second)	WATER QUANTITY (cm^3)	Δh (cm)	TEMPERATURE (C)	k_T (cm/sec)
1						
2						
3						
4						

k_T (average) ______________ cm/sec

k_{20} ______________ cm/sec

FALLING HEAD PERMEABILITY TEST

PROJECT	New Admin Building, Ghazi Boys High School, Kabul	**BH No.**	4
Client	USAID	**SAMPLE DEPTH**	4
Contractor	Tetra Tech Inc.	**SAMPLE NO.**	2
SOIL DESCRIPTION	Silty Clay	**Location**	Kabul

SOIL SAMPLE DATA

DIAMETER ,cm	10.00	INITIAL WT. OF SOIL + PAN ,g	4422
AREA $,cm^2$	78.50	FINAL WT. OF SOIL + PAN ,g	4606
HEIGHT (L) ,cm	8.70	WT. OF SAMPLE IN CELL ,g	1256
VOLUME $,cm^3$	682.95	WET UNIT WEIGHT $,g/cm^3$	1.84
% WATER CONTENT	20.17	DRY UNIT WEIGHT $,g/cm^3$	1.57
AREA OF STANDPIPE (a) $,cm^2$	0.635	Q cm^3/s	0.91

FALLING HEAD TEST DATA :

TEST NO.	h1(cm)	h2(cm)	TIME (sec)	TEMPERATURE (C	k_T (cm/sec)
1	100	86	60	21°C	$7.2X10^{-3}$
2					
3					
4					

k_T (average) $7.2X10^{-3}$ cm/sec

k_{20} $6.62X10^{-3}$ cm/sec

Tested By	Hayat
Checked By	Jafari

OMRAN GEOTECHNICAL COMPANY

MATERIAL TESTING LAB

CONSTANT HEAD PERMEABILITY TEST

ASTM D 2434-68

PROJECT	New Admin Building, Ghazi Boys High School, Kabul	**BH No.**	5
Client	USAID	**SAMPLE DEPTH**	3
Contractor	Tetra Tech Inc.	**SAMPLE NO.**	3
SOIL DESCRIPTION	Silty Clay	**Location**	Kabul

SOIL SAMPLE DATA:

DIAMETER ,cm		INITIAL WT. OF SOIL + PAN ,g	
AREA ,cm^2		FINAL WT. OF SOIL + PAN ,g	
HEIGHT ,cm		WT. OF SAMPLE IN CELL ,g	
VOLUME ,cm^3		WET UNIT WEIGHT ,g/cm^3	
% WATER CONTENT		DRY UNIT WEIGHT ,g/cm^3	
MANOMETER DISTANCE (L) ,cm			

CONSTANT HEAD TEST DATA :

TEST NO.	HEAD (cm)	TIME (second)	WATER QUANTITY (cm^3)	Δh (cm)	TEMPERATURE (C)	k_T (cm/sec)
1						
2						
3						
4						

k_T (average) ______________ cm/sec

k_{20} ______________ cm/sec

FALLING HEAD PERMEABILITY TEST

PROJECT	New Admin Building, Ghazi Boys High School, Kabul	**BH No.**	5
Client	USAID	**SAMPLE DEPTH**	3
Contractor	Tetra Tech Inc.	**SAMPLE NO.**	3
SOIL DESCRIPTION	Silty Clay	**Location**	Kabul

SOIL SAMPLE DATA

DIAMETER ,cm	10.00	INITIAL WT. OF SOIL + PAN ,g	4518
AREA ,cm^2	78.50	FINAL WT. OF SOIL + PAN ,g	4722
HEIGHT (L) ,cm	8.90	WT. OF SAMPLE IN CELL ,g	1372
VOLUME ,cm^3	698.65	WET UNIT WEIGHT ,g/cm^3	1.96
% WATER CONTENT	17.4	DRY UNIT WEIGHT ,g/cm^3	1.67
AREA OF STANDPIPE (a) ,cm^2	0.635	Q cm^3/s	0.93

FALLING HEAD TEST DATA :

TEST NO.	h1(cm)	h2(cm)	TIME (sec)	TEMPERATURE (C	k_T (cm/sec)
1	100	88	60	23°C	$8.7X10^{-3}$
2					
3					
4					

k_T (average) $8.7X10^{-3}$ cm/sec

k_{20} $8.17X10^{-3}$ cm/sec

Tested By	Hayat
Checked By	Jafari

Omran Geotechnical Company

Lab Test Result of Boreholes

Chemical Test Results

Professional Geotechnical Services

WATER/WASTE WATER LABORATORY

Greentec

Greentec Design & Consulting Co.

Analytical Report	
Client: **USAID** Contractor: **TETRA TECH Inc.** Sub Contractor: **OGC** Project: **New Admin Building, Ghazi Boys High School, Kabul** Location: **Kabul Province**	Request no: **S/4** Sample no :**7 -8** Ground water level: **2.65m** Depth: **10m** BH number: **1** Sample collected by: **OGC** Sample collected date:**7 -8-2010**
Source location; well river other V Source type; municipal industrial	lab receipt time:**4:00 PM** lab receipt date: **7-8-2010**
Sample description:	

Chemical analysis

	Test	Result	Unit	Method	*MCL as Per USEPA (for water sample only)
1-	Sulfate	85	mg/l	ASTM- C1580	250
2-	Chloride	177	mg/l	ASTM-D4327	250
3-	PH	8.18	-	ASTM-G51	6.5-8.5

Analyzed by: **Z.M** Analysis started:**9:00 PM**	Analysis completion date: **8-8-2010** Approved by: **Mosavi**
Remarks:	

Green tech

*Maximum Contamination Level

Add: Karte 3 – Kabul – Afghanistan
Mob :+93 (0)779 523 567 -078633025
Email: lab@greentech.af
Website: www.greentech.af

WATER/WASTE WATER LABORATORY

Greentec

Greentec Design & Consulting Co.

Analytical Report	
Client: **USAID** Contractor: **TETRA TECH Inc.** Sub Contractor: **OGC** Project: **New Admin Building, Ghazi Boys High School, Kabul** Location: **Kabul Province**	Request no: **S/1** Sample no : **4-8** Ground water level: **2.84m** Depth: **10m** BH number:**2** Sample collected by: **OGC** Sample collected date:**5 -8-2010**
Source location; well river other √ Source type; municipal industrial	lab receipt time: **10:00 AM** lab receipt date: **7-8-2010**
Sample description:	

Chemical analysis

	Test	Result	Unit	Method	*MCL as Per USEPA (for water sample only)
1-	Sulfate	80	mg/l	ASTM- C1580	250
2-	PH	8.12	-	ASTM-G51	6.5-8.5
3-	Chloride	147	mg/l	ASTM-D4327	250

Analyzed by: **Z.M**
Analysis started: **11:00 PM**

Analysis completion date: **8-8-2010**
Approved by: **Mosavi**

Green tech

Remarks:

*Maximum Contamination Level

Add: Karte 3 – Kabul – Afghanistan
Mob :+93 (0)779 523 567 -078633025
Email: lab@greentech.af
Website: www.greentech.af

WATER/WASTE WATER LABORATORY

Greentec

Greentec Design & Consulting Co.

Analytical Report	
Client: **USAID** Contractor: **TETRA TECH Inc.** Sub Contractor: **OGC** Project: **New Admin Building, Ghazi Boys High School, Kabul** Location: **Kabul Province**	Request no: **S/2** Sample no :**5 -8** Ground water level: **2.65m** Depth: **10m** BH number:**3** Sample collected by: **OGC** Sample collected date:**5 -8-2010**
Source location; well river other √ Source type; municipal industrial	lab receipt time: **10:00 AM** lab receipt date: **7-8-2010**
Sample description:	

Chemical analysis					
	Test	Result	Unit	Method	*MCL as Per USEPA (for water sample only)
1-	Sulfate	200	mg/l	ASTM- C1580	250
2-	PH	8.11	-	ASTM-G51	6.5-8.5
3-	Chloride	155	mg/l	ASTM-D4327	250

Analyzed by: **Z.M** Analysis started: **11:00 PM**	Analysis completion date: **8-8-2010** Approved by: **Mosavi**
Remarks:	

Greentech

*Maximum Contamination Level

Add: Karte 3 – Kabul – Afghanistan
Mob :+93 (0)779 523 567 -078633025
Email: lab@greentech.af
Website: www.greentech.af

WATER/WASTE WATER LABORATORY

Greentec

Greentec Design & Consulting Co.

Analytical Report	
Client: **USAID** Contractor: **TETRA TECH Inc.** Sub Contractor: **OGC** Project: **New Admin Building, Ghazi Boys High School, Kabul** Location: **Kabul Province**	Request no: **S/3** Sample no :**6 -8** Ground water level: **2.60m** Depth: **10m** BH number:**4** Sample collected by: **OGC** Sample collected date:**7 -8-2010**
Source location; well river other √ Source type; municipal industrial	lab receipt time: **10:00 AM** lab receipt date: **7-8-2010**
Sample description:	

Chemical analysis

	Test	Result	Unit	Method	*MCL as Per USEPA (for water sample only)
1-	Sulfate	151	mg/l	ASTM- C1580	250
2-	Chloride	255	mg/	ASTM-D4327	250
3-	PH	8.01	-	ASTM-G51	6.5-8.5

Analyzed by: **Z.M**
Analysis started:**9:00 PM**

Analysis completion date: **8-8-2010**
Approved by: **Mosavi**

Green tech

Remarks:

*Maximum Contamination Level

Add: Karte 3 – Kabul – Afghanistan
Mob :+93 (0)779 523 567 -078633025
Email: lab@greentech.af
Website: www.greentech.af

Omran Geotechnical Company

Appendix F

- ***Soil Resistivity Survey Results***

Professional Geotechnical Services

1. Geographical Location of the Site:

Ghazi High School area where Soil Resistivity investigation was performed is located at Karte e Char, Kabul, Afghanistan.

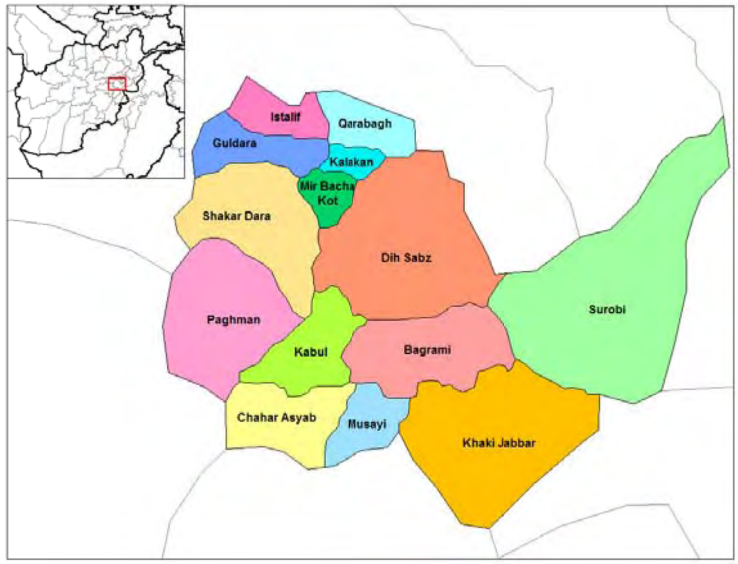


Figure 1: Geographical location of project site on satellite images

2. Vertical Electrical sounding (Carried out at Ghazi High School area)

In general, the resistivity method involves measuring the electrical resistivity of earth materials by introducing an electrical current into the ground and monitoring the potential field developed by the current. The most commonly used electrode configuration for geoelectrical soundings, which was used in this field survey, is the Wenner array. Four electrodes (two current A and B and two potential M and N) are placed along a straight line on the land surface such that the outside (current) electrode distance (AB) is equal to two times the inside (potential) electrode distance (MN). **Vertical sounding, in Wenner array**, were performed by keeping the electrode array centered over a field station while increasing the spacing between the current electrodes, thus increasing the depth of investigation. The potential difference (ΔV) and the electrical current (I) are measured for electrode spacing and the apparent resistivity (ρa) is calculated by the equation:

$$\rho_a = K \frac{\Delta V}{I} \qquad (\text{ohm} - \text{m})$$

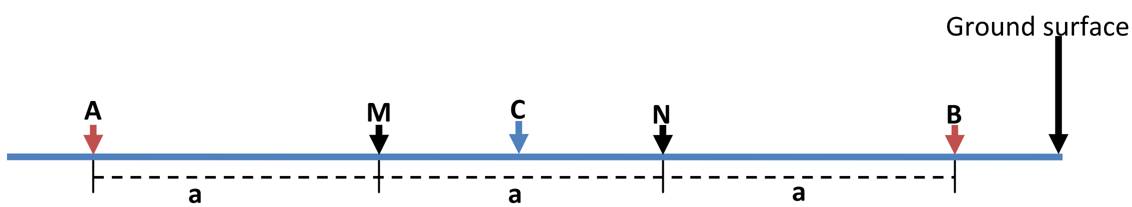


Figure2: Schematic electrode arrangement according to Wenner
Where: AB (current electrodes), MN (potential electrodes), C (Sounding), a (electrode space)

4. Field investigation:

Soil resistivity carried out at Ghazi High School area with 3 soundings on the proposed building site as showed on the site plan as R1, R2 and R3 (see below figure)

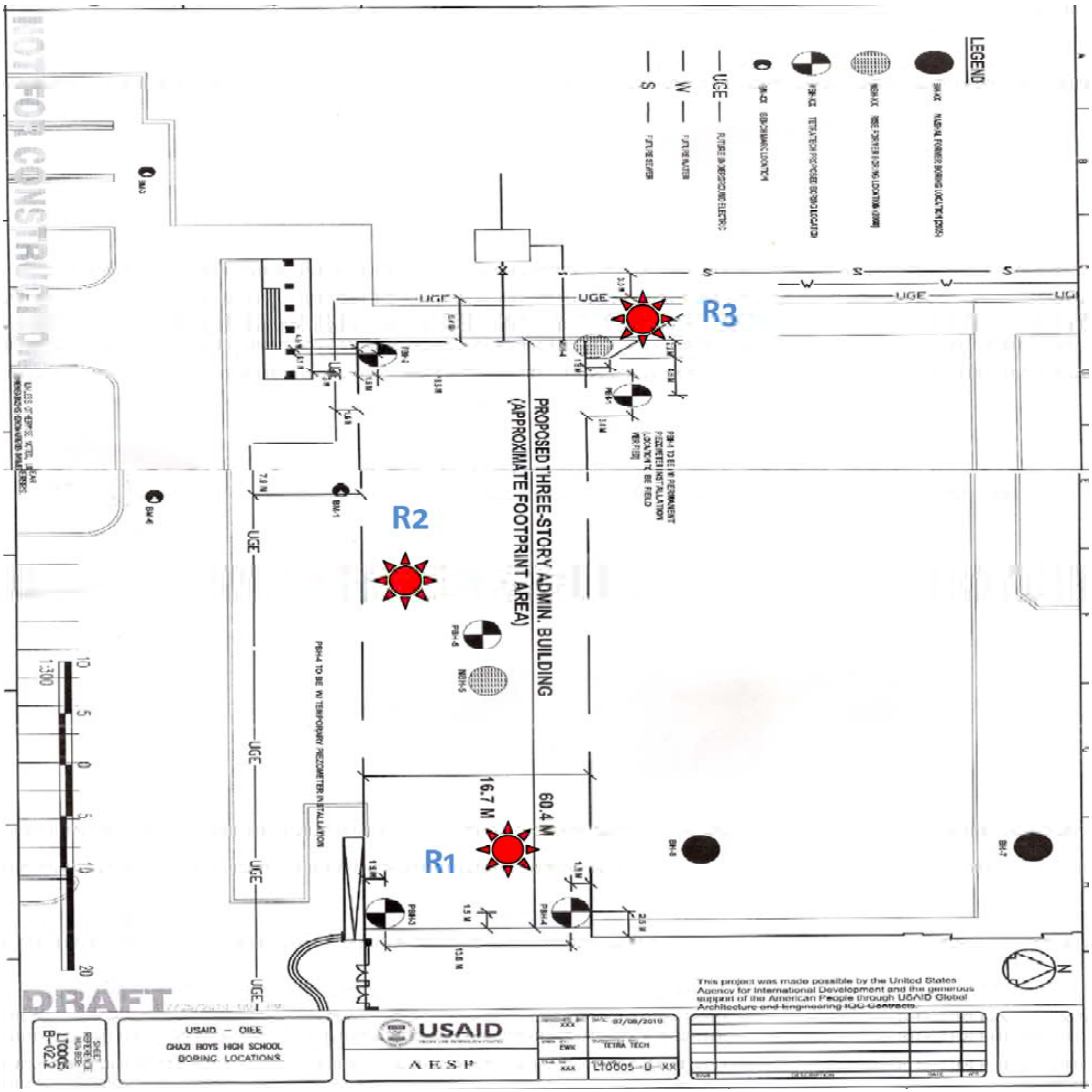


Figure3. Sounding locations on the proposed building site (Ghazi High School)

3. Apparent resistivity results:

Three soundings surveyed totally **by Italian earth resistivity meter, model "16GL" serial number: 08123212** on the Ghazi High School sites. This **survey performed by Wenner electrode arrangement, with 18m penetration in depth**. After field data collection we calculated apparent resistivity and plotted apparent resistivity versus AB/2(depth) that results presented in next graphs:

Project name				Date	
Ghazi High School Soil Resistivity				Aug 07. 2010	Note:T = 25 °C Time:10:30 -11:50AM weather: cloudy
Profile N	1	Sound N	1		
AB/2(a)	MN(a)	K	R(Ω)	ρ_a(Ω.m)	
1.125	0.75	2.355	33	77.715	
2.25	1.5	4.71	7.5	35.325	
4.5	3	9.42	1.7	16.014	
6.75	4.5	14.13	1.1	15.543	
9	6	18.84	1.3	24.492	
13.5	9	28.26	0.493	13.93218	

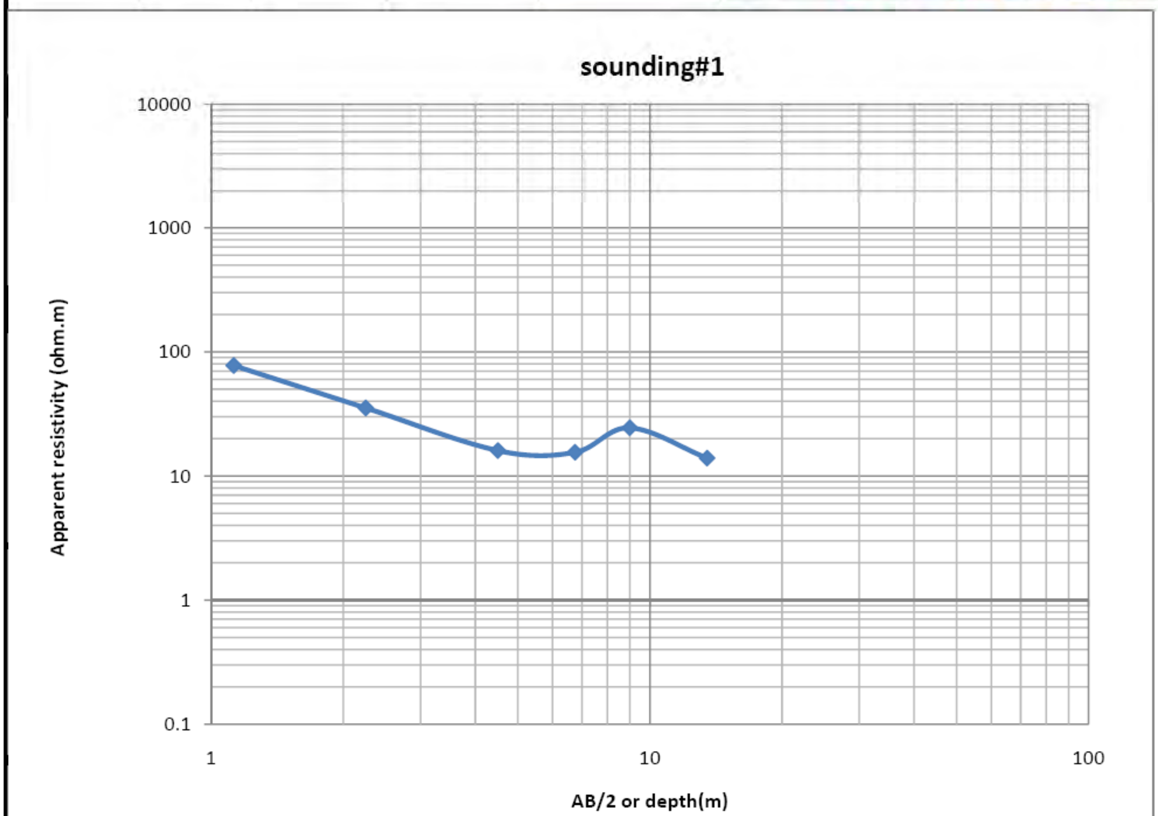


Figure 4: Data and log – log graph sounding 1, Profile 1

Project name				Date	
Ghazi High School Soil Resistivity				Aug 0.7 2010	Note: T= 25°C, Time: 10:50 - 11:20 AM weather: cloudy
Profile N	2	Sound N	1		
AB/2	MN(a)	K	R(Ω)	ρ_a(Ω.m)	
1.125	0.75	2.355	7.4	17.427	
2.25	1.5	4.71	5.4	25.434	
4.5	3	9.42	0.432	4.06944	
6.75	4.5	14.13	0.9391	13.269483	
9	6	18.84	0.5241	9.874044	
13.5	9	28.26	0.3674	10.382724	
18	12	37.68	0.578	21.77904	

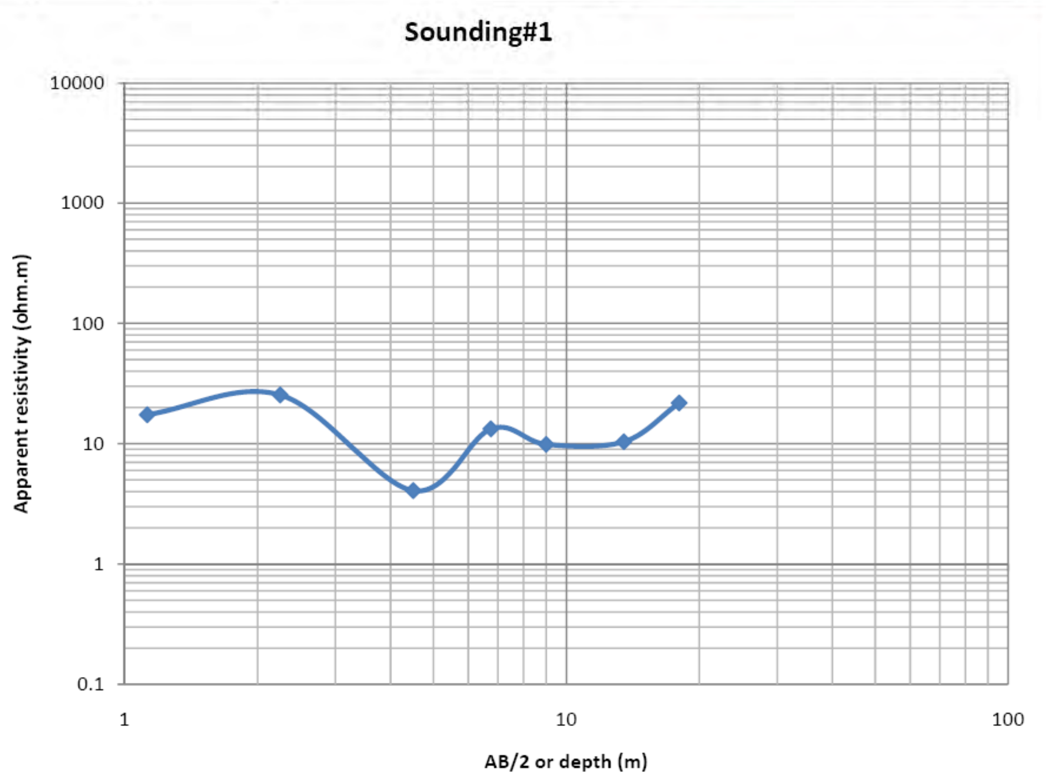


Figure 5: Data and log-log graph sounding 1, Profile 2

Project name				Date	
Ghazi High School Soil Resistivity				Aug 07. 2010	Note: T= 25°C Time: 11:20 - 11:45 AM weather: cloudy
Profile N	3	Sound N	2		
AB/2	MN(a)	K	R(Ω)	ρ_a(Ω.m)	
1.125	0.75	2.355	0.536	1.26228	
2.25	1.5	4.71	4.4	20.724	
4.5	3	9.42	1.3	12.246	
6.75	4.5	14.13	1.5	21.195	
9	6	18.84	1.6	30.144	
13.5	9	28.26	0.281	7.94106	
18	12	37.68	0.242	9.11856	

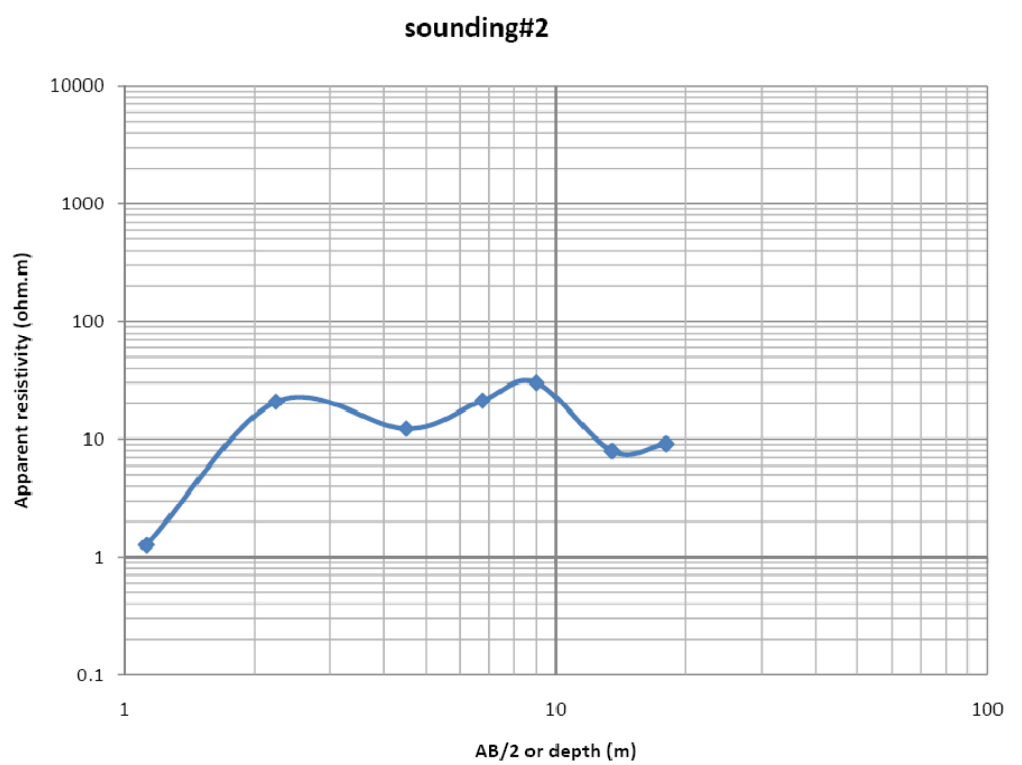


Figure 6: Data and log-log graph sounding 2, Profile 3

Project name				Date	
Ghazi High School Soil Resistivity				Aug 07. 2010	Note: T= 25°C Time: 11:45 - 12:10 PM weather: cloudy
Profile N	4	Sound N	2		
AB/2	MN(a)	K	R(Ω)	ρ_a(Ω.m)	
1.125	0.75	2.355	0.161	0.379155	
2.25	1.5	4.71	0.19	0.8949	
4.5	3	9.42	0.2307	2.173194	
6.75	4.5	14.13	0.288	4.06944	
9	6	18.84	0.098	1.84632	
13.5	9	28.26	0.0805	2.27493	
18	12	37.68	0.0752	2.833536	

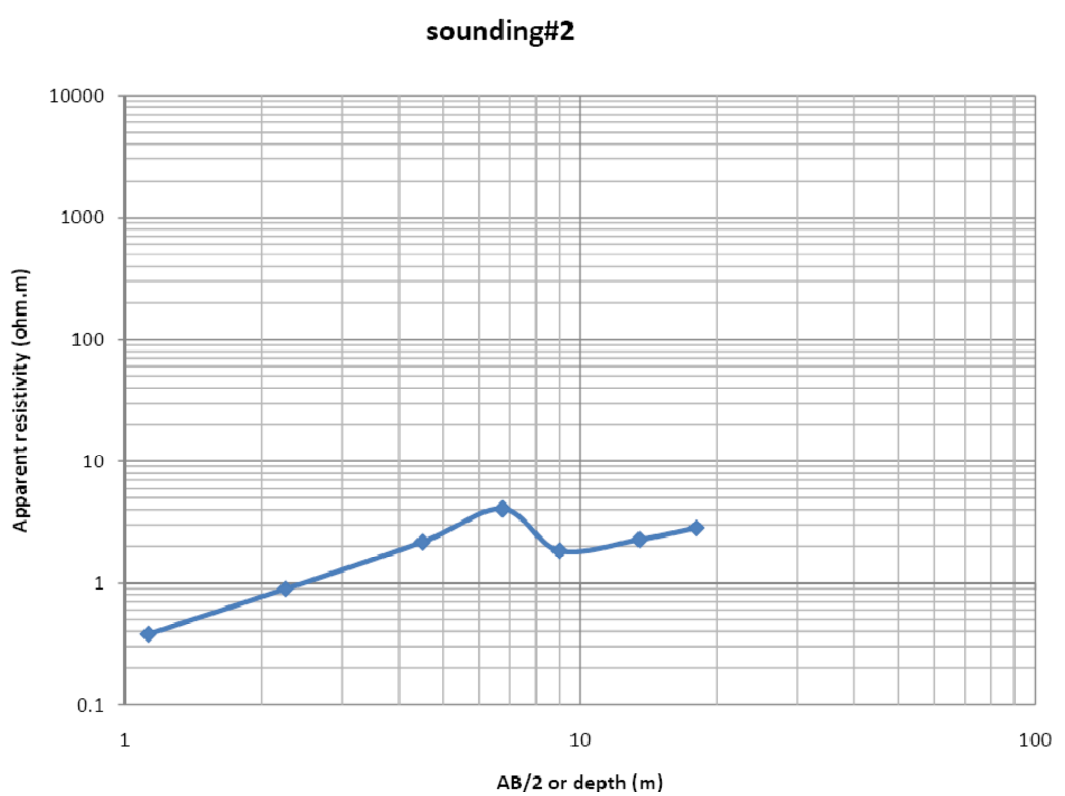


Figure 7: Data and log-log graph sounding 2, Profile 4

Project name				Date
Ghazi High School Soil Resistivity				Aug 07. 2010
Profile N	5	Sound N	3	

Note: T= 25°C
Time: 1:10 - 1:35 PM
weather: cloudy

AB/2	MN(a)	K	R(Ω)	$\rho_a(\Omega.m)$
1.125	0.75	2.355	9.9	23.3145
2.25	1.5	4.71	4.5	21.195
4.5	3	9.42	1.7	16.014
6.75	4.5	14.13	1.1	15.543
9	6	18.84	0.8163	15.379092
13.5	9	28.26	0.566	15.99516
18	12	37.68	0.432	16.27776

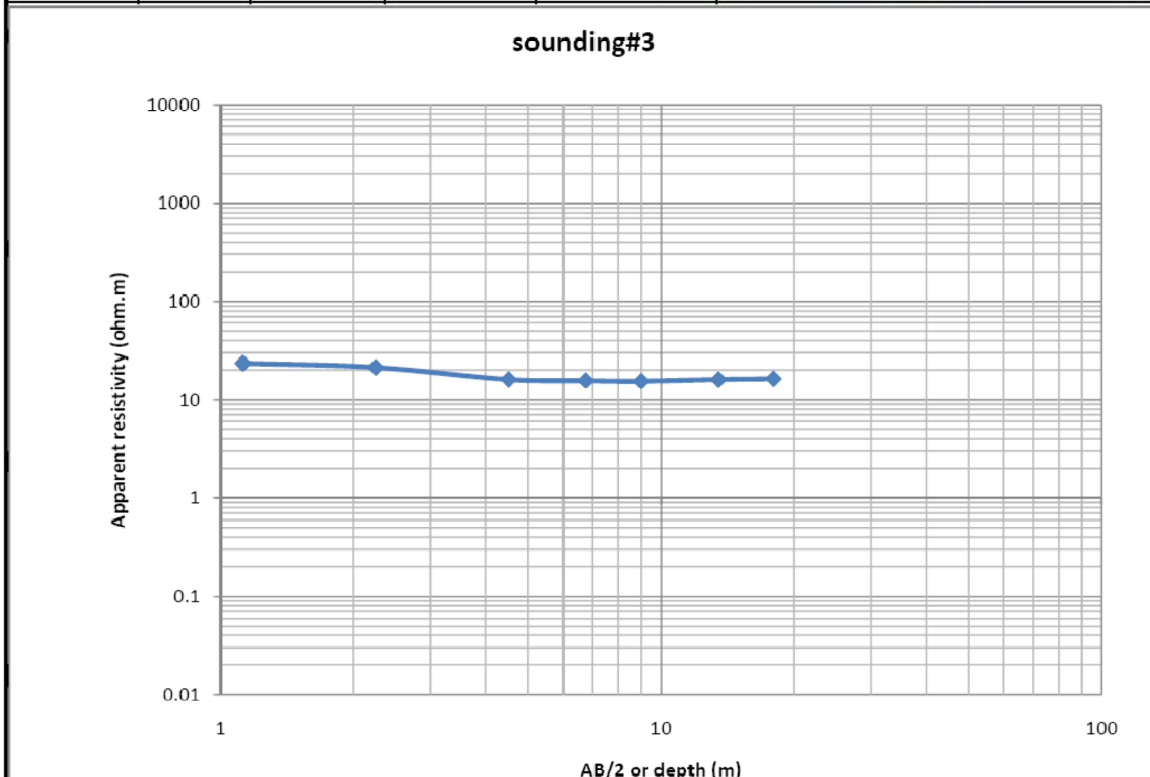


Figure 8: Data and log-log graph sounding 3, Profile 5

Project name				Date	
Ghazi High School Soil Resistivity				Aug 07. 2010	Note: T= 25°C Time: 1:35 - 2:20 PM weather: cloudy
Profile N	6	Sound N	3		
AB/2	MN(a)	K	R(Ω)	ρ_a(Ω.m)	
1.125	0.75	2.355	25.5	60.0525	
2.25	1.5	4.71	10.5	49.455	
4.5	3	9.42	1.4	13.188	
6.75	4.5	14.13	0.9525	13.458825	
9	6	18.84	0.7541	14.207244	
13.5	9	28.26	0.4325	12.22245	
18	12	37.68	0.3372	12.705696	

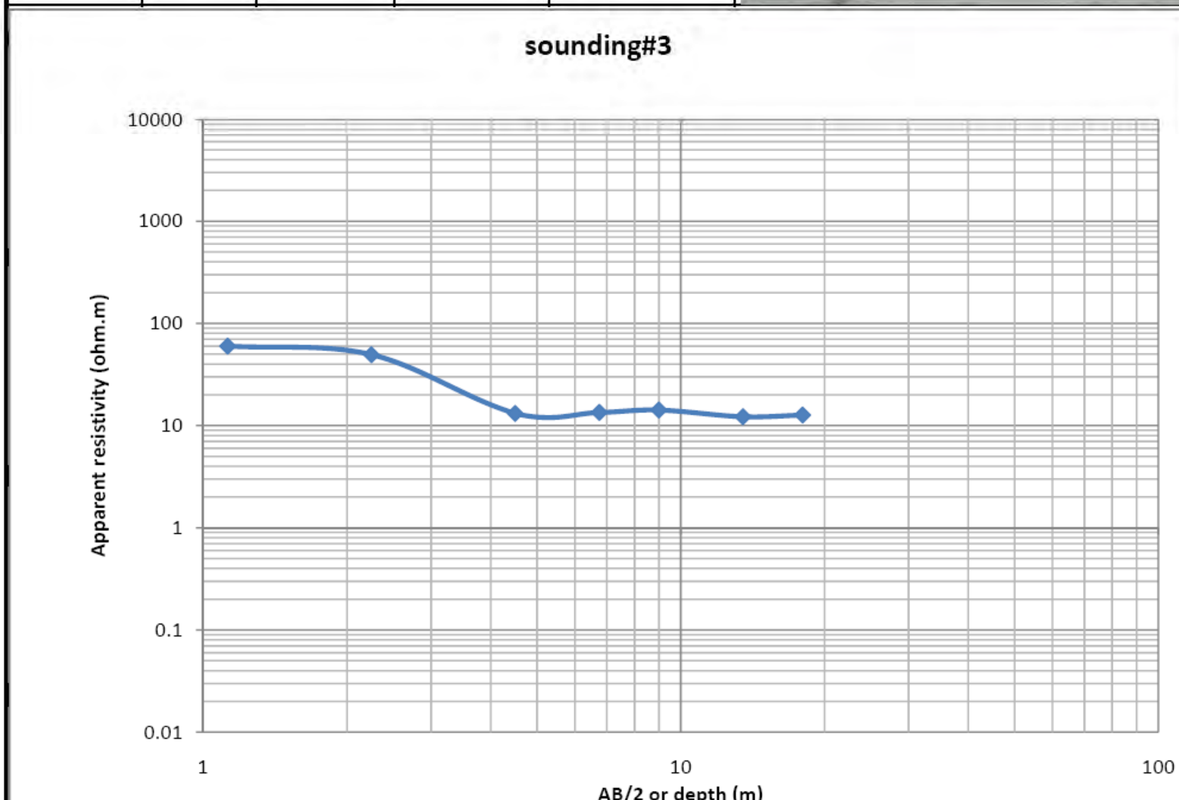


Figure 9: Data and log-log graph sounding 3, Profile 6

Omran Geotechnical Company

Appendix G

Photos

Professional Geotechnical Services

Geotechnical, Geophysical & Material Testing Services

1) Site Photos from purposed building location on Ghazi H.S, Kabul

2) Equipments for Geotechnical investigation

Standard Penetration Testing (SPT, ASTM D-1586)

Disturbed Split Spoon Soil sample per ASTM D-1586

3) Test Pits excavation

Field Density Testing

4) Soil sample boxes

BH#01, Depth 0-4m

BH#01, Depth 4-8m

BH#02, Depth 4-8m

BH#05, Depth 0-4m

Omran Geotechnical Company

Appendix H

Lab Certificate

Professional Geotechnical Services

DEPARTMENT OF THE ARMY
AFGHANISTAN ENGINEER DISTRICT
U.S. ARMY CORPS OF ENGINEERS
KABUL, AFGHANISTAN
APO, AE 09356

REPLY TO
ATTENTION OF:

CEAEN 20 DECEMBER 2009

LABORATORY CERTIFICATION FOR THE
OMRAN GEOTECHNICAL COMPANY

This letter confirms the completion of inspection and certification for the Omran Geotechnical Company construction materials laboratories at the following locations in Afghanistan: Kabul and Mazar-e-Sharif. While Omran's laboratories are physically located in these two cities, they can perform field tests anywhere in Afghanistan.

These laboratories should now be considered as certified for use by the Afghanistan Engineer District (AED), U.S. Army Corps of Engineers (USACE), for the construction materials tests listed in Tables 1 through 5 (attached). This certification will be included with records that are maintained at the AED Headquarters in Kabul, Afghanistan. Retaining certification will require yearly inspections by the AED. This certification is also contingent upon the continued employment of both Mr. [redacted] Business Manager, and Mr. [redacted], Lab Manager. Without the oversight of these gentlemen, the laboratory will require recertification. Also, if the laboratory is moved to a new location, it will require recertification.

The inspection and certification process for the Omran Geotechnical Company laboratory adhered to procedures outlined by the Materials Testing Center (MTC), which is located at the Geotechnical and Structures Laboratory (GSL), U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi, USA. The MTC is the USACE-authorized agency for certifying laboratories for use in quality control testing for USACE construction projects. To facilitate construction in Afghanistan, the AED has authorized this author to conduct laboratory certifications with strict adherence to MTC protocol. Qualifications of this author for conducting these certifications include: 14 years of laboratory research experience with the GSL, ERDC, 14 years of teaching US government-sponsored classes on construction materials, and eight years of teaching university-level construction materials classes.

[redacted]

[redacted], PhD, PE
Chief, Quality Assurance Branch
Afghanistan Engineer District – North
U.S. Army Corps of Engineers

<u>Certified Material Test Procedures Include</u>:
Soils (16 test procedures)
Aggregate (19 test procedures)
Cement, Grout, Mortar, and Concrete (13 test procedures)
Asphalt Cement and Asphalt Concrete (23 test procedures)
Advanced Soils Testing (7 test procedures)

Attachment (5 pages)