APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
DATE 7/30/07 BY [illegible]
PTO 13-04 Cell 2F

# Final Certification Report

## Construction Quality Assurance Services

## Volume I

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Cell 2F Construction
Charlotte Motor Speedway Landfill V
Charlotte, North Carolina

Prepared For:

ALLIED WASTE

Prepared by:

ACC of NORTH CAROLINA, LLC

MAY 2007

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May 8, 2007

Mr. Ed Mussler
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
1646 Mail Service Center
Raleigh, North Carolina 27605

SUBJECT: Charlotte Motor Speedway Landfill V
Cell 2F Construction
Construction Quality Assurance Report

Dear Mr. Mussler:

On behalf of our client, BFI Waste Systems of North Carolina, Inc., a subsidiary of Allied Waste Industries, Inc., ACC of North Carolina, LLC (ACC) is submitting the final Construction Quality Assurance (CQA) certification report for the construction of Cell 2F at the Charlotte Motor Speedway Landfill V facility. Our attached report contains the data collected and reviewed by ACC and the required certification statement verifying the work was completed in accordance with the required project documents.

If you have any questions, please feel free to contact me at (770) 594-5998.

Sincerely,

ACC of North Carolina, LLC

Richard T. Deason
Chief Operating Officer

RTD:rsc

CC: Mike Gurley – BFI Waste Systems of North Carolina, Inc.

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# SECTION 1

# Introduction

# SECTION 1
# Introduction

## 1.1 Project Description

BFI Waste Systems of North Carolina, Inc., a subsidiary of Allied Waste Industries, Inc. (Allied Waste) currently owns and operates the Charlotte Motor Speedway Landfill V located in Cabaurrus County, North Carolina. This report documents construction quality assurance (CQA) monitoring and testing services performed during the construction of Cell 2F. Cell 2F is a solid waste disposal cell encompassing approximately 17.3 acres of composite lined area.

The composite lining system for Cell 2F includes, from bottom to top:

- A prepared subgrade;
- A 1.5-foot thick recompacted soil liner with a maximum coefficient of permeability of $1 \times 10^{-5}$ cm/sec;
- A Geosynthetic Clay Liner (GCL);
- A 60-mil thick textured High Density Polyethylene (HDPE) geomembrane liner;
- A double sided geocomposite drainage layer; and
- A 2-foot thick protective cover layer.

## 1.2 Scope of Services

ACC of North Carolina, LLC (ACC) was retained by Allied Waste to provide Construction Quality Assurance (CQA) monitoring and testing services during construction of the prepared subgrade, structural fill, 1.5-foot thick, low permeability compacted soil liner, GCL, 60-mil geomembrane liner and the associated leachate collection system.

The CQA services provided during construction of Cell 2F were performed in accordance with the following project documents:

- Drawing Numbers 1 to 11 inclusive, entitled "Charlotte Motor Speedway Landfill – Cell 2F Construction Documents," prepared by ACC of North Carolina, LLC and dated November 2006 (referenced to in this report as the Construction Drawings).

- "Permit Modification Application Construction Quality Assurance Plan, BFI – Charlotte Motor Speedway Landfill V Lateral Expansion – Cells 2F, 2G &2H" prepared by Almes & Associates, Inc. dated May 2004 (referenced to in this report as the CQA Plan).

For the purposes of clarity, the above documents have been collectively referred to throughout the text of this report as the "Project Specifications."

This report describes the technical approach taken by ACC to provide CQA services during the construction of Cell 2F. Also included with this report are the results of field testing, field observations and laboratory test results. Finally, the report contains a certification statement, which confirms that Cell 2F was constructed in accordance with the approved design and operation plans, construction quality assurance plan, project specifications and the facility's solid waste permit.

## 1.3 CQA Project Personnel

The ACC on-site CQA team consisted of one full-time Resident Manager who was on-site during the Cell 2F construction. The resident manager was assisted by a geosynthetics monitor during the installation of the GCL and geomembrane liner materials.

The ACC CQA personnel coordinated their activities on a day-to-day basis with the ACC Project Engineer. Overall supervision of ACC's services was provided by the certifying engineer, a Registered Professional Engineer (State of North Carolina) from ACC. A listing of ACC project personnel, along with their initials, used on field and summary documentation, is included in Appendix A.

Copies of the Resident Manager's daily field summary reports are included in Appendix B.

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# SECTION 2

## Construction Overview

# SECTION 2
# Construction Overview

## 2.1 Project Participants

The principal project participants during the construction of the soil components of the Cell 2F construction at the Charlotte Motor Speedway Landfill V consisted of:

- Allied Waste, as owner and operator of the Charlotte Motor Speedway Landfill V facility;
- ACC of North Carolina, LLC (ACC), as the CQA Consultant during construction of Cell 2F;
- Timely Engineering Soil Tests, LLC (TEST), as the geotechnical laboratory for the testing of the soils components of this project;
- TRI/ Environmental. Inc. (TRI), as the geotechnical laboratory for the testing of the geosynthetic components of this project;
- Earnhardt Grading, Inc. (EGI), as general contractor for the construction;
- Texas Environmental Plastics, Inc. (TEP), as the geosynthetics installer for Cell 2F; and
- F. Donald Lawrence & Associates, Inc. (FDLA), as the Registered Professional Land Surveyor (North Carolina).

## 2.2 Prepared Subgrade and Structural Fill Construction

Construction of the prepared subgrade and structural fill components of Cell 2F started on December 11, 2006, and were completed on February 10, 2007. EGI hauled approximately 185,000 cubic yards of structural fill materials obtained from an approved borrow source into the Cell 2F waste disposal cell. The soil was placed, where required, in accordance with the Project Specifications.

The ACC Resident Manager was on-site during placement of structural fill materials. Elevations of the completed prepared subgrade and structural fill construction were obtained and reviewed by FDLA's Registered Professional Land Surveyor to verify compliance with the construction drawings. A copy of the record drawing showing the completion of the structural fill material, titled "Grade Verification Survey of CMS Cell 2F" was provided to ACC by FDLA and is presented as Figure 1.

## 2.3 Compacted Soil Liner Construction

Construction of compacted soil liner material started on February 7, 2007, and was completed on March 7, 2007. Approximately 42,000 cubic yards of compacted soil liner material was placed on the floor and side slopes of Cell 2F. EGI carried out routine maintenance of the compacted soil liner material until it was covered by the geosynthetic materials.

A record drawing showing the final grade elevations of the compacted soil liner, entitled "Grade Verification Survey of CMS Cell 2F" was provided to ACC by FDLA and is presented as Figure 1.

## 2.4 Geosynthetics Installation

TEP began the geosynthetic clay liner and geomembrane liner installation for Cell 2F on March 8, 2007, and completed installation on March 28, 2007. The geosynthetics liner consists of approximately 753,000 square feet of material covering all of Cell 2F. All installation procedures were in compliance with the Project Specifications. A copy of the geomembrane panel layout sketch, prepared by ACC is presented as Figure 2.

## 2.5 Leachate Collection System Installation

Construction of the leachate collection system in Cell 2F began on March 19, 2007 and was completed on April 23, 2007. The leachate collection system construction started with geocomposite installation. Approximately 753,000 square feet of geocomposite was installed on the floor and sideslopes of Cell 2F. The geocomposite was installed directly on top of the 60-mil HDPE geomembrane. The leachate collection drains were surrounded by No. 57 stone and encapsulated with geotextile. Protective cover material was placed directly on top of the geocomposite. Approximately 56,000 cubic yards of protective cover material was placed on the floor and sideslopes of Cell 2F.

A record drawing showing the final grades of the leachate collection layer material, entitled "Grade Verification Survey of CMS Cell 2F" was provided to ACC by FDLA and is presented as Figure 1.

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# SECTION 3

# CQA During Prepared Subgrade and Structural Fill Construction

# SECTION 3
# CQA During Prepared Subgrade and Structural Fill Construction

## 3.1 Project Specifications

In general, the Project Specifications require that: i) subgrade be proof-rolled prior to any fill placement of soils materials; ii) structural fill material will be used to establish elevations for the containment system after proof-rolling of the exposed surface is performed; iii) the structural fill material will be tested to determine the moisture/density relationship through laboratory testing and to evaluate the degree of compaction through field density testing; and iv) the structural fill material is to be placed in 6-inch thick compacted lifts and compacted to a minimum of 95 percent of the Standard Proctor (ASTM D698) maximum dry density.

The Project Specifications provided specific frequencies and acceptance criteria for both field and laboratory testing of the structural fill material.

## 3.2 Laboratory Testing

During the structural fill construction, representative samples of that material were obtained from the proposed borrow sources for detailed laboratory testing. A total of nineteen (19) samples were obtained. The samples were labeled SF-1 through SF-19. The laboratory testing program was comprised of standard Proctor moisture/density relationship ASTM D698 and particle size analysis ASTM D422. The laboratory testing met the required frequency and the results of this testing are presented in Appendix C.

## 3.3 Field Density Testing

Field density testing of the structural fill was performed by the ACC Resident Manager using the nuclear density gauge (ASTM D2922) and met a frequency of one test per 10,000 square feet per lift of placed material. In accordance with the project specifications, the drive cylinder method (ASTM D2937) was used periodically to verify the performance of the nuclear gauge.

In the event that a density test failed to meet the Project Specifications, remedial work was undertaken within the area represented by the failed test. The remedial work typically consisted of a bulldozer tracking up the soil material, allowing time for drying, and then using a compactor recompacting the material. After the remedial work was complete, the area was retested. This procedure was repeated until a passing result was achieved.

A total of 469 initial field density tests were performed during the placement of the structural fill material. Of the original 469 field density tests, only three test areas failed the original testing. All three of these areas were reworked, retested and passing retests were obtained that met the

project specifications for compaction in each of these areas. The results of the density testing of the structural fill material are summarized in Appendix D. The tests are identified with the prefix SF.

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# SECTION 4

# CQA During Compacted Soil Liner Construction

# SECTION 4

# CQA During Compacted Soil Liner Construction

## 4.1 Project Specifications

In general, the Project Specifications for the compacted soil liner material for Cell 2F require that: i) a minimum 1.5-foot thick compacted soil liner lift be placed with a maximum coefficient of permeability of 1.0 x $10^{-5}$ cm/sec; ii) preconstruction laboratory testing be performed to establish an acceptable range of moisture/density values which will result in achieving the required permeability (the acceptable range was subsequently determined to have a degree of compaction equal to or greater than 97 percent of the maximum dry density at or above three percent wet of the optimum moisture content ); iii) loose lift thickness shall not exceed 8 inches to yield a final minimum 6-inch compacted thickness; and, iv) a maximum particle size dimension of 3/4 inch be allowed for the upper 6 inches of liner base.

The Project Specifications provided frequencies and acceptance criteria for both field and laboratory testing of the liner base.

## 4.2 Preconstruction Testing

Prior to the use of any borrow source as construction material for the compacted soil liner, a test pad was constructed using the material in order to confirm the proposed borrow source would meet the project requirements for the compacted soil liner material. A total of two test pads were constructed. The first was for an off-site borrow source and the second was for an on-site borrow source. Compacted soil liner material from both borrow sources were utilized during the construction of the compacted soil liner in Cell 2F.

As required by the project specifications, bulk laboratory test samples, Shelby tube samples and in-place density testing were all performed on both of the test pads. The detailed laboratory testing data for the bulk samples and for the Shelby tube samples; as well as the field density test data for the test pads are presented in Appendix E, Sections E-1, E-2 and E-3, respectfully.

## 4.3 Testing During Construction

As required by the project specifications, bulk laboratory test samples, Shelby tube samples and in-place field density testing were all performed on the placed compacted soil liner within the limits of Cell 2F. As a result, ACC obtained a total of 13 bulk laboratory samples and 18 Shelby tube samples for laboratory testing. All of the samples met the project specifications. The results of the laboratory tests performed during construction are presented in Appendix F, Sections F-1 and F-2.

Field density testing of the compacted soil liner was performed by the ACC Resident Manager using the nuclear density gauge (ASTM D2922) and met a frequency of one test per 10,000

square feet per lift of placed material. In accordance with the Project Specifications, the drive cylinder method (ASTM D2937) was used to verify the performance of the nuclear gauge.

In the event that a density test failed to meet the Project Specifications, remedial work was undertaken within the area represented by the failed test. The remedial work typically consisted of a bulldozer tracking up the liner base material, allowed time for drying, and then a compactor recompacting the material. After the remedial work was complete, the area was retested. This procedure was repeated until a passing result was achieved.

A total of 228 initial field density tests were performed during the placement of the compacted soil liner material. Of the original 228 field density tests, only four test areas failed the original testing. All four of these areas were reworked, retested and passing retests were obtained that met the project specifications for compaction in each of these areas. The results of the field density testing, denoted with the prefix C, are summarized in Appendix F, Section F-3.

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# SECTION 5

## Geosynthetic Conformance Test Results and Manufacturers' Quality Control Submittals

# SECTION 5
# Geosynthetic Conformance Test Results and Manufacturers' Quality Control Submittals

## 5.1 Geomembrane

Samples of the 60-mil thick HDPE geomembrane materials used for Cell 2F were obtained by TRI for laboratory testing to verify conformance with the Project Specifications. The geomembrane samples were obtained at the frequencies stated in the project specifications. Approximately 753,000 square feet of 60-mil thick HDPE geomembrane material was delivered to the site. The tests were performed in accordance with the standard test procedures defined in the Project Specifications.

The conformance test results and quality control data were reviewed by ACC and compared to the Project Specifications. Based on the review, the test results for the geomembrane complied with the values detailed in the Project Specifications. A summary of the conformance test results for the geomembrane material is provided in Appendix G, Section G-1. A summary of the quality control data for the geomembrane material is provided in Appendix H, Section H-1.

## 5.2 Geosynthetic Clay Liner

Samples of the GCL materials used for Cell 2F were obtained by TRI for laboratory testing to verify conformance with the Project Specifications. The GCL samples were obtained at the frequencies stated in the project specifications. Approximately 753,000 square feet of GCL material was delivered to the site. The tests were performed in accordance with the standard test procedures defined in the Project Specifications.

The conformance test results and quality control data were reviewed by ACC and compared to the Project Specifications. Based on the review, the test results for the GCL complied with the values detailed in the Project Specifications. A summary of the conformance test results for the GCL material is provided in Appendix G, Section G-2. A summary of the quality control data for the GCL material is provided in Appendix H, Section H-2.

## 5.3 Geocomposite

Samples of the geocomposite material used for Cell 2F were obtained by TRI for laboratory testing to verify conformance with the Project Specifications. The geocomposite samples were obtained at the frequencies stated in the project specifications. Approximately 753,000 square feet of geocomposite material was delivered to the site. The tests were performed in accordance with the standard test procedures defined in the Project Specifications.

The conformance test results and quality control data were reviewed by ACC and compared to the Project Specifications. Based on the review, the test results for the geocomposite complied with the values detailed in the Project Specifications. A summary of the conformance test results

for the geocomposite material is provided in Appendix G, Section G-3. A summary of the quality control data for the geocomposite material is provided in Appendix H, Section H-3.

## 5.4 Geotextile

Samples of the geotextile materials used for Cell 2F were obtained by TRI for laboratory testing to verify conformance with the Project Specifications. The geotextile samples were obtained at the frequencies stated in the project specifications. Approximately 753,000 square feet of geotextile material was delivered to the site. The tests were performed in accordance with the standard test procedures defined in the Project Specifications.

The conformance test results and quality control data were reviewed by ACC and compared to the Project Specifications. Based on the review, the test results for the geotextile complied with the values detailed in the Project Specifications. A summary of the conformance test results for the geotextile material is provided in Appendix G, Section G-4. A summary of the quality control data for the geotextile material is provided in Appendix H, Section H-4.

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# SECTION 6

## Geosynthetics Installation Monitoring

# SECTION 6
# Geosynthetics Installation Monitoring

The ACC monitoring staff during the geosynthetics installation in Cell 2F consisted of the Resident Manager and one Geosynthetics Monitor.

The CQA monitoring services that ACC provided consisted of:

- Review of conformance test data and the geosynthetic manufacturers' quality control certificates for the geomembrane, geosynthetic clay liner, geocomposite and geotextile materials;
- Observation of geosynthetic clay liner installation: deployment, seaming, and handling;
- Visual examination and documentation of geomembrane panels during deployment;
- Observation and documentation of geomembrane trial seams and evaluation of the test results;
- Observation and documentation of geomembrane seaming operations;
- Observation and documentation of geomembrane non-destructive seam continuity testing;
- Selection of sample locations for geomembrane destructive seam strength testing; and
- Evaluation of geomembrane laboratory seam strength testing results.

Detailed descriptions of each of the above monitoring duties are presented in the following sections. Summaries of the field and laboratory data collected by ACC during Cell 2F geosynthetics installation have been included in Appendices I through Q.

## 6.1 Deployment Monitoring

During deployment of the geosynthetic clay liner and geomembrane panels in Cell 2F, TEP signed Certificates of Acceptance of Soil Surface, which are presented in Appendix I. Geomembrane panels were individually monitored by ACC personnel during deployment from the rolls. This process consisted of observation of geomembrane panel alignment, panel overlap, panel surface quality, and panel identification (roll and panel number). The ACC CQA Monitor labeled the individual panels P-1 through P-198 inclusive. Deployment of the geomembrane, geosynthetic clay liner and geocomposite was accomplished with the use of a rubber-wheeled front-end loader and/or manual labor.

In general, the Project Specifications for the geosynthetic clay liner for Cell 2F require that: i) only rolls that are to be placed and covered by geomembrane that day shall be unrolled; ii) the surface should be free of rock or other foreign materials larger than 3/4-inch in diameter; iii) after rolls are in place, as many wrinkles as possible shall be removed; and iv) adjoining panels shall have at least a 6-inch overlap along the length of the GCL and have at least a 24-inch overlap along the width of the GCL.

In general, the Project Specifications for the geomembrane liner for Cell 2F require that: i) only panels that are to be seamed together that day shall be unrolled; ii) panels shall be positioned with a minimum 3-inch overlap for extrusion welds and 5-inch overlap for fusion welds; iii) no horizontal seams be placed on slopes or within five feet of the toe or crest of the slope, iv) after panels are in place, as many wrinkles as possible shall be removed; and v) liner be allowed to "relax" before field seaming.

There were no defects observed in any of the geosynthetic materials that were the result of manufacturing, shipping, or deployment. Following deployment, sand bags were used to temporarily anchor the geomembrane panels until they were permanently joined. A plan view sketch of the geomembrane panel layout for Cell 2F is presented as Figure 2. A summary of the geomembrane panel deployment monitoring log is presented in Appendix J.

## 6.2 Trial Seam Monitoring

Geomembrane trial seaming was performed by the TEP technicians approximately every five hours to verify the adequacy of the seaming apparatus, operators, and procedures. Each trial seam was sampled and tested by the installer for peel adhesion (peel) and bonded seam (shear) failure modes. The trial seaming was observed and documented by ACC personnel. Summaries of the trial seam results for both the fusion and extrusion methods are presented in Appendix K.

## 6.3 Seam Monitoring

The principal seaming method used for joining of the geomembrane panels was the automated double-track fusion seaming process. The extrusion method was utilized for smaller seam lengths, patches, repairs, and intersection of fusion seams.

Monitoring of the seaming methods consisted of frequent visual observation of the seaming procedures, visual examination of the completed seam, and verification that the seam was welded for its entire length. Seaming imperfections were marked and subsequently repaired in accordance with the Project Specifications. Summaries of the fusion and extrusion seam monitoring logs are presented in Appendix L.

## 6.4 Non-Destructive Seam Continuity Testing and Repair Monitoring

All seams, seam repairs and patches were non-destructively tested for continuity by the installer using the air pressure method for double-track fusion seams and the vacuum box method for extrusion seams. Each repair was assigned a unique number to facilitate data tracking and location of all repairs. ACC observed the testing procedures and documented the progress of all non-destructive continuity testing. Monitoring and documentation of defects and associated testing of repairs are summarized in Appendices M and N, respectively.

The results of all seam pressure and vacuum testing are presented in Appendices O and P, respectively.

## 6.5 Destructive Seam Strength Testing

Destructive seam samples were taken by ACC in accordance with the Project Specifications at a minimum average frequency of one test per 500 linear feet of completed seam. Each destructive sample was divided into three sections; namely, one 12-inch long section was retained by TEP, one 12-inch long section was retained by Allied Waste, and the third 18-inch long section was shipped to the TRI geosynthetics laboratory for testing in accordance with the Project Specifications.

The destructive samples received by the TRI Laboratory were divided into ten (10) specimens; five (5) for bonded seam strength (shear) testing and five (5) for peel adhesion (peel) testing. For the double-track fusion samples, each track was tested as a separate destructive test resulting in five (5) shear tests and ten (10) peel tests. The specified strength acceptance criteria for shear testing was that specimens must have yield strengths greater than or equal to 126 pounds per inch of specimen width. The strength criteria for peel testing was that specimens must have yield strengths greater than or equal to 82 pounds per inch of specimen width. All of the destructive samples were tested and evaluated in accordance with the acceptance criteria detailed in the Project Specifications.

During geomembrane installation, a total of seventy-eight (78) initial seam destructive samples were obtained from approximately 36,920 linear feet of completed fusion seams. This results in an average testing frequency of one test per 474 linear feet of fusion welding. All of the fusion test samples met or exceeded the required test values per the project specifications.

A total of ten (10) destructive samples were obtained from approximately 4,260 linear feet of extrusion seams associated with the geomembrane repairs. This results in an average testing frequency of one test per 426 linear feet of extrusion welding. Only destructive sample number DX-2 failed initial testing. This sample was subsequently bound by DX-2A in the forward direction and DX-2B4 in the backwards direction. All areas represented by this failing destructive test were reconstructed or repaired and then non-destructively tested.

Summaries of the destructive test results for fusion and extrusion welds are presented in Appendix Q.

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# SECTION 7

## Leachate Collection System Construction

# SECTION 7
# Leachate Collection System Construction

During the leachate collection system construction in Cell 2F, ACC monitoring staff consisted of the Resident Manager as site activities required. The CQA monitoring services that ACC provided consisted of:

- Review of the geotextile and geocomposite manufacturers' quality control services;
- Visual examination of the geotextile, geocomposite and piping during deployment.
- Observation of the geocomposite and geotextile seaming operations;
- Observation of the HDPE pipe welding;
- Monitoring and documenting the placement of the leachate collection stone and protective cover layer material to insure that no damage was caused to the geotextile, geocomposite and HDPE piping;
- Monitoring the incoming protective cover layer material for any debris that could cause damage to the underlying geosynthetic materials; and
- Confirming that no damage was caused by wrinkles in the geocomposite and 60-mil HDPE geomembrane being covered by the leachate collection layer material.

## 7.1 Protective Cover Layer Testing

Prior to the protective cover layer installation, representative samples of the material were obtained from the proposed borrow sources for laboratory testing. A total of six (6) samples were obtained. The samples were labeled PC-1 through PC-6. The laboratory testing program was comprised of particle size analysis ASTM D422. The laboratory testing met the requirements of the project specifications. The results of this testing are presented in Appendix R.

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# SECTION 8

## Record Surveys

# SECTION 8
# Record Surveys

A record ("as-built") survey was conducted during Cell 2F construction by a Registered Professional Land Surveyor (North Carolina) from F. Donald Lawrence & Associates, Inc. to certify that the thickness, lines, grades and survey tolerances for the structural fill, compacted soil liner and protective cover layers met the Project Specifications. The survey was conducted using a system of field stakes that represented critical points in defining the shape of Cell 2F. As mentioned previously, the survey drawing was provided to ACC by FDLA and is included in this report as Figure 1.

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# SECTION 9

# Certification

# SECTION 9
# Certification

ACC of North Carolina, LLC was retained by BFI Waste Systems of North Carolina, Inc., a subsidiary of Allied Waste Industries, Inc. to provide CQA services during the construction of Cell 2F at the Charlotte Motor Speedway Landfill V located in Cabaurrus County, North Carolina. Services rendered consisted of construction quality assurance monitoring and testing during construction of the prepared subgrade, structural fill, 1.5-foot thick, low permeability compacted soil liner, GCL, 60-mil geomembrane liner and the associated leachate collection system. The ACC Registered Professional Engineer (North Carolina) performed on-site visits and reviewed the work during construction.

Based on the results of the CQA activities performed by ACC and described in this report, I certify that Cell 2F of the Charlotte Motor Speedway Landfill V facility was constructed in compliance with the approved design and operation plans, construction quality assurance plan, project specifications and the facility's solid waste permit.

ACC of North Carolina, LLC

R. Scott Callaway
Project Engineer

Richard T. Deason, P.E.
Certifying Engineer

NORTH CAROLINA PROFESSIONAL SEAL 032852 ENGINEER RICHARD T. DEASON

RSC/RTD:ods

# Figures

# APPENDIX A
## Listing of CQA Personnel

## LISTING OF ACC SITE CQA PERSONNEL

| ACC PERSONNEL | ACC POSITION TITLE | PERSONNEL INITIALS |
|---|---|---|
| | | |
| RICHARD T. DEASON | CERTIFYING ENGINEER | RTD |
| R. SCOTT CALLAWAY | PROJECT MANAGER | RSC |
| TIM J. SCHREIBER | RESIDENT SITE MONITOR | TJS |
| SONNY M. JOHNSTON | HDPE/ SOILS MONITOR | SMJ |
| WAYNE F. BARRON | HDPE/ SOILS MONITOR | WFB |
| | | |

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# APPENDIX B

## Resident Manager's Daily Summary Reports

# Daily Monitoring Summary



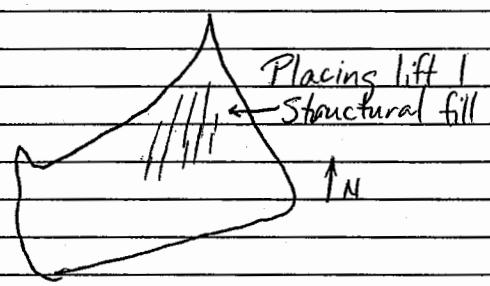
Date: Dec. 11 2006 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 30 @ AM High: 62 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

Earnhardt Grading (E.G.) placing lift 1 of Structural fill, in the Eastern half of the cell.




Equipment Used
- 5 CAT Offroad trucks
- CAT D6 Dozer
- CAT 815 Compactor.

NOTE: E.G. Started placing fill on 12-6-06

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 7 density/moisture tests on the structural fill. The first test failed, the contractor (E.G.) reworked the area. I retested the area with passing results. Leaving no outstanding failing areas.

# Daily Monitoring Summary



Date: Dec. 11, 2006 S (M) T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 12, 2006 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 30 @ AM High: 66 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

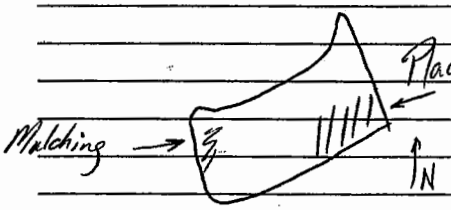
ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continued to place and compact lift 1 of the structural fill soil. Working in the Eastern half of the cell.

They continued to mulch trees and other debris in the Western end of the cell.

Equipment Used
- 5 CAT Offroad trucks
- CAT D6 Dozer
- CAT 815 Compactor




ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 14 density / moisture tests on lift 1, structural fill. All passing.

# Daily Monitoring Summary



Date: Dec 12, 2006 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



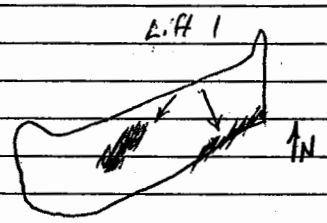
Date: Dec. 13, 2006 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 42 @ AM High: 66 @ PM
Cloud Cover: Mostly Sunny Precipitation: very light AM shower Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continues to place, spread and compact lift 1, structural fill. They are using a dozer to cut out wet areas prior to placing lift 1.




Equipment Used
7 CAT Offroad trucks
1 CAT D6
1 CAT D5
CAT 815 Sheepsfoot
CAT Motorgrader.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 12 density/moisture tests on lift 1, structural fill. All passing.

# Daily Monitoring Summary



Date: Dec. 13, 2006 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



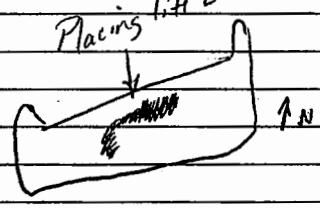
Date: Dec. 14, 2006 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 37 @ AM High: 62 @ PM
Cloud Cover: Fog AM Hrs. Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continued to place, spread and compact the structural fill soil. Placing lift 2 in the Eastern half of the Cell




Equipment Used
- 8 CAT Offroad trucks
- CAT D6 Dozer
- CAT D5 Dozer
- CAT 815 Compactor
- CAT Motorgrader.

ACC Activities and Test Results:

- Observed the activities noted above
- Ran 8 density / moisture tests, 4 on lift 1 and 4 on lift 2. All passing.
- Collected a soil sample from material to be used for the protective cover (top of liner). Sent to T.R.I. for testing with the composite.

# Daily Monitoring Summary



Date: Dec 14, 2006 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 15, 2006 S M T W T (F) S

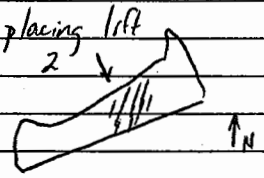
Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 42 @ AM High: 66 @ PM
Cloud Cover: Fog AM Res. Mostly Sunny PM Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continues to place spread and compact the structural fill soil. Working lift 2 in the Eastern half of the cell.

placing lift 2




Equipment Used
- 8 CAT Offroad trucks
- CAT D6 Dozer
- CAT 815 Compactor
- CAT Motorgrader

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran a total of 11 density/Moisture tests on lift 2, structural fill. Having 1 fail, the area was reworked and tested leaving no outstanding failures.
- Collected Bucket sample SF-4 Will deliver to T.E.S.T. on Sat. morning.

# Daily Monitoring Summary



Date: Dec. 15, 2006 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Met with Charlie (LF Manager) He and I discussed the clay liner soil. He asked if I could sample the soil being stockpiled to run a one point or possibly additional proctors and remolded perms to assure both BFI and E.G. that the soil continues to meet the spec. requirements. ($1 \times 10^{-5}$)

Summary of Health and Safety Issues:

Submitted by: L. S. [illegible]

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 18, 2006 S (M) T W T F S

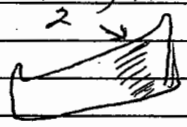
Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 43 @ AM High: 68 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continues to place, spread & compact lift 2 of the structural fill soil. Working in the Eastern half of the cell.

Placing lift 2



Equipment Used 8 Cat offroad trucks
CAT D6 Dozer
CAT 815 Compactor
CAT Motorgrader

ACC Activities and Test Results:

- Observed the activities noted above
- Did not run any density tests today

# Daily Monitoring Summary



Date: Dec. 18, 2006 S (M) T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 19, 2006 S M (T) W T F S

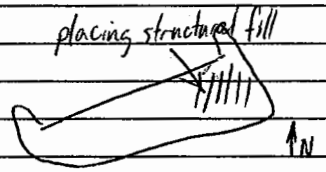
Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 42 @ AM High: 72 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continued to place, spread and compact structural fill soil in the Eastern half of the cell.

Equipment Used
- 8 CAT Offroad trucks
- CAT D6 Dozer
- CAT 815 Compactor
- CAT Motorgrader




ACC Activities and Test Results:

- Observed the activities noted above.
- Did not run any density tests today

# Daily Monitoring Summary



Date: Dec. 19, 2006 S M (T) W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 20, 2006 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 43 @ AM High: 70 @ PM
Cloud Cover: Partly Cloudy Precipitation: — Wind: 0-10

ACC Personnel On-Site: Jim Schreiber (short time)

Summary of Construction Progress:

E.G. continues to place structural fill soil. Working in the Eastern half of the Cell.

ACC Activities and Test Results:

Observed some of the activities noted above.

I left the site very early AM Abs
Drove back to Atlanta for Drs. Appointment.

Note - Did not return for rest of Week

# Daily Monitoring Summary



Date: Dec. 20, 2006 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

I talked to Wilson. (E.G.) told him everything that they were doing was looking good. Also that I was sick going home for Dr's appointment.

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 26, 2006 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 39 @ AM High: 48 @ PM
Cloud Cover: Mostly Cloudy Precipitation: — Wind: 5-15

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- E.G. did not work today due to wet conditions

ACC Activities and Test Results:

I ran 42 density/moisture tests on the structural fill placed. All passed.

# Daily Monitoring Summary



Date: Dec. 26, 2006 S M (T) W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec 27, 2006 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 32 @ AM High: 54 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continues to place, spread and compact structural fill soil. Working in the Eastern half of of the Cell.

Equipment Used - 11 CAT Offroad trucks
- CAT D6 Dozer
- CAT 815 Compactor.
- CAT D8 Dozer

ACC Activities and Test Results:

Observed the activities noted above.

Ran 14 density/moisture tests on the structural fill soil. All passing.

# Daily Monitoring Summary



Date: Dec. 27, 2006 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 28, 2006 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 31 @ AM High: 56 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to place, spread and compact the structural fill soil. Working in the Eastern half of the cell.

Equipment Used
- 11 CAT Off road trucks
- CAT D6 Dozer
- CAT D8 Dozer
- CAT 815 Compactor.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 21 density / moisture tests on the structural fill soil. All passing.

# Daily Monitoring Summary



Date: Dec. 28, 2006 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Attended a meeting called by Mike Gurley BFI
- Discussed the quantity control (load counts + Topo of stockpiled soil)
- quality control (Having ACC look at and sample soil as it is being stockpiled)
- Payment schedule for truckers.

Attendees Mike, Ben } Oapler trucking Mike G, Cotton } BFI Fred - E.G.

Summary of Health and Safety Issues:

Submitted by: [signature]
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Dec. 29, 2006 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 30 @ AM High: 69 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to place, spread and compact structural fill soil. Working along the Eastern half of the cell.

Equipment Used
- 12 CAT Offroad trucks
- CAT D8 Dozer
- CAT D6 Dozer
- CAT 815 Compactor.
- CAT Motorgrader.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 28 density tests on the structural fill soil. All passing

# Daily Monitoring Summary



Date: Dec. 29, 2006 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 3, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 34 @ Am High: 61 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

* EG continues to place, spread and compact the structural fill soil in the Eastern half of the cell.
* They continue to remove (excavate) unsuitable soils (Top soil and excessively wet soil) along the East. berm location.
* They continue to stockpile the 10-5 clay soil outside cell limits.

Note: On Sat. Dec. 30, 2006 EG excavated 774 c/yds of unsuitable soil along the tie-in to the existing cell.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 32 density/moisture tests on lift 5 of the structural fill. All passing.
- At 4 separate times today I went to Clay soil stockpile and physically felt the soil being stockpiled, making sure that it felt and acted like the samples that were sent into the lab. I felt that the soil was the same.

# Daily Monitoring Summary



Date: Jan. 3, 2007 S M T (W) T F S

Summary of Surveyor's Activities: Surveyors on site checking topo of the clay soil stockpile area / prior to clay being stockpiled.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan 4 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 51 @ AM High: 65 @ PM
Cloud Cover: Mostly Cloudy Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. continues to place, spread and compact structural fill Soil. Working in the Eastern half of the cell.

They continue to remove top soil and excessively wet soil (unsuitable) from Eastern Edge of Cell

The clay soil continues to be hauled in and stockpiled.

ACC Activities and Test Results:

- Observed the activities noted above
- Ran 21 density / moisture tests on the structural fill All passing
- Spent time watching the clay liner soil being stockpiled. I collected a sample and ran a one point proctor on it to see if it would match 1 of the curves that we have. I checked some of the truck loads by rolling worms and making ribbons. Everything I checked appears to be a soil that will meet the $1 \times 10^{-5}$ perm.

# Daily Monitoring Summary



Date: Jan. 4, 2007 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 5, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 60 @ AM High: 67 @ PM
Cloud Cover: Cloudy Precipitation: steady rain at 11:00 am Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to haul place and compact the structural fill soil. Working in the Eastern half of the cell.

They also continued to stockpile the 10-5 clay soil, on site.

Note: E.G. shut down around 11:15 AM due to rain.

ACC Activities and Test Results:

- Observed the activities noted above
- Ran 21 density / moisture tests on structural fill soil (All passing)
- Observed and felt some of the 10-5 clay soil being stockpiled. It appeared to good soil.

# Daily Monitoring Summary



Date: Jan 5, 2007 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 9, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 30 @ AM High: 44 @ PM
Cloud Cover: Mostly Cloudy Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- E.G. repaired the crossing over the creek. It washed out over the weekend from all the rain.
- They did NOT work on the cell due to wet conditions
- They did continue to bring in and stockpile the $1 \times 10^{-5}$ clay liner soil

ACC Activities and Test Results:

- Observed the activities noted above
- Observed some of the clay soil being hauled in and stockpiled. It looked and felt (rolling worms and making ribbons) good. It appears that this soil will meet the $1 \times 10^{-5}$ perm. requirements

# Daily Monitoring Summary



Date: Jan. 9, 2007 S M (T) W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan 10, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 25 @ AM High: 48 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continued to place, spread and compact structural fill soil

They excavated more of the unsuitable soil along the tie-in and the East side of the cell.

The clay liner soil continued to be stockpiled.

ACC Activities and Test Results:

- Observed the activities noted above.
- I checked and observed some of the clay liner soil being stockpiled. Rolling worms and making ribbons with the soil.

# Daily Monitoring Summary



Date: Jan. 10, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 11, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 24 @ AM High: 54 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place, spread and compact structural fill soil. Working in the Eastern half of the cell.
- They continue to stockpile clay liner soil outside the cell limits.
- Excavate unsuitable soil along East edge of Cell

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 21 density tests on the Structural Fill. The first test run, failed. EG re-rolled the area. It was retested with passing results.
- At the clay stockpile, I collected a sample of soil and ran a one point proctor test on it. It fell between one of the High curves and the 3 lower ones. A bucket sample will be collected and sent to the lab.

# Daily Monitoring Summary



Date: Jan. 11, 2007 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 12, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 34 @ AM High: 55 @ PM
Cloud Cover: Mostly Cloudy Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place spread & compact structural fill soil. Working in the Eastern half of the cell.
- The clay liner soil continues to be hauled in from offsite and stockpiled.
- Unsuitable soil is being excavated and hauled outside the cell limits.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 22 density / moisture tests on the structural fill. All passing.
- Watched and checked some of the truck loads of clay liner soil being stocked. The soil felt and looked OK for $1 \times 10^{-5}$ requirements.

# Daily Monitoring Summary



Date: Jan. 12, 2007 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 15, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 48 @ AM High: 70 @ PM
Cloud Cover: Cloudy Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place, spread and compact the structural fill soil. Working in the Western half of the cell.
- Stockpile clay liner soil, outside the Cell.
- Excavate and haul off unsuitable soils.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 12 density/moisture tests per lifts (8 & 9) All 24 tests passed.
- Checked on the incoming clay soil throughout the day feeling and looking at the soil. It appeared the soil would meet the $1 \times 10^{-5}$ requirements.

# Daily Monitoring Summary



Date: Jan 15, 2007 S (M) T W T F S

Summary of Surveyor's Activities:

Surveyors were on site checking different things for the contractor.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Attended a meeting to disuss the changes made to the drawings.

Attendees
- Charlie } Allied
- Mike }
- Fred } E.G.
- Wilson }
- Richie } ACC
- Tim }

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 16, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 59 @ AM High: ____ @ PM
Cloud Cover: Cloudy Precipitation: light Showers Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place spread and compact the structural fill soil.
- They continue to excavate unsuitable soil, loading into BFI trucks and hauling off.
- The clay liner soil continues to be stockpiled just outside the cell limits.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 14 density / moisture tests on the structural fill soil. All passing
- I spent time at the clay stockpile throughout the day, checking the soil by feeling to see if it felt and looked like it would meet the $1 \times 10^{-5}$ requirements.

# Daily Monitoring Summary



Date: Jan. 16, 2007 S M (T) W T F S

Summary of Surveyor's Activities:

Surveyors were on site, setting more grade stakes on the structural fill

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 17, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 29 @ AM High: 41 @ PM
Cloud Cover: Sunny to partly Cloudy Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place spread and compact the structural fill. Working from the middle of the cell to the West.
- They excavated more of the unsuitable soil. Hauling the soil outside the cell limits.
- They stockpiled the hauled in clay liner soil, just outside the cell.

ACC Activities and Test Results:

Observed the activities noted above.

- Ran 21 density tests on the structural fill soil All 21 tests passed.
- Drove to borrow pit to look at the clay liner soil. Collected and sent a bucket sample to the Lab.
- Checked the incoming clay liner soil. I felt and looked at the stockpiled material. It appeared that the soil would meet the $1 \times 10^{-5}$ requirements.

# Daily Monitoring Summary



Date: Jan. 17, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 18, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 30 @ Am High: 38 @ PM
Cloud Cover: Cloudy Precipitation: light rain Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

Rained Out

ACC Activities and Test Results:

# Daily Monitoring Summary



Date: Jan. 18, 2009 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan 19 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 34 @ AM High: 51 @ PM
Cloud Cover: Cloudy to partly Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG spent a couple of hours in the morning skimming off wet soils so they could fill on the areas later around 9 AM they continued to place fill in the berm (East) location only.

Also ≈ 9 AM they began to haul in and stockpile clay liner Soil.

ACC Activities and Test Results:

Observed the activities noted above

Ran 16 density / moisture tests on lift 11 and the East berm lifts 1 & 2

Observed some of the clay being stockpiled. Feeling the soil to make sure that it is consistent with the samples that have passed the $1 \times 10^{-5}$ requirements

# Daily Monitoring Summary



Date: Jan. 19, 2007 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 23, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 34 @ AM High: 46 @ PM
Cloud Cover: _____ Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continued to place, spread and compact the structural fill soil. Working on the floor and berm in the Eastern half of the cell.

They hauled in more or the protective cover soil and stockpiled outside the cell limits.

Note EG Did Not work yesterday 1-22-07 due to wet conditions, they did commence the stockpiling of the protective cover soil.

ACC Activities and Test Results:

Observed the activities noted above.

Ran 22 total density tests on the structural fill. 10 on the floor and 12 on the berm. All passing.

# Daily Monitoring Summary



Date: Jan. 23, 2007 S M (T) W T F S

Summary of Surveyor's Activities: Surveyors setting grade stakes for Subgrade elevations.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 24, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 33 @ AM High: 54 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to place, spread and compact structural fill soil. Working from the middle in both the East and West directions.

They continue to stockpile the clay liner soil. Stockpiling outside the cell limits

They are excavating unsuitable soils from a future cell, so they can build an access road around Cell 2F.

ACC Activities and Test Results:

Observed the activities noted above.

Ran density/moisture tests on structural fill placed.

Observed and felt some of the clay liner soil being stockpiled. They soil I checked appeared to meet the $1 \times 10^{-5}$ requirements

# Daily Monitoring Summary



Date: Jan. 24, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 25, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 30 @ AM High: 49 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to place, spread and compact structural fill soil. Working from the center of the cell to the West.

They continued to build an access road outside the cell limits. Using soil from cut areas on the West side.

They stockpiled more of the clay liner soil, in the morning.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 12 density/moisture tests on lift 12 of the structural fill. All passing.
- This morning I drove over to the borrow pit, for the clay liner. looking at the remaining soil that could be used for the $1 \times 10^{-5}$ clay soil.

# Daily Monitoring Summary



Date: Jan. 25, 2007 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Talked with Mike Gurley about the remaining clay liner soil remaining over at the Quarry.

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan 26, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 27 @ AM High: 48 @ PM
Cloud Cover: Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continued with the placement, spreading and compaction of structural fill soil on the floor of the cell.
- Constructing the access road, outside the cell limits.
- Stockpiling clay liner soil outside the cell.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 10 density tests on lift 12, structural fill soil.
- Throughout the day - I checked the incoming clay liner soil, looking and feeling the soil making sure that hasn't changed from what I sampled and met the $1 \times 10^{-5}$ requirements.

# Daily Monitoring Summary



Date: Jan, 26.2007 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



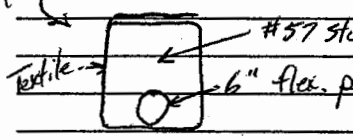
Date: Jan. 29, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 18 @ AM High: 40 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

GE working the french-drain that is being installed along the East half of the cell, at the tie-in. There will be approx. 2' of protective cover placed over the french drain.




They continued to place structural fill on both the East Berm and the access road outside the cell limits.

They stockpiled more of the protective cover soil.

ACC Activities and Test Results:

- Observed the activities noted above
- Did not run any density tests

# Daily Monitoring Summary



Date: Jan 29, 2007 S (M) T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Met with Mike Gurley, Ed Hood and Fred Brown. discussed and showed Ed Hood why EBC was using more structural fill, then what was initially thought. (Approx 45000 cu. yds.)
Also BFI wanting EG to excavate more test pits in the Southern fields. and for me (ACC) to sample and test.

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan 30, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 28 @ AM High: 43 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-10

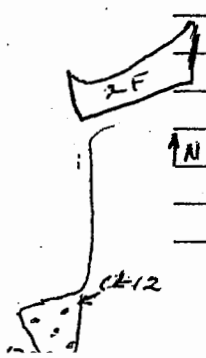
ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to construct the East berm and the access road. They are using excavated soil from the West end of the cell in cut areas, to build the access road.
- They completed the french drain along the East half of the cell and the tie-in.
- Drilling began today on the rock in the western end of the cell.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 5 tests (density/moisture) per lifts 5, 6, 7 & 8 on the East berm and 1 per lift, West berm. All 22 tests passing.
- Excavated 5 tests pits in the area that I showed to Mike Gurley. (He and Ed Hood had directed me to look at and sample.) I collected two bucket samples, CL 12 & CL 13. These samples would be used in Cell 2G (The next 7 acres).



# Daily Monitoring Summary



Date: Jan. 30, 2007 S M (T) W T F S

Summary of Surveyor's Activities:

Surveyors on site checking and setting grade stakes on the subgrade

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Jan. 31, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 27 @ AM High: 40 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to build the East berm, using soil from offsite.
- They continue to excavate in cut areas in the West end of the cell.
- Drill rock in the West end of the cell
- Stockpile Clay liner soil outside the cell limits.
- Finegrading the subgrade.

ACC Activities and Test Results:

Observed the activities noted above.

Ran a total of 16 density tests (4 per lift) on structural fill soil on the East Berm. All passing.

At the clay stockpile I felt and observed the incoming soil. It felt and appeared that it would meet the $1 \times 10^{-5}$ requirements.

# Daily Monitoring Summary



Date: Jan. 31, 2007 S M T (W) T F S

Summary of Surveyor's Activities: Surveyors are on site setting grade stakes for top of Subgrade.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: [signature]
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 5, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 25 @ AM High: 40 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-15

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continued to build the East and West berms, placing structural fill as needed.
- Excavating in the West end of the cell in Cut areas. Using the soil for fill along the West berm.
- Stripping vegetative material off of the tie-in berm. Hauling the material outside the the limits.
- Stockpiling protective cover soil outside the cell limits.
- Drilling Rock for blasting purposses in the West end of the cell.

NOTE: EG did not work on Feb 1st or the 2nd due to snow, rain and wet conditions.

ACC Activities and Test Results:

Observed the activities noted above.

Ran 8 density tests on the East and West berms. All passing.

# Daily Monitoring Summary



Date: Feb 5, 2007 S M T W T F S

Summary of Surveyor's Activities:

Surveyors checking and setting grade stakes for top of subgrade elevations.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 6, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 20 @ AM High: 42 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continued to build the East and West berms. The East berm was built with soil coming from the borrow pit and the West berm is being built from excavated soil from cut areas along the West end.
- They continue to fine grade the top of subgrade.
- Drill Rock in the West end of cell. Also blasted the large mound of rock.
- Stockpile more of the protective cover soil.
- Continued to strip the vegetative material along the Tie-in

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran a total of 6 density/moisture, 3 on the East berm and 3 on the West berm. All passing.

# Daily Monitoring Summary



Date: Feb 6, 2007 S M (T) W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 7, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 38 @ Am High: 60 @ Pm
Cloud Cover: Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continued to fine grade the floor and berm on the East half of the cell.
- Exposing the anchor trench and existing liner material at the tie in.
- Excavating and hauling off soil in cut areas.
- Stockpiling clay liner soil.
- EG placed lift 1 of the clay test pad.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 3 density / moisture tests on the West berm All passing.
- Throughout the day I went to clay stockpile and looked and felt the soil, checking and making sure the soil appears to be the same as the material that was tested.

# Daily Monitoring Summary



Date: Feb. 7, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Surveyors on site checking grade (Top of Subgrade) prior to clay liner soil being placed.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb 8, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 29 @ AM High: 50 @ PM
Cloud Cover: Sunny to Partly Cloudy Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to excavate in cut areas in the West end.
- They continue to fine grade the floor on the subgrade and exposing more of the liner at the tie-in.
- They continue to place and process the clay liner soil. Working in the East half of the cell. They completed both lifts 1 and 2 of the "Test pad."
-

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran density/moisture tests on both the Clay liner Test pad (lifts 1 & 2) and clay liner on the floor (lift 1)
- Pushed Shelby tube samples ST-TP-1 and ST-TP-2 on lifts 1 & 2 of the Test pad. Also collected a bucket sample from each lift, TP-1 & TP-2. I pushed shelby tube ST-1 from clay liner, lift 1. All Samples sent overnight to the Lab.

# Daily Monitoring Summary



Date: Feb 8 2007 S M T W (T) F S

Summary of Surveyor's Activities:

Surveyors on site, checking top of Subgrade elevations.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 9, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 28 @ AM High: 48 @ PM
Cloud Cover: Sunny to Partly Cloudy Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place lift 1 of the clay liner soil. They till and water the soil prior to compacting. They completed lift 3 on the test pad.
- Excavating blasted rock 4' below top of Subgrade.
- Finegrading Subgrade; West half of Cell.
* Hauled in clay liner soil from Rock Quarrey - Did not stockpile, they placed it in the cell.

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 3 density/moisture tests on lift 3 of the test pad. All passing. Pushed shelby tube ST-TP-3 and collected bucket sample. TP-3
- Ran a total of 18 moisture density tests on lift 1, clay liner soil. The 1st test failed (C-16), the area rerolled and tested with passing results.

# Daily Monitoring Summary



Date: Feb. 9, 2007 S M T W T (F) S

Summary of Surveyor's Activities:

Surveyors on site checking top of subgrade in the West half of the cell.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: [signature]
ACC Site Resident Manager

# Daily Monitoring Summary



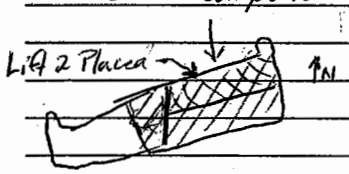
Date: Feb. 10, 2007 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 28 @ AM High: 50 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to work on the following.
- Fine grading top of subgrade. - Completed structural fill.
- Placing fill in undercut areas from blasting rock.
- Placing clay liner soil, lift 1, working in the Western half. Also Starting Lift 2 in the East half.
- Stockpiling protective cover soil.
- Backfilling the undercut blasted areas.




ACC Activities and Test Results:

Observed the activities noted above

- Ran 4 density/moisture tests on Lifts 1-4 in an undercut blasted area. All passing.
- Ran 14 density/moisture tests on lift Clay liner. Having 1 fail the area was reworked (rolled) and tested with passing results.
- Pushed Shelby tube ST-4 from lift 1

# Daily Monitoring Summary



Date: Feb. 10, 2007 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 12, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 31 @ AM High: 61 @ PM
Cloud Cover: Cloudy Precipitation: — Wind: 0-5

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to fine grade the subgrade, West end of cell.
- Placing and processing lift 2 in the East half of the cell. (Clay liner soil).
- They blasted another outcropping of rock today. Then began to excavate and haul outside the cell the blasted rock.

ACC Activities and Test Results:

Observed the activities noted above

Ran a total of 31 density/moisture tests, 7 on lift 1 and 24 on lift 2. All passing.

Pushed Shelby tube samples ST-5 & 6

# Daily Monitoring Summary



Date: Feb 12 2007 S (M) T W T F S

Summary of Surveyor's Activities:

Surveyors are checking top of subgrade elevations in the West end of the cell. Setting out some control stakes for edge of Clay

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 16, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 28 @ Am High: 46 @ Pm
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG Continued with the following activities.

- Grading the West End of the Cell. Excavating and hauling excess soil outside the cell limits.
- Hauling in and stockpiling clay liner soil.

ACC Activities and Test Results:

Observed the activities noted above.

Did not run any density / moisture tests today.

NOTE I was not on Site, Tues. 2-13-07 through Thurs 2-15-07
Due to Rain and EG working on grading the West end. Cutting the soil to grade.

# Daily Monitoring Summary



Date: Feb 16 2007 S M T W T (F) S

Summary of Surveyor's Activities:

Surveyors checking and setting grade stakes for top of subgrade elevations.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: L. Shih
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb 17 2007 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 27 @ Am High: 49 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-15

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

Ga continues to excavate and cut to subgrade elevations in the West end of the cell.

They continue to stockpile both the clay liner soil and the protective cover soil.

ACC Activities and Test Results:

Observed the activies noted above.

Ran 12 density/moisture tests on lift 2 of the clay liner soil in the East end of the cell. All passing

Did not collect any soil samples today

# Daily Monitoring Summary



Date: Feb 17 2007 S M T W T F (S)

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 19, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 26 @ AM High: 46 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continued with the following activities.

- Finegrading top of Subgrade in the West end of the cell.
- Placing and compacting lift 1, clay liner soil.
- Placed lift 1, clay liner soil test pad. (Building a second test pad because of a new borrow source)

ACC Activities and Test Results:

- Observed the activities noted above.
- Ran 10 density / moisture tests on lift 1 and 6 on lift 2. All passing.
- Ran 3 density / moisture tests on lift 1 of the test pad. All passing.
- Collected samples ST-7, ST TP 4, and TP4. All samples sent overnight to the lab.

# Daily Monitoring Summary



Date: Feb. 19, 2007 S (M) T W T F S

Summary of Surveyor's Activities:

Surveyors on site checking top of subgrade elevations in the West end. Also setting grade stakes for lift 3 (clay liner soil) in the East End.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: [signature]
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 20, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 37 @ AM High: 53 @ PM
Cloud Cover: Mostly Sunny Precipitation: Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues to work on the following activities.

- Grading Subgrade, West end, also excavate the sump.
- Placing lift 1 and 2 in the Western end of Cell
- Completed the construction of the test pad, lifts 2 and 3.

ACC Activities and Test Results:

Observed the activities noted above.

- Ran 3 density/moisture test per lifts 2 and 3 on the test pad. Pushed Shelby tubes ST-TP-5 & ST-TP-6 and collected bucket samples TP-5 and TP-6

- Ran 16 density/moisture test on lift 2, Clay liner soil. Having 1 Fail, the area rerolled and tested with passing results.

# Daily Monitoring Summary



Date: Feb. 20, 2007 S M (T) W T F S

Summary of Surveyor's Activities:

Surveyors are checking grade and setting grade stakes for both Subgrade and clay elevations

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 21, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ Am High: 65 @
Cloud Cover: Cloudy to partly Sunny Precipitation: very light shower/Am Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continues with the following activities.

- Placement of lifts 1 & 2 on the West half of the Cell. Compacting the soil as the place it.
- Grading and rolling lift 3 on the East end of the cell.

ACC Activities and Test Results:

Observed the activies noted above.

- Ran 40 density test on lift 3, East half of Cell.
- Pushed Shelby tube samples ST-9, 10 and 11

# Daily Monitoring Summary



Date: Feb. 21, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Surveyors checking and setting grade stakes on lift 3 of the clay liner soil.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: T. Shih

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb 22, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 49 @ Am High: 72 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 10-20

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

- EG continues to place lifts 1 and 2 in the West half of the cell. Compacting the clay liner soil as it is being spread. They also begin to work on lift 3 on the West end.
- They continue to grade lift 3 of the clay liner soil in the East half of the cell.

ACC Activities and Test Results:

Observed the activities noted above.

Ran 6 density moisture tests on lifts 1 and 2.

Pushed shelby tube # ST-12 on lift 2.

# Daily Monitoring Summary



Date: Feb. 22, 2007 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb 23, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 48 @ AM High: 60 @ PM
Cloud Cover: Sunny to Cloudy Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG performed the following activities

- Completed both lifts 1 & 2 in the West end of the cell. (Clay liner soil)
- Continued working lift 3, west end.
- Grading lift 3 in both the East and West ends.

ACC Activities and Test Results:

Observed the activities noted above.

- Ran 9 density/moisture tests on lift 1 and 11 on lift 2 of the clay liner soil. All passing.
- Pushed shelby tube sample ST-13 and ST-14 Will deliver samples to lab tomorrow.

# Daily Monitoring Summary



Date: Feb. 23, 2007 S M T W T (F) S

Summary of Surveyor's Activities:

Surveyors setting grade stakes on top of Clay surface.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 26, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 38 @ Am High: 62 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

E.G. pumped rain water from the West end of Cell.
(1" of Rain on 2-25-07)

They unloaded 5 truck loads of GCL.

* Too Wet to finegrade in the Cell.

ACC Activities and Test Results:

Observed the activities noted above.
Inventoried the GCL coming off the trucks

# Daily Monitoring Summary



Date: Feb. 26, 2007 S (M) T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb. 27, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 32 @ AM High: 65 @ ____
Cloud Cover: Sunny Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tom Schreiber, Wayne Barron.

Summary of Construction Progress:

E.G. unloaded and stacked rolls of GCL off of 7 flat bed trucks.

They DID NOT work in the cell because of wet conditions.

ACC Activities and Test Results:

Observed and inventoried the GC

# Daily Monitoring Summary



Date: Feb 27, 2007 S M (T) W T F S

Summary of Surveyor's Activities:

Surveyors checking and setting grade stakes for top of Clay surface.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: [signature]
ACC Site Resident Manager

# Daily Monitoring Summary



Date: Feb 28, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 34 @ AM High: 63 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-10

ACC Personnel On-Site: Tim Schreiber

Summary of Construction Progress:

EG continued to fine grade the top of clay on both sides of the cell.

They unloaded 5 more truck loads of GCL.

ACC Activities and Test Results:

Observed the activities noted above.

- Inventoried the 5 loads of GCL
- Ran a total of 36 density tests on the clay liner soil. 33 tests on lift 3, West side. Ran 3 on lift 1 South Edge.
- Pushed Shelby tube samples ST-15, 16, 17 and 18

# Daily Monitoring Summary



Date: Feb 28, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Surveyors on site, checking and setting grade stakes

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: 3/1/07 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 46 @ 8AM High: 56 @ 2PM
Cloud Cover: Cloudy Precipitation: Rain began 2PM Wind: SE @ 5-7 mph

ACC Personnel On-Site: Wayne Barron

Summary of Construction Progress: Earnhardt Grading, Inc. (EGI) continued finish grading using two motor graders, one paddle pan, one D5 dozer, and one smooth drum roller. Stopped work at 2PM when rain began.

ACC Activities and Test Results: Received three trucks with a total of 37 roles of GCL. Verified roll numbers with bills of lading. Faxed three pages of roll inventory to ACC.

# Daily Monitoring Summary



Date: 3/1/07 S M T W (T) F S

Summary of Surveyor's Activities: Surveyor shot elevations on the cell until rain at 2PM.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held: Pointed out to Danny of EGI that 17 rolls of GCL were not covered. All of the rolls were well wrapped except one, which had one end open. Danny said those rolls had been exposed to rain previously without a cover. Danny also said no need to be at the cell Friday because the amount of rain was forecast as 2" +. He said they would only pump water.

Summary of Health and Safety Issues:

Submitted by: Wayne Bar
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 3/5/07 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 29 @ 8AM High: 62 @ 3PM
Cloud Cover: Clear Precipitation: None Wind: NW @ 8-10 mph

ACC Personnel On-Site: Wayne Barron

Summary of Construction Progress: EGI continued finish grading. Used one D5 dozer, two motor graders, one paddle pan, and one steel drum roller.

ACC Activities and Test Results: Observed grading operations.

# Daily Monitoring Summary



Date: 3/5/07 S (M) T W T F S

Summary of Surveyor's Activities: Surveyor shot elevations on cell

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: Wayne Ban
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 3/6/07 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 44 @ 8AM High: 60 @ 3PM
Cloud Cover: Clear Precipitation: None Wind:

ACC Personnel On-Site: Wayne Barron + Tim Schreiber

Summary of Construction Progress: EGI continued finish grading using one D5 dozer, two motorgraders, one paddle pan, and one smooth drum roller. Also cleaned composite on North end of cell where tie-in to existing will be done. Used one track-hoe. Received and unloaded one load of composite consisting of 27 rolls.

ACC Activities and Test Results: Observed grading and cleaning mentioned above. Inventoried rolls of composite. Performed six density/moisture tests on lifts 2 and 3 of clay liner soil (3 per lift). All passed.

# Daily Monitoring Summary



Date: 3/6/07 S M (T) W T F S

Summary of Surveyor's Activities: Surveyor checked and set grade stakes for top of clay elevations.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: Wayne Ba

ACC Site Resident Manager

# Daily Monitoring Summary



Date: March 7, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 42 @ AM High: 68 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 5-15

ACC Personnel On-Site: Tim Schreiber, Wayne Barron

Summary of Construction Progress:

EG continued to finegrade, maintain and prep clay liner soil surface for the deployment of synthetic liner.

Note - Texas Enviro. showed up on site today.
- They made sandbags and made preplications for deploying tomorrow.

ACC Activities and Test Results:

Observed the activities noted above.
Inventoried 3 truck loads of Geocomposite

EG completed clay liner portion of this project

# Daily Monitoring Summary



Date: March. 7, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

~~Surveyors~~

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Attended the pre-construction meeting (Liner) today

Charlie - Allied Waste
Fred 3 EG
Wilson 3
Ron - T.E.P.
Tim - ACC

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 8, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran 4 trial weld tests 3 on fusion welded seams and 1 on an extrusion welded seam. All passing.

Geosynthetic Deployment Activities: They deployed approx 73,700 sq.ft. of both GCL and 60 mil. HDPE

Field Seaming Activities: They fusion welded all the seams. Made repairs using the extrusion welder.

Non-Destructive Testing: The fusion welded seams were pressure tested. All seams tested, passed.

Destructive Testing: Samples DS-1 through DS-6 were marked, cut and sent overnight to TRI for testing along with DX-1.

General Remarks: EG continued to finegrade and prep. soil surface for the deployment of liner material.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 9, 2006 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran 8 trial weld tests. Six on fusion and 2 on extrusion welded seams. All passing.

Geosynthetic Deployment Activities: They deployed approx. 90,300 sq.ft. of both GCL and 60 mil HDPE.

Field Seaming Activities: They Fusion welded all seams on the HDPE, and extrusion welded all repairs.

Non-Destructive Testing: The fusion welded seams were pressure tested @ a min. of 30 psi for 5 min. All tested seams passed.

Destructive Testing: Samples DS-7 through 14 were sent over night to TRI.

General Remarks: EG continued to prep the soil surface out in front of the deployment of GCL. Also fine grade in the West End.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 10, 2007 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran a total of 8 trial weld tests. Six on fusion welded seams and two on extrusion welded seams. All passing.

Geosynthetic Deployment Activities: They deployed approx. 68,900 sq.ft. of both the GCL material and the 60 mil, textured HDPE

Field Seaming Activities: All seams were fusion welded. All repairs were extrusion welded.

Non-Destructive Testing: All fusion welded seams were pressure tested. All seams tested, passed.

Destructive Testing: Samples DS-15 through DS-21 were cut and sent to TRI

General Remarks: E.G. continued prep the soil surface out infront of the deployment of GCL.

Submitted by: _____
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 12 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran a total of 10 trial weld tests. Eight tests were run on fusion welded seams and two on extrusion welded seams.

Geosynthetic Deployment Activities: They deployed approx. 110,800 sq.ft. of both GCL and 60 mil. HDPE.

Field Seaming Activities: All seams were fusion welded, using 4 fusion welders. All repairs made, were extrusion welded.

Non-Destructive Testing: They pressure tested the fusion welded seams. All seams that were tested, passed.

Destructive Testing: Samples DS-22 through DS-33 were cut. Did not get out in time to send via Fed Ex. Will send tomorrow (3-13-07)

General Remarks: EG continued to prep the soil surface out in front of the deployment of the GCL.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 13, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran a total of 8 trial weld tests. Six on fusion welded seams and two extrusion welded seams. All passing.

Geosynthetic Deployment Activities: The deployed approx. 74,600 sq.ft. of both GCL and 60 mil. textured HDPE.

Field Seaming Activities: TEP fusion welded all seams on the HDPE, using three fusion welders. All repairs made were extrusion welded, using 1 gun.

Non-Destructive Testing: They pressure tested all fusion welded seams. All seams tested, passed. They began to vacuum test all extrusion welded repairs. The repairs tested, passed

Destructive Testing: Samples DS-22 through DS-33 were sent (and DX 3) overnight to TRI. Samples DS-34 through DS-42 and DX-4 were marked.

General Remarks: E.G. continued to prep soil surface out in front of the deployment of the GCL.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 14, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. Ran a total of 10 trial welds. Eight on fusion welded seams and two on extrusion welded seams. All passing.

Geosynthetic Deployment Activities: They deployed approx. 56,000 sq.ft. of both GCL and 60 mil textured HDPE.

Field Seaming Activities: All seams on the HDPE were fusion welded. All repairs made on the HDPE were extrusion welded.

Non-Destructive Testing: The fusion welded seams were pressure tested. All those tested passed. The repairs were vacuum tested, those tested all passed.

Destructive Testing: Samples DS-43 through DS-47, along with DX-5 and DX2A & DX2B were all marked and cut. Samples DS-34 through DS 42 and DX-4 were sent overnight to be tested at TRI

General Remarks: EG continued to prep the soil surface out in front of the deployment of the GCL.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 15, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran a total of 8 trial Weld tests. Six on fusion welded seams and two on extrusion welded seams. All passing.

Geosynthetic Deployment Activities: They deployed approx 54,000 sq.ft. of both GCL and 60 mil textured HDPE. They did begin to deploy the geocomposite today.

Field Seaming Activities: They fusion welded all seams of the HDPE Using 3 fusion welders. All repairs on the HDPE were extrusion welded, using 1 extrusion gun. The Seams on the geocomposite were zip tied and the textile was sewn.

Non-Destructive Testing: The fusion welded seams were pressure tested. All tested seams passed. They vacuum tested some of the extrusion welded repairs. Those tested passed.

Destructive Testing: Samples DT-48 through DS 52, DX-6 and DX-2B2 were cut and sent to TRI.

General Remarks: E.G. continued to prep the soil surface out in front of the deployment of the GCL.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 17, 2007 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: TEP ran 1 extrusion welded trial weld. It passed.

Geosynthetic Deployment Activities: They deployed approx 202,500 sq ft. of Geocomposite in the last 2 days. (3-15-07 and 3-17-07)

Field Seaming Activities: The geocomposite was tied at the net, using plastic zip ties. The textile was sewn along the seams. The butt seams were zip tied and then capped with a piece of textile.
They made 1 repair to the HDPE using an extrusion gun.

Non-Destructive Testing: They ran more vacuum tests on Repairs made on the HDPE.

Destructive Testing: I marked and they cut sample DX-2B3 The sample was sent for Monday delivery to TRI

General Remarks: E G spent all day pumping out Water from the West End of the cell.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 18, 2007 (S) M T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities:

Geosynthetic Deployment Activities: T.E.P. deployed approx. 98,000 sq ft. of geocomposite.

Field Seaming Activities: The net of the geocomposite was tied using plastic zip ties and the textile was sewn. At the butt seams, they were zip tied and an extra piece of textile was liestered over the seam.

Non-Destructive Testing:

Destructive Testing:

General Remarks:

Submitted by:
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 19, 2007 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: They ran 1 trial weld test today, on an extrusion welded seam. It passed.

Geosynthetic Deployment Activities: They (T.E.P.) deployed approx 98,000 sq ft. of geocomposite

Field Seaming Activities: The net of the geocomposite was tied using zipties and the textile was sewn.
They also capped a repair on the HDPE using an extrusion gun.

Non-Destructive Testing:

Destructive Testing: Sample DX-2B4 was marked, cut and sent overnight to TRI

General Remarks: EG continued to prep the soil surface for the deployment of the geomembrane. They also commenced the placement of the protective cover soil, over the geocomposite.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 20, 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran a total of 9 trial seams. Seven on fusion welded seams and two on extrusion welded seams

Geosynthetic Deployment Activities: They deployed approx. 89,900 sq ft of both GCL and the HDPE.

Field Seaming Activities: All HDPE seams were fusion welded. The repairs on the HDPE were extrusion welded.

Non-Destructive Testing: The fusion welded seams were pressure tested. They also vacuum tested a few extrusion welded repairs.

Destructive Testing: I marked, and they cut samples DS-53 through DS-62 and DX-7. Samples sent overnight to TRI.

General Remarks: E.G. continued to prep soil surface out in front of the deployment of the GCL.
Also continued with the placement of the 2' layer of protective cover.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 21, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran 1 extrusion welded trial test. It passed.

Geosynthetic Deployment Activities: They deployed more of the geocomposite. Completing coverage of the East half of the cell.

Field Seaming Activities: The net of the composite was tied using plastic zip ties. The textile was sewn.

Non-Destructive Testing: /

Destructive Testing: /

General Remarks: E G excavated the West sump and continued to maintain the soil surface out in front of the liner crew. Also continue to place the 2' layer of protective cover soil in the East half of the cell.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 22, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran a total of 8 trial weld tests. Six on fusion welded seams and two on extrusion welded seams. All passing.

Geosynthetic Deployment Activities: They deployed approx. 85,300 sq.ft. of both GCL and 60 mil. textured HDPE.

Field Seaming Activities: All seams on the HDPE were fusion welded. All repairs made on the HDPE were extrusion welded.

Non-Destructive Testing: The fusion welded seams were pressure tested. All seams that were tested, passed.

Destructive Testing: I marked and they cut samples DS-63 through DS-71, also DX-8. All samples were sent overnight to TRE.

General Remarks: E&G continues to prep the soil surface out in front of the deployment on the liner system. They also continued to place the 2' layer of protective cover soil. Working in East half of Cell.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 23, 2007 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: TEP ran a total of 8 trial seam tests. Six on fusion welded seams and two extrusion welded seams. All passing.

Geosynthetic Deployment Activities: They deployed approx 66,700 sq.ft. of both GCL and 60 mil HDPE.

Field Seaming Activities: The seams on the HDPE were fusion welded. All repairs made on the HDPE were extrusion welded.

Non-Destructive Testing: The fusion welded seams were pressure tested. All seams tested, passed.

Destructive Testing: Samples DS-72 through DS-78, all samples will be sent tomorrow for a Monday delivery to TRI

General Remarks: E.G. continued to prep the soil surface out in front of the deployment of GCL. They also continued to place the 2' layer of protective cover soil, in the East half of the cell.

Submitted by: [signature]
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 24 2007 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: T.E.P. ran 1 extrusion trial weld test. It passed.

Geosynthetic Deployment Activities:

Field Seaming Activities: They made repairs on the HDPE, using an extrusion gun.

Non-Destructive Testing: They vacuum tested all of the remaining extrusion welded repairs.

Destructive Testing: Samples DS-72 through DS-78 and DX-9 and 10 were sent for Monday delivery to TRI.

General Remarks: E.G. continued to place the 2' layer of protective cover soil over the geocomposite.

Submitted by:
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: 3-26-07 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: None

Geosynthetic Deployment Activities: TEP deployed more Geo-Composite

Field Seaming Activities: Net part of Geo composite was tied using Zip-ties and textile was sewn

Non-Destructive Testing: None

Destructive Testing: None

General Remarks: EG continued deployment of 2 ft of protective cover.

Submitted by: Wayne Ban
ACC Site Resident Manager

# Geosynthetic Installation Monitoring Report



Date: March 27 2007 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina

Trial Seaming Activities: /

Geosynthetic Deployment Activities: TEP completed the deployment of the geocomposite. Finishing with approx 770,200 sq ft of the geocomposite. As of today, all three layers of the liner system are complete. They still have the ~~long~~ berm to weld into place.

Field Seaming Activities: The net part of the composite was tied using plastic zip ties. The textile part of the composite was sewn.

Non-Destructive Testing: /

Destructive Testing: /

General Remarks: EG continued to place the 2' layer of protective cover soil.

Submitted by: [signature]
ACC Site Resident Manager

# Daily Monitoring Summary



Date: March 28, 2007 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 59 @ AM High: 83 @ PM
Cloud Cover: Mostly Sunny Precipitation: — Wind: 0-10

ACC Personnel On-Site: Tim Schreiber, Wayne Barron

Summary of Construction Progress:

E.G. continued to place the 2' layre of the protective cover soil over the geocomposite.
P.F.F. (EG's Sub) arrived on site, began welding some of the HDPE pipe, for the leachate collection system.

T.E.P. welded most of the flap (40 mil HDPE) for the temp. berm. Extrusion welding the flap to the 60 mil HDPE liner. They left two sections open. The middle, where EG has their access ramp and the far West end was left open to allow rain water to flow out. (Allied waste will complete the berm prior to placing trash.)

ACC Activities and Test Results:

- Observed the activities noted above.

# Daily Monitoring Summary



Date: March 28, 2007 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: March 29, 2007 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 56 @ PM High: 61 @ AM
Cloud Cover: Mostly Cloudy Precipitation: very light shower Wind: 5-15

ACC Personnel On-Site: Tim Schreiber, Wayne Barron.

Summary of Construction Progress:

E.G. continues with the placement of the 2' layer of protective cover soil over the geocomposite. They are fine grading the East half of the cell.

PFE continues to weld some of the HDPE pipe for the leachate collection system.

ACC Activities and Test Results:

- Observed the activities noted above.
- continued with the deployment drawing.

# Daily Monitoring Summary



Date: March 29, 2007 S M T W (T) F S

Summary of Surveyor's Activities:

Surveyors on site checking East half of Cell and setting grade stakes for the top of protective cover soil.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:

ACC Site Resident Manager

# Daily Monitoring Summary



Date: 3-30-07 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ 0700 High: 70 @ 1600
Cloud Cover: Mostly cloudy Precipitation: 0 Wind: 0-5 mph

ACC Personnel On-Site: Sonny Johnston, Tim Schieber

Summary of Construction Progress: EG continued to place the 2' layer of protective cover on western end of cell. They also graded the middle-eastern part of cell.

PFF continued to weld HDPE pipe for leachate collection system. They also started to stage lengths of pipe on eastern side of cell.

ACC Activities and Test Results: Observed activities noted above, Verified that all task inside containment area were completed.

# Daily Monitoring Summary



Date: 3-30-07 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 3-31-07 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ 0700 High: 75 @ 1400
Cloud Cover: cloudy Precipitation: 0 Wind: 5-10mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG finished placing the 2' of protective cover soil except for sump areas. Then they sealed it with smooth drum roller because of chance of rain. They also placed composite in sump to make clean-up easier.

PFF continued to weld HDPE pipe for leachate collection system.

ACC Activities and Test Results: observed activities noted above.

# Daily Monitoring Summary



Date: 3-31-07 S M T W T F (S)

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-2-07 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 60 @ 0700 High: 80 @ 1500
Cloud Cover: Cloudy Precipitation: 1/4" Wind: 5-10mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: E&G graded mud off of road with motograder. They left early due to lack of work

PFF started the day by welding HDPE pipe for leachate collection system. When the truck arrived with pipe for riser, they started welding that.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-2-07 S (M) T W T F S

Summary of Surveyor's Activities: Surveyors onsite to shoot top of protective cover soil.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-3-07 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 52 @ 0700 High: 83 @ 1500
Cloud Cover: Partly cloudy Precipitation: Ø Wind: 5-10 mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG started the day placing riser in eastern sump. They also place the riser in western sump, placing rock in both. They also dug approx 150' of trench for leachate collection system. They placed approx 60' of pipe and covered it with stone. EG graded and sealed western half of cell.

PFF welded HDPE pipe for leachate collection system. They also moved equipment into cell to weld clean out riser and to weld Ts and Ys to start to connect system together.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-3-07 S M (T) W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions: Wilson (EG) informed me that wrapping sump in 10oz fabric would cause him to be short. We came to the conclusion that he could put double composite on bottom and heat tack 10oz fabric to that, to encase stone in sump.

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-4-07 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 58 @ 0700 High: 81 @ 1400
Cloud Cover: Partly Cloudy Precipitation: 0 Wind: 15-20mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG finished digging 1st and 2nd trench from the east. Rock was placed in the all of the toe and about 100' of the 2nd. All rock was wrapped and fabric burnt. EG started digging 3rd trench from east. They also finished grading western half.

PFF continued to weld pipe for leachate collection system.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-4-07 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-5-07 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ 0700 High: 78 @ 1400
Cloud Cover: Partly Cloudy Precipitation: 0 Wind: 15-20mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG finishes placing pipe and rock in trenches on the eastern half. They also sealed the western half.

PFF welds all Ys in eastern half. They continued to weld pipe outside of cell.

ACC Activities and Test Results: observed activities noted above.

# Daily Monitoring Summary



Date: 4-5-07 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-9-07 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 40 @ 0200 High: 60 @ 1400
Cloud Cover: Mostly Cloudy Precipitation: Ø Wind: 5-10mph

ACC Personnel On-Site: Sonny Johnson

Summary of Construction Progress: First, EG started by pulling back the bermflap to start building the berm on the eastern side. They also dug approx 500' of trench for leachate collection system pipe.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-9-07 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-10-07 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 40 @ 0700 High: 65 @ 1600
Cloud Cover: Mostly Sunny Precipitation: 0 Wind: 10-15 mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: Eg started the day working in the western sump area, by the end of the day it was complete. They also continued to dig trenches, place fabric and pipe for leachate collection system

PFF welded pipe for cleanout and all pipe for sump area. He also welded some Ts and Ys.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-10-07 S M (T) W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-11-07 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ 0700 High: 60 @ 1500
Cloud Cover: Cloudy Precipitation: 1" Wind: 10-15mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: Did not work due to rain.

ACC Activities and Test Results: paperwork

# Daily Monitoring Summary



Date: 4-11-07 S M T (W) T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-12-07 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 45 @ 0700 High: 70 @ 1400
Cloud Cover: Sunny Precipitation: Ø Wind: 15-20 mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG pumps water from east sump. They also started pumping west sump. EG also cleaned out most of the silt washed into existing trenches. They also dug more trenches for leachate collection system

PPF finishes welding long lengths of leachate collection system

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-12-07 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-13-07 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 45 @ 0700 High: 70 @ 1500
Cloud Cover: Sunny Precipitation: Ø Wind: 10-15 mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG continues to pump western sump, removing all water. They also continue digging trenches, placing fabric, pipe, and then rock for leachate collection system.

PFF continue to weld in cell to connect leachate collection system

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-13-07 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-14-07 S M T W T F (S)

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ 0700 High: 70 @ 1400
Cloud Cover: Mostly cloudy Precipitation: Ø Wind: 10-15mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG starts the day digging trenches, placing fabric, pipe and rock. They ended the day with the completion of leachate collection system except for east berm seaction.

PFF completes all perforated pipe welding.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-14-07 S M T W T F (S)

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: Tony [illegible]
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-16-07 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 45 @ 0700 High: 64 @ 1400
Cloud Cover: Sunny Precipitation: ø Wind: 20-30mph 50mph Gust

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: After pulling the berm flap over berm, EG spent rest of the day pumping water from east and west sump area.

PFF started welding force main pipe.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-16-07 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-17-07 S M (T) W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 40 @ 0700 High: 71 @ 1500
Cloud Cover: Sunny Precipitation: 0 Wind: 10-15 mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG continued to pump water out of the east and west sump areas. They also start digging trenches for force main, starting from east. EG repairs damage in toe of Temp. berm as well as place fabric and rock

PFF continue to weld force main pipe. They also weld two flanges onto manhole. Also started hydrostatically testing manhole.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-17-07 S M (T) W T F S

Summary of Surveyor's Activities: Surveyors onsite shooting for forcemain and manhole.

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by: Tony Thao
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-18-07 S M T (W) T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 48 @ 0700 High: 69 @ 1540
Cloud Cover: Mostly Cloudy Precipitation: Ø Wind: 5-10 mph

ACC Personnel On-Site: Sonny Johnson

Summary of Construction Progress: EG continues to clean silt and pump water from eastern sump area. EG places more fabric and rock in toe of temp berm.

PFF finishes welding long lengths of force main pipe.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-18-07 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-19-07 S M T W (T) F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 49 @ 0700 High: 70 @ 1400
Cloud Cover: cloudy Precipitation: 1/2" Wind: 5-10mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG continues to pull berm flap and clean silt out of that area. They also cleaned up trash onsite

PFF finished testing manholes and started testing part of forcemain that was hydrostatically tested.

ACC Activities and Test Results: observed activities noted above. Manholes tested ok.

# Daily Monitoring Summary



Date: 4-19-07 S M T W (T) F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held: Had a meeting with Richie Deason (Acc) Mike Gurley (Allied) Wilson (EG) about moving forcemain lines from slope to anchor trench on north side. They said that they would meet with Charlie and discuss it and get back with us Monday.

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-20-07 S M T W T (F) S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 49 @ 0700 High: 68 @ 1400
Cloud Cover: cloudy Precipitation: 0 Wind: 5-10mph

ACC Personnel On-Site: Sonny Johnson

Summary of Construction Progress: Did not work due to rain on 4-19-07

ACC Activities and Test Results: Came to site to check hydrostatic test. It past.

# Daily Monitoring Summary



Date: 4-20-07 S M T W T (F) S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

# Daily Monitoring Summary



Date: 4-23-07 S (M) T W T F S

Project Number: I001.113
Project Title: CMS Landfill V Cell 2F
Location: Charlotte, North Carolina
Weather: Temperature: Low: 50 @ 0700 High: 72 @ 1500
Cloud Cover: Sunny Precipitation: Ø Wind: 5-10mph

ACC Personnel On-Site: Sonny Johnston

Summary of Construction Progress: EG started building western berm after they flipped berm flap.

EG completed work inside of cell 2F. Protective cover and leachate collation lines in cell 2F are complete.

ACC Activities and Test Results: observed activities noted above

# Daily Monitoring Summary



Date: 4-23-07 S M T W T F S

Summary of Surveyor's Activities:

Summary of Problems and Resolutions:

Summary of Meetings and Discussions Held:

Summary of Health and Safety Issues:

Submitted by:
ACC Site Resident Manager

of NORTH CAROLINA, LLC

# APPENDIX C

## Structural Fill Laboratory Test Results

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233 Fax: 770-923-8973
Cell: 678-612-6534
Web: www.test-llc.com

# Summary of Soil Testing (SF-SAMPLES)

**Project Number:** 688

**Project Name:** CMS Landfill - Cell 2F

| T.E.S.T. Sample Number | Client Sample Number | USCS | UCS, psi | Moisture Content (%) | Grain Size Distribution | | | Atterberg Limits | | | Proctor | | Hydraulic Conductivity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | %Finer 6" Sieve | % Finer #200 Sieve | % Finer 0.005mm | L.L. % | P.L. % | P.I. % | Opt. M.C. % | Max.Dry. Density pcf | Initial M.C. % | Init.Dry Density pcf | Hydraulic Conduct. cm/sec |
| 2092 | SF-1 | - | - | - | 100.0 | 36.2 | - | - | - | - | 17.9 | 113.2 | - | - | - |
| 2094 | SF-2 | - | - | - | 100.0 | 15.9 | - | - | - | - | 14.7 | 116.6 | - | - | - |
| 2095 | SF-3 | - | - | - | 100.0 | 14.8 | - | - | - | - | 13.2 | 123.7 | - | - | - |
| 2160 | SF-4 | - | - | - | 100.0 | 11.4 | - | - | - | - | 12.2 | 125.7 | - | - | - |
| 2195 | SF-5 | - | - | - | 100.0 | 31.0 | - | - | - | - | 21.5 | 107.3 | - | - | - |
| 2196 | SF-6 | - | - | - | 100.0 | 23.2 | - | - | - | - | - | - | - | - | - |
| 2197 | SF-7 | - | - | - | 100.0 | 18.9 | - | - | - | - | - | - | - | - | - |
| 2198 | SF-8 | - | - | - | 100.0 | 18.3 | - | - | - | - | - | - | - | - | - |
| 2199 | SF-9 | - | - | - | 100.0 | 22.1 | - | - | - | - | - | - | - | - | - |
| 2236 | SF-10 | - | - | - | 100.0 | 22.3 | - | - | - | - | - | - | - | - | - |
| 2237 | SF-11 | - | - | - | 100.0 | 18.6 | - | - | - | - | - | - | - | - | - |
| 2238 | SF-12 | - | - | - | 100.0 | 20.2 | - | - | - | - | - | - | - | - | - |
| 2239 | SF-13 | - | - | - | 100.0 | 14.9 | - | - | - | - | - | - | - | - | - |
| 2240 | SF-14 | - | - | - | 100.0 | 16.2 | - | - | - | - | - | - | - | - | - |
| 2241 | SF-15 | - | - | - | 100.0 | 19.9 | - | - | - | - | - | - | - | - | - |
| 2242 | SF-16 | - | - | - | 100.0 | 11.7 | - | - | - | - | - | - | - | - | - |
| 2243 | SF-17 | - | - | - | 100.0 | 21.0 | - | - | - | - | - | - | - | - | - |
| 2244 | SF-18 | - | - | - | 100.0 | 16.8 | - | - | - | - | - | - | - | - | - |
| 2245 | SF-19 | - | - | - | 100.0 | 14.1 | - | - | - | - | - | - | - | - | - |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | KI |
| Date | 11/17/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2092/SF-1 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 282.63 |
| Mass of Dry Sample & Tare, g | 282.63 |
| Mass of Tare, g | 154.88 |
| Moisture Content, % | 0.00 |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 282.63 |
| Mass of Tare, g | 154.88 |
| Total mass of dry sample used for sieve analysis, g | 127.75 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 81.56 |
| Percent of sample retained on No. 200 sieve, % | 63.84 |
| **Percent of material finer than No. 200 sieve, %** | **36.16** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | KI |
| Date | 11/15/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2092/SF-1 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 22430.0 | 18790.2 |
| Mass of Mat. Retained on No. 4 sieve, g | - | - |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | - |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

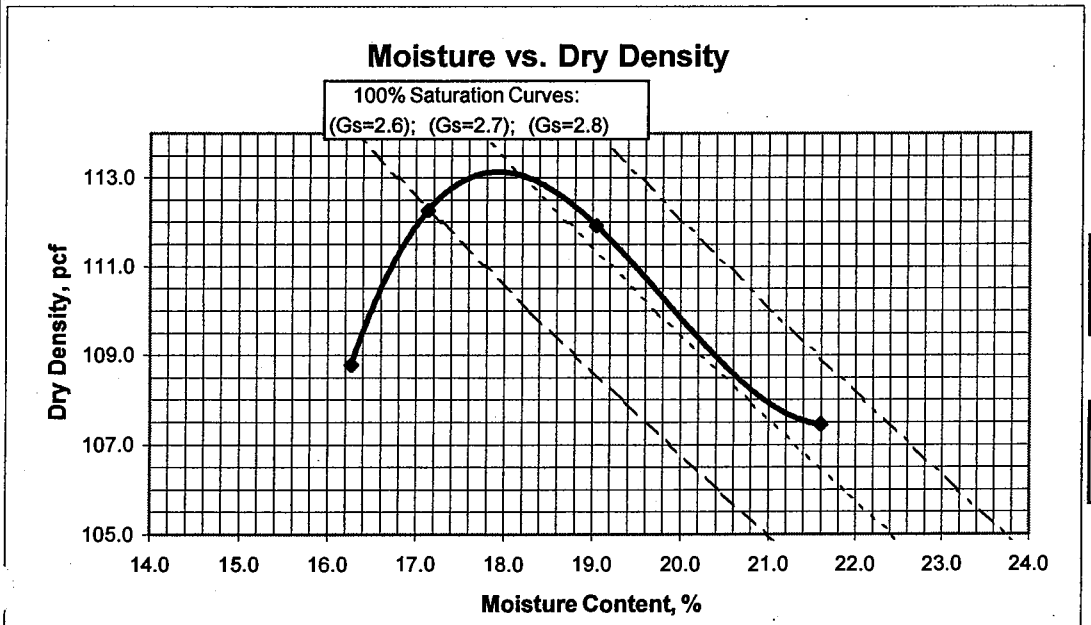
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 966.7 | |
| Mass of Dry Sample & Tare, g | 835.6 | |
| Mass of Tare, g | 158.8 | |
| Moisture Content, % | 19.4 | |

Procedure: B

TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5858.0 | 5934.0 | 5960.0 | 5921.0 | |
| Mass of Wet Sample & Tare, g | 600.5 | 655.5 | 603.5 | 659.0 | |
| Mass of Dry Sample & Tare, g | 530.7 | 573.5 | 521.4 | 559.9 | |
| Mass of Tare, g | 101.5 | 95.0 | 90.5 | 101.0 | |
| Moisture Content, % | 16.3 | 17.1 | 19.0 | 21.6 | |
| Wet Density, pcf | 126.5 | 131.5 | 133.2 | 130.7 | |
| Dry Density, pcf | 108.8 | 112.3 | 111.9 | 107.4 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 113.2 |
| **Optimum Moisture Content, %** | 17.9 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | KI |
| Date | 11/17/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2094/SF-2 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 214.33 |
| Mass of Dry Sample & Tare, g | 214.33 |
| Mass of Tare, g | 95.14 |
| Moisture Content, % | 0.00 |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 214.33 |
| Mass of Tare, g | 95.14 |
| Total mass of dry sample used for sieve analysis, g | 119.19 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 100.25 |
| Percent of sample retained on No. 200 sieve, % | 84.11 |
| **Percent of material finer than No. 200 sieve, %** | **15.89** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | MG |
| Date | 11/15/06 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2094/SF-2 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 21270.0 | 19204.4 |
| Mass of Mat. Retained on No. 4 sieve, g | - | - |
| Mass of Mat. Retained on 3/8" sieve, g | 694.6 | 694.6 |
| Mass of Mat. Retained on 3/4" sieve, g | - | - |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | - |
| Material Retained on 3/8" Sieve, % | 3.6 |
| Material Retained on 3/4" Sieve, % | - |
| Total, % (oversized) | 3.6 |

*MOISTURE CONTENT*

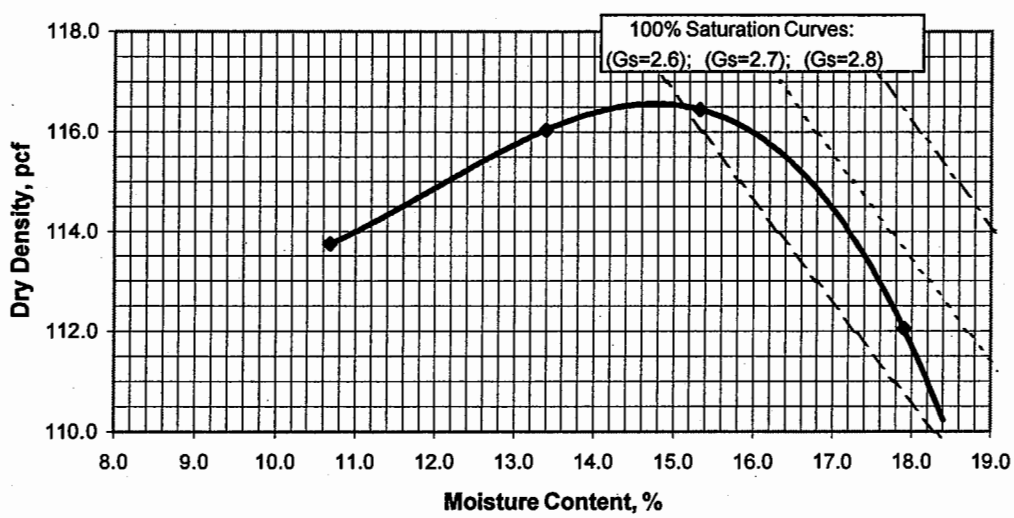
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 915.5 | 694.6 |
| Mass of Dry Sample & Tare, g | 841.8 | 694.6 |
| Mass of Tare, g | 156.6 | 0.0 |
| Moisture Content, % | 10.8 | 0.0 |

Procedure: B

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5849.0 | 5935.0 | 5976.0 | 5943.0 | |
| Mass of Wet Sample & Tare, g | 553.0 | 692.0 | 608.0 | 610.0 | |
| Mass of Dry Sample & Tare, g | 509.0 | 623.1 | 540.4 | 531.0 | |
| Mass of Tare, g | 96.5 | 108.5 | 99.5 | 89.5 | |
| Moisture Content, % | 10.7 | 13.4 | 15.3 | 17.9 | |
| Wet Density, pcf | 125.9 | 131.6 | 134.3 | 132.1 | |
| Dry Density, pcf | 113.7 | 116.0 | 116.4 | 112.0 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 116.6 |
| **Optimum Moisture Content, %** | 14.7 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | KI |
| Date | 11/17/06 |
| Checked By | KS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2095/SF-3 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 228.42 |
| Mass of Dry Sample & Tare, g | 228.42 |
| Mass of Tare, g | 108.40 |
| Moisture Content, % | 0.00 |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 228.42 |
| Mass of Tare, g | 108.40 |
| Total mass of dry sample used for sieve analysis, g | 120.02 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 102.23 |
| Percent of sample retained on No. 200 sieve, % | 85.18 |
| **Percent of material finer than No. 200 sieve, %** | **14.82** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | MS |
| Date | 11/15/06 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2095/SF-3 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 24560.0 | 22590.3 |
| Mass of Mat. Retained on No. 4 sieve, g | - | - |
| Mass of Mat. Retained on 3/8" sieve, g | 1679.0 | 1679.0 |
| Mass of Mat. Retained on 3/4" sieve, g | - | - |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | - |
| Material Retained on 3/8" Sieve, % | 7.4 |
| Material Retained on 3/4" Sieve, % | - |
| Total, % (oversized) | 7.4 |

*MOISTURE CONTENT*

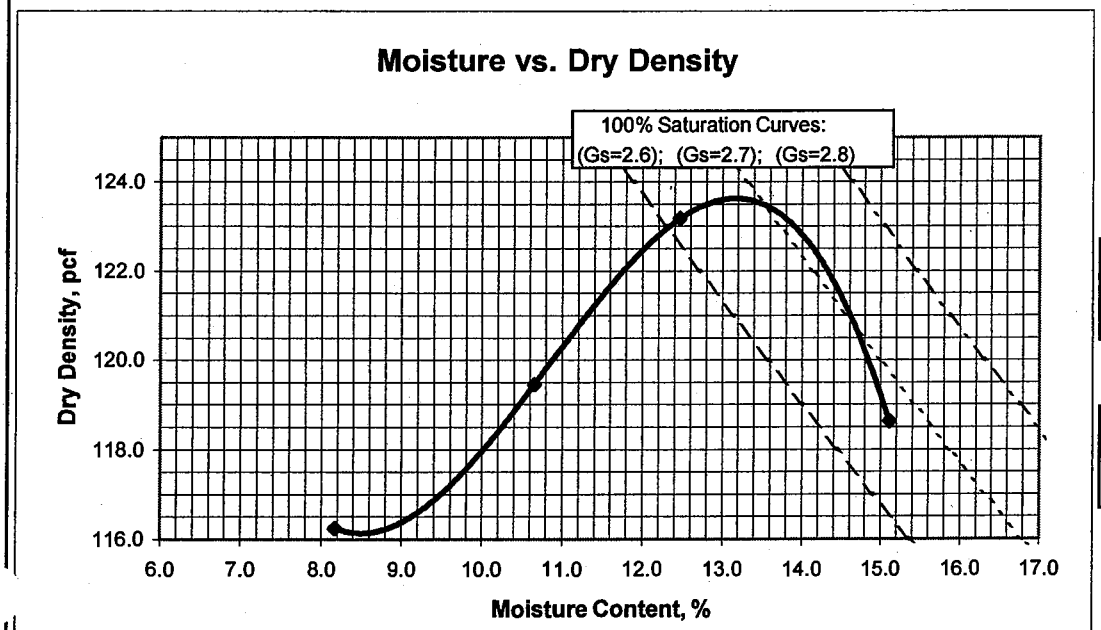
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 782.2 | 1679.0 |
| Mass of Dry Sample & Tare, g | 731.2 | 1679.0 |
| Mass of Tare, g | 146.3 | 0.0 |
| Moisture Content, % | 8.7 | 0.0 |

Procedure: B

TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5847.0 | 5944.0 | 6040.0 | 6010.0 | |
| Mass of Wet Sample & Tare, g | 539.5 | 575.5 | 623.0 | 747.0 | |
| Mass of Dry Sample & Tare, g | 505.9 | 528.8 | 564.9 | 663.1 | |
| Mass of Tare, g | 95.0 | 90.0 | 98.5 | 107.5 | |
| Moisture Content, % | 8.2 | 10.7 | 12.5 | 15.1 | |
| Wet Density, pcf | 125.8 | 132.2 | 138.5 | 136.5 | |
| Dry Density, pcf | 116.3 | 119.5 | 123.2 | 118.6 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 123.7 |
| **Optimum Moisture Content, %** | 13.2 |

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| | |
|---|---|
| Tested By | KI |
| Date | 12/18/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2160/SF-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 500.00 |
| Mass of Dry Sample & Tare, g | 476.97 |
| Mass of Tare, g | 167.50 |
| Moisture Content, % | 7.44 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 318.00 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 295.97 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 262.16 |
| Percent of sample retained on No. 200 sieve, % | 88.58 |
| **Percent of material finer than No. 200 sieve, %** | **11.42** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | KI |
| Date | 12/18/06 |
| Checked By | [illegible] |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2160/SF-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 26000.0 | 24199.2 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 593.3 | 593.3 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 2.5 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 2.5 |

*MOISTURE CONTENT*

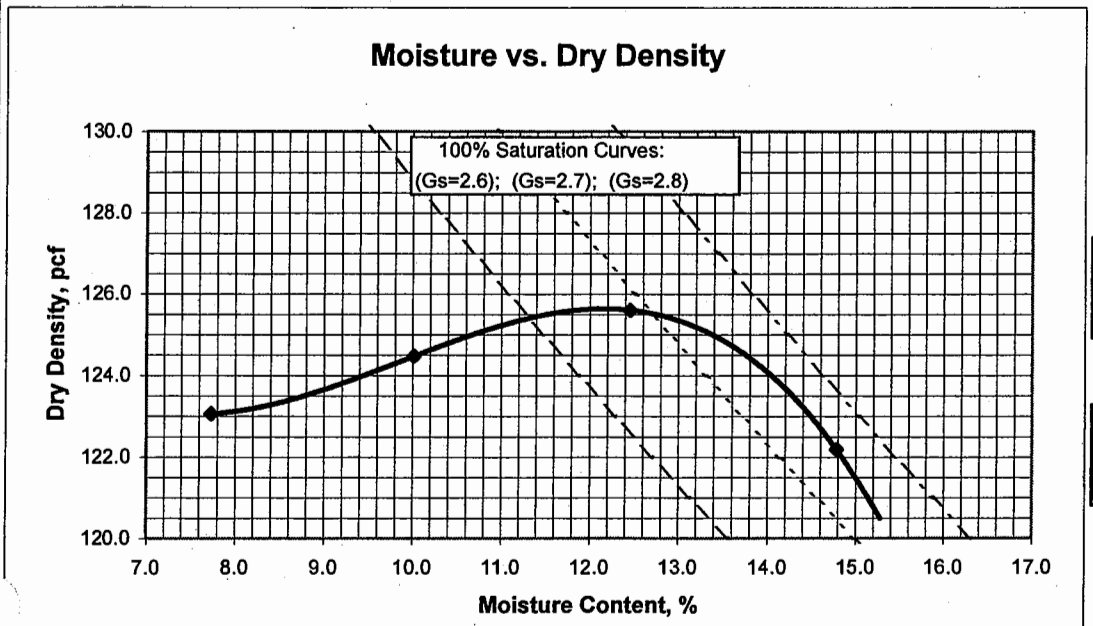
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 500.0 | 593.3 |
| Mass of Dry Sample & Tare, g | 477.0 | 593.3 |
| Mass of Tare, g | 167.5 | |
| Moisture Content, % | 7.4 | 0.0 |

Procedure: B

TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5950.0 | 6016.0 | 6081.0 | 6066.0 | |
| Mass of Wet Sample & Tare, g | 539.5 | 535.0 | 596.0 | 643.0 | |
| Mass of Dry Sample & Tare, g | 508.4 | 495.6 | 541.2 | 572.2 | |
| Mass of Tare, g | 106.0 | 102.5 | 101.0 | 93.0 | |
| Moisture Content, % | 7.7 | 10.0 | 12.5 | 14.8 | |
| Wet Density, pcf | 132.6 | 136.9 | 141.2 | 140.3 | |
| Dry Density, pcf | 123.1 | 124.5 | 125.6 | 122.2 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 125.7 |
| **Optimum Moisture Content, %** | 12.2 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/15/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2195/SF-5 | Depth/Elev. | - |
| Location | PLACED FILL | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 398.36 |
| Mass of Dry Sample & Tare, g | 331.44 |
| Mass of Tare, g | 100.49 |
| Moisture Content, % | 28.98 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.17 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 232.73 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 160.55 |
| Percent of sample retained on No. 200 sieve, % | 68.98 |
| **Percent of material finer than No. 200 sieve, %** | **31.02** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/15/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2195/SF-5 | Depth/Elev. | - |
| Location | PLACED FILL | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 16870.0 | 13154.4 |
| Mass of Mat. Retained on No. 4 sieve, g | 316.7 | 316.7 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 2.4 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 2.4 |

*MOISTURE CONTENT*

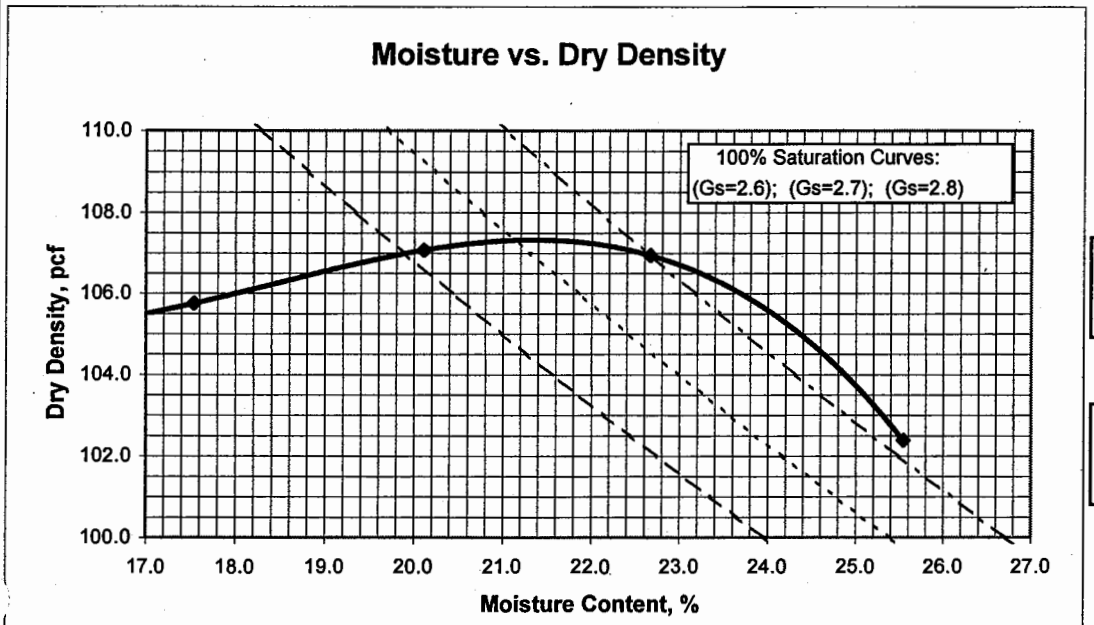
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 720.5 | 316.7 |
| Mass of Dry Sample & Tare, g | 596.5 | 316.7 |
| Mass of Tare, g | 157.5 | 0.0 |
| Moisture Content, % | 28.2 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5825.0 | 5890.0 | 5929.0 | 5889.0 | |
| Mass of Wet Sample & Tare, g | 643.5 | 643.5 | 628.5 | 638.5 | |
| Mass of Dry Sample & Tare, g | 561.5 | 552.0 | 529.0 | 527.0 | |
| Mass of Tare, g | 94.0 | 97.0 | 90.0 | 90.5 | |
| Moisture Content, % | 17.5 | 20.1 | 22.7 | 25.5 | |
| Wet Density, pcf | 124.3 | 128.6 | 131.2 | 128.5 | |
| Dry Density, pcf | 105.7 | 107.1 | 106.9 | 102.4 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION
NA

USCS (ASTM D2487; D2488)
NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 107.3 |
| **Optimum Moisture Content, %** | 21.5 |

| | | | |
|---|---|---|---|
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| | | Date | 01/15/07 |
| | | Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2196/SF-6 | Depth/Elev. | - |
| Location | PLACED FILL | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 464.20 |
| Mass of Dry Sample & Tare, g | 407.53 |
| Mass of Tare, g | 101.50 |
| Moisture Content, % | 18.52 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 304.53 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 256.95 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 197.28 |
| Percent of sample retained on No. 200 sieve, % | 76.78 |
| **Percent of material finer than No. 200 sieve, %** | **23.22** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/15/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2197/SF-7 | Depth/Elev. | - |
| Location | PLACED FILL | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 465.54 |
| Mass of Dry Sample & Tare, g | 415.57 |
| Mass of Tare, g | 95.16 |
| Moisture Content, % | 15.60 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 299.32 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 258.94 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 210 |
| Percent of sample retained on No. 200 sieve, % | 81.10 |
| **Percent of material finer than No. 200 sieve, %** | **18.90** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| NOTE: Method used for test: | B |
| Length of Soaking Period: | Overnight |
| Sieve No. 200 ID # | 38/86 |
| Sieve Shaker ID # | 54/130 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/15/07 |
| Checked By | VB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2198/SF-8 | Depth/Elev. | - |
| Location | PLACED FILL | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 453.14 |
| Mass of Dry Sample & Tare, g | 408.68 |
| Mass of Tare, g | 90.95 |
| Moisture Content, % | 13.99 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.28 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 263.42 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 215.29 |
| Percent of sample retained on No. 200 sieve, % | 81.73 |
| **Percent of material finer than No. 200 sieve, %** | **18.27** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/15/07 |
| Checked By | la |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2199/SF-9 | Depth/Elev. | - |
| Location | PLACED FILL | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 447.64 |
| Mass of Dry Sample & Tare, g | 394.32 |
| Mass of Tare, g | 99.74 |
| Moisture Content, % | 18.10 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.25 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 254.23 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 198.06 |
| Percent of sample retained on No. 200 sieve, % | 77.90 |
| **Percent of material finer than No. 200 sieve, %** | **22.10** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2236/SF-10 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 554.96 |
| Mass of Dry Sample & Tare, g | 498.63 |
| Mass of Tare, g | 83.76 |
| Moisture Content, % | 13.58 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 299.83 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 263.99 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 205.02 |
| Percent of sample retained on No. 200 sieve, % | 77.66 |
| **Percent of material finer than No. 200 sieve, %** | **22.34** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| NOTE: Method used for test: | B |
| Length of Soaking Period: | Overnight |
| Sieve No. 200 ID # | 38/86 |
| Sieve Shaker ID # | 54/130 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2237/SF-11 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 625.06 |
| Mass of Dry Sample & Tare, g | 558.23 |
| Mass of Tare, g | 102.59 |
| Moisture Content, % | 14.67 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 302.63 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 263.92 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 214.9 |
| Percent of sample retained on No. 200 sieve, % | 81.43 |
| **Percent of material finer than No. 200 sieve, %** | **18.57** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | VB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2238/SF-12 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 577.95 |
| Mass of Dry Sample & Tare, g | 527.05 |
| Mass of Tare, g | 98.55 |
| Moisture Content, % | 11.88 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 306.24 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 273.73 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 218.43 |
| Percent of sample retained on No. 200 sieve, % | 79.80 |
| **Percent of material finer than No. 200 sieve, %** | **20.20** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LO |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2239/SF-13 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 591.70 |
| Mass of Dry Sample & Tare, g | 536.95 |
| Mass of Tare, g | 100.93 |
| Moisture Content, % | 12.56 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 304.10 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 270.17 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 229.91 |
| Percent of sample retained on No. 200 sieve, % | 85.10 |
| **Percent of material finer than No. 200 sieve, %** | **14.90** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | KB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2240/SF-14 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 551.32 |
| Mass of Dry Sample & Tare, g | 501.36 |
| Mass of Tare, g | 101.18 |
| Moisture Content, % | 12.48 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 302.13 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 268.60 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 225.17 |
| Percent of sample retained on No. 200 sieve, % | 83.83 |
| **Percent of material finer than No. 200 sieve, %** | **16.17** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2241/SF-15 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 535.34 |
| Mass of Dry Sample & Tare, g | 476.65 |
| Mass of Tare, g | 95.04 |
| Moisture Content, % | 15.38 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 303.10 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 262.70 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 210.37 |
| Percent of sample retained on No. 200 sieve, % | 80.08 |
| **Percent of material finer than No. 200 sieve, %** | **19.92** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2242/SF-16 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 592.54 |
| Mass of Dry Sample & Tare, g | 546.95 |
| Mass of Tare, g | 96.16 |
| Moisture Content, % | 10.11 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.68 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 273.06 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 241.16 |
| Percent of sample retained on No. 200 sieve, % | 88.32 |
| **Percent of material finer than No. 200 sieve, %** | **11.68** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2243/SF-17 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 558.50 |
| Mass of Dry Sample & Tare, g | 495.93 |
| Mass of Tare, g | 93.83 |
| Moisture Content, % | 15.56 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.52 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 260.05 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 205.58 |
| Percent of sample retained on No. 200 sieve, % | 79.05 |
| **Percent of material finer than No. 200 sieve, %** | **20.95** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2244/SF-18 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 573.06 |
| Mass of Dry Sample & Tare, g | 522.11 |
| Mass of Tare, g | 96.43 |
| Moisture Content, % | 11.97 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.32 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 268.22 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 223.14 |
| Percent of sample retained on No. 200 sieve, % | 83.19 |
| **Percent of material finer than No. 200 sieve, %** | **16.81** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/29/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2245/SF-19 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 562.17 |
| Mass of Dry Sample & Tare, g | 514.30 |
| Mass of Tare, g | 90.67 |
| Moisture Content, % | 11.30 |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 300.38 |
| Mass of Tare, g | 0.00 |
| Total mass of dry sample used for sieve analysis, g | 269.88 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 231.82 |
| Percent of sample retained on No. 200 sieve, % | 85.90 |
| **Percent of material finer than No. 200 sieve, %** | **14.10** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

of NORTH CAROLINA, LLC

# APPENDIX D

## Structural Fill Field Test Results

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: [illegible]

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-1 | 12-11-06 | N 585410 | 1 | N | 110.5 | 12.0 | SF-2 | 116.6 | 14.7 | 94.8 | -2.7 | F | See SF-1R1 |
| | | E 1505480 | | | | | | | | | | | |
| SF-1R1 | | N 5410 | | | 111.2 | 12.1 | | | | 95.4 | -1.9 | P | Retest for SF-1 |
| | | E 5480 | | | | | | | | | | | |
| SF-2 | | N 5320 | | | 111.8 | 13.9 | | | | 95.9 | -.8 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF-3 | | N 5260 | | | 111.9 | 15.6 | | | | 95.9 | +.9 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF-4 | | N 5170 | | | 113.4 | 13.8 | | | | 97.3 | -.9 | P | |
| | | E 5130 | | | | | | | | | | | |
| SF-5 | | N 5090 | | | 112.0 | 12.7 | | | | 96.0 | -2.0 | P | |
| | | E 5030 | | | | | | | | | | | |
| SF-6 | | N 5040 | | | 114.2 | 13.1 | | | | 98.0 | -1.6 | P | |
| | | E 5130 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-7 | 12-12-06 | N 585160 | 1 | N | 111.3 | 12.1 | SF-2 | 116.6 | 14.7 | 95.5 | -2.6 | P | |
| | | E 1505230 | | | | | | | | | | | |
| SF-8 | | N 5230 | | | 114.1 | 12.4 | | | | 97.8 | -2.3 | P | |
| | | E 5330 | | | | | | | | | | | |
| SF-9 | | N 5320 | | | 114.9 | 12.7 | | | | 98.5 | -2.0 | P | |
| | | E 5440 | | | | | | | | | | | |
| SF-10 | | N 5410 | | | 111.9 | 13.8 | | | | 96.0 | -.9 | P | |
| | | E 5530 | | | | | | | | | | | |
| SF-11 | | N 5310 | | | 111.0 | 14.1 | | | | 95.2 | -.6 | P | |
| | | E 5560 | | | | | | | | | | | |
| SF-12 | | N 5220 | | | 114.4 | 12.0 | | | | 98.1 | -2.7 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF-13 | | N 5130 | | | 111.5 | 12.5 | | | | 95.6 | -2.2 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF-14 | | N 5050 | | | 113.5 | 14.6 | | | | 97.4 | -.1 | P | |
| | | E 5260 | | | | | | | | | | | |
| SF-15 | | N 4930 | | | 113.2 | 12.5 | | | | 97.0 | -1.2 | P | |
| | | E 5150 | | | | | | | | | | | |
| SF-16 | | N 4830 | | | 111.5 | 13.7 | | | | 95.6 | -1.0 | P | |
| | | E 5180 | | | | | | | | | | | |
| SF-17 | | N 4930 | | | 113.0 | 12.7 | | | | 96.9 | -2.0 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF-18 | | N 5030 | | | 113.4 | 14.0 | | | | 97.3 | -.7 | P | |
| | | E 5360 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 11/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-19 | 12-12-06 | N 585130 | 1 | N | 111.7 | 12.4 | SF-2 | 116.6 | 14.7 | 95.8 | -2.3 | P | |
| | ↓ | E 1505460 | | | | | | | | | | | |
| SF-20 | ↓ | N 5220 | ↓ | ↓ | 111.8 | 13.1 | ↓ | ↓ | ↓ | 95.8 | -1.6 | P | |
| | | E 5580 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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DATE REVIEWED: 1/16/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-21 | 12-13-06 | N 584820 | 1 | N | 114.5 | 12.9 | SF-2 | 116.6 | 14.7 | 98.2 | -1.8 | P | |
| | | E 1505270 | | | | | | | | | | | |
| SF-22 | | N 4920 | | | 113.5 | 13.1 | | | | 97.3 | -1.6 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF-23 | | N 5030 | | | 114.3 | 12.3 | | | | 98.1 | -2.4 | P | |
| | | E 5460 | | | | | | | | | | | |
| SF-24 | | N 5130 | | | 113.2 | 13.0 | | | | 97.1 | -1.7 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF-25 | | N 5210 | | | 115.9 | 12.8 | | | | 99.4 | -1.9 | P | |
| | | E 5650 | | | | | | | | | | | |
| SF-26 | | N 5130 | | | 113.1 | 13.3 | | | | 97.0 | -1.4 | P | |
| | | E 5670 | | | | | | | | | | | |
| SF-27 | | N 5020 | | | 113.0 | 15.9 | | | | 96.9 | +1.2 | P | |
| | | E 5570 | | | | | | | | | | | |
| SF-28 | | N 4950 | | | 113.3 | 14.9 | | | | 97.2 | +.2 | P | |
| | | E 5470 | | | | | | | | | | | |
| SF-29 | | N 5020 | | | 113.2 | 13.7 | | | | 97.1 | -.1 | P | |
| | | E 5640 | | | | | | | | | | | |
| SF-30 | | N 5070 | | | 111.8 | 13.4 | | | | 95.9 | -1.3 | P | |
| | | E 5730 | | | | | | | | | | | |
| SF-31 | | N 5030 | | | 113.8 | 14.8 | | | | 97.6 | +.1 | P | |
| | | E 4940 | | | | | | | | | | | |
| SF-32 | | N 4960 | | | 113.8 | 13.9 | | | | 97.6 | -.8 | P | |
| | | E 5020 | | | | | | | | | | | |

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COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-33 | 12-14-06 | N 584970 | 1 | N | 115.2 | 13.6 | SF-2 | 116.6 | 14.7 | 98.8 | -1.1 | P | |
| | | E 1504870 | | | | | | | | | | | |
| SF-34 | | N 4910 | | | 114.5 | 14.1 | | | | 98.2 | -.6 | P | |
| | | E 4790 | | | | | | | | | | | |
| SF-35 | | N 4820 | | | 114.6 | 13.7 | | | | 98.3 | -1.0 | P | |
| | | E 4840 | | | | | | | | | | | |
| SF-36 | | N 4780 | | | 113.2 | 14.1 | | | | 97.1 | -.6 | P | |
| | | E 4920 | | | | | | | | | | | |
| SF-37 | | N 4930 | 2 | | 113.3 | 13.8 | | | | 97.1 | -.9 | P | |
| | | E 4910 | | | | | | | | | | | |
| SF-38 | | N 4940 | | | 113.5 | 14.0 | | | | 97.3 | -.4 | P | |
| | | E 4820 | | | | | | | | | | | |
| SF-39 | | N 4830 | | | 114.1 | 14.0 | | | | 97.9 | -.7 | P | |
| | | E 4810 | | | | | | | | | | | |
| SF-40 | | N 4760 | | | 113.6 | 12.9 | | | | 97.4 | -1.8 | P | |
| | | E 4890 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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PROJECT LOCATION: Charlotte, North Carolina

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REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-41 | 12-15-06 | N 585070 | 2 | N | 109.5 | 14.4 | SF-2 | 116.6 | 14.7 | 93.9 | -.3 | F | See Retest SF-41R1 |
| | | E 1504930 | | | | | | | | | | | |
| SF-41R1 | | N 5070 | | | 111.5 | 14.2 | | | | 95.8 | -.5 | P | Retest for SF-41 |
| | | E 4930 | | | | | | | | | | | |
| SF-42 | | N 5140 | | | 112.6 | 13.9 | | | | 96.5 | -.8 | P | |
| | | E 5030 | | | | | | | | | | | |
| SF-43 | | N 5220 | | | 112.5 | 13.7 | | | | 96.5 | -1.0 | P | |
| | | E 5140 | | | | | | | | | | | |
| SF-44 | | N 5020 | | | 113.1 | 14.3 | | | | 97.0 | -.4 | P | |
| | | E 5020 | | | | | | | | | | | |
| SF-45 | | N 5070 | | | 111.5 | 15.0 | | | | 95.6 | +.3 | P | |
| | | E 5120 | | | | | | | | | | | |
| SF-46 | | N 5140 | | | 112.6 | 14.2 | | | | 96.6 | -.5 | P | |
| | | E 5190 | | | | | | | | | | | |
| SF-47 | | N 4920 | | | 113.8 | 12.3 | | | | 97.6 | -2.4 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF-48 | | N 4980 | | | 112.8 | 12.6 | | | | 96.8 | -2.1 | P | |
| | | E 5180 | | | | | | | | | | | |
| SF-49 | | N 5060 | | | 113.4 | 13.2 | | | | 97.3 | -1.5 | P | |
| | | E 5270 | | | | | | | | | | | |
| SF-50 | | N 4830 | | | 114.5 | 12.9 | | | | 98.2 | -1.8 | P | |
| | | E 5140 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-51 | 12-26-06 | N 584840 | 2 | N | 119.8 | 13.2 | SF-4 | 125.7 | 12.2 | 95.3 | +1.0 | P | |
| | | E 1505270 | | | | | | | | | | | |
| SF-52 | | N 4940 | | | 121.2 | 13.4 | | | | 96.4 | +1.2 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF-53 | | N 4940 | | | 120.4 | 13.7 | | | | 95.8 | +1.5 | P | |
| | | E 5380 | | | | | | | | | | | |
| SF-54 | | N 4950 | | | 122.4 | 13.8 | | | | 97.4 | +1.6 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF-55 | | N 5020 | | | 123.4 | 12.7 | | | | 98.2 | +.5 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF-56 | | N 5130 | | | 120.8 | 12.9 | | | | 96.1 | +.7 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF-57 | | N 5260 | | | 121.0 | 13.4 | | | | 96.3 | +1.1 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF-58 | | N 5330 | | | 120.1 | 13.7 | | | | 95.5 | +1.5 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF-59 | | N 5220 | | | 121.1 | 13.3 | | | | 96.3 | +1.1 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF-60 | | N 5120 | | | 121.1 | 11.6 | | | | 96.4 | -.6 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF-61 | | N 5030 | | | 121.8 | 12.2 | | | | 96.9 | Ø | P | |
| | | E 5460 | | | | | | | | | | | |
| SF-62 | | N 5010 | | | 123.7 | 12.6 | | | | 98.4 | +.4 | P | |
| | | E 5550 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
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PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-63 | 12-26-06 | N 585070 | 2 | N | 123.6 | 12.3 | SF-4 | 125.7 | 12.2 | 98.3 | +.1 | P | |
| | | E 1505660 | | | | | | | | | | | |
| SF-64 | | N 5140 | | | 120.2 | 12.8 | | | | 95.6 | +.6 | P | |
| | | E 5570 | | | | | | | | | | | |
| SF-65 | | N 5170 | | | 120.2 | 13.3 | | | | 95.6 | +1.1 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF-66 | | N 5280 | | | 123.0 | 13.9 | | | | 97.9 | +1.7 | P | |
| | | E 5470 | | | | | | | | | | | |
| SF-67 | | N 5390 | | | 123.5 | 14.2 | | | | 98.2 | +2.0 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF-68 | | N 5470 | | | 120.5 | 13.0 | | | | 95.9 | +.8 | P | |
| | | E 5490 | | | | | | | | | | | |
| SF-69 | | N 5350 | | | 121.7 | 13.7 | | | | 96.8 | +1.5 | P | |
| | | E 5560 | | | | | | | | | | | |
| SF-70 | | N 5220 | | | 123.3 | 12.2 | | | | 98.1 | Ø | P | |
| | | E 5570 | | | | | | | | | | | |
| SF-71 | | N 5190 | | | 122.3 | 14.0 | | | | 97.3 | +1.8 | P | |
| | | E 5670 | | | | | | | | | | | |
| SF-72 | | N 5050 | 3 | | 124.9 | 12.9 | | | | 99.4 | +.7 | P | |
| | | E 4940 | | | | | | | | | | | |
| SF-73 | | N 4940 | | | 123.8 | 13.3 | | | | 98.5 | +1.1 | P | |
| | | E 5010 | | | | | | | | | | | |
| SF-74 | | N 4860 | | | 120.0 | 13.7 | | | | 95.4 | +1.5 | P | |
| | | E 5070 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
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PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-75 | 12-26-06 | N 584780 | 3 | N | 120.5 | 13.5 | SF-4 | 125.7 | 12.2 | 95.9 | +1.3 | P | |
| | | E 1505130 | | | | | | | | | | | |
| SF-76 | | N 4810 | | | 122.9 | 12.4 | | | | 97.8 | +.2 | P | |
| | | E 5220 | | | | | | | | | | | |
| SF-77 | | N 4890 | | | 122.3 | 12.6 | | | | 97.3 | +.4 | P | |
| | | E 5170 | | | | | | | | | | | |
| SF-78 | | N 4970 | | | 120.4 | 13.6 | | | | 95.8 | +1.4 | P | |
| | | E 5120 | | | | | | | | | | | |
| SF-79 | | N 5070 | | | 125.4 | 12.2 | | | | 99.8 | Ø | P | |
| | | E 5030 | | | | | | | | | | | |
| SF-80 | | N 5140 | | | 123.3 | 13.1 | | | | 98.1 | +.9 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF-81 | | N 5060 | | | 122.7 | 13.1 | | | | 97.6 | +.9 | P | |
| | | E 5170 | | | | | | | | | | | |
| SF-82 | | N 4950 | | | 122.0 | 14.4 | | | | 97.1 | +1.2 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF-83 | | N 4880 | | | 120.1 | 13.0 | | | | 95.5 | +.8 | P | |
| | | E 5340 | | | | | | | | | | | |
| SF-84 | | N 4980 | | | 120.8 | 13.3 | | | | 96.1 | +1.1 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF-85 | | N 5050 | | | 120.4 | 12.6 | | | | 95.8 | +.4 | P | |
| | | E 5290 | | | | | | | | | | | |
| SF-86 | | N 5120 | | | 120.0 | 13.5 | | | | 95.5 | +1.3 | P | |
| | | E 5210 | | | | | | | | | | | |

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REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-87 | 12-26-05 | N 585190 | 3 | N | 122.5 | 13.0 | SF-4 | 125.7 | 12.2 | 97.5 | +.8 | P | |
| | | E 1505150 | | | | | | | | | | | |
| SF-88 | | N 5250 | | | 121.0 | 13.7 | | | | 96.3 | +1.5 | P | |
| | | E 5240 | | | | | | | | | | | |
| SF-89 | | N 5160 | | | 121.9 | 13.4 | | | | 97.0 | +1.2 | P | |
| | | E 5330 | | | | | | | | | | | |
| SF-90 | | N 5050 | | | 121.5 | 13.7 | | | | 96.6 | +1.5 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF-91 | | N 4970 | | | 124.1 | 13.0 | | | | 98.7 | +.8 | P | |
| | | E 5490 | | | | | | | | | | | |
| SF-92 | | N 5010 | | | 124.1 | 13.2 | | | | 98.7 | +1.0 | P | |
| | | E 5560 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-93 | 12-27-06 | N 585080 | 3 | N | 125.2 | 12.3 | SF-4 | 125.7 | 12.2 | 99.6 | +.1 | P | |
| | | E 1505490 | | | | | | | | | | | |
| SF-94 | | N 5190 | | | 120.5 | 12.5 | | | | 95.9 | +.3 | P | |
| | | E 5430 | | | | | | | | | | | |
| SF-95 | | N 5280 | | | 121.3 | 12.2 | | | | 96.5 | 0 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF-96 | | N 5360 | | | 121.1 | 12.1 | | | | 96.4 | -.1 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF-97 | | N 5270 | | | 121.2 | 12.8 | | | | 96.4 | +.6 | P | |
| | | E 5460 | | | | | | | | | | | |
| SF-98 | | N 5160 | | | 121.7 | 11.9 | | | | 96.8 | -.3 | P | |
| | | E 5540 | | | | | | | | | | | |
| SF-99 | | N 5050 | | | 122.1 | 12.4 | | | | 97.2 | +.2 | P | |
| | | E 5660 | | | | | | | | | | | |
| SF-100 | | N 5110 | | | 121.6 | 13.1 | | | | 96.7 | +.9 | P | |
| | | E 5730 | | | | | | | | | | | |
| SF-101 | | N 5180 | | | 121.5 | 12.7 | | | | 96.6 | +.5 | P | |
| | | E 5660 | | | | | | | | | | | |
| SF-102 | | N 5230 | | | 120.7 | 11.8 | | | | 96.0 | -.4 | P | |
| | | E 5580 | | | | | | | | | | | |
| SF-103 | | N 5350 | | | 121.1 | 12.1 | | | | 96.3 | -.1 | P | |
| | | E 5470 | | | | | | | | | | | |
| SF-104 | | N 5480 | | | 122.6 | 12.7 | | | | 97.6 | +.5 | P | |
| | | E 5490 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
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COMPLETED BY: TS

REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-105 | 12-27-06 | N 585410 | 3 | N | 123.0 | 12.8 | SF-4 | 125.7 | 12.2 | 97.8 | +.6 | P | |
| | ↓ | E 1505560 | ↓ | ↓ | | | ↓ | ↓ | ↓ | | | | |
| SF-106 | ↓ | N 5320 | ↓ | ↓ | 122.7 | 12.4 | ↓ | ↓ | ↓ | 97.6 | +.2 | P | |
| | | E 5590 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-107 | 12-28-06 | N 584780 | 4 | N | 123.9 | 11.3 | SF-4 | 125.7 | 12.2 | 98.6 | -.9 | P | |
| | | E 1505110 | | | | | | | | | | | |
| SF-108 | | N 4830 | | | 122.1 | 10.2 | | | | 97.2 | -2.0 | P | |
| | | E 5230 | | | | | | | | | | | |
| SF-109 | | N 4890 | | | 121.2 | 11.5 | | | | 96.4 | -.7 | P | |
| | | E 5320 | | | | | | | | | | | |
| SF-110 | | N 4940 | | | 121.9 | 11.1 | | | | 96.9 | -1.1 | P | |
| | | E 5260 | | | | | | | | | | | |
| SF-111 | | N 4870 | | | 122.2 | 11.8 | | | | 97.2 | -.4 | P | |
| | | E 5120 | | | | | | | | | | | |
| SF-112 | | N 4820 | | | 122.5 | 10.0 | | | | 97.5 | -2.2 | P | |
| | | E 5040 | | | | | | | | | | | |
| SF-113 | | N 4920 | | | 122.4 | 10.4 | | | | 97.4 | -1.8 | P | |
| | | E 5030 | | | | | | | | | | | |
| SF-114 | | N 4960 | | | 114.8 | 11.7 | SF-2 | 116.6 | 14.7 | 98.4 | -3.0 | P | |
| | | E 5120 | | | | | | | | | | | |
| SF-115 | | N 5030 | | | 113.9 | 12.2 | | | | 97.7 | -2.5 | P | |
| | | E 5210 | | | | | | | | | | | |
| SF-116 | | N 5080 | | | 113.1 | 14.2 | | | | 97.0 | -.5 | P | |
| | | E 5340 | | | | | | | | | | | |
| SF-117 | | N 5120 | | | 112.3 | 14.6 | | | | 96.3 | -.1 | P | |
| | | E 5440 | | | | | | | | | | | |
| SF-118 | | N 5190 | | | 114.4 | 12.8 | | | | 98.1 | -1.9 | P | |
| | | E 5590 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-119 | 12-28-06 | N 585160 | 4 | N | 115.4 | 12.6 | SF-2 | 116.6 | 14.7 | 98.9 | -2.1 | P | |
| | | E 1505690 | | | | | | | | | | | |
| SF-120 | | N 5080 | | | 115.4 | 11.7 | | | | 99.0 | -3.0 | P | |
| | | E 5580 | | | | | | | | | | | |
| SF-121 | | N 5030 | | | 114.7 | 13.1 | | | | 98.4 | -1.6 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF-122 | | N 4980 | | | 114.5 | 13.0 | | | | 98.2 | -1.7 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF-123 | | N 4920 | | | 113.6 | 13.2 | | | | 97.4 | -1.5 | P | |
| | | E 5380 | | | | | | | | | | | |
| SF-124 | | N 4990 | | | 111.7 | 14.7 | | | | 95.8 | Ø | P | |
| | | E 5450 | | | | | | | | | | | |
| SF-125 | | N 5040 | | | 112.0 | 14.9 | | | | 96.1 | +.2 | P | |
| | | E 5570 | | | | | | | | | | | |
| SF-126 | | N 5100 | | | 121.8 | 10.6 | SF-4 | 125.7 | 12.2 | 96.9 | -1.6 | P | |
| | | E 5760 | | | | | | | | | | | |
| SF-127 | | N 5240 | | | 121.8 | 11.1 | | | | 96.9 | -1.1 | P | |
| | | E 5660 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 128 | 12-29-06 | N 585030 | 4 | N | 116.4 | 11.4 | SF-2 | 116.6 | 14.7 | 99.9 | -3.3 | P | |
| | | E 1505020 | | | | | | | | | | | |
| SF 129 | | N 5090 | | | 114.0 | 12.8 | | | | 97.8 | -1.9 | P | |
| | | E 5120 | | | | | | | | | | | |
| SF 130 | | N 5140 | | | 122.3 | 10.3 | SF-4 | 125.7 | 12.2 | 97.3 | -1.9 | P | |
| | | E 5220 | | | | | | | | | | | |
| SF 131 | | N 5180 | | | 122.2 | 10.6 | | | | 97.2 | -1.6 | P | |
| | | E 5330 | | | | | | | | | | | |
| SF 132 | | N 5250 | | | 121.2 | 13.3 | | | | 96.4 | +1.1 | P | |
| | | E 5450 | | | | | | | | | | | |
| SF 133 | | N 5280 | | | 121.5 | 12.6 | | | | 96.7 | +.4 | P | |
| | | E 5520 | | | | | | | | | | | |
| SF 134 | | N 5390 | | | 121.3 | 11.9 | | | | 96.5 | -.3 | P | |
| | | E 5520 | | | | | | | | | | | |
| SF 135 | | N 5380 | | | 121.8 | 12.0 | | | | 96.9 | -.2 | P | |
| | | E 5520 | | | | | | | | | | | |
| SF 136 | | N 5340 | | | 120.7 | 12.4 | | | | 96.0 | +.2 | P | |
| | | E 5430 | | | | | | | | | | | |
| SF 137 | | N 5270 | | | 121.5 | 12.8 | | | | 96.7 | +.6 | P | |
| | | E 5320 | | | | | | | | | | | |
| SF 138 | | N 5220 | | | 120.8 | 12.7 | | | | 96.1 | +.5 | P | |
| | | E 5220 | | | | | | | | | | | |
| SF 139 | | N 5160 | | | 121.6 | 12.5 | | | | 96.7 | +.3 | P | |
| | | E 5130 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-140 | 12-29-06 | N 585050 | 4 | N | 121.8 | 11.7 | SF-4 | 125.7 | 12.2 | 96.9 | -.5 | P | |
| | | E 1504930 | | | | | | | | | | | |
| SF 141 | | N 5120 | | | 122.3 | 11.0 | | | | 97.3 | -1.2 | P | |
| | | E 5010 | | | | | | | | | | | |
| SF 142 | | N 5220 | | | 113.5 | 11.8 | SF-2 | 116.6 | 14.7 | 97.3 | -2.9 | P | |
| | | E 5140 | | | | | | | | | | | |
| SF 143 | | N 5320 | | | 113.5 | 12.2 | | | | 97.4 | -2.5 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF 144 | | N 5380 | | | 113.6 | 12.9 | | | | 97.4 | -1.8 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 145 | | N 5450 | | | 113.0 | 12.6 | | | | 96.9 | -2.1 | P | |
| | | E 5430 | | | | | | | | | | | |
| SF 146 | | N 5030 | -5 | | 113.3 | 13.1 | | | | 97.1 | -1.6 | P | |
| | | E 4910 | | | | | | | | | | | |
| SF 147 | | N 4980 | | | 113.3 | 12.5 | | | | 97.2 | -2.2 | P | |
| | | E 4980 | | | | | | | | | | | |
| SF 148 | | N 4910 | | | 115.1 | 13.9 | | | | 98.7 | -.8 | P | |
| | | E 5070 | | | | | | | | | | | |
| SF 149 | | N 4980 | | | 122.2 | 12.0 | SF-4 | 125.7 | 12.2 | 97.2 | -.2 | P | |
| | | E 5170 | | | | | | | | | | | |
| SF 150 | | N 5050 | | | 123.4 | 13.6 | | | | 98.2 | +1.4 | P | |
| | | E 5070 | | | | | | | | | | | |
| SF 151 | | N 5140 | | | 123.0 | 13.1 | | | | 97.8 | +.9 | P | |
| | | E 5010 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 152 | 12-29-06 | N 585190 | 5 | N | 111.8 | 11.7 | SF-2 | 116.6 | 14.7 | 95.9 | -3.0 | P | |
| | | E 1505110 | | | | | | | | | | | |
| SF 153 | | N 5090 | | | 112.3 | 11.9 | | | | 96.3 | -2.8 | P | |
| | | E 5190 | | | | | | | | | | | |
| SF 154 | | N 5030 | | | 111.8 | 10.7 | | | | 95.9 | -4.0 | P | |
| | | E 5270 | | | | | | | | | | | |
| SF 155 | | N 5260 | | | 110.8 | 11.8 | | | | 95.0 | -2.9 | P | |
| | | E 5180 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-156 | 1-3-07 | N 585320 | 5 | N | 122.9 | 11.5 | SF-4 | 125.7 | 12.2 | 97.8 | -.7 | P | |
| | | E 1505270 | | | | | | | | | | | |
| SF 157 | | N 5410 | | | 122.8 | 12.1 | | | | 97.7 | -.1 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 158 | | N 5480 | | | 124.1 | 12.3 | | | | 98.8 | +.1 | P | |
| | | E 5470 | | | | | | | | | | | |
| SF 159 | | N 5570 | | | 122.8 | 12.5 | | | | 97.7 | +.3 | P | |
| | | E 5500 | | | | | | | | | | | |
| SF 160 | | N 5420 | | | 122.5 | 11.8 | | | | 97.4 | -.4 | P | |
| | | E 5540 | | | | | | | | | | | |
| SF 161 | | N 5370 | | | 122.6 | 11.9 | | | | 97.5 | -.3 | P | |
| | | E 5450 | | | | | | | | | | | |
| SF 162 | | N 5310 | | | 121.1 | 12.0 | | | | 96.3 | -.2 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF 163 | | N 5230 | | | 120.8 | 13.1 | | | | 96.1 | +.9 | P | |
| | | E 5260 | | | | | | | | | | | |
| SF 164 | | N 5110 | | | 120.4 | 12.8 | | | | 95.8 | +.6 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF 165 | | N 5210 | | | 121.1 | 12.6 | | | | 96.4 | +.4 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 166 | | N 5260 | | | 120.4 | 13.3 | | | | 95.8 | +1.1 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF 167 | | N 5320 | | | 121.2 | 13.1 | | | | 96.4 | +.9 | P | |
| | | E 5580 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-168 | 1-3-07 | N 585280 | 5 | N | 120.6 | 13.0 | SF-4 | 125.7 | 12.2 | 96.0 | +.8 | P | |
| | | E 1505630 | | | | | | | | | | | |
| SF 169 | | N 5210 | | | 121.5 | 13.4 | | | | 96.8 | +1.2 | P | |
| | | E 5530 | | | | | | | | | | | |
| SF 170 | | N 5160 | | | 123.8 | 11.7 | | | | 98.5 | -.5 | P | |
| | | E 5440 | | | | | | | | | | | |
| SF 171 | | N 5110 | | | 122.1 | 12.4 | | | | 97.1 | +.2 | P | |
| | | E 5330 | | | | | | | | | | | |
| SF 172 | | N 4820 | | | 123.5 | 10.7 | | | | 98.3 | -1.5 | P | |
| | | E 5080 | | | | | | | | | | | |
| SF 173 | | N 4890 | | | 122.8 | 11.9 | | | | 97.7 | -.3 | P | |
| | | E 5170 | | | | | | | | | | | |
| SF 174 | | N 4930 | | | 120.7 | 11.3 | | | | 96.0 | -.9 | P | |
| | | E 5270 | | | | | | | | | | | |
| SF 175 | | N 5030 | | | 121.0 | 12.2 | | | | 96.3 | Ø | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 176 | | N 5060 | | | 121.4 | 11.0 | | | | 96.5 | -1.2 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF 177 | | N 5140 | | | 121.8 | 11.1 | | | | 96.9 | -1.1 | P | |
| | | E 5080 | | | | | | | | | | | |
| SF 178 | | N 5190 | | | 122.8 | 12.6 | | | | 97.7 | +.4 | P | |
| | | E 5670 | | | | | | | | | | | |
| SF 179 | | N 5110 | | | 121.8 | 13.3 | | | | 96.9 | +1.1 | P | |
| | | E 5750 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 180 | 1-3-07 | N 585060 | 5 | N | 113.3 | 14.8 | SF-2 | 116.6 | 14.7 | 97.2 | +.1 | P | |
| | | E 1505710 | | | | | | | | | | | |
| SF 181 | | N 5030 | | | 112.5 | 15.3 | | | | 96.5 | +.6 | P | |
| | | E 5610 | | | | | | | | | | | |
| SF 182 | | N 5010 | | | 111.1 | 14.7 | | | | 95.3 | Ø | P | |
| | | E 5520 | | | | | | | | | | | |
| SF 183 | | N 4920 | | | 111.6 | 15.0 | | | | 95.7 | +.3 | P | |
| | | E 5450 | | | | | | | | | | | |
| SF 184 | | N 4910 | | | 124.9 | 12.4 | SF-4 | 125.7 | 12.2 | 99.4 | +.2 | P | |
| | | E 5350 | | | | | | | | | | | |
| SF 185 | | N 4870 | | | 122.9 | 13.2 | | | | 97.8 | +1.0 | P | |
| | | E 5290 | | | | | | | | | | | |
| SF 186 | | N 4790 | | | 121.2 | 12.0 | | | | 96.4 | -.2 | P | |
| | | E 5180 | | | | | | | | | | | |
| SF 187 | | N 4750 | | | 122.5 | 11.8 | | | | 97.4 | -.4 | P | |
| | | E 5080 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 188 | 1-4-07 | N 585110 | 6 | N | 112.2 | 11.9 | SF-2 | 116.6 | 14.7 | 96.2 | -2.8 | P | |
| | | E 1504920 | | | | | | | | | | | |
| SF 189 | | N 5180 | | | 113.5 | 12.4 | | | | 97.4 | -2.3 | P | |
| | | E 5020 | | | | | | | | | | | |
| SF 190 | | N 5230 | | | 115.6 | 12.9 | | | | 99.1 | -1.8 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 191 | | N 5290 | | | 113.0 | 13.4 | | | | 96.9 | -1.3 | P | |
| | | E 5180 | | | | | | | | | | | |
| SF 192 | | N 5370 | | | 121.6 | 10.1 | SF-4 | 125.7 | 12.2 | 96.8 | -2.1 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF 193 | | N 5440 | | | 115.2 | 12.2 | SF-2 | 116.6 | 14.7 | 98.8 | -2.5 | P | |
| | | E 5380 | | | | | | | | | | | |
| SF 194 | | N 5520 | | | 113.2 | 13.2 | | | | 97.0 | -1.4 | P | |
| | | E 5460 | | | | | | | | | | | |
| SF 195 | | N 5490 | | | 112.8 | 13.6 | | | | 96.7 | -1.1 | P | |
| | | E 5540 | | | | | | | | | | | |
| SF 196 | | N 5410 | | | 124.7 | 10.2 | SF-4 | 125.7 | 12.2 | 99.2 | -2.0 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF 197 | | N 5320 | | | 121.4 | 11.9 | | | | 96.6 | -.3 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 198 | | N 5230 | | | 111.5 | 15.0 | SF-2 | 116.6 | 14.7 | 95.6 | +.3 | P | |
| | | E 5270 | | | | | | | | | | | |
| SF 199 | | N 5180 | | | 112.4 | 14.2 | | | | 96.4 | -.5 | P | |
| | | E 5180 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
## IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [signature]

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 200 | 1-4-07 | N 585090 | 6 | N | 120.4 | 11.1 | SF-4 | 125.7 | 12.2 | 95.8 | -1.1 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 201 | | N 5010 | | | 120.9 | 11.3 | | | | 96.2 | -.9 | P | |
| | | E 4990 | | | | | | | | | | | |
| SF 202 | | N 4950 | | | 113.8 | 14.8 | SF-2 | 116.6 | 14.7 | 97.6 | +.1 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 203 | | N 5040 | | | 112.6 | 15.3 | | | | 96.5 | +.6 | P | |
| | | E 5180 | | | | | | | | | | | |
| SF 204 | | N 5130 | | | 113.6 | 15.1 | | | | 97.4 | +.4 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF 205 | | N 5210 | | | 111.6 | 14.9 | | | | 95.7 | +.2 | P | |
| | | E 5330 | | | | | | | | | | | |
| SF 206 | | N 5280 | | | 122.3 | 10.3 | SF-4 | 125.7 | 12.2 | 97.3 | -1.9 | P | |
| | | E 5420 | | | | | | | | | | | |
| SF 207 | | N 5350 | | | 122.8 | 10.5 | | | | 97.7 | -1.7 | P | |
| | | E 5490 | | | | | | | | | | | |
| SF 208 | | N 5380 | | | 113.5 | 12.6 | SF-2 | 116.6 | 14.7 | 97.3 | -2.1 | P | |
| | | E 5570 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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# SUMMARY SHEET
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PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: DH

DATE REVIEWED: 1/16/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 209 | 1-5-07 | N 585310 | 6 | N | 114.8 | 13.2 | SF-2 | 116.6 | 14.7 | 98.4 | -1.5 | P | |
| | | E 1505610 | | | | | | | | | | | |
| SF 210 | | N 5220 | | | 112.8 | 13.7 | | | | 96.8 | -1.0 | P | |
| | | E 5540 | | | | | | | | | | | |
| SF 211 | | N 5160 | | | 120.1 | 12.0 | SF-4 | 125.7 | 12.2 | 95.5 | -.2 | P | |
| | | E 5430 | | | | | | | | | | | |
| SF 212 | | N 5110 | | | 121.1 | 12.1 | | | | 96.3 | -.1 | P | |
| | | E 5350 | | | | | | | | | | | |
| SF 213 | | N 5030 | | | 121.8 | 10.8 | | | | 96.8 | -1.4 | P | |
| | | E 5260 | | | | | | | | | | | |
| SF 214 | | N 4960 | | | 122.2 | 11.4 | | | | 97.2 | -.8 | P | |
| | | E 5170 | | | | | | | | | | | |
| SF 215 | | N 4860 | | | 121.9 | 11.1 | | | | 97.0 | -1.1 | P | |
| | | E 5080 | | | | | | | | | | | |
| SF 216 | | N 4810 | | | 122.0 | 12.2 | | | | 97.1 | Ø | P | |
| | | E 5140 | | | | | | | | | | | |
| SF 217 | | N 4920 | | | 123.5 | 10.4 | | | | 98.2 | -1.8 | P | |
| | | E 5260 | | | | | | | | | | | |
| SF 218 | | N 5020 | | | 122.2 | 11.9 | | | | 97.2 | -.3 | P | |
| | | E 5350 | | | | | | | | | | | |
| SF 219 | | N 5090 | | | 112.3 | 15.9 | SF-2 | 116.6 | 14.7 | 96.3 | +1.1 | P | |
| | | E 5440 | | | | | | | | | | | |
| SF 220 | | N 5160 | | | 112.7 | 15.3 | | | | 96.7 | +.6 | P | |
| | | E 5540 | | | | | | | | | | | |

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# SUMMARY SHEET
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PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 221 | 1-5-07 | N 585220 | 6 | N | 121.6 | 10.9 | SF-4 | 125.7 | 12.2 | 96.7 | -1.3 | P | |
| | | E 5650 | | | | | | | | | | | |
| SF 222 | | N 5160 | | | 122.1 | 11.1 | | | | 97.2 | -1.1 | P | |
| | | E 5720 | | | | | | | | | | | |
| SF 223 | | N 5120 | | | 110.8 | 13.5 | SF-2 | 116.6 | 14.7 | 95.1 | -1.2 | P | |
| | | E 5670 | | | | | | | | | | | |
| SF 224 | | N 5030 | | | 111.1 | 13.8 | | | | 95.3 | -.9 | P | |
| | | E 5640 | | | | | | | | | | | |
| SF 225 | | N 5070 | | | 113.7 | 13.6 | | | | 97.5 | -1.1 | P | |
| | | E 5730 | | | | | | | | | | | |
| SF 226 | | N 5060 | | | 113.8 | 13.1 | | | | 97.6 | -1.6 | P | |
| | | E 5540 | | | | | | | | | | | |
| SF 227 | | N 4990 | | | 111.3 | 15.0 | | | | 95.5 | +.3 | P | |
| | | E 5440 | | | | | | | | | | | |
| SF 228 | | N 4920 | | | 111.9 | 14.7 | | | | 96.0 | Ø | P | |
| | | E 5350 | | | | | | | | | | | |
| SF 229 | | N 4840 | | | 114.3 | 14.4 | | | | 98.1 | -.3 | P | |
| | | E 5240 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-230 | 1-11-07 | N 585060 | 7 | N | 108.3 | 14.2 | SF-2 | 116.6 | 14.7 | 92.9 | -.5 | F | See SF-230R1 |
| | | E 1504910 | | | | | | | | | | | |
| SF 230R1 | | N 5060 | | | 111.2 | 14.0 | | | | 95.4 | -.7 | P | Retest for SF 230 |
| | | E 4910 | | | | | | | | | | | |
| SF 231 | | N 5120 | | | 111.4 | 15.2 | | | | 95.5 | +.5 | P | |
| | | E 4990 | | | | | | | | | | | |
| SF 232 | | N 5190 | | | 112.7 | 15.8 | | | | 96.6 | +1.1 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 233 | | N 5260 | | | 111.7 | 16.0 | | | | 95.8 | +1.3 | P | |
| | | E 5170 | | | | | | | | | | | |
| SF 234 | | N 5350 | | | 120.7 | 13.2 | SF-4 | 125.7 | 12.2 | 96.0 | +1.0 | P | |
| | | E 5290 | | | | | | | | | | | |
| SF 235 | | N 5430 | | | 119.9 | 13.3 | | | | 96.4 | +1.1 | P | |
| | | E 5380 | | | | | | | | | | | |
| SF 236 | | N 5530 | | | 110.8 | 14.4 | SF-2 | 116.6 | 14.7 | 95.1 | -.3 | P | |
| | | E 5470 | | | | | | | | | | | |
| SF 237 | | N 5480 | | | 110.8 | 15.0 | | | | 95.0 | +.3 | P | |
| | | E 5530 | | | | | | | | | | | |
| SF 238 | | N 5410 | | | 119.8 | 14.1 | SF-4 | 125.7 | 12.2 | 95.3 | +1.9 | P | |
| | | E 5490 | | | | | | | | | | | |
| SF 239 | | N 5340 | | | 121.1 | 14.3 | | | | 96.3 | +2.1 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF 240 | | N 5230 | | | 110.8 | 15.0 | SF-2 | 116.6 | 14.7 | 95.0 | +.3 | P | |
| | | E 5280 | | | | | | | | | | | |

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PROJECT TITLE: CMS Landfill V Cell 2F

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COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 1/16/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 241 | 1-11-07 | N 585170 | 7 | N | 111.9 | 14.9 | SF-2 | 116.6 | 14.7 | 96.0 | +.2 | P | |
| | | E 1505190 | | | | | | | | | | | |
| SF 242 | | N 5090 | | | 111.9 | 15.6 | | | | 96.0 | +.9 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 243 | | N 4990 | | | 112.9 | 15.2 | | | | 96.9 | +.5 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 244 | | N 5060 | | | 112.4 | 15.7 | | | | 96.4 | +1.0 | P | |
| | | E 5180 | | | | | | | | | | | |
| SF 245 | | N 5130 | | | 111.6 | 15.9 | | | | 95.8 | +1.2 | P | |
| | | E 5270 | | | | | | | | | | | |
| SF 246 | | N 5210 | | | 112.9 | 16.0 | | | | 96.9 | +1.3 | P | |
| | | E 5340 | | | | | | | | | | | |
| SF 247 | | N 5270 | | | 113.5 | 15.2 | | | | 97.3 | +.5 | P | |
| | | E 5430 | | | | | | | | | | | |
| SF 248 | | N 5320 | | | 112.4 | 15.1 | | | | 96.4 | +.4 | P | |
| | | E 5490 | | | | | | | | | | | |
| SF 249 | | N 5370 | | | 111.4 | 14.9 | | | | 95.5 | +.2 | P | |
| | | E 5570 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 250 | 1-12-07 | N 585220 | 7 | N | 120.2 | 14.3 | SF-4 | 125.7 | 12.2 | 95.6 | +2.1 | P | |
| | | E 1505570 | | | | | | | | | | | |
| SF 251 | | N 5170 | | | 121.0 | 14.1 | | | | 96.3 | +1.9 | P | |
| | | E 5480 | | | | | | | | | | | |
| SF 252 | | N 5110 | | | 120.6 | 13.6 | | | | 95.9 | +1.4 | P | |
| | | E 5380 | | | | | | | | | | | |
| SF 253 | | N 5060 | | | 121.1 | 13.9 | | | | 96.3 | +1.7 | P | |
| | | E 5310 | | | | | | | | | | | |
| SF 254 | | N 5010 | | | 124.4 | 12.5 | | | | 99.0 | +.3 | P | |
| | | E 5220 | | | | | | | | | | | |
| SF 255 | | N 4930 | | | 124.1 | 13.4 | | | | 98.7 | +1.2 | P | |
| | | E 5130 | | | | | | | | | | | |
| SF 256 | | N 4870 | | | 120.7 | 14.0 | | | | 96.0 | +1.8 | P | |
| | | E 5040 | | | | | | | | | | | |
| SF 257 | | N 4810 | | | 121.4 | 14.7 | | | | 96.6 | +2.5 | P | |
| | | E 5110 | | | | | | | | | | | |
| SF 258 | | N 4910 | | | 112.0 | 16.6 | SF-2 | 116.6 | 14.7 | 96.1 | +1.9 | P | |
| | | E 5210 | | | | | | | | | | | |
| SF 259 | | N 4976 | | | 111.5 | 15.2 | | | | 95.6 | +.5 | P | |
| | | E 5330 | | | | | | | | | | | |
| SF 260 | | N 5020 | | | 112.3 | 15.0 | | | | 96.3 | +.3 | P | |
| | | E 5410 | | | | | | | | | | | |
| SF 261 | | N 5090 | | | 113.4 | 14.9 | | | | 97.3 | +.2 | P | |
| | | E 5510 | | | | | | | | | | | |

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# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

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PROJECT LOCATION: Charlotte, North Carolina

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REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 262 | 1-12-07 | N 585160 | 7 | N | 110.9 | 14.3 | SF-2 | 116.6 | 14.7 | 95.1 | -.4 | P | |
| | | E 1505580 | | | | | | | | | | | |
| SF 263 | | N 5220 | | | 111.7 | 14.0 | | | | 95.8 | -.7 | P | |
| | | E 5640 | | | | | | | | | | | |
| SF 264 | | N 5170 | | | 110.9 | 14.9 | | | | 95.1 | +.2 | P | |
| | | E 5720 | | | | | | | | | | | |
| SF 265 | | N 5110 | | | 111.4 | 15.2 | | | | 95.5 | +.5 | P | |
| | | E 5670 | | | | | | | | | | | |
| SF 266 | | N 5040 | | | 111.2 | 15.0 | | | | 95.4 | +.3 | P | |
| | | E 5610 | | | | | | | | | | | |
| SF 267 | | N 4990 | | | 111.6 | 15.2 | | | | 95.7 | +.5 | P | |
| | | E 5550 | | | | | | | | | | | |
| SF 268 | | N 4930 | | | 112.2 | 15.4 | | | | 96.2 | +.7 | P | |
| | | E 5460 | | | | | | | | | | | |
| SF 269 | | N 4890 | | | 113.1 | 15.1 | | | | 97.0 | +.4 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF 270 | | N 4830 | | | 112.2 | 15.9 | | | | 95.2 | +.2 | P | |
| | | E 5290 | | | | | | | | | | | |
| SF 271 | | N 4790 | | | 113.4 | 15.3 | | | | 97.2 | -.6 | P | |
| | | E 5190 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TB

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 272 | 1-15-07 | N 585050 | 8 | N | 114.1 | 14.3 | SF-2 | 116.6 | 14.7 | 97.9 | -.4 | P | |
| | | E 1504880 | | | | | | | | | | | |
| SF 273 | | N 4980 | | | 113.0 | 14.7 | | | | 96.9 | Ø | P | |
| | | E 4820 | | | | | | | | | | | |
| SF 274 | | N 4910 | | | 111.5 | 14.0 | | | | 95.6 | -.7 | P | |
| | | E 4710 | | | | | | | | | | | |
| SF 275 | | N 4830 | | | 112.3 | 13.9 | SF-4 | 125.7 | 12.2 | 96.3 | -.8 | P | |
| | | E 4650 | | | | | | | | | | | |
| SF 276 | | N 4770 | | | 115.2 | 12.6 | | | | 98.8 | -2.1 | P | |
| | | E 4670 | | | | | | | | | | | |
| SF 277 | | N 4840 | | | 114.7 | 13.9 | SF-2 | 116.6 | 14.7 | 98.3 | -.8 | P | |
| | | E 4760 | | | | | | | | | | | |
| SF 278 | | N 4960 | | | 112.5 | 14.1 | | | | 96.5 | -.6 | P | |
| | | E 4860 | | | | | | | | | | | |
| SF 279 | | N 4960 | | | 112.8 | 14.6 | | | | 96.8 | -.1 | P | |
| | | E 4940 | | | | | | | | | | | |
| SF 280 | | N 4860 | | | 112.2 | 15.0 | | | | 96.3 | +.3 | P | |
| | | E 4970 | | | | | | | | | | | |
| SF 281 | | N 4750 | | | 111.9 | 14.6 | | | | 95.9 | -.1 | P | |
| | | E 4950 | | | | | | | | | | | |
| SF 282 | | N 4670 | | | 121.9 | 14.3 | | | | 97.0 | +2.1 | P | |
| | | E 4920 | | | | | | | | | | | |
| SF 283 | | N 4740 | | | 121.1 | 14.5 | | | | 96.4 | +2.3 | P | |
| | | E 5040 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 284 | 1-15-07 | N 584750 | 9 | N | 112.8 | 15.8 | SF-2 | 116.6 | 14.7 | 96.7 | +1.1 | P | |
| | | E 1505060 | | | | | | | | | | | |
| SF 285 | | N 4680 | | | 112.7 | 15.4 | | | | 96.6 | +.7 | P | |
| | | E 4970 | | | | | | | | | | | |
| SF 286 | | N 4770 | | | 112.3 | 15.4 | | | | 96.3 | +.7 | P | |
| | | E 4910 | | | | | | | | | | | |
| SF 287 | | N 4840 | | | 112.3 | 14.8 | | | | 96.3 | +.1 | P | |
| | | E 4980 | | | | | | | | | | | |
| SF 288 | | N 4860 | | | 115.6 | 13.9 | | | | 99.2 | -.8 | P | |
| | | E 4870 | | | | | | | | | | | |
| SF 289 | | N 4930 | | | 113.8 | 14.6 | | | | 97.6 | -.1 | P | |
| | | E 4910 | | | | | | | | | | | |
| SF 290 | | N 4920 | | | 114.3 | 14.4 | | | | 98.0 | -.3 | P | |
| | | E 4810 | | | | | | | | | | | |
| SF 291 | | N 5010 | | | 112.9 | 14.8 | | | | 96.8 | +.1 | P | |
| | | E 4860 | | | | | | | | | | | |
| SF 292 | | N 4930 | | | 112.5 | 15.6 | | | | 96.5 | +.9 | P | |
| | | E 4730 | | | | | | | | | | | |
| SF 293 | | N 4880 | | | 115.7 | 12.9 | | | | 99.2 | -1.8 | P | |
| | | E 4630 | | | | | | | | | | | |
| SF 294 | | N 4790 | | | 113.3 | 14.2 | | | | 97.2 | -.5 | P | |
| | | E 4690 | | | | | | | | | | | |
| SF 295 | | N 4850 | | | 111.7 | 15.0 | | | | 95.8 | +.3 | P | |
| | | E 4790 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: [illegible]

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 296 | 1-16-07 | N 584690 | 10 | N | 122.1 | 10.5 | SF-4 | 125.7 | 12.2 | 97.1 | -1.7 | P | |
| | | E 1504980 | | | | | | | | | | | |
| SF 297 | | N 4750 | | | 122.1 | 11.1 | | | | 97.1 | -1.1 | P | |
| | | E 5090 | | | | | | | | | | | |
| SF 298 | | N 4790 | | | 121.4 | 10.7 | | | | 96.6 | -1.5 | P | |
| | | E 5190 | | | | | | | | | | | |
| SF 299 | | N 4850 | | | 122.7 | 10.9 | | | | 97.6 | -1.3 | P | |
| | | E 5290 | | | | | | | | | | | |
| SF 300 | | N 4930 | | | 113.1 | 14.8 | SF-2 | 116.6 | 14.7 | 97.0 | +.1 | P | |
| | | E 5220 | | | | | | | | | | | |
| SF 301 | | N 4850 | | | 113.2 | 14.3 | | | | 97.0 | -.4 | P | |
| | | E 5130 | | | | | | | | | | | |
| SF 302 | | N 4810 | | | 111.3 | 15.3 | | | | 95.4 | +.6 | P | |
| | | E 5010 | | | | | | | | | | | |
| SF 303 | | N 4760 | | | 112.8 | 14.8 | | | | 96.7 | +.1 | P | |
| | | E 4920 | | | | | | | | | | | |
| SF 304 | | N 4870 | | | 113.4 | 13.8 | | | | 97.3 | -.9 | P | |
| | | E 4930 | | | | | | | | | | | |
| SF 305 | | N 4930 | | | 114.2 | 14.2 | | | | 97.9 | -.5 | P | |
| | | E 5050 | | | | | | | | | | | |
| SF 306 | | N 4980 | | | 114.2 | 14.9 | | | | 97.9 | +.2 | P | |
| | | E 5150 | | | | | | | | | | | |
| SF 307 | | N 5050 | | | 113.2 | 12.9 | | | | 97.1 | -1.8 | P | |
| | | E 5220 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 308 | 1-16-07 | N 585060 | 10 | N | 120.4 | 12.3 | SF-4 | 125.7 | 12.2 | 95.8 | +.1 | P | |
| | ↓ | E 1505130 | ↓ | ↓ | | | ↓ | ↓ | ↓ | | | | |
| SF 309 | ↓ | N 5170 | ↓ | ↓ | 121.2 | 12.0 | ↓ | ↓ | ↓ | 96.4 | -.2 | P | |
| | | E 5190 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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# SUMMARY SHEET
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PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 310 | 1-17-07 | N 585060 | 10 | N | 113.9 | 12.9 | SF-2 | 116.6 | 14.7 | 97.7 | -1.8 | P | |
| | | E 1505030 | | | | | | | | | | | |
| SF 311 | | N 4980 | | | 114.4 | 13.1 | | | | 98.1 | -1.6 | P | |
| | | E 4980 | | | | | | | | | | | |
| SF 312 | | N 4890 | | | 116.0 | 12.8 | | | | 99.4 | -1.9 | P | |
| | | E 4870 | | | | | | | | | | | |
| SF 313 | | N 4950 | | | 113.9 | 12.6 | | | | 97.6 | -2.1 | P | |
| | | E 4810 | | | | | | | | | | | |
| SF 314 | | N 5010 | | | 116.6 | 11.4 | | | | 100.0 | -3.3 | P | |
| | | E 4780 | | | | | | | | | | | |
| SF 315 | | N 5030 | | | 113.0 | 13.0 | | | | 96.9 | -1.7 | P | |
| | | E 4860 | | | | | | | | | | | |
| SF 316 | | N 5070 | | | 113.8 | 11.5 | | | | 97.6 | -3.2 | P | |
| | | E 4930 | | | | | | | | | | | |
| SF 317 | | N 5120 | | | 112.1 | 13.6 | | | | 96.1 | -1.1 | P | |
| | | E 4990 | | | | | | | | | | | |
| SF 318 | | N 5170 | | | 113.0 | 12.7 | | | | 96.9 | -2.0 | P | |
| | | E 5060 | | | | | | | | | | | |
| SF 319 | | N 5220 | | | 114.0 | 12.4 | | | | 97.7 | -2.3 | P | |
| | | E 5110 | | | | | | | | | | | |
| SF 320 | | N 5300 | | | 115.9 | 13.4 | | | | 99.4 | -1.3 | P | |
| | | E 5190 | | | | | | | | | | | |
| SF 321 | | N 5330 | | | 114.8 | 13.8 | | | | 98.4 | -.9 | P | |
| | | E 5270 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: [illegible]

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 322 | 1-17-07 | N 585410 | 10 | N | 115.7 | 15.0 | SF-2 | 116.6 | 14.7 | 99.3 | +1.3 | P | |
| | | E 1505320 | | | | | | | | | | | |
| SF 323 | | N 5330 | | | 113.9 | 15.2 | | | | 97.7 | +1.5 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 324 | | N 5290 | | | 120.9 | 11.6 | SF-4 | 125.7 | 12.2 | 96.1 | -.6 | P | |
| | | E 5310 | | | | | | | | | | | |
| SF 325 | | N 5210 | | | 122.2 | 11.0 | | | | 97.2 | -1.2 | P | |
| | | E 5230 | | | | | | | | | | | |
| SF 326 | | N 5120 | | | 122.8 | 10.5 | | | | 97.7 | -1.7 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF 327 | | N 5190 | | | 114.2 | 13.9 | SF 2 | 116.6 | 14.7 | 98.0 | -.8 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF 328 | | N 5270 | | | 120.7 | 12.1 | SF 4 | 125.7 | 12.2 | 96.0 | -.1 | P | |
| | | E 5420 | | | | | | | | | | | |
| SF 329 | | N 4750 | 11 | | 122.1 | 12.0 | | | | 97.2 | -.2 | P | |
| | | E 5050 | | | | | | | | | | | |
| SF 330 | | N 4870 | | | 113.4 | 10.4 | SF-2 | 116.6 | 14.7 | 97.3 | -4.3 | P | |
| | | E 5090 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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| | | E | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 331 | 1-19-07 | N 585020 | 11 | N | 114.7 | 13.3 | SF-2 | 116.6 | 14.7 | 98.4 | -1.4 | P | |
| | | E 1505120 | | | | | | | | | | | |
| SF 332 | | N 5090 | | | 113.2 | 14.1 | | | | 97.1 | -.6 | P | |
| | | E 5210 | | | | | | | | | | | |
| SF 333 | | N 4990 | | | 114.4 | 15.0 | | | | 98.1 | +.3 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF 334 | | N 4940 | | | 114.1 | 14.5 | | | | 97.8 | -.2 | P | |
| | | E 5160 | | | | | | | | | | | |
| SF 335 | | N 5600 | 1 | | 114.4 | 15.1 | | | | 98.1 | +.4 | P | |
| | | E 5520 | | | | | | | | | | | |
| SF 336 | | N 5500 | | | 113.4 | 14.9 | | | | 97.2 | +.2 | P | |
| | | E 5540 | | | | | | | | | | | |
| SF 337 | | N 5410 | | | 110.9 | 15.9 | | | | 95.2 | +1.2 | P | |
| | | E 5590 | | | | | | | | | | | |
| SF 338 | | N 5310 | | | 112.8 | 14.3 | | | | 96.7 | -.4 | P | |
| | | E 5630 | | | | | | | | | | | |
| SF 339 | | N 5210 | | | 113.0 | 14.8 | | | | 96.9 | +.1 | P | |
| | | E 5690 | | | | | | | | | | | |
| SF 340 | | N 5130 | | | 112.9 | 15.3 | | | | 96.8 | +.6 | P | |
| | | E 5770 | | | | | | | | | | | |
| SF 341 | | N 5560 | 2 | | 113.3 | 15.4 | | | | 97.2 | +.7 | P | |
| | | E 5510 | | | | | | | | | | | |
| SF 342 | | N 5480 | | | 113.4 | 14.7 | | | | 97.3 | 0 | P | |
| | | E 5290 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 343 | 1-19-07 | N 585330 | 2 | N | 113.3 | 13.9 | SF-2 | 116.6 | 14.7 | 97.1 | -.8 | P | |
| | | E 1505620 | | | | | | | | | | | |
| SF 344 | | N 5270 | | | 112.4 | 14.2 | | | | 96.4 | -.5 | P | |
| | | E 5620 | | | | | | | | | | | |
| SF 345 | | N 5170 | | | 112.6 | 15.1 | | | | 96.6 | -.4 | P | |
| | | E 5730 | | | | | | | | | | | |
| SF 346 | | N 5090 | | | 112.8 | 15.8 | | | | 96.7 | -1.1 | P | |
| | | E 5790 | | | | | | | | | | | |
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# SUMMARY SHEET
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| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 347 | 1-23-07 | N 585030 | 11 | N | 120.2 | 13.1 | SF-4 | 125.7 | 12.2 | 95.6 | +.9 | P | |
| | | E 1505310 | | | | | | | | | | | |
| SF 348 | | N 5120 | | | 120.7 | 12.1 | | | | 96.0 | -.1 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF 349 | | N 5180 | | | 120.7 | 13.3 | | | | 96.0 | +1.1 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF 350 | | N 5220 | | | 120.9 | 12.3 | | | | 96.2 | +.1 | P | |
| | | E 5460 | | | | | | | | | | | |
| SF 351 | | N 5260 | | | 114.0 | 14.1 | SF-2 | 116.6 | 14.7 | 97.8 | -.6 | P | |
| | | E 5520 | | | | | | | | | | | |
| SF 352 | | N 5300 | | | 112.4 | 14.2 | | | | 96.4 | -.5 | P | |
| | | E 5610 | | | | | | | | | | | |
| SF 353 | | N 5210 | | | 113.5 | 14.8 | | | | 97.3 | +.1 | P | |
| | | E 5640 | | | | | | | | | | | |
| SF 354 | | N 5170 | | | 120.3 | 12.6 | SF-4 | 125.7 | 12.2 | 95.7 | +.4 | P | |
| | | E 5570 | | | | | | | | | | | |
| SF 355 | | N 5130 | | | 121.0 | 13.0 | | | | 96.2 | +.8 | P | |
| | | E 5490 | | | | | | | | | | | |
| SF 356 | | N 5090 | | | 113.3 | 15.3 | SF-2 | 116.6 | 14.7 | 96.9 | +.6 | P | |
| | | E 5390 | | | | | | | | | | | |
| SF 357 | | N 5580 | 3 | | 122.2 | 10.4 | SF-4 | 125.7 | 12.2 | 97.2 | -1.8 | P | |
| | | E 5530 | | | | | | | | | | | |
| SF 358 | | N 5500 | | | 120.9 | 11.8 | | | | 96.2 | -.4 | P | |
| | | E 5580 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF-359 | 1-23-07 | N 585400 | 3 | N | 112.9 | 13.2 | SF-2 | 116.6 | 14.7 | 96.8 | -1.5 | P | |
| | | E 1505620 | | | | | | | | | | | |
| SF 360 | | N 5280 | | | 113.8 | 12.7 | | | | 97.6 | -2.0 | P | |
| | | E 5690 | | | | | | | | | | | |
| SF 361 | | N 5200 | | | 115.4 | 11.8 | | | | 99.0 | -2.9 | P. | |
| | | E | | | | | | | | | | | |
| SF 362 | | N 5120 | | | 114.1 | 12.2 | | | | 97.8 | -2.5 | P | |
| | | E | | | | | | | | | | | |
| SF 363 | | N 5610 | 4 | | 115.7 | 11.0 | | | | 99.2 | -3.7 | P | |
| | | E | | | | | | | | | | | |
| SF 364 | | N 5520 | | | 114.7 | 11.3 | | | | 98.3 | -3.4 | P | |
| | | E | | | | | | | | | | | |
| SF 365 | | N 5420 | | | 121.4 | 10.2 | SF-4 | 125.7 | 12.2 | 96.5 | -2.0 | P | |
| | | E | | | | | | | | | | | |
| SF 366 | | N 5320 | | | 121.9 | 10.4 | | | | 97.0 | -1.8 | P | |
| | | E | | | | | | | | | | | |
| SF 367 | | N 5220 | | | 127.3 | 10.7 | SF-2 | 116.6 | 14.7 | 98.6 | -4.0 | P | |
| | | E | | | | | | | | | | | |
| SF 368 | | N 5130 | | | 112.7 | 13.4 | | | | 96.7 | -1.3 | P | |
| | | E 5750 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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COMPLETED BY: TS

REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 369 | 1-24-07 | N 585170 | 12 | N | 120.7 | 10.6 | SF-4 | 125.7 | 12.2 | 96.0 | -1.6 | P | |
| | | E 1505330 | | | | | | | | | | | |
| SF 370 | | N 5120 | | | 121.7 | 10.3 | | | | 96.8 | -1.9 | P | |
| | | E 5230 | | | | | | | | | | | |
| SF 371 | | N 5080 | | | 122.4 | 9.2 | | | | 97.4 | -3.0 | P | |
| | | E 5140 | | | | | | | | | | | |
| SF 372 | | N 5020 | | | 122.3 | 10.1 | | | | 97.3 | -2.1 | P | |
| | | E 5040 | | | | | | | | | | | |
| SF 373 | | N 4950 | | | 121.5 | 9.8 | | | | 96.7 | -2.4 | P | |
| | | E 4960 | | | | | | | | | | | |
| SF 374 | | N 4870 | | | 121.6 | 11.0 | | | | 96.8 | -1.2 | P | |
| | | E 4870 | | | | | | | | | | | |
| SF 375 | | N 4830 | | | 122.8 | 10.6 | | | | 97.7 | -1.6 | P | |
| | | E 4780 | | | | | | | | | | | |
| SF 376 | | N 4760 | | | 123.4 | 10.4 | | | | 98.1 | -1.8 | P | |
| | | E 4680 | | | | | | | | | | | |
| SF 377 | | N 4760 | | | 112.0 | 12.3 | SF-2 | 116.6 | 14.7 | 96.1 | -2.4 | P | |
| | | E 4780 | | | | | | | | | | | |
| SF 378 | | N 4770 | | | 112.6 | 12.5 | | | | 96.6 | -2.2 | P | |
| | | E 4880 | | | | | | | | | | | |
| SF 379 | | N 4850 | | | 120.7 | 11.3 | SF-4 | 125.7 | 12.2 | 96.0 | -.9 | P | |
| | | E 4960 | | | | | | | | | | | |
| SF 380 | | N 4920 | | | 121.6 | 11.1 | | | | 96.7 | -1.1 | P | |
| | | E 5060 | | | | | | | | | | | |

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# SUMMARY SHEET
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PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 381 | 1-24-07 | N 584980 | 12 | N | 123.2 | 10.1 | SF-4 | 125.7 | 12.2 | 98.0 | -2.1 | P | |
| | | E 1505160 | | | | | | | | | | | |
| SF 382 | | N 5020 | | | 122.6 | 9.9 | | | | 97.5 | -2.3 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF 383 | | N 5080 | | | 124.0 | 10.8 | | | | 98.7 | -1.4 | P | |
| | | E 5350 | | | | | | | | | | | |
| SF 384 | | N 4990 | | | 123.1 | 10.9 | | | | 97.9 | -1.3 | P | |
| | | E 5360 | | | | | | | | | | | |
| SF 385 | | N 4940 | | | 122.1 | 11.5 | | | | 97.1 | -.7 | P | |
| | | E 5280 | | | | | | | | | | | |
| SF 386 | | N 4890 | | | 122.6 | 11.4 | | | | 97.6 | -.8 | P | |
| | | E 5190 | | | | | | | | | | | |
| SF 387 | | N 4830 | | | 121.4 | 11.9 | | | | 96.6 | -.3 | P | |
| | | E 5080 | | | | | | | | | | | |
| SF 388 | | N 4760 | | | 122.9 | 11.2 | | | | 97.8 | -1.0 | P | |
| | | E 4980 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SE 389 | 1-25-07 | N 585310 | 12 | N | 121.5 | 10.8 | SE-4 | 125.7 | 12.2 | 96.6 | -1.4 | P | |
| | | E 1505220 | | | | | | | | | | | |
| SE 390 | | N 5280 | | | 122.6 | 10.4 | | | | 97.5 | -1.8 | P | |
| | | E 5150 | | | | | | | | | | | |
| SE 391 | | N 5210 | | | 121.6 | 12.0 | | | | 96.7 | -.2 | P | |
| | | E 5090 | | | | | | | | | | | |
| SE 392 | | N 5150 | | | 121.2 | 11.3 | | | | 96.4 | -.9 | P | |
| | | E 4980 | | | | | | | | | | | |
| SE 393 | | N 5090 | | | 122.5 | 10.4 | | | | 97.4 | -1.8 | P | |
| | | E 4890 | | | | | | | | | | | |
| SE 394 | | N 5010 | | | 122.4 | 10.2 | | | | 97.4 | -2.0 | P | |
| | | E 4790 | | | | | | | | | | | |
| SE 395 | | N 4940 | | | 121.9 | 10.5 | | | | 97.0 | -1.7 | P | |
| | | E 4720 | | | | | | | | | | | |
| SE 396 | | N 4970 | | | 113.7 | 12.9 | SE-2 | 116.6 | 14.7 | 97.5 | -1.8 | P | |
| | | E 4840 | | | | | | | | | | | |
| SE 397 | | N 5030 | | | 113.2 | 12.7 | | | | 97.1 | -2.0 | P | |
| | | E 4940 | | | | | | | | | | | |
| SE 398 | | N 5110 | | | 113.2 | 13.2 | | | | 97.1 | -1.5 | P | |
| | | E 5050 | | | | | | | | | | | |
| SE 399 | | N 5140 | | | 122.7 | 9.9 | SE-4 | 125.7 | 12.2 | 97.7 | -2.3 | P | |
| | | E 5140 | | | | | | | | | | | |
| SE 400 | | N 5210 | | | 123.0 | 10.8 | | | | 97.9 | -1.4 | P | |
| | | E 5220 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 401 | 1-26-07 | N 584920 | 12 | N | 110.8 | 12.1 | SF-2 | 116.6 | 14.7 | 95.1 | -2.6 | P | |
| | | E 1504660 | | | | | | | | | | | |
| SF 402 | | N 4830 | | | 111.8 | 12.3 | | | | 95.9 | -2.4 | P | |
| | | E 4610 | | | | | | | | | | | |
| SF 403 | | N 4740 | | | 112.0 | 11.8 | | | | 96.0 | -2.9 | P | |
| | | E 4750 | | | | | | | | | | | |
| SF 404 | | N 4680 | | | 112.3 | 12.2 | | | | 96.3 | -2.5 | P | |
| | | E 4630 | | | | | | | | | | | |
| SF 405 | | N 4680 | | | 116.3 | 13.4 | | | | 98.9 | -1.3 | P | |
| | | E 4980 | | | | | | | | | | | |
| SF 406 | | N 4740 | | | 121.7 | 10.7 | SF-4 | 125.7 | 12.2 | 96.8 | -1.5 | P | |
| | | E 5070 | | | | | | | | | | | |
| SF 407 | | N 4780 | | | 121.9 | 10.0 | | | | 97.0 | -2.2 | P | |
| | | E 5150 | | | | | | | | | | | |
| SF 408 | | N 4830 | | | 122.3 | 11.4 | | | | 97.3 | -.8 | P | |
| | | E 5250 | | | | | | | | | | | |
| SF 409 | | N 4880 | | | 115.3 | 12.9 | SF-2 | 116.6 | 14.7 | 98.9 | -1.8 | P | |
| | | E 5340 | | | | | | | | | | | |
| SF 410 | | N 4920 | | | 114.4 | 13.4 | | | | 98.1 | -1.3 | P | |
| | | E 5430 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 411 | 1-30-07 | N 585550 | 5 East Berm | N | 113.1 | 11.1 | SF-2 | 116.6 | 14.7 | 97.0 | -3.6 | P | |
| | | E 1505520 | | | | | | | | | | | |
| SF 412 | | N 5420 | | | 113.7 | 12.4 | | | | 97.5 | -2.3 | P | |
| | | E 5580 | | | | | | | | | | | |
| SF 413 | | N 5320 | | | 114.1 | 12.1 | | | | 97.9 | -2.6 | P | |
| | | E 5620 | | | | | | | | | | | |
| SF 414 | | N 5240 | | | 113.2 | 11.9 | | | | 97.1 | -2.8 | P | |
| | | E 5660 | | | | | | | | | | | |
| SF 415 | | N 5130 | | | 112.6 | 11.3 | | | | 96.6 | -3.4 | P | |
| | | E 5730 | | | | | | | | | | | |
| SF 416 | | N 5580 | 6 East Berm | | 113.2 | 11.0 | | | | 97.1 | -3.7 | P | |
| | | E 5530 | | | | | | | | | | | |
| SF 417 | | N 5490 | | | 115.1 | 12.8 | | | | 98.7 | -1.9 | P | |
| | | E 5590 | | | | | | | | | | | |
| SF 418 | | N 5390 | | | 114.3 | 12.4 | | | | 98.0 | -2.3 | P | |
| | | E 5630 | | | | | | | | | | | |
| SF 419 | | N 5290 | | | 113.2 | 12.7 | | | | 97.1 | -2.0 | P | |
| | | E 5690 | | | | | | | | | | | |
| SF 420 | | N 5190 | | | 114.9 | 12.1 | | | | 98.5 | -2.6 | P | |
| | | E 5370 | | | | | | | | | | | |
| SF 421 | | N 4410 | 1 West Berm | | 113.2 | 11.9 | | | | 97.1 | -2.8 | P | |
| | | E 4870 | | | | | | | | | | | |
| SF 422 | | N 4410 | 2 West Berm | | 112.4 | 12.3 | | | | 96.4 | -2.4 | P | |
| | | E 4850 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 423 | 1-30-07 | N 585510 | 7 | N | 113.2 | 14.8 | SF-2 | 116.6 | 14.7 | 97.0 | +.1 | P | |
| | | E 1505530 | | | | | | | | | | | |
| SF 424 | | N 5510 | | | 113.6 | 14.5 | | | | 97.4 | -.2 | P | |
| | | E 5410 | | | | | | | | | | | |
| SF 425 | | N 5310 | | | 113.3 | 14.1 | | | | 97.2 | -1.4 | P | |
| | | E 5630 | | | | | | | | | | | |
| SF 426 | | N 5200 | | | 112.7 | 13.8 | | | | 96.6 | -.9 | P | |
| | | E 5700 | | | | | | | | | | | |
| SF 427 | | N 5120 | | | 113.5 | 12.6 | | | | 97.3 | -2.1 | P | |
| | | E 5770 | | | | | | | | | | | |
| SF 428 | | N 5480 | 8 | | 113.4 | 12.9 | | | | 97.2 | -1.8 | P | |
| | | E 5580 | | | | | | | | | | | |
| SF 429 | | N 5360 | | | 120.3 | 11.2 | SF-4 | 125.7 | 12.2 | 95.7 | -1.0 | P | |
| | | E 5630 | | | | | | | | | | | |
| SF 430 | | N 5260 | | | 121.4 | 11.0 | | | | 96.5 | -1.2 | P | |
| | | E 5700 | | | | | | | | | | | |
| SF 431 | | N 5180 | | | 113.2 | 12.5 | SF-2 | 116.6 | 14.7 | 97.1 | -2.2 | P | |
| | | E 5730 | | | | | | | | | | | |
| SF 432 | | N 5110 | | | 114.0 | 13.3 | | | | 97.8 | -1.4 | P | |
| | | E 5810 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SE 433 | 1-31-07 | N 585580 | 9 | N | 122.0 | 9.6 | SE-4 | 125.7 | 12.2 | 97.0 | -2.6 | P | |
| | | E 1505500 | | | | | | | | | | | |
| SE 434 | | N 5430 | | | 122.0 | 10.1 | | | | 97.0 | -2.1 | P | |
| | | E 5570 | | | | | | | | | | | |
| SE 435 | | N 5310 | | | 114.6 | 11.1 | SE-2 | 116.6 | 14.7 | 98.3 | -3.6 | P | |
| | | E 5630 | | | | | | | | | | | |
| SE 436 | | N 5160 | | | 122.5 | 10.4 | SE-4 | 125.7 | 12.2 | 97.4 | -1.8 | P | |
| | | E 5730 | | | | | | | | | | | |
| SE 437 | | N 5530 | 10 | | 120.6 | 9.9 | | | | 95.9 | -2.3 | P | |
| | | E 5550 | | | | | | | | | | | |
| SE 438 | | N 5390 | | | 122.4 | 9.5 | | | | 97.4 | -2.7 | P | |
| | | E 5620 | | | | | | | | | | | |
| SE 439 | | N 5250 | | | 121.8 | 10.3 | | | | 96.9 | -1.9 | P | |
| | | E 5690 | | | | | | | | | | | |
| SE 440 | | N 5130 | | | 122.1 | 9.4 | | | | 97.2 | -2.8 | P | |
| | | E 5870 | | | | | | | | | | | |
| SE 441 | | N 5510 | 11 | | 121.4 | 9.8 | | | | 96.6 | -2.4 | P | |
| | | E 5530 | | | | | | | | | | | |
| SE 442 | | N 5390 | | | 121.9 | 10.0 | | | | 97.0 | -2.2 | P | |
| | | E 5590 | | | | | | | | | | | |
| SE 443 | | N 5230 | | | 114.6 | 11.9 | SE-2 | 116.2 | 14.7 | 98.3 | -2.8 | P | |
| | | E 5670 | | | | | | | | | | | |
| SE 444 | | N 5120 | | | 114.0 | 12.1 | | | | 97.8 | -2.6 | P | |
| | | E 5780 | | | | | | | | | | | |

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REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 445 | 1-31-07 | N 585580 | 12 | N | 122.8 | 10.6 | SF-4 | 125.7 | 12.2 | 97.7 | -1.5 | P | |
| | | E 1505530 | | | | | | | | | | | |
| SF 446 | | N 5460 | | | 120.4 | 11.6 | | | | 95.8 | -1.1 | P | |
| | | E 5590 | | | | | | | | | | | |
| SF 447 | | N 5320 | | | 121.3 | 9.6 | | | | 96.5 | -2.6 | P | |
| | | E 5660 | | | | | | | | | | | |
| SF 448 | | N 5190 | | | 121.1 | 10.5 | | | | 96.3 | -1.7 | P | |
| | | E 5730 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TB

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 449 | 2-5-07 | N 585600 | 13 | N | 124.9 | 11.4 | SF-4 | 125.7 | 12.2 | 99.4 | -.8 | P | |
| | | E 1505500 | | | | | | | | | | | |
| SF 450 | | N 5380 | | | 123.6 | 11.2 | | | | 98.3 | -1.0 | P | |
| | | E 5610 | | | | | | | | | | | |
| SF 451 | | N 5160 | | | 123.4 | 10.9 | | | | 98.1 | -1.3 | P | |
| | | E 5740 | | | | | | | | | | | |
| SF 452 | | N 5520 | 14 | | 123.9 | 10.1 | | | | 98.6 | -2.1 | P | |
| | | E 5550 | | | | | | | | | | | |
| SF 453 | | N 5290 | | | 123.1 | 11.7 | | | | 97.9 | -.5 | P | |
| | | E 5680 | | | | | | | | | | | |
| SF 454 | | N 5120 | | | 121.9 | 11.0 | | | | 97.0 | -1.2 | P | |
| | | E 5810 | | | | | | | | | | | |
| SF 455 | | N 4790 | 3 | | 113.3 | 12.6 | SF-2 | 116.6 | 14.7 | 97.2 | -2.1 | P | |
| | | E 4400 | | | | | | | | | | | |
| SF 456 | | N 4470 | 4 | | 111.9 | 12.9 | | | | 95.9 | -1.8 | P | |
| | | E 4380 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TB

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 457 | | N 585560 | 15 | N | 122.4 | 13.1 | SF-4 | 125.7 | 12.2 | 97.4 | +.9 | P | |
| | | E 1505520 | | | | | | | | | | | |
| SF 458 | | N 5330 | | | 121.3 | 12.5 | | | | 96.5 | +.3 | P | |
| | | E 5630 | | | | | | | | | | | |
| SF 459 | | N 5200 | | | 120.4 | 12.8 | | | | 95.8 | +.6 | P | |
| | | E 5920 | | | | | | | | | | | |
| SF 460 | | N 4850 | 5 | | 111.5 | 11.9 | SF-2 | 116.6 | 14.7 | 95.7 | -2.8 | P | |
| | | E 4430 | | | | | | | | | | | |
| SF 461 | | N 4840 | 6 | | 111.3 | 12.9 | | | | 95.5 | -1.8 | P | |
| | | E 4440 | | | | | | | | | | | |
| SF 462 | | N 4830 | 7 | | 110.9 | 13.0 | | | | 95.1 | -1.7 | P | |
| | | E 4420 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: DD

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 463 | 2-7-07 | N 584820 | 8 | N | 110.8 | 12.9 | SF-2 | 116.6 | 14.7 | 95.0 | -1.8 | P | |
| | | E 1504410 | | | | | | | | | | | |
| SF 464 | | N 4860 | 9 | | 111.5 | 13.4 | | | | 95.6 | -1.3 | P | |
| | | E 4410 | | | | | | | | | | | |
| SF 465 | | N 4870 | 10 | | 111.4 | 12.2 | | | | 95.5 | -2.5 | P | |
| | | E 4430 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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| | | E | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF 466 | 2-10-07 | N 584630 | 1 | N | 111.5 | 13.7 | SF-2 | 116.6 | 14.7 | 95.6 | -1.0 | P | |
| | | E 1504570 | | | | | | | | | | | |
| SF 467 | | N 4610 | 2 | | 112.1 | 14.1 | | | | 96.1 | -.6 | P | |
| | | E 4580 | | | | | | | | | | | |
| SF 468 | | N 4620 | 3 | | 111.0 | 13.4 | | | | 95.2 | -1.3 | P | |
| | | E 4590 | | | | | | | | | | | |
| SF 469 | | N 4640 | 4 | | 112.6 | 13.1 | | | | 96.5 | -1.6 | P | |
| | | E 4590 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

of NORTH CAROLINA, LLC

# APPENDIX E

## Preconstruction Testing

of NORTH CAROLINA, LLC

# SECTION E-1

## Laboratory Test Pad Bulk Sample Test Results

TIMELY ENGINEERING SOIL TESTS, LLC

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233 Fax: 770-923-8973
Cell: 678-612-6534
Web: www.test-llc.com

# Summary of Soil Testing (TP-Samples)

**Project Number:** 688

**Project Name:** CMS Landfill - Cell 2F

| T.E.S.T. Sample Number | Client Sample Number | USCS | UCS, psi | Moisture Content (%) | Grain Size Distribution | | | Atterberg Limits | | | Proctor | | Hydraulic Conductivity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | %Finer #4 Sieve | % Finer #200 Sieve | % Finer 0.005mm | L.L. % | P.L. % | P.I. % | Opt. M.C. % | Max.Dry. Density pcf | Initial M.C. % | Init.Dry Density pcf | Hydraulic Conduct. cm/sec |
| 2275 | TP-1 | - | - | - | 99.7 | 63.2 | 31.8 | 53 | 32 | 21 | 23.0 | 98.3 | 26.3 | 94.9 | 1.5E-06 |
| 2277 | TP-2 | - | - | - | 99.7 | 59.4 | 28.9 | 52 | 34 | 18 | 24.6 | 96.0 | 27.8 | 92.6 | 4.0E-06 |
| 2280 | TP-3 | - | - | - | 99.8 | 68.4 | 33.4 | 53 | 33 | 20 | 23.8 | 97.9 | 26.6 | 95.0 | 1.5E-06 |
| 2311 | TP-4 | - | - | - | 99.9 | 68.2 | 49.4 | 56 | 20 | 36 | 21.0 | 105.2 | 24.4 | 101.5 | 4.6E-08 |
| 2328 | TP-5 | - | - | - | 100.0 | 86.5 | 48.0 | 62 | 30 | 32 | 29.5 | 90.3 | 33.1 | 87.2 | 7.4E-07 |
| 2330 | TP-6 | - | - | - | 99.9 | 86.3 | 57.2 | 66 | 30 | 36 | 30.8 | 89.2 | 33.7 | 86.4 | 2.5E-07 |

Note: TP-1 to TP-3 are for the first test pad which was for an off-site borrow source.
TP-4 to TP-6 are for the second test pad which was for an on-site borrow source.

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/13/07 |
| Checked By | LB |

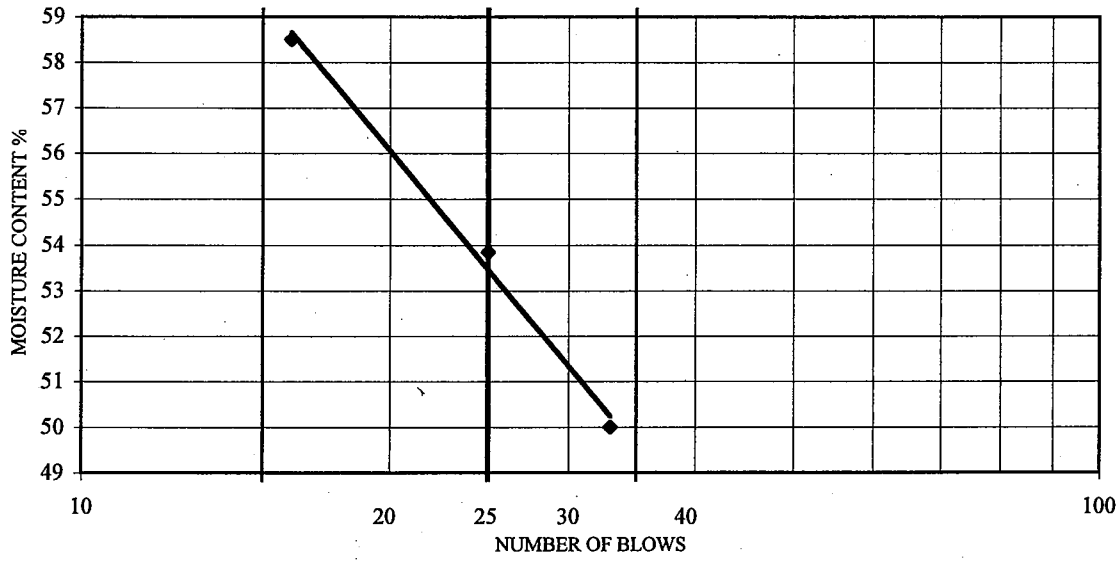
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2275/TP-1 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 1 | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| Number of Blows | 33 | 25 | 16 |
|---|---|---|---|
| Mass of Wet Sample & Tare, g | 34.56 | 34.50 | 33.66 |
| Mass of Dry Sample & Tare, g | 31.32 | 31.00 | 30.05 |
| Mass of Tare, g | 24.84 | 24.50 | 23.88 |
| Moisture Content, % | 50.00 | 53.85 | 58.51 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 31.03 | 31.89 |
| Mass of Dry Sample & Tare, g | 28.93 | 29.69 |
| Mass of Tare, g | 22.29 | 22.77 |
| Moisture Content, % | 31.63 | 31.79 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 721.50 |
| Mass of Dry Sample & Tare, g | 600.50 |
| Mass of Tare, g | 156.50 |
| Moisture Content, % | 27.25 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 53 |
| PLASTIC LIMIT (PL) | 32 |
| PLASTICITY INDEX (PI) | 21 |
| LIQUIDITY INDEX (LI) | -0.23 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | Tested By | RI |
| | | Date | 02/09/07 |
| | | Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2275/TP-1 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 1 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 721.50 |
| Mass of Dry Sample & Tare, g | 600.50 |
| Mass of Tare, g | 156.50 |
| Moisture Content, % | 27.3 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 419.55 |
| Mass of Dry Sample & Tare, g | 381.02 |
| Mass of Tare, g | 218.79 |
| Moisture Content, % | 23.8 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 21006.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 16974.51 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 69.39 |
| Dry Mass, g | 56.07 |
| % of Total Sample passing #4 sieve | 99.7 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| ve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | 0.00 | 0.0 | 100.0 |
| .75" | FINE GRAVEL | 19.09 | 0.1 | 99.9 |
| .5" | | 28.15 | 0.2 | 99.8 |
| .375" | | 41.56 | 0.2 | 99.8 |
| #4 | COARSE SAND | 50.90 | 0.3 | 99.7 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.47 | 98.9 |
| #20 | | 1.94 | 96.3 |
| #40 | FINE SAND | 5.37 | 90.2 |
| #60 | | 9.20 | 83.3 |
| #100 | | 14.26 | 74.3 |
| #200 | FINES | 20.53 | 63.2 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:15 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 8.7 |
| % COARSE GRAVEL | 0.1 | % FINE SAND | 27.0 |
| % FINE GRAVEL | 0.2 | % FINES | 63.2 |
| % COARSE SAND | 0.8 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 31.8 | % CLAY(<0.002mm) | 23.9 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/12/07 | 11:17 | 2 | 40.0 | 15.9 | 0.01414 | 7.0 | 33.0 | 10.9 | 0.99 | 0.0330 | 58.1 |
| 02/12/07 | 11:20 | 5 | 36.5 | 15.9 | 0.01414 | 7.0 | 29.5 | 11.5 | 0.99 | 0.0214 | 51.9 |
| 02/12/07 | 11:30 | 15 | 32.5 | 15.9 | 0.01414 | 7.0 | 25.5 | 12.1 | 0.99 | 0.0127 | 44.9 |
| 02/12/07 | 11:45 | 30 | 30.0 | 15.9 | 0.01414 | 7.0 | 23.0 | 12.6 | 0.99 | 0.0092 | 40.5 |
| 02/12/07 | 12:15 | 60 | 27.0 | 15.9 | 0.01414 | 7.0 | 20.0 | 13.1 | 0.99 | 0.0066 | 35.2 |
| 02/12/07 | 15:25 | 250 | 23.0 | 15.9 | 0.01414 | 7.0 | 16.0 | 13.7 | 0.99 | 0.0033 | 28.2 |
| 02/13/07 | 11:15 | 1440 | 19.5 | 15.9 | 0.01414 | 7.0 | 12.5 | 14.3 | 0.99 | 0.0014 | 22.0 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

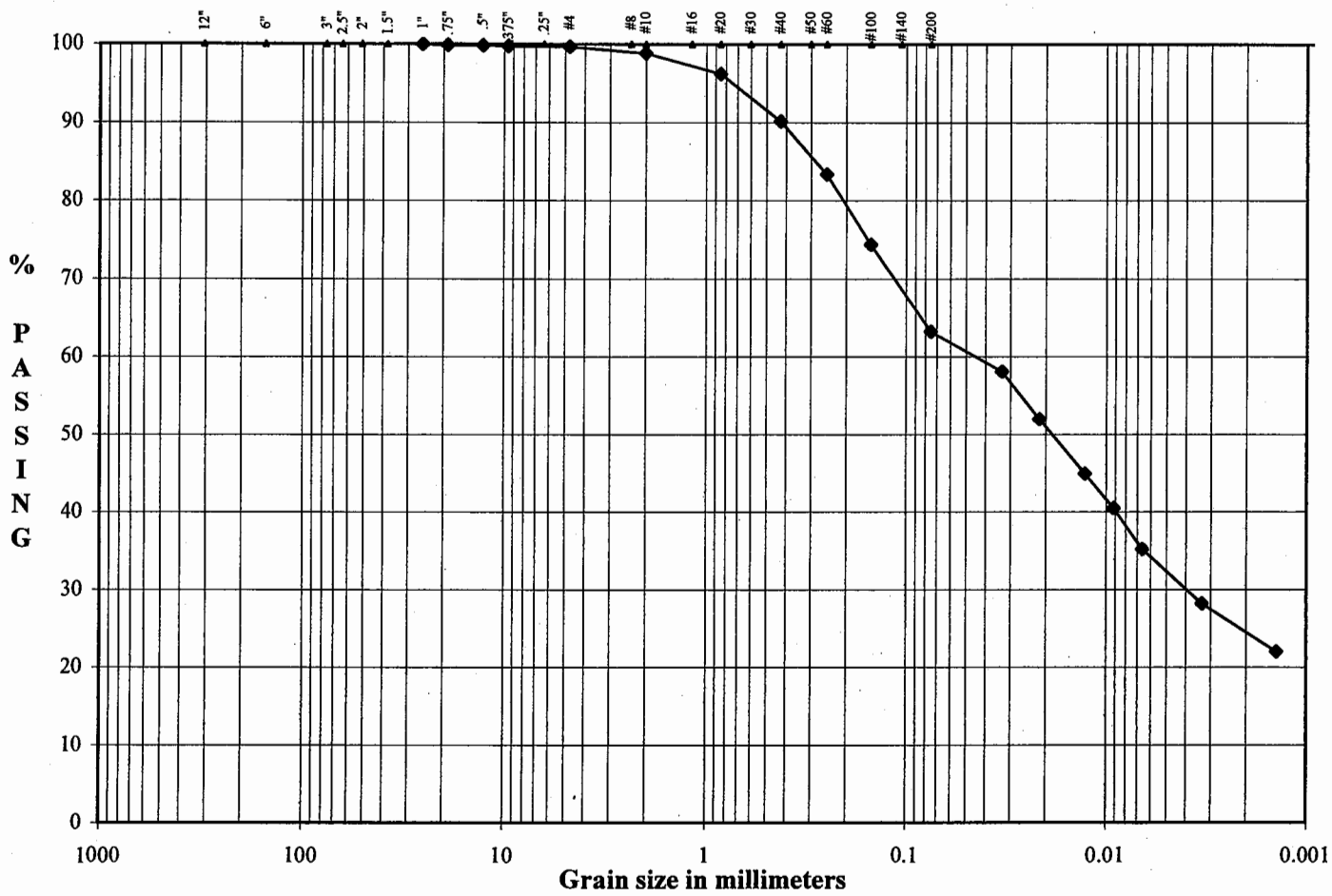
| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | Tested By | RI |
| | | Date | 02/09/07 |
| | | Checked By | [illegible] |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2275/TP-1 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 1 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel | | Sand | | | Fines |
|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt or Clay |

DESCRIPTION: NA

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

USCS (ASTM D2487; D2488): NA

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/09/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2275/TP-1 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 1 | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 21600.0 | 16974.2 |
| Mass of Mat. Retained on No. 4 sieve, g | 51.0 | 51.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.3 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.3 |

*MOISTURE CONTENT*

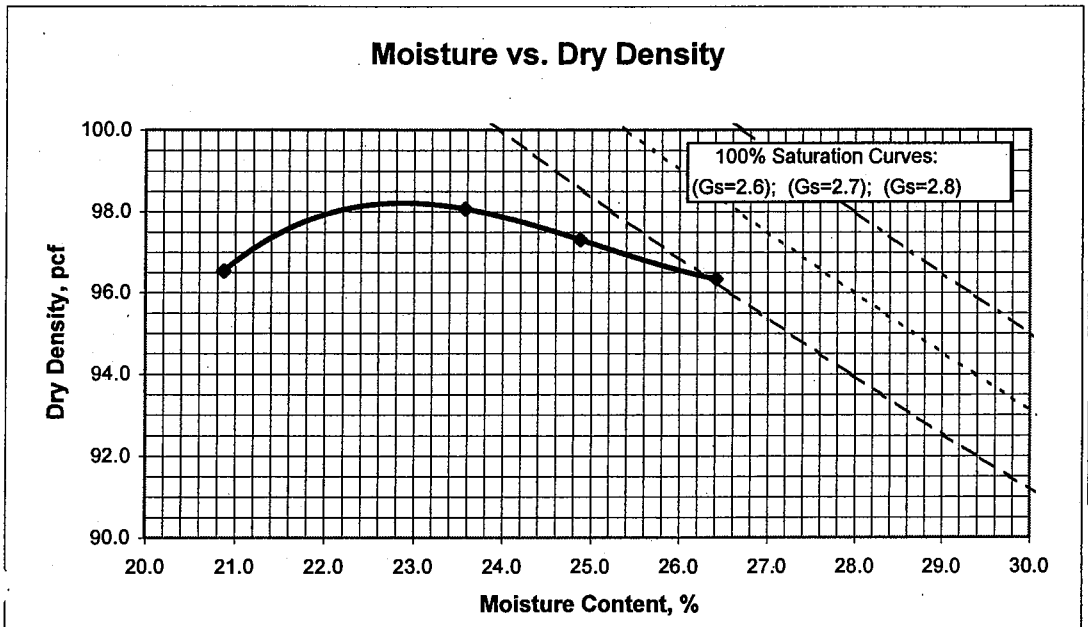
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 721.5 | 51.0 |
| Mass of Dry Sample & Tare, g | 600.5 | 51.0 |
| Mass of Tare, g | 156.5 | 0.0 |
| Moisture Content, % | 27.3 | 0.0 |

Procedure: A

TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5710.0 | 5778.0 | 5783.0 | 5787.0 | |
| Mass of Wet Sample & Tare, g | 625.0 | 600.5 | 613.0 | 614.0 | |
| Mass of Dry Sample & Tare, g | 536.5 | 503.0 | 511.0 | 504.5 | |
| Mass of Tare, g | 112.5 | 89.5 | 101.0 | 90.0 | |
| Moisture Content, % | 20.9 | 23.6 | 24.9 | 26.4 | |
| Wet Density, pcf | 116.7 | 121.2 | 121.5 | 121.8 | |
| Dry Density, pcf | 96.5 | 98.1 | 97.3 | 96.3 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 98.3 |
| **Optimum Moisture Content, %** | 23.0 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/13/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2275/TP-1 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.584 | in | 6.56 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 270.13 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 518.55 | g | 1.14 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 94.9 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 343.06 | g |
| Mass of dry sample & tare | 290.59 | g |
| Mass of tare | 90.90 | g |
| % Moisture | 26.3 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 7 | |
| Cell Number | 16 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 104.10 | cm |
| Min Head | 101.99 | cm |
| Maximum Gradient | 15.49 | |
| Minimum Gradient | 15.18 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.646 | in | 6.72 | cm |
| Average Diameter of Sample | | | 2.896 | in | 7.36 | cm |
| Area | 6.59 | $in^2$ | 42.50 | $cm^2$ | | |
| Volume | 285.61 | $cm^3$ | 0.0101 | $ft^3$ | | |
| Mass | 544.19 | g | 1.20 | lb | | |

| | | |
|---|---|---|
| Dry Density | 90.2 | pcf |
| Vol. of Voids | 132.73 | $cm^3$ |
| Vol. of Solids | 152.88 | $cm^3$ |
| Void Ratio | 0.87 | |
| Saturation | 99.0 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 656.38 | g |
| Mass of dry sample & tare | 525.06 | g |
| Mass of tare | 112.56 | g |
| % Moisture | 31.8 | |

| TIME FUNCTION DATE | HOUR | MIN | Δ t (sec) | READING (psi) | Head (cm) | Gradient | Temp. $T_x$( °C ) | PERMEABILITY (cm/sec) @ $T_x$ | $R_T$ | @ 20 °C | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/13/07 | 11 | 5 | - | 1.47 | 103.40 | 15.38 | 17.5 | - | - | - | |
| 02/13/07 | 11 | 10 | 300 | 1.45 | 101.99 | 15.18 | 17.5 | 1.38E-06 | 1.065 | 1.47E-06 | |
| 02/13/07 | 11 | 15 | 300 | 1.48 | 104.10 | 15.49 | 17.5 | 1.38E-06 | 1.065 | 1.46E-06 | |
| 02/13/07 | 11 | 20 | 300 | 1.46 | 102.70 | 15.28 | 17.5 | 1.37E-06 | 1.065 | 1.46E-06 | * |
| 02/13/07 | 11 | 25 | 300 | 1.48 | 104.10 | 15.49 | 17.5 | 1.37E-06 | 1.065 | 1.46E-06 | * |
| 02/13/07 | 11 | 30 | 300 | 1.47 | 103.40 | 15.38 | 17.5 | 1.37E-06 | 1.065 | 1.45E-06 | * |
| 02/13/07 | 11 | 35 | 300 | 1.48 | 104.10 | 15.49 | 17.5 | 1.37E-06 | 1.065 | 1.45E-06 | * |

Reported Average Hydraulic Conductivity* 1.5E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.5% of maximum dry density (standard proctor) at 3.3% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/13/07 |
| Checked By | LB |

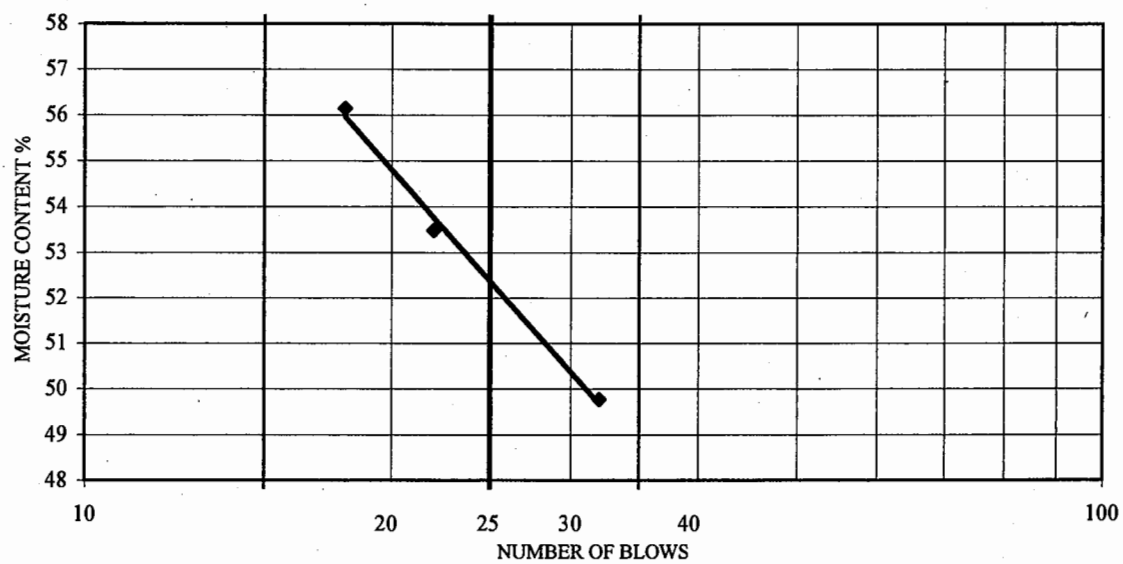
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2277/TP-2 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 2 | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 32 | 22 | 18 |
| Mass of Wet Sample & Tare, g | 33.13 | 34.53 | 35.24 |
| Mass of Dry Sample & Tare, g | 29.88 | 31.15 | 31.72 |
| Mass of Tare, g | 23.35 | 24.83 | 25.45 |
| Moisture Content, % | 49.77 | 53.48 | 56.14 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 31.00 | 32.05 |
| Mass of Dry Sample & Tare, g | 28.37 | 29.81 |
| Mass of Tare, g | 20.60 | 23.23 |
| Moisture Content, % | 33.85 | 34.04 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 708.00 |
| Mass of Dry Sample & Tare, g | 591.00 |
| Mass of Tare, g | 154.50 |
| Moisture Content, % | 26.80 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 52 |
| PLASTIC LIMIT (PL) | 34 |
| PLASTICITY INDEX (PI) | 18 |
| LIQUIDITY INDEX (LI) | -0.40 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

| | | | |
|---|---|---|---|
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| | | Date | 02/09/07 |
| | | Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2277/TP-2 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 2 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 708.00 |
| Mass of Dry Sample & Tare, g | 591.00 |
| Mass of Tare, g | 154.50 |
| Moisture Content, % | 26.8 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 465.33 |
| Mass of Dry Sample & Tare, g | 418.09 |
| Mass of Tare, g | 228.15 |
| Moisture Content, % | 24.9 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 21666.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 17350.70 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 69.32 |
| Dry Mass, g | 55.51 |
| % of Total Sample passing #4 sieve | 99.7 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| ve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | 0.00 | 0.0 | 100.0 |
| .75" | FINE GRAVEL | 9.25 | 0.1 | 99.9 |
| .5" | | 25.27 | 0.1 | 99.9 |
| .375" | | 29.68 | 0.2 | 99.8 |
| #4 | COARSE SAND | 48.37 | 0.3 | 99.7 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.23 | 99.3 |
| #20 | | 2.20 | 95.8 |
| #40 | FINE SAND | 5.96 | 89.0 |
| #60 | | 10.17 | 81.5 |
| #100 | | 15.71 | 71.5 |
| #200 | FINES | 22.47 | 59.4 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:17 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 10.3 |
| % COARSE GRAVEL | 0.1 | % FINE SAND | 29.7 |
| % FINE GRAVEL | 0.2 | % FINES | 59.4 |
| % COARSE SAND | 0.4 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 28.9 | % CLAY(<0.002mm) | 21.2 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/12/07 | 11:19 | 2 | 37.0 | 15.9 | 0.01414 | 7.0 | 30.0 | 11.4 | 0.99 | 0.0338 | 53.4 |
| 02/12/07 | 11:22 | 5 | 34.5 | 15.9 | 0.01414 | 7.0 | 27.5 | 11.8 | 0.99 | 0.0217 | 48.9 |
| 02/12/07 | 11:32 | 15 | 30.0 | 15.9 | 0.01414 | 7.0 | 23.0 | 12.6 | 0.99 | 0.0129 | 40.9 |
| 02/12/07 | 11:47 | 30 | 28.0 | 15.9 | 0.01414 | 7.0 | 21.0 | 12.9 | 0.99 | 0.0093 | 37.3 |
| 02/12/07 | 12:17 | 60 | 25.5 | 15.9 | 0.01414 | 7.0 | 18.5 | 13.3 | 0.99 | 0.0067 | 32.9 |
| 02/12/07 | 15:27 | 250 | 21.0 | 15.9 | 0.01414 | 7.0 | 14.0 | 14.1 | 0.99 | 0.0034 | 24.9 |
| 02/13/07 | 11:17 | 1440 | 18.0 | 15.9 | 0.01414 | 7.0 | 11.0 | 14.6 | 0.99 | 0.0014 | 19.6 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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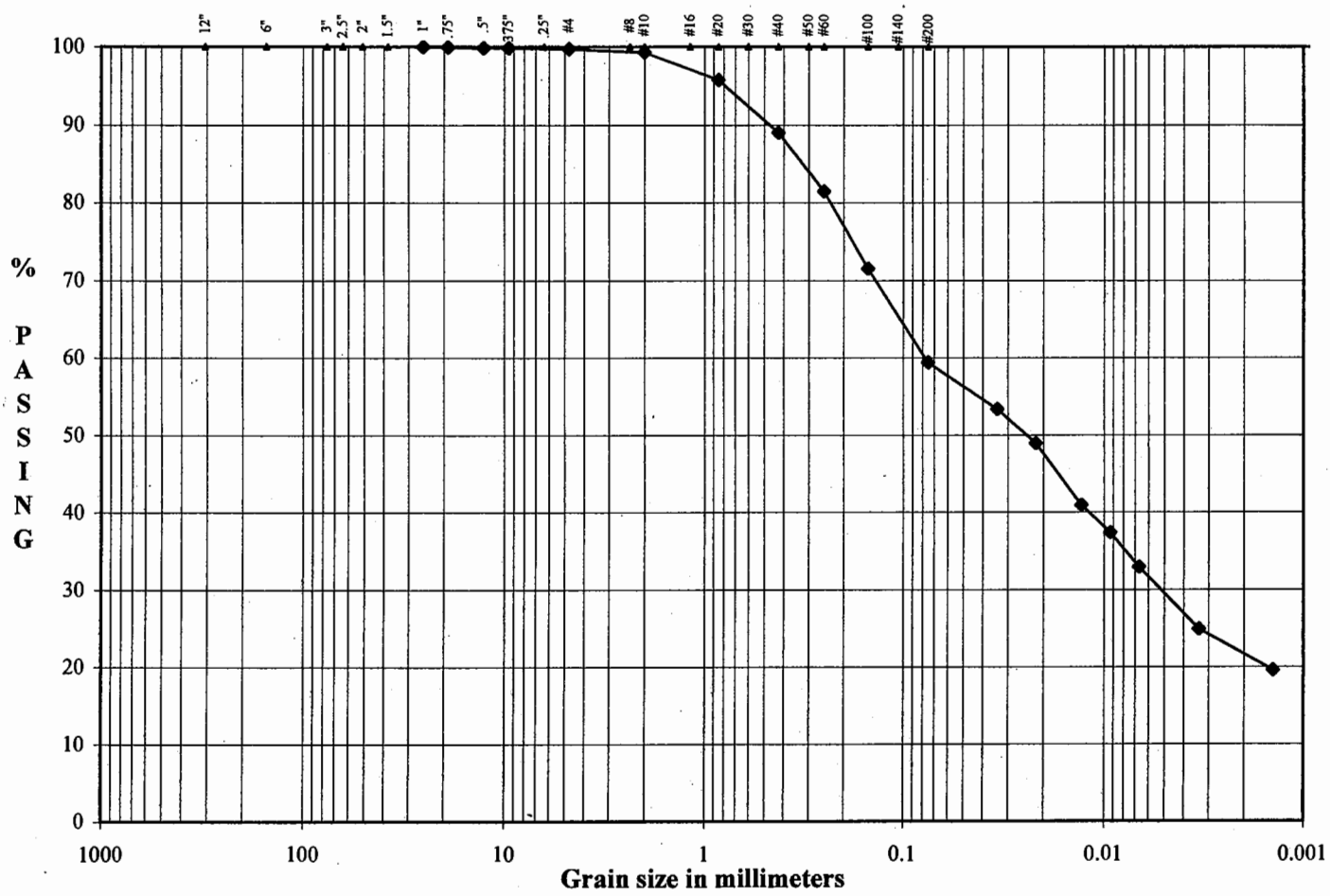
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2277/TP-2 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 2 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

DESCRIPTION: NA

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

USCS (ASTM D2487; D2488): NA

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| | |
|---|---|
| Tested By | KI |
| Date | 02/09/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2277/TP-2 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 2 | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 22000.0 | 17349.6 |
| Mass of Mat. Retained on No. 4 sieve, g | 48.4 | 48.4 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.3 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.3 |

*MOISTURE CONTENT*

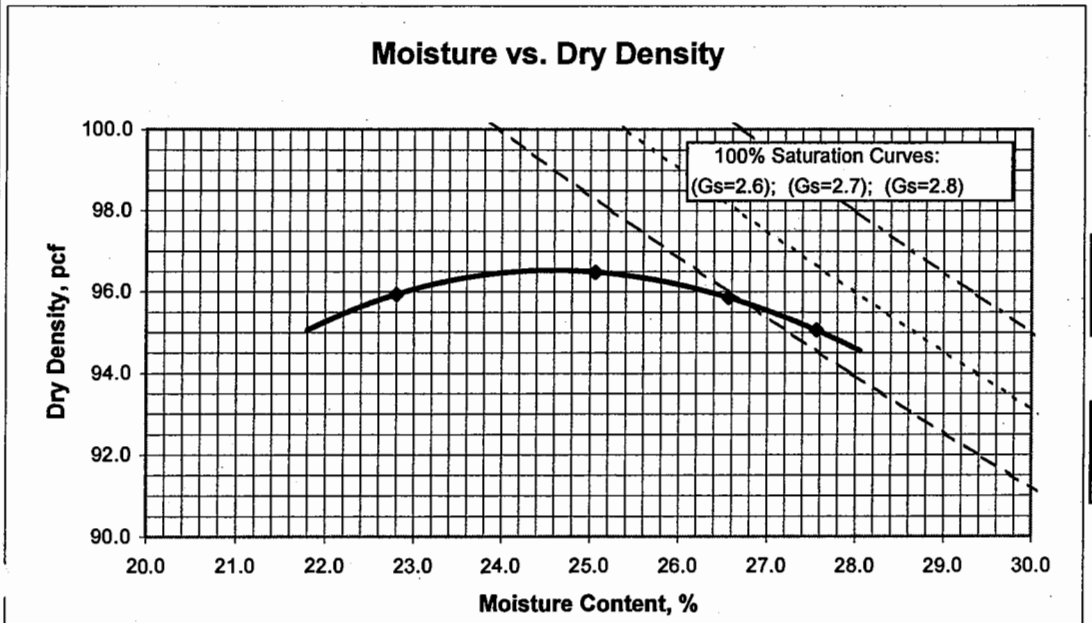
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 708.0 | 48.4 |
| Mass of Dry Sample & Tare, g | 591.0 | 48.4 |
| Mass of Tare, g | 154.5 | 0.0 |
| Moisture Content, % | 26.8 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5727.0 | 5770.0 | 5780.0 | 5779.0 | |
| Mass of Wet Sample & Tare, g | 612.0 | 618.5 | 619.0 | 613.5 | |
| Mass of Dry Sample & Tare, g | 516.0 | 512.0 | 509.0 | 500.5 | |
| Mass of Tare, g | 95.0 | 87.0 | 95.0 | 90.5 | |
| Moisture Content, % | 22.8 | 25.1 | 26.6 | 27.6 | |
| Wet Density, pcf | 117.8 | 120.7 | 121.3 | 121.3 | |
| Dry Density, pcf | 95.9 | 96.5 | 95.9 | 95.1 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 96.0 |
| **Optimum Moisture Content, %** | 24.6 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/13/07 |
| Checked By | CAS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2277/TP-2 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.585 | in | 6.57 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 270.23 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 512.64 | g | 1.13 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 92.6 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 330.56 | g |
| Mass of dry sample & tare | 280.48 | g |
| Mass of tare | 100.48 | g |
| % Moisture | 27.8 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 8 | |
| Cell Number | 15 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.96 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 37.98 | cm |
| Min Head | 37.98 | cm |
| Maximum Gradient | 5.66 | |
| Minimum Gradient | 5.66 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.642 | in | 6.71 | cm |
| Average Diameter of Sample | | | 2.894 | in | 7.35 | cm |
| Area | 6.58 | $in^2$ | 42.44 | $cm^2$ | | |
| Volume | 284.79 | $cm^3$ | 0.0101 | $ft^3$ | | |
| Mass | 537.20 | g | 1.18 | lb | | |

| | | |
|---|---|---|
| Dry Density | 87.9 | pcf |
| Vol. of Voids | 136.15 | $cm^3$ |
| Vol. of Solids | 148.63 | $cm^3$ |
| Void Ratio | 0.92 | |
| Saturation | 99.8 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 622.27 | g |
| Mass of dry sample & tare | 486.45 | g |
| Mass of tare | 85.33 | g |
| % Moisture | 33.9 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/13/07 | 11 | 5 | - | 0.54 | 37.98 | 5.66 | 17.5 | - | - | - | |
| 02/13/07 | 11 | 10 | 300 | 0.54 | 37.98 | 5.66 | 17.5 | 3.73E-06 | 1.065 | 3.97E-06 | |
| 02/13/07 | 11 | 15 | 300 | 0.54 | 37.98 | 5.66 | 17.5 | 3.73E-06 | 1.065 | 3.97E-06 | |
| 02/13/07 | 11 | 20 | 300 | 0.54 | 37.98 | 5.66 | 17.5 | 3.73E-06 | 1.065 | 3.97E-06 | * |
| 02/13/07 | 11 | 25 | 300 | 0.54 | 37.98 | 5.66 | 17.5 | 3.73E-06 | 1.065 | 3.97E-06 | * |
| 02/13/07 | 11 | 30 | 300 | 0.54 | 37.98 | 5.66 | 17.5 | 3.73E-06 | 1.065 | 3.97E-06 | * |
| 02/13/07 | 11 | 35 | 300 | 0.54 | 37.98 | 5.66 | 17.5 | 3.73E-06 | 1.065 | 3.97E-06 | * |

Reported Average Hydraulic Conductivity* 4.0E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.5% of maximum dry density (standard proctor) at 3.2% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

| | | | |
|---|---|---|---|
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| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2280/TP-3 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 3 | Add. Info | - |

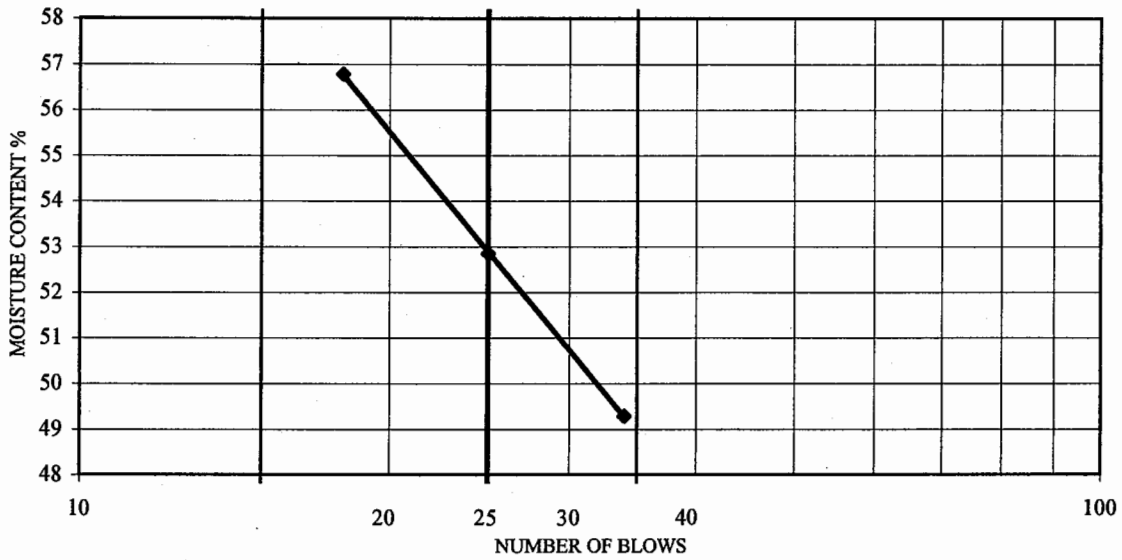
**ASTM D 4318/AASHTO T 88, T 89**

**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 34 | 25 | 18 |
| Mass of Wet Sample & Tare, g | 38.78 | 33.31 | 34.90 |
| Mass of Dry Sample & Tare, g | 35.66 | 30.25 | 31.30 |
| Mass of Tare, g | 29.33 | 24.46 | 24.96 |
| Moisture Content, % | 49.29 | 52.85 | 56.78 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 30.84 | 28.64 |
| Mass of Dry Sample & Tare, g | 28.59 | 26.14 |
| Mass of Tare, g | 21.78 | 18.55 |
| Moisture Content, % | 33.04 | 32.94 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 921.00 |
| Mass of Dry Sample & Tare, g | 766.50 |
| Mass of Tare, g | 153.00 |
| Moisture Content, % | 25.18 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 53 |
| PLASTIC LIMIT (PL) | 33 |
| PLASTICITY INDEX (PI) | 20 |
| LIQUIDITY INDEX (LI) | -0.39 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/12/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2280/TP-3 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 3 | Add. Info | - |

**ASTM D 422/AASHTO T 88**
**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 921.00 |
| Mass of Dry Sample & Tare, g | 766.50 |
| Mass of Tare, g | 153.00 |
| Moisture Content, % | 25.2 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 388.54 |
| Mass of Dry Sample & Tare, g | 334.12 |
| Mass of Tare, g | 108.44 |
| Moisture Content, % | 24.1 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 22406.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 18052.79 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 70.10 |
| Dry Mass, g | 56.48 |
| % of Total Sample passing #4 sieve | 99.8 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| ve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | 0.00 | 0.0 | 100.0 |
| .5" | | 25.46 | 0.1 | 99.9 |
| .375" | | 32.96 | 0.2 | 99.8 |
| #4 | COARSE SAND | 42.05 | 0.2 | 99.8 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.10 | 99.6 |
| #20 | | 1.49 | 97.1 |
| #40 | FINE SAND | 5.07 | 90.8 |
| #60 | | 8.75 | 84.3 |
| #100 | | 12.82 | 77.1 |
| #200 | FINES | 17.78 | 68.4 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 9:15 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 8.8 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 22.5 |
| % FINE GRAVEL | 0.2 | % FINES | 68.4 |
| % COARSE SAND | 0.2 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 33.4 | % CLAY(<0.002mm) | 26.8 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/14/07 | 9:17 | 2 | 41.5 | 15.9 | 0.01414 | 7.0 | 34.5 | 10.7 | 0.99 | 0.0326 | 60.3 |
| 02/14/07 | 9:20 | 5 | 37.5 | 15.9 | 0.01414 | 7.0 | 30.5 | 11.3 | 0.99 | 0.0213 | 53.3 |
| 02/14/07 | 9:30 | 15 | 33.5 | 15.9 | 0.01414 | 7.0 | 26.5 | 12.0 | 0.99 | 0.0126 | 46.3 |
| 02/14/07 | 9:45 | 30 | 30.5 | 15.9 | 0.01414 | 7.0 | 23.5 | 12.5 | 0.99 | 0.0091 | 41.1 |
| 02/14/07 | 10:15 | 60 | 28.0 | 15.9 | 0.01414 | 7.0 | 21.0 | 12.9 | 0.99 | 0.0066 | 36.7 |
| 02/14/07 | 13:25 | 250 | 24.0 | 15.9 | 0.01414 | 7.0 | 17.0 | 13.6 | 0.99 | 0.0033 | 29.7 |
| 02/15/07 | 9:15 | 1440 | 21.5 | 15.9 | 0.01414 | 7.0 | 14.5 | 14.0 | 0.99 | 0.0014 | 25.4 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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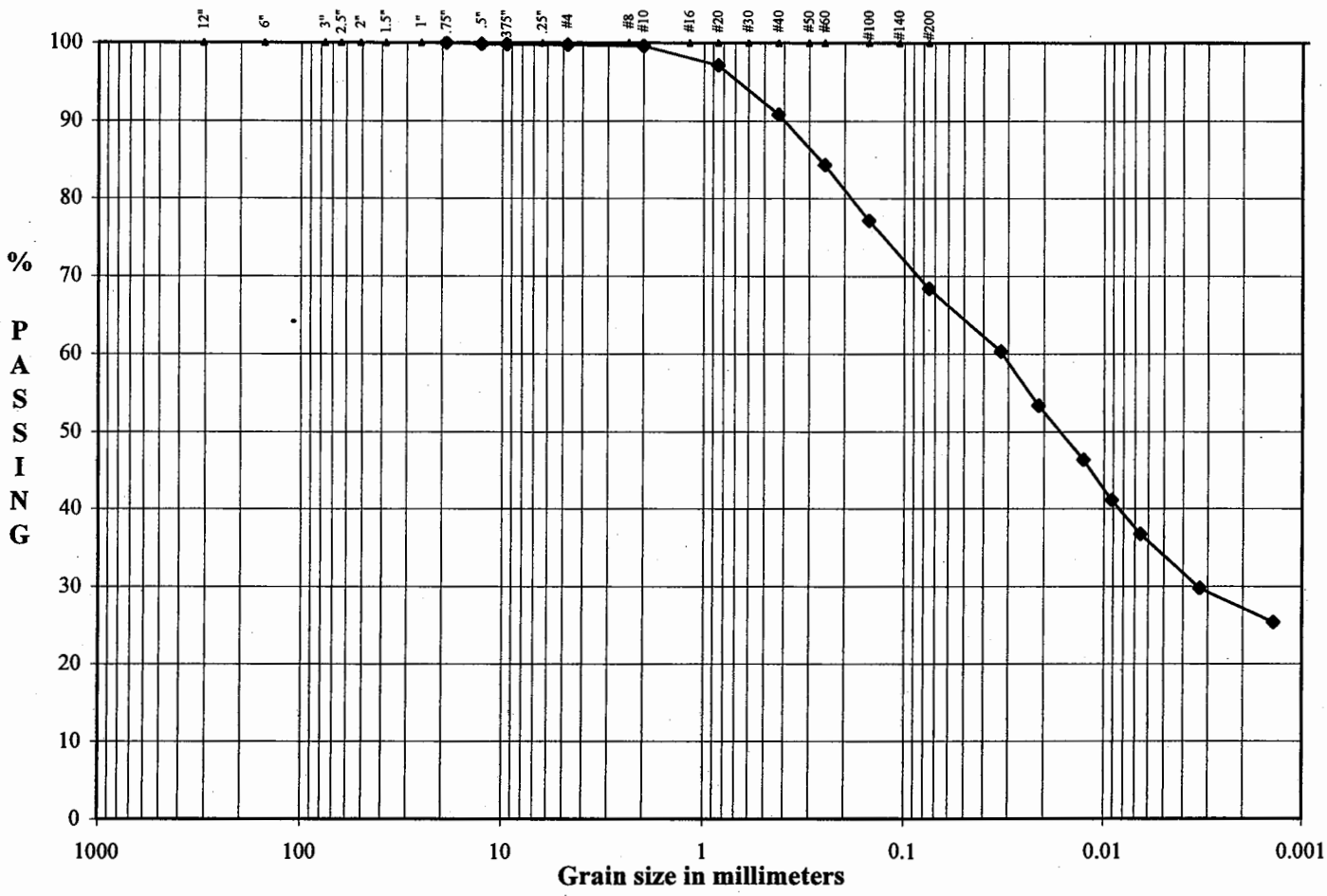
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2280/TP-3 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 3 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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AAP AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/12/07 |
| Checked By | VS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2280/TP-3 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 3 | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 22600.0 | 18053.5 |
| Mass of Mat. Retained on No. 4 sieve, g | 42.1 | 42.1 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.2 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.2 |

*MOISTURE CONTENT*

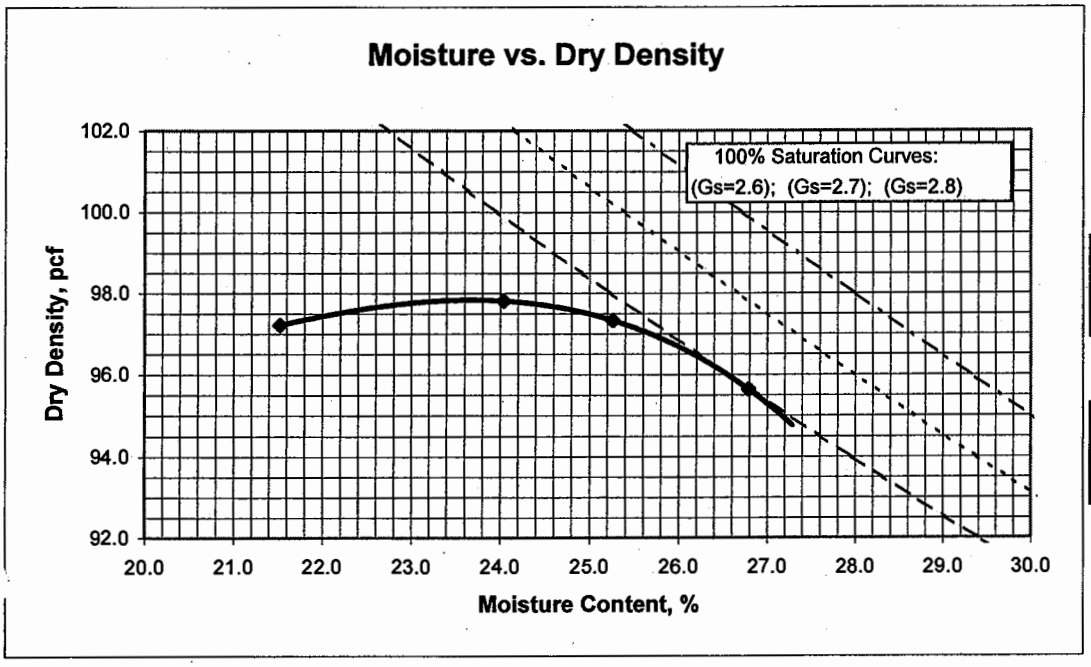
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 921.0 | 42.1 |
| Mass of Dry Sample & Tare, g | 766.5 | 42.1 |
| Mass of Tare, g | 153.0 | 0.0 |
| Moisture Content, % | 25.2 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5732.0 | 5780.0 | 5789.0 | 5779.0 | |
| Mass of Wet Sample & Tare, g | 615.0 | 623.5 | 616.5 | 626.5 | |
| Mass of Dry Sample & Tare, g | 522.0 | 520.0 | 510.5 | 512.5 | |
| Mass of Tare, g | 90.0 | 89.5 | 91.0 | 87.0 | |
| Moisture Content, % | 21.5 | 24.0 | 25.3 | 26.8 | |
| Wet Density, pcf | 118.1 | 121.3 | 121.9 | 121.3 | |
| Dry Density, pcf | 97.2 | 97.8 | 97.3 | 95.6 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 97.9 |
| **Optimum Moisture Content, %** | 23.8 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/14/07 |
| Checked By | VB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2280/TP-3 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.577 | in | 6.55 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.40 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 519.06 | g | 1.14 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 95.0 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 299.98 | g |
| Mass of dry sample & tare | 256.95 | g |
| Mass of tare | 95.19 | g |
| % Moisture | 26.6 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 5 | |
| Cell Number | 6 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 113.95 | cm |
| Min Head | 112.54 | cm |
| Maximum Gradient | 17.06 | |
| Minimum Gradient | 16.85 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.629 | in | 6.68 | cm |
| Average Diameter of Sample | | | 2.886 | in | 7.33 | cm |
| Area | 6.54 | $in^2$ | 42.20 | $cm^2$ | | |
| Volume | 281.82 | $cm^3$ | 0.0100 | $ft^3$ | | |
| Mass | 538.99 | g | 1.19 | lb | | |

| | | |
|---|---|---|
| Dry Density | 90.7 | pcf |
| Vol. of Voids | 130.11 | $cm^3$ |
| Vol. of Solids | 151.71 | $cm^3$ |
| Void Ratio | 0.86 | |
| Saturation | 99.4 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 634.32 | g |
| Mass of dry sample & tare | 504.96 | g |
| Mass of tare | 95.38 | g |
| % Moisture | 31.6 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/14/07 | 10 | 30 | - | 1.62 | 113.95 | 17.06 | 16.5 | - | - | - | |
| 02/14/07 | 10 | 35 | 300 | 1.61 | 113.25 | 16.96 | 16.5 | 1.25E-06 | 1.093 | 1.36E-06 | |
| 02/14/07 | 10 | 40 | 300 | 1.60 | 112.54 | 16.85 | 16.5 | 1.26E-06 | 1.093 | 1.37E-06 | |
| 02/14/07 | 10 | 45 | 300 | 1.61 | 113.25 | 16.96 | 16.5 | 1.26E-06 | 1.093 | 1.37E-06 | * |
| 02/14/07 | 10 | 50 | 300 | 1.62 | 113.95 | 17.06 | 16.5 | 1.25E-06 | 1.093 | 1.36E-06 | * |
| 02/14/07 | 10 | 55 | 300 | 1.62 | 113.95 | 17.06 | 16.5 | 1.24E-06 | 1.093 | 1.36E-06 | * |
| 02/14/07 | 11 | 0 | 300 | 1.62 | 113.95 | 17.06 | 16.5 | 1.24E-06 | 1.093 | 1.36E-06 | * |

Reported Average Hydraulic Conductivity* 1.4E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 97.0% of maximum dry density (standard proctor) at 2.8% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/26/07 |
| Checked By | LB |

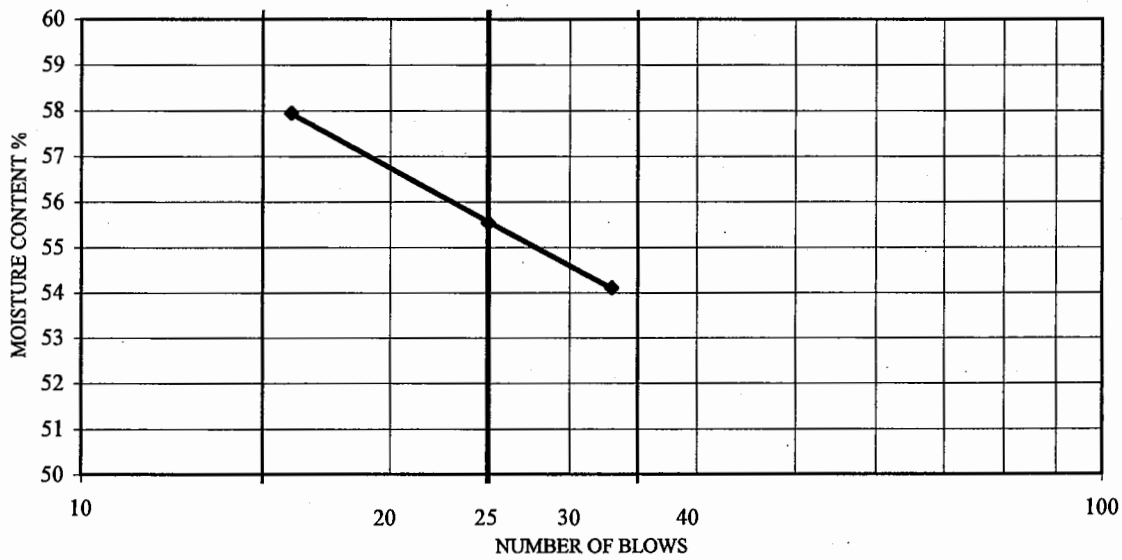
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2311/TP-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 33 | 25 | 16 |
| Mass of Wet Sample & Tare, g | 34.02 | 34.25 | 38.98 |
| Mass of Dry Sample & Tare, g | 30.46 | 30.89 | 35.44 |
| Mass of Tare, g | 23.88 | 24.84 | 29.33 |
| Moisture Content, % | 54.10 | 55.54 | 57.94 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 30.18 | 26.48 |
| Mass of Dry Sample & Tare, g | 28.65 | 25.14 |
| Mass of Tare, g | 20.88 | 18.34 |
| Moisture Content, % | 19.69 | 19.71 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 951.0 |
| Mass of Dry Sample & Tare, g | 797.1 |
| Mass of Tare, g | 156.5 |
| Moisture Content, % | 24.03 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 56 |
| PLASTIC LIMIT (PL) | 20 |
| PLASTICITY INDEX (PI) | 36 |
| LIQUIDITY INDEX (LI) | 0.11 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

| | | | |
|---|---|---|---|
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| | | Date | 02/20/07 |
| | | Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2311/TP-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 951.0 |
| Mass of Dry Sample & Tare, g | 797.1 |
| Mass of Tare, g | 156.5 |
| Moisture Content, % | 24.0 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 373.33 |
| Mass of Dry Sample & Tare, g | 351.23 |
| Mass of Tare, g | 108.35 |
| Moisture Content, % | 9.1 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 14073.00 |
| Mass of Tare, g | |
| Total Mass of Dry Sample, g | 12899.28 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 67.40 |
| Dry Mass, g | 61.78 |
| % of Total Sample passing #4 sieve | 99.9 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| ve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | | 0.0 | 100.0 |
| .5" | | 0.00 | 0.0 | 100.0 |
| .375" | | 3.17 | 0.0 | 100.0 |
| #4 | COARSE SAND | 11.56 | 0.1 | 99.9 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.47 | 99.2 |
| #20 | | 1.58 | 97.4 |
| #40 | FINE SAND | 3.83 | 93.7 |
| #60 | | 7.55 | 87.7 |
| #100 | | 13.29 | 78.4 |
| #200 | FINES | 19.58 | 68.2 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 10:25 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 5.4 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 25.5 |
| % FINE GRAVEL | 0.1 | % FINES | 68.2 |
| % COARSE SAND | 0.8 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 49.4 | % CLAY(<0.002mm) | 43.5 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/23/07 | 10:27 | 2 | 45.0 | 19.0 | 0.01361 | 7.0 | 38.0 | 10.1 | 0.99 | 0.0305 | 60.8 |
| 02/23/07 | 10:30 | 5 | 43.5 | 19.0 | 0.01361 | 7.0 | 36.5 | 10.3 | 0.99 | 0.0196 | 58.4 |
| 02/23/07 | 10:40 | 15 | 42.0 | 19.0 | 0.01361 | 7.0 | 35.0 | 10.6 | 0.99 | 0.0114 | 56.0 |
| 02/23/07 | 10:55 | 30 | 40.0 | 19.0 | 0.01361 | 7.0 | 33.0 | 10.9 | 0.99 | 0.0082 | 52.8 |
| 02/23/07 | 11:25 | 60 | 39.0 | 19.0 | 0.01361 | 7.0 | 32.0 | 11.1 | 0.99 | 0.0058 | 51.2 |
| 02/23/07 | 14:35 | 250 | 35.0 | 19.0 | 0.01361 | 7.0 | 28.0 | 11.7 | 0.99 | 0.0029 | 44.8 |
| 02/24/07 | 10:25 | 1440 | 33.5 | 19.0 | 0.01361 | 7.0 | 26.5 | 12.0 | 0.99 | 0.0012 | 42.4 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

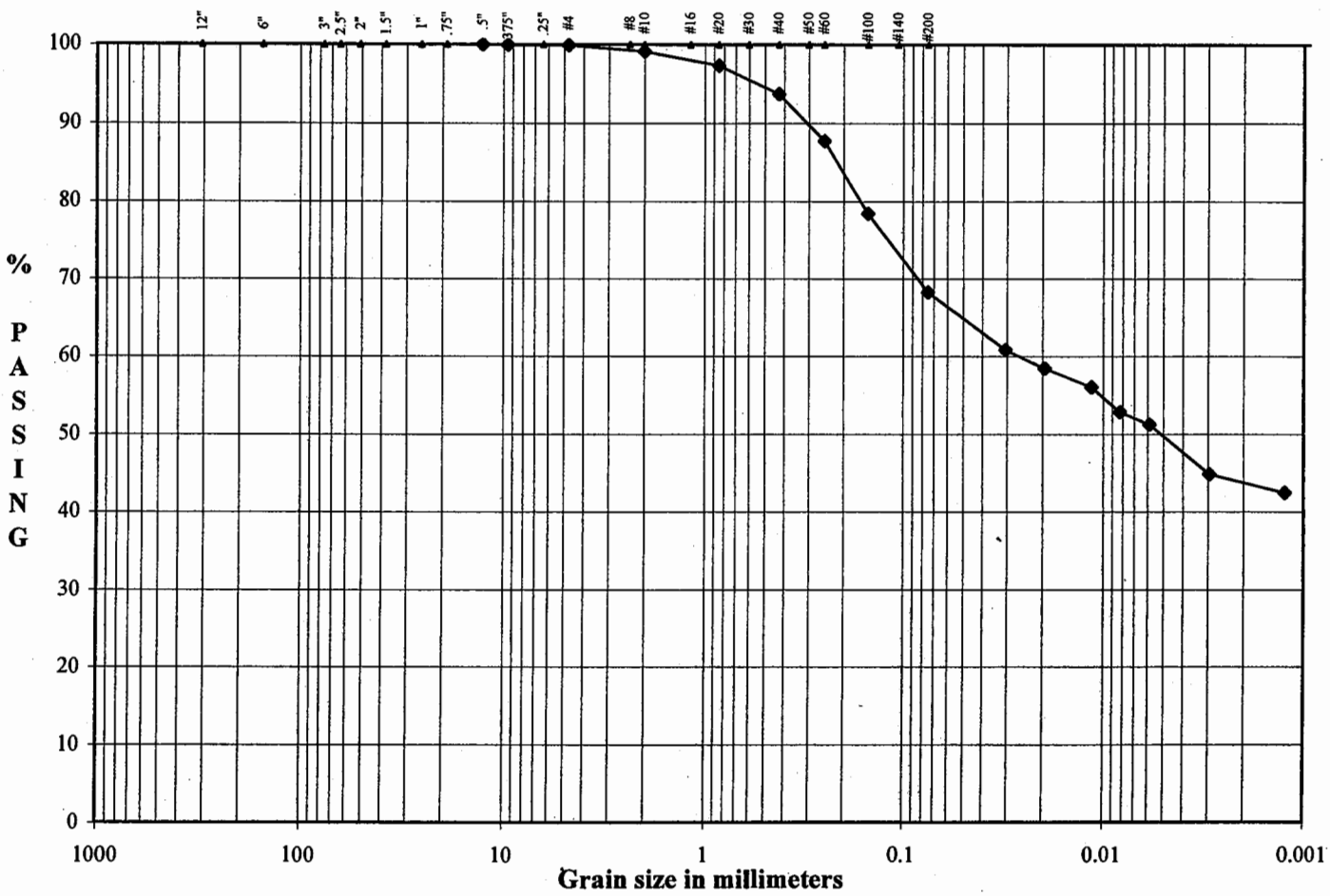
| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | Tested By | RI |
| | | Date | 02/20/07 |
| | | Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2311/TP-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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Fax: 770-923-8973
Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/20/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2311/TP-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 16000.0 | 12900.3 |
| Mass of Mat. Retained on No. 4 sieve, g | 11.6 | 11.6 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.1 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.1 |

*MOISTURE CONTENT*

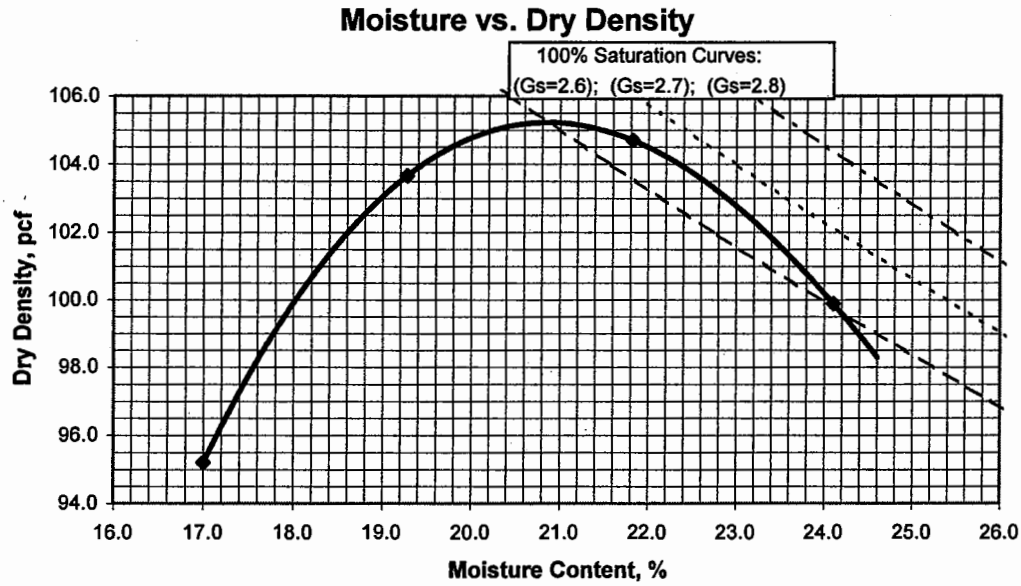
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 951.0 | 11.6 |
| Mass of Dry Sample & Tare, g | 797.1 | 11.6 |
| Mass of Tare, g | 156.5 | 0.0 |
| Moisture Content, % | 24.0 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5630.0 | 5815.0 | 5874.0 | 5820.0 | |
| Mass of Wet Sample & Tare, g | 541.0 | 462.0 | 446.5 | 576.0 | |
| Mass of Dry Sample & Tare, g | 476.2 | 401.4 | 382.7 | 481.6 | |
| Mass of Tare, g | 95.0 | 87.0 | 90.5 | 90.0 | |
| Moisture Content, % | 17.0 | 19.3 | 21.8 | 24.1 | |
| Wet Density, pcf | 111.4 | 123.6 | 127.5 | 124.0 | |
| Dry Density, pcf | 95.2 | 103.7 | 104.7 | 99.9 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 105.2 |
| **Optimum Moisture Content, %** | 21.0 |

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Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO 118

| | |
|---|---|
| Tested By | RI |
| Date | 02/23/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2311/TP-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.576 | in | 6.54 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.29 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 544.90 | g | 1.20 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 101.5 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 368.21 | g |
| Mass of dry sample & tare | 327.63 | g |
| Mass of tare | 161.41 | g |
| % Moisture | 24.4 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 7 | |
| Cell Number | 1 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.97 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 206.80 | cm |
| Min Head | 206.10 | cm |
| Maximum Gradient | 31.51 | |
| Minimum Gradient | 31.40 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.584 | in | 6.56 | cm |
| Average Diameter of Sample | | | 2.866 | in | 7.28 | cm |
| Area | 6.45 | $in^2$ | 41.62 | $cm^2$ | | |
| Volume | 273.17 | $cm^3$ | 0.0096 | $ft^3$ | | |
| Mass | 550.69 | g | 1.21 | lb | | |

| | | |
|---|---|---|
| Dry Density | 100.3 | pcf |
| Vol. of Voids | 110.51 | $cm^3$ |
| Vol. of Solids | 162.66 | $cm^3$ |
| Void Ratio | 0.68 | |
| Saturation | 100.9 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 751.62 | g |
| Mass of dry sample & tare | 640.20 | g |
| Mass of tare | 201.30 | g |
| % Moisture | 25.4 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/23/07 | 10 | 0 | - | 2.93 | 206.10 | 31.40 | 17.0 | - | - | - | |
| 02/23/07 | 10 | 5 | 300 | 2.93 | 206.10 | 31.40 | 17.0 | 4.28E-08 | 1.079 | 4.62E-08 | |
| 02/23/07 | 10 | 10 | 300 | 2.94 | 206.80 | 31.51 | 17.0 | 4.28E-08 | 1.079 | 4.61E-08 | |
| 02/23/07 | 10 | 15 | 300 | 2.93 | 206.10 | 31.40 | 17.0 | 4.28E-08 | 1.079 | 4.61E-08 | * |
| 02/23/07 | 10 | 20 | 300 | 2.94 | 206.80 | 31.51 | 17.0 | 4.28E-08 | 1.079 | 4.61E-08 | * |
| 02/23/07 | 10 | 25 | 300 | 2.94 | 206.80 | 31.51 | 17.0 | 4.27E-08 | 1.079 | 4.61E-08 | * |
| 02/23/07 | 10 | 30 | 300 | 2.94 | 206.80 | 31.51 | 17.0 | 4.27E-08 | 1.079 | 4.61E-08 | * |

Reported Average Hydraulic Conductivity* 4.6E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.5% of maximum dry density (standard proctor) at 3.4% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/26/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2328/TP-5 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

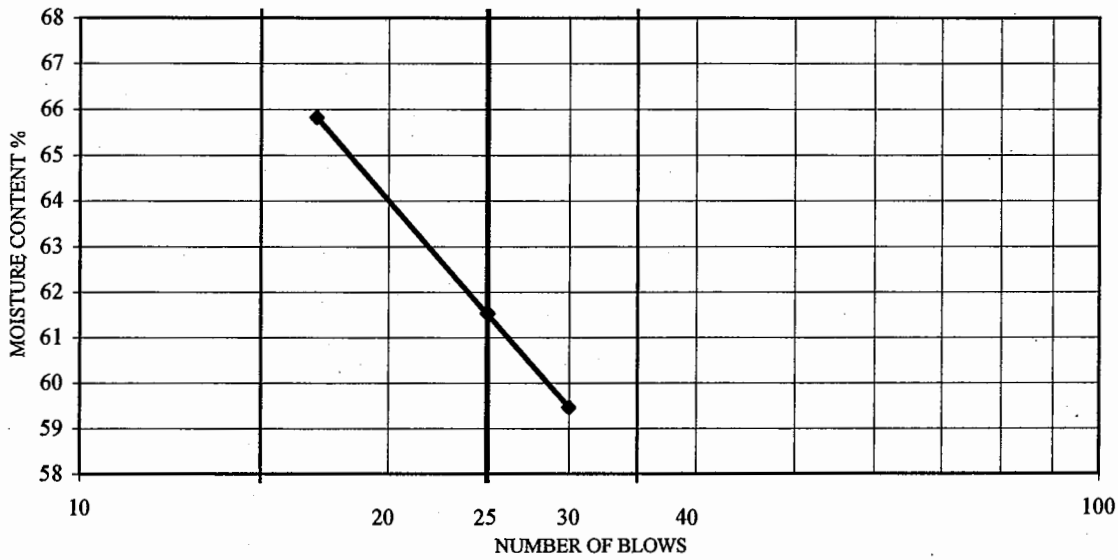
**ASTM D 4318/AASHTO T 88, T 89**

**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 30 | 25 | 17 |
| Mass of Wet Sample & Tare, g | 33.38 | 34.75 | 34.29 |
| Mass of Dry Sample & Tare, g | 29.86 | 30.96 | 30.65 |
| Mass of Tare, g | 23.94 | 24.80 | 25.12 |
| Moisture Content, % | 59.46 | 61.53 | 65.82 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 28.96 | 29.54 |
| Mass of Dry Sample & Tare, g | 27.00 | 27.38 |
| Mass of Tare, g | 20.43 | 20.16 |
| Moisture Content, % | 29.83 | 29.92 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 769.5 |
| Mass of Dry Sample & Tare, g | 600.4 |
| Mass of Tare, g | 146.5 |
| Moisture Content, % | 37.27 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 62 |
| PLASTIC LIMIT (PL) | 30 |
| PLASTICITY INDEX (PI) | 32 |
| LIQUIDITY INDEX (LI) | 0.23 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/22/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2328/TP-5 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

## ASTM D 422/AASHTO T 88
### Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 769.5 |
| Mass of Dry Sample & Tare, g | 600.4 |
| Mass of Tare, g | 146.5 |
| Moisture Content, % | 37.3 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 573.54 |
| Mass of Dry Sample & Tare, g | 498.26 |
| Mass of Tare, g | 210.48 |
| Moisture Content, % | 26.2 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 1200.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 951.18 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 65.63 |
| Dry Mass, g | 52.02 |
| % of Total Sample passing #4 sieve | 100.0 |

## SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

'ass of Tare, g: 0.00

| ve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | | | 0.0 | 100.0 |
| 2.5" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | | | 0.0 | 100.0 |
| .5" | FINE GRAVEL | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 0.00 | 0.0 | 100.0 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.03 | 99.9 |
| #20 | | 0.26 | 99.5 |
| #40 | FINE SAND | 0.82 | 98.4 |
| #60 | | 2.01 | 96.1 |
| #100 | | 4.01 | 92.3 |
| #200 | FINES | 7.00 | 86.5 |

Remarks

## HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 10:27 |

## PARTICLE-SIZE ANALYSIS

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 1.5 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 11.9 |
| % FINE GRAVEL | 0.0 | % FINES | 86.5 |
| % COARSE SAND | 0.1 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 48.0 | % CLAY(<0.002mm) | 38.2 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/23/07 | 10:29 | 2 | 45.0 | 19.0 | 0.01361 | 7.0 | 38.0 | 10.1 | 0.99 | 0.0305 | 72.3 |
| 02/23/07 | 10:32 | 5 | 42.5 | 19.0 | 0.01361 | 7.0 | 35.5 | 10.5 | 0.99 | 0.0197 | 67.6 |
| 02/23/07 | 10:42 | 15 | 40.0 | 19.0 | 0.01361 | 7.0 | 33.0 | 10.9 | 0.99 | 0.0116 | 62.8 |
| 02/23/07 | 10:57 | 30 | 37.0 | 19.0 | 0.01361 | 7.0 | 30.0 | 11.4 | 0.99 | 0.0084 | 57.1 |
| 02/23/07 | 11:27 | 60 | 34.5 | 19.0 | 0.01361 | 7.0 | 27.5 | 11.8 | 0.99 | 0.0060 | 52.3 |
| 02/23/07 | 14:37 | 250 | 28.0 | 19.0 | 0.01361 | 7.0 | 21.0 | 12.9 | 0.99 | 0.0031 | 40.0 |
| )2/24/07 | 10:27 | 1440 | 26.5 | 19.0 | 0.01361 | 7.0 | 19.5 | 13.1 | 0.99 | 0.0013 | 37.1 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

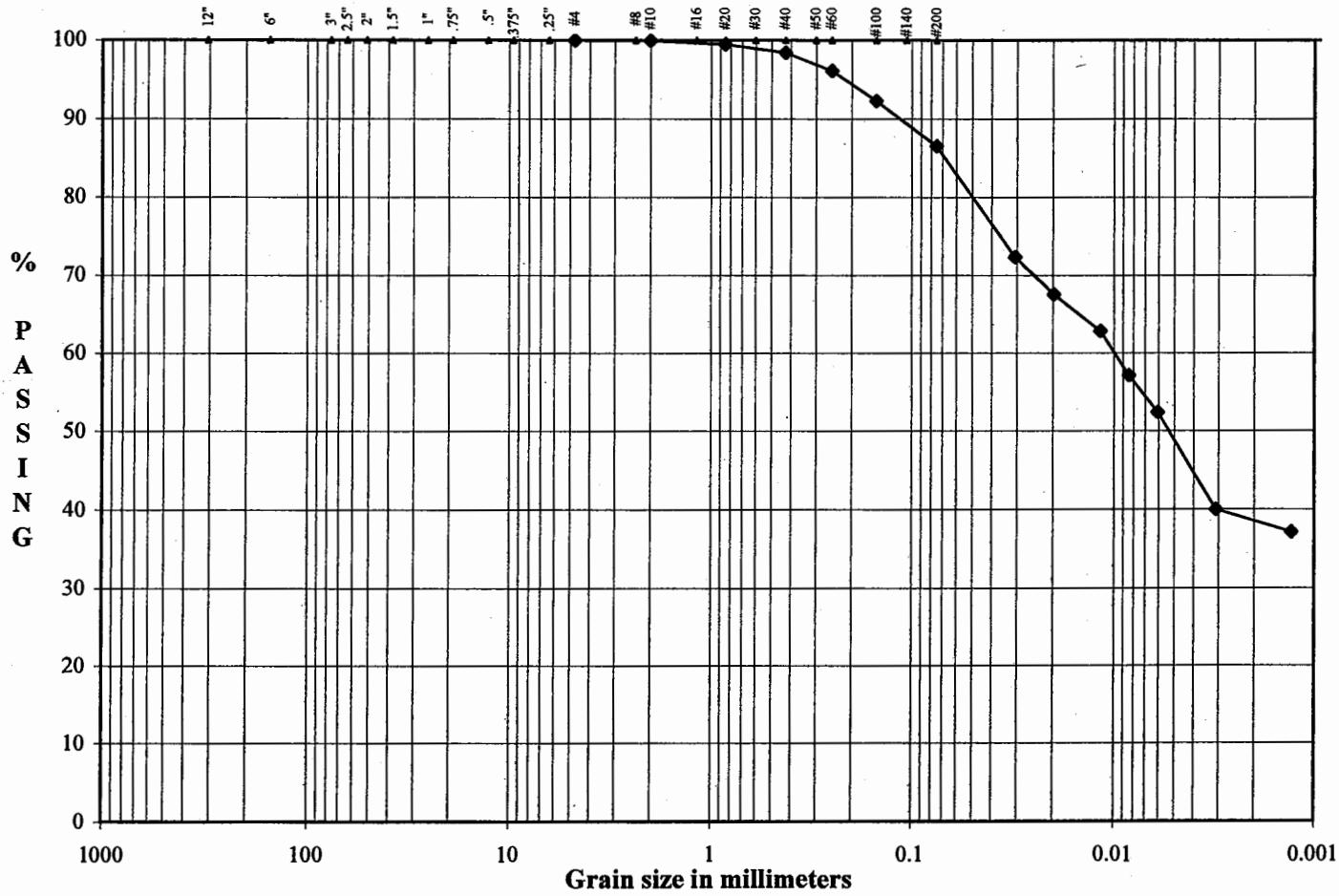
| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | Tested By | KI |
| | | Date | 02/22/07 |
| | | Checked By | KI |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2328/TP-5 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel | | Sand | | | Fines |
|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt or Clay |

DESCRIPTION: NA

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

USCS (ASTM D2487; D2488): NA

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/21/07 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2328/TP-5 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 16330.0 | 11896.3 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

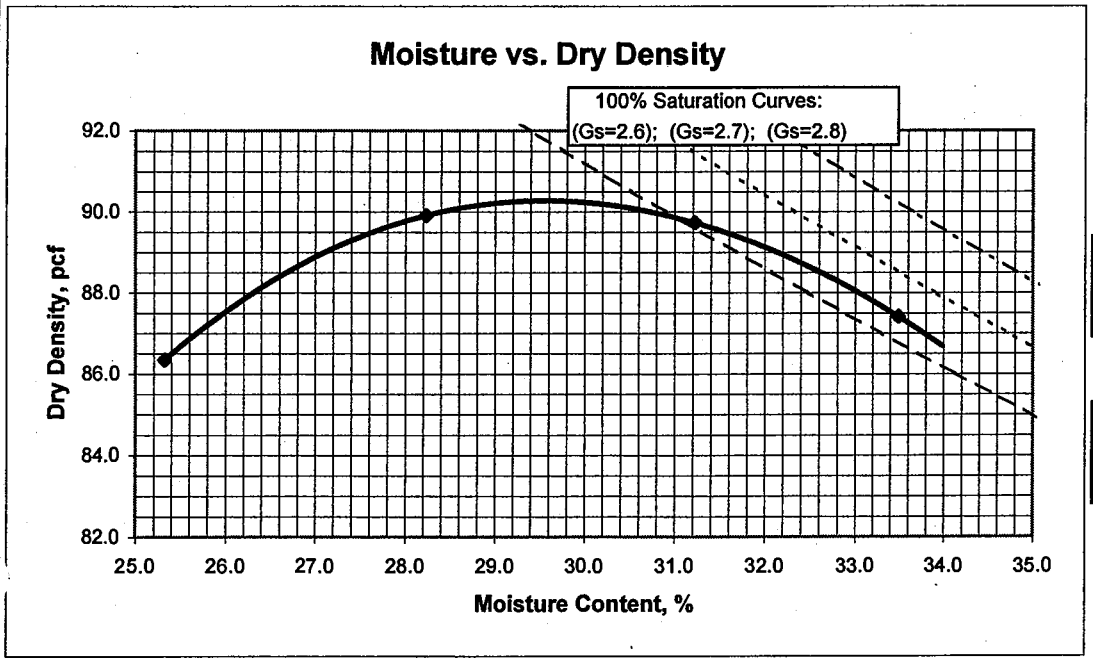
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 769.5 | |
| Mass of Dry Sample & Tare, g | 600.4 | |
| Mass of Tare, g | 146.5 | |
| Moisture Content, % | 37.3 | |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5582.0 | 5689.0 | 5726.0 | 5710.0 | |
| Mass of Wet Sample & Tare, g | 967.0 | 635.0 | 643.5 | 639.0 | |
| Mass of Dry Sample & Tare, g | 880.0 | 545.5 | 545.0 | 533.5 | |
| Mass of Tare, g | 536.5 | 228.5 | 229.5 | 218.5 | |
| Moisture Content, % | 25.3 | 28.2 | 31.2 | 33.5 | |
| Wet Density, pcf | 108.2 | 115.3 | 117.7 | 116.7 | |
| Dry Density, pcf | 86.3 | 89.9 | 89.7 | 87.4 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 90.3 |
| **Optimum Moisture Content, %** | 29.5 |

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| | |
|---|---|
| Tested By | KI |
| Date | 02/25/07 |
| Checked By | [illegible] |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2328/TP-5 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.576 | in | 6.54 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.29 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 500.75 | g | 1.10 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 87.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 371.45 | g |
| Mass of dry sample & tare | 317.14 | g |
| Mass of tare | 152.85 | g |
| % Moisture | 33.1 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 7 | |
| Cell Number | 16 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.95 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 48.53 | cm |
| Min Head | 47.13 | cm |
| Maximum Gradient | 7.35 | |
| Minimum Gradient | 7.14 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.600 | in | 6.60 | cm |
| Average Diameter of Sample | | | 2.882 | in | 7.32 | cm |
| Area | 6.52 | $in^2$ | 42.09 | $cm^2$ | | |
| Volume | 277.94 | $cm^3$ | 0.0098 | $ft^3$ | | |
| Mass | 517.01 | g | 1.14 | lb | | |

| | | |
|---|---|---|
| Dry Density | 84.8 | pcf |
| Vol. of Voids | 138.06 | $cm^3$ |
| Vol. of Solids | 139.88 | $cm^3$ |
| Void Ratio | 0.99 | |
| Saturation | 100.9 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 625.20 | g |
| Mass of dry sample & tare | 485.94 | g |
| Mass of tare | 108.44 | g |
| % Moisture | 36.9 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/25/07 | 12 | 10 | - | 0.68 | 47.83 | 7.24 | 19.4 | - | - | - | |
| 02/25/07 | 12 | 15 | 300 | 0.68 | 47.83 | 7.24 | 19.4 | 7.35E-07 | 1.015 | 7.46E-07 | |
| 02/25/07 | 12 | 20 | 300 | 0.69 | 48.53 | 7.35 | 19.4 | 7.29E-07 | 1.015 | 7.40E-07 | |
| 02/25/07 | 12 | 25 | 300 | 0.69 | 48.53 | 7.35 | 19.4 | 7.24E-07 | 1.015 | 7.35E-07 | * |
| 02/25/07 | 12 | 30 | 300 | 0.68 | 47.83 | 7.24 | 19.4 | 7.29E-07 | 1.015 | 7.40E-07 | * |
| 02/25/07 | 12 | 35 | 300 | 0.67 | 47.13 | 7.14 | 19.4 | 7.40E-07 | 1.015 | 7.51E-07 | * |
| 02/25/07 | 12 | 40 | 300 | 0.68 | 47.83 | 7.24 | 19.4 | 7.40E-07 | 1.015 | 7.51E-07 | * |

Reported Average Hydraulic Conductivity* 7.4E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.6% of maximum dry density (standard proctor) at 3.6% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | KI |
| Date | 02/26/07 |
| Checked By | LS |

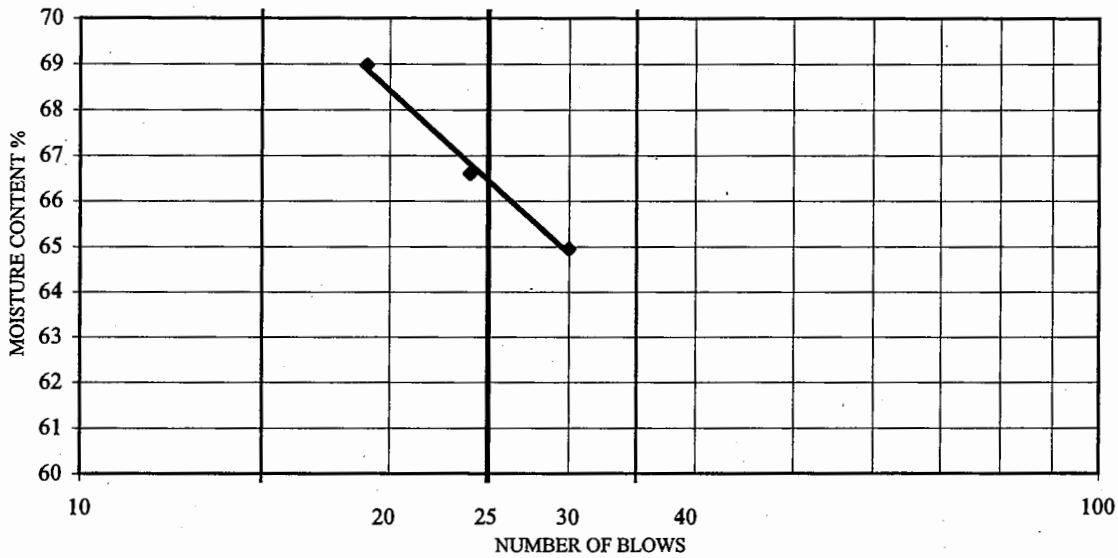
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2330/TP-6 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| Number of Blows | 30 | 24 | 19 |
|---|---|---|---|
| Mass of Wet Sample & Tare, g | 31.56 | 34.39 | 35.37 |
| Mass of Dry Sample & Tare, g | 28.41 | 30.68 | 31.08 |
| Mass of Tare, g | 23.56 | 25.11 | 24.86 |
| Moisture Content, % | 64.95 | 66.61 | 68.97 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 24.42 | 31.93 |
| Mass of Dry Sample & Tare, g | 22.50 | 29.69 |
| Mass of Tare, g | 16.18 | 22.28 |
| Moisture Content, % | 30.38 | 30.23 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 858.0 |
| Mass of Dry Sample & Tare, g | 656.7 |
| Mass of Tare, g | 161.5 |
| Moisture Content, % | 40.66 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 66 |
| PLASTIC LIMIT (PL) | 30 |
| PLASTICITY INDEX (PI) | 36 |
| LIQUIDITY INDEX (LI) | 0.30 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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| | |
|---|---|
| Tested By | KI |
| Date | 02/22/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2330/TP-6 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

**ASTM D 422/AASHTO T 88**
**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 858.0 |
| Mass of Dry Sample & Tare, g | 656.7 |
| Mass of Tare, g | 161.5 |
| Moisture Content, % | 40.7 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 473.95 |
| Mass of Dry Sample & Tare, g | 416.59 |
| Mass of Tare, g | 155.03 |
| Moisture Content, % | 21.9 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 14060.00 |
| Mass of Tare, g | |
| Total Mass of Dry Sample, g | 11531.21 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 65.69 |
| Dry Mass, g | 53.88 |
| % of Total Sample passing #4 sieve | 99.9 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | 0.00 | 0.0 | 100.0 |
| .5" | | 2.87 | 0.0 | 100.0 |
| .375" | | 6.33 | 0.1 | 99.9 |
| #4 | COARSE SAND | 14.43 | 0.1 | 99.9 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.10 | 99.7 |
| #20 | | 0.51 | 98.9 |
| #40 | FINE SAND | 1.16 | 97.7 |
| #60 | | 2.44 | 95.4 |
| #100 | | 4.43 | 91.7 |
| #200 | FINES | 7.33 | 86.3 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 10:29 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 2.0 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 11.4 |
| % FINE GRAVEL | 0.1 | % FINES | 86.3 |
| % COARSE SAND | 0.2 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 57.2 | % CLAY(<0.002mm) | 46.0 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/23/07 | 10:31 | 2 | 50.0 | 19.0 | 0.01361 | 7.0 | 43.0 | 9.2 | 0.99 | 0.0293 | 78.9 |
| 02/23/07 | 10:34 | 5 | 47.5 | 19.0 | 0.01361 | 7.0 | 40.5 | 9.7 | 0.99 | 0.0189 | 74.3 |
| 02/23/07 | 10:44 | 15 | 44.0 | 19.0 | 0.01361 | 7.0 | 37.0 | 10.2 | 0.99 | 0.0112 | 67.9 |
| 02/23/07 | 10:59 | 30 | 42.0 | 19.0 | 0.01361 | 7.0 | 35.0 | 10.6 | 0.99 | 0.0081 | 64.2 |
| 02/23/07 | 11:29 | 60 | 40.0 | 19.0 | 0.01361 | 7.0 | 33.0 | 10.9 | 0.99 | 0.0058 | 60.6 |
| 02/23/07 | 14:39 | 250 | 33.5 | 19.0 | 0.01361 | 7.0 | 26.5 | 12.0 | 0.99 | 0.0030 | 48.6 |
| 02/24/07 | 10:29 | 1440 | 31.0 | 19.0 | 0.01361 | 7.0 | 24.0 | 12.4 | 0.99 | 0.0013 | 44.0 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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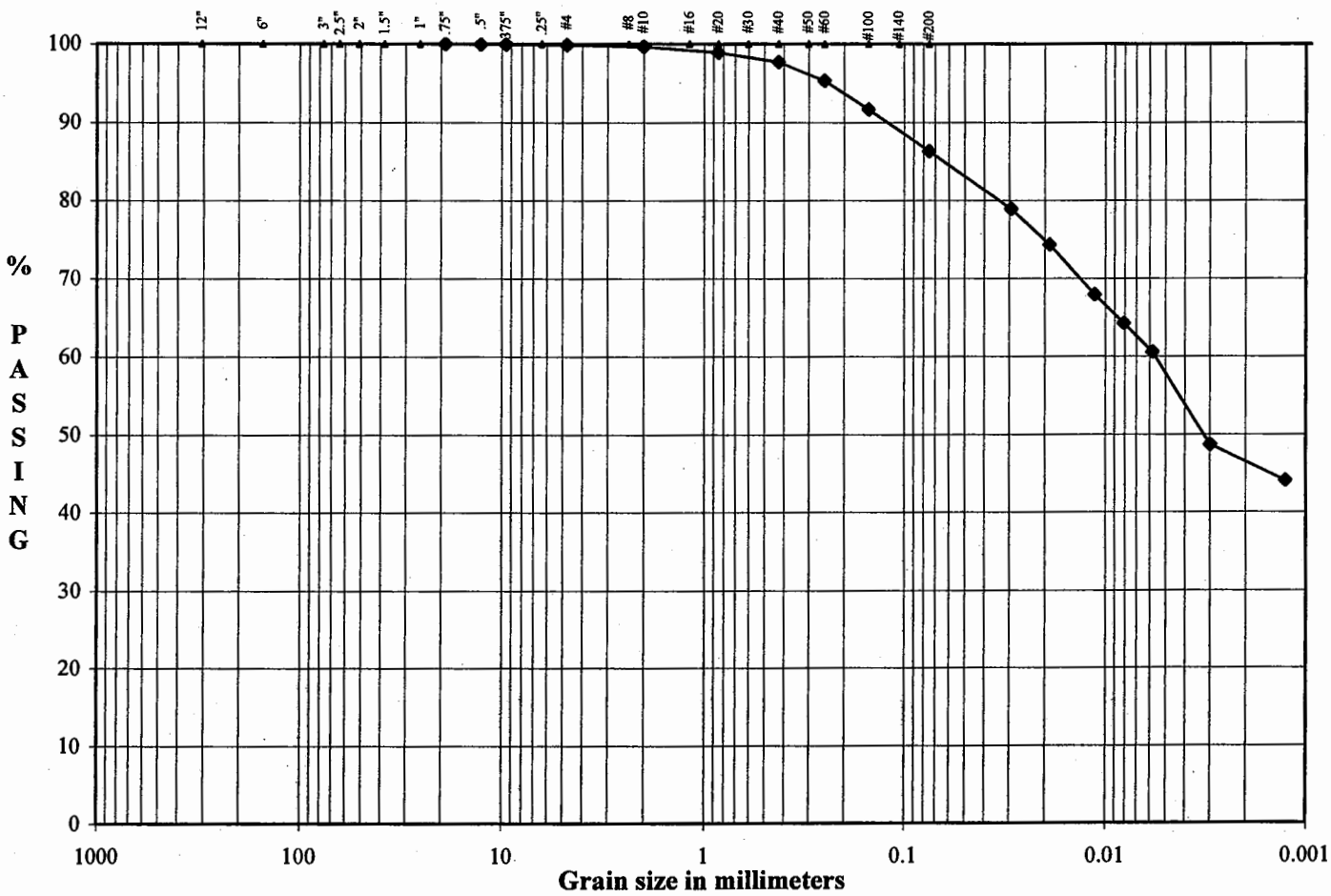
| | | Date | 02/22/07 |
| | | Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2330/TP-6 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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| | |
|---|---|
| Tested By | KI |
| Date | 02/21/07 |
| Checked By | LR |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2330/TP-6 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 16220.0 | 11531.2 |
| Mass of Mat. Retained on No. 4 sieve, g | 14.4 | 14.4 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.1 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.1 |

*MOISTURE CONTENT*

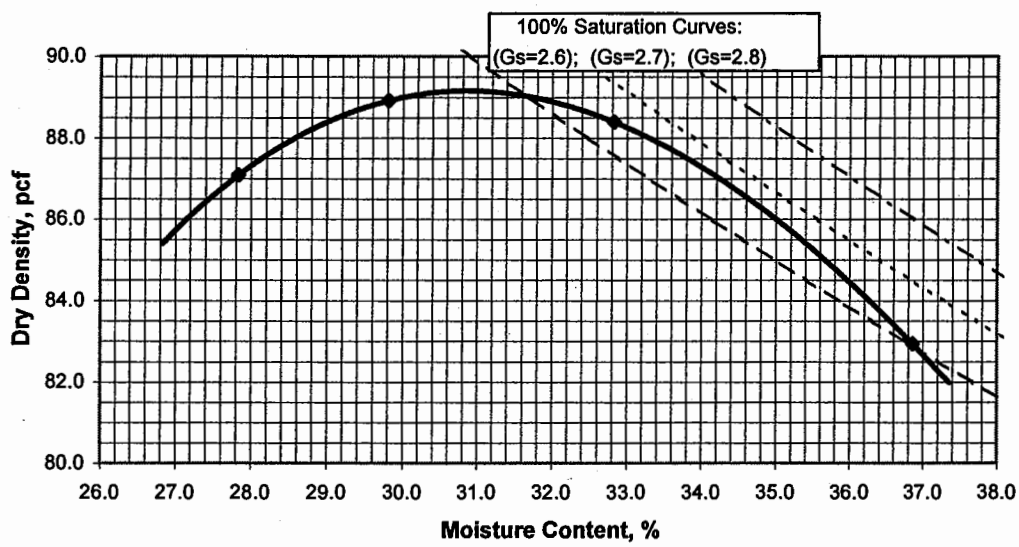
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 858.0 | 14.4 |
| Mass of Dry Sample & Tare, g | 656.7 | 14.4 |
| Mass of Tare, g | 161.5 | 0.0 |
| Moisture Content, % | 40.7 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5629.0 | 5691.0 | 5721.0 | 5662.0 | |
| Mass of Wet Sample & Tare, g | 402.5 | 476.0 | 446.5 | 558.5 | |
| Mass of Dry Sample & Tare, g | 335.0 | 388.5 | 359.5 | 450.5 | |
| Mass of Tare, g | 92.5 | 95.0 | 94.5 | 157.5 | |
| Moisture Content, % | 27.8 | 29.8 | 32.8 | 36.9 | |
| Wet Density, pcf | 111.3 | 115.4 | 117.4 | 113.5 | |
| Dry Density, pcf | 87.1 | 88.9 | 88.4 | 82.9 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 89.2 |
| **Optimum Moisture Content, %** | 30.8 |

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Fax: 770-923-8973
Web: www.test-llc.com

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| | |
|---|---|
| Tested By | KI |
| Date | 02/25/07 |
| Checked By | CS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2330/TP-6 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.573 | in | 6.54 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 268.98 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 498.18 | g | 1.10 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 86.4 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 421.58 | g |
| Mass of dry sample & tare | 366.65 | g |
| Mass of tare | 203.71 | g |
| % Moisture | 33.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 8 | |
| Cell Number | 3 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.96 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 145.60 | cm |
| Min Head | 144.20 | cm |
| Maximum Gradient | 22.00 | |
| Minimum Gradient | 21.78 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.606 | in | 6.62 | cm |
| Average Diameter of Sample | | | 2.880 | in | 7.32 | cm |
| Area | 6.51 | $in^2$ | 42.03 | $cm^2$ | | |
| Volume | 278.20 | $cm^3$ | 0.0098 | $ft^3$ | | |
| Mass | 511.11 | g | 1.13 | lb | | |

| | | |
|---|---|---|
| Dry Density | 83.9 | pcf |
| Vol. of Voids | 139.72 | $cm^3$ |
| Vol. of Solids | 138.48 | $cm^3$ |
| Void Ratio | 1.01 | |
| Saturation | 98.2 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 612.41 | g |
| Mass of dry sample & tare | 475.24 | g |
| Mass of tare | 101.50 | g |
| % Moisture | 36.7 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/25/07 | 12 | 10 | - | 2.06 | 144.90 | 21.89 | 19.4 | - | - | - | |
| 02/25/07 | 12 | 15 | 300 | 2.05 | 144.20 | 21.78 | 19.4 | 2.44E-07 | 1.015 | 2.48E-07 | |
| 02/25/07 | 12 | 20 | 300 | 2.05 | 144.20 | 21.78 | 19.4 | 2.45E-07 | 1.015 | 2.48E-07 | |
| 02/25/07 | 12 | 25 | 300 | 2.06 | 144.90 | 21.89 | 19.4 | 2.44E-07 | 1.015 | 2.48E-07 | * |
| 02/25/07 | 12 | 30 | 300 | 2.07 | 145.60 | 22.00 | 19.4 | 2.43E-07 | 1.015 | 2.47E-07 | * |
| 02/25/07 | 12 | 35 | 300 | 2.06 | 144.90 | 21.89 | 19.4 | 2.43E-07 | 1.015 | 2.47E-07 | * |
| 02/25/07 | 12 | 40 | 300 | 2.06 | 144.90 | 21.89 | 19.4 | 2.43E-07 | 1.015 | 2.47E-07 | * |

Reported Average Hydraulic Conductivity* 2.5E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.9% of maximum dry density (standard proctor) at 2.9% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

of NORTH CAROLINA, LLC

# SECTION E-2

## Laboratory Test Pad Shelby Tube Test Results

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Cell: 678-612-6534
Web: www.test-llc.com

# Summary of Soil Testing (ST-TP Samples)

**Project Number:** 688

**Project Name:** CMS Landfill - Cell 2F

| T.E.S.T. Sample Number | Client Sample Number | USCS | UCS, psi | Moisture Content (%) | Grain Size Distribution | | | Atterberg Limits | | | Proctor | | Hydraulic Conductivity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | %Finer #4 Sieve | % Finer #200 Sieve | % Finer 0.005mm | L.L. % | P.L. % | P.I. % | Opt. M.C. % | Max.Dry. Density pcf | Initial M.C. % | Init.Dry Density pcf | Hydraulic Conduct. cm/sec |
| 2274 | ST-TP-1 | - | - | - | - | - | - | - | - | - | - | - | 26.9 | 91.0 | 1.1E-06 |
| 2276 | ST-TP-2 | - | - | - | - | - | - | - | - | - | - | - | 25.9 | 94.2 | 1.2E-06 |
| 2279 | ST-TP-3 | - | - | - | - | - | - | - | - | - | - | - | 25.7 | 95.3 | 1.1E-06 |
| 2310 | ST-TP-4 | - | - | - | - | - | - | - | - | - | - | - | 23.4 | 102.6 | 3.3E-08 |
| 2327 | ST-TP-5 | - | - | - | - | - | - | - | - | - | - | - | 36.6 | 84.2 | 2.4E-07 |
| 2329 | ST-TP-6 | - | - | - | - | - | - | - | - | - | - | - | 36.4 | 84.2 | 5.0E-07 |

Note: ST-TP-1 to ST-TP-3 are for test Pad #1 which was for an off-site borrow Source.
ST-TP-4 to ST-TP-6 are for test Pad #2 which was for an on-site borrow Source.

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| | |
|---|---|
| Tested By | KI |
| Date | 02/10/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2274/ST-TP-1 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.287 | in | 8.35 | cm |
| Diameter | 2.841 | in | 7.22 | cm |
| Area | 6.34 | $in^2$ | 40.90 | $cm^2$ |
| Volume | 341.45 | $cm^3$ | 0.0121 | $ft^3$ |
| Mass | 632.00 | g | 1.39 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 91.0 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 334.50 | g |
| Mass of dry sample & tare | 297.76 | g |
| Mass of tare | 161.20 | g |
| % Moisture | 26.9 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 7 | |
| Cell Number | 4 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.96 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 175.85 | cm |
| Min Head | 174.44 | cm |
| Maximum Gradient | 20.78 | |
| Minimum Gradient | 20.61 | |

### Final Data (After Test)

| | | | | |
|---|---|---|---|---|
| Average Height of Sample | | 3.332 in | 8.46 | cm |
| Average Diameter of Sample | | 2.869 in | 7.29 | cm |
| Area | 6.46 $in^2$ | 41.71 $cm^2$ | | |
| Volume | 352.99 $cm^3$ | 0.0125 $ft^3$ | | |
| Mass | 668.12 g | 1.47 lb | | |

| | | |
|---|---|---|
| Dry Density | 88.1 | pcf |
| Vol. of Voids | 168.31 | $cm^3$ |
| Vol. of Solids | 184.68 | $cm^3$ |
| Void Ratio | 0.91 | |
| Saturation | 100.7 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 761.85 | g |
| Mass of dry sample & tare | 592.38 | g |
| Mass of tare | 93.80 | g |
| % Moisture | 34.0 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$(°C) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/10/07 | 9 | 30 | - | 2.50 | 175.85 | 20.78 | 16.5 | - | - | - | |
| 02/10/07 | 9 | 35 | 300 | 2.49 | 175.15 | 20.69 | 16.5 | 1.04E-06 | 1.093 | 1.13E-06 | |
| 02/10/07 | 9 | 40 | 300 | 2.48 | 174.44 | 20.61 | 16.5 | 1.04E-06 | 1.093 | 1.14E-06 | |
| 02/10/07 | 9 | 45 | 300 | 2.49 | 175.15 | 20.69 | 16.5 | 1.04E-06 | 1.093 | 1.14E-06 | * |
| 02/10/07 | 9 | 50 | 300 | 2.50 | 175.85 | 20.78 | 16.5 | 1.04E-06 | 1.093 | 1.13E-06 | * |
| 02/10/07 | 9 | 55 | 300 | 2.50 | 175.85 | 20.78 | 16.5 | 1.03E-06 | 1.093 | 1.13E-06 | * |
| 02/10/07 | 10 | 0 | 300 | 2.50 | 175.85 | 20.78 | 16.5 | 1.03E-06 | 1.093 | 1.13E-06 | * |

Reported Average Hydraulic Conductivity* 1.1E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | KI |
| Date | 02/10/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2276/ST-TP-2 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.007 | in | 7.64 | cm |
| Diameter | 2.861 | in | 7.27 | cm |
| Area | 6.43 | $in^2$ | 41.48 | $cm^2$ |
| Volume | 316.78 | $cm^3$ | 0.0112 | $ft^3$ |
| Mass | 602.00 | g | 1.33 | lb |
| Specific Gravity | 2.750 | (Assumed) | | |
| Dry Density | 94.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 379.30 | g |
| Mass of dry sample & tare | 334.57 | g |
| Mass of tare | 162.20 | g |
| % Moisture | 25.9 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 5 | |
| Cell Number | 6 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 151.23 | cm |
| Min Head | 149.82 | cm |
| Maximum Gradient | 19.55 | |
| Minimum Gradient | 19.37 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.045 | in | 7.73 | cm |
| Average Diameter of Sample | | | 2.867 | in | 7.28 | cm |
| Area | 6.46 | $in^2$ | 41.65 | $cm^2$ | | |
| Volume | 322.13 | $cm^3$ | 0.0114 | $ft^3$ | | |
| Mass | 629.35 | g | 1.39 | lb | | |

| | | |
|---|---|---|
| Dry Density | 92.0 | pcf |
| Vol. of Voids | 149.48 | $cm^3$ |
| Vol. of Solids | 172.66 | $cm^3$ |
| Void Ratio | 0.87 | |
| Saturation | 103.4 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 729.11 | g |
| Mass of dry sample & tare | 574.57 | g |
| Mass of tare | 99.78 | g |
| % Moisture | 32.5 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/10/07 | 9 | 30 | - | 2.14 | 150.53 | 19.46 | 16.5 | - | - | - | |
| 02/10/07 | 9 | 35 | 300 | 2.14 | 150.53 | 19.46 | 16.5 | 1.11E-06 | 1.093 | 1.21E-06 | |
| 02/10/07 | 9 | 40 | 300 | 2.15 | 151.23 | 19.55 | 16.5 | 1.10E-06 | 1.093 | 1.21E-06 | |
| 02/10/07 | 9 | 45 | 300 | 2.13 | 149.82 | 19.37 | 16.5 | 1.11E-06 | 1.093 | 1.21E-06 | * |
| 02/10/07 | 9 | 50 | 300 | 2.14 | 150.53 | 19.46 | 16.5 | 1.11E-06 | 1.093 | 1.21E-06 | * |
| 02/10/07 | 9 | 55 | 300 | 2.15 | 151.23 | 19.55 | 16.5 | 1.10E-06 | 1.093 | 1.21E-06 | * |
| 02/10/07 | 10 | 0 | 300 | 2.15 | 151.23 | 19.55 | 16.5 | 1.10E-06 | 1.093 | 1.20E-06 | * |

Reported Average Hydraulic Conductivity* 1.2E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/12/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2279/ST-TP-3 | Depth/Elev. | - |
| Location | TEST PAD/LIFT 3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.755 | in | 7.00 | cm |
| Diameter | 2.856 | in | 7.25 | cm |
| Area | 6.41 | $in^2$ | 41.33 | $cm^2$ |
| Volume | 289.22 | $cm^3$ | 0.0102 | $ft^3$ |
| Mass | 555.10 | g | 1.22 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 95.3 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 548.70 | g |
| Mass of dry sample & tare | 468.55 | g |
| Mass of tare | 156.40 | g |
| % Moisture | 25.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 9 | |
| Board Number | 7 | |
| Cell Number | 1 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 4.48E-04 | $cm^3$/sec |
| B - Value | 1.00 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 76.67 | cm |
| Min Head | 75.97 | cm |
| Maximum Gradient | 10.87 | |
| Minimum Gradient | 10.77 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.776 | in | 7.05 | cm |
| Average Diameter of Sample | | | 2.862 | in | 7.27 | cm |
| Area | 6.43 | $in^2$ | 41.50 | $cm^2$ | | |
| Volume | 292.65 | $cm^3$ | 0.0103 | $ft^3$ | | |
| Mass | 571.08 | g | 1.26 | lb | | |

| | | |
|---|---|---|
| Dry Density | 92.7 | pcf |
| Vol. of Voids | 131.56 | $cm^3$ |
| Vol. of Solids | 161.09 | $cm^3$ |
| Void Ratio | 0.82 | |
| Saturation | 103.5 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 667.51 | g |
| Mass of dry sample & tare | 531.37 | g |
| Mass of tare | 96.45 | g |
| % Moisture | 31.3 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/12/07 | 10 | 30 | - | 1.08 | 75.97 | 10.77 | 16.5 | - | - | - | |
| 02/12/07 | 10 | 35 | 300 | 1.08 | 75.97 | 10.77 | 16.5 | 1.00E-06 | 1.093 | 1.09E-06 | |
| 02/12/07 | 10 | 40 | 300 | 1.09 | 76.67 | 10.87 | 16.5 | 9.97E-07 | 1.093 | 1.09E-06 | |
| 02/12/07 | 10 | 45 | 300 | 1.09 | 76.67 | 10.87 | 16.5 | 9.93E-07 | 1.093 | 1.08E-06 | * |
| 02/12/07 | 10 | 50 | 300 | 1.08 | 75.97 | 10.77 | 16.5 | 9.97E-07 | 1.093 | 1.09E-06 | * |
| 02/12/07 | 10 | 55 | 300 | 1.09 | 76.67 | 10.87 | 16.5 | 9.97E-07 | 1.093 | 1.09E-06 | * |
| 02/12/07 | 11 | 0 | 300 | 1.08 | 75.97 | 10.77 | 16.5 | 9.97E-07 | 1.093 | 1.09E-06 | * |

Reported Average Hydraulic Conductivity* 1.1E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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AASHTO 318

| | |
|---|---|
| Tested By | RI |
| Date | 02/21/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2310/ST-TP-4 | Depth/Elev. | - |
| Location | LIFT 1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.195 | in | 8.12 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 334.00 | $cm^3$ | 0.0118 | $ft^3$ |
| Mass | 677.60 | g | 1.49 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 102.6 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 729.30 | g |
| Mass of dry sample & tare | 622.63 | g |
| Mass of tare | 167.30 | g |
| % Moisture | 23.4 | |

### Test Data

| | | |
|---|---|---|
| Speed | 13 | |
| Board Number | 5 | |
| Cell Number | 14 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 2.80E-05 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 180.07 | cm |
| Min Head | 180.07 | cm |
| Maximum Gradient | 22.18 | |
| Minimum Gradient | 22.18 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.196 | in | 8.12 | cm |
| Average Diameter of Sample | | | 2.851 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.19 | $cm^2$ | | |
| Volume | 334.34 | $cm^3$ | 0.0118 | $ft^3$ | | |
| Mass | 683.04 | g | 1.51 | lb | | |

| | | |
|---|---|---|
| Dry Density | 102.2 | pcf |
| Vol. of Voids | 131.50 | $cm^3$ |
| Vol. of Solids | 202.84 | $cm^3$ |
| Void Ratio | 0.65 | |
| Saturation | 102.9 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 783.48 | g |
| Mass of dry sample & tare | 648.11 | g |
| Mass of tare | 100.46 | g |
| % Moisture | 24.7 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/21/07 | 11 | 30 | - | 2.56 | 180.07 | 22.18 | 16.5 | - | - | - | |
| 02/21/07 | 11 | 35 | 300 | 2.56 | 180.07 | 22.18 | 16.5 | 3.06E-08 | 1.093 | 3.35E-08 | |
| 02/21/07 | 11 | 40 | 300 | 2.56 | 180.07 | 22.18 | 16.5 | 3.06E-08 | 1.093 | 3.35E-08 | |
| 02/21/07 | 11 | 45 | 300 | 2.56 | 180.07 | 22.18 | 16.5 | 3.06E-08 | 1.093 | 3.35E-08 | * |
| 02/21/07 | 11 | 50 | 300 | 2.56 | 180.07 | 22.18 | 16.5 | 3.06E-08 | 1.093 | 3.35E-08 | * |
| 02/21/07 | 11 | 55 | 300 | 2.56 | 180.07 | 22.18 | 16.5 | 3.06E-08 | 1.093 | 3.35E-08 | * |
| 02/21/07 | 12 | 0 | 300 | 2.56 | 180.07 | 22.18 | 16.5 | 3.06E-08 | 1.093 | 3.35E-08 | * |

Reported Average Hydraulic Conductivity* 3.3E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/22/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2327/ST-TP-5 | Depth/Elev. | - |
| Location | TEST PAD | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.843 | in | 7.22 | cm |
| Diameter | 2.834 | in | 7.20 | cm |
| Area | 6.31 | $in^2$ | 40.70 | $cm^2$ |
| Volume | 293.88 | $cm^3$ | 0.0104 | $ft^3$ |
| Mass | 541.70 | g | 1.19 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 84.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 746.10 | g |
| Mass of dry sample & tare | 571.16 | g |
| Mass of tare | 93.70 | g |
| % Moisture | 36.6 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 5 | |
| Cell Number | 3 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 170.22 | cm |
| Min Head | 168.82 | cm |
| Maximum Gradient | 23.55 | |
| Minimum Gradient | 23.35 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.846 | in | 7.23 | cm |
| Average Diameter of Sample | | | 2.843 | in | 7.22 | cm |
| Area | 6.35 | $in^2$ | 40.96 | $cm^2$ | | |
| Volume | 296.06 | $cm^3$ | 0.0105 | $ft^3$ | | |
| Mass | 546.85 | g | 1.21 | lb | | |

| | | |
|---|---|---|
| Dry Density | 83.4 | pcf |
| Vol. of Voids | 149.51 | $cm^3$ |
| Vol. of Solids | 146.55 | $cm^3$ |
| Void Ratio | 1.02 | |
| Saturation | 101.1 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 700.68 | g |
| Mass of dry sample & tare | 549.52 | g |
| Mass of tare | 153.88 | g |
| % Moisture | 38.2 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/22/07 | 11 | 15 | - | 2.41 | 169.52 | 23.45 | 18.7 | - | - | - | |
| 02/22/07 | 11 | 20 | 300 | 2.40 | 168.82 | 23.35 | 18.7 | 2.34E-07 | 1.033 | 2.41E-07 | |
| 02/22/07 | 11 | 25 | 300 | 2.40 | 168.82 | 23.35 | 18.7 | 2.34E-07 | 1.033 | 2.42E-07 | |
| 02/22/07 | 11 | 30 | 300 | 2.41 | 169.52 | 23.45 | 18.7 | 2.34E-07 | 1.033 | 2.41E-07 | * |
| 02/22/07 | 11 | 35 | 300 | 2.41 | 169.52 | 23.45 | 18.7 | 2.33E-07 | 1.033 | 2.41E-07 | * |
| 02/22/07 | 11 | 40 | 300 | 2.40 | 168.82 | 23.35 | 18.7 | 2.34E-07 | 1.033 | 2.41E-07 | * |
| 02/22/07 | 11 | 45 | 300 | 2.42 | 170.22 | 23.55 | 18.7 | 2.33E-07 | 1.033 | 2.41E-07 | * |

Reported Average Hydraulic Conductivity* 2.4E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/22/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2329/ST-TP-6 | Depth/Elev. | - |
| Location | TEST PAD | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.775 | in | 7.05 | cm |
| Diameter | 2.846 | in | 7.23 | cm |
| Area | 6.36 | $in^2$ | 41.04 | $cm^2$ |
| Volume | 289.28 | $cm^3$ | 0.0102 | $ft^3$ |
| Mass | 532.50 | g | 1.17 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 84.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 702.40 | g |
| Mass of dry sample & tare | 540.44 | g |
| Mass of tare | 96.00 | g |
| % Moisture | 36.4 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 7 | |
| Cell Number | 2 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 79.48 | cm |
| Min Head | 79.48 | cm |
| Maximum Gradient | 11.26 | |
| Minimum Gradient | 11.26 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.780 | in | 7.06 | cm |
| Average Diameter of Sample | | | 2.854 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.27 | $cm^2$ | | |
| Volume | 291.44 | $cm^3$ | 0.0103 | $ft^3$ | | |
| Mass | 539.28 | g | 1.19 | lb | | |

| | | |
|---|---|---|
| Dry Density | 84.1 | pcf |
| Vol. of Voids | 145.89 | $cm^3$ |
| Vol. of Solids | 145.55 | $cm^3$ |
| Void Ratio | 1.00 | |
| Saturation | 100.3 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 632.34 | g |
| Mass of dry sample & tare | 486.07 | g |
| Mass of tare | 93.19 | g |
| % Moisture | 37.2 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/22/07 | 11 | 15 | - | 1.13 | 79.48 | 11.26 | 18.7 | - | - | - | |
| 02/22/07 | 11 | 20 | 300 | 1.13 | 79.48 | 11.26 | 18.7 | 4.82E-07 | 1.033 | 4.98E-07 | |
| 02/22/07 | 11 | 25 | 300 | 1.13 | 79.48 | 11.26 | 18.7 | 4.82E-07 | 1.033 | 4.98E-07 | |
| 02/22/07 | 11 | 30 | 300 | 1.13 | 79.48 | 11.26 | 18.7 | 4.82E-07 | 1.033 | 4.98E-07 | * |
| 02/22/07 | 11 | 35 | 300 | 1.13 | 79.48 | 11.26 | 18.7 | 4.82E-07 | 1.033 | 4.98E-07 | * |
| 02/22/07 | 11 | 40 | 300 | 1.13 | 79.48 | 11.26 | 18.7 | 4.82E-07 | 1.033 | 4.98E-07 | * |
| 02/22/07 | 11 | 45 | 300 | 1.13 | 79.48 | 11.26 | 18.7 | 4.82E-07 | 1.033 | 4.98E-07 | * |

Reported Average Hydraulic Conductivity* 5.0E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

of NORTH CAROLINA, LLC

# SECTION E-3

## Test Pad Field Density Test Results

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

Test Pad 2 - off-site Borrow

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP-1 | 2-8-07 | N Test | 1 | N | 92.2 | 28.8 | CL-4 | 94.0 | 25.2 | 98.0 | +3.6 | P | |
| | | E Pad | | | | | | | | | | | |
| TP-2 | | N | 1 | | 91.7 | 28.3 | | | | 97.5 | +3.1 | P | |
| | | E | | | | | | | | | | | |
| TP-3 | | N | 1 | | 91.9 | 28.3 | | | | 97.8 | +3.3 | P | |
| | | E | | | | | | | | | | | |
| TP-4 | | N | 2 | | 91.7 | 28.5 | | | | 97.6 | +3.2 | P | |
| | | E | | | | | | | | | | | |
| TP-5 | | N | 2 | | 92.4 | 28.9 | | | | 98.3 | +3.7 | P | |
| | | E | | | | | | | | | | | |
| TP-6 | | N | 2 | | 92.2 | 29.0 | | | | 98.1 | +3.8 | P | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

Test Pad 1 - off-site Borrow

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP-7 | 2-9-07 | N Test | 3 | N | 92.6 | 30.1 | CL-4 | 94.0 | 25.2 | 98.5 | +4.4 | P | |
| | | E Pad | | | | | | | | | | | |
| TP-8 | | N " | | | 92.2 | 30.2 | | | | 98.1 | +5.0 | P | |
| | | E " | | | | | | | | | | | |
| TP-9 | | N " | | | 92.2 | 29.6 | | | | 98.1 | +4.9 | P | |
| | | E " | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

Test Pad #2 - on-site Borrow

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP 10 | 2-19-07 | N Test | 1 | N | 97.5 | 27.0 | CL 13 | 101.5 | 23.9 | 96.0 | +3.1 | F | |
| | | E Pad | | | | | | | | | | | |
| TP 10 R1 | | N | | | 98.6 | 27.0 | | | | 97.1 | +3.1 | P | Retest for TP 10 |
| | | E | | | | | | | | | | | |
| TP 11 | | N | | | 98.6 | 27.2 | | | | 97.1 | +3.3 | P | |
| | | E | | | | | | | | | | | |
| TP 12 | | N | | | 98.7 | 27.3 | | | | 97.3 | +3.4 | P | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

Test Pad #2 - on-site Borrow

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP 13 | 2-20-07 | N TEST | 2 | N | 80.9 | 40.7 | CL 12 | 82.3 | 37.1 | 98.3 | +3.1 | P | |
| | | E PAD | | | | | | | | | | | |
| TP 14 | | N | 2 | | 80.5 | 40.3 | | | | 97.9 | +3.2 | P | |
| | | E | | | | | | | | | | | |
| TP 15 | | N | 2 | | 81.2 | 40.5 | | | | 98.7 | +3.4 | P | |
| | | E | | | | | | | | | | | |
| TP 16 | | N | 3 | | 81.1 | 40.1 | | | | 98.5 | +3.0 | P | |
| | | E | | | | | | | | | | | |
| TP 17 | | N | 3 | | 80.4 | 40.7 | | | | 97.7 | +3.6 | P | |
| | | E | | | | | | | | | | | |
| TP 18 | | N | 3 | | 81.1 | 40.4 | | | | 98.6 | +3.3 | P | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

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of NORTH CAROLINA, LLC

# APPENDIX F
# Construction Testing

of NORTH CAROLINA, LLC

# SECTION F-1

## Laboratory Bulk Sample Test Results

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233 Fax: 770-923-8973
Cell: 678-612-6534
Web: www.test-llc.com

# Summary of Soil Testing (CL-Samples)

**Project Number:** 688

**Project Name:** CMS Landfill - Cell 2F

| T.E.S.T. Sample Number | Client Sample Number | USCS | UCS, psi | Moisture Content (%) | Grain Size Distribution | | | Atterberg Limits | | | Proctor | | Hydraulic Conductivity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | %Finer #4 Sieve | % Finer #200 Sieve | % Finer 0.005mm | L.L. % | P.L. % | P.I. % | Opt. M.C. % | Max.Dry. Density pcf | Initial M.C. % | Init.Dry Density pcf | Hydraulic Conduct. cm/sec |
| 2093 | CL-1 | - | - | - | 100* | 88.3 | - | - | - | - | 27.9 | 94.8 | - | - | - |
| 2109 | CL-2 | - | - | - | - | - | - | - | - | - | 16.9 | 114.4 | - | - | - |
| 2110 | CL-3 | - | - | - | - | - | - | - | - | - | 18.9 | 103.9 | - | - | - |
| 2111 | CL-4 | - | - | - | - | - | - | - | - | - | 25.2 | 94.0 | 26.9 | 90.1 | 2.6E-06 |
| 2120 | CL-5 | - | - | - | - | - | - | - | - | - | 26.3 | 86.7 | - | - | - |
| 2121 | CL-6 | - | - | - | 99.9 | 57.4 | 13.1 | 55 | 43 | 12 | 25.3 | 86.1 | - | - | - |
| 2121A | CL-6 | - | - | - | - | - | - | - | - | - | - | - | 28.7 | 83.4 | 9.8E-06 |
| 2122 | CL-7 | - | - | - | 100.0 | 75.7 | 25.7 | 51 | 40 | 11 | 27.4 | 88.6 | 31.0 | 85.9 | 7.0E-06 |
| 2123 | CL-8 | - | - | - | 98.9 | 48.5 | 15.9 | 44 | 34 | 10 | 18.3 | 103.0 | 21.7 | 100.2 | 4.2E-06 |
| 2194 | CL-9 | - | - | - | 100.0 | 56.6 | 23.4 | 45 | 30 | 15 | 21.4 | 100.0 | 25.0 | 96.8 | 1.5E-06 |
| 2210 | CL-10 | - | - | - | 100.0 | 53.4 | 17.8 | 53 | 32 | 21 | 21.6 | 100.2 | 24.5 | 97.0 | 1.8E-06 |
| 2217 | CL-11 | - | - | - | 100.0 | 76.6 | 52.8 | 63 | 30 | 33 | 24.4 | 97.8 | 27.6 | 94.7 | 9.9E-08 |
| 2250 | CL-12 | - | - | - | 100.0 | 89.2 | 51.2 | 77 | 34 | 43 | 37.1 | 82.3 | 40.7 | 79.4 | 3.4E-07 |
| 2251 | CL-13 | - | - | - | 99.5 | 67.0 | 39.3 | 52 | 22 | 30 | 23.9 | 101.5 | 27.3 | 98.2 | 4.9E-08 |

Note: * = Passing 6" Sieve

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 11/17/06 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2093/CL-1 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 1140; Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve

### NATURAL MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | |
| Mass of Dry Sample & Tare, g | |
| Mass of Tare, g | |
| Moisture Content, % | |

### HYGROSCOPIC MOISTURE CONTENT

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 186.28 |
| Mass of Dry Sample & Tare, g | 186.28 |
| Mass of Tare, g | 83.75 |
| Moisture Content, % | 0.00 |

### SAMPLE DATA

| | |
|---|---|
| Total mass of wet sample used for sieve analysis & tare, g | 186.28 |
| Mass of Tare, g | 83.75 |
| Total mass of dry sample used for sieve analysis, g | 102.53 |

### REMARKS

100% passing 6" sieve.

### SIEVE ANALYSIS

| | |
|---|---|
| Mass of Tare, g | 0 |
| Mass of sample and tare retained on No. 200 sieve, g | 12.03 |
| Percent of sample retained on No. 200 sieve, % | 11.73 |
| **Percent of material finer than No. 200 sieve, %** | **88.27** |

DESCRIPTION: NA

| | |
|---|---|
| LL | |
| PL | |
| PI | |

USCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
| NOTE: Method used for test: | B | Sieve No. 200 ID # | 38/86 |
| Length of Soaking Period: | Overnight | Sieve Shaker ID # | 54/130 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

| | |
|---|---|
| Tested By | KI |
| Date | 11/15/06 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2093/CL-1 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 19050.0 | 14689.8 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

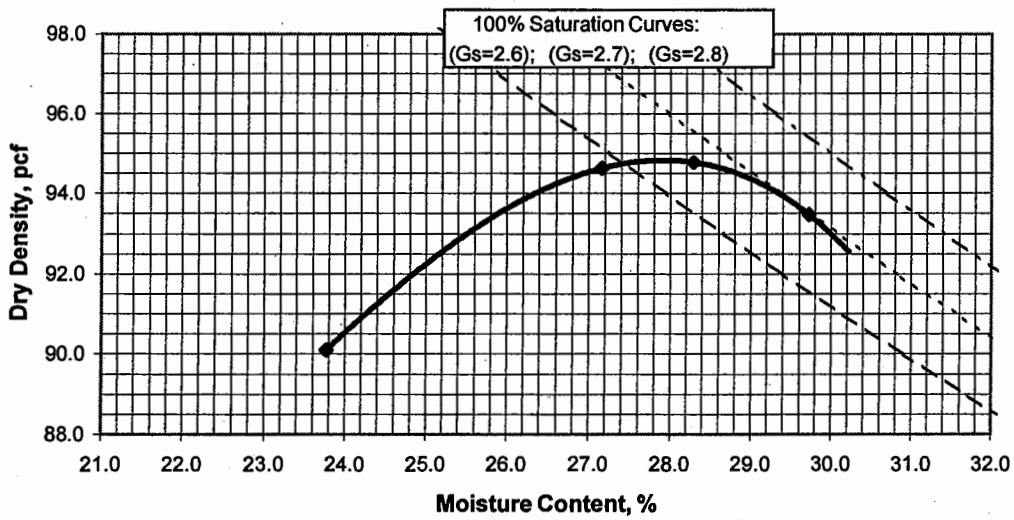
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 659.4 | |
| Mass of Dry Sample & Tare, g | 545.6 | |
| Mass of Tare, g | 162.2 | |
| Moisture Content, % | 29.7 | |

Procedure: B

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5632.0 | 5765.0 | 5784.0 | 5779.0 | |
| ass of Wet Sample & Tare, g | 507.0 | 493.5 | 583.5 | 481.5 | |
| Mass of Dry Sample & Tare, g | 426.7 | 406.7 | 475.8 | 393.8 | |
| Mass of Tare, g | 89.0 | 87.0 | 95.0 | 98.5 | |
| Moisture Content, % | 23.8 | 27.2 | 28.3 | 29.7 | |
| Wet Density, pcf | 111.5 | 120.3 | 121.6 | 121.3 | |
| Dry Density, pcf | 90.1 | 94.6 | 94.8 | 93.5 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 94.8 |
| **Optimum Moisture Content, %** | 27.9 |

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| | |
|---|---|
| Tested By | KI |
| Date | 11/22/06 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2109/CL-2 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 27850.0 | 23903.1 |
| Mass of Mat. Retained on No. 4 sieve, g | 337.5 | 337.5 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 1.4 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 1.4 |

*MOISTURE CONTENT*

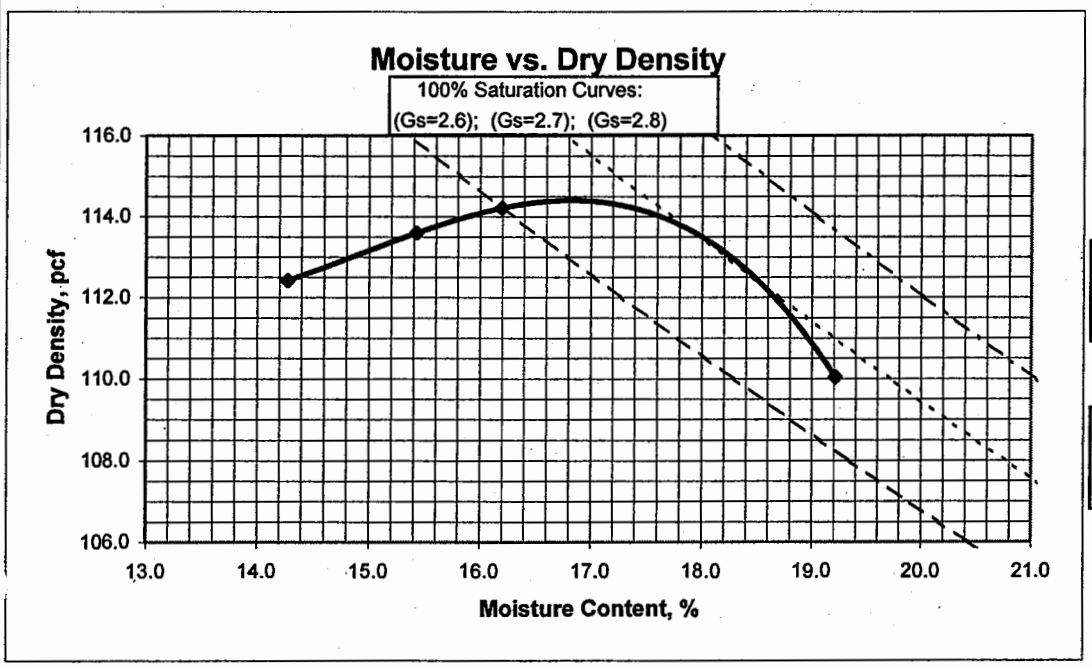
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 658.0 | 337.5 |
| Mass of Dry Sample & Tare, g | 578.0 | 337.5 |
| Mass of Tare, g | 93.5 | 0.0 |
| Moisture Content, % | 16.5 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5888.0 | 5928.0 | 5952.0 | 5929.0 | |
| Mass of Wet Sample & Tare, g | 511.0 | 519.5 | 497.5 | 463.0 | |
| Mass of Dry Sample & Tare, g | 458.9 | 462.5 | 442.3 | 404.4 | |
| Mass of Tare, g | 94.0 | 93.0 | 101.5 | 99.5 | |
| Moisture Content, % | 14.3 | 15.4 | 16.2 | 19.2 | |
| Wet Density, pcf | 128.5 | 131.1 | 132.7 | 131.2 | |
| Dry Density, pcf | 112.4 | 113.6 | 114.2 | 110.0 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 114.4 |
| **Optimum Moisture Content, %** | 16.9 |

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| | |
|---|---|
| Tested By | KI |
| Date | 11/22/06 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2110/CL-3 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 18050.0 | 15720.1 |
| Mass of Mat. Retained on No. 4 sieve, g | 393.0 | 393.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 2.5 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 2.5 |

*MOISTURE CONTENT*

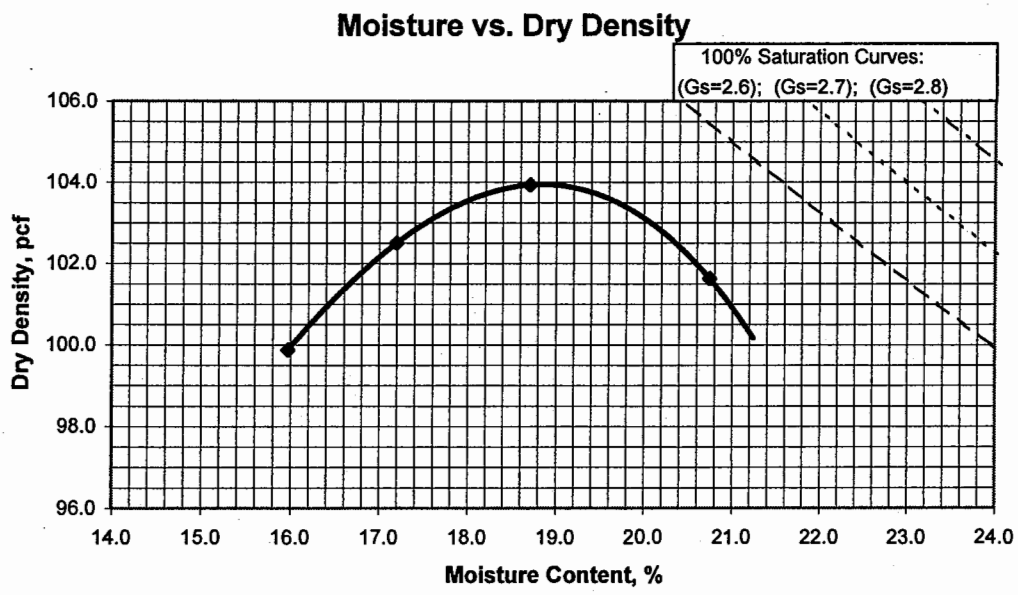
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 591.0 | 393.0 |
| Mass of Dry Sample & Tare, g | 527.0 | 393.0 |
| Mass of Tare, g | 95.5 | 0.0 |
| Moisture Content, % | 14.8 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5697.0 | 5762.0 | 5811.0 | 5801.0 | |
| Mass of Wet Sample & Tare, g | 512.5 | 538.0 | 522.0 | 520.5 | |
| Mass of Dry Sample & Tare, g | 455.0 | 474.0 | 455.0 | 449.7 | |
| Mass of Tare, g | 95.0 | 101.5 | 97.0 | 108.5 | |
| Moisture Content, % | 16.0 | 17.2 | 18.7 | 20.7 | |
| Wet Density, pcf | 115.8 | 120.1 | 123.4 | 122.7 | |
| Dry Density, pcf | 99.9 | 102.5 | 103.9 | 101.6 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 103.9 |
| **Optimum Moisture Content, %** | 18.9 |

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| | |
|---|---|
| Tested By | KI |
| Date | 11/22/06 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2111/CL-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 18730.0 | 15067.8 |
| Mass of Mat. Retained on No. 4 sieve, g | 67.2 | 37.2 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.2 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.2 |

*MOISTURE CONTENT*

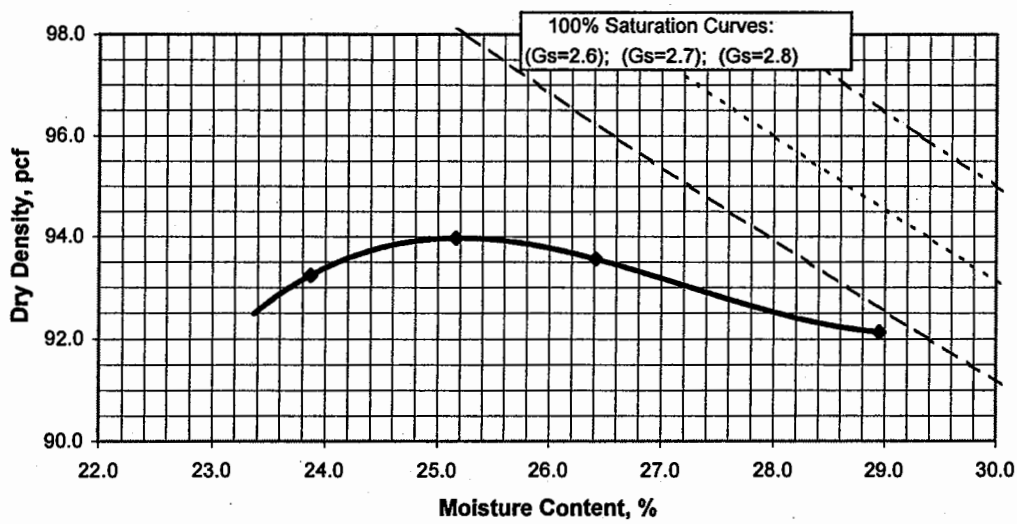
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 644.5 | 67.2 |
| Mass of Dry Sample & Tare, g | 535.2 | 37.2 |
| Mass of Tare, g | 85.5 | 0.0 |
| Moisture Content, % | 24.3 | 80.8 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5692.0 | 5724.0 | 5734.0 | 5742.0 | |
| Mass of Wet Sample & Tare, g | 554.5 | 555.5 | 551.0 | 627.0 | |
| Mass of Dry Sample & Tare, g | 468.4 | 463.6 | 458.5 | 507.9 | |
| Mass of Tare, g | 107.5 | 98.5 | 108.5 | 96.5 | |
| Moisture Content, % | 23.9 | 25.2 | 26.4 | 28.9 | |
| Wet Density, pcf | 115.5 | 117.6 | 118.3 | 118.8 | |
| Dry Density, pcf | 93.2 | 94.0 | 93.6 | 92.1 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 94.0 |
| **Optimum Moisture Content, %** | 25.2 |

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| | |
|---|---|
| Tested By | RI |
| Date | 11/28/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-01 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2111/CL-4 | Depth/Elev. | - |
| Location | - | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.585 | in | 6.57 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 270.23 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 495.07 | g | 1.09 | lb |
| Specific Gravity | 2.800 | (Assumed) | | |
| Dry Density | 90.1 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 419.49 | g |
| Mass of dry sample & tare | 375.71 | g |
| Mass of tare | 212.81 | g |
| % Moisture | 26.9 | |

### Test Data

| | | |
|---|---|---|
| Speed | 7 | |
| Board Number | 3 | |
| Cell Number | 10 | |
| Flow Pump Number | 1A | |
| Flow Pump Rate | 1.79E-03 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 111.84 | cm |
| Min Head | 111.14 | cm |
| Maximum Gradient | 16.81 | |
| Minimum Gradient | 16.71 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.619 | in | 6.65 | cm |
| Average Diameter of Sample | | | 2.875 | in | 7.30 | cm |
| Area | 6.49 | $in^2$ | 41.88 | $cm^2$ | | |
| Volume | 278.61 | $cm^3$ | 0.0098 | $ft^3$ | | |
| Mass | 532.65 | g | 1.17 | lb | | |

| | | |
|---|---|---|
| Dry Density | 87.3 | pcf |
| Vol. of Voids | 139.45 | $cm^3$ |
| Vol. of Solids | 139.16 | $cm^3$ |
| Void Ratio | 1.00 | |
| Saturation | 102.5 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 635.14 | g |
| Mass of dry sample & tare | 492.16 | g |
| Mass of tare | 102.54 | g |
| % Moisture | 36.7 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 11/28/06 | 10 | 0 | - | 1.58 | 111.14 | 16.71 | 19.8 | - | - | - | |
| 11/28/06 | 10 | 5 | 300 | 1.58 | 111.14 | 16.71 | 19.8 | 2.56E-06 | 1.005 | 2.57E-06 | |
| 11/28/06 | 10 | 10 | 300 | 1.59 | 111.84 | 16.81 | 19.8 | 2.55E-06 | 1.005 | 2.57E-06 | |
| 11/28/06 | 10 | 15 | 300 | 1.58 | 111.14 | 16.71 | 19.8 | 2.55E-06 | 1.005 | 2.57E-06 | * |
| 11/28/06 | 10 | 20 | 300 | 1.59 | 111.84 | 16.81 | 19.8 | 2.55E-06 | 1.005 | 2.57E-06 | * |
| 11/28/06 | 10 | 25 | 300 | 1.59 | 111.84 | 16.81 | 19.8 | 2.54E-06 | 1.005 | 2.56E-06 | * |
| 11/28/06 | 10 | 30 | 300 | 1.59 | 111.84 | 16.81 | 19.8 | 2.54E-06 | 1.005 | 2.56E-06 | * |

Reported Average Hydraulic Conductivity* 2.6E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 95.9% of maximum dry density (standard proctor) at 1.7% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 24/25 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 29 |
| Syringe ID # | 140 | | | Pore Pressure Transducer ID # | 26/27 |

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| | |
|---|---|
| Tested By | RI |
| Date | 12/06/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2120/CL-5 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 21410.0 | 17004.6 |
| Mass of Mat. Retained on No. 4 sieve, g | 114.2 | 114.2 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.7 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.7 |

*MOISTURE CONTENT*

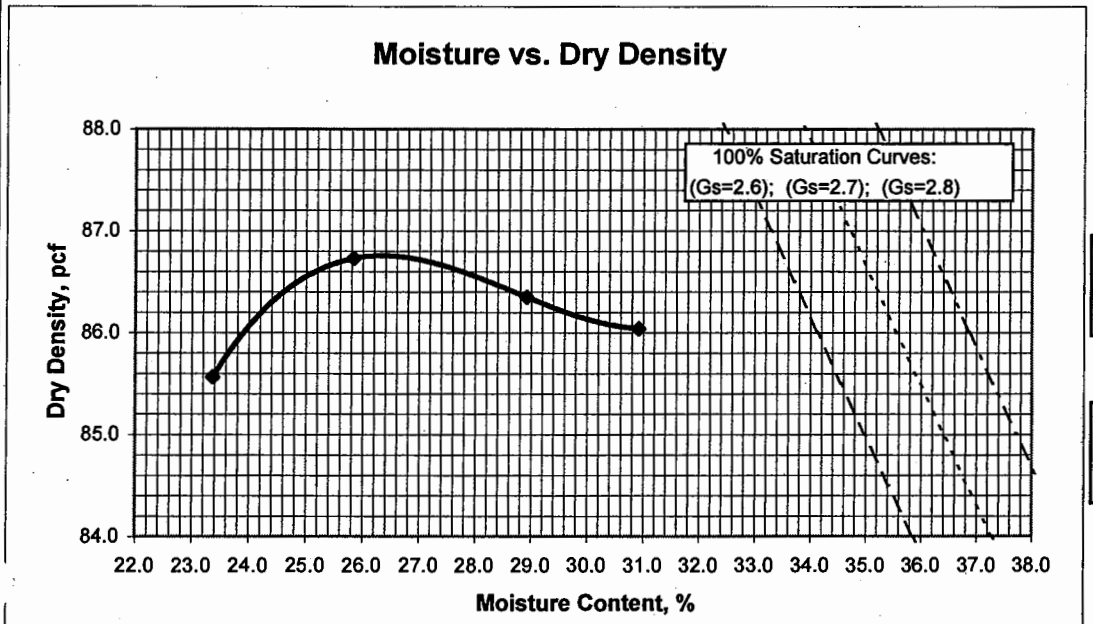
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 621.0 | 114.2 |
| Mass of Dry Sample & Tare, g | 513.9 | 114.2 |
| Mass of Tare, g | 100.5 | 0.0 |
| Moisture Content, % | 25.9 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5542.0 | 5596.0 | 5629.0 | 5649.0 | |
| Mass of Wet Sample & Tare, g | 574.5 | 562.0 | 580.0 | 579.5 | |
| Mass of Dry Sample & Tare, g | 484.8 | 467.3 | 471.2 | 465.3 | |
| Mass of Tare, g | 101.0 | 101.0 | 95.0 | 96.0 | |
| Moisture Content, % | 23.4 | 25.8 | 28.9 | 30.9 | |
| Wet Density, pcf | 105.6 | 109.1 | 111.3 | 112.6 | |
| Dry Density, pcf | 85.6 | 86.7 | 86.3 | 86.0 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION
NA

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 86.7 |
| **Optimum Moisture Content, %** | 26.3 |

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| | |
|---|---|
| Tested By | K.I |
| Date | 01/24/07 |
| Checked By | LK |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2121/CL-6 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

## ASTM D 422/AASHTO T 88
### Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 623.0 |
| Mass of Dry Sample & Tare, g | 535.3 |
| Mass of Tare, g | 159.0 |
| Moisture Content, % | 23.3 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 222.91 |
| Mass of Dry Sample & Tare, g | 201.36 |
| Mass of Tare, g | 86.87 |
| Moisture Content, % | 18.8 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 14551.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 12245.99 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 60.45 |
| Dry Mass, g | 50.87 |
| % of Total Sample passing #4 sieve | 99.9 |

## SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| e Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | | 0.0 | 100.0 |
| .5" | | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 6.60 | 0.1 | 99.9 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.51 | 98.9 |
| #20 | | 2.83 | 94.4 |
| #40 | FINE SAND | 7.37 | 85.5 |
| #60 | | 10.92 | 78.5 |
| #100 | | 15.19 | 70.1 |
| #200 | FINES | 21.68 | 57.4 |

Remarks

## HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:30 |

## PARTICLE-SIZE ANALYSIS

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 13.5 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 28.1 |
| % FINE GRAVEL | 0.1 | % FINES | 57.4 |
| % COARSE SAND | 1.0 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 13.1 | % CLAY(<0.002mm) | 6.9 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/25/07 | 11:32 | 2 | 30.0 | 16.7 | 0.01396 | 7.0 | 23.0 | 12.6 | 0.99 | 0.0350 | 44.7 |
| 01/25/07 | 11:35 | 5 | 26.0 | 16.7 | 0.01396 | 7.0 | 19.0 | 13.2 | 0.99 | 0.0227 | 37.0 |
| 01/25/07 | 11:45 | 15 | 21.5 | 16.7 | 0.01396 | 7.0 | 14.5 | 14.0 | 0.99 | 0.0135 | 28.2 |
| 01/25/07 | 12:00 | 30 | 18.0 | 16.7 | 0.01396 | 7.0 | 11.0 | 14.6 | 0.99 | 0.0097 | 21.4 |
| 01/25/07 | 12:30 | 60 | 16.0 | 16.7 | 0.01396 | 7.0 | 9.0 | 14.9 | 0.99 | 0.0070 | 17.5 |
| 01/25/07 | 15:40 | 250 | 12.0 | 16.7 | 0.01396 | 7.0 | 5.0 | 15.6 | 0.99 | 0.0035 | 9.7 |
| 01/26/07 | 11:30 | 1440 | 10.0 | 16.7 | 0.01396 | 7.0 | 3.0 | 15.9 | 0.99 | 0.0015 | 5.8 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

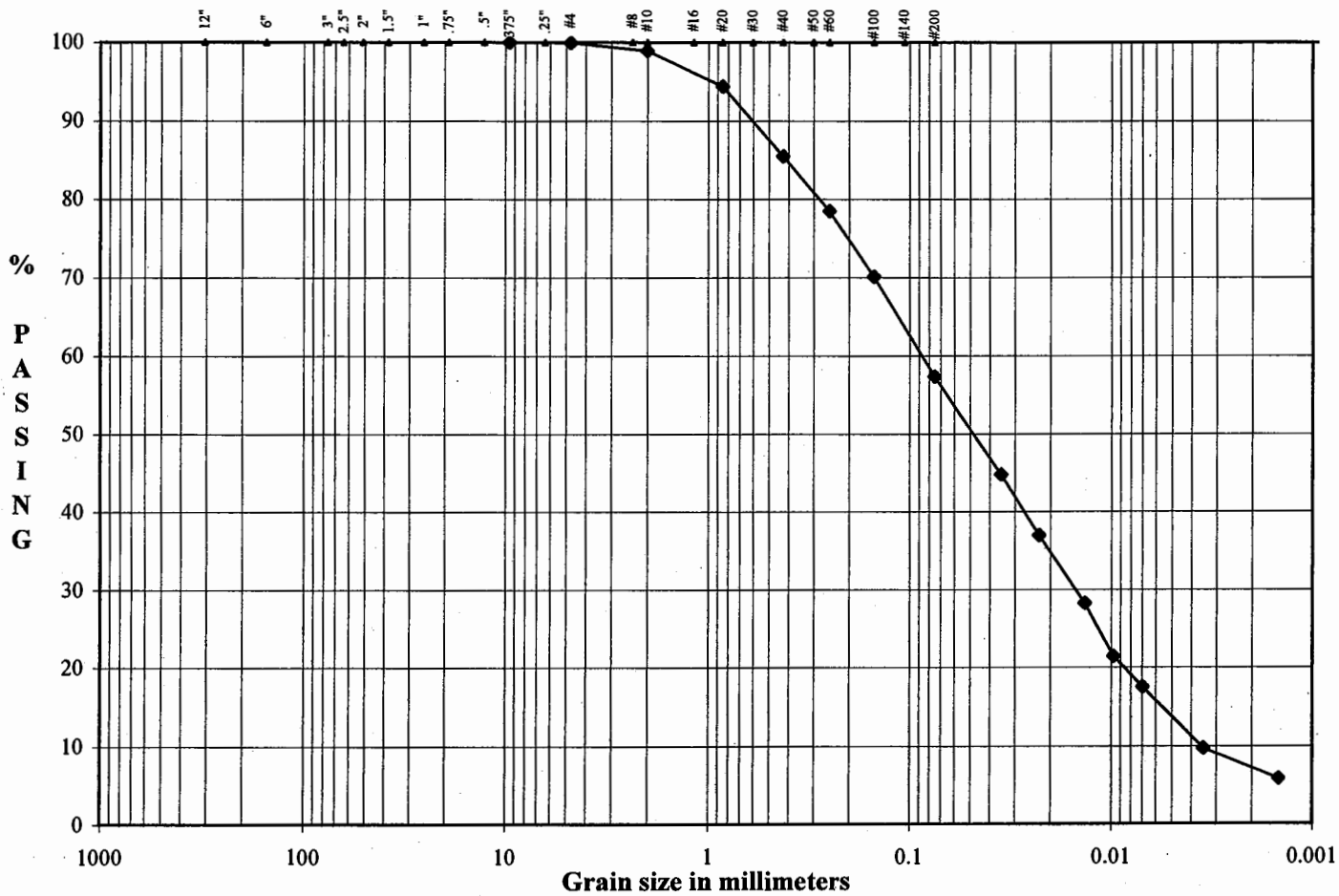
| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | Tested By | K.I |
| | | Date | 01/24/07 |
| | | Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2121/CL-6 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt or Clay |
|---|---|---|---|---|---|---|---|
| | | Gravel | | Sand | | | Fines |

DESCRIPTION: NA

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

USCS (ASTM D2487; D2488): NA

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AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 01/25/07 |
| Checked By | LB |

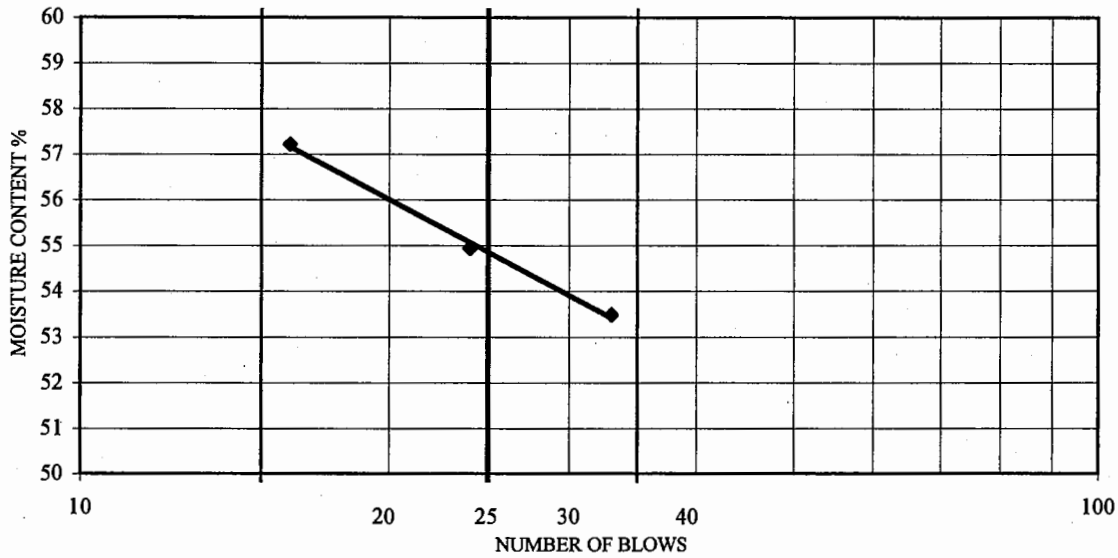
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2121/CL-6 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 33 | 24 | 16 |
| Mass of Wet Sample & Tare, g | 33.57 | 33.25 | 34.18 |
| Mass of Dry Sample & Tare, g | 30.73 | 30.30 | 30.85 |
| Mass of Tare, g | 25.42 | 24.93 | 25.03 |
| Moisture Content, % | 53.48 | 54.93 | 57.22 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 33.54 | 35.03 |
| Mass of Dry Sample & Tare, g | 31.12 | 31.98 |
| Mass of Tare, g | 25.50 | 24.91 |
| Moisture Content, % | 43.06 | 43.14 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 623.0 |
| Mass of Dry Sample & Tare, g | 535.3 |
| Mass of Tare, g | 159.0 |
| Moisture Content, % | 23.31 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 55 |
| PLASTIC LIMIT (PL) | 43 |
| PLASTICITY INDEX (PI) | 12 |
| LIQUIDITY INDEX (LI) | -1.64 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 12/06/06 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2121/CL-6 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 15100.0 | 12246.0 |
| Mass of Mat. Retained on No. 4 sieve, g | 6.6 | 6.6 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.1 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.1 |

*MOISTURE CONTENT*

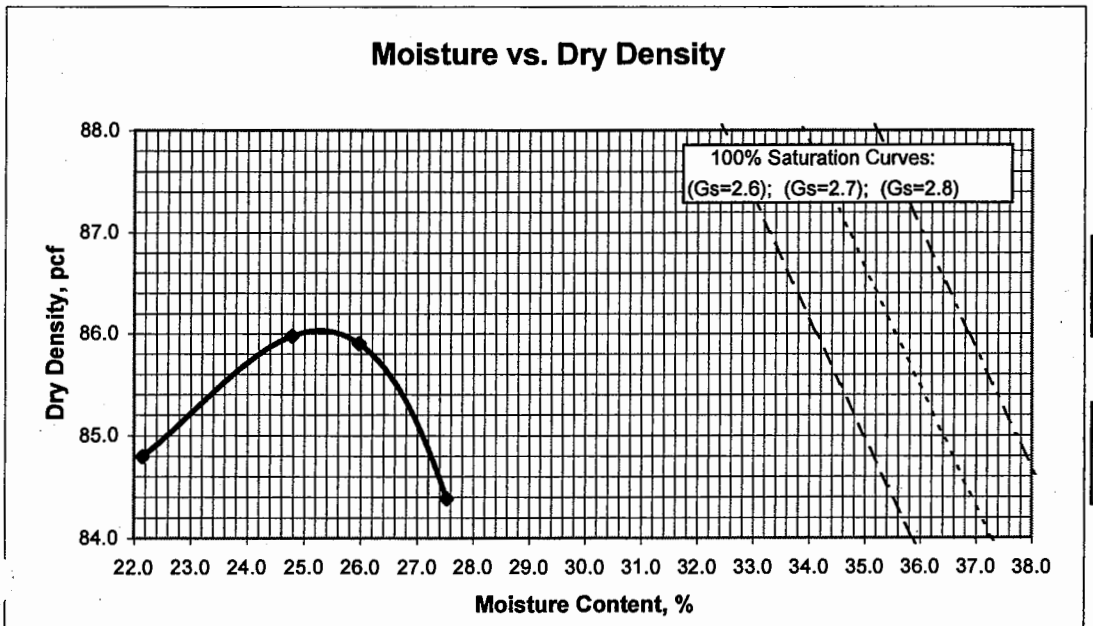
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 623.0 | 6.6 |
| Mass of Dry Sample & Tare, g | 535.3 | 6.6 |
| Mass of Tare, g | 159.0 | 0.0 |
| Moisture Content, % | 23.3 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5512.0 | 5568.0 | 5582.0 | 5573.0 | |
| Mass of Wet Sample & Tare, g | 534.0 | 526.0 | 586.0 | 534.5 | |
| Mass of Dry Sample & Tare, g | 453.3 | 438.8 | 485.5 | 439.2 | |
| Mass of Tare, g | 89.0 | 87.0 | 98.5 | 93.0 | |
| Moisture Content, % | 22.2 | 24.8 | 26.0 | 27.5 | |
| Wet Density, pcf | 103.6 | 107.3 | 108.2 | 107.6 | |
| Dry Density, pcf | 84.8 | 86.0 | 85.9 | 84.4 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION
NA

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 86.1 |
| **Optimum Moisture Content, %** | 25.3 |

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AAR AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 12/09/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | Remold |
| Sample ID | 2121A/CL-6 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.585 | in | 6.57 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 270.23 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 464.56 | g | 1.02 | lb |
| Specific Gravity | 2.650 | (Assumed) | | |
| Dry Density | 83.4 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 295.32 | g |
| Mass of dry sample & tare | 264.99 | g |
| Mass of tare | 159.14 | g |
| % Moisture | 28.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 6 | |
| Board Number | 1 | |
| Cell Number | 13 | |
| Flow Pump Number | 1A | |
| Flow Pump Rate | 3.58E-03 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 59.79 | cm |
| Min Head | 59.79 | cm |
| Maximum Gradient | 8.88 | |
| Minimum Gradient | 8.88 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.650 | in | 6.73 | cm |
| Average Diameter of Sample | | | 2.923 | in | 7.42 | cm |
| Area | 6.71 | $in^2$ | 43.29 | $cm^2$ | | |
| Volume | 291.40 | $cm^3$ | 0.0103 | $ft^3$ | | |
| Mass | 512.31 | g | 1.13 | lb | | |

| | | |
|---|---|---|
| Dry Density | 77.3 | pcf |
| Vol. of Voids | 155.23 | $cm^3$ |
| Vol. of Solids | 136.17 | $cm^3$ |
| Void Ratio | 1.14 | |
| Saturation | 97.6 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 608.44 | g |
| Mass of dry sample & tare | 457.00 | g |
| Mass of tare | 96.19 | g |
| % Moisture | 42.0 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 12/09/06 | 10 | 30 | - | 0.85 | 59.79 | 8.88 | 18.0 | - | - | - | |
| 12/09/06 | 10 | 35 | 300 | 0.85 | 59.79 | 8.88 | 18.0 | 9.32E-06 | 1.051 | 9.80E-06 | |
| 12/09/06 | 10 | 40 | 300 | 0.85 | 59.79 | 8.88 | 18.0 | 9.32E-06 | 1.051 | 9.80E-06 | |
| 12/09/06 | 10 | 45 | 300 | 0.85 | 59.79 | 8.88 | 18.0 | 9.32E-06 | 1.051 | 9.80E-06 | * |
| 12/09/06 | 10 | 50 | 300 | 0.85 | 59.79 | 8.88 | 18.0 | 9.32E-06 | 1.051 | 9.80E-06 | * |
| 12/09/06 | 10 | 55 | 300 | 0.85 | 59.79 | 8.88 | 18.0 | 9.32E-06 | 1.051 | 9.80E-06 | * |
| 12/09/06 | 11 | 0 | 300 | 0.85 | 59.79 | 8.88 | 18.0 | 9.32E-06 | 1.051 | 9.80E-06 | * |

Reported Average Hydraulic Conductivity* 9.8E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.9% of maximum dry density (standard proctor) at 3.4% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 24/25 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 140 | | | Pore Pressure Transducer ID # | 26/27 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | K.I |
| Date | 01/24/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2122/CL-7 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

## ASTM D 422/AASHTO T 88
### Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 421.0 |
| Mass of Dry Sample & Tare, g | 376.7 |
| Mass of Tare, g | 159.0 |
| Moisture Content, % | 20.3 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 195.73 |
| Mass of Dry Sample & Tare, g | 187.80 |
| Mass of Tare, g | 98.55 |
| Moisture Content, % | 8.9 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 16665.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 15305.12 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 59.76 |
| Dry Mass, g | 54.88 |
| % of Total Sample passing #4 sieve | 100.0 |

## SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | | 0.0 | 100.0 |
| .5" | | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 0.00 | 0.0 | 100.0 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.09 | 99.8 |
| #20 | | 0.66 | 98.8 |
| #40 | FINE SAND | 2.26 | 95.9 |
| #60 | | 4.18 | 92.4 |
| #100 | | 7.48 | 86.4 |
| #200 | FINES | 13.34 | 75.7 |

Remarks

## HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:32 |

## PARTICLE-SIZE ANALYSIS

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 4.0 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 20.2 |
| % FINE GRAVEL | 0.0 | % FINES | 75.7 |
| % COARSE SAND | 0.2 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 25.7 | % CLAY(<0.002mm) | 16.3 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/25/07 | 11:34 | 2 | 42.0 | 16.7 | 0.01396 | 7.0 | 35.0 | 10.6 | 0.99 | 0.0321 | 63.1 |
| 01/25/07 | 11:37 | 5 | 37.0 | 16.7 | 0.01396 | 7.0 | 30.0 | 11.4 | 0.99 | 0.0211 | 54.1 |
| 01/25/07 | 11:47 | 15 | 31.0 | 16.7 | 0.01396 | 7.0 | 24.0 | 12.4 | 0.99 | 0.0127 | 43.3 |
| 01/25/07 | 12:02 | 30 | 27.0 | 16.7 | 0.01396 | 7.0 | 20.0 | 13.1 | 0.99 | 0.0092 | 36.1 |
| 01/25/07 | 12:32 | 60 | 24.0 | 16.7 | 0.01396 | 7.0 | 17.0 | 13.6 | 0.99 | 0.0066 | 30.7 |
| 01/25/07 | 15:42 | 250 | 18.5 | 16.7 | 0.01396 | 7.0 | 11.5 | 14.5 | 0.99 | 0.0034 | 20.7 |
| 01/26/07 | 11:32 | 1440 | 15.0 | 16.7 | 0.01396 | 7.0 | 8.0 | 15.1 | 0.99 | 0.0014 | 14.4 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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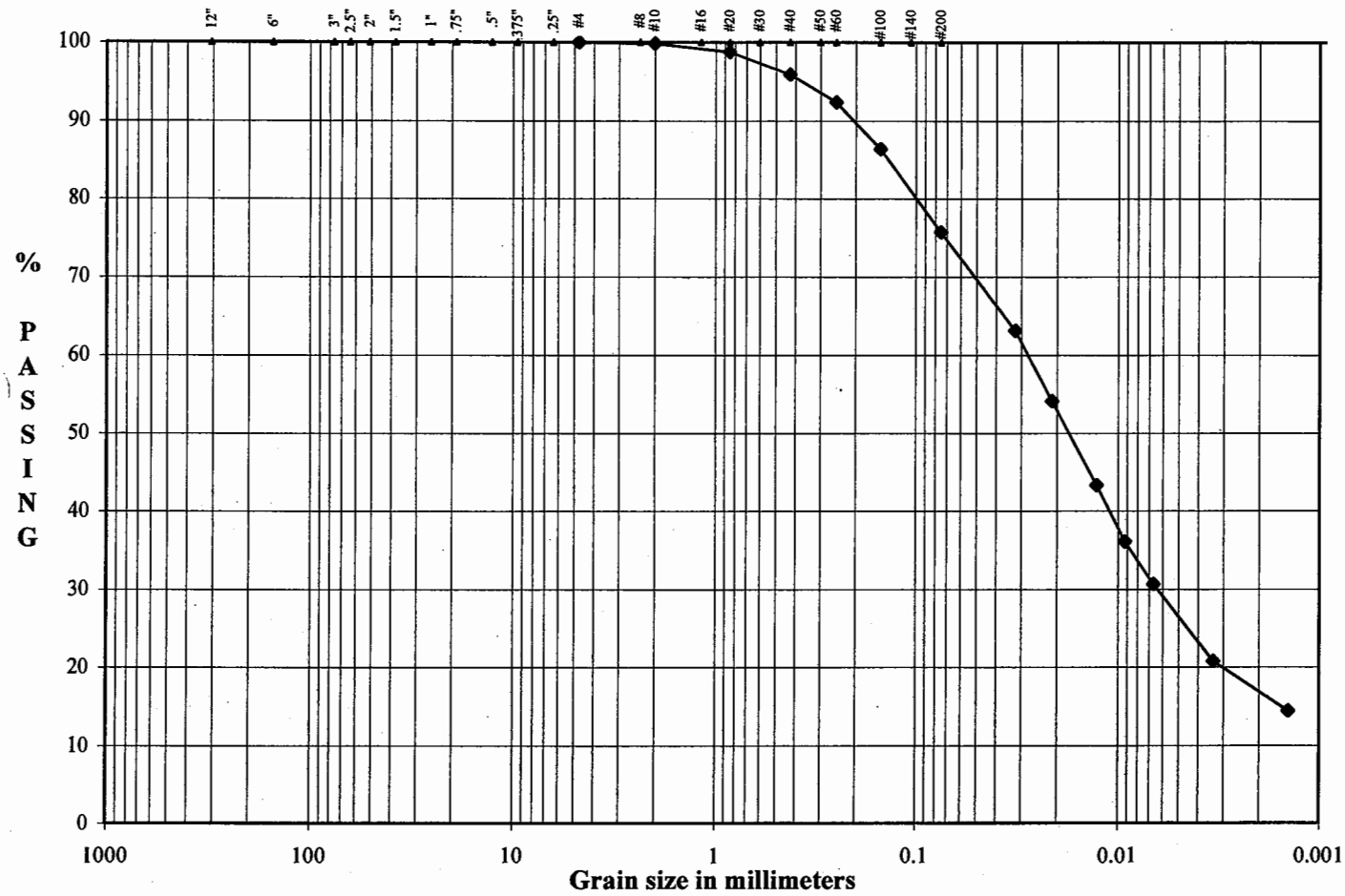
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2122/CL-7 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 01/25/07 |
| Checked By | KB |

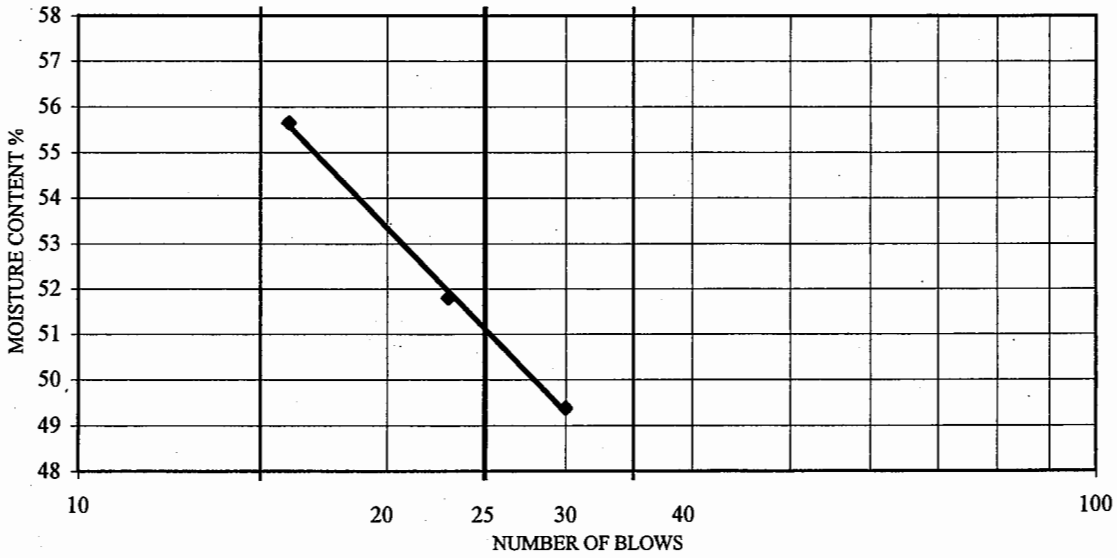
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2122/CL-7 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 30 | 23 | 16 |
| Mass of Wet Sample & Tare, g | 33.44 | 34.79 | 38.56 |
| Mass of Dry Sample & Tare, g | 30.68 | 31.33 | 35.26 |
| Mass of Tare, g | 25.09 | 24.65 | 29.33 |
| Moisture Content, % | 49.37 | 51.80 | 55.65 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 32.81 | 34.07 |
| Mass of Dry Sample & Tare, g | 30.46 | 31.55 |
| Mass of Tare, g | 24.53 | 25.17 |
| Moisture Content, % | 39.63 | 39.50 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 421.0 |
| Mass of Dry Sample & Tare, g | 376.7 |
| Mass of Tare, g | 159.0 |
| Moisture Content, % | 20.35 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 51 |
| PLASTIC LIMIT (PL) | 40 |
| PLASTICITY INDEX (PI) | 11 |
| LIQUIDITY INDEX (LI) | -1.79 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 12/07/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2122/CL-7 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 18420.0 | 15305.5 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

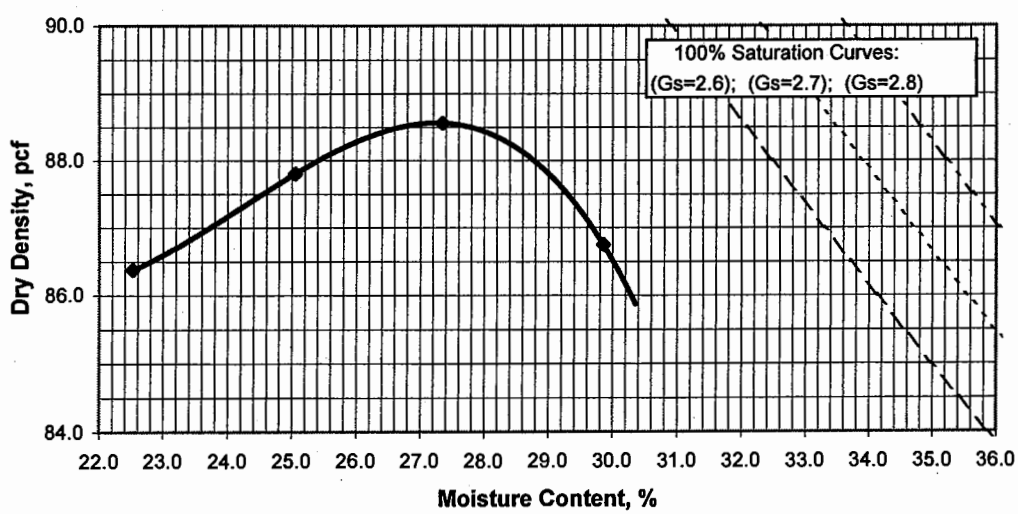
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 421.0 | |
| Mass of Dry Sample & Tare, g | 376.7 | |
| Mass of Tare, g | 159.0 | |
| Moisture Content, % | 20.3 | |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5546.0 | 5606.0 | 5651.0 | 5649.0 | |
| Mass of Wet Sample & Tare, g | 483.0 | 446.0 | 459.0 | 433.0 | |
| Mass of Dry Sample & Tare, g | 425.0 | 388.5 | 393.6 | 368.5 | |
| Mass of Tare, g | 167.5 | 159.0 | 154.5 | 152.5 | |
| Moisture Content, % | 22.5 | 25.1 | 27.4 | 29.9 | |
| Wet Density, pcf | 105.8 | 109.8 | 112.8 | 112.6 | |
| Dry Density, pcf | 86.4 | 87.8 | 88.6 | 86.7 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 88.6 |
| **Optimum Moisture Content, %** | 27.4 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 12/10/06 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | Remold |
| Sample ID | 2122/CL-7 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.580 | in | 6.55 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.71 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 486.41 | g | 1.07 | lb |
| Specific Gravity | 2.650 | (Assumed) | | |
| Dry Density | 85.9 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 310.31 | g |
| Mass of dry sample & tare | 273.82 | g |
| Mass of tare | 156.16 | g |
| % Moisture | 31.0 | |

### Test Data

| | | |
|---|---|---|
| Speed | 7 | |
| Board Number | 1 | |
| Cell Number | 8 | |
| Flow Pump Number | 1B | |
| Flow Pump Rate | 1.79E-03 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 45.72 | cm |
| Min Head | 45.02 | cm |
| Maximum Gradient | 6.76 | |
| Minimum Gradient | 6.65 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.664 | in | 6.77 | cm |
| Average Diameter of Sample | | | 2.894 | in | 7.35 | cm |
| Area | 6.58 | $in^2$ | 42.44 | $cm^2$ | | |
| Volume | 287.16 | $cm^3$ | 0.0101 | $ft^3$ | | |
| Mass | 519.85 | g | 1.15 | lb | | |

| | | |
|---|---|---|
| Dry Density | 80.8 | pcf |
| Vol. of Voids | 146.86 | $cm^3$ |
| Vol. of Solids | 140.30 | $cm^3$ |
| Void Ratio | 1.05 | |
| Saturation | 100.8 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 828.49 | g |
| Mass of dry sample & tare | 680.44 | g |
| Mass of tare | 308.69 | g |
| % Moisture | 39.8 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 12/10/06 | 12 | 10 | - | 0.65 | 45.72 | 6.76 | 15.9 | - | - | - | |
| 12/10/06 | 12 | 15 | 300 | 0.64 | 45.02 | 6.65 | 15.9 | 6.30E-06 | 1.110 | 6.99E-06 | |
| 12/10/06 | 12 | 20 | 300 | 0.64 | 45.02 | 6.65 | 15.9 | 6.35E-06 | 1.110 | 7.05E-06 | |
| 12/10/06 | 12 | 25 | 300 | 0.65 | 45.72 | 6.76 | 15.9 | 6.30E-06 | 1.110 | 6.99E-06 | * |
| 12/10/06 | 12 | 30 | 300 | 0.65 | 45.72 | 6.76 | 15.9 | 6.25E-06 | 1.110 | 6.94E-06 | * |
| 12/10/06 | 12 | 35 | 300 | 0.64 | 45.02 | 6.65 | 15.9 | 6.30E-06 | 1.110 | 6.99E-06 | * |
| 12/10/06 | 12 | 40 | 300 | 0.65 | 45.72 | 6.76 | 15.9 | 6.30E-06 | 1.110 | 6.99E-06 | * |

Reported Average Hydraulic Conductivity* 7.0E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION

NA

USCS (ASTM D2487;2488)

NA

REMARKS

Material passed #4 sieve used for testing. Material was remolded to 97.0% of maximum dry density (standard proctor) at 3.6% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 70/68 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 141 | | | Pore Pressure Transducer ID # | 26/27 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | K.I |
| Date | 01/24/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2123/CL-8 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 422/AASHTO T 88**
**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 592.5 |
| Mass of Dry Sample & Tare, g | 511.3 |
| Mass of Tare, g | 210.5 |
| Moisture Content, % | 27.0 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 200.49 |
| Mass of Dry Sample & Tare, g | 196.16 |
| Mass of Tare, g | 90.84 |
| Moisture Content, % | 4.1 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 13535.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 13000.51 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 59.95 |
| Dry Mass, g | 57.58 |
| % of Total Sample passing #4 sieve | 98.9 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | | | 0.0 | 100.0 |
| 2.5" | COARSE | | 0.0 | 100.0 |
| 2" | GRAVEL | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | | | 0.0 | 100.0 |
| .5" | FINE GRAVEL | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 139.00 | 1.1 | 98.9 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM | 0.54 | 98.0 |
| #20 | SAND | 1.76 | 95.9 |
| #40 | | 7.73 | 85.7 |
| #60 | FINE SAND | 14.62 | 73.8 |
| #100 | | 21.82 | 61.4 |
| #200 | FINES | 29.37 | 48.5 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:34 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 12.4 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 37.2 |
| % FINE GRAVEL | 1.1 | % FINES | 48.5 |
| % COARSE SAND | 0.9 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 15.9 | % CLAY(<0.002mm) | 11.2 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/25/07 | 11:36 | 2 | 30.5 | 16.7 | 0.01396 | 7.0 | 23.5 | 12.5 | 0.99 | 0.0349 | 40.0 |
| 01/25/07 | 11:39 | 5 | 27.0 | 16.7 | 0.01396 | 7.0 | 20.0 | 13.1 | 0.99 | 0.0226 | 34.0 |
| 01/25/07 | 11:49 | 15 | 23.0 | 16.7 | 0.01396 | 7.0 | 16.0 | 13.7 | 0.99 | 0.0134 | 27.2 |
| 01/25/07 | 12:04 | 30 | 20.0 | 16.7 | 0.01396 | 7.0 | 13.0 | 14.2 | 0.99 | 0.0096 | 22.1 |
| 01/25/07 | 12:34 | 60 | 18.0 | 16.7 | 0.01396 | 7.0 | 11.0 | 14.6 | 0.99 | 0.0069 | 18.7 |
| 01/25/07 | 15:44 | 250 | 15.0 | 16.7 | 0.01396 | 7.0 | 8.0 | 15.1 | 0.99 | 0.0034 | 13.6 |
| 01/26/07 | 11:34 | 1440 | 13.0 | 16.7 | 0.01396 | 7.0 | 6.0 | 15.4 | 0.99 | 0.0014 | 10.2 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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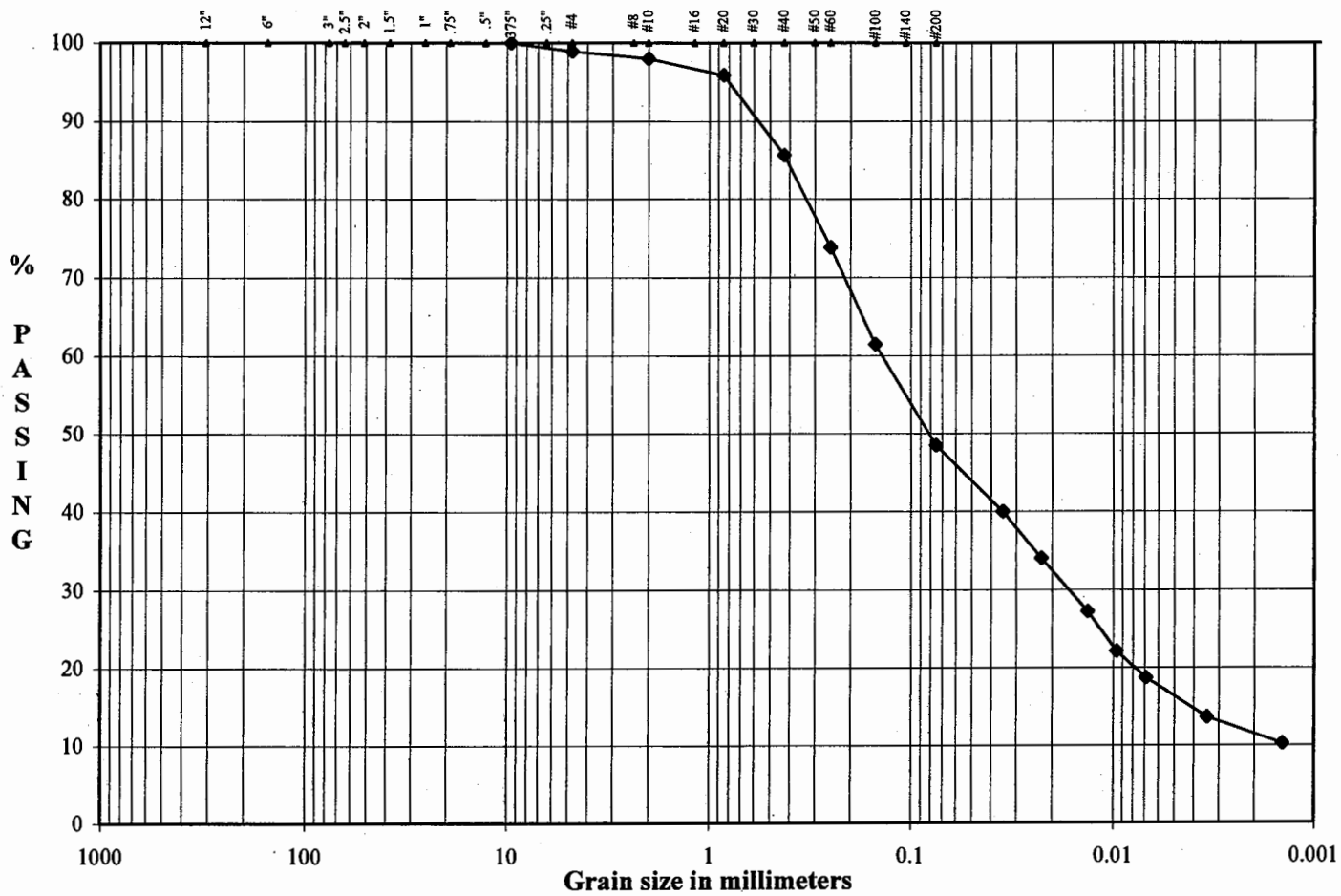
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2123/CL-8 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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| | |
|---|---|
| Tested By | KI |
| Date | 01/25/07 |
| Checked By | LB |

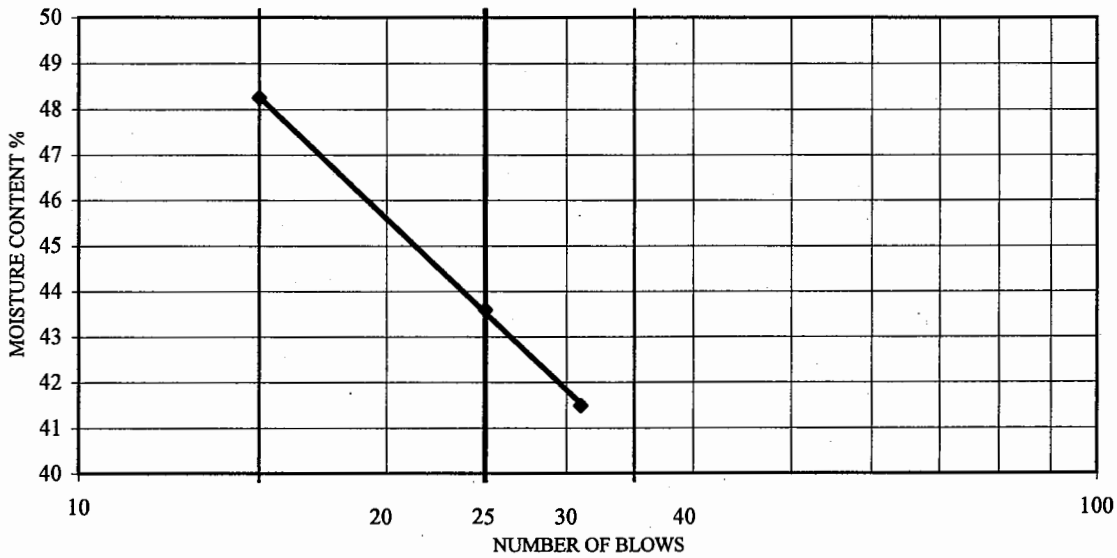
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2123/CL-8 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 31 | 25 | 15 |
| Mass of Wet Sample & Tare, g | 33.58 | 34.05 | 34.84 |
| Mass of Dry Sample & Tare, g | 31.02 | 31.43 | 31.67 |
| Mass of Tare, g | 24.85 | 25.42 | 25.10 |
| Moisture Content, % | 41.49 | 43.59 | 48.25 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 33.35 | 36.65 |
| Mass of Dry Sample & Tare, g | 31.21 | 33.79 |
| Mass of Tare, g | 24.97 | 25.44 |
| Moisture Content, % | 34.29 | 34.25 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 592.5 |
| Mass of Dry Sample & Tare, g | 511.3 |
| Mass of Tare, g | 210.5 |
| Moisture Content, % | 26.99 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 44 |
| PLASTIC LIMIT (PL) | 34 |
| PLASTICITY INDEX (PI) | 10 |
| LIQUIDITY INDEX (LI) | -0.70 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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| | |
|---|---|
| Tested By | KI |
| Date | 12/07/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2123/CL-8 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 16510.0 | 13000.5 |
| Mass of Mat. Retained on No. 4 sieve, g | 139.0 | 139.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 1.1 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 1.1 |

*MOISTURE CONTENT*

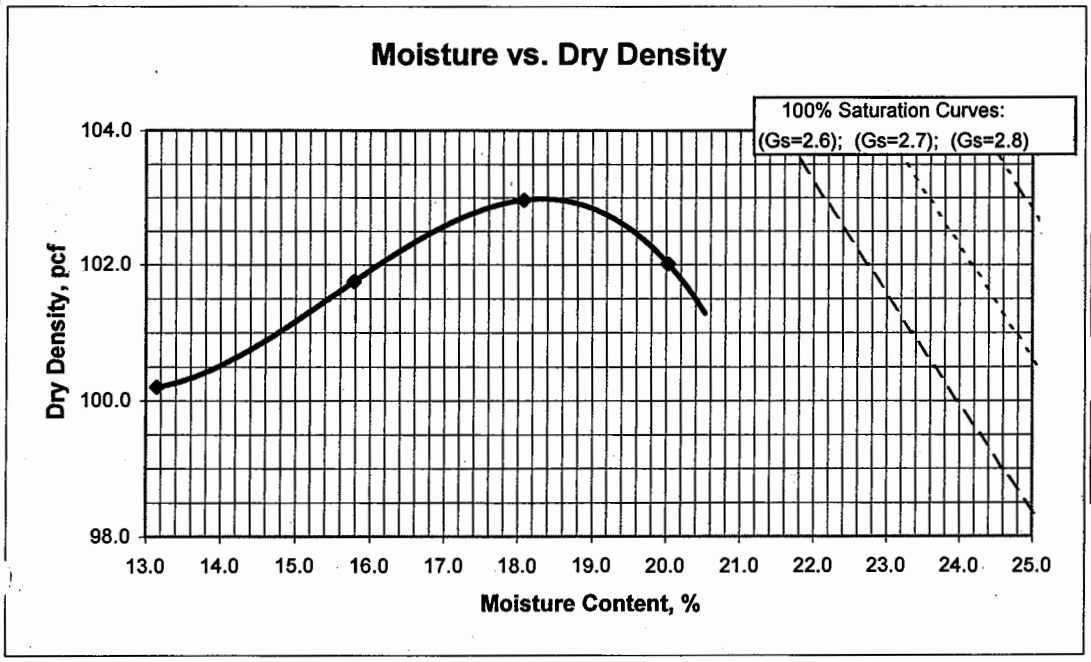
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 592.5 | 139.0 |
| Mass of Dry Sample & Tare, g | 511.3 | 139.0 |
| Mass of Tare, g | 210.5 | 0.0 |
| Moisture Content, % | 27.0 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5660.0 | 5727.0 | 5784.0 | 5797.0 | |
| Mass of Wet Sample & Tare, g | 415.5 | 429.5 | 457.0 | 616.0 | |
| Mass of Dry Sample & Tare, g | 385.4 | 393.1 | 410.9 | 564.1 | |
| Mass of Tare, g | 156.5 | 162.5 | 156.0 | 305.0 | |
| Moisture Content, % | 13.1 | 15.8 | 18.1 | 20.0 | |
| Wet Density, pcf | 113.4 | 117.8 | 121.6 | 122.4 | |
| Dry Density, pcf | 100.2 | 101.7 | 103.0 | 102.0 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%
Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%
Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 103.0 |
| **Optimum Moisture Content, %** | 18.3 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 12/10/06 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-02 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | Remold |
| Sample ID | 2123/CL-8 | Depth/Elev. | - |
| Location | ROCK QUARRY | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.580 | in | 6.55 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.71 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 527.00 | g | 1.16 | lb |
| Specific Gravity | 2.650 | (Assumed) | | |
| Dry Density | 100.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 318.54 | g |
| Mass of dry sample & tare | 290.24 | g |
| Mass of tare | 159.64 | g |
| % Moisture | 21.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 7 | |
| Board Number | 2 | |
| Cell Number | 11 | |
| Flow Pump Number | 1A | |
| Flow Pump Rate | 1.79E-03 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 75.26 | cm |
| Min Head | 75.26 | cm |
| Maximum Gradient | 11.25 | |
| Minimum Gradient | 11.25 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.634 | in | 6.69 | cm |
| Average Diameter of Sample | | | 2.885 | in | 7.33 | cm |
| Area | 6.54 | $in^2$ | 42.17 | $cm^2$ | | |
| Volume | 282.16 | $cm^3$ | 0.0100 | $ft^3$ | | |
| Mass | 551.11 | g | 1.21 | lb | | |

| | | |
|---|---|---|
| Dry Density | 95.7 | pcf |
| Vol. of Voids | 118.80 | $cm^3$ |
| Vol. of Solids | 163.36 | $cm^3$ |
| Void Ratio | 0.73 | |
| Saturation | 99.5 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 856.95 | g |
| Mass of dry sample & tare | 738.77 | g |
| Mass of tare | 305.90 | g |
| % Moisture | 27.3 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 12/10/06 | 12 | 10 | - | 1.07 | 75.26 | 11.25 | 15.9 | - | - | - | |
| 12/10/06 | 12 | 15 | 300 | 1.07 | 75.26 | 11.25 | 15.9 | 3.78E-06 | 1.110 | 4.19E-06 | |
| 12/10/06 | 12 | 20 | 300 | 1.07 | 75.26 | 11.25 | 15.9 | 3.78E-06 | 1.110 | 4.19E-06 | |
| 12/10/06 | 12 | 25 | 300 | 1.07 | 75.26 | 11.25 | 15.9 | 3.78E-06 | 1.110 | 4.19E-06 | * |
| 12/10/06 | 12 | 30 | 300 | 1.07 | 75.26 | 11.25 | 15.9 | 3.78E-06 | 1.110 | 4.19E-06 | * |
| 12/10/06 | 12 | 35 | 300 | 1.07 | 75.26 | 11.25 | 15.9 | 3.78E-06 | 1.110 | 4.19E-06 | * |
| 12/10/06 | 12 | 40 | 300 | 1.07 | 75.26 | 11.25 | 15.9 | 3.78E-06 | 1.110 | 4.19E-06 | * |

Reported Average Hydraulic Conductivity* 4.2E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 97.3% of maximum dry density (standard proctor) at 3.4% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 24/25 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 140 | | | Pore Pressure Transducer ID # | 26/27 |

| | | | |
|---|---|---|---|
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| | | Date | 01/12/07 |
| | | Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2194/CL-9 | Depth/Elev. | - |
| Location | STOCKPILE | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 814.70 |
| Mass of Dry Sample & Tare, g | 698.00 |
| Mass of Tare, g | 162.60 |
| Moisture Content, % | 21.8 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 513.39 |
| Mass of Dry Sample & Tare, g | 461.98 |
| Mass of Tare, g | 228.10 |
| Moisture Content, % | 22.0 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 17126.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 14039.85 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 75.05 |
| Dry Mass, g | 61.53 |
| % of Total Sample passing #4 sieve | 100.0 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | | 0.0 | 100.0 |
| .5" | | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 0.00 | 0.0 | 100.0 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.22 | 99.6 |
| #20 | | 3.25 | 94.7 |
| #40 | FINE SAND | 9.93 | 83.9 |
| #60 | | 15.70 | 74.5 |
| #100 | | 21.03 | 65.8 |
| #200 | FINES | 26.69 | 56.6 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 9:48 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 15.8 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 27.2 |
| % FINE GRAVEL | 0.0 | % FINES | 56.6 |
| % COARSE SAND | 0.4 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 23.4 | % CLAY(<0.002mm) | 18.0 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/15/07 | 9:50 | 2 | 36.5 | 18.9 | 0.01361 | 7.5 | 29.0 | 11.6 | 0.99 | 0.0327 | 46.7 |
| 01/15/07 | 9:53 | 5 | 32.5 | 18.9 | 0.01361 | 7.5 | 25.0 | 12.2 | 0.99 | 0.0213 | 40.2 |
| 01/15/07 | 10:03 | 15 | 28.0 | 18.9 | 0.01361 | 7.5 | 20.5 | 13.0 | 0.99 | 0.0127 | 33.0 |
| 01/15/07 | 10:18 | 30 | 26.0 | 18.9 | 0.01361 | 7.5 | 18.5 | 13.3 | 0.99 | 0.0091 | 29.8 |
| 01/15/07 | 10:48 | 60 | 23.0 | 18.9 | 0.01361 | 7.5 | 15.5 | 13.8 | 0.99 | 0.0065 | 24.9 |
| 01/15/07 | 13:58 | 250 | 21.0 | 18.9 | 0.01361 | 7.5 | 13.5 | 14.1 | 0.99 | 0.0032 | 21.7 |
| 01/16/07 | 9:48 | 1440 | 17.5 | 18.9 | 0.01361 | 7.5 | 10.0 | 14.7 | 0.99 | 0.0014 | 16.1 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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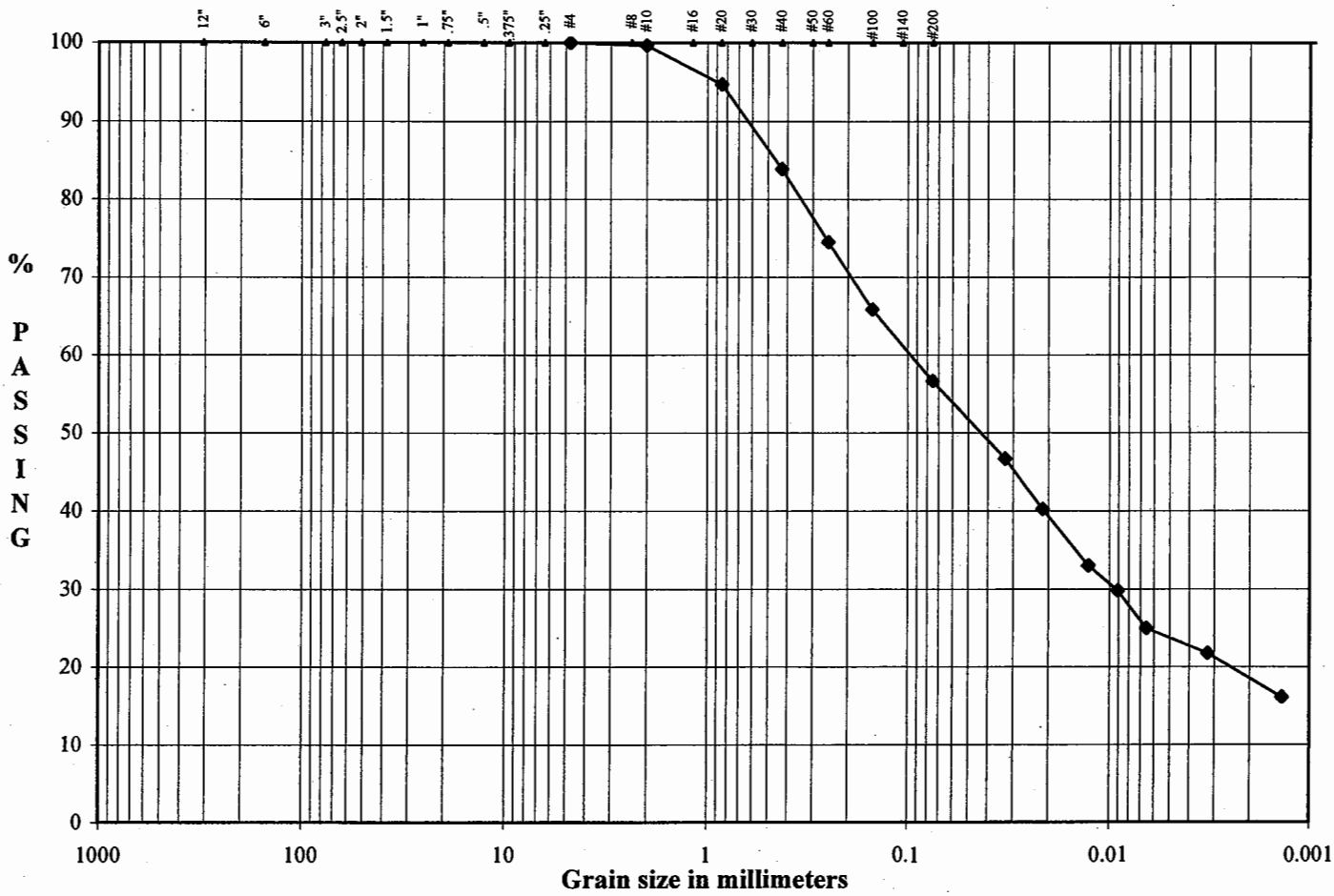
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2194/CL-9 | Depth/Elev. | - |
| Location | STOCKPILE | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

DESCRIPTION: NA

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

USCS (ASTM D2487; D2488): NA

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/16/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2194/CL-9 | Depth/Elev. | - |
| Location | STOCKPILE | Add. Info | - |

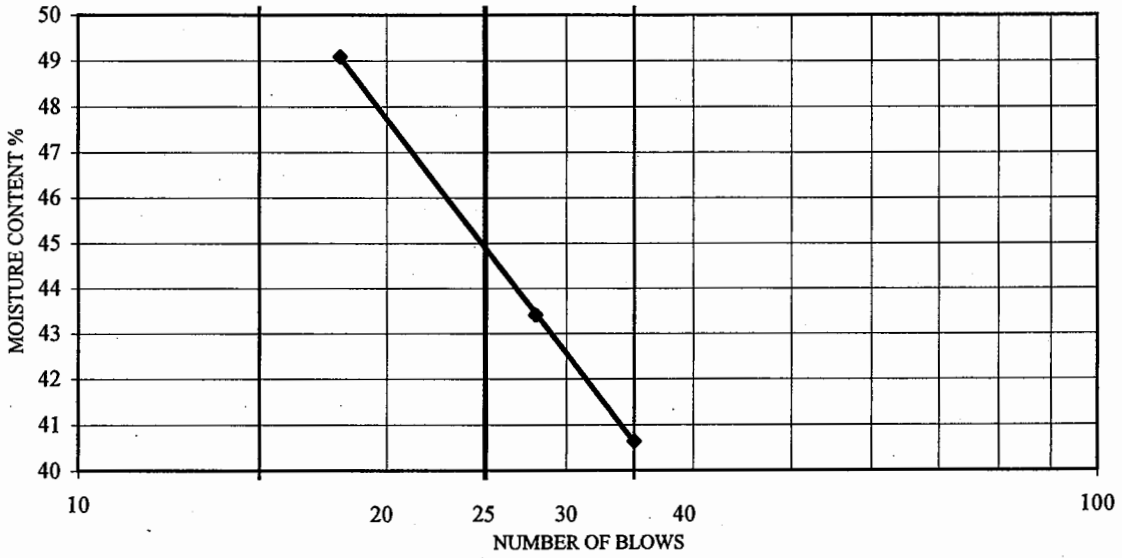
**ASTM D 4318/AASHTO T 88, T 89**

**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 35 | 28 | 18 |
| Mass of Wet Sample & Tare, g | 34.46 | 35.44 | 33.65 |
| Mass of Dry Sample & Tare, g | 31.79 | 32.64 | 30.96 |
| Mass of Tare, g | 25.22 | 26.19 | 25.48 |
| Moisture Content, % | 40.64 | 43.41 | 49.09 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 30.03 | 28.98 |
| Mass of Dry Sample & Tare, g | 27.84 | 26.83 |
| Mass of Tare, g | 20.67 | 19.72 |
| Moisture Content, % | 30.54 | 30.24 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 814.70 |
| Mass of Dry Sample & Tare, g | 698.00 |
| Mass of Tare, g | 162.60 |
| Moisture Content, % | 21.80 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 45 |
| PLASTIC LIMIT (PL) | 30 |
| PLASTICITY INDEX (PI) | 15 |
| LIQUIDITY INDEX (LI) | -0.55 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/12/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2194/CL-9 | Depth/Elev. | - |
| Location | STOCKPILE | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 17100.0 | 14039.8 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

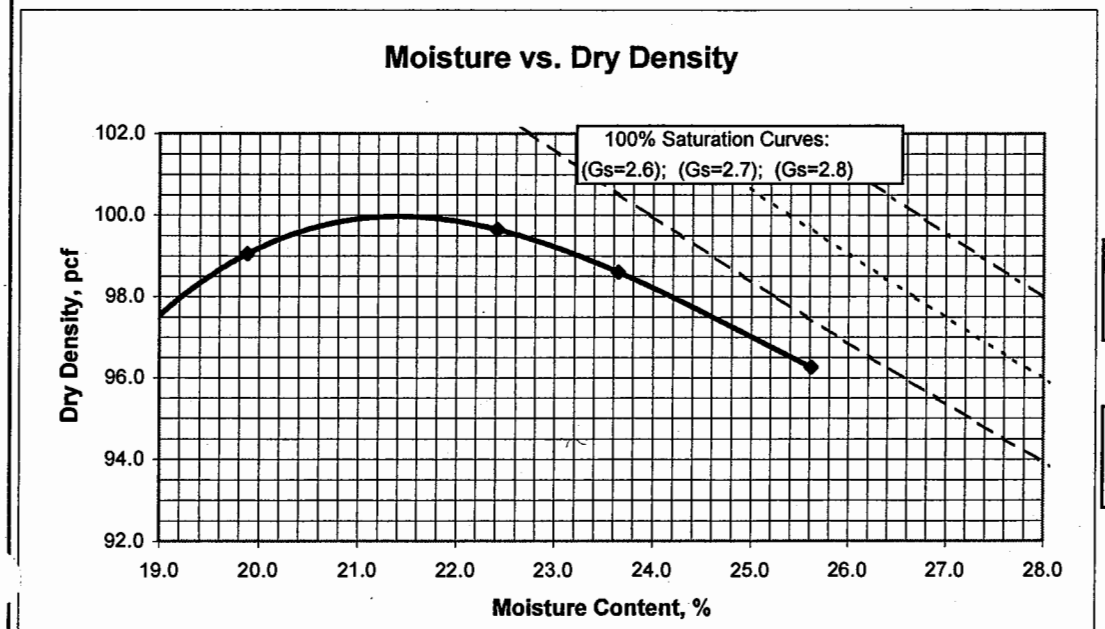
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 814.7 | |
| Mass of Dry Sample & Tare, g | 698.0 | |
| Mass of Tare, g | 162.6 | |
| Moisture Content, % | 21.8 | |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5741.0 | 5790.0 | 5789.0 | 5774.0 | |
| Mass of Wet Sample & Tare, g | 581.0 | 625.5 | 668.0 | 615.0 | |
| Mass of Dry Sample & Tare, g | 498.5 | 530.0 | 558.5 | 511.5 | |
| Mass of Tare, g | 83.5 | 104.0 | 95.5 | 107.5 | |
| Moisture Content, % | 19.9 | 22.4 | 23.7 | 25.6 | |
| Wet Density, pcf | 118.7 | 122.0 | 121.9 | 120.9 | |
| Dry Density, pcf | 99.0 | 99.6 | 98.6 | 96.3 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 100.0 |
| **Optimum Moisture Content, %** | 21.4 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/16/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2194/CL-9 | Depth/Elev. | - |
| Location | STOCKPILE | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.568 | in | 6.52 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 268.46 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 520.59 | g | 1.15 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 96.8 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 452.72 | g |
| Mass of dry sample & tare | 408.10 | g |
| Mass of tare | 229.86 | g |
| % Moisture | 25.0 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 5 | |
| Cell Number | 6 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 94.96 | cm |
| Min Head | 94.96 | cm |
| Maximum Gradient | 14.52 | |
| Minimum Gradient | 14.52 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.574 | in | 6.54 | cm |
| Average Diameter of Sample | | | 2.859 | in | 7.26 | cm |
| Area | 6.42 | $in^2$ | 41.42 | $cm^2$ | | |
| Volume | 270.79 | $cm^3$ | 0.0096 | $ft^3$ | | |
| Mass | 534.83 | g | 1.18 | lb | | |

| | | |
|---|---|---|
| Dry Density | 95.8 | pcf |
| Vol. of Voids | 116.88 | $cm^3$ |
| Vol. of Solids | 153.91 | $cm^3$ |
| Void Ratio | 0.76 | |
| Saturation | 102.1 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 643.23 | g |
| Mass of dry sample & tare | 523.96 | g |
| Mass of tare | 108.44 | g |
| % Moisture | 28.7 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 01/16/07 | 10 | 30 | - | 1.35 | 94.96 | 14.52 | 18.9 | - | - | - | |
| 01/16/07 | 10 | 35 | 300 | 1.35 | 94.96 | 14.52 | 18.9 | 1.49E-06 | 1.028 | 1.53E-06 | |
| 01/16/07 | 10 | 40 | 300 | 1.35 | 94.96 | 14.52 | 18.9 | 1.49E-06 | 1.028 | 1.53E-06 | |
| 01/16/07 | 10 | 45 | 300 | 1.35 | 94.96 | 14.52 | 18.9 | 1.49E-06 | 1.028 | 1.53E-06 | * |
| 01/16/07 | 10 | 50 | 300 | 1.35 | 94.96 | 14.52 | 18.9 | 1.49E-06 | 1.028 | 1.53E-06 | * |
| 01/16/07 | 10 | 55 | 300 | 1.35 | 94.96 | 14.52 | 18.9 | 1.49E-06 | 1.028 | 1.53E-06 | * |
| 01/16/07 | 11 | 0 | 300 | 1.35 | 94.96 | 14.52 | 18.9 | 1.49E-06 | 1.028 | 1.53E-06 | * |

Reported Average Hydraulic Conductivity* 1.5E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.8% of maximum dry density (standard proctor) at 3.6% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 01/18/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2210/CL-10 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

**ASTM D 422/AASHTO T 88**
**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 842.0 |
| Mass of Dry Sample & Tare, g | 720.0 |
| Mass of Tare, g | 158.0 |
| Moisture Content, % | 21.7 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 344.49 |
| Mass of Dry Sample & Tare, g | 296.02 |
| Mass of Tare, g | 89.32 |
| Moisture Content, % | 23.4 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 23936.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 19389.31 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 80.20 |
| Dry Mass, g | 64.97 |
| % of Total Sample passing #4 sieve | 100.0 |

SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| ve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | | | 0.0 | 100.0 |
| 2.5" | COARSE | | 0.0 | 100.0 |
| 2" | GRAVEL | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | | | 0.0 | 100.0 |
| .5" | FINE GRAVEL | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 0.00 | 0.0 | 100.0 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM | 0.73 | 98.9 |
| #20 | SAND | 3.28 | 95.0 |
| #40 | | 7.63 | 88.3 |
| #60 | FINE SAND | 12.89 | 80.2 |
| #100 | | 20.65 | 68.2 |
| #200 | FINES | 30.25 | 53.4 |

Remarks

HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 9:25 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 10.6 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 34.8 |
| % FINE GRAVEL | 0.0 | % FINES | 53.4 |
| % COARSE SAND | 1.1 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 17.8 | % CLAY(<0.002mm) | 12.5 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/19/07 | 9:27 | 2 | 33.0 | 17.0 | 0.01396 | 7.0 | 26.0 | 12.1 | 0.99 | 0.0343 | 39.6 |
| 01/19/07 | 9:30 | 5 | 28.0 | 17.0 | 0.01396 | 7.0 | 21.0 | 12.9 | 0.99 | 0.0224 | 32.0 |
| 01/19/07 | 9:40 | 15 | 24.5 | 17.0 | 0.01396 | 7.0 | 17.5 | 13.5 | 0.99 | 0.0132 | 26.7 |
| 01/19/07 | 9:55 | 30 | 22.0 | 17.0 | 0.01396 | 7.0 | 15.0 | 13.9 | 0.99 | 0.0095 | 22.9 |
| 01/19/07 | 10:25 | 60 | 20.5 | 17.0 | 0.01396 | 7.0 | 13.5 | 14.1 | 0.99 | 0.0068 | 20.6 |
| 01/19/07 | 13:35 | 250 | 17.0 | 17.0 | 0.01396 | 7.0 | 10.0 | 14.7 | 0.99 | 0.0034 | 15.2 |
| 01/20/07 | 9:25 | 1440 | 14.5 | 17.0 | 0.01396 | 7.0 | 7.5 | 15.1 | 0.99 | 0.0014 | 11.4 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

| | | | |
|---|---|---|---|
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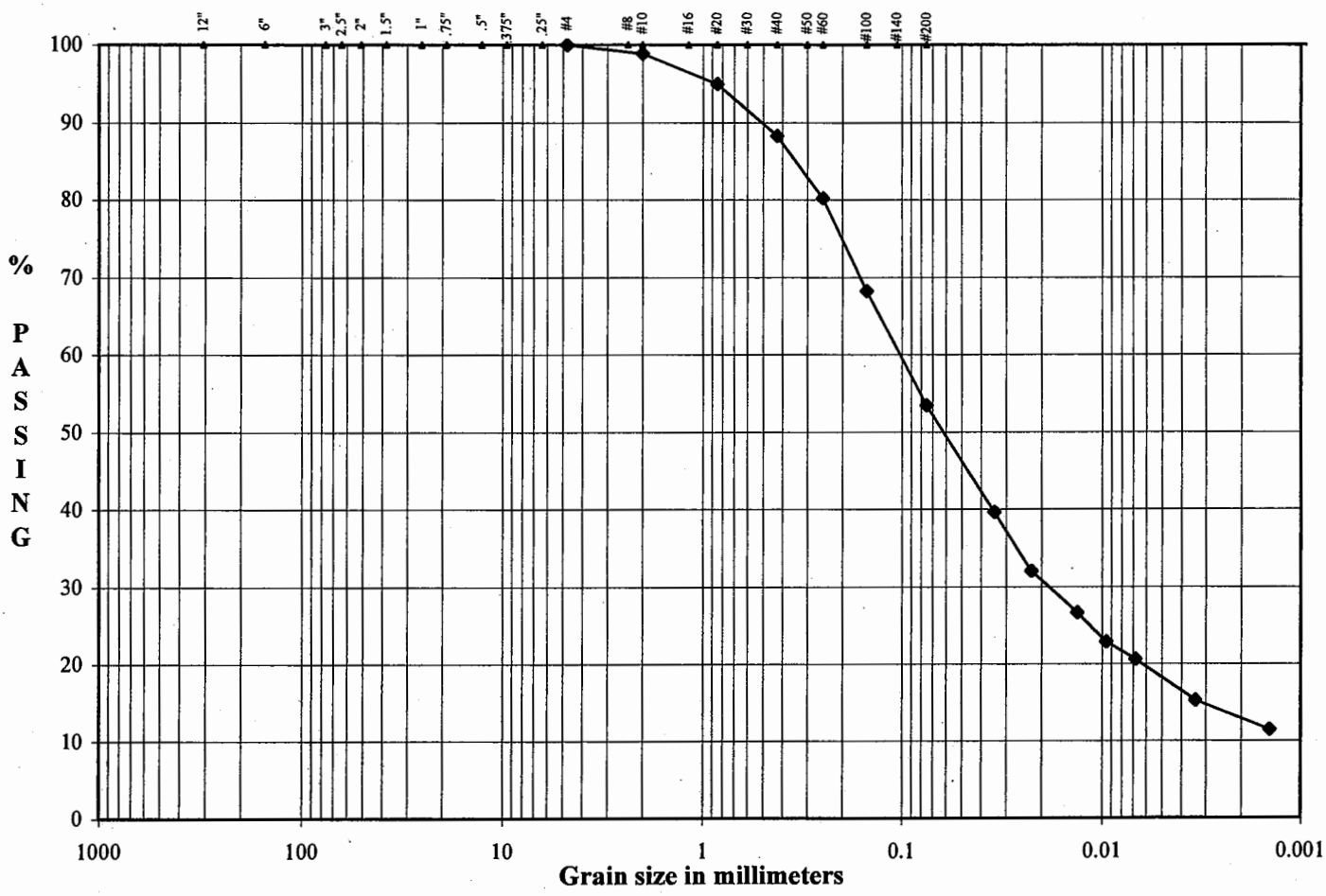
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2210/CL-10 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 11/19/07 |
| Checked By | VB |

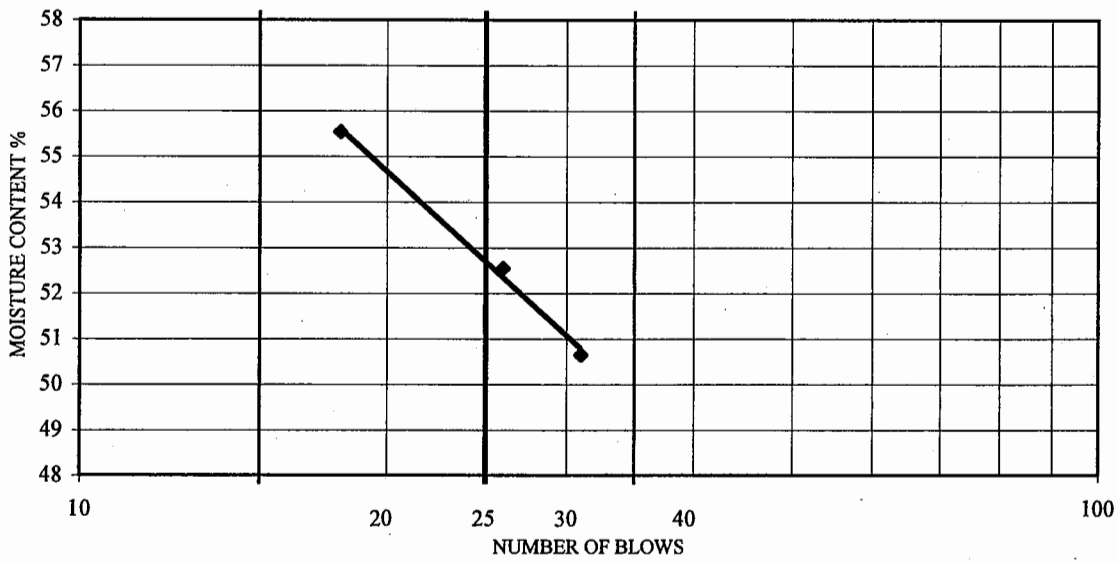
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2210/CL-10 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 31 | 26 | 18 |
| Mass of Wet Sample & Tare, g | 33.67 | 34.61 | 36.18 |
| Mass of Dry Sample & Tare, g | 30.54 | 31.62 | 32.82 |
| Mass of Tare, g | 24.36 | 25.93 | 26.77 |
| Moisture Content, % | 50.65 | 52.55 | 55.54 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 30.29 | 27.63 |
| Mass of Dry Sample & Tare, g | 28.03 | 25.38 |
| Mass of Tare, g | 20.87 | 18.33 |
| Moisture Content, % | 31.56 | 31.91 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 842.00 |
| Mass of Dry Sample & Tare, g | 720.00 |
| Mass of Tare, g | 158.00 |
| Moisture Content, % | 21.71 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 53 |
| PLASTIC LIMIT (PL) | 32 |
| PLASTICITY INDEX (PI) | 21 |
| LIQUIDITY INDEX (LI) | -0.49 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/18/07 |
| Checked By | Vl |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2210/CL-10 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 23600.0 | 19390.6 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

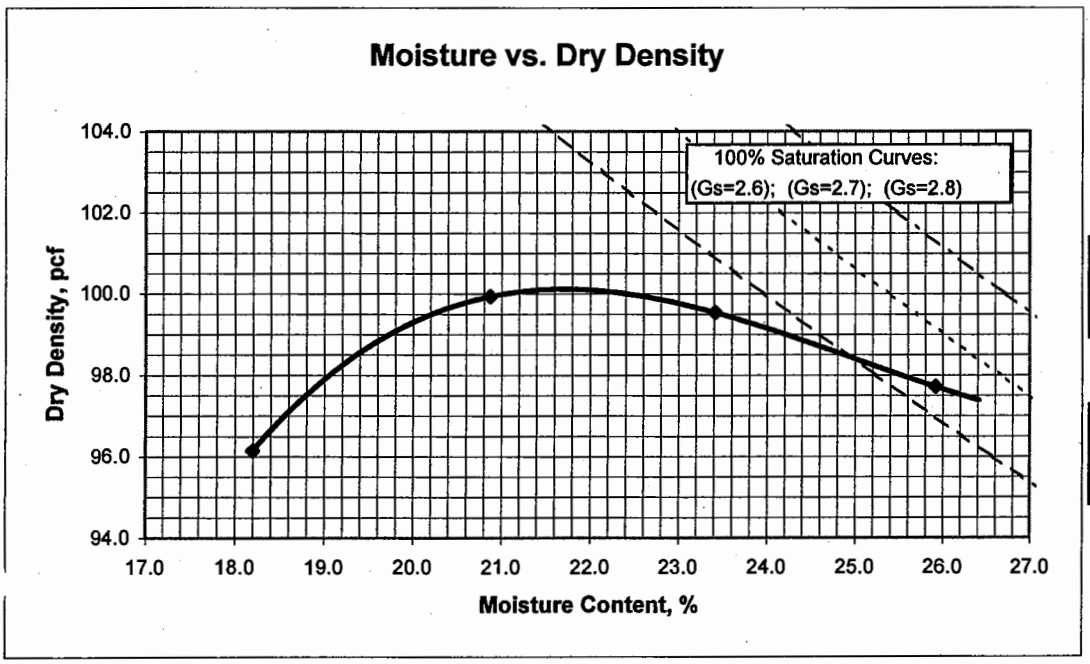
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 842.0 | |
| Mass of Dry Sample & Tare, g | 720.0 | |
| Mass of Tare, g | 158.0 | |
| Moisture Content, % | 21.7 | |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5664.0 | 5772.0 | 5803.0 | 5806.0 | |
| Mass of Wet Sample & Tare, g | 409.5 | 464.5 | 474.5 | 390.0 | |
| Mass of Dry Sample & Tare, g | 362.0 | 400.0 | 402.5 | 330.0 | |
| Mass of Tare, g | 101.0 | 91.0 | 95.0 | 98.5 | |
| Moisture Content, % | 18.2 | 20.9 | 23.4 | 25.9 | |
| Wet Density, pcf | 113.6 | 120.8 | 122.8 | 123.0 | |
| Dry Density, pcf | 96.1 | 99.9 | 99.5 | 97.7 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 100.2 |
| **Optimum Moisture Content, %** | 21.6 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/22/07 |
| Checked By | VR |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2210/CL-10 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.582 | in | 6.56 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.92 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 522.40 | g | 1.15 | lb |
| Specific Gravity | 2.750 | (Assumed) | | |
| Dry Density | 97.0 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 337.10 | g |
| Mass of dry sample & tare | 302.25 | g |
| Mass of tare | 159.77 | g |
| % Moisture | 24.5 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 5 | |
| Cell Number | 6 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 89.33 | cm |
| Min Head | 89.33 | cm |
| Maximum Gradient | 13.50 | |
| Minimum Gradient | 13.50 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.605 | in | 6.62 | cm |
| Average Diameter of Sample | | | 2.874 | in | 7.30 | cm |
| Area | 6.49 | $in^2$ | 41.85 | $cm^2$ | | |
| Volume | 276.93 | $cm^3$ | 0.0098 | $ft^3$ | | |
| Mass | 547.94 | g | 1.21 | lb | | |

| | | |
|---|---|---|
| Dry Density | 94.2 | pcf |
| Vol. of Voids | 124.91 | $cm^3$ |
| Vol. of Solids | 152.02 | $cm^3$ |
| Void Ratio | 0.82 | |
| Saturation | 104.0 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 638.19 | g |
| Mass of dry sample & tare | 508.32 | g |
| Mass of tare | 90.33 | g |
| % Moisture | 31.1 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 01/22/07 | 9 | 30 | - | 1.27 | 89.33 | 13.50 | 15.3 | - | - | - | |
| 01/22/07 | 9 | 35 | 300 | 1.27 | 89.33 | 13.50 | 15.3 | 1.59E-06 | 1.128 | 1.79E-06 | |
| 01/22/07 | 9 | 40 | 300 | 1.27 | 89.33 | 13.50 | 15.3 | 1.59E-06 | 1.128 | 1.79E-06 | |
| 01/22/07 | 9 | 45 | 300 | 1.27 | 89.33 | 13.50 | 15.3 | 1.59E-06 | 1.128 | 1.79E-06 | * |
| 01/22/07 | 9 | 50 | 300 | 1.27 | 89.33 | 13.50 | 15.3 | 1.59E-06 | 1.128 | 1.79E-06 | * |
| 01/22/07 | 9 | 55 | 300 | 1.27 | 89.33 | 13.50 | 15.3 | 1.59E-06 | 1.128 | 1.79E-06 | * |
| 01/22/07 | 10 | 0 | 300 | 1.27 | 89.33 | 13.50 | 15.3 | 1.59E-06 | 1.128 | 1.79E-06 | * |

Note: Deaired Water Used for Permeability Test.

DESCRIPTION

NA

USCS (ASTM D2487;2488)

NA

REMARKS

Material passed #4 sieve used for testing. Material was remolded to 96.9% of maximum dry density (standard proctor) at 2.9% above optimum moisture content.

Reported Average Hydraulic Conductivity* 1.8E-06 cm/sec

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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AASHTO R18

| | |
|---|---|
| Tested By | K.I |
| Date | 01/24/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2217/CL-11 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

**ASTM D 422/AASHTO T 88**
**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 944.50 |
| Mass of Dry Sample & Tare, g | 788.00 |
| Mass of Tare, g | 162.50 |
| Moisture Content, % | 25.0 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 222.67 |
| Mass of Dry Sample & Tare, g | 218.91 |
| Mass of Tare, g | 95.13 |
| Moisture Content, % | 3.0 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 17720.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 17197.60 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 59.87 |
| Dry Mass, g | 58.10 |
| % of Total Sample passing #4 sieve | 100.0 |

## SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | | 0.0 | 100.0 |
| .5" | | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 0.00 | 0.0 | 100.0 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.08 | 99.9 |
| #20 | | 1.32 | 97.7 |
| #40 | FINE SAND | 4.87 | 91.6 |
| #60 | | 8.16 | 86.0 |
| #100 | | 10.87 | 81.3 |
| #200 | FINES | 13.60 | 76.6 |

Remarks

## HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:36 |

**PARTICLE-SIZE ANALYSIS**

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 8.2 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 15.0 |
| % FINE GRAVEL | 0.0 | % FINES | 76.6 |
| % COARSE SAND | 0.1 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 52.8 | % CLAY(<0.002mm) | 44.2 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/25/07 | 11:38 | 2 | 51.0 | 16.7 | 0.01396 | 7.0 | 44.0 | 9.1 | 0.99 | 0.0297 | 75.0 |
| 01/25/07 | 11:41 | 5 | 50.0 | 16.7 | 0.01396 | 7.0 | 43.0 | 9.2 | 0.99 | 0.0190 | 73.3 |
| 01/25/07 | 11:51 | 15 | 45.0 | 16.7 | 0.01396 | 7.0 | 38.0 | 10.1 | 0.99 | 0.0114 | 64.7 |
| 01/25/07 | 12:06 | 30 | 42.0 | 16.7 | 0.01396 | 7.0 | 35.0 | 10.6 | 0.99 | 0.0083 | 59.6 |
| 01/25/07 | 12:36 | 60 | 39.5 | 16.7 | 0.01396 | 7.0 | 32.5 | 11.0 | 0.99 | 0.0060 | 55.4 |
| 01/25/07 | 15:46 | 250 | 35.0 | 16.7 | 0.01396 | 7.0 | 28.0 | 11.7 | 0.99 | 0.0030 | 47.7 |
| 01/26/07 | 11:36 | 1440 | 31.5 | 16.7 | 0.01396 | 7.0 | 24.5 | 12.3 | 0.99 | 0.0013 | 41.7 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

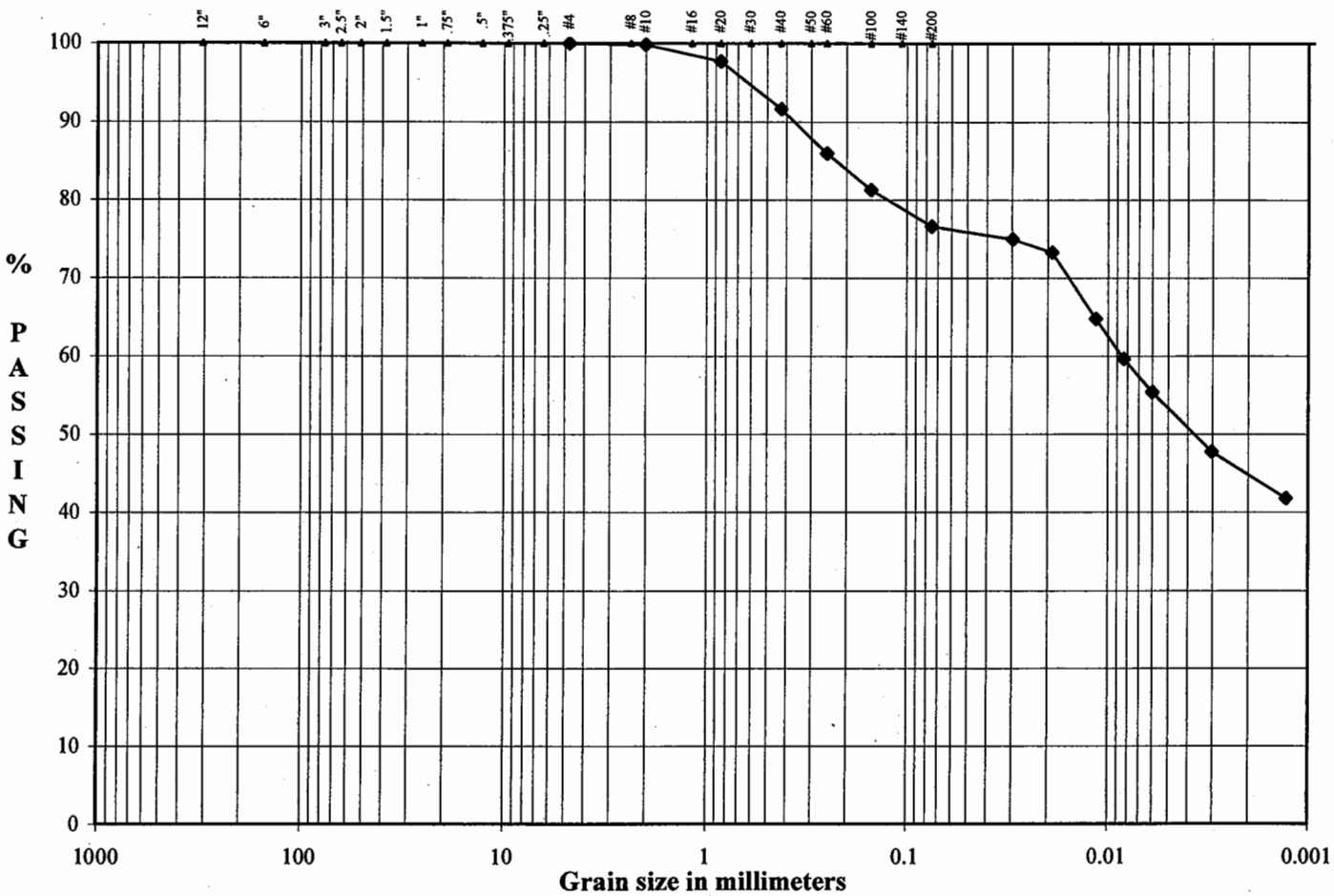
| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | Tested By | K.I |
| | | Date | 01/24/07 |
| | | Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2217/CL-11 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

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AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 01/25/07 |
| Checked By | LS |

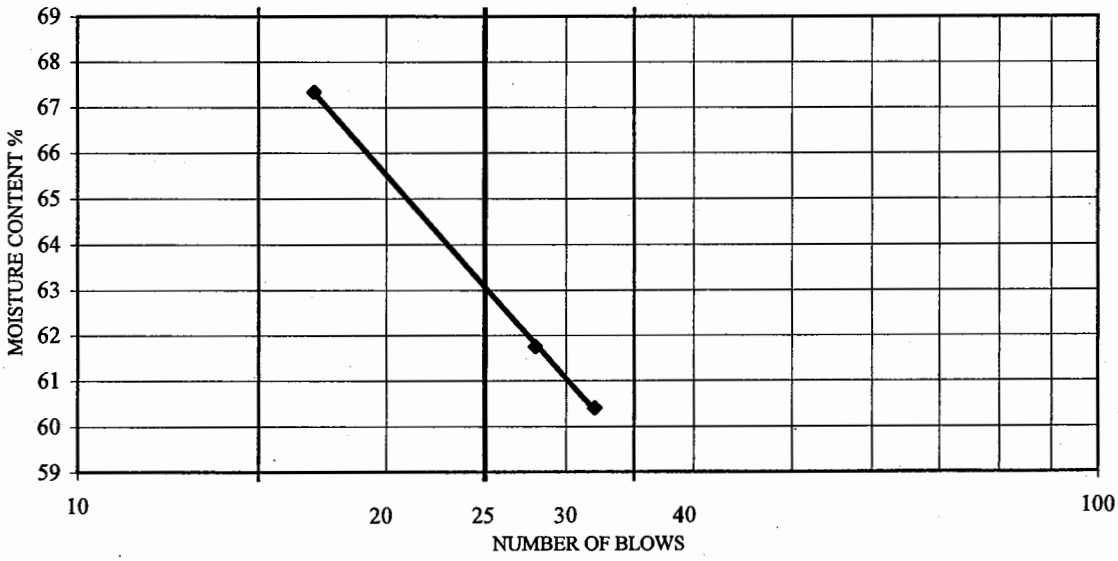
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2217/CL-11 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 32 | 28 | 17 |
| Mass of Wet Sample & Tare, g | 36.26 | 38.40 | 39.73 |
| Mass of Dry Sample & Tare, g | 31.99 | 33.46 | 33.32 |
| Mass of Tare, g | 24.92 | 25.46 | 23.80 |
| Moisture Content, % | 60.40 | 61.75 | 67.33 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 35.54 | 35.73 |
| Mass of Dry Sample & Tare, g | 33.36 | 33.47 |
| Mass of Tare, g | 26.03 | 25.89 |
| Moisture Content, % | 29.74 | 29.82 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 944.5 |
| Mass of Dry Sample & Tare, g | 788.0 |
| Mass of Tare, g | 162.5 |
| Moisture Content, % | 25.02 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 63 |
| PLASTIC LIMIT (PL) | 30 |
| PLASTICITY INDEX (PI) | 33 |
| LIQUIDITY INDEX (LI) | -0.15 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 01/22/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2217/CL-11 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 21500.0 | 17197.3 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

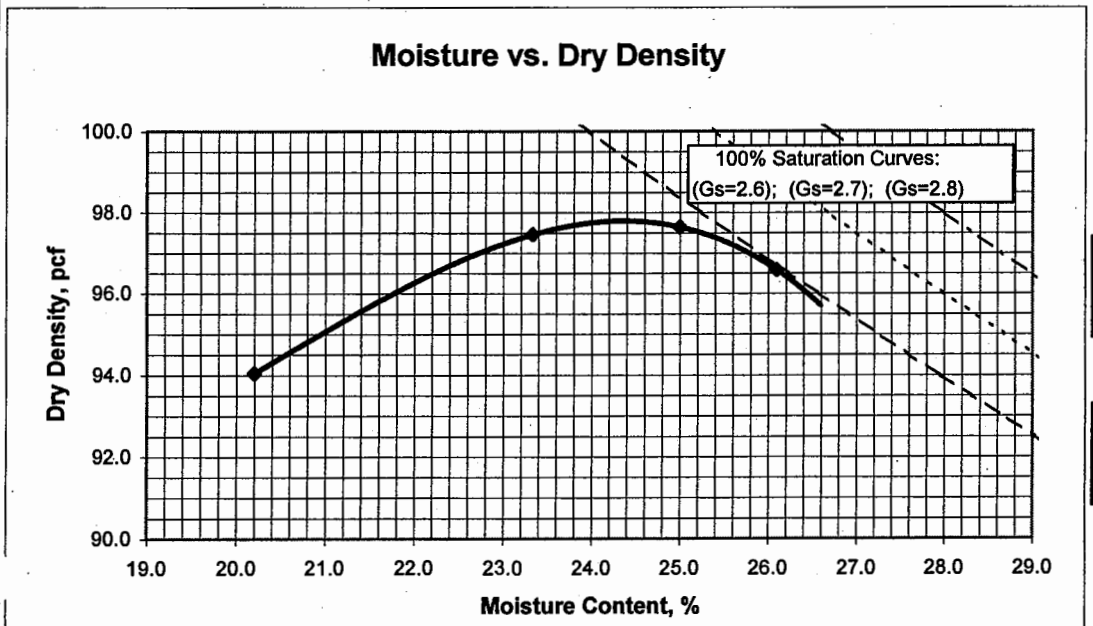
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 944.5 | |
| Mass of Dry Sample & Tare, g | 788.0 | |
| Mass of Tare, g | 162.5 | |
| Moisture Content, % | 25.0 | |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5655.0 | 5763.0 | 5791.0 | 5787.0 | |
| Mass of Wet Sample & Tare, g | 391.5 | 409.5 | 426.0 | 400.5 | |
| Mass of Dry Sample & Tare, g | 341.0 | 350.0 | 361.0 | 338.0 | |
| Mass of Tare, g | 91.0 | 95.0 | 101.0 | 98.5 | |
| Moisture Content, % | 20.2 | 23.3 | 25.0 | 26.1 | |
| Wet Density, pcf | 113.0 | 120.2 | 122.0 | 121.8 | |
| Dry Density, pcf | 94.0 | 97.5 | 97.6 | 96.6 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 97.8 |
| **Optimum Moisture Content, %** | 24.4 |

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Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 01/24/07 |
| Checked By | LL |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-03 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2217/CL-11 | Depth/Elev. | - |
| Location | BORROW PIT | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.574 | in | 6.54 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.08 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 520.73 | g | 1.15 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 94.7 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 774.89 | g |
| Mass of dry sample & tare | 722.24 | g |
| Mass of tare | 531.16 | g |
| % Moisture | 27.6 | |

### Test Data

| | | |
|---|---|---|
| Speed | 11 | |
| Board Number | 5 | |
| Cell Number | 2A | |
| Flow Pump Number | | |
| Flow Pump Rate | 1.12E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 191.32 | cm |
| Min Head | 191.32 | cm |
| Maximum Gradient | 29.12 | |
| Minimum Gradient | 29.12 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.587 | in | 6.57 | cm |
| Average Diameter of Sample | | | 2.873 | in | 7.30 | cm |
| Area | 6.48 | $in^2$ | 41.82 | $cm^2$ | | |
| Volume | 274.83 | $cm^3$ | 0.0097 | $ft^3$ | | |
| Mass | 530.51 | g | 1.17 | lb | | |

| | | |
|---|---|---|
| Dry Density | 92.5 | pcf |
| Vol. of Voids | 123.86 | $cm^3$ |
| Vol. of Solids | 150.96 | $cm^3$ |
| Void Ratio | 0.82 | |
| Saturation | 99.2 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 614.22 | g |
| Mass of dry sample & tare | 491.33 | g |
| Mass of tare | 83.79 | g |
| % Moisture | 30.2 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 01/24/07 | 12 | 30 | - | 2.72 | 191.32 | 29.12 | 17.0 | - | - | - | |
| 01/24/07 | 12 | 35 | 300 | 2.72 | 191.32 | 29.12 | 17.0 | 9.20E-08 | 1.079 | 9.92E-08 | |
| 01/24/07 | 12 | 40 | 300 | 2.72 | 191.32 | 29.12 | 17.0 | 9.20E-08 | 1.079 | 9.92E-08 | |
| 01/24/07 | 12 | 45 | 300 | 2.72 | 191.32 | 29.12 | 17.0 | 9.20E-08 | 1.079 | 9.92E-08 | * |
| 01/24/07 | 12 | 50 | 300 | 2.72 | 191.32 | 29.12 | 17.0 | 9.20E-08 | 1.079 | 9.92E-08 | * |
| 01/24/07 | 12 | 55 | 300 | 2.72 | 191.32 | 29.12 | 17.0 | 9.20E-08 | 1.079 | 9.92E-08 | * |
| 01/24/07 | 13 | 0 | 300 | 2.72 | 191.32 | 29.12 | 17.0 | 9.20E-08 | 1.079 | 9.92E-08 | * |

Reported Average Hydraulic Conductivity* 9.9E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.8% of maximum dry density (standard proctor) at 3.2% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | #N/A | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | #N/A |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | #N/A | | | Pore Pressure Transducer ID # | 28 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/01/07 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2250/CL-12 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

## ASTM D 422/AASHTO T 88
### Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 939.0 |
| Mass of Dry Sample & Tare, g | 707.5 |
| Mass of Tare, g | 146.0 |
| Moisture Content, % | 41.2 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 519.97 |
| Mass of Dry Sample & Tare, g | 441.15 |
| Mass of Tare, g | 228.54 |
| Moisture Content, % | 37.1 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 17587.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 12830.43 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 70.45 |
| Dry Mass, g | 51.40 |
| % of Total Sample passing #4 sieve | 100.0 |

## SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | | 0.0 | 100.0 |
| .5" | | | 0.0 | 100.0 |
| .375" | | | 0.0 | 100.0 |
| #4 | COARSE SAND | 0.00 | 0.0 | 100.0 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 0.03 | 99.9 |
| #20 | | 0.26 | 99.5 |
| #40 | FINE SAND | 0.84 | 98.4 |
| #60 | | 1.87 | 96.4 |
| #100 | | 3.41 | 93.4 |
| #200 | FINES | 5.55 | 89.2 |

Remarks

## HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:00 |

## PARTICLE-SIZE ANALYSIS

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 1.6 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 9.2 |
| % FINE GRAVEL | 0.0 | % FINES | 89.2 |
| % COARSE SAND | 0.1 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 51.2 | % CLAY(<0.002mm) | 45.4 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/02/07 | 11:02 | 2 | 47.5 | 15.8 | 0.01414 | 7.5 | 40.0 | 9.7 | 0.99 | 0.0312 | 77.0 |
| 02/02/07 | 11:05 | 5 | 44.0 | 15.8 | 0.01414 | 7.5 | 36.5 | 10.3 | 0.99 | 0.0203 | 70.3 |
| 02/02/07 | 11:15 | 15 | 40.5 | 15.8 | 0.01414 | 7.5 | 33.0 | 10.9 | 0.99 | 0.0121 | 63.6 |
| 02/02/07 | 11:30 | 30 | 37.5 | 15.8 | 0.01414 | 7.5 | 30.0 | 11.4 | 0.99 | 0.0087 | 57.8 |
| 02/02/07 | 12:00 | 60 | 35.5 | 15.8 | 0.01414 | 7.5 | 28.0 | 11.7 | 0.99 | 0.0063 | 53.9 |
| 02/02/07 | 15:10 | 250 | 32.0 | 15.8 | 0.01414 | 7.5 | 24.5 | 12.3 | 0.99 | 0.0031 | 47.2 |
| 02/03/07 | 11:00 | 1440 | 30.5 | 15.8 | 0.01414 | 7.5 | 23.0 | 12.6 | 0.99 | 0.0013 | 44.3 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

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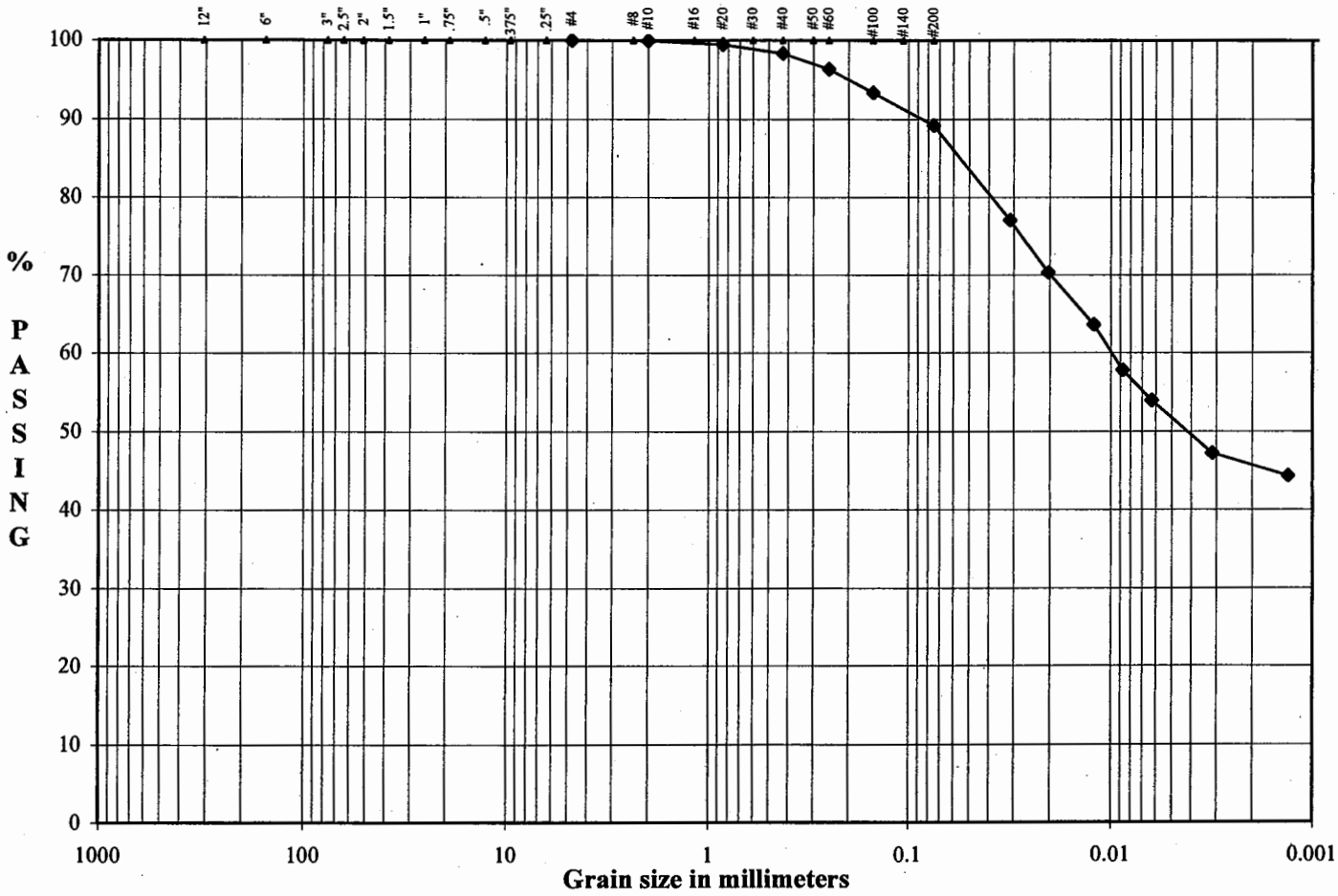
| | |
|---|---|
| Tested By | RI |
| Date | 02/01/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2250/CL-12 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel | | Sand | | | Fines |
|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt or Clay |

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

DESCRIPTION: NA

.SCS (ASTM D2487; D2488): NA

| | | | |
|---|---|---|---|
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| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2250/CL-12 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

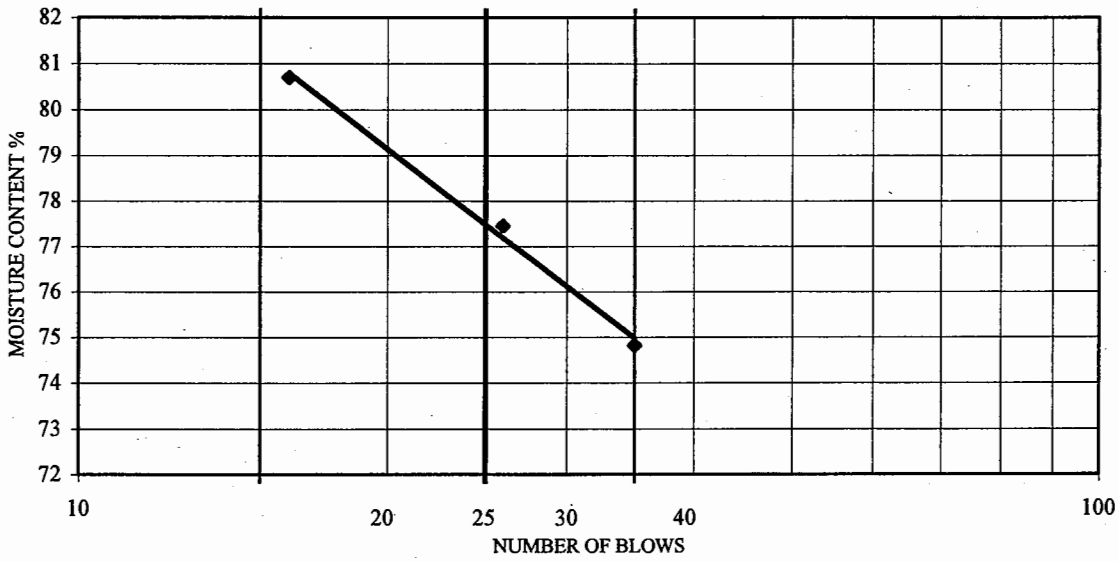
**ASTM D 4318/AASHTO T 88, T 89**

**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 35 | 26 | 16 |
| Mass of Wet Sample & Tare, g | 34.27 | 33.93 | 33.27 |
| Mass of Dry Sample & Tare, g | 30.23 | 29.81 | 29.34 |
| Mass of Tare, g | 24.83 | 24.49 | 24.47 |
| Moisture Content, % | 74.81 | 77.44 | 80.70 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 28.81 | 32.16 |
| Mass of Dry Sample & Tare, g | 26.72 | 29.89 |
| Mass of Tare, g | 20.61 | 23.23 |
| Moisture Content, % | 34.21 | 34.08 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 939.0 |
| Mass of Dry Sample & Tare, g | 707.5 |
| Mass of Tare, g | 146.0 |
| Moisture Content, % | 41.23 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 77 |
| PLASTIC LIMIT (PL) | 34 |
| PLASTICITY INDEX (PI) | 43 |
| LIQUIDITY INDEX (LI) | 0.17 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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| | |
|---|---|
| Tested By | R.I. |
| Date | 02/01/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2250/CL-12 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

## ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 18120.0 | 12830.2 |
| Mass of Mat. Retained on No. 4 sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.0 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.0 |

*MOISTURE CONTENT*

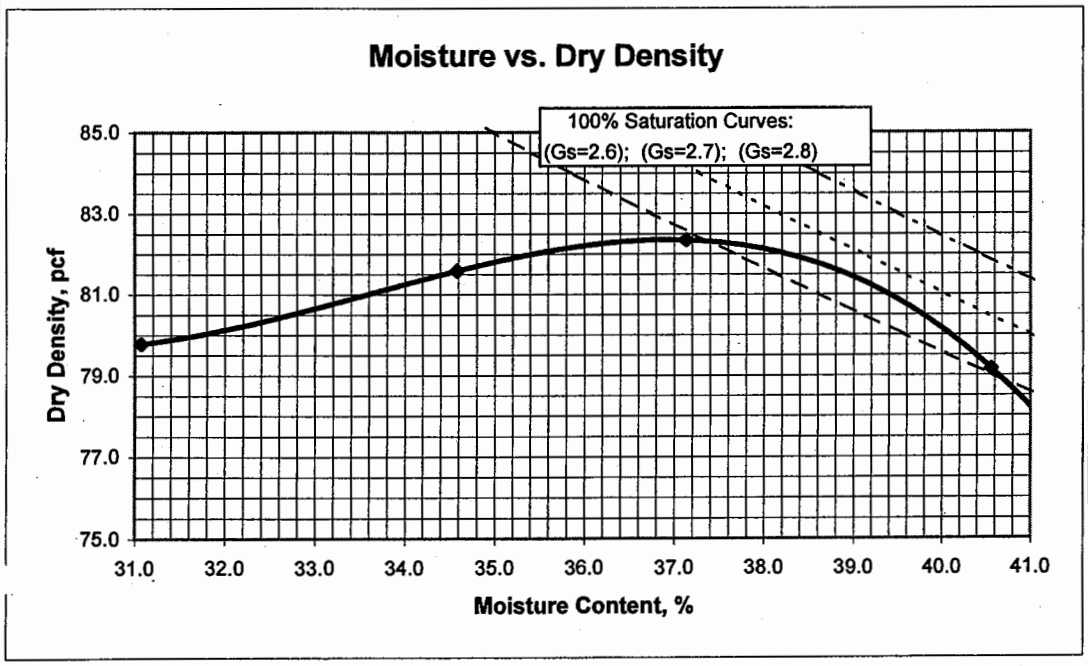
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 939.0 | |
| Mass of Dry Sample & Tare, g | 707.5 | |
| Mass of Tare, g | 146.0 | |
| Moisture Content, % | 41.2 | |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5527.0 | 5606.0 | 5653.0 | 5628.0 | |
| Mass of Wet Sample & Tare, g | 622.0 | 624.0 | 629.5 | 614.5 | |
| Mass of Dry Sample & Tare, g | 496.0 | 486.0 | 489.5 | 463.0 | |
| Mass of Tare, g | 90.5 | 87.0 | 112.5 | 89.5 | |
| Moisture Content, % | 31.1 | 34.6 | 37.1 | 40.6 | |
| Wet Density, pcf | 104.6 | 109.8 | 112.9 | 111.3 | |
| Dry Density, pcf | 79.8 | 81.6 | 82.3 | 79.2 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488)

NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 82.3 |
| **Optimum Moisture Content, %** | 37.1 |

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/03/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2250/CL-12 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.576 | in | 6.54 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 269.29 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 482.28 | g | 1.06 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 79.4 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 303.26 | g |
| Mass of dry sample & tare | 245.20 | g |
| Mass of tare | 102.50 | g |
| % Moisture | 40.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 5 | |
| Cell Number | 16 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 28.14 | cm |
| Min Head | 28.14 | cm |
| Maximum Gradient | 4.31 | |
| Minimum Gradient | 4.31 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.573 | in | 6.54 | cm |
| Average Diameter of Sample | | | 2.868 | in | 7.28 | cm |
| Area | 6.46 | $in^2$ | 41.68 | $cm^2$ | | |
| Volume | 272.39 | $cm^3$ | 0.0096 | $ft^3$ | | |
| Mass | 490.27 | g | 1.08 | lb | | |

| | | |
|---|---|---|
| Dry Density | 78.5 | pcf |
| Vol. of Voids | 145.48 | $cm^3$ |
| Vol. of Solids | 126.91 | $cm^3$ |
| Void Ratio | 1.15 | |
| Saturation | 101.5 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 588.79 | g |
| Mass of dry sample & tare | 441.19 | g |
| Mass of tare | 98.60 | g |
| % Moisture | 43.1 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/03/07 | 11 | 0 | - | 0.40 | 28.14 | 4.31 | 16.5 | - | - | - | |
| 02/03/07 | 11 | 5 | 300 | 0.40 | 28.14 | 4.31 | 16.5 | 3.12E-07 | 1.093 | 3.41E-07 | |
| 02/03/07 | 11 | 10 | 300 | 0.40 | 28.14 | 4.31 | 16.5 | 3.12E-07 | 1.093 | 3.41E-07 | |
| 02/03/07 | 11 | 15 | 300 | 0.40 | 28.14 | 4.31 | 16.5 | 3.12E-07 | 1.093 | 3.41E-07 | * |
| 02/03/07 | 11 | 20 | 300 | 0.40 | 28.14 | 4.31 | 16.5 | 3.12E-07 | 1.093 | 3.41E-07 | * |
| 02/03/07 | 11 | 25 | 300 | 0.40 | 28.14 | 4.31 | 16.5 | 3.12E-07 | 1.093 | 3.41E-07 | * |
| 02/03/07 | 11 | 30 | 300 | 0.40 | 28.14 | 4.31 | 16.5 | 3.12E-07 | 1.093 | 3.41E-07 | * |

Reported Average Hydraulic Conductivity* 3.4E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION

NA

USCS (ASTM D2487;2488)

NA

REMARKS

Material passed #4 sieve used for testing. Material was remolded to 96.6% of maximum dry density (standard proctor) at 3.6% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/01/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2251/CL-13 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

## ASTM D 422/AASHTO T 88
### Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

*As-Received Moisture Content*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 866.0 |
| Mass of Dry Sample & Tare, g | 709.0 |
| Mass of Tare, g | 167.5 |
| Moisture Content, % | 29.0 |

*Moisture Content of Material Used for Hydrometer Analysis*

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 459.64 |
| Mass of Dry Sample & Tare, g | 403.11 |
| Mass of Tare, g | 108.43 |
| Moisture Content, % | 19.2 |

| | |
|---|---|
| Mass of Total Sample before separation on #4 sieve & Tare, g | 16853.00 |
| Mass of Tare, g | 0.00 |
| Total Mass of Dry Sample, g | 14140.38 |

| | |
|---|---|
| Mass of Sample used for hydrometer analysis, g | 70.93 |
| Dry Mass, g | 59.51 |
| % of Total Sample passing #4 sieve | 99.5 |

## SIEVE ANALYSIS

*PORTION OF SAMPLE RETAINED ON #4 SIEVE*

Mass of Tare, g: 0.00

| Sieve Size | | Sample & Tare, g | % RETAINED | %PASSING |
|---|---|---|---|---|
| 12" | COBBLES | | 0.0 | 100.0 |
| 3" | COARSE GRAVEL | | 0.0 | 100.0 |
| 2.5" | | | 0.0 | 100.0 |
| 2" | | | 0.0 | 100.0 |
| 1.5" | | | 0.0 | 100.0 |
| 1" | | | 0.0 | 100.0 |
| .75" | FINE GRAVEL | 0.00 | 0.0 | 100.0 |
| .5" | | 7.02 | 0.0 | 100.0 |
| .375" | | 11.62 | 0.1 | 99.9 |
| #4 | COARSE SAND | 70.63 | 0.5 | 99.5 |

*PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)*

| Sieve Size | | Cumulative Mass retained, g | % PASSING |
|---|---|---|---|
| #10 | MEDIUM SAND | 1.73 | 96.6 |
| #20 | | 4.34 | 92.2 |
| #40 | FINE SAND | 7.17 | 87.5 |
| #60 | | 10.77 | 81.5 |
| #100 | | 15.13 | 74.2 |
| #200 | FINES | 19.46 | 67.0 |

Remarks

## HYDROMETER ANALYSIS

| | |
|---|---|
| Length of Dispersion Period | 1 Minute |
| Mechanical Dispersion Device ID # | 61 |
| Amount of Dispersing Agent (ml) | 125.0 |
| Specific Gravity (assumed) | 2.700 |
| Specific Gravity (tested) | |
| Starting time | 11:02 |

## PARTICLE-SIZE ANALYSIS

| | | | |
|---|---|---|---|
| % COBBLES | 0.0 | % MEDIUM SAND | 9.1 |
| % COARSE GRAVEL | 0.0 | % FINE SAND | 20.5 |
| % FINE GRAVEL | 0.5 | % FINES | 67.0 |
| % COARSE SAND | 2.9 | % TOTAL SAMPLE | 100.0 |
| % CLAY(<0.005mm) | 39.3 | % CLAY(<0.002mm) | 33.3 |

| Date | Time | Testing time (min) | Reading | Temp (°C) | K | Composite Correction | Actual Reading | Effective Depth (cm) | a | Particle Diam. (mm) | Percent Passing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/02/07 | 11:04 | 2 | 42.0 | 17.0 | 0.01396 | 7.5 | 34.5 | 10.7 | 0.99 | 0.0322 | 57.1 |
| 02/02/07 | 11:07 | 5 | 39.5 | 17.0 | 0.01396 | 7.5 | 32.0 | 11.1 | 0.99 | 0.0208 | 53.0 |
| 02/02/07 | 11:17 | 15 | 37.0 | 17.0 | 0.01396 | 7.5 | 29.5 | 11.5 | 0.99 | 0.0122 | 48.8 |
| 02/02/07 | 11:32 | 30 | 35.0 | 17.0 | 0.01396 | 7.5 | 27.5 | 11.8 | 0.99 | 0.0088 | 45.5 |
| 02/02/07 | 12:02 | 60 | 32.5 | 17.0 | 0.01396 | 7.5 | 25.0 | 12.2 | 0.99 | 0.0063 | 41.4 |
| 02/02/07 | 15:12 | 250 | 29.5 | 17.0 | 0.01396 | 7.5 | 22.0 | 12.7 | 0.99 | 0.0031 | 36,4 |
| 02/03/07 | 11:02 | 1440 | 26.5 | 17.0 | 0.01396 | 7.5 | 19.0 | 13.2 | 0.99 | 0.0013 | 31.4 |

| | | | |
|---|---|---|---|
| Hydrometer 152H ID # | 700210 | Oven ID # | 12/13/14/15 |
| Sieve Shaker ID # | 54/130 | Balance ID# | 1/6/7 |

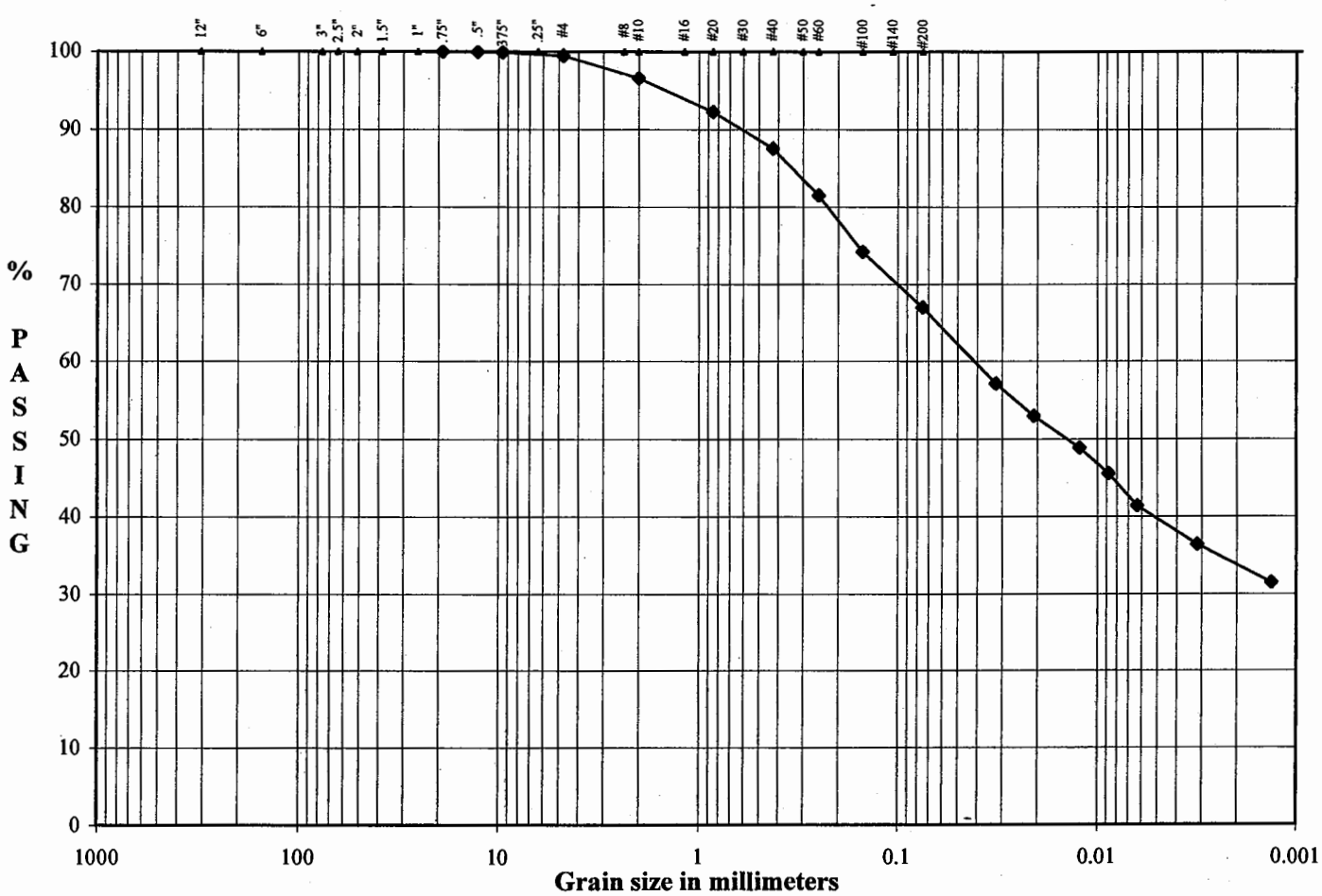
| | | | |
|---|---|---|---|
| **TIMELY ENGINEERING SOIL TESTS, LLC** | 1874 Forge Street Tucker, GA 30084<br>Phone: 770-938-8233<br>Fax: 770-923-8973<br>Web: www.test-llc.com | AAP AASHTO R18 | Tested By: KI<br>Date: 02/01/07<br>Checked By: KB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2251/CL-13 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

**ASTM D 422/AASHTO T 88**

**Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)**

## Particle-Size Analysis




| Boulders | Cobbles | Gravel: Coarse | Gravel: Fine | Sand: Coarse | Sand: Medium | Sand: Fine | Fines: Silt or Clay |
|---|---|---|---|---|---|---|---|

DESCRIPTION: NA

| | | |
|---|---|---|
| $D_{10}$ | NA | mm |
| $D_{30}$ | NA | mm |
| $D_{60}$ | NA | mm |
| Cu | NA | |
| Cc | NA | |

USCS (ASTM D2487; D2488): NA

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AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/02/07 |
| Checked By | LB |

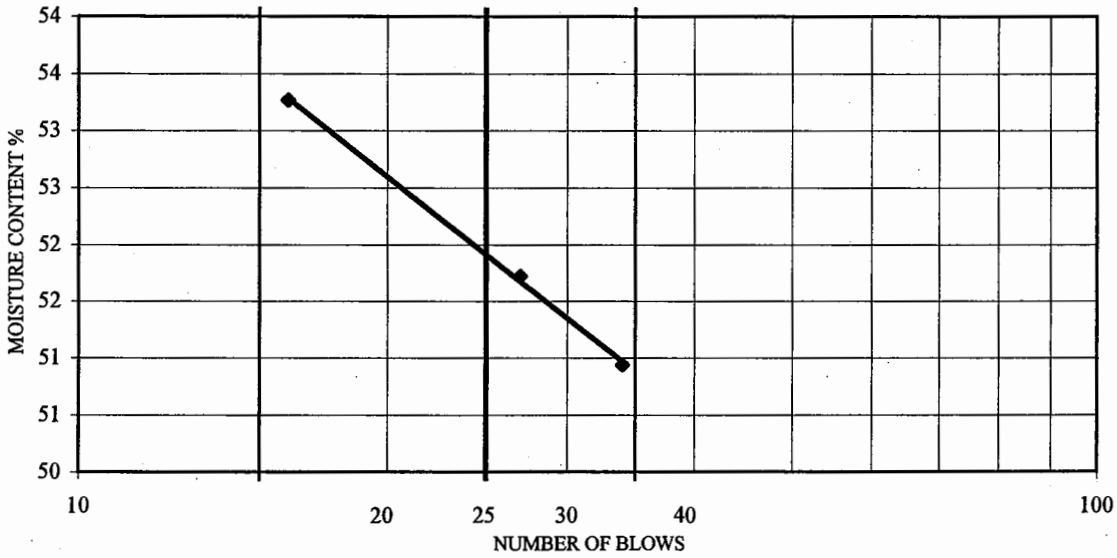
| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2251/CL-13 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

**ASTM D 4318/AASHTO T 88, T 89**
**Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)**

LIQUID LIMIT

| | | | |
|---|---|---|---|
| Number of Blows | 34 | 27 | 16 |
| Mass of Wet Sample & Tare, g | 35.11 | 35.55 | 35.63 |
| Mass of Dry Sample & Tare, g | 31.85 | 31.94 | 31.88 |
| Mass of Tare, g | 25.45 | 24.96 | 24.84 |
| Moisture Content, % | 50.94 | 51.72 | 53.27 |

| | |
|---|---|
| Oven ID # | 12/13/14/15 |
| Balance ID # | 2 |
| Liquid Limit Device ID # | 56 |




PLASTIC LIMIT

| | | |
|---|---|---|
| Mass of Wet Sample & Tare, g | 31.41 | 31.19 |
| Mass of Dry Sample & Tare, g | 29.87 | 29.61 |
| Mass of Tare, g | 22.78 | 22.30 |
| Moisture Content, % | 21.72 | 21.61 |

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

| | |
|---|---|
| Mass of Wet Sample & Tare, g | 866.0 |
| Mass of Dry Sample & Tare, g | 709.0 |
| Mass of Tare, g | 167.5 |
| Moisture Content, % | 28.99 |

| | |
|---|---|
| LIQUID LIMIT (LL) | 52 |
| PLASTIC LIMIT (PL) | 22 |
| PLASTICITY INDEX (PI) | 30 |
| LIQUIDITY INDEX (LI) | 0.23 |

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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AASHTO R18

| | |
|---|---|
| Tested By | K.I. |
| Date | 02/01/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2251/CL-13 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

# ASTM D 698
## Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft$^3$ (600kN-m/m$^3$))

### DETERMINATION OF TEST PROCEDURE

| | wet | dry |
|---|---|---|
| Mass of Soil before sieving, g | 18240.0 | 14140.2 |
| Mass of Mat. Retained on No. 4 sieve, g | 70.6 | 70.6 |
| Mass of Mat. Retained on 3/8" sieve, g | 0.0 | 0.0 |
| Mass of Mat. Retained on 3/4" sieve, g | 0.0 | 0.0 |

| | |
|---|---|
| Material Retained on No. 4 Sieve, % | 0.5 |
| Material Retained on 3/8" Sieve, % | 0.0 |
| Material Retained on 3/4" Sieve, % | 0.0 |
| Total, % (oversized) | 0.5 |

*MOISTURE CONTENT*

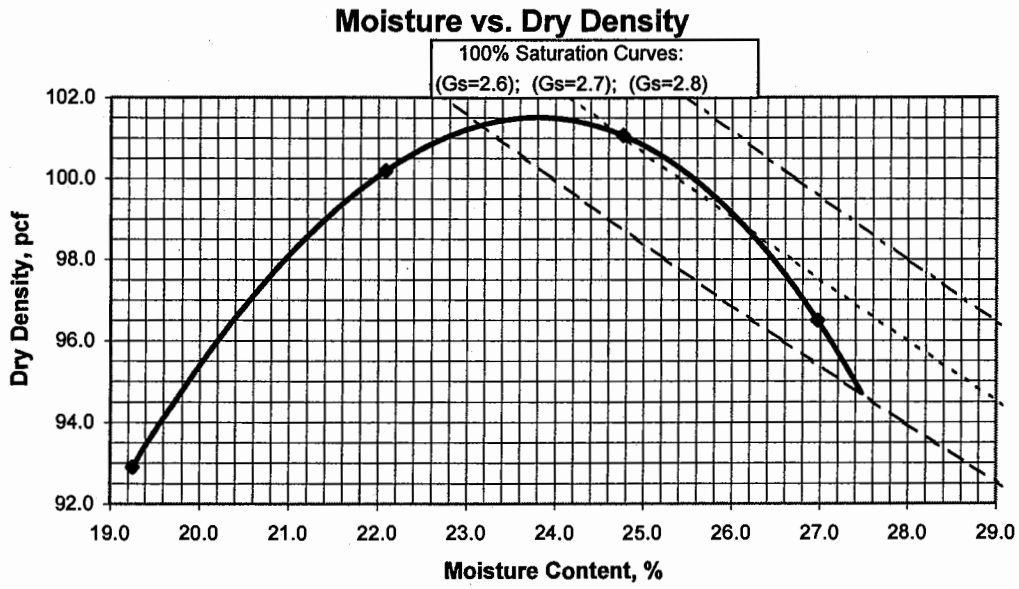
| | Coarse + Fine Fraction | Coarse Fraction |
|---|---|---|
| Mass of Wet Sample & Tare, g | 866.0 | 70.6 |
| Mass of Dry Sample & Tare, g | 709.0 | 70.6 |
| Mass of Tare, g | 167.5 | 0.0 |
| Moisture Content, % | 29.0 | 0.0 |

Procedure: A

### TEST DATA

| Points | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Mass of Mold and Soil, g | 5621.0 | 5795.0 | 5852.0 | 5798.0 | |
| Mass of Wet Sample & Tare, g | 383.0 | 441.0 | 427.5 | 476.5 | |
| Mass of Dry Sample & Tare, g | 336.5 | 378.5 | 361.5 | 394.5 | |
| Mass of Tare, g | 95.0 | 95.5 | 95.0 | 90.5 | |
| Moisture Content, % | 19.3 | 22.1 | 24.8 | 27.0 | |
| Wet Density, pcf | 110.8 | 122.3 | 126.1 | 122.5 | |
| Dry Density, pcf | 92.9 | 100.2 | 101.1 | 96.5 | |

| | |
|---|---|
| Mold ID Number | 18 |
| Mass of Mold, g | 3947.5 |
| Volume of Mold, ft$^3$ | 0.0333 |
| Hammer ID Number | 20 |
| Number of Blows per layer | 25 |
| Number of Layers | 3 |




Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

DESCRIPTION

NA

USCS (ASTM D2487; D2488): NA

| | |
|---|---|
| **Maximum Dry Density, pcf** | 101.5 |
| **Optimum Moisture Content, %** | 23.9 |

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AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 02/03/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | BULK |
| Sample ID | 2251/CL-13 | Depth/Elev. | - |
| Location | SOUTH OF 2F | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.571 | in | 6.53 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 268.77 | $cm^3$ | 0.0095 | $ft^3$ |
| Mass | 538.77 | g | 1.19 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 98.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 306.59 | g |
| Mass of dry sample & tare | 262.42 | g |
| Mass of tare | 100.92 | g |
| % Moisture | 27.3 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 7 | |
| Cell Number | 6 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 196.95 | cm |
| Min Head | 196.25 | cm |
| Maximum Gradient | 30.16 | |
| Minimum Gradient | 30.05 | |

### Final Data (After Test)

| | | | | | |
|---|---|---|---|---|---|
| Average Height of Sample | | | 2.571 | in | 6.53 cm |
| Average Diameter of Sample | | | 2.864 | in | 7.27 cm |
| Area | 6.44 | $in^2$ | 41.56 | $cm^2$ | |
| Volume | 271.42 | $cm^3$ | 0.0096 | $ft^3$ | |
| Mass | 542.52 | g | 1.20 | lb | |

| | | |
|---|---|---|
| Dry Density | 97.3 | pcf |
| Vol. of Voids | 114.68 | $cm^3$ |
| Vol. of Solids | 156.74 | $cm^3$ |
| Void Ratio | 0.73 | |
| Saturation | 104.1 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 637.59 | g |
| Mass of dry sample & tare | 518.27 | g |
| Mass of tare | 95.10 | g |
| % Moisture | 28.2 | |

| TIME FUNCTION DATE | HOUR | MIN | Δ t (sec) | READING (psi) | Head (cm) | Gradient | Temp. $T_x$( °C ) | PERMEABILITY (cm/sec) @ $T_x$ | $R_T$ | @ 20 °C | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/03/07 | 11 | 0 | - | 2.79 | 196.25 | 30.05 | 16.5 | - | - | - | |
| 02/03/07 | 11 | 5 | 300 | 2.79 | 196.25 | 30.05 | 16.5 | 4.48E-08 | 1.093 | 4.90E-08 | |
| 02/03/07 | 11 | 10 | 300 | 2.80 | 196.95 | 30.16 | 16.5 | 4.48E-08 | 1.093 | 4.89E-08 | |
| 02/03/07 | 11 | 15 | 300 | 2.79 | 196.25 | 30.05 | 16.5 | 4.48E-08 | 1.093 | 4.89E-08 | * |
| 02/03/07 | 11 | 20 | 300 | 2.80 | 196.95 | 30.16 | 16.5 | 4.48E-08 | 1.093 | 4.89E-08 | * |
| 02/03/07 | 11 | 25 | 300 | 2.80 | 196.95 | 30.16 | 16.5 | 4.47E-08 | 1.093 | 4.88E-08 | * |
| 02/03/07 | 11 | 30 | 300 | 2.80 | 196.95 | 30.16 | 16.5 | 4.47E-08 | 1.093 | 4.88E-08 | * |

Reported Average Hydraulic Conductivity* 4.9E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS: Material passed #4 sieve used for testing. Material was remolded to 96.8% of maximum dry density (standard proctor) at 3.4% above optimum moisture content.

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

of NORTH CAROLINA, LLC

# SECTION F-2

## Laboratory Shelby Tube Test Results

**TIMELY ENGINEERING SOIL TESTS, LLC**

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Phone: 770-938-8233 Fax: 770-923-8973
Cell: 678-612-6534
Web: www.test-llc.com

# Summary of Soil Testing (ST-Samples)

**Project Number:** 688

**Project Name:** CMS Landfill - Cell 2F

| T.E.S.T. Sample Number | Client Sample Number | USCS | UCS, psi | Moisture Content (%) | Grain Size Distribution | | | Atterberg Limits | | | Proctor | | Hydraulic Conductivity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | %Finer #4 Sieve | % Finer #200 Sieve | % Finer 0.005mm | L.L. % | P.L. % | P.I. % | Opt. M.C. % | Max.Dry. Density pcf | Initial M.C. % | Init.Dry Density pcf | Hydraulic Conduct. cm/sec |
| 2278 | ST-1 | - | - | - | - | - | - | - | - | - | - | - | 25.7 | 93.2 | 1.4E-06 |
| 2281 | ST-2 | - | - | - | - | - | - | - | - | - | - | - | 22.0 | 99.8 | 7.2E-07 |
| 2282 | ST-3 | - | - | - | - | - | - | - | - | - | - | - | 25.5 | 92.8 | 1.0E-06 |
| 2284 | ST-4 | - | - | - | - | - | - | - | - | - | - | - | 25.0 | 94.1 | 2.5E-06 |
| 2291 | ST-5 | - | - | - | - | - | - | - | - | - | - | - | 26.1 | 89.6 | 1.6E-06 |
| 2292 | ST-6 | - | - | - | - | - | - | - | - | - | - | - | 24.0 | 96.5 | 4.9E-07 |
| 2312 | ST-7 | - | - | - | - | - | - | - | - | - | - | - | 24.4 | 99.4 | 2.0E-07 |
| 2331 | ST-8 | - | - | - | - | - | - | - | - | - | - | - | 27.7 | 95.3 | 1.1E-07 |
| 2332 | ST-9 | - | - | - | - | - | - | - | - | - | - | - | 28.6 | 92.8 | 1.3E-07 |
| 2333 | ST-10 | - | - | - | - | - | - | - | - | - | - | - | 26.8 | 92.9 | 4.9E-07 |
| 2334 | ST-11 | - | - | - | - | - | - | - | - | - | - | - | 28.2 | 92.6 | 1.9E-07 |
| 2352 | ST-12 | - | - | - | - | - | - | - | - | - | - | - | 31.7 | 90.0 | 2.3E-07 |
| 2353 | ST-13 | - | - | - | - | - | - | - | - | - | - | - | 23.3 | 93.8 | 2.1E-06 |
| 2354 | ST-14 | - | - | - | - | - | - | - | - | - | - | - | 26.2 | 95.9 | 3.3E-07 |
| 2367 | ST-15 | - | - | - | - | - | - | - | - | - | - | - | 26.1 | 99.2 | 2.4E-07 |
| 2368 | ST-16 | - | - | - | - | - | - | - | - | - | - | - | 31.2 | 91.8 | 6.2E-08 |
| 2369 | ST-17 | - | - | - | - | - | - | - | - | - | - | - | 32.5 | 92.6 | 6.1E-08 |
| 2370 | ST-18 | - | - | - | - | - | - | - | - | - | - | - | 28.7 | 93.4 | 8.5E-08 |

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Web: www.test-llc.com

AASHTO R18

| | |
|---|---|
| Tested By | KI |
| Date | 02/10/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2278/ST-1 | Depth/Elev. | - |
| Location | LIFT 1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.959 | in | 7.52 | cm |
| Diameter | 2.857 | in | 7.26 | cm |
| Area | 6.41 | $in^2$ | 41.36 | $cm^2$ |
| Volume | 310.85 | $cm^3$ | 0.0110 | $ft^3$ |
| Mass | 583.80 | g | 1.29 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 93.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 318.10 | g |
| Mass of dry sample & tare | 286.09 | g |
| Mass of tare | 161.50 | g |
| % Moisture | 25.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 9 | |
| Board Number | 1 | |
| Cell Number | 1 | |
| Flow Pump Number | 1A | |
| Flow Pump Rate | 4.48E-04 | $cm^3$/sec |
| B - Value | 0.97 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 66.12 | cm |
| Min Head | 64.71 | cm |
| Maximum Gradient | 8.62 | |
| Minimum Gradient | 8.44 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.019 | in | 7.67 | cm |
| Average Diameter of Sample | | | 2.860 | in | 7.26 | cm |
| Area | 6.42 | $in^2$ | 41.45 | $cm^2$ | | |
| Volume | 317.82 | $cm^3$ | 0.0112 | $ft^3$ | | |
| Mass | 612.23 | g | 1.35 | lb | | |

| | | |
|---|---|---|
| Dry Density | 90.7 | pcf |
| Vol. of Voids | 146.75 | $cm^3$ |
| Vol. of Solids | 171.07 | $cm^3$ |
| Void Ratio | 0.86 | |
| Saturation | 102.4 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 714.71 | g |
| Mass of dry sample & tare | 564.39 | g |
| Mass of tare | 102.52 | g |
| % Moisture | 32.5 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$(°C) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/10/07 | 9 | 30 | - | 0.93 | 65.42 | 8.53 | 16.5 | - | - | - | |
| 02/10/07 | 9 | 35 | 300 | 0.94 | 66.12 | 8.62 | 16.5 | 1.26E-06 | 1.093 | 1.38E-06 | |
| 02/10/07 | 9 | 40 | 300 | 0.94 | 66.12 | 8.62 | 16.5 | 1.25E-06 | 1.093 | 1.37E-06 | |
| 02/10/07 | 9 | 45 | 300 | 0.92 | 64.71 | 8.44 | 16.5 | 1.27E-06 | 1.093 | 1.38E-06 | * |
| 02/10/07 | 9 | 50 | 300 | 0.93 | 65.42 | 8.53 | 16.5 | 1.27E-06 | 1.093 | 1.39E-06 | * |
| 02/10/07 | 9 | 55 | 300 | 0.94 | 66.12 | 8.62 | 16.5 | 1.26E-06 | 1.093 | 1.38E-06 | * |
| 02/10/07 | 10 | 0 | 300 | 0.94 | 66.12 | 8.62 | 16.5 | 1.25E-06 | 1.093 | 1.37E-06 | * |

Reported Average Hydraulic Conductivity* 1.4E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 24/25 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 140 | | | Pore Pressure Transducer ID # | 26/27 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/12/07 |
| Checked By | CB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2281/ST-2 | Depth/Elev. | - |
| Location | LIFT-1 | Add. Info | - |

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.134 | in | 7.96 | cm |
| Diameter | 2.855 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.30 | $cm^2$ |
| Volume | 328.78 | $cm^3$ | 0.0116 | $ft^3$ |
| Mass | 641.70 | g | 1.41 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 99.8 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 816.80 | g |
| Mass of dry sample & tare | 686.64 | g |
| Mass of tare | 96.00 | g |
| % Moisture | 22.0 | |

### Test Data

| | | |
|---|---|---|
| Speed | 9 | |
| Board Number | 5 | |
| Cell Number | 4 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 4.48E-04 | $cm^3$/sec |
| B - Value | 0.97 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 130.13 | cm |
| Min Head | 129.43 | cm |
| Maximum Gradient | 16.24 | |
| Minimum Gradient | 16.16 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.154 | in | 8.01 | cm |
| Average Diameter of Sample | | | 2.867 | in | 7.28 | cm |
| Area | 6.46 | $in^2$ | 41.65 | $cm^2$ | | |
| Volume | 333.66 | $cm^3$ | 0.0118 | $ft^3$ | | |
| Mass | 661.24 | g | 1.46 | lb | | |

| | | |
|---|---|---|
| Dry Density | 96.0 | pcf |
| Vol. of Voids | 143.59 | $cm^3$ |
| Vol. of Solids | 190.08 | $cm^3$ |
| Void Ratio | 0.76 | |
| Saturation | 103.1 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 768.58 | g |
| Mass of dry sample & tare | 620.57 | g |
| Mass of tare | 107.43 | g |
| % Moisture | 28.8 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/12/07 | 10 | 30 | - | 1.84 | 129.43 | 16.16 | 16.6 | - | - | - | |
| 02/12/07 | 10 | 35 | 300 | 1.85 | 130.13 | 16.24 | 16.6 | 6.64E-07 | 1.090 | 7.24E-07 | |
| 02/12/07 | 10 | 40 | 300 | 1.84 | 129.43 | 16.16 | 16.6 | 6.64E-07 | 1.090 | 7.24E-07 | |
| 02/12/07 | 10 | 45 | 300 | 1.84 | 129.43 | 16.16 | 16.6 | 6.66E-07 | 1.090 | 7.26E-07 | * |
| 02/12/07 | 10 | 50 | 300 | 1.85 | 130.13 | 16.24 | 16.6 | 6.64E-07 | 1.090 | 7.24E-07 | * |
| 02/12/07 | 10 | 55 | 300 | 1.85 | 130.13 | 16.24 | 16.6 | 6.62E-07 | 1.090 | 7.22E-07 | * |
| 02/12/07 | 11 | 0 | 300 | 1.85 | 130.13 | 16.24 | 16.6 | 6.62E-07 | 1.090 | 7.22E-07 | * |

Reported Average Hydraulic Conductivity* 7.2E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/12/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2282/ST-3 | Depth/Elev. | - |
| Location | LIFT-1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.265 | in | 8.29 | cm |
| Diameter | 2.863 | in | 7.27 | cm |
| Area | 6.44 | $in^2$ | 41.53 | $cm^2$ |
| Volume | 344.44 | $cm^3$ | 0.0122 | $ft^3$ |
| Mass | 643.10 | g | 1.42 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 92.8 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 785.60 | g |
| Mass of dry sample & tare | 646.00 | g |
| Mass of tare | 98.40 | g |
| % Moisture | 25.5 | |

### Test Data

| | | |
|---|---|---|
| Speed | 9 | |
| Board Number | 1 | |
| Cell Number | 6 | |
| Flow Pump Number | 1B | |
| Flow Pump Rate | 4.48E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 98.48 | cm |
| Min Head | 98.48 | cm |
| Maximum Gradient | 11.76 | |
| Minimum Gradient | 11.76 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.297 | in | 8.37 | cm |
| Average Diameter of Sample | | | 2.868 | in | 7.28 | cm |
| Area | 6.46 | $in^2$ | 41.68 | $cm^2$ | | |
| Volume | 349.03 | $cm^3$ | 0.0123 | $ft^3$ | | |
| Mass | 668.76 | g | 1.47 | lb | | |

| | | |
|---|---|---|
| Dry Density | 89.9 | pcf |
| Vol. of Voids | 162.69 | $cm^3$ |
| Vol. of Solids | 186.34 | $cm^3$ |
| Void Ratio | 0.87 | |
| Saturation | 101.8 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 764.46 | g |
| Mass of dry sample & tare | 598.83 | g |
| Mass of tare | 95.71 | g |
| % Moisture | 32.9 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/12/07 | 10 | 40 | - | 1.40 | 98.48 | 11.76 | 16.5 | - | - | - | |
| 02/12/07 | 10 | 45 | 300 | 1.40 | 98.48 | 11.76 | 16.5 | 9.14E-07 | 1.093 | 9.99E-07 | |
| 02/12/07 | 10 | 50 | 300 | 1.40 | 98.48 | 11.76 | 16.5 | 9.14E-07 | 1.093 | 9.99E-07 | |
| 02/12/07 | 10 | 55 | 300 | 1.40 | 98.48 | 11.76 | 16.5 | 9.14E-07 | 1.093 | 9.99E-07 | * |
| 02/12/07 | 11 | 0 | 300 | 1.40 | 98.48 | 11.76 | 16.5 | 9.14E-07 | 1.093 | 9.99E-07 | * |
| 02/12/07 | 11 | 5 | 300 | 1.40 | 98.48 | 11.76 | 16.5 | 9.14E-07 | 1.093 | 9.99E-07 | * |
| 02/12/07 | 11 | 10 | 300 | 1.40 | 98.48 | 11.76 | 16.5 | 9.14E-07 | 1.093 | 9.99E-07 | * |

Reported Average Hydraulic Conductivity* 1.0E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 70/68 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 141 | | | Pore Pressure Transducer ID # | 26/27 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/13/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-04 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2284/ST-4 | Depth/Elev. | - |
| Location | LIFT-1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.978 | in | 7.56 | cm |
| Diameter | 2.854 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.27 | $cm^2$ |
| Volume | 312.19 | $cm^3$ | 0.0110 | $ft^3$ |
| Mass | 588.20 | g | 1.30 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 94.1 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 762.00 | g |
| Mass of dry sample & tare | 639.00 | g |
| Mass of tare | 146.10 | g |
| % Moisture | 25.0 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 5 | |
| Cell Number | 6 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.97 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 69.64 | cm |
| Min Head | 68.23 | cm |
| Maximum Gradient | 9.00 | |
| Minimum Gradient | 8.82 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.045 | in | 7.73 | cm |
| Average Diameter of Sample | | | 2.893 | in | 7.35 | cm |
| Area | 6.57 | $in^2$ | 42.41 | $cm^2$ | | |
| Volume | 328.00 | $cm^3$ | 0.0116 | $ft^3$ | | |
| Mass | 611.01 | g | 1.35 | lb | | |

| | | |
|---|---|---|
| Dry Density | 86.6 | pcf |
| Vol. of Voids | 159.34 | $cm^3$ |
| Vol. of Solids | 168.66 | $cm^3$ |
| Void Ratio | 0.94 | |
| Saturation | 97.7 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 719.09 | g |
| Mass of dry sample & tare | 563.54 | g |
| Mass of tare | 108.37 | g |
| % Moisture | 34.2 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/13/07 | 12 | 20 | - | 0.97 | 68.23 | 8.82 | 17.5 | - | - | - | |
| 02/13/07 | 12 | 25 | 300 | 0.97 | 68.23 | 8.82 | 17.5 | 2.39E-06 | 1.065 | 2.55E-06 | |
| 02/13/07 | 12 | 30 | 300 | 0.98 | 68.93 | 8.91 | 17.5 | 2.38E-06 | 1.065 | 2.54E-06 | |
| 02/13/07 | 12 | 35 | 300 | 0.99 | 69.64 | 9.00 | 17.5 | 2.36E-06 | 1.065 | 2.51E-06 | * |
| 02/13/07 | 12 | 40 | 300 | 0.98 | 68.93 | 8.91 | 17.5 | 2.36E-06 | 1.065 | 2.51E-06 | * |
| 02/13/07 | 12 | 45 | 300 | 0.99 | 69.64 | 9.00 | 17.5 | 2.36E-06 | 1.065 | 2.51E-06 | * |
| 02/13/07 | 12 | 50 | 300 | 0.99 | 69.64 | 9.00 | 17.5 | 2.35E-06 | 1.065 | 2.50E-06 | * |

Reported Average Hydraulic Conductivity* 2.5E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/14/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2291/ST-5 | Depth/Elev. | - |
| Location | LIFT 2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.994 | in | 7.60 | cm |
| Diameter | 2.859 | in | 7.26 | cm |
| Area | 6.42 | $in^2$ | 41.42 | $cm^2$ |
| Volume | 314.97 | $cm^3$ | 0.0111 | $ft^3$ |
| Mass | 569.90 | g | 1.26 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 89.6 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 397.80 | g |
| Mass of dry sample & tare | 335.15 | g |
| Mass of tare | 94.90 | g |
| % Moisture | 26.1 | |

### Test Data

| | | |
|---|---|---|
| Speed | 8 | |
| Board Number | 1 | |
| Cell Number | 16 | |
| Flow Pump Number | 1A | |
| Flow Pump Rate | 8.96E-04 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 112.54 | cm |
| Min Head | 111.84 | cm |
| Maximum Gradient | 14.77 | |
| Minimum Gradient | 14.68 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.999 | in | 7.62 | cm |
| Average Diameter of Sample | | | 2.881 | in | 7.32 | cm |
| Area | 6.52 | $in^2$ | 42.06 | $cm^2$ | | |
| Volume | 320.37 | $cm^3$ | 0.0113 | $ft^3$ | | |
| Mass | 621.55 | g | 1.37 | lb | | |

| | | |
|---|---|---|
| Dry Density | 92.1 | pcf |
| Vol. of Voids | 145.21 | $cm^3$ |
| Vol. of Solids | 175.16 | $cm^3$ |
| Void Ratio | 0.83 | |
| Saturation | 102.4 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 723.43 | g |
| Mass of dry sample & tare | 574.80 | g |
| Mass of tare | 101.87 | g |
| % Moisture | 31.4 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/14/07 | 10 | 40 | - | 1.59 | 111.84 | 14.68 | 16.5 | - | - | - | |
| 02/14/07 | 10 | 45 | 300 | 1.60 | 112.54 | 14.77 | 16.5 | 1.45E-06 | 1.093 | 1.58E-06 | |
| 02/14/07 | 10 | 50 | 300 | 1.59 | 111.84 | 14.68 | 16.5 | 1.45E-06 | 1.093 | 1.58E-06 | |
| 02/14/07 | 10 | 55 | 300 | 1.60 | 112.54 | 14.77 | 16.5 | 1.45E-06 | 1.093 | 1.58E-06 | * |
| 02/14/07 | 11 | 0 | 300 | 1.60 | 112.54 | 14.77 | 16.5 | 1.44E-06 | 1.093 | 1.58E-06 | * |
| 02/14/07 | 11 | 5 | 300 | 1.59 | 111.84 | 14.68 | 16.5 | 1.45E-06 | 1.093 | 1.58E-06 | * |
| 02/14/07 | 11 | 10 | 300 | 1.60 | 112.54 | 14.77 | 16.5 | 1.45E-06 | 1.093 | 1.58E-06 | * |

Reported Average Hydraulic Conductivity* 1.6E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: -

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 24/25 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 140 | | | Pore Pressure Transducer ID # | 26/27 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/14/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2292/ST-6 | Depth/Elev. | - |
| Location | LIFT 2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.027 | in | 7.69 | cm |
| Diameter | 2.862 | in | 7.27 | cm |
| Area | 6.43 | $in^2$ | 41.50 | $cm^2$ |
| Volume | 319.11 | $cm^3$ | 0.0113 | $ft^3$ |
| Mass | 612.30 | g | 1.35 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 96.5 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 414.70 | g |
| Mass of dry sample & tare | 354.49 | g |
| Mass of tare | 104.00 | g |
| % Moisture | 24.0 | |

### Test Data

| | | |
|---|---|---|
| Speed | 9 | |
| Board Number | 2 | |
| Cell Number | 15 | |
| Flow Pump Number | 1A | |
| Flow Pump Rate | 4.48E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 182.18 | cm |
| Min Head | 181.48 | cm |
| Maximum Gradient | 23.54 | |
| Minimum Gradient | 23.45 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.047 | in | 7.74 | cm |
| Average Diameter of Sample | | | 2.896 | in | 7.36 | cm |
| Area | 6.59 | $in^2$ | 42.50 | $cm^2$ | | |
| Volume | 328.90 | $cm^3$ | 0.0116 | $ft^3$ | | |
| Mass | 633.66 | g | 1.40 | lb | | |

| | | |
|---|---|---|
| Dry Density | 92.2 | pcf |
| Vol. of Voids | 148.84 | $cm^3$ |
| Vol. of Solids | 180.05 | $cm^3$ |
| Void Ratio | 0.83 | |
| Saturation | 99.1 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 735.38 | g |
| Mass of dry sample & tare | 587.87 | g |
| Mass of tare | 101.75 | g |
| % Moisture | 30.3 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/14/07 | 10 | 0 | - | 2.58 | 181.48 | 23.45 | 16.5 | - | - | - | |
| 02/14/07 | 10 | 5 | 300 | 2.58 | 181.48 | 23.45 | 16.5 | 4.50E-07 | 1.093 | 4.91E-07 | |
| 02/14/07 | 10 | 10 | 300 | 2.58 | 181.48 | 23.45 | 16.5 | 4.50E-07 | 1.093 | 4.91E-07 | |
| 02/14/07 | 10 | 15 | 300 | 2.59 | 182.18 | 23.54 | 16.5 | 4.49E-07 | 1.093 | 4.90E-07 | * |
| 02/14/07 | 10 | 20 | 300 | 2.58 | 181.48 | 23.45 | 16.5 | 4.49E-07 | 1.093 | 4.90E-07 | * |
| 02/14/07 | 10 | 25 | 300 | 2.59 | 182.18 | 23.54 | 16.5 | 4.49E-07 | 1.093 | 4.90E-07 | * |
| 02/14/07 | 10 | 30 | 300 | 2.58 | 181.48 | 23.45 | 16.5 | 4.49E-07 | 1.093 | 4.90E-07 | * |

Reported Average Hydraulic Conductivity* 4.9E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: -

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 24/25 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 140 | | | Pore Pressure Transducer ID # | 26/27 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/21/07 |
| Checked By | GB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2312/ST-7 | Depth/Elev. | - |
| Location | LIFT 1 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.960 | in | 7.52 | cm |
| Diameter | 2.856 | in | 7.25 | cm |
| Area | 6.41 | $in^2$ | 41.33 | $cm^2$ |
| Volume | 310.74 | $cm^3$ | 0.0110 | $ft^3$ |
| Mass | 615.70 | g | 1.36 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 99.4 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 761.30 | g |
| Mass of dry sample & tare | 642.98 | g |
| Mass of tare | 158.90 | g |
| % Moisture | 24.4 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 9 | |
| Cell Number | 4 | |
| Flow Pump Number | 1B | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 219.46 | cm |
| Min Head | 218.05 | cm |
| Maximum Gradient | 29.02 | |
| Minimum Gradient | 28.84 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.977 | in | 7.56 | cm |
| Average Diameter of Sample | | | 2.864 | in | 7.27 | cm |
| Area | 6.44 | $in^2$ | 41.56 | $cm^2$ | | |
| Volume | 314.28 | $cm^3$ | 0.0111 | $ft^3$ | | |
| Mass | 625.06 | g | 1.38 | lb | | |

| | | |
|---|---|---|
| Dry Density | 98.3 | pcf |
| Vol. of Voids | 131.00 | $cm^3$ |
| Vol. of Solids | 183.28 | $cm^3$ |
| Void Ratio | 0.71 | |
| Saturation | 99.4 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 726.20 | g |
| Mass of dry sample & tare | 596.00 | g |
| Mass of tare | 101.22 | g |
| % Moisture | 26.3 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/21/07 | 11 | 0 | - | 3.10 | 218.05 | 28.84 | 16.5 | - | - | - | |
| 02/21/07 | 11 | 5 | 300 | 3.11 | 218.76 | 28.93 | 16.5 | 1.87E-07 | 1.093 | 2.04E-07 | |
| 02/21/07 | 11 | 10 | 300 | 3.11 | 218.76 | 28.93 | 16.5 | 1.86E-07 | 1.093 | 2.04E-07 | |
| 02/21/07 | 11 | 15 | 300 | 3.12 | 219.46 | 29.02 | 16.5 | 1.86E-07 | 1.093 | 2.03E-07 | * |
| 02/21/07 | 11 | 20 | 300 | 3.11 | 218.76 | 28.93 | 16.5 | 1.86E-07 | 1.093 | 2.03E-07 | * |
| 02/21/07 | 11 | 25 | 300 | 3.10 | 218.05 | 28.84 | 16.5 | 1.87E-07 | 1.093 | 2.04E-07 | * |
| 02/21/07 | 11 | 30 | 300 | 3.12 | 219.46 | 29.02 | 16.5 | 1.86E-07 | 1.093 | 2.04E-07 | * |

Reported Average Hydraulic Conductivity* 2.0E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 22 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 70/68 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 141 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/22/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2331/ST-8 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.266 | in | 8.30 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 341.43 | $cm^3$ | 0.0121 | $ft^3$ |
| Mass | 665.80 | g | 1.47 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 95.3 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 756.30 | g |
| Mass of dry sample & tare | 614.33 | g |
| Mass of tare | 102.30 | g |
| % Moisture | 27.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 11 | |
| Board Number | 9 | |
| Cell Number | 3 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 1.12E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 209.82 | cm |
| Min Head | 207.50 | cm |
| Maximum Gradient | 25.29 | |
| Minimum Gradient | 25.01 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.267 | in | 8.30 | cm |
| Average Diameter of Sample | | | 2.864 | in | 7.27 | cm |
| Area | 6.44 | $in^2$ | 41.56 | $cm^2$ | | |
| Volume | 344.89 | $cm^3$ | 0.0122 | $ft^3$ | | |
| Mass | 672.82 | g | 1.48 | lb | | |

| | | |
|---|---|---|
| Dry Density | 93.8 | pcf |
| Vol. of Voids | 152.82 | $cm^3$ |
| Vol. of Solids | 192.07 | $cm^3$ |
| Void Ratio | 0.80 | |
| Saturation | 100.9 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 828.75 | g |
| Mass of dry sample & tare | 674.58 | g |
| Mass of tare | 156.14 | g |
| % Moisture | 29.7 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/22/07 | 12 | 10 | - | 2.95 | 207.50 | 25.01 | 18.7 | - | - | - | |
| 02/22/07 | 12 | 15 | 300 | 2.97 | 208.91 | 25.18 | 18.7 | 1.07E-07 | 1.033 | 1.11E-07 | |
| 02/22/07 | 12 | 20 | 300 | 2.98 | 209.61 | 25.26 | 18.7 | 1.07E-07 | 1.033 | 1.10E-07 | |
| 02/22/07 | 12 | 25 | 300 | 2.98 | 209.61 | 25.26 | 18.7 | 1.07E-07 | 1.033 | 1.10E-07 | * |
| 02/22/07 | 12 | 30 | 300 | 2.98 | 209.61 | 25.26 | 18.7 | 1.07E-07 | 1.033 | 1.10E-07 | * |
| 02/22/07 | 12 | 35 | 300 | 2.98 | 209.61 | 25.26 | 18.7 | 1.07E-07 | 1.033 | 1.10E-07 | * |
| 02/22/07 | 12 | 40 | 300 | 2.98 | 209.82 | 25.29 | 18.7 | 1.07E-07 | 1.033 | 1.10E-07 | * |

Reported Average Hydraulic Conductivity* 1.1E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/23/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2332/ST-9 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.641 | in | 6.71 | cm |
| Diameter | 2.855 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.30 | $cm^2$ |
| Volume | 277.06 | $cm^3$ | 0.0098 | $ft^3$ |
| Mass | 529.90 | g | 1.17 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 92.8 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 695.60 | g |
| Mass of dry sample & tare | 563.03 | g |
| Mass of tare | 98.70 | g |
| % Moisture | 28.6 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 8 | |
| Cell Number | 3 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 75.26 | cm |
| Min Head | 74.56 | cm |
| Maximum Gradient | 11.04 | |
| Minimum Gradient | 10.94 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.684 | in | 6.82 | cm |
| Average Diameter of Sample | | | 2.879 | in | 7.31 | cm |
| Area | 6.51 | $in^2$ | 42.00 | $cm^2$ | | |
| Volume | 286.32 | $cm^3$ | 0.0101 | $ft^3$ | | |
| Mass | 543.21 | g | 1.20 | lb | | |

| | | |
|---|---|---|
| Dry Density | 90.5 | pcf |
| Vol. of Voids | 132.46 | $cm^3$ |
| Vol. of Solids | 153.86 | $cm^3$ |
| Void Ratio | 0.86 | |
| Saturation | 96.5 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 750.52 | g |
| Mass of dry sample & tare | 622.92 | g |
| Mass of tare | 208.08 | g |
| % Moisture | 30.8 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/23/07 | 10 | 0 | - | 1.07 | 75.26 | 11.04 | 17.0 | - | - | - | |
| 02/23/07 | 10 | 5 | 300 | 1.06 | 74.56 | 10.94 | 17.0 | 1.21E-07 | 1.079 | 1.31E-07 | |
| 02/23/07 | 10 | 10 | 300 | 1.06 | 74.56 | 10.94 | 17.0 | 1.22E-07 | 1.079 | 1.31E-07 | |
| 02/23/07 | 10 | 15 | 300 | 1.07 | 75.26 | 11.04 | 17.0 | 1.21E-07 | 1.079 | 1.31E-07 | * |
| 02/23/07 | 10 | 20 | 300 | 1.07 | 75.26 | 11.04 | 17.0 | 1.21E-07 | 1.079 | 1.30E-07 | * |
| 02/23/07 | 10 | 25 | 300 | 1.07 | 75.26 | 11.04 | 17.0 | 1.21E-07 | 1.079 | 1.30E-07 | * |
| 02/23/07 | 10 | 30 | 300 | 1.07 | 75.26 | 11.04 | 17.0 | 1.21E-07 | 1.079 | 1.30E-07 | * |

Reported Average Hydraulic Conductivity* 1.3E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/23/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2333/ST-10 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.862 | in | 7.27 | cm |
| Diameter | 2.853 | in | 7.25 | cm |
| Area | 6.39 | $in^2$ | 41.24 | $cm^2$ |
| Volume | 299.82 | $cm^3$ | 0.0106 | $ft^3$ |
| Mass | 566.20 | g | 1.25 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 92.9 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 691.10 | g |
| Mass of dry sample & tare | 563.80 | g |
| Mass of tare | 89.30 | g |
| % Moisture | 26.8 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 9 | |
| Cell Number | 2 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 85.81 | cm |
| Min Head | 85.11 | cm |
| Maximum Gradient | 11.68 | |
| Minimum Gradient | 11.58 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.893 | in | 7.35 | cm |
| Average Diameter of Sample | | | 2.878 | in | 7.31 | cm |
| Area | 6.51 | $in^2$ | 41.97 | $cm^2$ | | |
| Volume | 308.40 | $cm^3$ | 0.0109 | $ft^3$ | | |
| Mass | 585.28 | g | 1.29 | lb | | |

| | | |
|---|---|---|
| Dry Density | 89.1 | pcf |
| Vol. of Voids | 145.29 | $cm^3$ |
| Vol. of Solids | 163.11 | $cm^3$ |
| Void Ratio | 0.89 | |
| Saturation | 99.7 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 790.66 | g |
| Mass of dry sample & tare | 645.89 | g |
| Mass of tare | 205.80 | g |
| % Moisture | 32.9 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$(°C) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/23/07 | 12 | 15 | - | 1.21 | 85.11 | 11.58 | 17.5 | - | - | - | |
| 02/23/07 | 12 | 20 | 300 | 1.21 | 85.11 | 11.58 | 17.5 | 4.61E-07 | 1.065 | 4.91E-07 | |
| 02/23/07 | 12 | 25 | 300 | 1.21 | 85.11 | 11.58 | 17.5 | 4.61E-07 | 1.065 | 4.91E-07 | |
| 02/23/07 | 12 | 30 | 300 | 1.22 | 85.81 | 11.68 | 17.5 | 4.59E-07 | 1.065 | 4.89E-07 | * |
| 02/23/07 | 12 | 35 | 300 | 1.22 | 85.81 | 11.68 | 17.5 | 4.57E-07 | 1.065 | 4.87E-07 | * |
| 02/23/07 | 12 | 40 | 300 | 1.21 | 85.11 | 11.58 | 17.5 | 4.59E-07 | 1.065 | 4.89E-07 | * |
| 02/23/07 | 12 | 45 | 300 | 1.22 | 85.81 | 11.68 | 17.5 | 4.59E-07 | 1.065 | 4.89E-07 | * |

Reported Average Hydraulic Conductivity* 4.9E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/23/07 |
| Checked By | LS |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-05 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2334/ST-11 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.727 | in | 6.93 | cm |
| Diameter | 2.852 | in | 7.24 | cm |
| Area | 6.39 | $in^2$ | 41.22 | $cm^2$ |
| Volume | 285.48 | $cm^3$ | 0.0101 | $ft^3$ |
| Mass | 542.81 | g | 1.20 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 92.6 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 731.80 | g |
| Mass of dry sample & tare | 593.15 | g |
| Mass of tare | 100.80 | g |
| % Moisture | 28.2 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 10 | |
| Cell Number | 1 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 212.43 | cm |
| Min Head | 211.02 | cm |
| Maximum Gradient | 30.28 | |
| Minimum Gradient | 30.08 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | 2.762 | in | 7.02 | cm | |
| Average Diameter of Sample | | 2.882 | in | 7.32 | cm | |
| Area | 6.52 | $in^2$ | 42.09 | $cm^2$ | | |
| Volume | 295.26 | $cm^3$ | 0.0104 | $ft^3$ | | |
| Mass | 561.02 | g | 1.24 | lb | | |
| Dry Density | | | | | 89.5 | pcf |
| Vol. of Voids | | | | | 138.46 | $cm^3$ |
| Vol. of Solids | | | | | 156.79 | $cm^3$ |
| Void Ratio | | | | | 0.88 | |
| Saturation | | | | | 99.4 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 778.25 | g |
| Mass of dry sample & tare | 640.63 | g |
| Mass of tare | 217.45 | g |
| % Moisture | 32.5 | |

| TIME FUNCTION | | | Δt | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/23/07 | 12 | 15 | - | 3.01 | 211.72 | 30.18 | 17.5 | - | - | - | |
| 02/23/07 | 12 | 20 | 300 | 3.00 | 211.02 | 30.08 | 17.5 | 1.77E-07 | 1.065 | 1.88E-07 | |
| 02/23/07 | 12 | 25 | 300 | 3.01 | 211.72 | 30.18 | 17.5 | 1.77E-07 | 1.065 | 1.88E-07 | |
| 02/23/07 | 12 | 30 | 300 | 3.01 | 211.72 | 30.18 | 17.5 | 1.76E-07 | 1.065 | 1.88E-07 | * |
| 02/23/07 | 12 | 35 | 300 | 3.01 | 211.72 | 30.18 | 17.5 | 1.76E-07 | 1.065 | 1.88E-07 | * |
| 02/23/07 | 12 | 40 | 300 | 3.02 | 212.43 | 30.28 | 17.5 | 1.76E-07 | 1.065 | 1.87E-07 | * |
| 02/23/07 | 12 | 45 | 300 | 3.02 | 212.43 | 30.28 | 17.5 | 1.76E-07 | 1.065 | 1.87E-07 | * |

Reported Average Hydraulic Conductivity* 1.9E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 216 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | KI |
| Date | 02/27/07 |
| Checked By | [illegible] |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2352/ST-12 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.030 | in | 7.70 | cm |
| Diameter | 2.855 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.30 | $cm^2$ |
| Volume | 317.87 | $cm^3$ | 0.0112 | $ft^3$ |
| Mass | 603.60 | g | 1.33 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 90.0 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 376.90 | g |
| Mass of dry sample & tare | 309.87 | g |
| Mass of tare | 98.40 | g |
| % Moisture | 31.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 11 | |
| Board Number | 7 | |
| Cell Number | 15 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 1.12E-04 | $cm^3$/sec |
| B - Value | 0.96 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 98.48 | cm |
| Min Head | 94.96 | cm |
| Maximum Gradient | 12.75 | |
| Minimum Gradient | 12.30 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.040 | in | 7.72 | cm |
| Average Diameter of Sample | | | 2.871 | in | 7.29 | cm |
| Area | 6.47 | $in^2$ | 41.77 | $cm^2$ | | |
| Volume | 322.50 | $cm^3$ | 0.0114 | $ft^3$ | | |
| Mass | 609.26 | g | 1.34 | lb | | |

| | | |
|---|---|---|
| Dry Density | 87.7 | pcf |
| Vol. of Voids | 154.66 | $cm^3$ |
| Vol. of Solids | 167.84 | $cm^3$ |
| Void Ratio | 0.92 | |
| Saturation | 100.9 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 708.72 | g |
| Mass of dry sample & tare | 552.66 | g |
| Mass of tare | 99.57 | g |
| % Moisture | 34.4 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/27/07 | 10 | 15 | - | 1.35 | 94.96 | 12.30 | 16.9 | - | - | - | |
| 02/27/07 | 10 | 20 | 300 | 1.37 | 96.37 | 12.48 | 16.9 | 2.16E-07 | 1.081 | 2.34E-07 | |
| 02/27/07 | 10 | 25 | 300 | 1.36 | 95.66 | 12.39 | 16.9 | 2.16E-07 | 1.081 | 2.33E-07 | |
| 02/27/07 | 10 | 30 | 300 | 1.40 | 98.48 | 12.75 | 16.9 | 2.13E-07 | 1.081 | 2.31E-07 | * |
| 02/27/07 | 10 | 35 | 300 | 1.38 | 97.07 | 12.57 | 16.9 | 2.12E-07 | 1.081 | 2.29E-07 | * |
| 02/27/07 | 10 | 40 | 300 | 1.37 | 96.37 | 12.48 | 16.9 | 2.14E-07 | 1.081 | 2.32E-07 | * |
| 02/27/07 | 10 | 45 | 300 | 1.36 | 95.66 | 12.39 | 16.9 | 2.16E-07 | 1.081 | 2.33E-07 | * |

Reported Average Hydraulic Conductivity* 2.3E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/27/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2353/ST-13 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 3.045 | in | 7.73 | cm |
| Diameter | 2.836 | in | 7.20 | cm |
| Area | 6.32 | $in^2$ | 40.75 | $cm^2$ |
| Volume | 315.20 | $cm^3$ | 0.0111 | $ft^3$ |
| Mass | 584.30 | g | 1.29 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 93.8 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 326.70 | g |
| Mass of dry sample & tare | 284.29 | g |
| Mass of tare | 102.30 | g |
| % Moisture | 23.3 | |

### Test Data

| | | |
|---|---|---|
| Speed | 10 | |
| Board Number | 8 | |
| Cell Number | 16 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 2.24E-04 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 21.10 | cm |
| Min Head | 20.40 | cm |
| Maximum Gradient | 2.72 | |
| Minimum Gradient | 2.63 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 3.049 | in | 7.74 | cm |
| Average Diameter of Sample | | | 2.888 | in | 7.34 | cm |
| Area | 6.55 | $in^2$ | 42.26 | $cm^2$ | | |
| Volume | 327.30 | $cm^3$ | 0.0116 | $ft^3$ | | |
| Mass | 626.84 | g | 1.38 | lb | | |

| | | |
|---|---|---|
| Dry Density | 91.3 | pcf |
| Vol. of Voids | 149.89 | $cm^3$ |
| Vol. of Solids | 177.41 | $cm^3$ |
| Void Ratio | 0.84 | |
| Saturation | 98.6 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 726.40 | g |
| Mass of dry sample & tare | 578.58 | g |
| Mass of tare | 99.64 | g |
| % Moisture | 30.9 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/27/07 | 9 | 40 | - | 0.30 | 21.10 | 2.72 | 16.9 | - | - | - | |
| 02/27/07 | 9 | 45 | 300 | 0.29 | 20.40 | 2.63 | 16.9 | 1.98E-06 | 1.081 | 2.14E-06 | |
| 02/27/07 | 9 | 50 | 300 | 0.30 | 21.10 | 2.72 | 16.9 | 1.98E-06 | 1.081 | 2.14E-06 | |
| 02/27/07 | 9 | 55 | 300 | 0.29 | 20.40 | 2.63 | 16.9 | 1.98E-06 | 1.081 | 2.14E-06 | * |
| 02/27/07 | 10 | 0 | 300 | 0.30 | 21.10 | 2.72 | 16.9 | 1.98E-06 | 1.081 | 2.14E-06 | * |
| 02/27/07 | 10 | 5 | 300 | 0.29 | 20.40 | 2.63 | 16.9 | 1.98E-06 | 1.081 | 2.14E-06 | * |
| 02/27/07 | 10 | 10 | 300 | 0.29 | 20.40 | 2.63 | 16.9 | 2.01E-06 | 1.081 | 2.18E-06 | * |

Reported Average Hydraulic Conductivity* 2.1E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 02/27/07 |
| Checked By | [illegible] |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2354/ST-14 | Depth/Elev. | - |
| Location | LIFT-2 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.816 | in | 7.15 | cm |
| Diameter | 2.847 | in | 7.23 | cm |
| Area | 6.37 | $in^2$ | 41.07 | $cm^2$ |
| Volume | 293.76 | $cm^3$ | 0.0104 | $ft^3$ |
| Mass | 569.70 | g | 1.26 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 95.9 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 361.15 | g |
| Mass of dry sample & tare | 306.18 | g |
| Mass of tare | 96.20 | g |
| % Moisture | 26.2 | |

### Test Data

| | | |
|---|---|---|
| Speed | 13 | |
| Board Number | 8 | |
| Cell Number | 8 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 2.80E-05 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 16.18 | cm |
| Min Head | 16.18 | cm |
| Maximum Gradient | 2.23 | |
| Minimum Gradient | 2.23 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.853 | in | 7.25 | cm |
| Average Diameter of Sample | | | 2.854 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.27 | $cm^2$ | | |
| Volume | 299.09 | $cm^3$ | 0.0106 | $ft^3$ | | |
| Mass | 589.69 | g | 1.30 | lb | | |

| | | |
|---|---|---|
| Dry Density | 95.3 | pcf |
| Vol. of Voids | 129.85 | $cm^3$ |
| Vol. of Solids | 169.23 | $cm^3$ |
| Void Ratio | 0.77 | |
| Saturation | 102.2 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 689.80 | g |
| Mass of dry sample & tare | 557.12 | g |
| Mass of tare | 100.45 | g |
| % Moisture | 29.1 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 02/27/07 | 13 | 30 | - | 0.23 | 16.18 | 2.23 | 16.9 | - | - | - | |
| 02/27/07 | 13 | 35 | 300 | 0.23 | 16.18 | 2.23 | 16.9 | 3.04E-07 | 1.081 | 3.29E-07 | |
| 02/27/07 | 13 | 40 | 300 | 0.23 | 16.18 | 2.23 | 16.9 | 3.04E-07 | 1.081 | 3.29E-07 | |
| 02/27/07 | 13 | 45 | 300 | 0.23 | 16.18 | 2.23 | 16.9 | 3.04E-07 | 1.081 | 3.29E-07 | * |
| 02/27/07 | 13 | 50 | 300 | 0.23 | 16.18 | 2.23 | 16.9 | 3.04E-07 | 1.081 | 3.29E-07 | * |
| 02/27/07 | 13 | 55 | 300 | 0.23 | 16.18 | 2.23 | 16.9 | 3.04E-07 | 1.081 | 3.29E-07 | * |
| 02/27/07 | 14 | 0 | 300 | 0.23 | 16.18 | 2.23 | 16.9 | 3.04E-07 | 1.081 | 3.29E-07 | * |

Reported Average Hydraulic Conductivity* 3.3E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 03/02/07 |
| Checked By | VB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2367/ST-15 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.931 | in | 7.44 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 306.41 | $cm^3$ | 0.0108 | $ft^3$ |
| Mass | 614.40 | g | 1.35 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 99.2 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 546.50 | g |
| Mass of dry sample & tare | 455.57 | g |
| Mass of tare | 107.20 | g |
| % Moisture | 26.1 | |

### Test Data

| | | |
|---|---|---|
| Speed | 11 | |
| Board Number | 7 | |
| Cell Number | 3 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 1.12E-04 | $cm^3$/sec |
| B - Value | 0.95 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 92.15 | cm |
| Min Head | 91.44 | cm |
| Maximum Gradient | 12.29 | |
| Minimum Gradient | 12.19 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.953 | in | 7.50 | cm |
| Average Diameter of Sample | | | 2.853 | in | 7.25 | cm |
| Area | 6.39 | $in^2$ | 41.24 | $cm^2$ | | |
| Volume | 309.36 | $cm^3$ | 0.0109 | $ft^3$ | | |
| Mass | 626.30 | g | 1.38 | lb | | |

| | | |
|---|---|---|
| Dry Density | 100.4 | pcf |
| Vol. of Voids | 124.97 | $cm^3$ |
| Vol. of Solids | 184.39 | $cm^3$ |
| Void Ratio | 0.68 | |
| Saturation | 102.8 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 710.00 | g |
| Mass of dry sample & tare | 581.55 | g |
| Mass of tare | 83.75 | g |
| % Moisture | 25.8 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 03/02/07 | 10 | 0 | - | 1.30 | 91.44 | 12.19 | 17.4 | - | - | - | |
| 03/02/07 | 10 | 5 | 300 | 1.31 | 92.15 | 12.29 | 17.4 | 2.22E-07 | 1.068 | 2.37E-07 | |
| 03/02/07 | 10 | 10 | 300 | 1.30 | 91.44 | 12.19 | 17.4 | 2.22E-07 | 1.068 | 2.37E-07 | |
| 03/02/07 | 10 | 15 | 300 | 1.31 | 92.15 | 12.29 | 17.4 | 2.22E-07 | 1.068 | 2.37E-07 | * |
| 03/02/07 | 10 | 20 | 300 | 1.30 | 91.44 | 12.19 | 17.4 | 2.22E-07 | 1.068 | 2.37E-07 | * |
| 03/02/07 | 10 | 25 | 300 | 1.31 | 92.15 | 12.29 | 17.4 | 2.22E-07 | 1.068 | 2.37E-07 | * |
| 03/02/07 | 10 | 30 | 300 | 1.31 | 92.15 | 12.29 | 17.4 | 2.21E-07 | 1.068 | 2.36E-07 | * |

Reported Average Hydraulic Conductivity* 2.4E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 03/02/07 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2368/ST-16 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.901 | in | 7.37 | cm |
| Diameter | 2.850 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.16 | $cm^2$ |
| Volume | 303.27 | $cm^3$ | 0.0107 | $ft^3$ |
| Mass | 585.30 | g | 1.29 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 91.8 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 434.60 | g |
| Mass of dry sample & tare | 354.18 | g |
| Mass of tare | 96.30 | g |
| % Moisture | 31.2 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 8 | |
| Cell Number | 3 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.96 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 171.63 | cm |
| Min Head | 170.22 | cm |
| Maximum Gradient | 23.24 | |
| Minimum Gradient | 23.05 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.908 | in | 7.39 | cm |
| Average Diameter of Sample | | | 2.855 | in | 7.25 | cm |
| Area | 6.40 | $in^2$ | 41.30 | $cm^2$ | | |
| Volume | 305.07 | $cm^3$ | 0.0108 | $ft^3$ | | |
| Mass | 591.66 | g | 1.30 | lb | | |

| | | |
|---|---|---|
| Dry Density | 91.5 | pcf |
| Vol. of Voids | 139.32 | $cm^3$ |
| Vol. of Solids | 165.75 | $cm^3$ |
| Void Ratio | 0.84 | |
| Saturation | 103.5 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 693.49 | g |
| Mass of dry sample & tare | 549.36 | g |
| Mass of tare | 101.88 | g |
| % Moisture | 32.2 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 03/02/07 | 11 | 0 | - | 2.42 | 170.22 | 23.05 | 17.4 | - | - | - | |
| 03/02/07 | 11 | 5 | 300 | 2.42 | 170.22 | 23.05 | 17.4 | 5.88E-08 | 1.068 | 6.28E-08 | |
| 03/02/07 | 11 | 10 | 300 | 2.43 | 170.93 | 23.14 | 17.4 | 5.87E-08 | 1.068 | 6.27E-08 | |
| 03/02/07 | 11 | 15 | 300 | 2.43 | 170.93 | 23.14 | 17.4 | 5.86E-08 | 1.068 | 6.25E-08 | * |
| 03/02/07 | 11 | 20 | 300 | 2.44 | 171.63 | 23.24 | 17.4 | 5.85E-08 | 1.068 | 6.24E-08 | * |
| 03/02/07 | 11 | 25 | 300 | 2.44 | 171.63 | 23.24 | 17.4 | 5.84E-08 | 1.068 | 6.23E-08 | * |
| 03/02/07 | 11 | 30 | 300 | 2.44 | 171.63 | 23.24 | 17.4 | 5.84E-08 | 1.068 | 6.23E-08 | * |

Reported Average Hydraulic Conductivity* 6.2E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 215 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 28 |

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| | |
|---|---|
| Tested By | RI |
| Date | 03/02/07 |
| Checked By | LB |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2369/ST-17 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

## ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.955 | in | 7.51 | cm |
| Diameter | 2.851 | in | 7.24 | cm |
| Area | 6.38 | $in^2$ | 41.19 | $cm^2$ |
| Volume | 309.13 | $cm^3$ | 0.0109 | $ft^3$ |
| Mass | 607.40 | g | 1.34 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 92.6 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 515.70 | g |
| Mass of dry sample & tare | 412.60 | g |
| Mass of tare | 94.90 | g |
| % Moisture | 32.5 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 1 | |
| Cell Number | 4 | |
| Flow Pump Number | 2B | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.99 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 180.07 | cm |
| Min Head | 179.37 | cm |
| Maximum Gradient | 23.86 | |
| Minimum Gradient | 23.77 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.971 | in | 7.55 | cm |
| Average Diameter of Sample | | | 2.857 | in | 7.26 | cm |
| Area | 6.41 | $in^2$ | 41.36 | $cm^2$ | | |
| Volume | 312.11 | $cm^3$ | 0.0110 | $ft^3$ | | |
| Mass | 615.30 | g | 1.36 | lb | | |

| | | |
|---|---|---|
| Dry Density | 95.4 | pcf |
| Vol. of Voids | 135.32 | $cm^3$ |
| Vol. of Solids | 176.79 | $cm^3$ |
| Void Ratio | 0.77 | |
| Saturation | 102.0 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 708.35 | g |
| Mass of dry sample & tare | 570.42 | g |
| Mass of tare | 93.21 | g |
| % Moisture | 28.9 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 03/02/07 | 11 | 30 | - | 2.55 | 179.37 | 23.77 | 17.3 | - | - | - | |
| 03/02/07 | 11 | 35 | 300 | 2.55 | 179.37 | 23.77 | 17.3 | 5.70E-08 | 1.070 | 6.10E-08 | |
| 03/02/07 | 11 | 40 | 300 | 2.56 | 180.07 | 23.86 | 17.3 | 5.69E-08 | 1.070 | 6.08E-08 | |
| 03/02/07 | 11 | 45 | 300 | 2.56 | 180.07 | 23.86 | 17.3 | 5.67E-08 | 1.070 | 6.07E-08 | * |
| 03/02/07 | 11 | 50 | 300 | 2.55 | 179.37 | 23.77 | 17.3 | 5.69E-08 | 1.070 | 6.08E-08 | * |
| 03/02/07 | 11 | 55 | 300 | 2.56 | 180.07 | 23.86 | 17.3 | 5.69E-08 | 1.070 | 6.08E-08 | * |
| 03/02/07 | 12 | 0 | 300 | 2.56 | 180.07 | 23.86 | 17.3 | 5.67E-08 | 1.070 | 6.07E-08 | * |

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 6.1E-08 cm/sec

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 263 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 246 | | | Pore Pressure Transducer ID # | 26/27 |

**TIMELY ENGINEERING SOIL TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AAP AASHTO R18

| | |
|---|---|
| Tested By | RI |
| Date | 03/02/07 |
| Checked By | |

| | | | |
|---|---|---|---|
| Client Pr. # | - | Lab. PR. # | 688-06 |
| Pr. Name | CMS LANDFILL - CELL 2F | S. Type | UD |
| Sample ID | 2370/ST-18 | Depth/Elev. | - |
| Location | LIFT-3 | Add. Info | - |

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

### Initial Sample Data (Before Test)

| | | | | |
|---|---|---|---|---|
| Height | 2.941 | in | 7.47 | cm |
| Diameter | 2.849 | in | 7.24 | cm |
| Area | 6.37 | $in^2$ | 41.13 | $cm^2$ |
| Volume | 307.23 | $cm^3$ | 0.0108 | $ft^3$ |
| Mass | 591.40 | g | 1.30 | lb |
| Specific Gravity | 2.700 | (Assumed) | | |
| Dry Density | 93.4 | pcf | | |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 607.00 | g |
| Mass of dry sample & tare | 506.59 | g |
| Mass of tare | 156.20 | g |
| % Moisture | 28.7 | |

### Test Data

| | | |
|---|---|---|
| Speed | 12 | |
| Board Number | 2 | |
| Cell Number | 16 | |
| Flow Pump Number | 2A | |
| Flow Pump Rate | 5.60E-05 | $cm^3$/sec |
| B - Value | 0.98 | |
| Cell Pressure | 90.0 | psi |
| Back Pressure | 80.0 | psi |
| Confining (Effective) Pressure | 10.0 | psi |
| Max Head | 137.87 | cm |
| Min Head | 137.16 | cm |
| Maximum Gradient | 18.45 | |
| Minimum Gradient | 18.36 | |

### Final Data (After Test)

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Height of Sample | | | 2.942 | in | 7.47 | cm |
| Average Diameter of Sample | | | 2.853 | in | 7.25 | cm |
| Area | 6.39 | $in^2$ | 41.24 | $cm^2$ | | |
| Volume | 308.20 | $cm^3$ | 0.0109 | $ft^3$ | | |
| Mass | 596.24 | g | 1.31 | lb | | |

| | | |
|---|---|---|
| Dry Density | 92.8 | pcf |
| Vol. of Voids | 138.47 | $cm^3$ |
| Vol. of Solids | 169.73 | $cm^3$ |
| Void Ratio | 0.82 | |
| Saturation | 99.6 | % |

**Moisture Content**

| | | |
|---|---|---|
| Mass of wet sample & tare | 687.13 | g |
| Mass of dry sample & tare | 549.18 | g |
| Mass of tare | 90.94 | g |
| % Moisture | 30.1 | |

| TIME FUNCTION | | | Δ t | READING | Head | Gradient | Temp. | PERMEABILITY (cm/sec) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | HOUR | MIN | (sec) | (psi) | (cm) | | $T_x$( °C ) | @ $T_x$ | $R_T$ | @ 20 °C | |
| 03/02/07 | 11 | 30 | - | 1.95 | 137.16 | 18.36 | 17.3 | - | - | - | |
| 03/02/07 | 11 | 35 | 300 | 1.95 | 137.16 | 18.36 | 17.3 | 7.40E-08 | 1.070 | 7.92E-08 | |
| 03/02/07 | 11 | 40 | 300 | 1.95 | 137.16 | 18.36 | 17.3 | 7.40E-08 | 1.070 | 7.92E-08 | |
| 03/02/07 | 11 | 45 | 300 | 1.96 | 137.87 | 18.45 | 17.3 | 7.38E-08 | 1.070 | 7.90E-08 | * |
| 03/02/07 | 11 | 50 | 300 | 1.96 | 137.87 | 18.45 | 17.3 | 7.36E-08 | 1.070 | 7.88E-08 | * |
| 03/02/07 | 11 | 55 | 300 | 1.95 | 137.16 | 18.36 | 17.3 | 7.38E-08 | 1.070 | 7.90E-08 | * |
| 03/02/07 | 12 | 0 | 300 | 1.96 | 137.87 | 18.45 | | 7.38E-08 | 1.382 | 1.02E-07 | * |

Reported Average Hydraulic Conductivity* 8.5E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

| | | | | | |
|---|---|---|---|---|---|
| Flow pump ID # | 244 | Balance ID # | 1/6/7 | Differential Pressure Transducer ID # | 262 |
| Thermometer ID # | 63 | Oven ID # | 14/15 | Board Pressure Transducer ID # | 64 |
| Syringe ID # | 245 | | | Pore Pressure Transducer ID # | 26/27 |

of NORTH CAROLINA, LLC

# SECTION F-3

## Field Density Test Results

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-1 | 2-08-07 | N 585230 | 1 | N | 92.8 | 28.6 | CL 4 | 94.0 | 25.2 | 98.7 | +3.4 | P | |
| | | E 1505130 | | | | | | | | | | | |
| C-2 | | N 5310 | | | 92.8 | 28.7 | | | | 98.7 | +3.5 | P | |
| | | E 5230 | | | | | | | | | | | |
| C-3 | | N 5380 | | | 93.3 | 28.4 | | | | 99.3 | +3.2 | P | |
| | | E 5320 | | | | | | | | | | | |
| C-4 | | N 5430 | | | 93.2 | 29.0 | | | | 99.1 | +3.8 | P | |
| | | E 5410 | | | | | | | | | | | |
| C-5 | | N 5510 | | | 93.3 | 28.6 | | | | 99.3 | +3.4 | P | |
| | | E 5490 | | | | | | | | | | | |
| C-6 | | N 5420 | | | 91.7 | 28.4 | | | | 97.6 | +3.2 | P | |
| | | E 5520 | | | | | | | | | | | |
| C-7 | | N 5360 | | | 91.7 | 28.2 | | | | 97.6 | +3.0 | P | |
| | | E 5430 | | | | | | | | | | | |
| C-8 | | N 5280 | | | 92.0 | 28.7 | | | | 97.9 | +3.5 | P | |
| | | E 5330 | | | | | | | | | | | |
| C-9 | | N 5220 | | | 92.1 | 28.4 | | | | 98.0 | +3.2 | P | |
| | | E 5240 | | | | | | | | | | | |
| C-10 | | N 5130 | | | 92.5 | 28.8 | | | | 98.5 | +3.6 | P | |
| | | E 5140 | | | | | | | | | | | |
| C-11 | | N 5040 | | | 91.2 | 28.2 | | | | 97.0 | +3.0 | P | |
| | | E 5160 | | | | | | | | | | | |
| C-12 | | N 5120 | | | 91.6 | 28.3 | | | | 97.4 | +3.1 | P | |
| | | E 5280 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-13 | 2-8-07 | N 585190 | 1 | N | 92.3 | 28.6 | CL-4 | 94.0 | 25.2 | 98.2 | +3.4 | P | |
| | | E 1505370 | | | | | | | | | | | |
| C-14 | | N 5280 | | | 91.9 | 28.4 | | | | 97.8 | +3.2 | P | |
| | | E 5480 | | | | | | | | | | | |
| C-15 | | N 5370 | | | 91.8 | 28.9 | | | | 97.6 | +3.7 | P | |
| | | E 5580 | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-16 | 2-9-07 | N 584910 | 1 | N | 90.7 | 28.2 | CL 4 | 94.0 | 25.2 | 96.5 | +3.0 | F | See Retest C-16R1 |
| | | E 1505070 | | | | | | | | | | | |
| C-16R1 | | N 4910 | | | 91.3 | 28.3 | | | | 97.2 | +3.1 | P | Retest for C-16 |
| | | E 5070 | | | | | | | | | | | |
| C 17 | | N 4950 | | | 91.5 | 30.1 | | | | 97.3 | +4.9 | P | |
| | | E 5170 | | | | | | | | | | | |
| C 18 | | N 5020 | | | 91.6 | 29.0 | | | | 97.5 | +3.8 | P | |
| | | E 5280 | | | | | | | | | | | |
| C 19 | | N 5080 | | | 92.4 | 28.7 | | | | 98.3 | +3.5 | P | |
| | | E 5380 | | | | | | | | | | | |
| C 20 | | N 5130 | | | 92.3 | 29.2 | | | | 98.1 | +4.0 | P | |
| | | E 5430 | | | | | | | | | | | |
| C 21 | | N 5230 | | | 92.0 | 28.7 | | | | 97.9 | +3.5 | P | |
| | | E 5540 | | | | | | | | | | | |
| C 22 | | N 5260 | | | 92.4 | 28.9 | | | | 98.3 | +3.7 | P | |
| | | E 5610 | | | | | | | | | | | |
| C 23 | | N 5150 | | | 92.0 | 28.7 | | | | 97.9 | +3.5 | P | |
| | | E 5620 | | | | | | | | | | | |
| C 24 | | N 5100 | | | 91.6 | 28.4 | | | | 97.4 | +3.2 | P | |
| | | E 5560 | | | | | | | | | | | |
| C 25 | | N 5040 | | | 92.5 | 29.9 | | | | 98.4 | +4.7 | P | |
| | | E 5470 | | | | | | | | | | | |
| C 26 | | N 4980 | | | 92.4 | 29.6 | | | | 98.3 | +4.4 | P | |
| | | E 5360 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-27 | 2-9-07 | N 584910 | 1 | N | 91.9 | 28.9 | CL 4 | 94.0 | 25.2 | 97.8 | +3.7 | P | |
| | | E 1505270 | | | | | | | | | | | |
| C-28 | | N 4830 | | | 92.2 | 29.0 | | | | 98.1 | +3.8 | P | |
| | | E 5130 | | | | | | | | | | | |
| C 29 | | N 4810 | | | 92.0 | 29.1 | | | | 97.9 | +3.9 | P | |
| | | E 5050 | | | | | | | | | | | |
| C 30 | | N 4730 | | | 92.4 | 28.3 | | | | 98.3 | +3.1 | P | |
| | | E 5040 | | | | | | | | | | | |
| C 31 | | N 4770 | | | 91.3 | 28.4 | | | | 97.1 | +3.2 | P | |
| | | E 5130 | | | | | | | | | | | |
| C 32 | | N 4830 | | | 91.8 | 28.7 | | | | 97.6 | +3.5 | P | |
| | | E 5320 | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: TD

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-33 | 2-10-07 | N 584880 | 1 | N | 91.3 | 28.5 | CL-4 | 94.0 | 25.2 | 97.1 | +3.3 | P | |
| | | E 1505330 | | | | | | | | | | | |
| C 34 | | N 4910 | | | 91.2 | 28.4 | | | | 97.0 | +3.2 | P | |
| | | E 5420 | | | | | | | | | | | |
| C 35 | | N 4980 | | | 91.0 | 28.3 | | | | 96.8 | +3.1 | F | See Retest C-35R1 |
| | | E 5510 | | | | | | | | | | | |
| C 35R1 | | N 4980 | | | 91.9 | 28.7 | | | | 97.8 | +3.5 | P | Retest for C 35 |
| | | E 5510 | | | | | | | | | | | |
| C 36 | | N 5010 | | | 93.1 | 28.2 | | | | 99.0 | +3.0 | P | |
| | | E 5590 | | | | | | | | | | | |
| C 37 | | N 5070 | | | 91.8 | 28.5 | | | | 97.6 | +3.3 | P | |
| | | E 5670 | | | | | | | | | | | |
| C 38 | | N 5110 | | | 91.9 | 29.0 | | | | 97.8 | +3.8 | P | |
| | | E 5740 | | | | | | | | | | | |
| C 39 | | N 5210 | | | 92.5 | 29.1 | | | | 98.4 | +3.9 | P | |
| | | E 5050 | | | | | | | | | | | |
| C 40 | | N 5120 | | | 92.4 | 28.9 | | | | 98.3 | +3.7 | P | |
| | | E 5020 | | | | | | | | | | | |
| C 41 | | N 5010 | | | 91.3 | 28.2 | | | | 97.2 | +3.0 | P | |
| | | E 5010 | | | | | | | | | | | |
| C 42 | | N 4920 | | | 92.2 | 28.5 | | | | 98.1 | +3.3 | P | |
| | | E 4980 | | | | | | | | | | | |
| C 43 | | N 4820 | | | 91.4 | 28.3 | | | | 97.3 | +3.1 | P | |
| | | E 4950 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 2/13/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 44 | 2-10-07 | N 584730 | 1 | N | 92.5 | 28.8 | CL-4 | 94.0 | 25.2 | 98.4 | + 3.5 | P | |
| | ↓ | E 1504930 | ↓ | ↓ | | | ↓ | ↓ | ↓ | | | | |
| C 45 | ↓ | N 4650 | ↓ | ↓ | 92.7 | 29.3 | ↓ | ↓ | ↓ | 98.6 | + 4.1 | P | |
| | | E 4920 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 46 | 2-12-07 | N 585150 | 1 | N | 91.2 | 29.1 | CL-4 | 94.0 | 25.2 | 97.1 | +3.9 | P | |
| | | E 1504980 | | | | | | | | | | | |
| C 47 | | N 5040 | | | 91.9 | 28.9 | | | | 97.7 | +3.7 | P | |
| | | E 4950 | | | | | | | | | | | |
| C 48 | | N 4940 | | | 92.3 | 28.6 | | | | 98.2 | +3.4 | P | |
| | | E 4890 | | | | | | | | | | | |
| C 49 | | N 4840 | | | 92.3 | 29.3 | | | | 98.2 | +3.1 | P | |
| | | E 4850 | | | | | | | | | | | |
| C 50 | | N 5080 | | | 92.1 | 28.4 | | | | 98.0 | +3.2 | P | |
| | | E 4880 | | | | | | | | | | | |
| C 51 | | N 5010 | | | 92.0 | 28.2 | | | | 97.8 | +3.0 | P | |
| | | E 4790 | | | | | | | | | | | |
| C 52 | | N 4920 | | | 91.8 | 29.1 | | | | 97.6 | +3.9 | P | |
| | | E 4750 | | | | | | | | | | | |
| C 53 | | N 5280 | 2 | | 93.1 | 29.6 | | | | 99.6 | +3.8 | P | |
| | | E 5150 | | | | | | | | | | | |
| C 54 | | N 5340 | | | 93.1 | 28.6 | | | | 99.0 | +3.4 | P | |
| | | E 5240 | | | | | | | | | | | |
| C 55 | | N 5410 | | | 91.3 | 28.4 | | | | 97.1 | +3.2 | P | |
| | | E 5330 | | | | | | | | | | | |
| C 56 | | N 5480 | | | 91.7 | 28.3 | | | | 97.5 | +3.1 | P | |
| | | E 5410 | | | | | | | | | | | |
| C 57 | | N 5340 | | | 91.3 | 28.3 | | | | 97.1 | +3.1 | P | |
| | | E 5490 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 58 | 2-12-07 | N 585480 | 2 | N | 91.9 | 28.8 | CL-4 | 94.0 | 25.2 | 97.8 | +3.6 | P | |
| | | E 1505520 | | | | | | | | | | | |
| C 59 | | N 5390 | | | 92.0 | 28.5 | | | | 97.9 | +3.3 | P | |
| | | E 5470 | | | | | | | | | | | |
| C 60 | | N 5340 | | | 92.6 | 28.9 | | | | 98.5 | +3.7 | P | |
| | | E 5370 | | | | | | | | | | | |
| C 61 | | N 5360 | | | 92.7 | 29.1 | | | | 98.6 | +3.9 | P | |
| | | E 5280 | | | | | | | | | | | |
| C 62 | | N 5170 | | | 92.1 | 29.0 | | | | 98.0 | +3.8 | P | |
| | | E 5160 | | | | | | | | | | | |
| C 63 | | N 5040 | | | 92.9 | 28.8 | | | | 98.9 | +3.6 | P | |
| | | E 5160 | | | | | | | | | | | |
| C 64 | | N 5130 | | | 93.0 | 28.4 | | | | 98.9 | +3.2 | P | |
| | | E 5280 | | | | | | | | | | | |
| C 65 | | N 5210 | | | 93.0 | 28.2 | | | | 98.9 | +3.0 | P | |
| | | E 5370 | | | | | | | | | | | |
| C 66 | | N 5260 | | | 92.4 | 28.3 | | | | 98.3 | +3.1 | P | |
| | | E 5450 | | | | | | | | | | | |
| C 67 | | N 5310 | | | 92.8 | 29.1 | | | | 98.7 | +3.9 | P | |
| | | E 5530 | | | | | | | | | | | |
| C 68 | | N 5370 | | | 92.4 | 28.9 | | | | 98.3 | +3.7 | P | |
| | | E 5610 | | | | | | | | | | | |
| C 69 | | N 5280 | | | 91.5 | 29.0 | | | | 97.3 | +3.8 | P | |
| | | E 5620 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 70 | 2-12-07 | N 585220 | 2 | N | 91.7 | 28.5 | CL-4 | 94.0 | 25.2 | 97.5 | +3.3 | P | |
| | | E 1505570 | | | | | | | | | | | |
| C 71 | | N 5170 | | | 91.5 | 28.6 | | | | 97.4 | +3.4 | P | |
| | | E 5480 | | | | | | | | | | | |
| C 72 | | N 5110 | | | 92.5 | 29.1 | | | | 98.4 | +3.9 | P | |
| | | E 5380 | | | | | | | | | | | |
| C 73 | | N 5060 | | | 93.0 | 29.3 | | | | 99.0 | +4.1 | P | |
| | | E 5310 | | | | | | | | | | | |
| C 74 | | N 5010 | | | 92.7 | 28.6 | | | | 98.6 | +3.4 | P | |
| | | E 5220 | | | | | | | | | | | |
| C 75 | | N 4920 | | | 91.7 | 28.3 | | | | 97.5 | +3.1 | P | |
| | | E 5110 | | | | | | | | | | | |
| C 76 | | N 4810 | | | 92.1 | 28.5 | | | | 97.9 | +3.3 | P | |
| | | E 5090 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 77 | 2-17-07 | N 584860 | 2 | N | 93.2 | 28.6 | CL 4 | 94.0 | 25.2 | 99.2 | +3.4 | P | |
| | | E 1505180 | | | | | | | | | | | |
| C 78 | | N 4930 | | | 97.5 | 25.2 | CL 10 | 100.2 | 21.6 | 97.3 | +3.6 | P | |
| | | E 5280 | | | | | | | | | | | |
| C 79 | | N 4980 | | | 97.9 | 25.0 | | | | 97.7 | +3.4 | P | |
| | | E 5380 | | | | | | | | | | | |
| C 80 | | N 5050 | | | 97.4 | 24.9 | | | | 97.2 | +3.3 | P | |
| | | E 5470 | | | | | | | | | | | |
| C 81 | | N 5120 | | | 97.7 | 24.9 | | | | 97.5 | +3.3 | P | |
| | | E 5580 | | | | | | | | | | | |
| C 82 | | N 5180 | | | 91.9 | 28.8 | CL 4 | 94.0 | 25.2 | 97.8 | +3.7 | P | |
| | | E 5680 | | | | | | | | | | | |
| C 83 | | N 5130 | | | 91.9 | 28.3 | | | | 97.8 | +3.1 | P | |
| | | E 5750 | | | | | | | | | | | |
| C 84 | | N 5070 | | | 91.8 | 28.7 | | | | 97.7 | +3.5 | P | |
| | | E 5650 | | | | | | | | | | | |
| C 85 | | N 5010 | | | 92.6 | 28.8 | | | | 98.5 | +3.6 | P | |
| | | E 5560 | | | | | | | | | | | |
| C 86 | | N 4930 | | | 92.8 | 28.2 | | | | 98.7 | +3.0 | P | |
| | | E 5470 | | | | | | | | | | | |
| C 87 | | N 4870 | | | 93.7 | 28.3 | | | | 99.7 | +3.1 | P | |
| | | E 5330 | | | | | | | | | | | |
| C 88 | | N 4820 | | | 92.3 | 28.7 | | | | 98.0 | +3.5 | P | |
| | | E 5230 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/26/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 89 | 2-19-07 | N 584880 | 1 | N | 95.8 | 27.7 | CL 11 | 97.8 | 24.4 | 97.9 | +3.3 | P | |
| | | E 1504720 | | | | | | | | | | | |
| C 90 | | N 4880 | | | 95.8 | 28.0 | | | | 97.9 | +3.6 | P | |
| | | E 4630 | | | | | | | | | | | |
| C 91 | | N 4750 | | | 95.5 | 28.2 | | | | 97.7 | +3.8 | P | |
| | | E 4646 | | | | | | | | | | | |
| C 92 | | N 4780 | | | 95.4 | 27.8 | | | | 97.5 | +3.4 | P | |
| | | E 4730 | | | | | | | | | | | |
| C 93 | | N 4780 | | | 95.9 | 28.4 | | | | 98.0 | +4.0 | P | |
| | | E 4810 | | | | | | | | | | | |
| C 94 | | N 4670 | | | 96.2 | 27.5 | | | | 98.4 | +3.1 | P | |
| | | E 4860 | | | | | | | | | | | |
| C 95 | | N 4680 | | | 95.2 | 27.9 | | | | 97.4 | +3.5 | P | |
| | | E 4740 | | | | | | | | | | | |
| C 96 | | N 4650 | | | 95.8 | 27.5 | | | | 98.0 | +3.1 | P | |
| | | E 4630 | | | | | | | | | | | |
| C 97 | | N 4570 | | | 95.9 | 28.4 | | | | 98.0 | +4.0 | P | |
| | | E 4660 | | | | | | | | | | | |
| C 98 | | N 4570 | | | 95.7 | 28.1 | | | | 97.9 | +3.7 | P | |
| | | E 4730 | | | | | | | | | | | |
| C 99 | | N 4770 | 2 | | 95.4 | 27.4 | | | | 97.6 | +3.0 | P | |
| | | E 5120 | | | | | | | | | | | |
| C 100 | | N 4720 | | | 95.7 | 27.4 | | | | 97.8 | +3.0 | P | |
| | | E 5030 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 101 | 2-19-07 | N 584910 | 2 | N | 95.8 | 27.7 | CL 11 | 97.8 | 24.4 | 98.0 | +3.3 | P | |
| | | E 1505020 | | | | | | | | | | | |
| C 102 | | N 5030 | | | 95.1 | 28.0 | | | | 97.2 | +3.6 | P | |
| | | E 5030 | | | | | | | | | | | |
| C 103 | | N 5120 | | | 95.2 | 28.0 | | | | 97.4 | +3.6 | P | |
| | | E 5020 | | | | | | | | | | | |
| C 104 | | N 5210 | | | 95.8 | 28.1 | | | | 97.9 | +3.7 | P | |
| | | E 5040 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 105 | 2-20-07 | N 585130 | 2 | N | 99.1 | 27.8 | CL 13 | 101.5 | 23.9 | 97.6 | +3.9 | P | |
| | | E 1504960 | | | | | | | | | | | |
| C 106 | | N 5050 | | | 98.8 | 27.2 | | | | 97.4 | +3.3 | P | |
| | | E 4930 | | | | | | | | | | | |
| C 107 | | N 5020 | | | 99.1 | 27.0 | | | | 97.7 | +3.1 | P | |
| | | E 4840 | | | | | | | | | | | |
| C 108 | | N 4930 | | | 99.0 | 27.7 | | | | 97.5 | +3.8 | P | |
| | | E 4750 | | | | | | | | | | | |
| C 109 | | N 4910 | | | 96.0 | 27.8 | C 11 | 97.8 | 24.4 | 98.2 | +3.4 | P | |
| | | E 4660 | | | | | | | | | | | |
| C 110 | | N 4840 | | | 95.7 | 27.6 | | | | 97.8 | +3.2 | P | |
| | | E 4610 | | | | | | | | | | | |
| C 111 | | N 4960 | | | 98.2 | 28.0 | CL 13 | 101.5 | 23.9 | 96.7 | +4.1 | F | See Retest C-111R1 |
| | | E 4950 | | | | | | | | | | | |
| C 111R1 | | N 4960 | | | 98.6 | 27.1 | | | | 97.1 | +3.2 | P | Retest for C 111 |
| | | E 4950 | | | | | | | | | | | |
| C 112 | | N 4930 | | | 96.3 | 27.9 | C 11 | 97.8 | 24.4 | 98.5 | +3.5 | P | |
| | | E 4840 | | | | | | | | | | | |
| C 113 | | N 4840 | | | 95.9 | 28.1 | | | | 98.1 | +3.7 | P | |
| | | E 4760 | | | | | | | | | | | |
| C 114 | | N 4770 | | | 95.4 | 28.2 | | | | 97.5 | +3.8 | P | |
| | | E 4640 | | | | | | | | | | | |
| C 115 | | N 4670 | | | 96.4 | 27.6 | | | | 98.6 | +3.2 | P | |
| | | E 4630 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: PS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 116 | 2-20-07 | N 584740 | 2 | N | 96.2 | 27.4 | C 11 | 97.8 | 24.4 | 98.4 | +3.0 | P | |
| | | E 1504750 | | | | | | | | | | | |
| C 117 | | N 4860 | | | 96.1 | 28.4 | | | | 98.3 | +4.0 | P | |
| | | E 4870 | | | | | | | | | | | |
| C 118 | | N 4870 | | | 99.0 | 27.2 | C-13 | 101.5 | 23.9 | 97.5 | +3.3 | P | |
| | | E 4970 | | | | | | | | | | | |
| C 119 | | N 4770 | | | 99.1 | 27.5 | | | | 97.6 | +3.6 | P | |
| | | E 4960 | | | | | | | | | | | |
| C 120 | | N 4770 | | | 99.0 | 27.3 | | | | 97.5 | +3.4 | P | |
| | | E 4840 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 121 | 3-21-07 | N 585060 | 3 | N | 93.2 | 28.5 | CL-4 | 94.0 | 25.2 | 99.1 | +3.3 | P | |
| | | E 1505110 | | | | | | | | | | | |
| C 122 | | N 5120 | | | 92.4 | 28.3 | | | | 98.3 | +3.1 | P | |
| | | E 5220 | | | | | | | | | | | |
| C 123 | | N 5210 | | | 93.7 | 29.0 | | | | 99.7 | +3.8 | P | |
| | | E 5320 | | | | | | | | | | | |
| C 124 | | N 5260 | | | 92.7 | 28.7 | | | | 98.6 | +3.5 | P | |
| | | E 5410 | | | | | | | | | | | |
| C 125 | | N 5320 | | | 92.5 | 28.8 | | | | 98.4 | +3.6 | P | |
| | | E 5490 | | | | | | | | | | | |
| C 126 | | N 5390 | | | 92.1 | 28.5 | | | | 98.0 | +3.3 | P | |
| | | E 5590 | | | | | | | | | | | |
| C 127 | | N 5470 | | | 91.2 | 28.2 | | | | 97.0 | +3.0 | P | |
| | | E 5530 | | | | | | | | | | | |
| C 128 | | N 5410 | | | 92.0 | 28.3 | | | | 97.9 | +3.1 | P | |
| | | E 5430 | | | | | | | | | | | |
| C 129 | | N 5320 | | | 91.2 | 28.6 | | | | 97.0 | +3.4 | P | |
| | | E 5340 | | | | | | | | | | | |
| C 130 | | N 5240 | | | 91.3 | 28.9 | | | | 97.1 | +3.6 | P | |
| | | E 5340 | | | | | | | | | | | |
| C 131 | | N 5170 | | | 92.5 | 28.5 | | | | 98.4 | +3.3 | P | |
| | | E 5130 | | | | | | | | | | | |
| C 132 | | N 5290 | | | 91.4 | 28.4 | | | | 97.2 | +3.2 | P | |
| | | E 5160 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 133 | 2-21-07 | N 585360 | 3 | N | 92.1 | 28.6 | CL 4 | 94.0 | 25.2 | 97.9 | +3.4 | P | |
| | | E 1505250 | | | | | | | | | | | |
| C 134 | | N 5420 | | | 91.7 | 28.3 | | | | 97.6 | +3.1 | P | |
| | | E 5350 | | | | | | | | | | | |
| C 135 | | N 5510 | | | 92.3 | 28.9 | | | | 98.2 | +3.7 | P | |
| | | E 5430 | | | | | | | | | | | |
| C 136 | | N 4910 | | | 93.0 | 28.7 | | | | 98.9 | +3.5 | P | |
| | | E 5080 | | | | | | | | | | | |
| C 137 | | N 4970 | | | 91.4 | 28.4 | | | | 97.2 | +3.2 | P | |
| | | E 5170 | | | | | | | | | | | |
| C 138 | | N 5030 | | | 92.1 | 28.6 | | | | 98.0 | +3.4 | P | |
| | | E 5270 | | | | | | | | | | | |
| C 139 | | N 5110 | | | 92.5 | 28.9 | | | | 98.4 | +3.7 | P | |
| | | E 5350 | | | | | | | | | | | |
| C 140 | | N 5170 | | | 92.9 | 29.0 | | | | 98.8 | +3.8 | P | |
| | | E 5420 | | | | | | | | | | | |
| C 141 | | N 5230 | | | 92.1 | 28.5 | | | | 97.9 | +3.3 | P | |
| | | E 5520 | | | | | | | | | | | |
| C 142 | | N 5310 | | | 92.0 | 28.3 | | | | 97.9 | +3.1 | P | |
| | | E 5610 | | | | | | | | | | | |
| C 143 | | N 5220 | | | 91.4 | 28.3 | | | | 97.3 | +3.1 | P | |
| | | E 5650 | | | | | | | | | | | |
| C 144 | | N 5140 | | | 91.8 | 28.5 | | | | 97.6 | +3.3 | P | |
| | | E 5530 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
## IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE. (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 145 | 2-21-07 | N 585080 | 3 | N | 91.4 | 29.1 | CL 4 | 94.0 | 25.2 | 97.2 | +3.9 | P | |
| | | E 1505470 | | | | | | | | | | | |
| C 146 | | N 5020 | | | 92.0 | 28.8 | | | | 97.9 | +3.6 | P | |
| | | E 5390 | | | | | | | | | | | |
| C 147 | | N 4970 | | | 91.3 | 28.4 | | | | 97.2 | +3.2 | P | |
| | | E 5310 | | | | | | | | | | | |
| C 148 | | N 4910 | | | 92.0 | 28.2 | | | | 97.8 | +3.0 | P | |
| | | E 5220 | | | | | | | | | | | |
| C 149 | | N 4830 | | | 93.2 | 29.0 | | | | 99.1 | +3.8 | P | |
| | | E 5110 | | | | | | | | | | | |
| C 150 | | N 4810 | | | 91.8 | 28.6 | | | | 97.7 | +3.4 | P | |
| | | E 5020 | | | | | | | | | | | |
| C 151 | | N 5160 | | | 93.6 | 29.1 | | | | 99.6 | +3.9 | P | |
| | | E 5720 | | | | | | | | | | | |
| C 152 | | N 5110 | | | 96.6 | 28.9 | | | | 98.5 | +3.7 | P | |
| | | E 5650 | | | | | | | | | | | |
| C 153 | | N 5030 | | | 92.1 | 28.5 | | | | 97.9 | +3.3 | P | |
| | | E 5580 | | | | | | | | | | | |
| C 154 | | N 4980 | | | 91.4 | 28.4 | | | | 97.3 | +3.2 | P | |
| | | E 5436 | | | | | | | | | | | |
| C 155 | | N 5080 | | | 91.3 | 28.3 | | | | 97.1 | +3.1 | P | |
| | | E 5720 | | | | | | | | | | | |
| C 156 | | N 5020 | | | 91.8 | 28.7 | | | | 97.7 | +3.5 | P | |
| | | E 5630 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TB

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 157 | 2-21-07 | N 584970 | 3 | N | 92.2 | 28.3 | CL 4 | 94.0 | 25.2 | 98.1 | +3.1 | P | |
| | | E 1505520 | | | | | | | | | | | |
| C 158 | | N 4890 | | | 91.6 | 28.5 | | | | 97.4 | +3.3 | P | |
| | | E 5390 | | | | | | | | | | | |
| C 159 | | N 4820 | | | 91.8 | 28.6 | | | | 97.6 | +3.4 | P | |
| | | E 5250 | | | | | | | | | | | |
| C 160 | | N 4760 | | | 92.3 | 29.2 | | | | 98.1 | +4.0 | P | |
| | | E 5120 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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| | | E | | | | | | | | | | | |

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# SUMMARY SHEET
## IN - SITU DENSITY TEST RESULTS

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PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 161 | 2-22-07 | N 584670 | 2 | N | 98.1 | 27.1 | CL 13 | 101.5 | 23.9 | 96.7 | +3.2 | F | See Retest C-161R1 |
| | | E 1504930 | | | | | | | | | | | |
| C 161R1 | | N 4670 | | | 99.0 | 27.1 | | | | 97.5 | +3.2 | P | Retest of C-161 |
| | | E 4930 | | | | | | | | | | | |
| C 162 | | N 4680 | | | 98.7 | 27.2 | | | | 97.3 | +3.3 | P | |
| | | E 4820 | | | | | | | | | | | |
| C 163 | | N 4610 | | | 99.2 | 27.4 | | | | 97.7 | +3.5 | P | |
| | | E 4780 | | | | | | | | | | | |
| C 164 | | N 4540 | | | 99.1 | 28.0 | | | | 97.7 | +4.1 | P | |
| | | E 4720 | | | | | | | | | | | |
| C 165 | | N 4810 | | | 98.8 | 27.5 | | | | 97.4 | +3.6 | P | |
| | | E 4550 | | | | | | | | | | | |
| C 166 | | N 4720 | | | 99.0 | 27.0 | | | | 97.5 | +3.1 | P | |
| | | E 4550 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
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| | | E | | | | | | | | | | | |

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# SUMMARY SHEET
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PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 167 | 2-23-07 | N 584640 | 1 | N | 99.1 | 27.0 | CL 13 | 101.5 | 23.9 | 97.7 | +3.1 | P | |
| | | E 1504560 | | | | | | | | | | | |
| C 168 | | N 4530 | | | 99.3 | 27.6 | | | | 97.8 | +3.7 | P | |
| | | E 4580 | | | | | | | | | | | |
| C 169 | | N 4480 | | | 99.2 | 27.2 | | | | 97.7 | +3.3 | P | |
| | | E 4580 | | | | | | | | | | | |
| C 170 | | N 4810 | | | 99.1 | 28.1 | | | | 97.7 | +4.2 | P | |
| | | E 4440 | | | | | | | | | | | |
| C 171 | | N 4710 | | | 99.1 | 27.8 | | | | 97.6 | +3.9 | P | |
| | | E 4430 | | | | | | | | | | | |
| C 172 | | N 4670 | | | 99.4 | 27.0 | | | | 98.0 | +3.1 | P | |
| | | E 4450 | | | | | | | | | | | |
| C 173 | | N 4550 | | | 81.6 | 40.1 | CL-12 | 82.3 | 37.1 | 99.1 | +3.0 | P | |
| | | E 4440 | | | | | | | | | | | |
| C 174 | | N 4490 | | | 99.8 | 27.1 | | | | 98.4 | +3.2 | P | |
| | | E 4470 | | | | | | | | | | | |
| C 175 | | N 4580 | | | 98.9 | 27.2 | | | | 97.4 | +3.3 | P | |
| | | E 4390 | | | | | | | | | | | |
| C 176 | | N 4810 | 2 | | 92.9 | 28.9 | CL-4 | 94.0 | 25.2 | 98.9 | +3.7 | P | |
| | | E 4550 | | | | | | | | | | | |
| C 177 | | N 4710 | | | 93.2 | 29.1 | | | | 99.1 | +3.9 | P | |
| | | E 4560 | | | | | | | | | | | |
| C 178 | | N 4610 | | | 92.5 | 29.3 | | | | 98.4 | +4.1 | P | |
| | | E 4570 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 179 | 2-23-07 | N 584510 | 2 | N | 92.5 | 28.7 | CL 4 | 94.0 | 25.2 | 98.4 | +3.5 | P | |
| | | E 1504620 | | | | | | | | | | | |
| C 180 | | N 4460 | | | 98.6 | 27.5 | CL-13 | 101.5 | 23.9 | 97.1 | +3.6 | P | |
| | | E 4550 | | | | | | | | | | | |
| C 181 | | N 4530 | | | 99.2 | 26.9 | | | | 97.7 | +3.0 | P | |
| | | E 4520 | | | | | | | | | | | |
| C 182 | | N 4640 | | | 99.3 | 27.3 | | | | 97.8 | +3.4 | P | |
| | | E 4480 | | | | | | | | | | | |
| C 183 | | N 4740 | | | 99.2 | 27.9 | | | | 97.8 | +4.0 | P | |
| | | E 4460 | | | | | | | | | | | |
| C 184 | | N 4620 | | | 99.1 | 27.4 | | | | 97.6 | +3.5 | P | |
| | | E 4390 | | | | | | | | | | | |
| C 185 | | N 4540 | | | 99.6 | 27.6 | | | | 98.1 | +3.7 | P | |
| | | E 4410 | | | | | | | | | | | |
| C 186 | | N 4480 | | | 98.9 | 27.0 | | | | 97.5 | +3.1 | P | |
| | | E 4470 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
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| | | E | | | | | | | | | | | |

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# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 187 | 2-28-07 | N 585180 | 3 | N | 99.2 | 26.9 | CL 13 | 101.5 | 23.9 | 97.7 | +3.0 | P | |
| | | E 1505050 | | | | | | | | | | | |
| C 188 | | N 5110 | | | 99.4 | 27.1 | | | | 98.0 | +3.2 | P | |
| | | E 4970 | | | | | | | | | | | |
| C 189 | | N 5050 | | | 92.4 | 28.4 | CL 4 | 94.0 | 25.2 | 98.3 | +3.2 | P | |
| | | E 4860 | | | | | | | | | | | |
| C 190 | | N 4980 | | | 92.4 | 29.0 | | | | 98.3 | +3.8 | P | |
| | | E 4770 | | | | | | | | | | | |
| C 191 | | N 4910 | | | 91.7 | 28.5 | | | | 97.5 | +3.3 | P | |
| | | E 4690 | | | | | | | | | | | |
| C 192 | | N 4880 | | | 91.2 | 28.2 | | | | 97.0 | +3.0 | P | |
| | | E 4610 | | | | | | | | | | | |
| C 193 | | N 4770 | | | 93.3 | 28.6 | | | | 99.3 | +3.4 | P | |
| | | E 4620 | | | | | | | | | | | |
| C 194 | | N 4870 | | | 92.5 | 28.8 | | | | 98.5 | +3.6 | P | |
| | | E 4730 | | | | | | | | | | | |
| C 195 | | N 4940 | | | 91.3 | 28.4 | | | | 97.1 | +3.2 | P | |
| | | E 4840 | | | | | | | | | | | |
| C 196 | | N 5030 | | | 91.7 | 28.3 | | | | 97.6 | +3.1 | P | |
| | | E 4970 | | | | | | | | | | | |
| C 197 | | N 5080 | | | 99.1 | 27.0 | CL 13 | 101.5 | 23.9 | 97.6 | +3.1 | P | |
| | | E 5050 | | | | | | | | | | | |
| C 198 | | N 4930 | | | 98.7 | 27.1 | | | | 97.3 | +3.2 | P | |
| | | E 4990 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 199 | 2-28-07 | N 584860 | 3 | N | 99.2 | 27.3 | CL 13 | 101.5 | 23.9 | 97.7 | +3.4 | P | |
| | | E 4890 | | | | | | | | | | | |
| C 200 | | N 4760 | | | 99.1 | 27.0 | | | | 97.7 | +3.1 | P | |
| | | E 4790 | | | | | | | | | | | |
| C 201 | | N 4680 | | | 99.8 | 27.2 | | | | 98.4 | +3.3 | P | |
| | | E 4680 | | | | | | | | | | | |
| C 202 | | N 4560 | | | 98.8 | 28.0 | | | | 97.3 | +3.1 | P | |
| | | E 4640 | | | | | | | | | | | |
| C 203 | | N 4640 | | | 91.5 | 28.6 | CL 4 | 94.0 | 25.2 | 97.4 | +3.4 | P | |
| | | E 4770 | | | | | | | | | | | |
| C 204 | | N 4730 | | | 91.3 | 28.5 | | | | 97.1 | +3.3 | P | |
| | | E 4880 | | | | | | | | | | | |
| C 205 | | N 4820 | | | 92.9 | 28.4 | | | | 98.8 | +3.2 | P | |
| | | E 4970 | | | | | | | | | | | |
| C 206 | | N 4760 | | | 92.2 | 28.7 | | | | 98.0 | +3.5 | P | |
| | | E 5050 | | | | | | | | | | | |
| C 207 | | N 4710 | | | 91.5 | 28.2 | | | | 97.3 | +3.0 | P | |
| | | E 4990 | | | | | | | | | | | |
| C 208 | | N 4670 | | | 91.2 | 28.6 | | | | 97.0 | +3.4 | P | |
| | | E 4920 | | | | | | | | | | | |
| C 209 | | N 4610 | | | 91.5 | 28.3 | | | | 97.3 | +3.1 | P | |
| | | E 4850 | | | | | | | | | | | |
| C 210 | | N 4550 | | | 91.8 | 28.7 | | | | 97.6 | +3.5 | P | |
| | | E 4730 | | | | | | | | | | | |

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ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 211 | 2-28-07 | N 584480 | 3 | N | 92.5 | 28.5 | CL 4 | 94.0 | 25.2 | 98.4 | +3.3 | P | |
| | | E 1504540 | | | | | | | | | | | |
| C 212 | | N 4560 | | | 99.4 | 27.1 | CL 13 | 101.5 | 23.9 | 97.9 | +3.2 | P | |
| | | E 4510 | | | | | | | | | | | |
| C 213 | | N 4670 | | | 99.9 | 27.3 | | | | 98.4 | +3.4 | P | |
| | | E 4530 | | | | | | | | | | | |
| C 214 | | N 4780 | | | 99.0 | 27.4 | | | | 97.5 | +3.5 | P | |
| | | E 4520 | | | | | | | | | | | |
| C 215 | | N 4810 | | | 99.1 | 27.1 | | | | 97.6 | +3.2 | P | |
| | | E 4450 | | | | | | | | | | | |
| C 216 | | N 4720 | | | 99.2 | 27.4 | | | | 97.7 | +3.5 | P | |
| | | E 4440 | | | | | | | | | | | |
| C 217 | | N 4620 | | | 99.2 | 27.0 | | | | 97.7 | +3.1 | P | |
| | | E 4450 | | | | | | | | | | | |
| C 218 | | N 4540 | | | 91.2 | 28.2 | CL-4 | 94.0 | 25.2 | 97.0 | +3.0 | P | |
| | | E 4440 | | | | | | | | | | | |
| C 219 | | N 4650 | | | 91.4 | 28.4 | | | | 97.3 | +3.2 | P | |
| | | E 4380 | | | | | | | | | | | |
| C 220 | | N 4590 | | | 91.4 | 28.2 | | | | 97.3 | +3.0 | P | |
| | | E 4820 | | | | | | | | | | | |
| C 221 | | N 4780 | | | 91.9 | 28.3 | | | | 97.8 | +3.1 | P | |
| | | E 5720 | | | | | | | | | | | |
| C 222 | | N 5000 | | | 92.5 | 28.6 | | | | 98.4 | +3.4 | P | |
| | | E 5680 | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

# SUMMARY SHEET
# IN - SITU DENSITY TEST RESULTS

PROJECT NUMBER: I001.113

PROJECT TITLE: CMS Landfill V Cell 2F

PROJECT LOCATION: Charlotte, North Carolina

COMPLETED BY: TS

REVIEWED BY: [illegible]

DATE REVIEWED: 3/12/07

| TEST NUMBER | TEST DATE | APPROX. LOCATION | LIFT OR ELEVATION | TEST METHOD | IN-SITU DRY DENSITY (pcf) | IN-SITU MOISTURE CONTENT (%) | REFERENCE CURVE NUMBER | REFERENCE MAX. DRY DENSITY (pcf) | REFERENCE OPTIMUM MOISTURE (%) | PERCENT COMPACTION | DIFFERENCE FROM OPT. MOISTURE (%) | PASS/ FAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 223 | 3-6-07 | N 584490 | 2 | N | 99.4 | 27.1 | CL 13 | 101.5 | 23.9 | 97.9 | +3.2 | P | |
| | | E 1504620 | | | | | | | | | | | |
| C 224 | | N 4690 | 2 | | 99.5 | 27.4 | | | | 98.1 | +3.5 | P | |
| | | E 5050 | | | | | | | | | | | |
| C 225 | | N 4950 | 2 | | 92.4 | 28.8 | CL 4 | 94.0 | 25.2 | 98.3 | +3.6 | P | |
| | | E 5580 | | | | | | | | | | | |
| C 226 | | N 4970 | 3 | | 92.2 | 28.4 | | | | 98.1 | +3.2 | P | |
| | | E 5620 | | | | | | | | | | | |
| C 227 | | N 4770 | 3 | | 91.7 | 28.6 | | | | 97.5 | +3.4 | P | |
| | | E 5210 | | | | | | | | | | | |
| C 228 | | N 4580 | 3 | | 92.6 | 28.2 | | | | 98.5 | +3.0 | P | |
| | | E 4820 | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |
| | | N | | | | | | | | | | | |
| | | E | | | | | | | | | | | |

N = NUCLEAR DENSITY GAUGE DC = DRIVE CYLINDER S = SAND CONE

ATLANTIC COAST CONSULTING, INC

of NORTH CAROLINA, LLC

# APPENDIX G

## Conformance Test Results

of NORTH CAROLINA, LLC

# SECTION G-1

## Geomembrane

# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 446719-06**
**TRI Log #: E2274-62-03**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 70 | 63 | 62 | 61 | 60 | 70 | 63 | 61 | 59 | 61 | 63 | 4 | 60 min avg |
| | | | | | | | | | | | 59 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.946 | 0.946 | 0.946 | | | | | | | | 0.946 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.42 | 2.39 | | | | | | | | | 2.41 | 0.02 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 142 | 138 | 145 | 158 | 164 | | | | | | 149 | 11 | 126 min |
| TD Yield Strength (ppi) | 171 | 154 | 152 | 163 | 155 | | | | | | 159 | 8 | 126 min |
| MD Break Strength (ppi) | 217 | 216 | 219 | 200 | 217 | | | | | | 214 | 8 | 90 min |
| TD Break Strength (ppi) | 235 | 169 | 187 | 206 | 193 | | | | | | 198 | 25 | 90 min |
| MD Yield Elongation (%) | 22 | 22 | 22 | 22 | 22 | | | | | | 22 | 0 | 12 min |
| TD Yield Elongation (%) | 17 | 17 | 15 | 19 | 17 | | | | | | 17 | 1 | 12 min |
| MD Break Elongation (%) | 453 | 489 | 488 | 485 | 510 | | | | | | 485 | 21 | 100 min |
| TD Break Elongation (%) | 639 | 545 | 604 | 580 | 604 | | | | | | 594 | 35 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 447105-06**
**TRI Log #: E2274-62-03**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 65 | 63 | 65 | 64 | 63 | 62 | 61 | 61 | 66 | 65 | 64 | 2 | 60 min avg |
| | | | | | | | | | | | 61 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.944 | 0.944 | 0.944 | | | | | | | | 0.944 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.51 | 2.47 | | | | | | | | | 2.49 | 0.03 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 154 | 167 | 160 | 157 | 145 | | | | | | 157 | 8 | 126 min |
| TD Yield Strength (ppi) | 164 | 181 | 178 | 162 | 161 | | | | | | 169 | 10 | 126 min |
| MD Break Strength (ppi) | 194 | 240 | 279 | 189 | 190 | | | | | | 218 | 40 | 90 min |
| TD Break Strength (ppi) | 207 | 200 | 210 | 197 | 204 | | | | | | 204 | 5 | 90 min |
| MD Yield Elongation (%) | 19 | 21 | 21 | 21 | 19 | | | | | | 20 | 1 | 12 min |
| TD Yield Elongation (%) | 20 | 18 | 16 | 18 | 20 | | | | | | 18 | 2 | 12 min |
| MD Break Elongation (%) | 505 | 498 | 530 | 495 | 504 | | | | | | 506 | 14 | 100 min |
| TD Break Elongation (%) | 583 | 546 | 598 | 609 | 589 | | | | | | 585 | 24 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 447115-06**
**TRI Log #: E2274-64-02**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 63 | 67 | 66 | 62 | 67 | 63 | 64 | 63 | 69 | 64 | 65 | 2 | 60 min avg |
| | | | | | | | | | | | 62 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.945 | 0.945 | 0.945 | | | | | | | | 0.945 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.50 | 2.48 | | | | | | | | | 2.49 | 0.01 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 155 | 155 | 153 | 173 | 160 | | | | | | 159 | 8 | 126 min |
| TD Yield Strength (ppi) | 172 | 160 | 154 | 154 | 167 | | | | | | 161 | 8 | 126 min |
| MD Break Strength (ppi) | 259 | 229 | 185 | 243 | 263 | | | | | | 236 | 31 | 90 min |
| TD Break Strength (ppi) | 204 | 198 | 210 | 204 | 210 | | | | | | 205 | 5 | 90 min |
| MD Yield Elongation (%) | 23 | 23 | 21 | 23 | 24 | | | | | | 23 | 1 | 12 min |
| TD Yield Elongation (%) | 18 | 16 | 19 | 19 | 21 | | | | | | 19 | 2 | 12 min |
| MD Break Elongation (%) | 526 | 496 | 526 | 560 | 556 | | | | | | 533 | 26 | 100 min |
| TD Break Elongation (%) | 578 | 603 | 620 | 601 | 575 | | | | | | 595 | 19 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

✓ RE

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 447225-06**
**TRI Log #: E2274-64-02**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 61 | 64 | 60 | 64 | 64 | 65 | 62 | 62 | 65 | 64 | 63 | 2 | 60 min avg |
| | | | | | | | | | | | 60 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.945 | 0.945 | 0.945 | | | | | | | | 0.945 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.53 | 2.46 | | | | | | | | | 2.50 | 0.05 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 165 | 164 | 171 | 166 | 166 | | | | | | 166 | 3 | 126 min |
| TD Yield Strength (ppi) | 150 | 152 | 156 | 163 | 148 | | | | | | 154 | 6 | 126 min |
| MD Break Strength (ppi) | 205 | 181 | 194 | 236 | 176 | | | | | | 198 | 24 | 90 min |
| TD Break Strength (ppi) | 258 | 278 | 197 | 206 | 232 | | | | | | 234 | 34 | 90 min |
| MD Yield Elongation (%) | 17 | 17 | 15 | 19 | 19 | | | | | | 17 | 2 | 12 min |
| TD Yield Elongation (%) | 22 | 22 | 19 | 21 | 21 | | | | | | 21 | 1 | 12 min |
| MD Break Elongation (%) | 635 | 559 | 585 | 670 | 496 | | | | | | 589 | 67 | 100 min |
| TD Break Elongation (%) | 530 | 550 | 535 | 526 | 489 | | | | | | 526 | 23 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 447235-06**
**TRI Log #: E2274-65-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 60 | 62 | 60 | 66 | 64 | 67 | 63 | 64 | 62 | 65 | 63 | 2 | 60 min avg |
| | | | | | | | | | | | 60 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.945 | 0.945 | 0.945 | | | | | | | | 0.945 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.53 | 2.49 | | | | | | | | | 2.51 | 0.03 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 157 | 162 | 154 | 155 | 147 | | | | | | 155 | 5 | 126 min |
| TD Yield Strength (ppi) | 157 | 184 | 184 | 168 | 171 | | | | | | 173 | 11 | 126 min |
| MD Break Strength (ppi) | 291 | 220 | 236 | 178 | 243 | | | | | | 234 | 41 | 90 min |
| TD Break Strength (ppi) | 171 | 212 | 214 | 196 | 174 | | | | | | 193 | 20 | 90 min |
| MD Yield Elongation (%) | 20 | 20 | 20 | 20 | 20 | | | | | | 20 | 0 | 12 min |
| TD Yield Elongation (%) | 20 | 18 | 18 | 18 | 16 | | | | | | 18 | 1 | 12 min |
| MD Break Elongation (%) | 556 | 550 | 504 | 500 | 511 | | | | | | 524 | 27 | 100 min |
| TD Break Elongation (%) | 499 | 590 | 600 | 590 | 516 | | | | | | 559 | 48 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 447345-06**
**TRI Log #: E2274-65-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 59 | 65 | 60 | 64 | 63 | 66 | 62 | 63 | 67 | 65 | 63 | 3 | 60 min avg |
| | | | | | | | | | | | 59 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.947 | 0.947 | 0.947 | | | | | | | | 0.947 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.55 | 2.52 | | | | | | | | | 2.54 | 0.02 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 162 | 153 | 168 | 152 | 135 | | | | | | 154 | 13 | 126 min |
| TD Yield Strength (ppi) | 163 | 172 | 160 | 170 | 154 | | | | | | 164 | 7 | 126 min |
| MD Break Strength (ppi) | 201 | 274 | 249 | 194 | 227 | | | | | | 229 | 33 | 90 min |
| TD Break Strength (ppi) | 225 | 180 | 190 | 182 | 195 | | | | | | 194 | 18 | 90 min |
| MD Yield Elongation (%) | 18 | 18 | 18 | 18 | 18 | | | | | | 18 | 0 | 12 min |
| TD Yield Elongation (%) | 20 | 19 | 19 | 19 | 19 | | | | | | 19 | 0 | 12 min |
| MD Break Elongation (%) | 530 | 546 | 546 | 543 | 486 | | | | | | 530 | 25 | 100 min |
| TD Break Elongation (%) | 631 | 485 | 604 | 541 | 626 | | | | | | 578 | 63 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 448328-06**
**TRI Log #: E2274-69-05**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 62 | 59 | 62 | 62 | 72 | 73 | 72 | 69 | 65 | 64 | 66 | 5 | 60 min avg |
| | | | | | | | | | | | 59 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.944 | 0.944 | 0.944 | | | | | | | | 0.944 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.48 | 2.50 | | | | | | | | | 2.49 | 0.01 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 161 | 137 | 148 | 136 | 144 | | | | | | 145 | 10 | 126 min |
| TD Yield Strength (ppi) | 151 | 141 | 187 | 158 | 150 | | | | | | 157 | 18 | 126 min |
| MD Break Strength (ppi) | 319 | 236 | 197 | 184 | 194 | | | | | | 226 | 56 | 90 min |
| TD Break Strength (ppi) | 191 | 191 | 245 | 170 | 181 | | | | | | 196 | 29 | 90 min |
| MD Yield Elongation (%) | 20 | 20 | 20 | 20 | 20 | | | | | | 20 | 0 | 12 min |
| TD Yield Elongation (%) | 17 | 19 | 16 | 19 | 19 | | | | | | 18 | 1 | 12 min |
| MD Break Elongation (%) | 534 | 521 | 558 | 586 | 559 | | | | | | 552 | 25 | 100 min |
| TD Break Elongation (%) | 611 | 621 | 674 | 495 | 570 | | | | | | 594 | 67 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 449115-06**
**TRI Log #: E2274-74-07**

RSW

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 60 | 58 | 63 | 66 | 62 | 67 | 61 | 64 | 65 | 66 | 63 | 3 | 60 min avg |
| | | | | | | | | | | | 58 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.946 | 0.946 | 0.946 | | | | | | | | 0.946 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.47 | 2.43 | | | | | | | | | 2.45 | 0.03 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 164 | 154 | 175 | 159 | 147 | | | | | | 160 | 11 | 126 min |
| TD Yield Strength (ppi) | 162 | 178 | 162 | 163 | 171 | | | | | | 167 | 7 | 126 min |
| MD Break Strength (ppi) | 212 | 214 | 240 | 280 | 238 | | | | | | 237 | 27 | 90 min |
| TD Break Strength (ppi) | 202 | 215 | 202 | 156 | 198 | | | | | | 195 | 23 | 90 min |
| MD Yield Elongation (%) | 17 | 17 | 17 | 17 | 17 | | | | | | 17 | 0 | 12 min |
| TD Yield Elongation (%) | 18 | 18 | 18 | 18 | 18 | | | | | | 18 | 0 | 12 min |
| MD Break Elongation (%) | 605 | 461 | 481 | 535 | 481 | | | | | | 513 | 58 | 100 min |
| TD Break Elongation (%) | 631 | 600 | 653 | 455 | 604 | | | | | | 589 | 78 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 449225-06**
**TRI Log #: E2274-74-07**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 63 | 64 | 71 | 68 | 68 | 70 | 64 | 64 | 60 | 59 | 65 | 4 | 60 min avg |
| | | | | | | | | | | | 59 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.947 | 0.946 | 0.946 | | | | | | | | 0.946 | 0.001 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.49 | 2.52 | | | | | | | | | 2.51 | 0.02 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 143 | 159 | 179 | 171 | 142 | | | | | | 159 | 16 | 126 min |
| TD Yield Strength (ppi) | 190 | 176 | 172 | 157 | 156 | | | | | | 170 | 14 | 126 min |
| MD Break Strength (ppi) | 216 | 263 | 280 | 246 | 276 | | | | | | 256 | 26 | 90 min |
| TD Break Strength (ppi) | 219 | 218 | 210 | 173 | 209 | | | | | | 206 | 19 | 90 min |
| MD Yield Elongation (%) | 22 | 22 | 22 | 22 | 22 | | | | | | 22 | 0 | 12 min |
| TD Yield Elongation (%) | 20 | 20 | 20 | 20 | 20 | | | | | | 20 | 0 | 12 min |
| MD Break Elongation (%) | 454 | 510 | 499 | 551 | 504 | | | | | | 504 | 35 | 100 min |
| TD Break Elongation (%) | 586 | 603 | 625 | 541 | 680 | | | | | | 607 | 51 | 100 min |

MD Machine Direction TD Transverse Direction

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# GEOMEMBRANE TEST RESULTS

**TRI Client: Atlantic Coast Company**
**Project: Charlotte Motor Speedway**

**Material: Agru 60 mil Microspike HDPE Geomembrane**
**Sample Identification: 449335-06**
**TRI Log #: E2274-75-06**

✓ (RSC)

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thickness (ASTM D 5994)** | | | | | | | | | | | | | |
| Thickness (mils) | 61 | 63 | 62 | 60 | 63 | 61 | 63 | 63 | 68 | 70 | 63 | 3 | 60 min avg |
| | | | | | | | | | | | 60 | << min | 54 min |
| **Density (ASTM D 1505)** | | | | | | | | | | | | | |
| Density (g/cm3) | 0.945 | 0.945 | 0.945 | | | | | | | | 0.945 | 0.000 | 0.940 min |
| **Carbon Black Content (ASTM D 1603, mod.)** | | | | | | | | | | | | | |
| % Carbon Black | 2.48 | 2.48 | | | | | | | | | 2.48 | 0.00 | 2% - 3% |
| **Carbon Black Dispersion (ASTM D 5596)** | | | | | | | | | | | | | |
| Rating - 1st field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 9 Cat 1 or 2 |
| Rating - 2nd field view | 1 | 1 | 1 | 1 | 1 | | | | | | | | 1 Cat 3 |
| **Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen - HDPE)** | | | | | | | | | | | | | |
| MD Yield Strength (ppi) | 158 | 142 | 160 | 146 | 135 | | | | | | 148 | 11 | 126 min |
| TD Yield Strength (ppi) | 143 | 155 | 159 | 181 | 159 | | | | | | 159 | 14 | 126 min |
| MD Break Strength (ppi) | 241 | 183 | 239 | 214 | 230 | | | | | | 221 | 24 | 90 min |
| TD Break Strength (ppi) | 183 | 173 | 198 | 218 | 174 | | | | | | 189 | 19 | 90 min |
| MD Yield Elongation (%) | 20 | 20 | 20 | 20 | 20 | | | | | | 20 | 0 | 12 min |
| TD Yield Elongation (%) | 17 | 17 | 17 | 17 | 16 | | | | | | 17 | 0 | 12 min |
| MD Break Elongation (%) | 466 | 361 | 526 | 518 | 510 | | | | | | 476 | 68 | 100 min |
| TD Break Elongation (%) | 599 | 498 | 593 | 608 | 528 | | | | | | 565 | 49 | 100 min |

MD Machine Direction TD Transverse Direction

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# SECTION G-2

## Geosynthetic Clay liner

# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1100**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.72 | 0.77 | 0.97 | 0.91 | 0.78 | | | | | | **0.83** | 0.11 | 0.75 min |
| Moisture Content (%) | 27.1 | 27.1 | 26.7 | 28.0 | 27.0 | | | | | | **27.2** | 0.5 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 49.9 | 47.0 | 18.7 | 19.5 | 36.9 | | | | | | **34.4** | 15 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 200 | 188 | 74.7 | 78.0 | 148 | | | | | | **138** | 59 | 2.5 min |
| **Hydraulic Conductivity (ASTM D 5084)** | | | | | | | | | | | | | |
| Hydraulic Conductivity (cm/sec) | 9.0E-10 | | | | | | | | | | **9.0E-10** | | 5E-09 max |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1138**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.82 | 0.81 | 0.89 | 0.93 | 0.83 | | | | | | **0.86** | 0.05 | 0.75 min |
| Moisture Content (%) | 27.6 | 28.0 | 28.4 | 28.3 | 29.3 | | | | | | **28.3** | 0.6 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 41.6 | 20.4 | 36.8 | 30.5 | 39.3 | | | | | | **33.7** | 9 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 166 | 81.6 | 147 | 122 | 157 | | | | | | **135** | 34 | 2.5 min |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1182**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.84 | 0.83 | 0.91 | 0.97 | 0.79 | | | | | | **0.87** | 0.07 | 0.75 min |
| Moisture Content (%) | 29.1 | 29.4 | 29.2 | 6.2 | 28.1 | | | | | | **24.4** | 10.2 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 40.8 | 48.1 | 47.9 | 47.6 | 41.4 | | | | | | **45.2** | 4 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 163 | 192 | 192 | 191 | 165 | | | | | | **181** | 15 | 2.5 min |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1226**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.82 | 0.78 | 0.85 | 0.91 | 0.82 | | | | | | **0.84** | 0.05 | 0.75 min |
| Moisture Content (%) | 28.9 | 30.0 | 29.5 | 28.8 | 29.1 | | | | | | **29.3** | 0.5 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 50.0 | 44.7 | 39.3 | 33.5 | 31.7 | | | | | | **39.8** | 8 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 200 | 179 | 157 | 134 | 127 | | | | | | **159** | 31 | 2.5 min |
| **Hydraulic Conductivity (ASTM D 5084)** | | | | | | | | | | | | | |
| Hydraulic Conductivity (cm/sec) | 2.6E-09 | | | | | | | | | | **2.6E-09** | | 5E-09 max |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1264**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.99 | 1.02 | 1.03 | 0.95 | 0.89 | | | | | | **0.98** | 0.06 | 0.75 min |
| Moisture Content (%) | 28.2 | 29.0 | 28.4 | 28.1 | 28.4 | | | | | | **28.4** | 0.3 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 35.3 | 38.8 | 32.4 | 37.8 | 36.0 | | | | | | **36.1** | 2 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 141 | 155 | 130 | 151 | 144 | | | | | | **144** | 10 | 2.5 min |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1309**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.78 | 0.79 | 0.87 | 0.87 | 0.82 | | | | | | **0.83** | 0.04 | 0.75 min |
| Moisture Content (%) | 28.5 | 28.4 | 30.7 | 28.2 | 28.5 | | | | | | **28.9** | 1.0 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 34.1 | 27.1 | 28.6 | 24.0 | 21.6 | | | | | | **27.1** | 5 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 136 | 109 | 115 | 96.1 | 86.4 | | | | | | **108** | 19 | 2.5 min |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1353**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.91 | 0.80 | 0.95 | 0.85 | 0.80 | | | | | | **0.86** | 0.07 | 0.75 min |
| Moisture Content (%) | 29.1 | 29.1 | 28.5 | 29.2 | 29.9 | | | | | | **29.2** | 0.5 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 34.4 | 31.3 | 25.4 | 25.7 | 35.2 | | | | | | **30.4** | 5 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 138 | 125 | 101 | 103 | 141 | | | | | | **122** | 19 | 2.5 min |
| **Hydraulic Conductivity (ASTM D 5084)** | | | | | | | | | | | | | |
| Hydraulic Conductivity (cm/sec) | 2.5E-09 | | | | | | | | | | **2.5E-09** | | 5E-09 max |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1397**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.97 | 0.89 | 0.82 | 0.88 | 0.91 | | | | | | **0.89** | 0.05 | 0.75 min |
| Moisture Content (%) | 28.5 | 28.8 | 27.7 | 28.7 | 25.5 | | | | | | **27.8** | 1.4 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 60.0 | 48.7 | 63.3 | 54.5 | 53.5 | | | | | | **56.0** | 6 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 240 | 195 | 253 | 218 | 214 | | | | | | **224** | 23 | 2.5 min |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1444**
**TRI Log #: E2279-01-04**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.81 | 0.78 | 0.81 | 0.83 | 0.77 | | | | | | **0.80** | 0.02 | 0.75 min |
| Moisture Content (%) | 30.7 | 30.6 | 30.3 | 28.2 | 29.3 | | | | | | **29.8** | 1.1 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 47.2 | 44.8 | 46.3 | 52.1 | 61.0 | | | | | | **50.3** | 7 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 189 | 179 | 185 | 208 | 244 | | | | | | **201** | 26 | 2.5 min |
| **Hydraulic Conductivity (ASTM D 5084)** | | | | | | | | | | | | | |
| Hydraulic Conductivity (cm/sec) | 3.1E-09 | | | | | | | | | | **3.1E-09** | | 5E-09 max |

NA Not Available

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# GCL TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Bentomat ST GCL**
**Sample Identification: 1501**
**TRI Log #: E2279-01-08**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bentonite - Mass/Unit Area (ASTM D 5993, result @ 0% M.C.)** | | | | | | | | | | | | | |
| Bentonite mass/unit area (lbs/ft$^2$) | 0.80 | 0.81 | 0.93 | 0.85 | 0.81 | | | | | | **0.84** | 0.05 | 0.75 min |
| Moisture Content (%) | 28.4 | 28.6 | 26.9 | 27.6 | 26.2 | | | | | | **27.5** | 1.0 | NA |
| **Peel Strength (ASTM D 6496)** | | | | | | | | | | | | | |
| MD - Peel Strength (lbs/in) | 46.9 | 49.1 | 45.4 | 46.3 | 44.8 | | | | | | **46.5** | 2 | 2.5 min |
| MD - Peel Strength (lbs/4 in) | 188 | 196 | 182 | 185 | 179 | | | | | | **186** | 7 | 2.5 min |

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# SECTION G-3

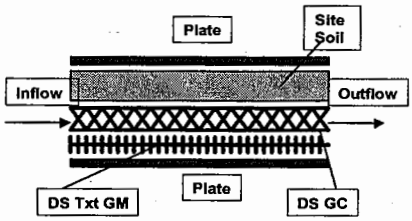
## Geocomposite

# GEOCOMPOSITE TEST RESULTS

**Client: Atlantic Coast Consulting, Inc.**
**Project: Charlotte Motor Speedway**

**Material: Skaps TN270-2-8 Double Sided Geocomposite**
**Sample Identification: 2245006**
**TRI Log #: E2277-24-06**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hydraulic Transmissivity (ASTM D 4716) - GC** | | | | | | | | | | | | | |
| Direction Tested: Machine Direction | | | | | | | | | | | | | |
| Normal Load (psf): 10,000 | | | | | | | | | | | | | |
| Hydraulic Gradient: 0.25 | | | | | | | | | | | | | |
| Test Length (in) 12 | | | | | | | | | | | | | |
| Test Width (in) 12 | | | | | | | | | | | | | |
| Plate / Site Soil/ Geocomposite / Agru 60mil HDPE Microspike / Plate | | | | | | | | | | | | | |
| Seat Time (hrs) | Specimen | | 1 | | | | | | | | | | |
| Volume (cc) | | 540 | 539 | 532 | | | | | | | | | |
| Time (s) | | 10.12 | 10.15 | 10.12 | | | | | | | | | |
| 24 Flow Rate (GPM/ft width) | | 0.85 | 0.84 | 0.83 | | | | | | | 0.84 | 0.01 | |
| Transmissivity (m^2/s) | | 7.00E-04 | 6.97E-04 | 6.90E-04 | | | | | | | 6.96E-04 | 5.29E-06 | 5E-04 min |
| Test Temp (C) | | | 20.0 | | | | | | | | | | |
| Temp. Corr. Factor | | | 1.000 | | | | | | | | | | |
| **Peel Strength (ASTM F 904)** | | | | | | | | | | | | | |
| A - MD Average Peel Strength (ppi) | 4.5 | 5.1 | 3.2 | 4.2 | 4.8 | | | | | | 4.4 | 0.7 | |
| A - MD Average Peel Strength (g/in) | 2043 | 2315 | 1453 | 1907 | 2179 | | | | | | 1979 | 331 | 150 min |
| B - MD Average Peel Strength (ppi) | 3.9 | 5.0 | 3.1 | 1.6 | 3.2 | | | | | | 3.4 | 1.2 | |
| B - MD Average Peel Strength (g/in) | 1771 | 2270 | 1407 | 726 | 1453 | | | | | | 1525 | 564 | 150 min |




Note: A and B represent a randomly assigned top and bottom of the sample

MD Machine Direction

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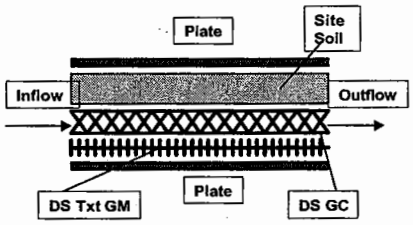
# GEOCOMPOSITE TEST RESULTS

**Client: Atlantic Coast Consulting, Inc.**
**Project: Charlotte Motor Speedway**

**Material: Skaps TN270-2-8 Double Sided Geocomposite**
**Sample Identification: 2245135**
**TRI Log #: E2277-24-06**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hydraulic Transmissivity (ASTM D 4716) - GC** | | | | | | | | | | | | | |
| Direction Tested: Machine Direction | | | | | | | | | | | | | |
| Normal Load (psf): 10,000 | | | | | | | | | | | | | |
| Hydraulic Gradient: 0.25 | | | | | | | | | | | | | |
| Test Length (in) 12 | | | | | | | | | | | | | |
| Test Width (in) 12 | | | | | | | | | | | | | |
| Plate / Site Soil/ Geocomposite / Agru 60mil HDPE Microspike / Plate | | | | | | | | | | | | | |
| Seat Time (hrs) | Specimen | | 1 | | | | | | | | | | |
| Volume (cc) | | 689 | 701 | 687 | | | | | | | | | |
| Time (s) | | 8.09 | 8.28 | 8.06 | | | | | | | | | |
| 24 Flow Rate (GPM/ft width) | | 1.35 | 1.34 | 1.35 | | | | | | | 1.35 | 0.00 | |
| 24 Transmissivity (m^2/s) | | 1.12E-03 | 1.11E-03 | 1.12E-03 | | | | | | | 1.12E-03 | 4.11E-06 | 5E-04 min |
| Test Temp (C) | | | 20.0 | | | | | | | | | | |
| Temp. Corr. Factor | | | 1.000 | | | | | | | | | | |
| **Peel Strength (ASTM F 904)** | | | | | | | | | | | | | |
| A - MD Average Peel Strength (ppi) | 3.6 | 5.7 | 1.6 | 5.5 | 2.9 | | | | | | 3.9 | 1.7 | |
| A - MD Average Peel Strength (g/in) | 1634 | 2588 | 726 | 2497 | 1317 | | | | | | 1752 | 792 | 150 min |
| B - MD Average Peel Strength (ppi) | 3.4 | 4.6 | 1.1 | 4.5 | 2.2 | | | | | | 3.2 | 1.5 | |
| B - MD Average Peel Strength (g/in) | 1544 | 2088 | 499 | 2043 | 999 | | | | | | 1435 | 684 | 150 min |




Note: A and B represent a randomly assigned top and bottom of the sample

MD Machine Direction

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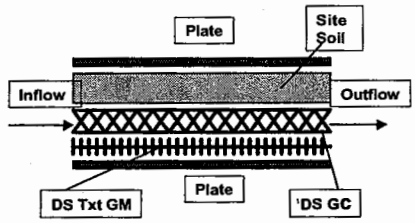
# GEOCOMPOSITE TEST RESULTS

**Client: Atlantic Coast Consulting, Inc.**
**Project: Charlotte Motor Speedway**

**Material: Skaps TN270-2-8 Double Sided Geocomposite**
**Sample Identification: 2245228**
**TRI Log #: E2277-24-06**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hydraulic Transmissivity (ASTM D 4716) - GC** | | | | | | | | | | | | | |
| Direction Tested: Machine Direction | | | | | | | | | | | | | |
| Normal Load (psf): 10,000 | | | | | | | | | | | | | |
| Hydraulic Gradient: 0.25 | | | | | | | | | | | | | |
| Test Length (in) 12 | | | | | | | | | | | | | |
| Test Width (in) 12 | | | | | | | | | | | | | |
| Plate / Site Soil/ Geocomposite / Agru 60mil HDPE Microspike / Plate | | | | | | | | | | | | | |
| Seat Time (hrs) | Specimen | | 1 | | | | | | | | | | |
| Volume (cc) | | 684 | 690 | 690 | | | | | | | | | |
| Time (s) | | 8.09 | 8.16 | 8.06 | | | | | | | | | |
| 24 Flow Rate (GPM/ft width) | | 1.34 | 1.34 | 1.36 | | | | | | | 1.34 | 0.01 | |
| Transmissivity (m^2/s) | | 1.11E-03 | 1.11E-03 | 1.12E-03 | | | | | | | 1.11E-03 | 8.86E-06 | 5E-04 min |
| Test Temp (C) | | | 20.0 | | | | | | | | | | |
| Temp. Corr. Factor | | | 1.000 | | | | | | | | | | |
| **Peel Strength (ASTM F 904)** | | | | | | | | | | | | | |
| A - MD Average Peel Strength (ppi) | 3.4 | 6.7 | 5.3 | 1.4 | 3.1 | | | | | | 4.0 | 2.1 | |
| A - MD Average Peel Strength (g/in) | 1544 | 3042 | 2406 | 636 | 1407 | | | | | | 1807 | 933 | 150 min |
| B - MD Average Peel Strength (ppi) | 1.5 | 5.4 | 3.1 | 2.9 | 2.4 | | | | | | 3.1 | 1.4 | |
| B - MD Average Peel Strength (g/in) | 681 | 2452 | 1407 | 1317 | 1090 | | | | | | 1389 | 657 | 150 min |




Note: A and B represent a randomly assigned top and bottom of the sample

MD Machine Direction

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# GEOCOMPOSITE TEST RESULTS

**Client: Atlantic Coast Consulting, Inc.**
**Project: Charlotte Motor Speedway**

**Material: Skaps TN270-2-8 Double Sided Geocomposite**
**Sample Identification: 2245307**
**TRI Log #: E2277-24-06**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Hydraulic Transmissivity (ASTM D 4716) - GC**

Direction Tested: Machine Direction

| | |
|---|---|
| Normal Load (psf): | 10,000 |
| Hydraulic Gradient: | 0.25 |
| Test Length (in) | 12 |
| Test Width (in) | 12 |

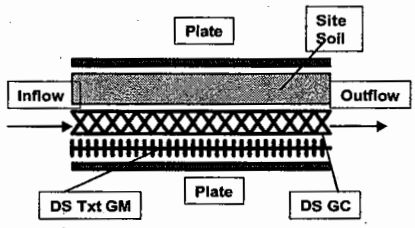


Plate / Site Soil/ Geocomposite / Agru 60mil HDPE Microspike / Plate

| Seat Time (hrs) | Specimen | 1 | | | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|
| | Volume (cc) | 703 | 693 | 698 | | | |
| | Time (s) | 8.15 | 8.03 | 8.15 | | | |
| 24 | Flow Rate (GPM/ft width) | 1.37 | 1.37 | 1.36 | 1.36 | 0.01 | |
| | Transmissivity (m^2/s) | 1.13E-03 | 1.13E-03 | 1.12E-03 | 1.13E-03 | 4.82E-06 | 5E-04 min |
| | Test Temp (C) | | 20.0 | | | | |
| | Temp. Corr. Factor | | 1.000 | | | | |

**Peel Strength (ASTM F 904)**

| | 1 | 2 | 3 | 4 | 5 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|
| A - MD Average Peel Strength (ppi) | 6.3 | 7.1 | 5.2 | 3.0 | 6.3 | 5.6 | 1.6 | |
| A - MD Average Peel Strength (g/in) | 2860 | 3223 | 2361 | 1362 | 2860 | 2533 | 723 | 150 min |
| B - MD Average Peel Strength (ppi) | 3.5 | 4.6 | 4.1 | 2.2 | 4.7 | 3.8 | 1.0 | |
| B - MD Average Peel Strength (g/in) | 1589 | 2088 | 1861 | 999 | 2134 | 1734 | 465 | 150 min |

Note: A and B represent a randomly assigned top and bottom of the sample

MD Machine Direction

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of NORTH CAROLINA, LLC

# SECTION G-4

## Geotextile

## GEOTEXTILE TEST RESULTS

**TRI Client: Atlantic Coast Consulting, Inc. (ACC)**
**Project: Charlotte Motor Speedway**

**Material: Skaps GE110 Nonwoven Geotextile**
**Sample Identification: 4148.09**
**TRI Log #: E2277-40-09**

| PARAMETER | TEST REPLICATE NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN | STD. DEV. | PROJ. SPEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mass/Unit Area (ASTM D 5261)** | | | | | | | | | | | | | |
| 5" diameter circle (grams) | 4.70 | 4.33 | 4.85 | 4.66 | 4.68 | 4.80 | 4.84 | 4.54 | 4.64 | 4.66 | **4.67** | 0.15 | |
| Mass/Unit Area (oz/sq.yd) | 10.93 | 10.07 | 11.28 | 10.84 | 10.89 | 11.16 | 11.26 | 10.56 | 10.79 | 10.84 | **10.86** | 0.36 | 10 min |
| **Grab Tensile Properties (ASTM D 4632)** | | | | | | | | | | | | | |
| MD - Tensile Strength (lbs) | 314 | 316 | 321 | 303 | 277 | 329 | 325 | 335 | 322 | 303 | **315** | 17 | 250 min |
| TD - Tensile Strength (lbs) | 346 | 360 | 350 | 385 | 333 | 363 | 401 | 390 | 375 | 335 | **364** | 23 | 250 min |
| MD - Elong. @ Max. Load (%) | 89 | 85 | 85 | 84 | 75 | 84 | 80 | 97 | 73 | 82 | **83** | 7 | |
| TD - Elong. @ Max. Load (%) | 111 | 91 | 143 | 103 | 116 | 95 | 100 | 113 | 109 | 121 | **110** | 15 | |
| **Puncture Resistance (ASTM D 4833)** | | | | | | | | | | | | | |
| Puncture Strength (lbs) | 177 | 183 | 188 | 180 | 198 | 166 | 188 | 192 | 167 | 202 | **184** | 19 | 125 min |
| | 160 | 176 | 156 | 189 | 233 | | | | | | | | |
| **Trapezoidal Tear (ASTM D 4533)** | | | | | | | | | | | | | |
| MD - Tear Strength (lbs) | 137 | 116 | 138 | 122 | 129 | 120 | 101 | 126 | 115 | 102 | **121** | 13 | 100 min |
| TD - Tear Strength (lbs) | 146 | 126 | 118 | 167 | 182 | 147 | 140 | 141 | 150 | 153 | **147** | 18 | 100 min |

MD Machine Direction TD Transverse Direction NA Not Available

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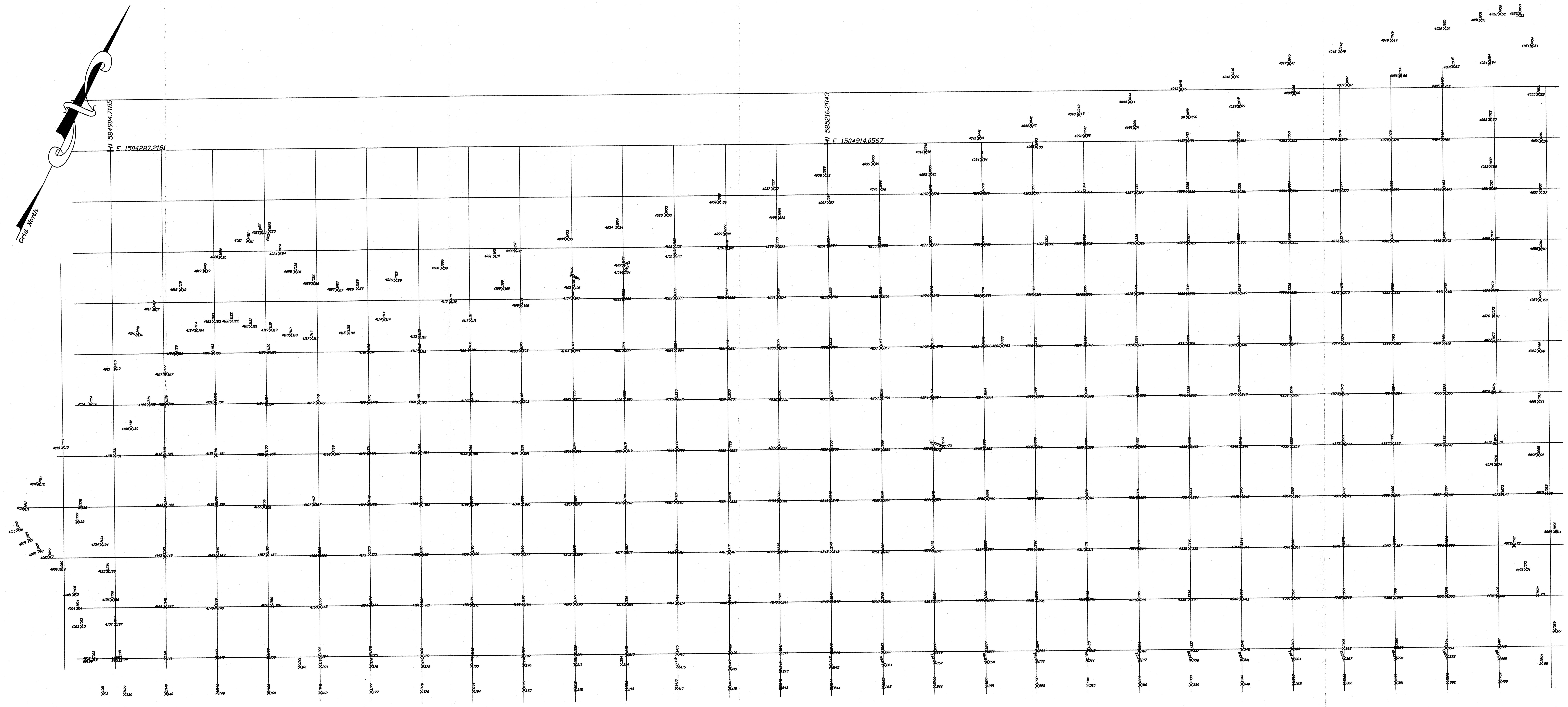



| PT # | EL | PT # | EL | Difference | PT# | EL | Difference |
|---|---|---|---|---|---|---|---|
| 1 | 598.10 | 1001 | 599.63 | 1.53 | 4001 | 0.00 | NULL |
| 2 | 597.89 | 1002 | 599.55 | 1.66 | 4002 | 601.61 | 2.06 |
| 3 | 598.53 | 1003 | 600.13 | 1.60 | 4003 | 602.18 | 2.05 |
| 4 | 598.15 | 1004 | 599.78 | 1.64 | 4004 | 601.96 | 2.18 |
| 5 | 598.40 | 1005 | 599.95 | 1.55 | 4005 | 601.98 | 2.03 |
| 6 | 598.27 | 1006 | 599.80 | 1.53 | 4006 | 601.91 | 2.11 |
| 7 | 598.38 | 1007 | 599.90 | 1.52 | 4007 | 0.00 | NULL |
| 8 | 598.56 | 1008 | 600.07 | 1.51 | 4008 | 0.00 | NULL |
| 9 | 598.51 | 1009 | 600.05 | 1.53 | 4009 | 0.00 | NULL |
| 10 | 598.45 | 1010 | 600.04 | 1.59 | 4010 | 0.00 | NULL |
| 11 | 598.20 | 1011 | 599.78 | 1.58 | 4011 | 0.00 | NULL |
| 12 | 597.98 | 1012 | 599.60 | 1.62 | 4012 | 0.00 | NULL |
| 13 | 598.15 | 1013 | 599.71 | 1.56 | 4013 | 601.74 | 2.02 |
| 14 | 597.83 | 1014 | 599.36 | 1.53 | 4014 | 601.41 | 2.05 |
| 15 | 598.29 | 1015 | 599.82 | 1.53 | 4015 | 601.84 | 2.02 |
| 16 | 597.74 | 1016 | 599.40 | 1.66 | 4016 | 601.64 | 2.24 |
| 17 | 598.14 | 1017 | 599.71 | 1.57 | 4017 | 601.92 | 2.21 |
| 18 | 600.91 | 1018 | 602.45 | 1.54 | 4018 | 604.50 | 2.05 |
| 19 | 603.30 | 1019 | 604.85 | 1.55 | 4019 | 606.90 | 2.04 |
| 20 | 605.08 | 1020 | 606.62 | 1.54 | 4020 | 608.78 | 2.16 |
| 21 | 608.95 | 1021 | 610.49 | 1.55 | 4021 | 612.66 | 2.17 |
| 22 | 611.28 | 1022 | 612.83 | 1.55 | 4022 | 614.88 | 2.05 |
| 23 | 610.80 | 1023 | 612.30 | 1.50 | 4023 | 614.31 | 2.00 |
| 24 | 611.20 | 1024 | 612.70 | 1.50 | 4024 | 614.71 | 2.01 |
| 25 | 611.29 | 1025 | 612.79 | 1.50 | 4025 | 614.81 | 2.02 |
| 26 | 611.48 | 1026 | 612.98 | 1.50 | 4026 | 615.06 | 2.08 |
| 27 | 611.61 | 1027 | 613.11 | 1.50 | 4027 | 615.13 | 2.01 |
| 28 | 611.71 | 1028 | 613.21 | 1.50 | 4028 | 615.28 | 2.07 |
| 29 | 612.06 | 1029 | 613.56 | 1.50 | 4029 | 615.56 | 2.00 |
| 30 | 612.07 | 1030 | 613.57 | 1.50 | 4030 | 615.74 | 2.17 |
| 31 | 612.81 | 1031 | 614.31 | 1.50 | 4031 | 616.35 | 2.04 |
| 32 | 612.99 | 1032 | 614.49 | 1.50 | 4032 | 616.59 | 2.10 |
| 33 | 613.98 | 1033 | 615.48 | 1.50 | 4033 | 617.56 | 2.08 |
| 34 | 614.12 | 1034 | 615.62 | 1.50 | 4034 | 617.64 | 2.02 |
| 35 | 614.31 | 1035 | 615.81 | 1.50 | 4035 | 617.82 | 2.01 |
| 36 | 614.17 | 1036 | 615.67 | 1.50 | 4036 | 617.79 | 2.12 |
| 37 | 614.60 | 1037 | 616.10 | 1.50 | 4037 | 618.11 | 2.01 |
| 38 | 614.94 | 1038 | 616.44 | 1.50 | 4038 | 618.54 | 2.10 |
| 39 | 615.46 | 1039 | 616.96 | 1.50 | 4039 | 618.98 | 2.02 |
| 40 | 615.45 | 1040 | 616.95 | 1.50 | 4040 | 619.17 | 2.22 |
| 41 | 615.98 | 1041 | 617.48 | 1.50 | 4041 | 619.75 | 2.27 |
| 42 | 616.32 | 1042 | 617.82 | 1.50 | 4042 | 620.11 | 2.29 |
| 43 | 616.53 | 1043 | 618.03 | 1.50 | 4043 | 620.42 | 2.39 |
| 44 | 617.39 | 1044 | 618.89 | 1.50 | 4044 | 621.24 | 2.35 |
| 45 | 617.92 | 1045 | 619.42 | 1.50 | 4045 | 621.78 | 2.36 |
| 46 | 619.04 | 1046 | 620.54 | 1.50 | 4046 | 622.56 | 2.02 |
| 47 | 619.34 | 1047 | 620.84 | 1.50 | 4047 | 622.84 | 2.00 |
| 48 | 619.83 | 1048 | 621.33 | 1.50 | 4048 | 623.48 | 2.15 |
| 49 | 620.71 | 1049 | 622.21 | 1.50 | 4049 | 624.27 | 2.06 |
| 50 | 621.61 | 1050 | 623.11 | 1.50 | 4050 | 625.11 | 2.00 |
| 51 | 622.11 | 1051 | 623.61 | 1.50 | 4051 | 625.62 | 2.01 |
| 52 | 622.17 | 1052 | 623.67 | 1.50 | 4052 | 625.68 | 2.01 |
| 53 | 622.20 | 1053 | 623.74 | 1.54 | 4053 | 625.79 | 2.05 |
| 54 | 621.71 | 1054 | 623.26 | 1.55 | 4054 | 625.30 | 2.04 |
| 55 | 621.02 | 1055 | 622.65 | 1.63 | 4055 | 624.65 | 2.00 |
| 56 | 620.08 | 1056 | 621.65 | 1.57 | 4056 | 623.65 | 2.00 |
| 57 | 619.04 | 1057 | 620.58 | 1.54 | 4057 | 622.60 | 2.01 |
| 58 | 617.90 | 1058 | 619.42 | 1.51 | 4058 | 621.44 | 2.02 |
| 59 | 616.96 | 1059 | 618.49 | 1.53 | 4059 | 620.49 | 2.00 |
| 60 | 615.91 | 1060 | 617.46 | 1.55 | 4060 | 619.54 | 2.08 |
| 61 | 615.00 | 1061 | 616.55 | 1.54 | 4061 | 618.57 | 2.02 |
| 62 | 614.09 | 1062 | 615.61 | 1.52 | 4062 | 617.63 | 2.02 |
| 63 | 613.03 | 1063 | 614.57 | 1.54 | 4063 | 616.60 | 2.03 |
| 64 | 612.01 | 1064 | 613.57 | 1.55 | 4064 | 615.66 | 2.09 |
| 65 | 611.23 | 1065 | 612.81 | 1.59 | 4065 | 0.00 | NULL |
| 66 | 610.39 | 1066 | 612.02 | 1.63 | 4066 | 0.00 | NULL |
| 67 | 609.91 | 1067 | 611.47 | 1.56 | 4067 | 0.00 | NULL |
| 68 | 596.57 | 1068 | 598.17 | 1.60 | 4068 | 0.00 | NULL |
| 69 | 598.50 | 1069 | 600.02 | 1.53 | 4069 | 0.00 | NULL |
| 70 | 598.48 | 1070 | 600.01 | 1.53 | 4070 | 0.00 | NULL |
| 71 | 598.46 | 1071 | 600.01 | 1.56 | 4071 | 602.31 | 2.30 |
| 72 | 599.10 | 1072 | 600.65 | 1.56 | 4072 | 602.70 | 2.05 |
| 73 | 599.94 | 1073 | 601.49 | 1.55 | 4073 | 603.52 | 2.03 |
| 74 | 600.42 | 1074 | 601.97 | 1.55 | 4074 | 604.00 | 2.03 |

| PT # | EL | PT # | EL | Difference | PT# | EL | Difference |
|---|---|---|---|---|---|---|---|
| 76 | 601.41 | 1076 | 602.94 | 1.53 | 4076 | 604.99 | 2.05 |
| 77 | 602.07 | 1077 | 603.63 | 1.56 | 4077 | 605.65 | 2.02 |
| 78 | 602.40 | 1078 | 603.98 | 1.58 | 4078 | 606.01 | 2.03 |
| 79 | 602.75 | 1079 | 604.33 | 1.58 | 4079 | 606.37 | 2.04 |
| 80 | 603.46 | 1080 | 605.05 | 1.59 | 4080 | 607.11 | 2.06 |
| 81 | 604.13 | 1081 | 605.79 | 1.66 | 4081 | 607.86 | 2.07 |
| 82 | 604.47 | 1082 | 606.12 | 1.66 | 4082 | 608.21 | 2.09 |
| 83 | 606.51 | 1083 | 608.09 | 1.58 | 4083 | 610.09 | 2.00 |
| 84 | 608.70 | 1084 | 610.28 | 1.58 | 4084 | 612.30 | 2.02 |
| 85 | 608.81 | 1085 | 610.36 | 1.55 | 4085 | 612.70 | 2.34 |
| 86 | 609.08 | 1086 | 610.64 | 1.56 | 4086 | 612.73 | 2.09 |
| 87 | 608.89 | 1087 | 610.51 | 1.61 | 4087 | 612.73 | 2.22 |
| 88 | 609.61 | 1088 | 611.15 | 1.54 | 4088 | 613.16 | 2.01 |
| 89 | 610.45 | 1089 | 612.02 | 1.57 | 4089 | 614.11 | 2.09 |
| 90 | 611.30 | 1090 | 612.88 | 1.57 | 4090 | 614.97 | 2.09 |
| 91 | 611.81 | 1091 | 613.40 | 1.60 | 4091 | 615.43 | 2.02 |
| 92 | 612.25 | 1092 | 613.83 | 1.58 | 4092 | 615.87 | 2.04 |
| 93 | 611.75 | 1093 | 613.32 | 1.57 | 4093 | 615.33 | 2.01 |
| 94 | 611.07 | 1094 | 612.65 | 1.58 | 4094 | 614.82 | 2.17 |
| 95 | 610.51 | 1095 | 612.07 | 1.56 | 4095 | 614.18 | 2.11 |
| 96 | 608.58 | 1096 | 610.17 | 1.60 | 4096 | 612.29 | 2.12 |
| 97 | 607.31 | 1097 | 608.84 | 1.53 | 4097 | 610.99 | 2.15 |
| 98 | 605.66 | 1098 | 607.19 | 1.53 | 4098 | 609.28 | 2.09 |
| 99 | 604.06 | 1099 | 605.64 | 1.58 | 4099 | 607.64 | 2.00 |
| 100 | 603.48 | 1100 | 605.11 | 1.63 | 4100 | 607.93 | 2.82 |
| 101 | 602.45 | 1101 | 604.09 | 1.63 | 4101 | 607.61 | 3.52 |
| 102 | 604.44 | 1102 | 605.95 | 1.52 | 4102 | 608.01 | 2.06 |
| 103 | 602.45 | 1103 | 604.07 | 1.62 | 4103 | 606.10 | 2.03 |
| 104 | 602.09 | 1104 | 603.65 | 1.56 | 4104 | 605.74 | 2.10 |
| 105 | 601.84 | 1105 | 603.35 | 1.51 | 4105 | 605.48 | 2.14 |
| 106 | 602.52 | 1106 | 604.05 | 1.53 | 4106 | 606.13 | 2.08 |
| 107 | 602.20 | 1107 | 603.82 | 1.62 | 4107 | 606.07 | 2.25 |
| 108 | 601.34 | 1108 | 602.91 | 1.56 | 4108 | 605.06 | 2.16 |
| 109 | 601.74 | 1109 | 603.35 | 1.60 | 4109 | 605.37 | 2.03 |
| 110 | 601.64 | 1110 | 603.19 | 1.55 | 4110 | 605.24 | 2.04 |
| 111 | 601.17 | 1111 | 602.68 | 1.51 | 4111 | 604.73 | 2.06 |
| 112 | 601.46 | 1112 | 602.98 | 1.52 | 4112 | 605.10 | 2.12 |
| 113 | 600.73 | 1113 | 602.24 | 1.51 | 4113 | 604.28 | 2.04 |
| 114 | 600.55 | 1114 | 602.19 | 1.64 | 4114 | 604.25 | 2.06 |
| 115 | 597.46 | 1115 | 599.10 | 1.64 | 4115 | 601.19 | 2.09 |
| 116 | 600.15 | 1116 | 601.69 | 1.54 | 4116 | 603.79 | 2.10 |
| 117 | 594.54 | 1117 | 596.18 | 1.64 | 4117 | 598.27 | 2.08 |
| 118 | 592.56 | 1118 | 594.13 | 1.57 | 4118 | 596.18 | 2.05 |
| 119 | 590.44 | 1119 | 591.98 | 1.55 | 4119 | 594.67 | 2.69 |
| 120 | 591.11 | 1120 | 592.69 | 1.58 | 4120 | 594.70 | 2.01 |
| 121 | 588.52 | 1121 | 590.06 | 1.55 | 4121 | 592.12 | 2.05 |
| 122 | 586.51 | 1122 | 588.03 | 1.52 | 4122 | 590.20 | 2.17 |
| 123 | 585.79 | 1123 | 587.39 | 1.60 | 4123 | 589.60 | 2.20 |
| 124 | 585.50 | 1124 | 587.05 | 1.55 | 4124 | 589.15 | 2.10 |
| 126 | 584.60 | 1126 | 586.25 | 1.65 | 4126 | 588.26 | 2.01 |
| 127 | 583.52 | 1127 | 585.09 | 1.58 | 4127 | 587.31 | 2.22 |
| 128 | 583.36 | 1128 | 584.98 | 1.62 | 4128 | 587.12 | 2.15 |
| 129 | 582.58 | 1129 | 584.16 | 1.58 | 4129 | 586.34 | 2.17 |
| 130 | 582.47 | 1130 | 584.06 | 1.59 | 4130 | 586.24 | 2.18 |
| 131 | 582.54 | 1131 | 584.17 | 1.63 | 4131 | 586.38 | 2.21 |
| 132 | 582.42 | 1132 | 584.00 | 1.58 | 4132 | 0.00 | NULL |
| 133 | 582.48 | 1133 | 584.02 | 1.54 | 4133 | 0.00 | NULL |
| 134 | 582.50 | 1134 | 584.11 | 1.60 | 4134 | 586.11 | 2.00 |
| 135 | 585.70 | 1135 | 587.41 | 1.71 | 4135 | 589.49 | 2.08 |
| 136 | 586.19 | 1136 | 587.94 | 1.75 | 4136 | 590.10 | 2.16 |
| 137 | 587.68 | 1137 | 589.34 | 1.67 | 4137 | 591.42 | 2.08 |
| 138 | 589.39 | 1138 | 591.26 | 1.87 | 4138 | 593.38 | 2.12 |
| 139 | 591.66 | 1139 | 593.19 | 1.53 | 4139 | 0.00 | NULL |
| 140 | 592.56 | 1140 | 594.11 | 1.55 | 4140 | 0.00 | NULL |
| 141 | 592.56 | 1141 | 594.17 | 1.60 | 4141 | 0.00 | NULL |
| 142 | 590.75 | 1142 | 592.38 | 1.62 | 4142 | 594.46 | 2.08 |
| 143 | 588.80 | 1143 | 590.41 | 1.61 | 4143 | 592.58 | 2.18 |
| 144 | 587.11 | 1144 | 588.64 | 1.53 | 4144 | 590.76 | 2.12 |
| 145 | 585.31 | 1145 | 586.89 | 1.57 | 4145 | 588.92 | 2.03 |
| 146 | 596.45 | 1146 | 598.12 | 1.66 | 4146 | 0.00 | NULL |
| 147 | 597.05 | 1147 | 598.60 | 1.55 | 4147 | 0.00 | NULL |
| 148 | 595.32 | 1148 | 596.89 | 1.57 | 4148 | 599.10 | 2.21 |
| 149 | 593.31 | 1149 | 594.90 | 1.59 | 4149 | 597.16 | 2.27 |

| PT # | EL | PT # | EL | Difference | PT# | EL | Difference |
|---|---|---|---|---|---|---|---|
| 150 | 591.66 | 1150 | 593.28 | 1.63 | 4150 | 595.46 | 2.17 |
| 151 | 589.89 | 1151 | 591.52 | 1.63 | 4151 | 593.67 | 2.15 |
| 152 | 588.12 | 1152 | 589.70 | 1.59 | 4152 | 591.93 | 2.23 |
| 153 | 586.69 | 1153 | 588.29 | 1.60 | 4153 | 590.42 | 2.13 |
| 154 | 592.75 | 1154 | 594.40 | 1.65 | 4154 | 596.68 | 2.28 |
| 155 | 594.59 | 1155 | 596.14 | 1.55 | 4155 | 598.41 | 2.27 |
| 156 | 596.31 | 1156 | 597.93 | 1.62 | 4156 | 600.04 | 2.11 |
| 157 | 598.13 | 1157 | 599.66 | 1.53 | 4157 | 601.96 | 2.30 |
| 158 | 600.49 | 1158 | 602.13 | 1.65 | 4158 | 604.44 | 2.31 |
| 159 | 601.68 | 1159 | 603.31 | 1.63 | 4159 | 0.00 | NULL |
| 160 | 600.05 | 1160 | 601.64 | 1.59 | 4160 | 0.00 | NULL |
| 161 | 604.57 | 1161 | 606.13 | 1.56 | 4161 | 0.00 | NULL |
| 162 | 601.14 | 1162 | 602.74 | 1.60 | 4162 | 0.00 | NULL |
| 163 | 604.98 | 1163 | 606.53 | 1.55 | 4163 | 0.00 | NULL |
| 164 | 604.83 | 1164 | 606.35 | 1.52 | 4164 | 0.00 | NULL |
| 165 | 604.52 | 1165 | 606.05 | 1.52 | 4165 | 608.32 | 2.28 |
| 166 | 602.62 | 1166 | 604.16 | 1.53 | 4166 | 606.30 | 2.14 |
| 167 | 600.46 | 1167 | 602.05 | 1.59 | 4167 | 604.20 | 2.15 |
| 168 | 600.48 | 1168 | 602.04 | 1.56 | 4168 | 604.12 | 2.08 |
| 169 | 597.31 | 1169 | 598.87 | 1.56 | 4169 | 601.00 | 2.13 |
| 170 | 600.89 | 1170 | 602.44 | 1.55 | 4170 | 604.55 | 2.11 |
| 171 | 601.75 | 1171 | 603.37 | 1.62 | 4171 | 605.49 | 2.12 |
| 172 | 602.79 | 1172 | 604.29 | 1.50 | 4172 | 606.58 | 2.29 |
| 173 | 604.17 | 1173 | 605.74 | 1.57 | 4173 | 607.79 | 2.05 |
| 174 | 605.36 | 1174 | 606.96 | 1.60 | 4174 | 609.18 | 2.22 |
| 175 | 605.89 | 1175 | 607.48 | 1.58 | 4175 | 0.00 | NULL |
| 176 | 605.82 | 1176 | 607.34 | 1.52 | 4176 | 0.00 | NULL |
| 177 | 602.10 | 1177 | 603.70 | 1.60 | 4177 | 0.00 | NULL |
| 178 | 603.01 | 1178 | 604.51 | 1.50 | 4178 | 0.00 | NULL |
| 179 | 606.89 | 1179 | 608.47 | 1.58 | 4179 | 0.00 | NULL |
| 180 | 606.86 | 1180 | 608.42 | 1.57 | 4180 | 0.00 | NULL |
| 181 | 606.16 | 1181 | 607.67 | 1.50 | 4181 | 609.99 | 2.33 |
| 182 | 605.17 | 1182 | 606.80 | 1.63 | 4182 | 608.95 | 2.15 |
| 183 | 603.90 | 1183 | 605.47 | 1.56 | 4183 | 607.80 | 2.34 |
| 184 | 602.90 | 1184 | 604.44 | 1.54 | 4184 | 606.74 | 2.30 |
| 185 | 602.21 | 1185 | 603.72 | 1.50 | 4185 | 605.91 | 2.19 |
| 186 | 602.44 | 1186 | 603.99 | 1.54 | 4186 | 606.23 | 2.24 |
| 187 | 602.99 | 1187 | 604.58 | 1.59 | 4187 | 606.63 | 2.05 |
| 188 | 604.02 | 1188 | 605.53 | 1.52 | 4188 | 607.66 | 2.13 |
| 189 | 604.89 | 1189 | 606.49 | 1.60 | 4189 | 608.58 | 2.09 |
| 190 | 605.89 | 1190 | 607.44 | 1.56 | 4190 | 609.66 | 2.22 |
| 191 | 606.97 | 1191 | 608.54 | 1.57 | 4191 | 610.79 | 2.25 |
| 192 | 607.76 | 1192 | 609.36 | 1.60 | 4192 | 0.00 | NULL |
| 193 | 607.78 | 1193 | 609.30 | 1.52 | 4193 | 0.00 | NULL |
| 194 | 603.83 | 1194 | 605.37 | 1.54 | 4194 | 0.00 | NULL |
| 195 | 604.69 | 1195 | 606.19 | 1.51 | 4195 | 0.00 | NULL |
| 196 | 608.78 | 1196 | 610.33 | 1.55 | 4196 | 0.00 | NULL |
| 197 | 608.67 | 1197 | 610.25 | 1.58 | 4197 | 0.00 | NULL |
| 198 | 607.74 | 1198 | 609.33 | 1.58 | 4198 | 611.64 | 2.31 |
| 199 | 606.74 | 1199 | 608.33 | 1.59 | 4199 | 610.42 | 2.10 |
| 200 | 605.64 | 1200 | 607.19 | 1.55 | 4200 | 609.30 | 2.11 |
| 201 | 604.76 | 1201 | 606.35 | 1.59 | 4201 | 608.49 | 2.14 |
| 202 | 603.78 | 1202 | 605.33 | 1.55 | 4202 | 607.44 | 2.11 |
| 203 | 603.04 | 1203 | 604.64 | 1.59 | 4203 | 606.69 | 2.06 |
| 204 | 603.48 | 1204 | 605.03 | 1.55 | 4204 | 607.24 | 2.21 |
| 205 | 604.51 | 1205 | 606.03 | 1.52 | 4205 | 608.17 | 2.14 |
| 206 | 605.53 | 1206 | 607.07 | 1.55 | 4206 | 609.19 | 2.12 |
| 207 | 606.47 | 1207 | 608.01 | 1.54 | 4207 | 610.21 | 2.20 |
| 208 | 607.42 | 1208 | 608.99 | 1.57 | 4208 | 611.11 | 2.12 |
| 209 | 608.50 | 1209 | 610.05 | 1.55 | 4209 | 612.29 | 2.24 |
| 210 | 609.51 | 1210 | 611.09 | 1.59 | 4210 | 0.00 | NULL |
| 211 | 609.61 | 1211 | 611.14 | 1.53 | 4211 | 0.00 | NULL |
| 212 | 605.51 | 1212 | 607.09 | 1.58 | 4212 | 0.00 | NULL |
| 213 | 606.40 | 1213 | 607.99 | 1.60 | 4213 | 0.00 | NULL |
| 214 | 610.42 | 1214 | 612.10 | 1.68 | 4214 | 0.00 | NULL |
| 215 | 610.35 | 1215 | 611.94 | 1.59 | 4215 | 0.00 | NULL |
| 216 | 609.31 | 1216 | 610.86 | 1.55 | 4216 | 613.01 | 2.15 |
| 217 | 608.32 | 1217 | 609.90 | 1.58 | 4217 | 611.98 | 2.08 |
| 218 | 607.25 | 1218 | 608.81 | 1.57 | 4218 | 610.91 | 2.09 |
| 219 | 606.28 | 1219 | 607.79 | 1.51 | 4219 | 609.81 | 2.02 |
| 220 | 605.41 | 1220 | 607.00 | 1.59 | 4220 | 609.02 | 2.02 |
| 221 | 604.32 | 1221 | 605.89 | 1.57 | 4221 | 607.91 | 2.02 |
| 222 | 603.27 | 1222 | 604.80 | 1.53 | 4222 | 606.87 | 2.07 |
| 223 | 604.04 | 1223 | 605.60 | 1.56 | 4223 | 607.70 | 2.10 |
| 224 | 605.10 | 1224 | 606.69 | 1.59 | 4224 | 608.84 | 2.15 |

| PT # | EL | PT # | EL | Difference | PT# | EL | Difference |
|---|---|---|---|---|---|---|---|
| 226 | 607.14 | 1226 | 608.72 | 1.58 | 4226 | 610.82 | 2.09 |
| 227 | 608.10 | 1227 | 609.68 | 1.58 | 4227 | 611.78 | 2.10 |
| 228 | 608.86 | 1228 | 610.44 | 1.58 | 4228 | 612.47 | 2.03 |
| 229 | 607.83 | 1229 | 609.40 | 1.57 | 4229 | 611.42 | 2.02 |
| 230 | 606.93 | 1230 | 608.46 | 1.53 | 4230 | 610.52 | 2.06 |
| 231 | 606.03 | 1231 | 607.56 | 1.53 | 4231 | 609.63 | 2.08 |
| 232 | 604.93 | 1232 | 606.55 | 1.62 | 4232 | 608.68 | 2.13 |
| 233 | 604.89 | 1233 | 606.47 | 1.58 | 4233 | 608.63 | 2.16 |
| 234 | 605.85 | 1234 | 607.44 | 1.59 | 4234 | 609.59 | 2.15 |
| 235 | 606.81 | 1235 | 608.41 | 1.60 | 4235 | 610.47 | 2.06 |
| 236 | 607.65 | 1236 | 609.26 | 1.61 | 4236 | 611.38 | 2.12 |
| 237 | 608.76 | 1237 | 610.35 | 1.59 | 4237 | 612.50 | 2.14 |
| 238 | 609.73 | 1238 | 611.31 | 1.58 | 4238 | 613.49 | 2.18 |
| 239 | 610.64 | 1239 | 612.22 | 1.57 | 4239 | 614.29 | 2.07 |
| 240 | 611.48 | 1240 | 613.08 | 1.60 | 4240 | 615.14 | 2.06 |
| 241 | 612.31 | 1241 | 613.94 | 1.63 | 4241 | 0.00 | NULL |
| 242 | 610.51 | 1242 | 612.04 | 1.53 | 4242 | 0.00 | NULL |
| 243 | 609.76 | 1243 | 611.32 | 1.56 | 4243 | 0.00 | NULL |
| 244 | 608.93 | 1244 | 610.60 | 1.67 | 4244 | 0.00 | NULL |
| 245 | 612.04 | 1245 | 613.65 | 1.61 | 4245 | 0.00 | NULL |
| 246 | 611.41 | 1246 | 612.97 | 1.55 | 4246 | 0.00 | NULL |
| 247 | 612.21 | 1247 | 613.78 | 1.57 | 4247 | 615.91 | 2.13 |
| 248 | 611.42 | 1248 | 613.02 | 1.60 | 4248 | 615.10 | 2.08 |
| 249 | 610.50 | 1249 | 612.07 | 1.57 | 4249 | 614.15 | 2.08 |
| 250 | 609.72 | 1250 | 611.29 | 1.57 | 4250 | 613.33 | 2.04 |
| 251 | 608.57 | 1251 | 610.12 | 1.55 | 4251 | 612.23 | 2.11 |
| 252 | 607.71 | 1252 | 609.30 | 1.58 | 4252 | 611.36 | 2.06 |
| 253 | 606.62 | 1253 | 608.22 | 1.59 | 4253 | 610.31 | 2.09 |
| 254 | 606.52 | 1254 | 608.12 | 1.60 | 4254 | 610.12 | 2.00 |
| 255 | 608.28 | 1255 | 609.85 | 1.57 | 4255 | 611.91 | 2.07 |
| 256 | 608.16 | 1256 | 609.84 | 1.69 | 4256 | 611.87 | 2.03 |
| 257 | 609.03 | 1257 | 610.63 | 1.60 | 4257 | 612.68 | 2.05 |
| 258 | 609.99 | 1258 | 611.56 | 1.57 | 4258 | 613.57 | 2.01 |
| 259 | 610.72 | 1259 | 612.32 | 1.60 | 4259 | 614.33 | 2.01 |
| 260 | 611.49 | 1260 | 613.07 | 1.57 | 4260 | 615.08 | 2.01 |
| 261 | 612.24 | 1261 | 613.84 | 1.60 | 4261 | 615.86 | 2.02 |
| 262 | 611.28 | 1262 | 612.88 | 1.60 | 4262 | 615.01 | 2.12 |
| 263 | 610.58 | 1263 | 612.15 | 1.58 | 4263 | 0.00 | NULL |
| 264 | 610.43 | 1264 | 612.08 | 1.65 | 4264 | 0.00 | NULL |
| 265 | 608.70 | 1265 | 610.21 | 1.51 | 4265 | 0.00 | NULL |
| 266 | 607.96 | 1266 | 609.51 | 1.55 | 4266 | 0.00 | NULL |
| 267 | 609.50 | 1267 | 611.16 | 1.66 | 4267 | 0.00 | NULL |
| 268 | 609.66 | 1268 | 611.23 | 1.58 | 4268 | 0.00 | NULL |
| 269 | 610.30 | 1269 | 611.85 | 1.54 | 4269 | 613.86 | 2.02 |
| 270 | 611.00 | 1270 | 612.61 | 1.61 | 4270 | 614.69 | 2.08 |
| 271 | 611.84 | 1271 | 613.43 | 1.59 | 4271 | 615.52 | 2.09 |
| 272 | 612.01 | 1272 | 613.55 | 1.54 | 4272 | 615.64 | 2.09 |
| 273 | 612.28 | 1273 | 613.88 | 1.59 | 4273 | 616.01 | 2.13 |
| 274 | 611.30 | 1274 | 612.88 | 1.58 | 4274 | 614.96 | 2.08 |
| 275 | 610.68 | 1275 | 612.27 | 1.58 | 4275 | 614.33 | 2.07 |
| 276 | 610.01 | 1276 | 611.60 | 1.59 | 4276 | 613.71 | 2.12 |
| 277 | 610.36 | 1277 | 611.92 | 1.56 | 4277 | 613.95 | 2.03 |
| 278 | 610.50 | 1278 | 612.10 | 1.59 | 4278 | 614.13 | 2.03 |
| 279 | 611.31 | 1279 | 612.90 | 1.59 | 4279 | 614.98 | 2.08 |
| 280 | 611.23 | 1280 | 612.84 | 1.60 | 4280 | 614.93 | 2.09 |
| 281 | 611.31 | 1281 | 612.90 | 1.59 | 4281 | 614.96 | 2.06 |
| 282 | 611.88 | 1282 | 613.47 | 1.59 | 4282 | 615.54 | 2.07 |
| 283 | 612.27 | 1283 | 613.92 | 1.65 | 4283 | 615.98 | 2.06 |
| 284 | 612.00 | 1284 | 613.58 | 1.58 | 4284 | 615.60 | 2.02 |
| 285 | 611.42 | 1285 | 613.02 | 1.61 | 4285 | 615.06 | 2.04 |
| 286 | 610.55 | 1286 | 612.13 | 1.59 | 4286 | 614.16 | 2.02 |
| 287 | 609.77 | 1287 | 611.35 | 1.58 | 4287 | 613.35 | 2.00 |
| 288 | 609.18 | 1288 | 610.77 | 1.60 | 4288 | 612.78 | 2.01 |
| 289 | 608.46 | 1289 | 610.05 | 1.59 | 4289 | 0.00 | NULL |
| 290 | 608.43 | 1290 | 610.07 | 1.64 | 4290 | 0.00 | NULL |
| 291 | 606.72 | 1291 | 608.53 | 1.81 | 4291 | 0.00 | NULL |
| 292 | 605.83 | 1292 | 607.54 | 1.71 | 4292 | 0.00 | NULL |
| 293 | 607.38 | 1293 | 609.05 | 1.67 | 4293 | 0.00 | NULL |
| 294 | 607.36 | 1294 | 608.96 | 1.60 | 4294 | 0.00 | NULL |
| 295 | 608.08 | 1295 | 609.64 | 1.56 | 4295 | 611.70 | 2.06 |
| 296 | 608.72 | 1296 | 610.32 | 1.60 | 4296 | 612.41 | 2.09 |
| 297 | 609.49 | 1297 | 611.06 | 1.58 | 4297 | 613.09 | 2.03 |
| 298 | 610.21 | 1298 | 611.79 | 1.58 | 4298 | 613.83 | 2.04 |
| 299 | 611.01 | 1299 | 612.57 | 1.56 | 4299 | 614.61 | 2.04 |
| 300 | 611.59 | 1300 | 613.17 | 1.58 | 4300 | 615.19 | 2.02 |

| PT # | EL | PT # | EL | Difference | PT# | EL | Difference |
|---|---|---|---|---|---|---|---|
| 301 | 612.12 | 1301 | 613.72 | 1.60 | 4301 | 615.77 | 2.05 |
| 302 | 612.22 | 1302 | 613.78 | 1.56 | 4302 | 615.91 | 2.12 |
| 303 | 611.86 | 1303 | 613.45 | 1.59 | 4303 | 615.52 | 2.07 |
| 304 | 612.00 | 1304 | 613.60 | 1.60 | 4304 | 615.63 | 2.03 |
| 305 | 611.65 | 1305 | 613.25 | 1.60 | 4305 | 615.25 | 2.00 |
| 306 | 611.23 | 1306 | 612.82 | 1.58 | 4306 | 614.89 | 2.07 |
| 307 | 610.41 | 1307 | 612.03 | 1.62 | 4307 | 614.15 | 2.12 |
| 308 | 609.81 | 1308 | 611.40 | 1.59 | 4308 | 613.48 | 2.08 |
| 309 | 609.12 | 1309 | 610.71 | 1.59 | 4309 | 612.76 | 2.05 |
| 310 | 608.47 | 1310 | 610.05 | 1.58 | 4310 | 612.07 | 2.01 |
| 311 | 607.72 | 1311 | 609.30 | 1.58 | 4311 | 611.32 | 2.01 |
| 312 | 607.03 | 1312 | 608.62 | 1.59 | 4312 | 610.62 | 2.01 |
| 313 | 606.43 | 1313 | 608.11 | 1.68 | 4313 | 0.00 | NULL |
| 314 | 606.29 | 1314 | 607.82 | 1.53 | 4314 | 0.00 | NULL |
| 315 | 604.83 | 1315 | 606.57 | 1.74 | 4315 | 0.00 | NULL |
| 316 | 603.77 | 1316 | 605.63 | 1.86 | 4316 | 0.00 | NULL |
| 317 | 605.25 | 1317 | 606.84 | 1.59 | 4317 | 0.00 | NULL |
| 318 | 605.37 | 1318 | 606.97 | 1.60 | 4318 | 0.00 | NULL |
| 319 | 605.97 | 1319 | 607.55 | 1.59 | 4319 | 609.59 | 2.04 |
| 320 | 606.65 | 1320 | 608.24 | 1.58 | 4320 | 610.32 | 2.09 |
| 321 | 607.40 | 1321 | 609.01 | 1.61 | 4321 | 611.09 | 2.07 |
| 322 | 608.06 | 1322 | 609.64 | 1.58 | 4322 | 611.64 | 2.00 |
| 323 | 608.68 | 1323 | 610.25 | 1.57 | 4323 | 612.35 | 2.10 |
| 324 | 609.37 | 1324 | 610.95 | 1.58 | 4324 | 613.07 | 2.12 |
| 325 | 610.17 | 1325 | 611.79 | 1.63 | 4325 | 613.83 | 2.04 |
| 326 | 610.80 | 1326 | 612.41 | 1.60 | 4326 | 614.49 | 2.08 |
| 327 | 611.32 | 1327 | 612.91 | 1.59 | 4327 | 615.00 | 2.09 |
| 328 | 610.41 | 1328 | 612.00 | 1.59 | 4328 | 614.01 | 2.01 |
| 329 | 609.84 | 1329 | 611.42 | 1.58 | 4329 | 613.44 | 2.02 |
| 330 | 609.03 | 1330 | 610.62 | 1.58 | 4330 | 612.63 | 2.01 |
| 331 | 608.30 | 1331 | 609.90 | 1.59 | 4331 | 611.97 | 2.07 |
| 332 | 607.64 | 1332 | 609.19 | 1.54 | 4332 | 611.19 | 2.01 |
| 333 | 606.96 | 1333 | 608.56 | 1.60 | 4333 | 610.59 | 2.03 |
| 334 | 606.27 | 1334 | 607.88 | 1.61 | 4334 | 609.91 | 2.03 |
| 335 | 605.58 | 1335 | 607.17 | 1.59 | 4335 | 609.19 | 2.01 |
| 336 | 604.96 | 1336 | 606.55 | 1.59 | 4336 | 608.57 | 2.02 |
| 337 | 604.22 | 1337 | 605.86 | 1.64 | 4337 | 0.00 | NULL |
| 338 | 604.22 | 1338 | 605.78 | 1.56 | 4338 | 0.00 | NULL |
| 339 | 602.64 | 1339 | 604.69 | 2.05 | 4339 | 0.00 | NULL |
| 340 | 601.56 | 1340 | 603.60 | 2.04 | 4340 | 0.00 | NULL |
| 341 | 603.18 | 1341 | 604.70 | 1.52 | 4341 | 0.00 | NULL |
| 342 | 603.20 | 1342 | 604.82 | 1.62 | 4342 | 0.00 | NULL |
| 343 | 603.97 | 1343 | 605.54 | 1.57 | 4343 | 607.65 | 2.11 |
| 344 | 604.56 | 1344 | 606.14 | 1.58 | 4344 | 608.20 | 2.06 |
| 345 | 605.23 | 1345 | 606.81 | 1.58 | 4345 | 608.93 | 2.12 |
| 346 | 605.92 | 1346 | 607.53 | 1.61 | 4346 | 609.68 | 2.16 |
| 347 | 606.64 | 1347 | 608.23 | 1.60 | 4347 | 610.34 | 2.11 |
| 348 | 607.26 | 1348 | 608.85 | 1.60 | 4348 | 610.91 | 2.06 |
| 349 | 608.09 | 1349 | 609.68 | 1.59 | 4349 | 611.70 | 2.02 |
| 350 | 608.68 | 1350 | 610.25 | 1.56 | 4350 | 612.33 | 2.08 |
| 351 | 609.37 | 1351 | 610.98 | 1.61 | 4351 | 613.02 | 2.05 |
| 352 | 610.09 | 1352 | 611.68 | 1.59 | 4352 | 613.70 | 2.01 |
| 353 | 609.02 | 1353 | 610.61 | 1.59 | 4353 | 612.62 | 2.01 |
| 354 | 608.27 | 1354 | 609.86 | 1.59 | 4354 | 611.86 | 2.00 |
| 355 | 607.70 | 1355 | 609.28 | 1.57 | 4355 | 611.30 | 2.02 |
| 356 | 606.90 | 1356 | 608.48 | 1.58 | 4356 | 610.55 | 2.07 |
| 357 | 606.19 | 1357 | 607.79 | 1.60 | 4357 | 609.82 | 2.02 |
| 358 | 605.52 | 1358 | 607.13 | 1.61 | 4358 | 609.16 | 2.04 |
| 359 | 604.89 | 1359 | 606.48 | 1.59 | 4359 | 608.52 | 2.04 |
| 360 | 604.22 | 1360 | 605.80 | 1.58 | 4360 | 607.84 | 2.04 |
| 361 | 603.69 | 1361 | 605.25 | 1.57 | 4361 | 607.34 | 2.09 |
| 362 | 602.89 | 1362 | 604.49 | 1.59 | 4362 | 606.57 | 2.09 |
| 363 | 602.20 | 1363 | 603.81 | 1.60 | 4363 | 0.00 | NULL |
| 364 | 602.12 | 1364 | 603.69 | 1.57 | 4364 | 0.00 | NULL |
| 365 | 600.50 | 1365 | 602.27 | 1.77 | 4365 | 0.00 | NULL |
| 366 | 599.22 | 1366 | 601.05 | 1.83 | 4366 | 0.00 | NULL |
| 367 | 601.08 | 1367 | 602.68 | 1.60 | 4367 | 0.00 | NULL |
| 368 | 601.23 | 1368 | 602.84 | 1.62 | 4368 | 0.00 | NULL |
| 369 | 601.88 | 1369 | 603.47 | 1.59 | 4369 | 605.53 | 2.06 |
| 370 | 602.48 | 1370 | 604.07 | 1.59 | 4370 | 606.29 | 2.22 |
| 371 | 603.22 | 1371 | 604.80 | 1.58 | 4371 | 606.92 | 2.12 |
| 372 | 603.84 | 1372 | 605.45 | 1.60 | 4372 | 607.56 | 2.11 |
| 373 | 604.59 | 1373 | 606.20 | 1.61 | 4373 | 608.21 | 2.02 |
| 374 | 605.17 | 1374 | 606.75 | 1.59 | 4374 | 608.86 | 2.11 |
| 375 | 605.86 | 1375 | 607.44 | 1.59 | 4375 | 609.44 | 2.00 |

| PT # | EL | PT # | EL | Difference | PT# | EL | Difference |
|---|---|---|---|---|---|---|---|
| 376 | 606.56 | 1376 | 608.16 | 1.60 | 4376 | 610.24 | 2.08 |
| 377 | 607.27 | 1377 | 608.86 | 1.59 | 4377 | 610.89 | 2.03 |
| 378 | 607.98 | 1378 | 609.56 | 1.57 | 4378 | 611.69 | 2.14 |
| 379 | 606.90 | 1379 | 608.48 | 1.58 | 4379 | 610.58 | 2.10 |
| 380 | 606.28 | 1380 | 607.83 | 1.54 | 4380 | 609.93 | 2.10 |
| 381 | 605.50 | 1381 | 607.05 | 1.55 | 4381 | 609.13 | 2.08 |
| 382 | 604.81 | 1382 | 606.40 | 1.59 | 4382 | 608.48 | 2.08 |
| 383 | 604.14 | 1383 | 605.71 | 1.57 | 4383 | 607.85 | 2.13 |
| 384 | 603.47 | 1384 | 605.02 | 1.55 | 4384 | 607.08 | 2.06 |
| 385 | 602.78 | 1385 | 604.37 | 1.59 | 4385 | 606.48 | 2.11 |
| 386 | 602.10 | 1386 | 603.68 | 1.58 | 4386 | 605.79 | 2.11 |
| 387 | 601.53 | 1387 | 603.12 | 1.60 | 4387 | 605.19 | 2.06 |
| 388 | 600.76 | 1388 | 602.33 | 1.57 | 4388 | 604.51 | 2.18 |
| 389 | 600.08 | 1389 | 601.69 | 1.61 | 4389 | 0.00 | NULL |
| 390 | 600.03 | 1390 | 601.56 | 1.53 | 4390 | 0.00 | NULL |
| 391 | 597.96 | 1391 | 599.71 | 1.75 | 4391 | 0.00 | NULL |
| 392 | 596.66 | 1392 | 598.48 | 1.82 | 4392 | 0.00 | NULL |
| 393 | 598.97 | 1393 | 600.55 | 1.58 | 4393 | 0.00 | NULL |
| 394 | 599.09 | 1394 | 600.71 | 1.63 | 4394 | 0.00 | NULL |
| 395 | 599.86 | 1395 | 601.44 | 1.58 | 4395 | 603.44 | 2.00 |
| 396 | 600.42 | 1396 | 602.01 | 1.58 | 4396 | 604.20 | 2.19 |
| 397 | 601.21 | 1397 | 602.80 | 1.58 | 4397 | 604.86 | 2.06 |
| 398 | 601.88 | 1398 | 603.46 | 1.58 | 4398 | 605.47 | 2.01 |
| 399 | 602.52 | 1399 | 604.11 | 1.59 | 4399 | 606.17 | 2.06 |
| 400 | 603.15 | 1400 | 604.74 | 1.59 | 4400 | 606.75 | 2.01 |
| 401 | 603.72 | 1401 | 605.33 | 1.61 | 4401 | 607.35 | 2.02 |
| 402 | 604.43 | 1402 | 606.03 | 1.60 | 4402 | 608.09 | 2.06 |
| 403 | 605.24 | 1403 | 606.85 | 1.61 | 4403 | 608.89 | 2.04 |
| 404 | 606.15 | 1404 | 607.76 | 1.61 | 4404 | 609.80 | 2.04 |
| 405 | 608.18 | 1405 | 609.77 | 1.58 | 4405 | 611.92 | 2.16 |
| 406 | 598.74 | 1406 | 600.34 | 1.61 | 4406 | 602.43 | 2.09 |
| 407 | 598.02 | 1407 | 599.60 | 1.58 | 4407 | 0.00 | NULL |
| 408 | 597.73 | 1408 | 599.27 | 1.54 | 4408 | 0.00 | NULL |
| 409 | 596.50 | 1409 | 598.00 | 1.50 | 4409 | 0.00 | NULL |
| 411 | 609.03 | 1411 | 610.60 | 1.57 | 4411 | 612.79 | 2.19 |
| 412 | 609.95 | 1412 | 611.52 | 1.57 | 4412 | 613.67 | 2.15 |
| 413 | 610.75 | 1413 | 612.35 | 1.60 | 4413 | 614.44 | 2.09 |
| 414 | 610.02 | 1414 | 611.59 | 1.57 | 4414 | 613.67 | 2.08 |
| 415 | 611.00 | 1415 | 612.59 | 1.59 | 4415 | 0.00 | NULL |
| 416 | 610.57 | 1416 | 612.24 | 1.67 | 4416 | 0.00 | NULL |
| 417 | 607.85 | 1417 | 609.41 | 1.56 | 4417 | 0.00 | NULL |
| 418 | 608.89 | 1418 | 610.40 | 1.51 | 4418 | 0.00 | NULL |
| 419 | 610.53 | 1419 | 612.15 | 1.62 | 4419 | 0.00 | NULL |
| 420 | 611.58 | 1420 | 613.19 | 1.61 | 4420 | 0.00 | NULL |
| 421 | 611.01 | 1421 | 612.53 | 1.52 | 4421 | 614.57 | 2.04 |

Grid line
Working Surface (typical) xxx.xx | xxx.xx Sub grade (typical)
xxx.xx Clay Grade (typical)

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL L-1290 F. DONALD LAWRENCE
4-30-07

GRAPHIC SCALE
40 0 20 40 80 160
( IN FEET )
1 inch = 40 ft.

Figure #1

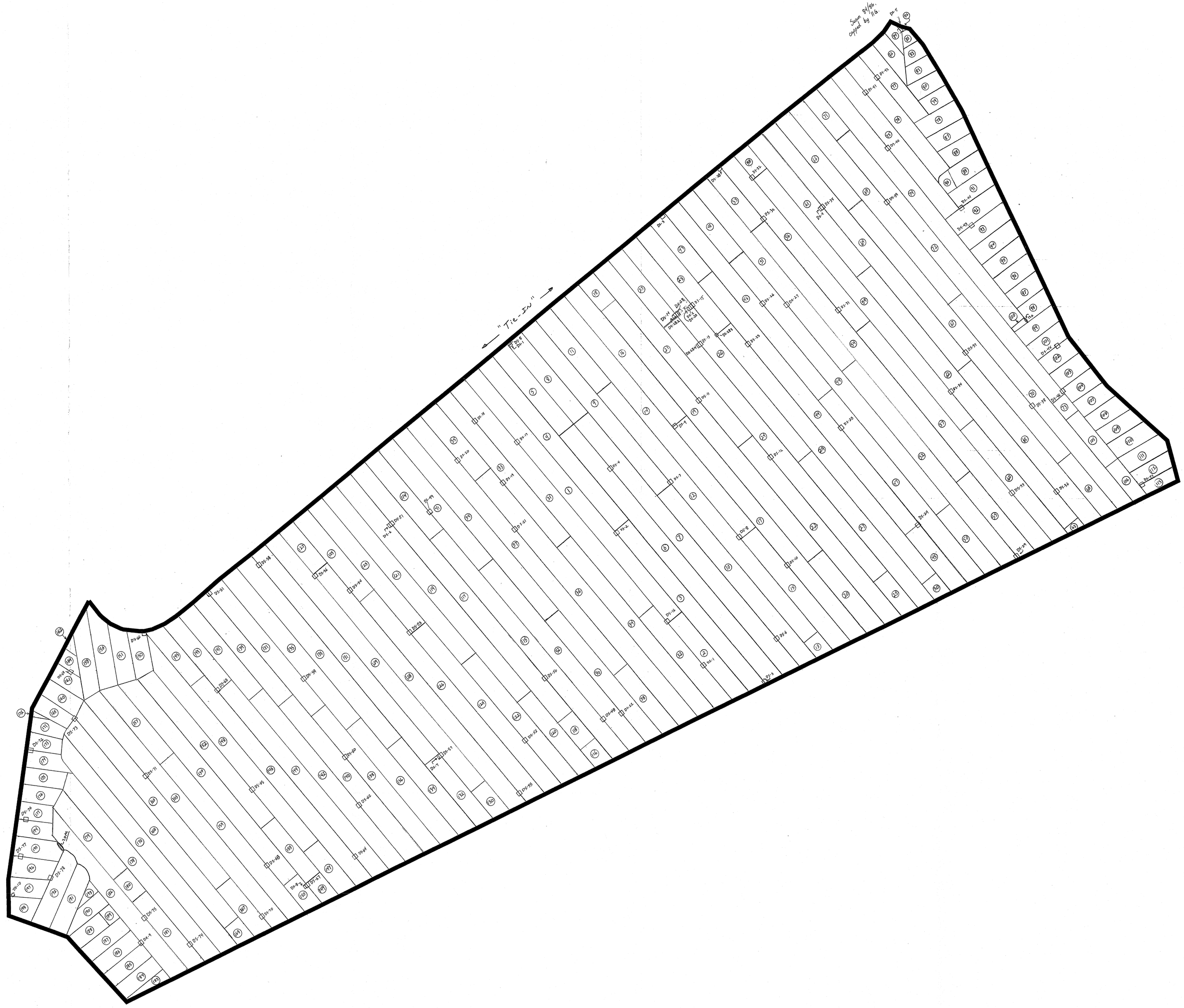
FDL& assoc

Grade Verification Survey of
**CMS Cell 2-F**
Cabarrus County Concord N.C.
Orig. scale 1"=40' Date: 4-30-2007
Surveyed by: F. Donald Lawrence & Associates, P.A.
114 E. Jefferson St. P.O. Box 1014
Monroe, North Carolina 28111 (704) 289-1013

Job No.0135 Drawing file verified_final.dwg

REVISIONS
MCM

Drawing no.
07/75




N

SCALE: 1"=50' (IN FEET)

50 0 25 50 100 200


ATLANTIC COAST CONSULTING, INC.
630 Colonial Park Drive
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Roswell, GA 30075
o 770.594.5998
f 770.594.5967
www.atlcc.net


PROJECT:

CHARLOTTE MOTOR SPEEDWAY LANDFILL PHASE V

Cell 2F Construction Documents

ALLIED WASTE

5105 Morehead Road
Concord, NC 28027

REVISIONS

Drawn by: TJS

Checked by: ESG

PROJECT NUMBER:

I001-113

March 2007

Figure #2

60-Mil HDPE Geomembrane Panel Layout Sketch

SHEET OF

I002-113-1Liner.dwg