SMITH+GARDNER
ENGINEERS

ADDRESS 14 N. Boylan Avenue, Raleigh NC 27603
TEL 919.828.0577
WEB www.smithgardnerinc.com

Scanned By	Date	DOC ID	Permit
Backus	08/23/2016	26538	9231-CDLF-2012

July 5, 2016

Ms. Patricia Backus, P.E.
Environmental Engineer
NCDENR Division of Waste Management
217 W. Jones Street
Raleigh, North Carolina

RE: Construction Quality Assurance Report
Brownfield Road C&D Landfill (Phase 2A – Stage 2 Construction)
Solid Waste Permit No. 92-31
Raleigh, North Carolina

Dear Ms. Backus:

On behalf of Wake Reclamation, LLC, Smith Gardner, Inc. (S+G) would like to submit for your review the (2) **enclosed** Construction Quality Assurance (CQA) Reports (one (1) hard copy and one (1) electronic) for the Phase 2A – Stage 2 Construction at the Brownfield Road C&D Landfill. An updated capacity study for the site to reflect airspace lost due to rock during construction has been submitted with the Phase 2B Permit to Construct Application[1].

Closure Event No. 1 took place simultaneously with Phase 2A –Stage 2 construction. A separate certification report for Closure Event No. 1 will be submitted within the month and the **attached** financial assurance has been updated to represent both construction and closure activities.

Should you have any questions or require clarification, please contact us at (919) 828-0577 or by email below.

Sincerely,
SMITH GARDNER, INC.

DocuSigned by:
Carter T. Shore
B1406A9917CA4B6...

DocuSigned by:
Stacey A. Smith
27B482DF1A09438...
7/5/2016

NORTH CAROLINA PROFESSIONAL SEAL 023002 ENGINEER STACEY A. SMITH

Carter T. Shore, E.I.
Staff Engineer, ext. 142
carter@smithgardnerinc.com

Stacey A. Smith, P.E.
Project Manager, ext. 127
stacey@smithgardnerinc.com

cts/sas

Attachments: Financial Assurance – Brownfield Road CDLF

Cc: Donald Plessinger, Waste Industries USA, Inc.
David Pepper, Waste Industries USA, Inc.
Jim Poole, Insure-NC

[1] Brownfield Road C&D Landfill – Phase 2B Permit to Construct Application by S+G dated October 2015.

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SMITH+GARDNER

DATE: 27-Jun-16
BY: CTS

Brownfield Road C&D Landfill (NC Solid Waste Permit No. 92-31)
Engineer's Closure Construction Cost Estimate

Item No.	Item Description	Unit	Contractor Quantity	Contractor Unit Price	Contractor Total Price	Comments
	Closure Area (Horizontal Plan) ---->	**AC**	**30.2**			
1.0	**Pre-Construction**			**Subtotal**	**$45,200.00**	
1.1	Construction Documents & Bidding	AC	30	$15k + $1k/AC	$45,200.00	S+G Estimate
2.0	**Construction**				**$1,980,516.00**	Reference 1
2.1	Surveys and Layout	AC	30	$250.00	$7,550.00	S+G Historical Estimate
2.2	Mobilization	AC	30	$1,100.00	$33,220.00	Based on 2016 Closure Event No. 1 Costs
2.3	Site Preparation (repairs to intermediate cover layer)	AC	30	$2,100.00	$63,420.00	Based on 2016 Closure Event No. 1 Costs
2.4	18" On-site Low Permeability Soil	CY	73,084	$8.00	$584,672.00	S+G Historical Estimate
2.5	18" Vegetative Support Layer	CY	73,084	$3.50	$255,794.00	S+G Historical Estimate
2.6	Landfill Gas Venting System	AC	30	$3,000.00	$90,600.00	Based on 2016 Closure Event No. 1 Costs
2.7	Cap Drainage Structures (berms, piping, etc.)	AC	30	$27,000.00	$815,400.00	Based on 2016 Closure Event No. 1 Costs
2.8	Erosion & Sediment Control (grading, silt fence, maintenance, etc.)	AC	30	$1,800.00	$54,360.00	S+G Historical Estimate
2.9	Revegetation	AC	30	$2,500.00	$75,500.00	S+G Historical Estimate
3.0	**Quality Assurance, Certification, & Deed Notation**				**$181,670.00**	
3.1	Field Monitoring	AC	30	$3,000.00	$90,600.00	S+G Estimate
3.2	Laboratory Testing	AC	30	$2,500.00	$75,500.00	S+G Estimate
3.3	Engineering Certification	AC	30	$5k + $250/AC	$12,550.00	S+G Estimate
3.4	Surveying and Deed Notation	AC	30	$100.00	$3,020.00	S+G Historical Estimate
4.0	**Miscellaneous Costs to Close**				**$37,750.00**	
4.1	Erosion and Stormwater Control (outside landfill footprint)	AC	30	$1,000.00	$30,200.00	S+G Historical Estimate
4.2	Engineering and Reporting	AC	30	$250.00	$7,550.00	S+G Historical Estimate
5.0	**Total Closure Costs**					
	Construction Estimate ----->				**$2,245,136**	(2016$)
	Cost per Acre ----->				***$74,342***	
	Total Estimate ----->				**$2,245,136**	(2016$) (See Notes 1 & 2)

Notes:

1. All costs are presented in current dollars and should be increased at an inflation rate prescribed by the NCDENR Division of Waste Management per http://portal.ncdenr.org/web/wm/sw/financialassurance if additional review is not performed annually.
2. This ESTIMATE has been prepared for financial assurance purposes only and shall not be considered a replacement for an actual bid from a licensed contractor and is considered acceptable within a +/- 10% of the Total Estimate value.

References:

1. Wake Reclamatinon, LLC., Brownfield Road C&D Landfill, Phase 2B Permit to Construction, October 2015, prepared by Smith Gardner, Inc.

Denotes values calculated in spreadsheet.

NOTE: Estimate for purpose of permitting only. Actual estimate will be based on actual constructed area.

SMITH+GARDNER

DATE: 27-Jun-16
BY: CTS

Brownfield Road C&D Landfill (NC Solid Waste Permit No. 92-31)
Engineer's Post Closure Cost Estimate

Item	Quantity	Unit	Comments
Groundwater Monitoring			
Monitoring wells	9	wells	Reference 1
Surface water point	3	points	Reference 1
Sampling frequency	2	events	Reference 1
Field sampling, collection, and shipping	$800	per event	S+G estimate
Laboratory Analysis	$350	per well	S+G estimate
Data review, statistics, and reporting	$2,000	per event	S+G estimate
Maintenance and repair	$100	per well	S+G estimate
Subtotal Cost	**$14,900**	**per year**	Compares to current pricing by Golder
Landfill Gas Management			
Control System Vents	37	vents	Pro-rated @ one (1) per one (1) acre
Sub-Surface Perimeter Monitoring Probes	10	probes	Per Ref. 1
Control system monitoring, maintenance and repair	$100	per vent per year	S+G estimate
Semi-Annual Perimeter Monitoring	$150	per probe per year	S+G estimate
Subtotal Cost	**$5,200**	**per year**	Averaged over post-closure period
Final Cover Management			
Area of maintenance	36.7	acres	Extends to area immediately around landfill.
Mowing	$200	per acre	S+G estimate
Erosion and sediment control maintenance	$200	per acre	S+G estimate
Topdressing (seed & fertilizer)	$150	per acre	S+G estimate
Vector and rodent control	$10	per acre	S+G estimate
Maintenance Mobilization	$2,000	per year	S+G estimate
Subtotal Cost	**$22,552**	**per year**	
Administration, Inspections, and Reporting			
Administration and record keeping	$1,000	per year	S+G estimate
Inspection	$1,000	per year	S+G estimate
Miscellaneous engineering	$1,500	per year	S+G estimate
Subtotal Cost	**$3,500**	**per year**	
Subtotal Post-Closure Costs			
Estimated Average Annual Costs	$46,152	per year (2016$)	
Number of Years for Post-Closure	30	years	
Cost per Acre	$1,257.55	per year	
Subtotal Post Closure Costs	**$1,384,560**	(2016$) (See Notes 1 & 2)	
Potential Assessment and Corrective (Remedial) Action			
Minimum amount required by NCDENR Division of Waste Management	$1,000,000	lump sum	Regulatory requirement (G.S. 130A-295.2 (h1))
Subtotal Remedial Cost	**$1,000,000**	**lump sum**	
Total Post Closure and Remedial Costs	**$2,384,560**	(2016$) (See Notes 1 & 2)	
Total Closure, Post Closure, and Remedial Costs	**$4,629,696**	(2016$) (See Notes 1 & 2)	

Notes:

1. All costs are presented in current dollars and should be increased at an inflation rate prescribed by the NCDENR Division of Waste Management per http://portal.ncdenr.org/web/wm/sw/financialassurance if additional review is not performed annually.
2. This ESTIMATE has been prepared for financial assurance purposes only and shall not be considered a replacement for an actual bid from a licensed contractor and is considered acceptable within a +/- 10% of the Total Estimate value.

NOTE: Estimate for purpose of permitting only. Actual estimate will be based on actual constructed area.

References:

1. Wake Reclamatinon, LLC., Brownfield Road C&D Landfill, Phase 2B Permit to Construction, October 2015, prepared by Smith Gardner, Inc.

Denotes values calculated in spreadsheet.

Construction Quality Assurance Report

Brownfield Road C&D Landfill - Phase 2A Stage 2
Raleigh, North Carolina

Prepared for:

Wake Reclamation, LLC
(A Subsidiary of Waste Industries USA, Inc.)
Raleigh, North Carolina

APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
Date 08/18/2016 **By** Patricia M. Beeker
DIN 26538
Attachment 1 **Part** III **Document** 18
Permit 9231-CDLF-2012 **Permit DIN** 26176

June 2016

Prepared by:

NC LIC. NO. C-0828 (ENGINEERING)
SMITH+GARDNER
14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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Construction Quality Assurance Report

Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

Prepared For:

Wake Reclamation, LLC
(A Subsidiary of Waste Industries USA, Inc.)
Raleigh, North Carolina

S+G Project No. BROWNFIELD-16-1

DocuSigned by:
Carter T. Shore
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Carter T. Shore, E.I.
Staff Engineer

DocuSigned by:
Stacey A. Smith
7/5/2016 | 2D482DF1A09438...

Stacey A. Smith, P.E.
Senior Engineer

NORTH CAROLINA PROFESSIONAL SEAL 023002 ENGINEER STACEY A. SMITH

June 2016

NC LIC. NO. C-0828 (ENGINEERING)
SMITH+GARDNER
14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

Construction Quality Assurance Report

Table of Contents

Table of Contents (Cont.)

1.0 OVERVIEW

This Construction Quality Assurance (CQA) Report has been prepared to document the CQA activities performed during the construction of Phase 2A Stage 2 of the Brownfield Road Construction and Demolition (C&D) Landfill. The landfill facility is located on Brownfield Road in Raleigh, North Carolina and is owned and operated by Wake Reclamation, LLC under North Carolina Solid Waste Permit No. 92-31. A Permit to Construct for Phase 2A (including Phase 2A Stage 2) was issued by the North Carolina Department of Environment and Natural Resources Division of Waste Management (NCDENR-DWM) on March 20, 2012.

2.0 PROJECT DESCRIPTION

2.1 General

Phase 2A Stage 2 is a 7.5 acre C&D landfill unit. The construction documents were prepared by Smith Gardner, Inc. (S+G). The subgrade was constructed using soils obtained from on-site sources located within the limits of the facility. In addition to the subgrade, the Phase 2A Stage 2 design also includes associated perimeter berms and erosion and sedimentation control (E&SC) measures.

2.2 Reference Documents

Phase 2A Stage 2 was constructed in accordance with the following documents :

Permit To Construct - Brownfield Road C&D Landfill - Phase 2A Stage 2: Permit to Construct issued by NCDENR-DWM on March 20, 2012 (copy provided in **Appendix A**)).

Erosion and Sedimentation Control Plan for Brownfield Road C&D Landfill - Phase 2A Stage 2 Construction & Closure Event No. 1, submitted by Smith Gardner, Inc., January 2016, to update previous permits, as follows:

- Permit S#2148-A3 submitted by Smith Gardner, Inc., January 2016. Approved by Wake County Environmental Services Sedimentation & Erosion Control on February 3, 2016

2.3 Project Participants

The following parties were involved in the construction and CQA of Phase 2A Cell 2:

2.3.1 Owner

Wake Reclamation, LLC
2600 Brownfield Road
Raleigh, NC27610
Phone: (336) 883-3215

Contact: Donald Plessinger, Landfill Manager

2.3.2 Engineer/CQA Engineer

Smith Gardner, Inc. (S+G)
14 N. Boylan Ave.
Raleigh, NC 27603
Phone: (919) 828-0577
Fax: (919) 828-3899

Contacts: Stacey A. Smith, P.E., Senior Engineer
Carter T. Shore, E.I., Staff Engineer

2.3.3 CQA Testing - Earthwork & Construction Monitoring

Geotechnics (Soil Testing)
2200 Westinghouse Blvd., Suite 103
Raleigh, NC 27604
Phone: (919) 876-0405
Fax: (919) 876-0460

Contacts: Michael Smith, Regional Manager
Aaron Smith, Field Technician

2.3.4 Contractor

Baxter Johnson Contracting (BJC)
PO Box 33343
Raleigh, NC 27636
Phone: (919) 851-2617

Contacts: Brady Johnson, President

Brad Murray, Site Superintendent

2.3.5 Owner's Surveyor

Surveying Solutions, PC
PO Box 376
Louisburg, NC 27549
Phone: (919) 340-2250

Contact: Dwayne Kroeze, PLS

3.0 SUMMARY OF CONSTRUCTION ACTIVITIES

Major elements of the project are discussed below. Photos documenting the construction of Phase 2A Cell 2 can be found in **Appendix C**. Prior to BJC beginning work, a project Pre-Construction Meeting was held on January 19, 2016.

3.1 Well Abandonment

A total of ten wells were abandoned[1] in relation to the construction of Phase 2A – Stage 2. Four wells (G-4, G-18, G-19, and G-22) were located within the cell footprint. One well (G-15) was located in the future Phase 2B area but had be irreparably damaged and was therefore abandoned. Five wells (P-15, P-16, UD-2, UD-5, and Test Well 40) within the southern stockpile and sediment basin footprint were abandoned.

3.2 Site Preparation

Construction of Phase 2A Stage 2 began on January 26, 2016 with the surveying/staking of the limits of construction and the initiation of site preparation activities by BJC.

3.3 Erosion and Sedimentation Control Measures

The construction of erosion and sedimentation control measures took place in conjunction with project activities and under the site permits issued by Wake County Erosion and Sedimentation Control Services (**Appendix A**). Permanent and temporary drainage channels were added as areas were brought to grade. Once areas reached final grade, the areas were matted and vegetated in accordance with project requirements.

[1] Phase 2A – Stage 2 Well Abandonment reports by S+G submitted to NCDEQ dated February 29, 2016 and May 2, 2016

3.4 Excavation, Embankment, and Rock Removal

The work area was cleared and grubbed. Afterwards, excavation and stockpiling activities were performed. Excavated materials including stripped topsoil and structural fill were identified and separated. Topsoil was taken to the stockpile area for later use by BJC on the closure area or future use as daily/intermediate cover by the Landfill. The soils within the Phase 2A Stage 2 footprint identified for use as structural fill were excavated and placed and compacted where needed.

Per the Wake County approved erosion and sedimentation control design, the sediment basin in the stockpile area to the south of Phase 2A Cell 2 was constructed before excavation of Phase 2A – Stage 2 commenced. Construction of the eastern berm of Phase 2A – Stage 2 was completed in conjunction with cell excavation. The drainage channels were built as construction on their respective areas progressed. The access road for Phase 2A Stage 2 was constructed in conjunction with berm and excavation activities.

Upon completion of construction, Mr. Kroeze performed the record survey, and Madeline German, P.G. from S+G conducted a post-construction subgrade inspection. As documented in Ms. German's report (Appendix C) no adverse conditions were observed.

3.5 Prepared Subgrade

The upper two feet of subgrade consists of soil types ML and CL, meeting the requirements set forth in 15A NCAC 13B .0540(2)(b). Subgrade was inspected visually as construction took place.

4.0 CQA PROGRAM

4.1 Scope of Services

In satisfying the requirements of the Project CQA Manual for Phase 2A Stage 2, the following activities were performed:

- Observation and documentation of construction of prepared subgrade and structural fill.
- Field and/or laboratory testing of embankment material.
- Review of submittals from the Contractor for conformance with project specifications and CQA requirements.
- Review/preparation of record drawings.
- Preparation of the final CQA report.

5.0 EARTHWORK CQA

The criteria for construction of embankment per the project specifications included the following:

Materials:	SP, SW, SM, SC, ML, or CL (ASTM D 2488) with no topsoil or other deleterious material and no stones or rocks in excess of one half the lift thickness as compacted;
Density:	100% for Embankment beneath structures and roads; 95% for embankment, backfill around structures, and backfill in pipe trenches (ASTM D 698);
Moisture Content:	As necessary for compaction; and
Lift Thickness:	8-inch max. (compacted).

The number and results of material control and record tests performed on the structural fill are summarized in Table 1. Other tests performed on an on-going basis during construction included visual classification of soils (ASTM D 2488) and monitoring of loose lift thickness. Note that the number of tests required was based on an approximate quantity of 17,500 CY of embankment material placed (in-place measure). The results of field and laboratory testing of structural fill can be found in Appendix D.

6.0 MODIFICATIONS

During construction, it is typically necessary to make modifications to the design and construction documents to accommodate field conditions and/or to improve constructability based on practical considerations.

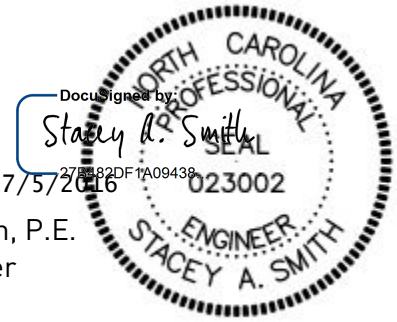
As anticipated, areas with rippable rock were encountered. These areas were able to be excavated. However, unrippable rock was encountered in two locations on the southern slope of the cell. After two weeks of using a hydraulic hammer the majority of the rock was removed. A field order (Appendix G) was issued for rock that remained in place to be covered with soil to maintain the regulatory separation of four (4) feet between rock with the upper two (2) feet of separation being the prepared subgrade to satisfy the requirements of 15A NCAC 13B .0540(2)(b). Based upon the as-built survey data, total airspace lost is 26,128 CY.

7.0 PROJECT CERTIFICATION

7.1 Engineer's Certification

Based on the observations and results of the CQA program documented herein, it is our professional opinion that the construction of Phase 2A Stage 2 of the Brownfield Road C&D Landfill was completed in accordance with the following:

i. The Project CQA Manual;
ii. The conditions of the Permit to Construct Phase 2A Stage 2; and
iii. Acceptable engineering practices.

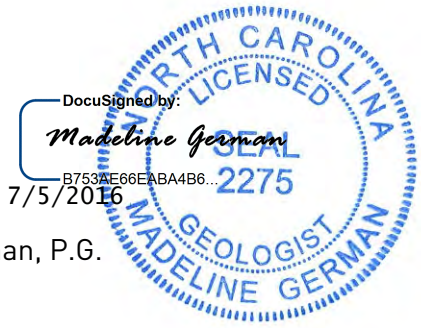


7/5/2016

Stacey A. Smith, P.E.
Senior Engineer

7.2 Geologist's Certification

Based on my inspection of the completed Phase 2 - Stage 2A Subgrade at the Brownfield Road C&D Landfill Facility, I certify no unusual geologic conditions were encountered. Rock type at the facility is primarily granite or weathered granite. Rock encountered during construction was either excavated or covered with four (4) feet of soil to comply with 15A NCAC 13B .0540.



7/5/2016

Madeline M. German, P.G.
Hydrogeologist

SMITH GARDNER, INC.

TABLE 1
SUMMARY OF MATERIAL CONTROL AND RECORD TESTS
STRUCTURAL FILL

	Property		
	Control Tests	Record Tests	
	Moisture-Density Relationship (Proctor)	In-Place Density	In-Place Moisture Content
Units	-----	% Std. Proctor	%
Test Method	ASTM D 698	ASTM D 6938[1]	ASTM D 6938[2]
Required Test Frequency	5,000 CY per each soil	20,000 ft^2 per lift & 1 per 500 LF of Berms (<200 ft. base width) (+/- 1 Per 500 CY)	20,000 ft^2 per lift & 1 per 500 LF of Berms (<200 ft. base width) (+/- 1 Per 500 CY)
No. of Tests Required	4	35	35
No. of Tests Performed	8	39	39
Specified Value	-----	≥ 95% Std. Proctor	As Required for Density
Minimum Value	-----	95.0	% Opt.
Maximum Value	-----	103.4	% Opt.
Average Value	-----	98.1	% Opt.
Quantity of Structural Fill (In-Place):		17,500 CY	

Notes:

1. Nuclear density values verified periodically by sand cone (ASTM D 1556), rubber balloon (ASTM D 2167), and/or drive cylinder (ASTM D 2937) test methods.

2. Nuclear moisture values verified periodically by oven (ASTM D 2216), microwave oven (ASTM D 4643), and/or direct heating (ASTM D 4959) test methods.

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Figures

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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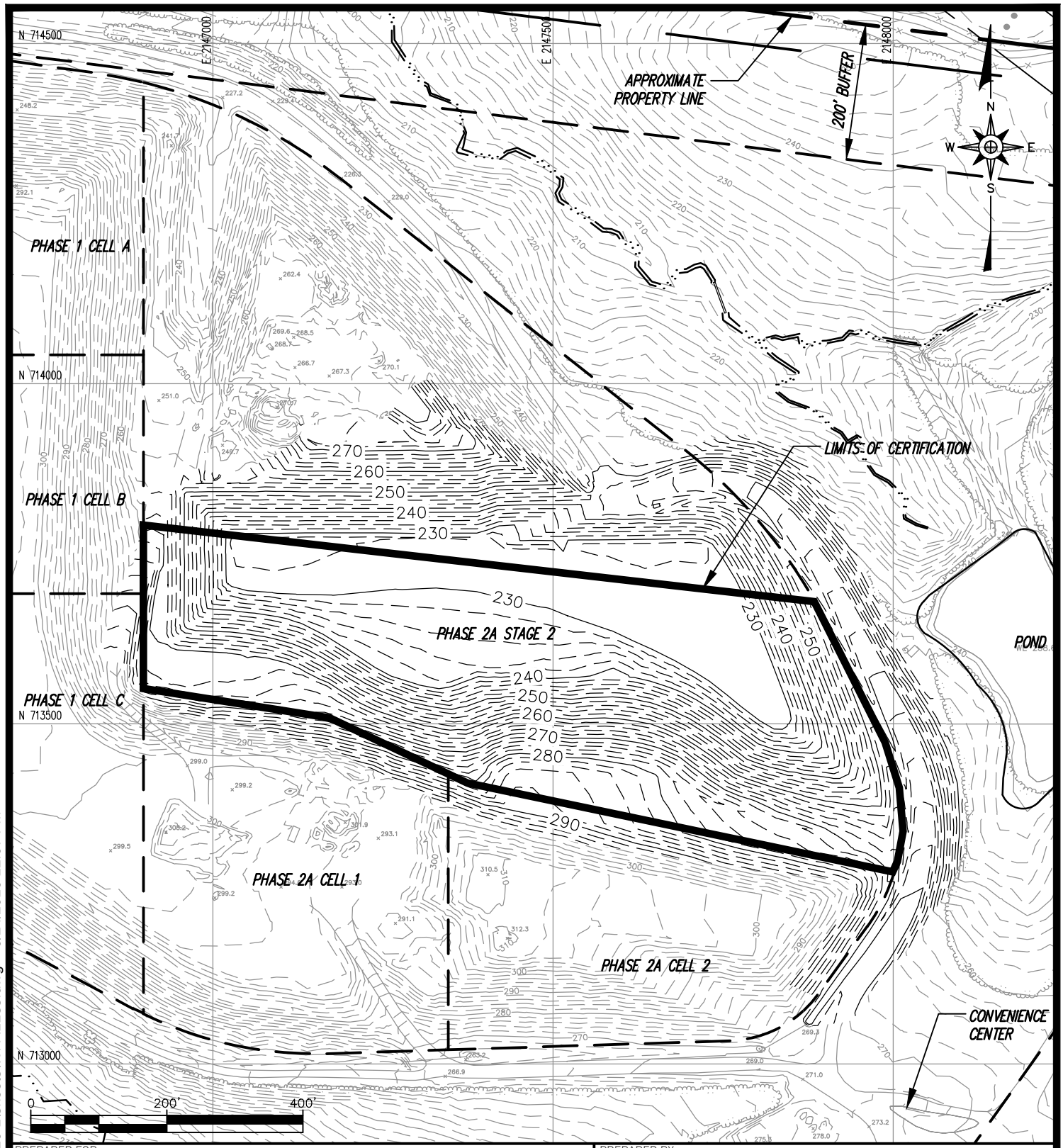

PREPARED FOR:

WAKE RECLAMATION, LLC
BROWNFIELD ROAD C&D LANDFILL
PHASE 2A STAGE 2
LIMITS OF CERTIFICATION

PREPARED BY:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT NO.:	FIGURE NO.:	FILE NAME:
T.R.S.		AS SHOWN	Jun 2016	BROWNFIELD 14-1	1	WI-A1183

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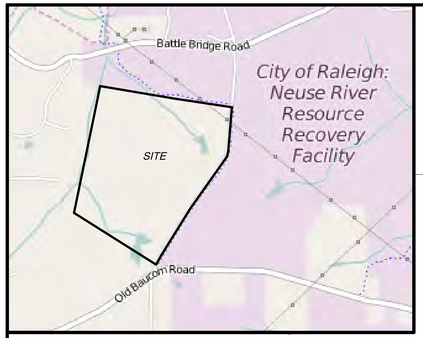

PHASE 2B

PHASE 1 CELL B

ACCESS ROAD

PHASE 2A STAGE 2

PHASE 1 CELL C

PHASE 2A CELL 1

PHASE 2A CELL 2

SURVEY LIMITS

STONE ACCESS ROAD

DRAINAGE CHANNEL

INV. = 237.70

24" CPP

INV. = 241.08

36" RCP

INV. = 268.60

E 2147000 E 2147500 E 2148000

N 714000 N 713500 N 713000

NC GRID NADS 83

I, DWAYNE R. KROEZE, HEREBY CERTIFY THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION, THAT THE ELEVATIONS REPRESENTED BY ANY CONTOUR LINE AS PLOTTED DO NOT HAVE A VERTICAL ERROR GREATER THAN 0.5' OVER 90% OF THE AREA COVERED. ALL LOCATIONS SHOWN ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DWAYNE R. KROEZE, P.L.S. L-3911 — JUNE 27, 2016 DATE

NOTES
1. COORDINATES SHOWN ARE NC GRID NAD 83 (2011)
2. ELEVATIONS ARE NAVD 88

REFERENCES

SURVEY ENTITLED
"SURVEY CONTROL FOR
WASTE INDUSTRIES
BROWNFIELD ROAD C&D LANDFILL
PHASE 2A STAGE 2"
DATED JANUARY 26, 2016
BY SURVEYING SOLUTIONS, PC

PLANS ENTITLED
BROWNFIELD ROAD C&D LANDFILL
PHASE 2A-STAGE 2 & CLOSURE EVENT NO. 1
NC SOLID WASTE PERMIT NO. 92-31
CONSTRUCTION DRAWINGS

LEGEND
—100— INDEX CONTOUR
—— INTERMEDIATE CONTOUR
+100.0 SPOT ELEVATION
CPP CORRUGATED PLASTIC PIPE
— · · — PHASE / CELL LIMITS

SURVEYING SOLUTIONS
precision powered by integrity
LICENSES: C-1948 (NC), C.O.A. 4197 (SC), 0405001788 (VA)
307 EAST MAIN ST., YOUNGSVILLE, NC 27596
919-554-6502 | SSPC@SURVEYPC.COM | SURVEYPC.COM

NORTH CAROLINA PROFESSIONAL SEAL L-3911 JUNE 27, 2016 LAND SURVEYOR DWAYNE R. KROEZE

TOPOGRAPHIC SURVEY OF BROWNFIELD ROAD C&D LANDFILL PHASE 2A - STAGE 2 CELL GRADES

DATE	REVISION(S)

0 50 100 150

ZONING: R-30
TOWNSHIP: ST. MARYS
COUNTY: WAKE
STATE: NC
SCALE: 1" = 50'
PROJECT: 160005
DWG: Brownfield Phase 2A-Stage 2 cell survey

SHEET 1 OF 1

Appendix A

Reference Documents

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue, Governor
Dexter R. Matthews, Director
Dee Freeman, Secretary

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION

CONSTRUCTION AND DEMOLITION LANDFILL FACILITY
Permit No. 92-31

MATERIAL RECOVERY, LLC
and WCA WASTE SYSTEMS, INC., wholly owned subsidiaries of
WCA WASTE CORPORATION
are all hereby issued a

PERMIT TO CONSTRUCT
MATERIAL RECOVERY C&D LANDFILL
Phase 2A, and a

PERMIT TO OPERATE
MATERIAL RECOVERY C&D LANDFILL
Phase 1 (Cells A, B, and C), and Phase 2A (Cell 1)

Located at 2600 Brown Field Road, southeast of Raleigh, Wake County, North Carolina, in accordance with Article 9, Chapter 130A, of the General Statutes of North Carolina and all rules promulgated thereunder and subject to the conditions set forth in this permit. The legal description of the site is identified on the deeds recorded for this property listed in Attachment No. 1 of this permit.

Edward F. Mussler, III, P.E.,
Permitting Branch Supervisor
Solid Waste Section

1646 Mail Service Center, Raleigh, North Carolina 27699-1646
Telephone 919-707-8200 \ Internet: http://portal.ncdenr.org/web/wm/sw

ATTACHMENT 1

PART I: PERMITTING HISTORY

Permit Type	Date Issued	Doc ID
Site Suitability Approval Letter	January 24, 2003	10050
Original Issue PTC (Phase 1 – Cells A, B, & C)	January 31, 2003	3232
PTO Phase 1, Cell A	October 1, 2003	10050
PTO Modification - New franchise / Wood waste processing area added	February 18, 2005	3600
PTO–Phase 1, Cell B	May 23, 2006	230
PTO– Phase 1, Cell C, and ownership change	January 28, 2008	3612
PTC Phase 2A	January 28, 2011	12346
PTO – 5 year amendment Phase 1, Cells A, B, and C	January 28, 2011	12346
PTO – Phase 2A, Cell 1	March 20, 2012	16327

1. In 2003, a Permit to Construct for Phase 1, and Permit to Operate for Phase 1 Cell A were issued to Material Recovery, LLC, owned by MRR Southern, LLC. The Permit to Construct was recorded on February 14, 2003, at Book 9914, Pages 701 – 720 in the Wake County Register of Deeds.

2. On or about April 5, 2005, business entities which were wholly owned by WCA Waste Corporation purchased four solid waste management facilities in North Carolina owned by MRR Southern, LLC, including the construction and demolition waste landfill permitted to Material Recovery, LLC. Subsequent to the purchase of the facility, WCA obtained a franchise for the landfill from Wake County and applied for the permit to operate the facility to be re-issued to WCA Waste Systems, Inc. and Material Recovery, LLC. During this period, WCA continued to operate the landfill as previously permitted to Material Recovery, LLC. The permit that approved the ownership change was issued in January 2008.

PART II: LIST OF DOCUMENTS FOR THE APPROVED PLAN

1. *Volume One - Site Application, Material Recovery, LLC/Brown-field Road Construction & Demolition Landfill*. December 2001. Joyce Engineering, Inc., Greensboro, NC. Revised through 2003. Doc ID 3602 (partial, Section II).

2. *Volume Two - Site Application, Material Recovery, LLC/Brown-field Road Construction & Demolition Landfill*. December 2001. Joyce Engineering, Inc., Greensboro, NC. Revised through 2003. Doc ID 10463.

3. *Construction Certification, Phase 1, Cell A.* Prepared by Joyce Engineering, Greensboro, NC. September 16, 2003.

4. Modification: Letter dated 25 March 2004 requesting the use of soils off-site with less than 10 ppm nitrate and addressing that soils with greater than 10 ppm nitrate levels be utilized on-site. Doc ID 10051.

5. Modification: New franchise approvals for Material Recovery, LLC. 20 January 2004 and 2 February 2004, Wake Board of Commissioners. The franchise changes include adding Franklin County to the service area and increasing the daily disposal amount. Doc ID 10551.

6. *Construction Quality Assurance Report, WCA Brownfield Road C&D Landfill Cell B.* Prepared by: David Garrett, P.G., P.E, Raleigh, NC. May 22, 2006. Doc ID 232.

7. Letter from Stephen R. Berlin to Paul Crissman, dated November 16, 2006, requesting issuance of permit to WCA Waste Corporation and providing information to support the request for permit issuance. Doc ID 823.

8. *Construction Quality Assurance Report, WCA Brownfield Road C&D Landfill Cell C*. Prepared by: David Garrett, P.G., P.E, Raleigh, NC. April 13, 2007. Doc ID 3828.

9. *Application for Permit to Construct, Phase 2A*. Prepared by David Garrett, P.G., P.E, Raleigh, NC. June 25, 2008, revised through December 2010. Doc ID 12363.

10. *Application for Permit to Construct, Phase 2A, Design Hydro Report, Water Quality Monitoring Plan, and Landfill Gas Monitoring Plan.* Prepared by David Garrett, P.G., P.E, Raleigh, NC. June 25, 2008, revised through March 2010. Doc ID 10041. Approval letter Doc ID 10047.

11. *Construction Quality Assurance Certification Report, Phase 2A, Cell 1.* Prepared by Joyce Engineering, Greensboro, NC. September 2011, revised through December 2011. Doc ID 16328.

PART III: PROPERTIES APPROVED FOR THE SOLID WASTE FACILITY

Wake County, N.C. Register of Deeds					
Book	Page	Grantee	Grantor	Tract	Acres
8806	845	Material Recovery, LLC	William A. Turner and wife, Debra C. Turner	1	113.55
8806	849	Material Recovery, LLC	Ashley Turner Enterprises, Inc.	N/A	98.41
Book of Maps 2002	791	Material Recovery, LLC	Material Recovery, LLC	1A and 1B	211.96
Book of Maps 2003	1508	Material Recovery, LLC	Material Recovery, LLC and Margaret Talton	1	210.19
				Total Site Acreage	210.19

The Wake County property ID is 174 163 9103, and the Real Estate ID is 4648.

PART IV: GENERAL PERMIT CONDITIONS

1. This permit is issued by the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section (Section). In accordance with North Carolina Solid Waste Management Rule 15A NCAC 13B .0201(d), a solid waste management facility permit shall have two parts: a Permit to Construct and a Permit to Operate. The Permit to Construct shall expire January 28, 2016. The Permit to Construct shall be implemented in accordance with Attachment 2 of this permit. The Permit to Operate shall expire January 28, 2016. The Permit to Operate must be implemented in accordance with Attachment 3 of this permit.

2. The persons to whom this permit is issued ("permittee") are the owners and operators of the solid waste management facility.

3. (Intentionally Blank)

4. When this property is sold, leased, conveyed, or transferred in any manner, the deed or other instrument of transfer must contain in the deed description section, in no smaller type than that used in the body of the deed or instrument, a statement that the property has been used as a sanitary landfill and a reference by book and page to the recordation of the permit.

5. By beginning construction or receiving waste at this facility the permittee shall be considered to have accepted the terms and conditions of this permit.

6. Construction and operation of this solid waste management facility must be in accordance with the Solid Waste Management Rules, 15A NCAC 13B, Article 9 of Chapter 130A of the North Carolina General Statutes (NCGS 130A-290, et seq.), the conditions contained in this permit, and the approved plan. Should the approved plan and the rules conflict, the Solid Waste Management Rules shall take precedence unless specifically addressed by permit condition.

7. This permit is issued based on the documents submitted in support of the application for permitting the facility identified in Attachment 1, "List of Documents for Approved Plan," which constitutes the approved plan for the facility. Where discrepancies exist, the most recent submittals and the Conditions of Permit shall govern.

8. This permit may be transferred only with the approval of the Section, through the issuance of a new or substantially amended permit in accordance with applicable statutes and rules. In accordance with NCGS 130A-295.2(g), the permittee must notify the Section thirty (30) days prior to any significant change in the identity or business structure of either the owner or the operator, including but not limited to, a proposed transfer of ownership of the facility or a change in the parent company of the owner or operator of the facility.

9. The permittee is responsible for obtaining all permits and approvals necessary for the development of this project including approval from appropriate agencies for sedimentation and erosion control, and a General or Individual National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit, if applicable. Issuance of this permit does not remove the permittee's responsibilities for compliance with any other local, state or federal rule, regulation or statute.

- End of Section -

ATTACHMENT 2
CONDITIONS OF PERMIT TO CONSTRUCT

1. Pursuant to the NC Solid Waste Management Rules (Rule) 15A NCAC 13B .0201(c) and (d)(1), this permit approves construction for Phase 2A of the landfill, consisting of approximately 16.7 acres with a projected operating capacity of 1,400,000 cubic yards of airspace.

2. The initial, substantial, construction authorized by this Permit to Construct must commence within 18 months from the issuance date of this permit. If substantial construction does not begin within 18 months from the issuance date of this permit, then the permit to construct shall expire. Substantial construction includes, but is not limited to, issuance of construction contracts, mobilization of equipment on site, and construction activities including installation of sedimentation and erosion control structures. The permittee may reapply for the Permit to Construct prior to the expiration date. The re-application will be subject to the statutes and rules in effect on that date and may be subject to additional fees.

3. Construction of all solid waste management units within this facility must be in accordance with the pertinent approved plans and only for those phases of development approved for construction as described in Attachment I, Part II, List of Documents for the Approved Plan.

4. The permittee must conduct a preconstruction meeting at the facility prior to initiating construction of any unit/cell and must notify the Section at least 10 days prior to the meeting.

5. Modifications or revisions of the approved documents or changes during construction of any landfill unit/cell require approval by the Section, and may constitute a permit modification and be subject to a permitting fee.

6. The following conditions must be met prior to operation of Cell 2 and subsequent cells of Phase 2A:

   a. Construction Quality Assurance (CQA) documentation and a certification by the project engineer that the landfill was built in accordance with approved plans and the conditions of the permit must be submitted to the Section for review and approval.

b. The edge of the waste footprint must be identified with permanent physical markers, for both existing units and the new unit.

c. The Permittee must contact the appropriate regional environmental specialist and permitting engineer to determine whether the Section chooses to hold a pre-operative meeting with key landfill personnel and representatives of the Section.

d. Documentation of financial assurance mechanisms must be submitted to the Section. The financial assurance amount must include closure and post-closure costs including the new phase to receive the PTO, in accordance with 15A NCAC 13B .0546, and must include costs for potential assessment and corrective action, in accordance with NCAC 13A 295.2 (h).

e. The Permittee must obtain a Permit to Operate for the phase from the Section in accordance with 15A NCAC 13B .0201(d).

7. If dried sludge from the site's previous use as a composting/sludge application site are encountered during excavation of the landfill cell, the dried sludge must be stockpiled separately from the insitu soils and must not be used in the cell construction.

8. No rock blasting is allowed in construction without written approval of a blasting plan by the Section.

9. Prior to construction of Phases 2B through 5, a Permit to Construct application must be submitted for approval to the Section. The application must be prepared in accordance with applicable statutes and rules in effect on that date and will be subject to a permitting fee.

10. Pursuant to Rule 15A NCAC 13B .0542(i)(2), burning of land-clearing debris generated on-site, as a result of construction activities, requires approval by the Section prior to initiating the burn. In addition, the Division of Air Quality and local fire department must approve the activity prior to burning.

Geologic, Water Quality, and Landfill Gas Monitoring Requirements

11. Prior to construction of the phase or cell(s) within the phase, all piezometers, borings, and groundwater and landfill gas monitoring wells within the footprint must be properly abandoned by overdrilling first (exception of non-cased borings) and sealed with grout in accordance with 15A NCAC 2C .0113 (d)(2), entitled "Abandonment of Wells."

12. In areas where soil is to be undercut, abandoned piezometers, groundwater and landfill gas monitoring wells and borings must not be grouted to pregrade land surface, but to the proposed base grade surface to prevent having to cut excess grout and possibly damage the wells.

13. A Licensed Geologist must report any pertinent geological feature(s) exposed during phase or cell excavation. Prior to placing any landfill liner, the geologist must submit to the Section hydrogeologist a written report that includes an accurate description of the exposed geological feature(s) and effect of the geological feature(s) on the design, construction, and operation of the cell, phase, or unit.

14. A Licensed Geologist must supervise the installation of groundwater monitoring wells and landfill gas monitoring wells. Each groundwater monitoring well and landfill gas well must be surveyed for location and elevation. Each groundwater monitoring well and landfill gas monitoring well must have an identification plate permanently attached to the well, in accordance with 15A NCAC 2C .0108(o).

15. Any modification to the approved water quality monitoring, sampling, landfill gas, and analysis plan must be submitted to the Section Hydrogeologist for review.

16. Groundwater and landfill gas monitoring well construction and abandonment must meet the requirements of 15A NCAC 02C.

17. Within 30 days of completed construction of each new groundwater and landfill gas monitoring well, a well construction record, well schematic, boring log, field log and notes, and description of well development activities, certified by a Licensed Geologist, must be submitted to the Section. Form GW-1(b) must be used for both groundwater and landfill gas wells. The submittal must also include a scaled topographic map, showing the location and identification of new, existing, and abandoned wells and piezometers.

18. Within thirty (30) days of the abandonment of any groundwater monitoring well or landfill gas monitoring well, the well abandonment record and any additional information included in the abandonment record must be certified by a Licensed Geologist, and submitted to the Section. Form GW-30 must be used for both groundwater and landfill gas wells.

19. All forms, reports, maps, plans, and data submitted to the Section must include an electronic (pdf) copy.

20. Proper abandonment records must be submitted to the Section for the residential drinking water well located in the center of Phase 2. The records must be submitted with the CQA report for the construction area of Phase 2 containing the well.

Erosion and Sedimentation Control Requirements

21. All sedimentation and erosion control activities must be conducted in accordance with the Sedimentation Control Act N.C.G.S. 113A-50, et seq., and rules promulgated under 15A NCAC 4. All required sedimentation and erosion control measures must be installed and operable to mitigate excessive on-site erosion and to prevent silt from leaving the area of the landfill unit during the service life of the facility.

22. Facility construction, operations or practices must not cause or result in a discharge of pollution, dredged material, and/or fill material into waters of the state in violation of the requirements under Sections 401 and 404 of the Clean Water Act, as amended.

23. Modifications to the approved sedimentation and erosion control activities require approval by the North Carolina Land Quality Section. The Section must be notified of any sedimentation and erosion control plan modifications.

- End of Section -

ATTACHMENT 3
CONDITIONS OF OPERATING PERMIT

PART I: OPERATING CONDITIONS

1. The Permit to Operate shall expire January 28, 2016. Pursuant to 15A NCAC 13B .0201(g), no later than September 28, 2015, the permittee must submit to the Section a permit amendment application prepared in accordance with 15A NCAC 13B .0535 (b).

2. This permit approves operation of Phase 2A, Cell 1 and the continued operation of Phase 1, Cells A, B, and C of the landfill, as well as the onsite environmental management and protection facilities as described in the approved plans. Operation of future phases or cells requires written approval of the Section after documentation has been submitted that the area has been constructed in accordance with applicable statutes and rules.

3. The following table lists the dimensions and details for the landfill, both existing and planned. Total gross capacity is defined as the volume measured from the bottom of waste through the top of final cover. The estimated life of the landfill, for both northern and southern areas, is approximately 21.9 years from 2010.

Phase	Acres	Gross Capacity	Status
1	20	1,636,000	Partially filled
2A (Cell 1)	4.8	366,000	Approved for fill
2A (remaining area)	11.9	1,034,000	Approved for construction
2B	8.2	1,400,000	future
2C	*	1,400,000	future
Total northern area	45	5,836,000	
Southern area 3-5	24.2	2,300,000	future
Total northern and southern areas	**69.2**	**8,136,000**	

*Phase 2C will be vertical fill over Phases 1, 2A, and 2B.

4. The permittee must maintain permanent markers that accurately identify the edge of the approved waste disposal boundary.

5. Fill operations must be contained within the approved elevation contours as shown on the approved application drawings. The maximum approved fill elevation for Phase 2A is 310 feet mean sea level, as shown on Drawing 8 (E2), Doc ID 12363.

6. The landfill is permitted to receive the following waste types:

   a. "C&D solid waste" as defined in 15A NCAC 13B, Rule .0532(8) means solid waste generated solely from the construction, remodeling, repair, or demolition operations on pavement and buildings or structures. C&D waste does not include municipal and industrial wastes that may be generated by the on-going operations at buildings or structures.

   b. “Inert debris” as defined in G.S. 130A-290 (a)(14) means solid waste that consists solely of material such as concrete, brick, concrete block, uncontaminated soil, rock, and gravel.

   c. “Land-clearing debris” as defined in G.S. 130A-290 (a)(15) means solid waste which is generated solely from land clearing activities, limited to stumps, trees, limbs, brush, grass, and other naturally occurring vegetative material.

   d. “Asphalt” in accordance with G.S. 130-294(m).

7. Regulated asbestos-containing material must be managed in accordance with 40 CFR 61. Disposal of asbestos waste must be in accordance with 15 NCAC 13B .0542 (c).

8. Those wastes listed in 15A NCAC 13B .0542 (e) must not be accepted for disposal including, but not limited to, hazardous waste, municipal solid waste, liquid waste, commercial and industrial wastes, and yard trash.

9. Wastewater treatment sludge is not approved for disposal. Wastewater treatment sludge may be accepted, with the approval of the Section, for utilization as a soil conditioner and incorporated into or applied onto the vegetative growth layer. The wastewater treatment sludge must not be applied at greater than agronomic rates nor to a depth greater than six inches.

10. The facility is approved to accept approximately 1100 tons per day, approximately 286 days per year (5.5 days per week), with a maximum variance in accordance with GS 130A-294(b1)(1) and consistent with the approved franchise granted by the County of Wake dated February 2, 2004.

11. This facility is permitted to receive solid waste generated within the following counties: Chatham, Durham, Franklin, Johnston, Orange, and Wake and the municipalities contained within those counties, consistent with the approved franchise approved by the Wake County Board of Commissioners.

12. The permittee must not knowingly dispose of C&D waste that is generated within the boundaries of a unit of local government that by ordinance:

    a. Prohibits generators or collectors of C&D waste from disposing of that type or form of C&D waste.

    b. Requires generators or collectors of C&D waste to recycle that type or form of C&D waste.

13. The facility operator must complete an approved operator training course in compliance with G.S. 130A-309.25.

    a. A responsible individual certified in landfill operations must be on-site during all operating hours of the facility at all times while open for public use to ensure compliance with operational requirements.

    b. All pertinent landfill-operating personnel must receive training and supervision necessary to properly operate the C&D landfill unit in accordance with G.S. 130A-309.25 and addressed by memorandum dated November 29, 2000.

14. The permittee must actively employ a training and screening program at the facility prepared in accordance with Section .0544(e) for detecting and preventing the disposal of excluded or unauthorized wastes. At a minimum, the program must include:

    a. Random inspections of incoming loads or other comparable procedures.

    b. Records of any inspections.

    c. Training of personnel to recognize hazardous, liquid, and other excluded waste types.

    d. Development of a contingency plan to properly manage any identified hazardous, liquid, MSW, or other excluded or unauthorized wastes. The plan must address identification, removal, storage, and final disposition of these wastes.

15. The use of alternative periodic cover requires approval, prior to implementation, by the Section. Requests for alternative periodic cover approval must include a plan detailing the comprehensive use and a demonstration of the effectiveness of the alternative cover,

developed according to Section guidelines. Plans that are approved by the Section will be incorporated into, and made a part of, the approved documents listed in Attachment 1.

16. Financial assurance must be continuously maintained for the duration of the facility in accordance with Rule 15A NCAC 13B .0546, 15A NCAC 13B .0547 (2), and NCGS 130A 295.2 (h). The owner and operator must annually adjust cost estimates including closure and post-closure activities, and potential assessment and corrective action costs, for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s), pursuant to 15A NCAC 13B .0546.

17. All sedimentation and erosion control activities must be conducted in accordance with the Sedimentation Control Act N.C.G.S. 113A-50, et seq., and rules promulgated under 15A NCAC 4. All required sedimentation and erosion control measures must be installed and operable to mitigate excessive on-site erosion and to prevent silt from leaving the area of the landfill unit during the service life of the facility.

18. Facility construction, operations or practices must not cause or result in a discharge of pollution, dredged material, and/or fill material into waters of the state in violation of the requirements under Sections 401 and 404 of the Clean Water Act, as amended.

19. Modifications to the approved sedimentation and erosion control activities require approval by the North Carolina Land Quality Section. The Section must be notified of any sedimentation and erosion control plan modifications.

20. An updated closure and post-closure plan must be submitted for approval at least 90 days prior to closure or partial closure of any landfill unit. The plan must include all steps and measures necessary to close and maintain the C&D unit in accordance with all rules in effect at that time. At a minimum, the plan must address the following:

    a. Design of a final cover system in accordance with 15 NCAC 13B .0543(c), or the solid waste management rules in effect at the time of closure;

    b. Construction and maintenance/operation of the final cover system and erosion control structures; and

    c. Surface water, ground water, and explosive gas monitoring.

PART II: MONITORING AND REPORTING REQUIREMENTS

21. Groundwater, surface water, and landfill gas monitoring locations must be established and monitored as identified in the approved plans (Doc ID 10041 and 10047). Any proposed modification to an approved plan must be submitted to the Section and approved prior to implementation.

22. The permittee must obtain approval from the Section for the modification of any groundwater or landfill gas monitoring well. Design, construction, abandonment, surveying, and well plate identification of groundwater and landfill gas monitoring wells must be implemented in accordance with the conditions in Attachment 2, Geologic, Water Quality, and Landfill Gas Monitoring Requirements.

23. Groundwater monitoring wells and surface water sampling locations must be sampled at least semi-annually in accordance with 15A NCAC 13B .0544, the approved water quality monitoring plan, and the current policies and guidelines of the Section in effect at the time of sampling. In accordance with 15A NCAC 13B .0544(d), landfill gas monitoring must be conducted quarterly, unless otherwise specified by the Section.

24. Monitoring reports of the analytical results for surface water and groundwater monitoring sampling events must be submitted to the Section within 120 days of the sample collection date. Analytical laboratory data must be submitted in electronic portable document format (pdf) and in a spreadsheet format in an Electronic Data Deliverable (EDD) Template. All monitoring reports must contain:

    a. a potentiometric surface map for the current sampling event,

    b. analytical laboratory reports and summary tables,

    c. a completed Solid Waste Environment Monitoring Data Form, and

    d. laboratory data submitted in accordance with the EDD Template.

25. A readily accessible unobstructed path must be maintained so that groundwater and landfill gas monitoring wells and surface water sampling locations are accessible using four-wheel drive vehicles.

26. Documentation of well completion, development details, repair, abandonment, and all other pertinent activities associated with each groundwater and landfill gas monitoring well must be maintained in the facility operating record. The permittee must maintain a record of all groundwater, surface water, and landfill gas monitoring events and analytical data in the operating record.

27. All forms, reports, maps, plans, and data submitted to the Section must include an electronic (pdf) copy.

28. All landfill gas monitoring events must be conducted by properly trained personnel and must include monitoring for all explosive gases, including hydrogen sulfide. Landfill gas monitoring must include interior monitoring of onsite buildings.

29. Landfill gas monitoring results must be recorded on forms provided by the Section and be maintained in the facility's operating record.

REPORTING AND RECORDKEEPING

30. Copies of this permit, the approved plans, and all records required to be maintained by the permittee must be maintained at the facility and made available to the Section upon request during normal business hours.

31. The owner or operator must maintain records of the following. Scales must be used to weigh the amount of waste received. The daily reports are to be summarized into a monthly report for use in the required annual reports.

    a. The amount of all accepted solid waste materials as (i) C&D wastes, (ii) material used as alternate periodic cover, and (iii) recyclable material.

    b. Daily records of waste received, and origins of the loads.

32. On or before August 1 annually, the Permittee must submit an annual facility report to the Section, on forms prescribed by the Section.

    a. The reporting period shall be for the previous year beginning July 1 and ending June 30.

    b. The annual facility report must list the amount of waste received in tons and be compiled:
        i) On a monthly basis.
        ii) By county, city or transfer station of origin.
        iii) By specific waste type.
        iv) By disposal location within the facility.
        v) By diversion to alternative management facilities.

c. A measurement of volume utilized in the landfill cells must be performed during the second quarter of the calendar year. The date and volumes, in cubic yards, must be included in the report.

d. The amount of waste, in tons from scale records, disposed in landfill cells from October 1, 2003 through the date of the annual volume survey must be included in the report.

e. The tons of C&D waste recycled, recovered or diverted from disposal including a description of how and where the material was ultimately managed, as applicable, must be included in the report.

f. The completed report must be forwarded to the Regional Environmental Senior Specialist for the facility by the date due on the prescribed annual facility report form.

g. A copy of the completed report must be forwarded to each county manager for each county from which waste was received the facility. Documentation that a copy of the report has been forwarded to the county managers must be sent to the Regional Environmental Senior Specialist by the date due on the prescribed annual facility report form.

PART III: MISCELLANEOUS SOLID WASTE MANAGEMENT CONDITIONS, (SPECIFY)

33. The reclamation pad operation as shown on the application drawings is not approved for construction or operation.

34. The wood waste/land clearing debris storage and processing operation as shown in the application text and on drawings is not approved for operation at this time.

- End of Permit Conditions -

Wake County Environmental Services Department
Water Quality Division, Watershed Management Section
336 Fayetteville St. • P.O. Box 550 • Raleigh, NC 27602
TEL 919 856-7400 • FAX 919 743-4772

WMCPA – WATERSHED MANAGEMENT CONSTRUCTION PLAN APPROVAL

Project Name Brownfield Road C&D Landfill (stockpile addition) **Watershed** Lower Neuse

Date Received 2/3/16 **Date Processing Initiated** 2/3/16 **Disturbed Acreage** 86.39

S&E Permit Number S#2148 **S&E Plan Review Fee** $2925(paid) **S&E Permit Fee** $2846(pending)

SW Permit Number S#2148 **SW Plan Review Fee** N/A **SW Permit Fee** N/A

Applicant:

Name: Wake Reclamation , LLC
Address: 2600 Brownfield Rd Raleigh, NC 27610
Phone: 919-779-3339
Email:

Engineer:

Name: Smith Gardner, INC
Address: 14 N Boylan Ave Raleigh, NC 27603
Phone: 919-828-0577 x142
Email: Carter@smithgardnerinc.com

Plan Date/Revision Date: **12.24.15/2.3.16**

Approval Date: **2/3/16**	**The above-referenced erosion control and stormwater management plans have been reviewed and *conditionally* approved.** Brownfield C&D is approved for the addition of 11.39 ac disturbance for a stockpile that is to be converted back to existing conditions, grade and land cover, upon abandonment of stockpile. Conversion back to existing conditions exempts requirement for stormwater for this additional disturbance. The permit acreage will be added to an existing 75 ac with a new site total of 86.39 ac. [*Merged from Permit S#998008*]

Approved Site Data:

Permitted Imp (SF)= TBD	Road ISA (SF)= TBD	Lots ISA (SF)= TBD	Other ISA (SF)= TBD
Nitrogen Pre (lb/ac/yr)= TBD	Nitrogen Post (lb/ac/yr)= TBD	Nitrogen Post BMP (lb/ac/yr)= TBD	Nitrogen Offset (lb)= TBD

Conditions of Approval

Items marked with an "X" were noted as conditions of the Stormwater and Sediment and Erosion Control Plan approval. Unless otherwise noted, all references shown in brackets are for the *Wake County Unified Development Ordinance* (UDO), adopted 04/17/06.

☒	**1.**	A mandatory preconstruction meeting is required between the owner, contractor, and Wake County prior to issuance of the Stormwater and Land Disturbance Permits. Please call to schedule this meeting at your convenience. **The Stormwater and Land Disturbance permit fees are due at that time.**
☒	**2.**	Grading, other than for installation of soil erosion and sedimentation control measures, is prohibited prior to the issuance of a Certificate of Compliance. ***[10-30-7(D)]***
☒	**3.**	Contractor shall follow plans strictly and maintain contact with Wake County prior to making any field modifications to erosion and sediment control devices. No devices shall be removed without prior approval from Wake County.

Wake County Environmental Services Department
Water Quality Division, Watershed Management Section
336 Fayetteville St. • P.O. Box 550 • Raleigh, NC 27602
TEL 919 856-7400 • FAX 919 743-4772

WMCPA – WATERSHED MANAGEMENT CONSTRUCTION PLAN APPROVAL

☒	**4.**		Wake County's sedimentation pollution control program is performance oriented, requiring protection of the natural resources and adjoining properties. If at any time during the project it is determined that the Erosion and Sedimentation Control Plan is inadequate to meet the requirements of the Erosion and Sedimentation Control Ordinance of Wake County, this office may require revisions in the plan and its implementation to ensure compliance with the Ordinance.
☒	**5.**		All projects that have approved plans for an E&SC permit on or after Aug. 3, 2011 are covered by the NPDES Construction Stormwater General Permit, NCG 010000. In addition, effective October 1, 2010, persons conducting land-disturbing activities larger than one acre must inspect their project after each phase of the project, and document the inspection in writing. A packet with information on the NPDES General Permit and the Self-inspection Program will be provided at the preconstruction meeting. Permits and inspection reports shall be maintained on site.
☐	**6.**		SUBDIVISIONS ONLY Builders are required to obtain grading permits for cumulative disturbance over one acre (including non-contiguous lots).
Stormwater COAs - All conditions of approval must be completed and approved by Wake County prior to final plat approval or signoff of the Certificate of Occupancy (C.O.) for future building permits. Items required prior to final plat or building permit approval are checked and listed below.			
☐	**7.**		**As-Built Plans –** Upon completion of required improvements, an as-built plan of required stormwater improvements must be submitted (must indicate that stormwater improvements were constructed in accordance with the approved plan). *[9-31-2]*
☐	**8.**		**Maintenance Plan**
	☐	**a.**	The developer must record and reference on the record plat, a maintenance plan providing instruction about annual maintenance tasks and associated costs for at least a 20-year period. *[9-32-3(A)]*
	☐	**b.**	It will be the responsibility of the property owners association or lot owner to update the maintenance plan at least every 10 years. *[9-32-3(B)]*
☐	**9.**		**Maintenance Agreement**
	☐	**a.**	The developer must record and reference on the record plat, a maintenance agreement or restrictive covenant that sets for the property owners association's or lot owner's continuing responsibilities for maintenance, including how cost will be apportioned among lot owners served. *[9-32-4(A)]*
	☐	**b.**	The maintenance agreement must provide that the association and its individual members are jointly and severable liable for maintenance. *[9-32-4(B)]*
☐	**10.**		All maintenance documents required must be submitted prior to record plat approval and must be referenced on the record plat. For developments not requiring record plats, documentation must be submitted prior to building permit issuance. *[9-32-6]*
☐	**11.**		**Performance Guarantee –** The county may not approve a record plat or issue a building permit until stormwater improvements required of the developer have been completed or a performance guarantee has been provided. *[9-31-1]*
Applicable Regulations			
☐	**12.**		***9-32-2 Parties Responsible for Maintenance of Improvements***
	☐	**a.**	The developer must maintain stormwater improvements until accepted by a property owners association or lot owner. The developer must disclose which party will be responsible for continued maintenance on the record plat.
	☐	**b.**	Before improvements are accepted for maintenance by the property owners association or lot owner, the developer must certify to the property owners association or lot owner and the county that improvements are complete and functioning as designed.

Wake County Environmental Services Department
Water Quality Division, Watershed Management Section
336 Fayetteville St. • P.O. Box 550 • Raleigh, NC 27602
TEL 919 856-7400 • FAX 919 743-4772

WMCPA – WATERSHED MANAGEMENT CONSTRUCTION PLAN APPROVAL

☒	**13.**	***Part 5 – Enforcement and Penalties***	
	☒	**a.**	Failure to complete required improvements or failure to maintain improvements as required by the approved plan are violations and subject to a fine of up to $1,000 per day. *[9-50]*
	☒	**b.**	**Inspection of Stormwater Improvements –** Wake County agents have the right to inspect sites to determine whether stormwater improvements are being installed and maintained in compliance with the ordinance. *[9-51]*
☐	**14.**	***10-30-6 Validity of Plan, Lapse of Approval*** - An approved erosion and sedimentation control plan is valid for 2 calendar years from the date of approval. If a land disturbance permit has not been obtained within the 2-year period, the erosion and sedimentation control plan approval becomes null and void.	
☒	**15.**	***10-20-11 Standards for Landfills***	
	☒	**a.**	Land disturbance permits for landfills are valid for five (5) calendar years. If no construction activity has begun within 2-years, the land disturbance permit becomes null and void.
	☒	**b.**	A valid land disturbance permit is required for the duration of the —active life of the landfill or phased permitted portion thereof until completion of closure activities.
	☒	**c.**	Land disturbance permits for landfills may be renewed in 5-year increments.
	☒	**d.**	Land Disturbance permits for landfills may be automatically renewed upon the certification of Financially Responsible Party and upon concurrence by County staff that there are no major modifications to the approved plan and that the project adheres to all current applicable standards.
	☒	**e.**	Automatic permit renewals will not be subject to plan review and land disturbance permit fees.
	☒	**f.**	No plan shall be approved unless it complies with all applicable state and Wake County erosion and sedimentation control and stormwater management requirements. Approval assumes the applicant's compliance with federal and state water quality and landfill laws, regulations and rules in addition to Wake County's regulations.
	☒	**g.**	Adequate erosion and sediment control measures consisting of vegetative cover, materials, structures or devices must be utilized to prevent sediment from leaving the landfill facility.
	☒	**h.**	Whenever the County determines that significant erosion and sedimentation is occurring as a result of land-disturbing activity, despite application and maintenance of protective practices, the party conducting the land-disturbing activity will be required to and shall take additional protective action.
	☒	**i.**	Adequate erosion and sediment control measures consisting of vegetative cover, materials, structures or devices must be utilized to prevent excessive on-site erosion of the landfill facility or portion thereof.
	☒	**j.**	Erosion and sedimentation control measures, structures and devices for landfills must be designed, constructed and maintained to manage the calculated maximum peak rate of runoff generated by the 24-hour, 25-year storm event. Runoff rates must be calculated using the procedures in the USDA, Soil Conservation Service's National Engineering Field manual for Conservation Practices, or the North Carolina Department of Environment and Natural Resources Erosion and Sediment Control Planning and Design Manual or other calculation procedures acceptable to Wake County.
	☒	**k.**	Stormwater plan review for landfills shall be included in the plan review for erosion and sedimentation control and stormwater improvements shall be permitted under the land disturbance permit upon payment of applicable land disturbances review and permit fees.
	☒	**l.**	Landfills shall conform to the requirements of the Sedimentation and Pollution Control Law (15A NCAC 04) and any required NPDES permits.
	☒	**m.**	Phased permits may be closed upon compliance with Wake County's certificate of completion requirements.
☒	**16.**	***10-30-8 Actions Required Prior to Land Disturbance***	

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Water Quality Division, Watershed Management Section
336 Fayetteville St. • P.O. Box 550 • Raleigh, NC 27602
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WMCPA – WATERSHED MANAGEMENT CONSTRUCTION PLAN APPROVAL

	☒	**a.**	S&EC plan approval and land disturbance permit issued must be prominently displayed until all construction is complete, all permanent sedimentation and erosion control measures are installed and the site has been stabilized. A copy of the approved plan must be kept on file at the job site.
	☒	**b.**	No person shall initiate a land-disturbing activity until notifying Wake County of the date that the land-disturbing activity will begin.
☒	**17.**	***10-31-1 Authority***	
	☒	**a.**	County officials may enter any property, public or private, at reasonable times for the purpose of investigating and inspecting the sites of any land-disturbing activity. No person shall refuse entry or access to any authorized representative or agent for the County who requests entry for purposes of inspections, and presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representatives while in the process of carrying out their official duties.
	☒	**b.**	Agents and officials of the County will periodically inspect land-disturbing activities to ensure compliance with the North Carolina Sedimentation Pollution Control Act, this article, or rules or orders adopted or issued pursuant to this article, and to determine whether the measures required in the erosion and sedimentation control plan are effective in controlling erosion and sedimentation resulting from land-disturbing activity.
	☒	**c.**	Any land-disturbing activity will be the responsibility of the person(s) conducting the land disturbing activity, including the property owners. Failure to prevent off site sedimentation will be deemed a violation of the erosion and sedimentation control regulations of this article.

Wake County Watershed Management Section is not responsible for subject approvals of other Local, State or Federal Agencies. The subject approvals are (but not limited to) Federal Emergency Management Area Flood regulations/requirements, Division of Water Quality under stormwater or other water quality regulations/requirements, U.S. Army Corps of Engineers under Article 404/401 (Wetlands/Streams) jurisdiction/requirements, and/or any Federal, State, County and Local municipal regulations or permit requirements. The approval issued in this letter cannot supersede any other required permit or approval.

Watershed Manager Name & Signature: Shawn Springer, PE

Contact Info: shawn.springer@wakegov.com **919-369-6135**

Appendix B

Photographic Log

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-16-1

Photo No.	Date:
1	3/1/16

Direction Photo Taken:

North

Description:

E&S controls were established for stockpile area.

Photo No.	Date:
2	3/1/16

Direction Photo Taken:

West

Description:

Drainage channel with check dams along perimeter of stockpile area.

S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-16-1

Photo No.	Date:
3	3/8/16

Direction Photo Taken:

Northeast

Description:

Commencement of excavation of Phase 2A Stage 2.

Photo No.	Date:
4	4/6/16

Direction Photo Taken:

Southeast

Description:

Eastern berm and access road.

S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-16-1

Photo No.	Date:
5	4/6/16

Direction Photo Taken:

West

Description:

Excavation of Stage 2 in progress.

Photo No.	Date:
6	4/13/16

Direction Photo Taken:

Southeast

Description:

Excavation of Stage 2 in progress.

S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-16-1

Photo No.	Date:
7	6/7/16

Direction Photo Taken:
South

Description:

Established vegetation in perimeter channel with matting and check dams along access road.

Photo No.	Date:
8	6/7/16

Direction Photo Taken:

West

Description:

Phase 2A Stage 2 Subgrade

Appendix C

Subgrade Inspection Report

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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SMITH+GARDNER
ENGINEERS

ADDRESS 14 N. Boylan Avenue, Raleigh NC 27603
TEL 919.828.0577
WEB www.smithgardnerinc.com

MEMORANDUM

Date:	May 27, 2016
To:	Stacey A. Smith, P.E., Carter Shore, E.I. Smith Gardner, Inc.
From:	Madeline German, P. G. Smith Gardner, Inc.
RE:	**Brownfield Road C&D Landfill Phase 2-Stage2A Subgrade Certification**

On May 27, 2016, I visited the Waste Industries Brownfield Road C&D Landfill Facility, in Raleigh, for the purpose of inspecting the subgrade in the Phase 2 – Stage 2A Cell. I found soil types were consistent with those encountered during drilling (primarily silty sand and PWR above bedrock). This area had been previously excavated to the designed subgrade elevations. It was understood that rock had been encountered during construction along the southern slope of the cell; however, slight adjustments to the design ensured that subgrade elevations maintained the proper separation from bedrock. During my visit, boulders were observed in three locations. These were determined to be boulders based on their size (only a few feet visible) and relative position in line with the slope.

Based on my observation, I hereby certify that the subgrade material, following completion of subgrade construction, was materially consistent with the soil types found during the site investigation.

Madeline German, P.G.
Project Geologist

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Appendix D

Well Abandonment Records

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

For Internal Use ONLY:

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: G-4

6b. Total well depth: 60.0 (ft.)

6c. Borehole diameter: 8.0 (in.)

6d. Water level below ground surface: 43.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 75.0 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

156.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

WELL OVERDRILLED WITH 4 1/4 AUGERS

8. Certification:

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: G-18

6b. Total well depth: 42.0 (ft.)

6c. Borehole diameter: 8.0 (in.)

6d. Water level below ground surface: 30.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 75.0 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

109.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

WELL OVERDRILLED WITH 4 1/4 AUGERS

8. Certification:

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: G-19

6b. Total well depth: 88.0 (ft.)

6c. Borehole diameter: 8.0 (in.)

6d. Water level below ground surface: 40.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 75.0 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

229.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

WELL OVERDRILLED WITH 4 1/4 AUGERS

8. Certification:

Signature of Certified Well Contractor or Well Owner — Date: 12/21/15

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: G-22

6b. Total well depth: 52.0 (ft.)

6c. Borehole diameter: 8.0 (in.)

6d. Water level below ground surface: 40.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 75.0 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

135.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

WELL OVERDRILLED WITH 4 1/4 AUGERS

8. Certification:

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: G-15

6b. Total well depth: 65.0 (ft.)

6c. Borehole diameter: 8.0 (in.)

6d. Water level below ground surface: 10.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 75.0 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

169.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

WELL OVERDRILLED WITH 4 1/4 AUGERS

8. Certification:

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

For Internal Use ONLY:

I. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: P-15

6b. Total well depth: 25.0 (ft.)

6c. Borehole diameter: 2.0 (in.)

6d. Water level below ground surface: 5.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 3.25 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

4.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

8. Certification:

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

For Internal Use ONLY:

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: UD-2

6b. Total well depth: 56.0 (ft.)

6c. Borehole diameter: 2.0 (in.)

6d. Water level below ground surface: 5.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 8.25 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

9.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

8. Certification:

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

BRIAN THOMAS

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 2581

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:	
☐Agricultural	☐Municipal/Public
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)
☐Industrial/Commercial	☐Residential Water Supply (shared)
☐Irrigation	
Non-Water Supply Well:	
☑Monitoring	☐Recovery
Injection Well:	
☐Aquifer Recharge	☐Groundwater Remediation
☐Aquifer Storage and Recovery	☐Salinity Barrier
☐Aquifer Test	☐Stormwater Drainage
☐Experimental Technology	☐Subsidence Control
☐Geothermal (Closed Loop)	☐Tracer
☐Geothermal (Heating/Cooling Return)	☐Other (explain under 7g)

4. Date well(s) abandoned: 12/08/15

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: TW-40

6b. Total well depth: 20.0 (ft.)

6c. Borehole diameter: 2.0 (in.)

6d. Water level below ground surface: 5.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 2.5 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

☑ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	☐ Drill Cuttings
☐ Specialty Grout	☐ Gravel
☐ Bentonite Slurry	☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

3.25 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

8. Certification

/Brian Thomas

Signature of Certified Well Contractor or Well Owner

12/21/15

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

KENNY SARGENT

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 4226

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:

- ☐ Agricultural
- ☐ Municipal/Public
- ☐ Geothermal (Heating/Cooling Supply)
- ☐ Residential Water Supply (single)
- ☐ Industrial/Commercial
- ☐ Residential Water Supply (shared)
- ☐ Irrigation

Non-Water Supply Well:

- ☑ Monitoring
- ☐ Recovery

Injection Well:

- ☐ Aquifer Recharge
- ☐ Groundwater Remediation
- ☐ Aquifer Storage and Recovery
- ☐ Salinity Barrier
- ☐ Aquifer Test
- ☐ Stormwater Drainage
- ☐ Experimental Technology
- ☐ Subsidence Control
- ☐ Geothermal (Closed Loop)
- ☐ Tracer
- ☐ Geothermal (Heating/Cooling Return)
- ☐ Other (explain under 7g)

4. Date well(s) abandoned: 03/09/16

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form.

6a. Well ID#: P-16

6b. Total well depth: 22.0 (ft.)

6c. Borehole diameter: 2.0 (in.)

6d. Water level below ground surface: 10.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 8.25 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

- ☑ Neat Cement Grout
- ☐ Sand Cement Grout
- ☐ Concrete Grout
- ☐ Specialty Grout
- ☐ Bentonite Slurry
- ☐ Bentonite Chips or Pellets
- ☐ Dry Clay
- ☐ Drill Cuttings
- ☐ Gravel
- ☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

3.5 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

8. Certification:

Signature of Certified Well Contractor or Well Owner

03/31/16

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

KENNY SARGENT

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 4226

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

2. Well Construction Permit #: _____

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:

- ☐ Agricultural
- ☐ Municipal/Public
- ☐ Geothermal (Heating/Cooling Supply)
- ☐ Residential Water Supply (single)
- ☐ Industrial/Commercial
- ☐ Residential Water Supply (shared)
- ☐ Irrigation

Non-Water Supply Well:

- ☑ Monitoring
- ☐ Recovery

Injection Well:

- ☐ Aquifer Recharge
- ☐ Groundwater Remediation
- ☐ Aquifer Storage and Recovery
- ☐ Salinity Barrier
- ☐ Aquifer Test
- ☐ Stormwater Drainage
- ☐ Experimental Technology
- ☐ Subsidence Control
- ☐ Geothermal (Closed Loop)
- ☐ Tracer
- ☐ Geothermal (Heating/Cooling Return)
- ☐ Other (explain under 7g)

4. Date well(s) abandoned: 03/09/16

5a. Well location:

WASTE INDUSTRIES

Facility/Owner Name

Facility ID# (if applicable)

2600 BROWNFIELD ROAD RALEIGH 27610

Physical Address, City, and Zip

WAKE

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 42' 34.39" N 78° 30' 12.79" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

6a. Well ID#: UD-5

6b. Total well depth: 38.0 (ft.)

6c. Borehole diameter: 2.0 (in.)

6d. Water level below ground surface: 10.0 (ft.)

6e. Outer casing length (if known): _____ (ft.)

6f. Inner casing/tubing length (if known): _____ (ft.)

6g. Screen length (if known): _____ (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction/abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): 8.25 (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: _____

7d. Amount of disinfectant used: _____

7e. Sealing materials used (check all that apply):

- ☑ Neat Cement Grout
- ☐ Sand Cement Grout
- ☐ Concrete Grout
- ☐ Specialty Grout
- ☐ Bentonite Slurry
- ☐ Bentonite Chips or Pellets
- ☐ Dry Clay
- ☐ Drill Cuttings
- ☐ Gravel
- ☐ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

6.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

WELL ABANDONED VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

8. Certification:

Signature of Certified Well Contractor or Well Owner

03/31/16

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

**Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617**

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

**Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636**

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

Appendix E

Meeting Minutes

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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SMITH+GARDNER
ENGINEERS

ADDRESS
14 N. Boylan Avenue, Raleigh NC 27603

TEL
919.828.0577

WEB
www.smithgardnerinc.com

MEMORANDUM

Date:	February 15, 2016
To:	Distribution and Meeting Attendees
From:	Carter T. Shore, E.I. Smith Gardner, Inc.
RE:	**Brownfield Road C&D Landfill** **Phase 2A – Stage 2 Construction & Closure Event No. 1** **Pre-Construction Meeting Summary**

Attendees: See attached list and contact information.

Meeting Summary:

A pre-construction meeting was held Tuesday, January 16th at the scalehouse to discuss the plans for the construction of Phase 2A – Stage 2 and Closure Event No. 1 of the Brownfield Road C&D Landfill. The meeting began at 2:00 p.m. and the following items were discussed:

A. Tentative Construction Schedule/Milestones

The Notice to Proceed (NTP) was discussed and will be issued once bonds have been received from Baxter Johnson. Work will generally occur Monday through Saturday (7 a.m. to 7 p.m. as daylight allows). Initial plans are to focus on construction of sediment basin and stockpile area to allow for cell excavation. Closure work will begin in spring to increase success of revegetation. Work sequencing will be discussed and updated at regular construction meetings.

B. Designation of Responsible Personnel

Wake Reclamation, LLC (Owner)
David Pepper, Director of Capital Projects
Don Plessinger, Site Manager
Richard Call, Jr., Site Supervisor

S+G (Design and CQA Engineer)
Stacey Smith, P.E., Senior Engineer
Carter Shore, E.I., Staff Engineer
Geotechnics (Soil Testing)

Baxter Johnson Contracting, Inc. (Contractor)
Brady Johnson, Project Manager
Brad Murray, Site Superintendent

Wake County - Water Quality
Shawn Springer, P.E., Site Inspector

C. Field Decisions and Change Orders

- Conflicts between drawings and field conditions shall be brought to the attention of S+G ASAP for resolution.

D. Distribution of Contract Documents

S+G will provide copies as requested by contractor and site.

E. Submittals

- Submittals will be reviewed by Engineer and issued back to Contractor as quickly as possible.

Electronic submittals will be used.

F. Record Documents

- S+G and Geotechnics will perform and document all quality assurance testing.
- S+G will maintain all test and sample information for preparation of the certification report.

G. Use of Site and Owner's Requirements

- Site access will be through the existing entrances and as coordinated with Site (Mr. Call).
- All personnel were reminded that the job is at an active landfill. Mr. Plessinger has informed site personnel that Baxter Johnson equipment has right-of-way. Baxter Johnson discussed use of flagmen to control traffic flow.

H. Safety and First Aid Procedures

Safety was discussed. Baxter Johnson has an internal safety program that is used.

I. Security Procedures

- Baxter Johnson is responsible for security when working after landfill hours and the gate must be locked.
- Baxter Johnson is responsible for securing equipment on-site.

J. Pay Requests

- Pay requests should be submitted at/near the end of each month to S+G (Attn: Carter Shore).

S+G will forward approved pay requests to Mr. Pepper.

K. Other Items

Land disturbance and erosion control permits are still in the process of being reviewed by Mr. Springer. S+G will work on acquiring approval and the permits as quickly as possible so as to not hold up construction activities. A pre-construction meeting with a County representative present will need to take place.

L. Next Meeting

Regular project meetings will be held monthly during active construction. It was agreed that regular meetings would be held each month at the scalehouse. The initial meeting will be February 16th at 8 a.m.

Attachment: Attendee List
Baxter Johnson Schedule

cc: Distribution:
David Pepper, Waste Industries USA, Inc.
Don Plessinger, Waste Industries USA, Inc.
Richard Call, Jr., Waste Industries USA, Inc.
Brady Johnson, Baxter Johnson
File

PRE-CONSTRUCTION MEETING
ATTENDEES

NAME	COMPANY/AGENCY	PHONE	EMAIL
Stacey Smith, P.E.	Smith Gardner, Inc.	(919) 828-0577 x127 (Office) (919) 815-0803 (Cell)	stacey@smithgardnerinc.com
Carter Shore	Smith Gardner, Inc.	(919) 828-0577 x142 (Office) (919) 500-1686 (Cell)	carter@smithgardnerinc.com
Brady Johnson	BJC	919-624-0110	bjohnson@baxterjohnson.com
Brad murray	BJC	919 669-5387	b murray @ baxterjohnson.com
Richard Call	WI	(919) 669-6729	Richard.Call@wasteIndustries.com
David Pepper	WI	(919) 877-2235	dawid-pepper@wasteindustries.com
Don Plessinger	W.I.	919-201-1434	donald.plessinger@wasteindustries.com

	Name	Duration	Start	Finish	Predecessors	Resource Names
1	Cell: Erosion Control	6 days	1/19/16 8:00 AM	1/22/16 5:00 PM		
2	Cell: Stockpile Basin	10 days	1/25/16 8:00 AM	2/5/16 5:00 PM	1	
3	Cell: Site Prep	20 days	2/8/16 8:00 AM	3/4/16 5:00 PM	2	
4	Cell: Embankment	18 days	3/7/16 8:00 AM	3/28/16 5:00 PM	3	
5	Cell: Excavation	30 days	3/29/16 8:00 AM	4/26/16 5:00 PM	4SS+2 days	
6	Cell: Perimeter Rd	5 days	3/29/16 8:00 AM	4/1/16 5:00 PM	4	
7	Cell: Revegetation	10 days	4/4/16 8:00 AM	4/18/16 5:00 PM	6	
8	Cap: Site Prep	8 days	4/18/16 8:00 AM	4/28/16 5:00 PM	7	
9	Cap: Vegetative Soil Layer	28 days	4/29/16 8:00 AM	6/7/16 5:00 PM	8	
10	Cap: Storm Runoff Structures	8 days	6/30/16 8:00 AM	8/9/16 5:00 PM	9	
11	Cap: Down Pipes	18 days	6/9/16 8:00 AM	6/24/16 5:00 PM	10	
12	Cap: Gas Vents	6 days	6/27/16 8:00 AM	7/4/16 5:00 PM	11	
13	Cap: Revegetation	8 days	7/4/16 8:00 AM	7/18/16 5:00 PM	12	

Appendix F

Earthwork CQA Data

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Stage 2
Raleigh, North Carolina

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Client: Smith+Gardner, Inc.
Project Name : Brownfield Rd. C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-01**	Geotechnics Representative :	Aaron Smith	Page :	1 of 1
Date (s) :	1/28/16-1/29/16	Reviewed By :	Shannon Sisell	Date :	2/23/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 1	40'	Lift 1	6"	625-001-001	118.3	12.1	**130.1**	**14.1**	**114.0**	**96.4%**	**95.0%**	Access Road, 1/28/16
DC- 1	40'	Lift 1	6"	625-001-001	118.3	12.1	**131.0**	**14.6**	**114.3**	**96.7%**	**95.0%**	Access Road, 1/28/16
ND- 2	200'	Lift 1	6"	625-001-002	110.0	13.0	**122.8**	**13.4**	**108.3**	**98.4%**	**95.0%**	Access Road, 1/28/16
ND- 3	330'	Lift 1	6"	625-001-002	110.0	13.0	**123.8**	**14.7**	**107.9**	**98.1%**	**95.0%**	Access Road, 1/28/16

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	1886	581

Client: Smith+Gardner, Inc.
Project Name : Brownfield Road C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-02**	Geotechnics Representative :	Aaron Smith	Page :	1 of 1
Date (s) :	2/1/16 to 2/6/16	Reviewed By :	Shannon Sisell	Date :	2/23/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 4	30'	Lift 2	6"	625-001-002	110.0	13.0	**120.6**	**13.4**	**106.3**	**96.7%**	**95.0%**	Access Road, 2/1/16
DC- 2	30'	Lift 2	6"	625-001-002	110.0	13.0	**121.6**	**13.8**	**106.8**	**97.1%**	**95.0%**	Access Road, 2/1/16
ND- 5	170'	Lift 2	6"	625-001-002	110.0	13.0	**116.4**	**11.3**	**104.6**	**95.1%**	**95.0%**	Access Road, 2/1/16
ND- 6	310'	Lift 2	6"	625-001-002	110.0	13.0	**117.1**	**11.9**	**104.6**	**95.1%**	**95.0%**	Access Road, 2/1/16
ND- 7	260'	Lift 3	6"	625-002-002	110.2	15.5	**120.4**	**15.0**	**104.7**	**95.0%**	**95.0%**	Access Road, 2/2/16
DC- 3	260'	Lift 3	6"	625-002-002	110.2	15.5	**121.4**	**15.4**	**105.2**	**95.4%**	**95.0%**	Access Road, 2/2/16
ND- 8	370'	Lift 3	6"	625-002-002	110.2	15.5	**127.0**	**16.4**	**109.1**	**99.0%**	**95.0%**	Access Road, 2/2/16
ND- 9	270'	Lift 4	6"	625-002-002	110.2	15.5	**125.1**	**17.5**	**106.5**	**96.6%**	**95.0%**	Access Road, 2/2/16
ND- 10	380'	Lift 4	6"	625-002-002	110.2	15.5	**124.2**	**17.1**	**106.1**	**96.2%**	**95.0%**	Access Road, 2/2/16
ND- 11	270'	Lift 5	6"	625-002-002	110.2	15.5	**122.7**	**17.0**	**104.9**	**95.2%**	**95.0%**	Access Road, 2/2/16
ND- 12	380'	Lift 5	6"	625-002-002	110.2	15.5	**123.8**	**16.9**	**105.9**	**96.1%**	**95.0%**	Access Road, 2/2/16
ND- 13	30'	Lift 3	6"	625-002-001	107.8	17.6	**123.4**	**19.5**	**103.3**	**95.8%**	**95.0%**	Access Road, 2/2/16
DC- 4	30'	Lift 3	6"	625-002-001	107.8	17.6	**123.0**	**20.1**	**102.5**	**95.1%**	**95.0%**	Access Road, 2/2/16
ND- 14	160'	Lift 3	6"	625-002-001	107.8	17.6	**122.5**	**19.4**	**102.6**	**95.2%**	**95.0%**	Access Road, 2/2/16
ND- 15	30'	Lift 4	6"	625-002-002	110.2	15.5	**124.1**	**17.5**	**105.6**	**95.8%**	**95.0%**	Access Road, 2/3/16
DC- 5	30'	Lift 4	6"	625-002-002	110.2	15.5	**123.3**	**17.3**	**105.1**	**95.4%**	**95.0%**	Access Road, 2/3/16
ND- 16	160'	Lift 4	6"	625-002-002	110.2	15.5	**124.8**	**17.0**	**106.7**	**96.8%**	**95.0%**	Access Road, 2/3/16

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	1903	572

Client: Smith + Gardner, Inc.
Project Name : Brownfield Rd. C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-03**	Geotechnics Representative :	Aaron Smith	Page :	1 of 1
Date (s) :	2/10/16 to 2/12/16	Reviewed By :	Shannon Sisell	Date :	3/26/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site- Excavated from basin of pond dam to be used for pond dam embankment

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 17	Side 1	1	6"	625-003-001	104.7	15.8	**117.3**	**17.5**	**99.8**	**95.3%**	**95.0%**	2/10/16
SFDC- 6	Side 1	1	N/A	625-003-001	104.7	15.8	**118.4**	**16.4**	**101.7**	**97.2%**	**95.0%**	2/10/16
ND- 18	Side 2	1	6"	625-003-001	104.7	15.8	**118.1**	**17.8**	**100.3**	**95.8%**	**95.0%**	2/10/16
ND- 19	Side 1	2	6"	625-003-001	104.7	15.8	**119.2**	**16.2**	**102.6**	**98.0%**	**95.0%**	2/10/16
ND- 20	Side 2	2	6"	625-003-001	104.7	15.8	**116.9**	**17.2**	**99.7**	**95.3%**	**95.0%**	2/10/16
ND- 21	Side 1	3	6"	625-003-001	104.7	15.8	**118.0**	**17.1**	**100.8**	**96.2%**	**95.0%**	2/10/16
ND- 22	Side 2	3	6"	625-003-001	104.7	15.8	**118.5**	**17.8**	**100.6**	**96.1%**	**95.0%**	2/10/16
SFDC- 7	Side 2	3	N/A	625-003-001	104.7	15.8	**119.7**	**17.3**	**102.0**	**97.5%**	**95.0%**	2/10/16
ND- 23	Side 1	4	6"	625-004-001	112.6	15.3	**127.6**	**16.8**	**109.2**	**97.0%**	**95.0%**	2/11/16
ND- 24	Side 2	4	6"	625-004-001	112.6	15.3	**126.5**	**17.4**	**107.8**	**95.7%**	**95.0%**	2/11/16
SFDC- 8	Side 2	4	N/A	625-004-001	112.6	15.3	**127.4**	**15.3**	**110.5**	**98.1%**	**95.0%**	2/11/16
ND- 25	Side 1	5	6"	625-004-001	112.6	15.3	**126.2**	**16.2**	**108.6**	**96.5%**	**95.0%**	2/11/16
ND- 26	Side 2	5	6"	625-004-001	112.6	15.3	**126.7**	**15.3**	**109.9**	**97.6%**	**95.0%**	2/11/16
ND- 27	Side 1	6	6"	625-004-001	112.6	15.3	**127.4**	**17.4**	**108.5**	**96.4%**	**95.0%**	2/11/16
ND- 28	Side 2	6	6"	625-004-001	112.6	15.3	**126.4**	**17.1**	**107.9**	**95.9%**	**95.0%**	2/11/16
ND- 29	Side 1	7	6"	625-004-001	112.6	15.3	**125.4**	**17.2**	**107.0**	**95.0%**	**95.0%**	2/11/16
SFDC- 9	Side 1	7	N/A	625-004-001	112.6	15.3	**125.7**	**16.2**	**108.2**	**96.1%**	**95.0%**	2/11/16
ND- 30	Side 2	7	6"	625-004-001	112.6	15.3	**125.4**	**16.2**	**107.9**	**95.8%**	**95.0%**	2/11/16
ND- 31	Side 1	8	6"	625-004-001	112.6	15.3	**124.8**	**15.9**	**107.7**	**95.6%**	**95.0%**	2/11/16
ND- 32	Side 1	8	6"	625-004-001	112.6	15.3	**125.7**	**17.2**	**107.3**	**95.3%**	**95.0%**	2/11/16
ND- 33	Side 1	9	6"	625-004-001	112.6	15.3	**127.6**	**17.1**	**109.0**	**96.8%**	**95.0%**	2/11/16
ND- 34	Side 2	9	6"	625-003-001	104.7	15.8	**120.2**	**17.5**	**102.3**	**97.7%**	**95.0%**	2/11/16
SFDC- 10	Side 2	9	N/A	625-003-001	104.7	15.8	**122.0**	**16.7**	**104.5**	**99.8%**	**95.0%**	2/11/16

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3440	1885	578

Client: Smith + Gardner, Inc.
Project Name : Brownfield Rd. C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-03**	Geotechnics Representative :	Aaron Smith	Page :	1 of 1
Date (s) :	2/10/16 to 2/12/16	Reviewed By :	Shannon Sisell	Date :	3/26/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site- Excavated from basin of pond dam to be used for pond dam embankment

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 35	Side 1	10	6"	625-003-001	104.7	15.8	**118.3**	**17.4**	**100.8**	**96.2%**	**95.0%**	2/12/16
SFDC- 11	Side 1	10	N/A	625-003-001	104.7	15.8	**119.7**	**16.3**	**102.9**	**98.3%**	**95.0%**	2/12/16
ND- 36	Side 2	10	6"	625-003-001	104.7	15.8	**119.2**	**17.2**	**101.7**	**97.1%**	**95.0%**	2/12/16
ND- 37	Side 1	11	6"	625-003-001	104.7	15.8	**120.6**	**16.8**	**103.3**	**98.6%**	**95.0%**	2/12/16
ND- 38	Side 2	11	6"	625-003-001	104.7	15.8	**119.1**	**16.0**	**102.7**	**98.1%**	**95.0%**	2/12/16
ND- 39	Side 1	12	6"	625-003-001	104.7	15.8	**118.0**	**18.0**	**100.0**	**95.5%**	**95.0%**	2/12/16
ND- 40	Side 2	12	6"	625-003-001	104.7	15.8	**120.8**	**17.8**	**102.5**	**97.9%**	**95.0%**	2/12/16
SFDC- 12	Side 2	12	N/A	625-003-001	104.7	15.8	**121.7**	**16.5**	**104.5**	**99.8%**	**95.0%**	2/12/16
ND- 41	Side 1	13	6"	625-003-001	104.7	15.8	**118.2**	**17.7**	**100.4**	**95.9%**	**95.0%**	2/12/16
ND- 42	Side 2	13	6"	625-003-001	104.7	15.8	**119.2**	**16.2**	**102.6**	**98.0%**	**95.0%**	2/12/16

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3440	1885	578

Client: Smith+Gardner, Inc.
Project Name : Brownfield Rd. C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-04**	Geotechnics Representative :	Aaron Smith	Page :	1 of 1
Date (s) :	2/17/16, 2/18/16	Reviewed By :	Shannon Sisell	Date :	4/4/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site- Excavated from basin of pond dam to be used for pond dam embankment

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 43	Side 1	13	6"	625-003-001	104.7	15.8	**120.2**	**17.8**	**102.0**	**97.5%**	**95.0%**	2/17/16
ND- 44	Side 2	13	6"	625-003-001	104.7	15.8	**119.7**	**17.4**	**102.0**	**97.4%**	**95.0%**	2/17/16
ND- 45	Side 1	14	6"	625-003-001	104.7	15.8	**117.4**	**16.8**	**100.5**	**96.0%**	**95.0%**	2/17/16
ND- 46	Side 2	14	6"	625-003-001	104.7	15.8	**119.6**	**17.4**	**101.9**	**97.3%**	**95.0%**	2/17/16
DCND- 13	Side 2	14	N/A	625-003-001	104.7	15.8	**117.9**	**16.4**	**101.3**	**96.7%**	**95.0%**	2/17/16
ND- 47	Side 1	15	6"	625-003-001	104.7	15.8	**120.7**	**17.3**	**102.9**	**98.3%**	**95.0%**	2/18/16
ND- 48	Side 2	15	6"	625-003-001	104.7	15.8	**122.1**	**16.0**	**105.3**	**100.5%**	**95.0%**	2/18/16
ND- 49	Side 1	16	6"	625-003-001	104.7	15.8	**120.6**	**17.1**	**103.0**	**98.4%**	**95.0%**	2/18/16
DCND- 14	Side 1	16	N/A	625-003-001	104.7	15.8	**118.4**	**16.2**	**101.9**	**97.3%**	**95.0%**	2/18/16
ND- 50	Side 2	16	6"	625-003-001	104.7	15.8	**117.2**	**15.4**	**101.6**	**97.0%**	**95.0%**	2/18/16
ND- 51	Side 1	17	6"	625-003-001	104.7	15.8	**120.4**	**17.0**	**102.9**	**98.3%**	**95.0%**	2/18/16
ND- 52	Side 2	17	6"	625-003-001	104.7	15.8	**117.4**	**16.2**	**101.0**	**96.5%**	**95.0%**	2/18/16
DCND- 15	Side 1	17	N/A	625-003-001	104.7	15.8	**119.4**	**15.4**	**103.5**	**98.8%**	**95.0%**	2/18/16

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3440	1914	580

Client: Smith + Gardner, Inc.
Project Name : Brownfield Rd. C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-05**	Geotechnics Representative :	Aaron Smith	Page :	1 of 1
Date (s) :	2/17/16, 2/18/16	Reviewed By :	Shannon F. Sisell	Date :	4/7/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site- Excavated from basin of pond dam to be used for pond dam embankment

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 53	30'	Lift 5	6"	625-004-001	112.6	15.3	**125.9**	**16.7**	**107.9**	**95.8%**	**95.0%**	3/9/16
ND- 54	170'	Lift 5	6"	625-004-001	112.6	15.3	**124.8**	**16.2**	**107.4**	**95.4%**	**95.0%**	3/9/16
NDDC- 16	170'	Lift 5	6"	625-004-001	112.6	15.3	**126.8**	**16.7**	**108.7**	**96.5%**	**95.0%**	3/9/16
ND- 55	310'	Lift 5	6"	625-004-001	112.6	15.3	**125.5**	**17.3**	**107.0**	**95.0%**	**95.0%**	3/9/16
ND- 56	30'	Lift 6	6"	625-004-001	112.6	15.3	**126.4**	**16.5**	**108.5**	**96.4%**	**95.0%**	3/9/16
ND- 57	170	Lift 6	6"	625-004-001	112.6	15.3	**124.9**	**15.4**	**108.2**	**96.1%**	**95.0%**	3/9/16
ND- 58	310'	Lift 6	6"	625-004-001	112.6	15.3	**129.4**	**16.0**	**111.6**	**99.1%**	**95.0%**	3/9/16
ND- 59	30'	Lift 7	6"	625-004-001	112.6	15.3	**126.4**	**15.9**	**109.1**	**96.9%**	**95.0%**	3/9/16
NDDC- 17	30'	Lift 7	6"	625-004-001	112.6	15.3	**127.2**	**15.1**	**110.5**	**98.1%**	**95.0%**	3/9/16
ND- 60	170'	Lift 7	6"	625-004-001	112.6	15.3	**125.4**	**17.0**	**107.2**	**95.2%**	**95.0%**	3/9/16
ND- 61	310'	Lift 7	6"	625-004-001	112.6	15.3	**126.8**	**17.4**	**108.0**	**95.9%**	**95.0%**	3/9/16
ND- 62	50'	Lift 8	6"	625-004-001	112.6	15.3	**127.5**	**17.4**	**108.6**	**96.5%**	**95.0%**	3/10/16
NDDC- 18	50'	Lift 8	6"	625-004-001	112.6	15.3	**127.3**	**17.8**	**108.1**	**96.0%**	**95.0%**	3/10/16
ND- 63	150'	Lift 8	6"	625-003-001	104.7	15.8	**123.4**	**20.9**	**102.1**	**97.5%**	**95.0%**	3/10/16
ND- 64	50'	Lift 9	6"	625-003-001	104.7	15.8	**121.7**	**16.6**	**104.4**	**99.7%**	**95.0%**	3/10/16
ND- 65	150'	Lift 9	6"	625-003-001	104.7	15.8	**121.6**	**16.7**	**104.2**	**99.5%**	**95.0%**	3/10/16
ND- 66	75'	Lift 10	6"	625-003-001	104.7	15.8	**115.1**	**15.3**	**99.8**	**95.3%**	**95.0%**	3/11/16
NDDC- 19	75'	Lift 10	6"	625-003-001	104.7	15.8	**115.5**	**15.9**	**99.7**	**95.2%**	**95.0%**	3/11/16
ND- 67	175'	Lift 10	6"	625-004-001	112.6	15.3	**125.2**	**15.7**	**108.2**	**96.1%**	**95.0%**	3/11/16
ND- 68	75'	Lift 11	6"	625-003-001	104.7	15.8	**119.4**	**18.2**	**101.0**	**96.5%**	**95.0%**	3/11/16
ND- 69	200'	Lift 11	6"	625-003-001	104.7	15.8	**120.0**	**17.9**	**101.8**	**97.2%**	**95.0%**	3/11/16
ND- 70	50'	Lift 12	6"	625-004-001	112.6	15.3	**120.6**	**12.6**	**107.1**	**95.1%**	**95.0%**	3/11/16
ND- 71	150'	Lift 12	6"	625-004-001	112.6	15.3	**121.5**	**12.9**	**107.6**	**95.6%**	**95.0%**	3/11/16

3/9/16				3/10/16 to 3/11/16			
Gauge Number	Gauge Model	Density Count	Moisture Count	Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3440	2179	710	20722	3430	1927	638

Client: Smith + Gardner, Inc.
Project Name : Brownfield Rd. C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-6**	Geotechnics Representative :	Erik Lindquist	Page :	1 of 1
Date (s) :	**3/14-3/19**	Reviewed By :	Shannon Sisell	Date :	4/7/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND- 72	225'	Lift 12	6"	625-004-001	112.6	15.3	**127.2**	**17.9**	**107.9**	**95.8%**	**95.0%**	3/14/16
ND- 73	75'	Lift 13	6"	625-003-001	104.7	15.8	**114.1**	**14.6**	**99.6**	**95.1%**	**95.0%**	3/14/16
ND- 74	200'	Lift 13	6"	625-003-001	104.7	15.8	**114.6**	**14.5**	**100.1**	**95.6%**	**95.0%**	3/14/16
ND- 75	75'	Lift 14	6"	625-004-001	112.6	15.3	**123.7**	**12.8**	**109.7**	**97.4%**	**95.0%**	3/15/16
DC- 20	75'	Lift 14	6"	625-004-001	112.6	15.3	**124.5**	**13.1**	**110.1**	**97.8%**	**95.0%**	3/15/16
ND- 76	Tie-in area	Lift 1	6"	625-003-001	104.7	15.8	**111.0**	**11.4**	**99.6**	**95.2%**	**95.0%**	3/15/16
ND- 77	Tie-in area	Lift 2	6"	625-003-001	104.7	15.8	**114.6**	**12.0**	**102.3**	**97.7%**	**95.0%**	3/15/16

Gauge Number	Gauge Model	Density Count	Moisture Count
20722	3430	1927	638

Client: Smith+Gardner
Project Name : Brown field Rd C&D Landfill
Project Number : 2016-625

Field Density Report

Report Number :	**SFFDR-7**	Geotechnics Representative :	Brandon Thomas	Page :	1 of 1
Date (s) :	**3/16-3/18**	Reviewed By :	MPS	Date :	4/26/16

Contractor :	Baxter-Johnson	Borrow Source :	On Site

Compaction Equipment :	CAT 100 F Roller, Sakai SV 505 P Roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND 78	S. END ACCESS RD	-5	6"	625-005-001	105.0	17.3	**125.4**	**17.9**	**106.4**	**101.3%**	**95.0%**	3/16/2016
ND 79	S. END ACCESS RD	-4	6"	625-005-001	105.0	17.3	**122.1**	**16.6**	**104.7**	**99.7%**	**95.0%**	3/16/2016
ND 80	S. END ACCESS RD	-4	6"	625-005-001	105.0	17.3	**126.0**	**16.0**	**108.6**	**103.4%**	**95.0%**	3/16/2016
ND 81	S. END ACCESS RD	-3	6"	625-005-001	105.0	17.3	**123.0**	**17.2**	**104.9**	**100.0%**	**95.0%**	3/16/2016
ND 82	S. END ACCESS RD	-3	6"	625-005-001	105.0	17.3	**124.5**	**17.5**	**106.0**	**100.9%**	**95.0%**	3/16/2016
ND 83	S. END ACCESS RD	-2	6"	625-005-001	105.0	17.3	**123.2**	**16.4**	**105.8**	**100.8%**	**95.0%**	3/17/2016
ND 84	S. END ACCESS RD	-2	6"	625-005-001	105.0	17.3	**124.0**	**18.1**	**105.0**	**100.0%**	**95.0%**	3/17/2016
ND 85	S. END ACCESS RD	-1.5	6"	625-005-001	105.0	17.3	**124.3**	**17.6**	**105.7**	**100.7%**	**95.0%**	3/17/2016
ND 86	S. END ACCESS RD	-1.5	6"	625-005-001	105.0	17.3	**125.1**	**19.1**	**105.0**	**100.0%**	**95.0%**	3/17/2016
ND 87	S. END ACCESS RD	-1	6"	625-005-001	105.0	17.3	**126.4**	**19.4**	**105.9**	**100.8%**	**95.0%**	3/17/2016
ND 88	S. END ACCESS RD	-1	6"	625-005-001	105.0	17.3	**125.9**	**18.6**	**106.2**	**101.1%**	**95.0%**	3/18/2016
ND 89	S. END ACCESS RD	-0.5	6"	625-005-001	105.0	17.3	**123.7**	**17.9**	**104.9**	**99.9%**	**95.0%**	3/18/2016
ND 90	S. END ACCESS RD	-0.5	6"	625-005-001	105.0	17.3	**126.3**	**18.3**	**106.8**	**101.7%**	**95.0%**	3/18/2016
ND 91	S. END ACCESS RD	SG	6"	625-005-001	105.0	17.3	**125.8**	**17.7**	**106.9**	**101.8%**	**95.0%**	3/18/2016
DC 21	S. END ACCESS RD	SG	6"	625-005-001	105.0	17.3	**124.5**	**16.2**	**107.1**	**102.0%**	**95.0%**	3/18/2016
ND 92	S. END ACCESS RD	SG	6"	625-005-001	105.0	17.3	**125.0**	**18.0**	**105.9**	**100.9%**	**95.0%**	3/18/2016

Gauge Number	Gauge Model	Density Count	Moisture Count
32387	3430	2202	678

ATTERBERG LIMIT

ASTM D 4318-10

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-1
Lab ID	2016-625-001-001	Visual Description	**BROWN**
			(MInus No. 40 sieve material, Wet Method)

NON - PLASTIC MATERIAL

Tested By *TB* *Date* *2/1/16* *Checked By* *GEM* *Date* 2/2/16

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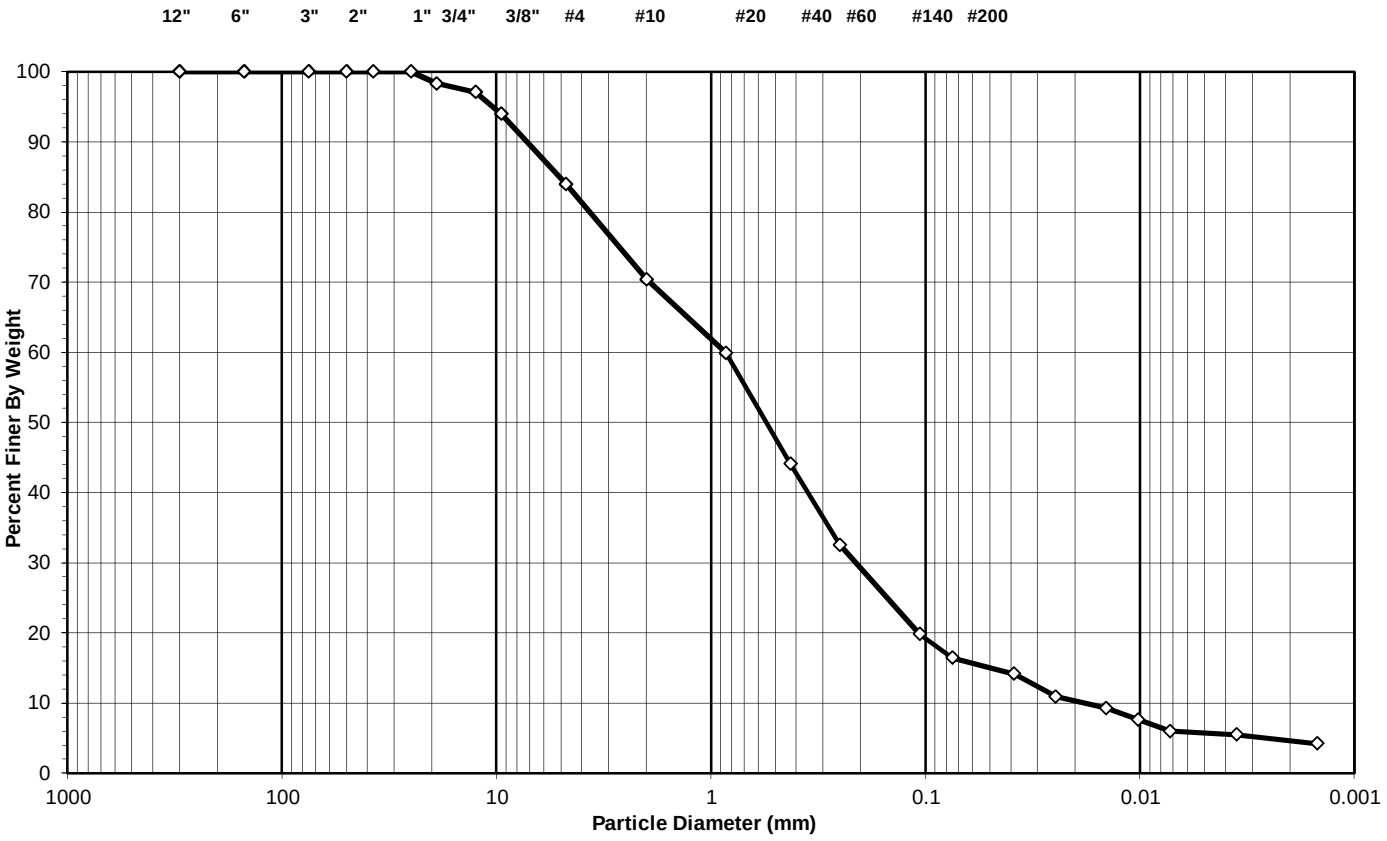
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-1
Lab ID	2016-625-001-001	Soil Color	BROWN

	SIEVE ANALYSIS				*HYDROMETER*
USCS	**cobbles**	**gravel**	**sand**		**silt and clay fraction**
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	16.00
#4 To #200	*Sand*	67.55
Finer Than #200	*Silt & Clay*	16.45

USCS Symbol ***SM, TESTED (NON PLASTIC FINES)***

USCS Classification ***SILTY SAND WITH GRAVEL***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-001-001 SIEVEHYD10.xls]Sheet1*

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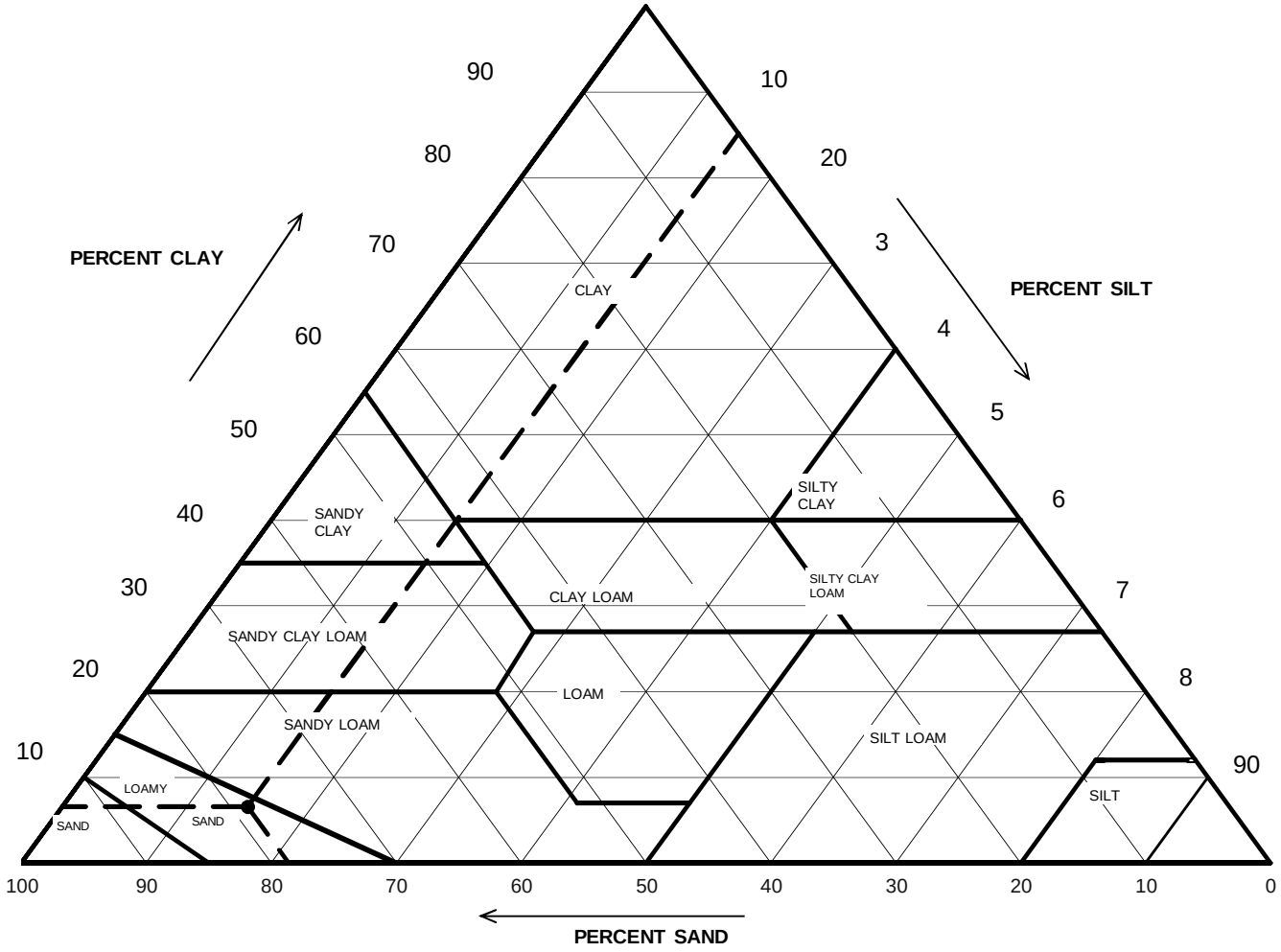
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-1
Lab ID	2016-625-001-001	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	29.61	**0.00**
2	70.39	*Sand*	55.33	**78.61**
0.05	15.06	*Silt*	10.42	**14.80**
0.002	4.64	*Clay*	4.64	**6.59**

USDA Classification: ***LOAMY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-001-001 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-1
Lab ID	2016-625-001-001	Soil Color	**BROWN**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	E-2	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	37.41	Corrected Dry Wt. of - #10 Material (g)	45.19
Wgt.Tare + Dry Soil (g)	35.98		
Weight of Tare (g)	22.54	Weight of - #200 Material (g)	10.56
Weight of Water (g)	1.43	Weight of - #10 ; + #200 Material (g)	34.63
Weight of Dry Soil (g)	13.44		
Moisture Content (%)	**10.6**	**J-FACTOR (%FINER THAN #10)**	**0.7039**
Soil Specimen Data			
Tare No.	165		
Wgt.Tare + Air Dry Soil (g)	958.43		
Weight of Tare (g)	237.36		
Air Dried Wgt. Total Sample (g)	721.07	Dry Weight of Material Retained on #10 (g)	198.61
Total Dry Sample Weight (g)	670.83	Corrected Dry Sample Wt - #10 (g)	472.22

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	11.24	1.7	1.7	98.3	**98.3**
1/2"	12.5	8.22	1.2	2.9	97.1	**97.1**
3/8"	9.50	20.75	3.1	6.0	94.0	**94.0**
#4	4.75	67.10	10.0	16.0	84.0	**84.0**
#10	2.00	91.30	13.6	29.6	70.4	**70.4**
#20	0.85	6.71	14.8	14.8	85.2	**59.9**
#40	0.425	10.17	22.5	37.4	62.6	**44.1**
#60	0.250	7.40	16.4	53.7	46.3	**32.6**
#140	0.106	8.18	18.1	71.8	28.2	**19.8**
#200	0.075	2.17	4.8	76.6	23.4	**16.5**
Pan	-	10.56	23.4	100.0	-	**-**

Notes :

Tested By EL Date 2/3/16 Checked By GEM Date 2/4/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-1
Lab ID	2016-625-001-001	Soil Color	**BROWN**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	13.0	22.6	4.38	8.6	20.1	0.01452	0.0386	**14.2**
5	11.0	22.7	4.35	6.6	15.5	0.01450	0.0247	**10.9**
15	10.0	22.7	4.35	5.6	13.2	0.01450	0.0143	**9.3**
30	9.0	22.7	4.35	4.6	10.9	0.01450	0.0102	**7.6**
60	8.0	22.7	4.35	3.6	8.5	0.01450	0.0072	**6.0**
250	7.5	23.3	4.17	3.3	7.8	0.01440	0.0035	**5.5**
1440	7.0	22.4	4.44	2.6	6.0	0.01455	0.0015	**4.2**

Soil Specimen Data		**Other Corrections**	
Wgt. of Dry Material (g)	45.19	Hygroscopic Moisture Factor	0.904
Weight of Deflocculant (g)	5.0	a - Factor	1.056
		Percent Finer than # 10	70.39
		Specific Gravity	2.37 Assumed

Notes:

Tested By TB Date 2/1/16 Checked By GEM Date 2/4/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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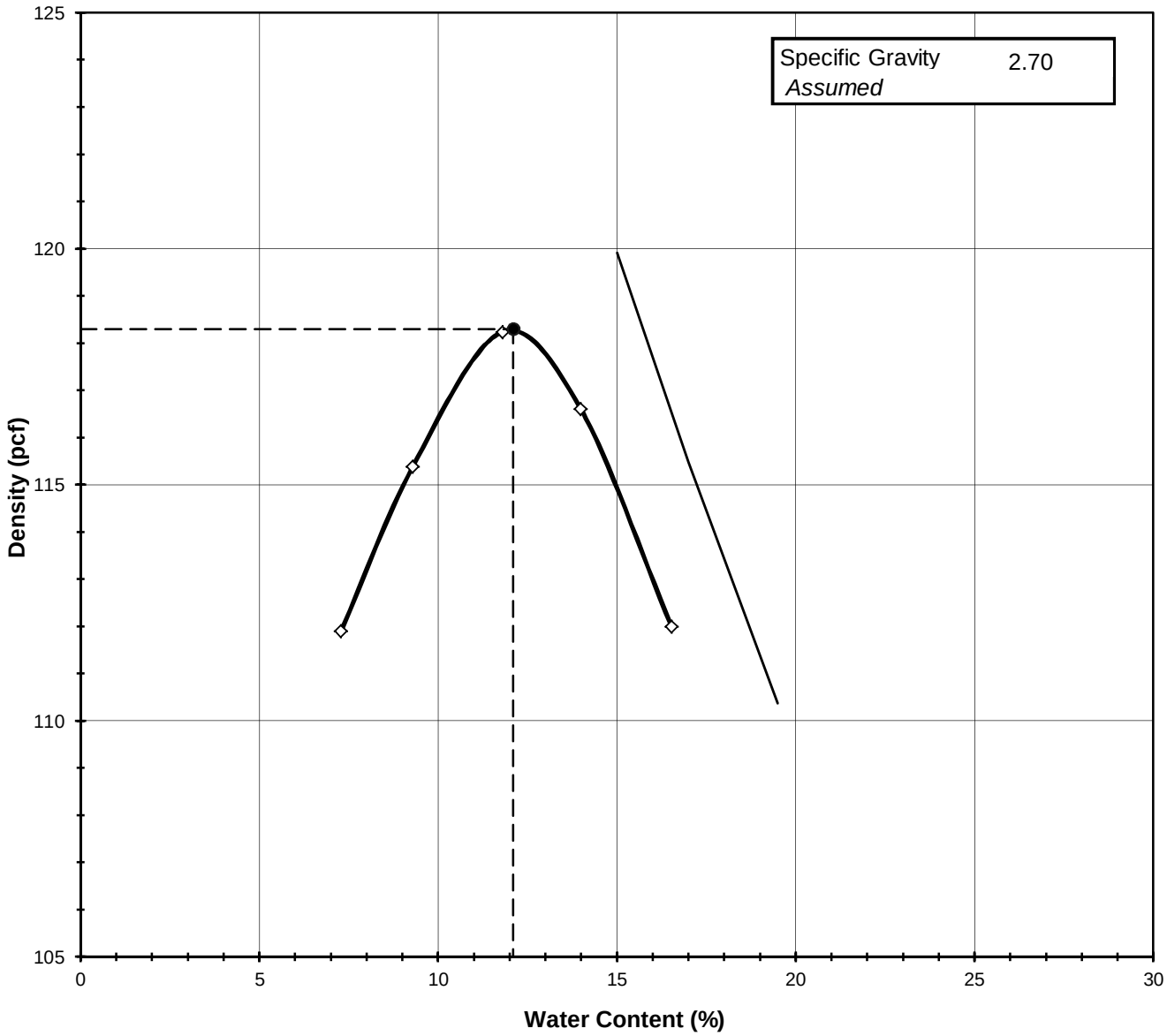
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-001	Sample No.:	BS-1
Lab ID:	2016-625-001-001	Test Method	**STANDARD**

Visual Description: BROWN SILTY SAND WITH GRAVEL

Optimum Water Content	**12.1**
Maximum Dry Density	**118.3**



Tested By AMS *Date* 2/4/16 *Checked By* GEM *Date* 2/5/16

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-001	Sample No.:	BS-1
Lab ID:	2016-625-001-001		

Visual Description: BROWN SILTY SAND WITH GRAVEL

Total Weight of the Sample (g)	19100
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	2
Percent Retained on 3/8"	6
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	173
Mold diameter		6'
Weight of the Mold (g)		5531
Volume of the Mold (cm^3)		2119

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	9608	9814	10020	10045	9963
Wt.of Mold (g)	5531	5531	5531	5531	5531
Wt. of Wet Sample (g)	4078	4284	4490	4515	4433
Mold Volume (cm^3)	2119	2119	2119	2119	2119

Moisture Content / Density

Tare Number	310	821	815	305	300
Wt. of Tare & Wet Sample (g)	401.90	450.70	440.30	416.50	433.80
Wt. of Tare & Dry Sample (g)	382.20	423.50	408.40	375.80	388.00
Wt. of Tare (g)	111.90	130.90	138.10	84.80	110.90
Wt. of Water (g)	19.70	27.20	31.90	40.70	45.80
Wt. of Dry Sample (g)	270.30	292.60	270.30	291.00	277.10

Wet Density (g/cm^3)	1.92	2.02	2.12	2.13	2.09
Wet Density (pcf)	120.1	126.1	132.2	132.9	130.5
Moisture Content (%)	**7.3**	**9.3**	**11.8**	**14.0**	**16.5**
Dry Density (pcf)	**111.9**	**115.4**	**118.2**	**116.6**	**112.0**

Zero Air Voids

Moisture Content (%)	15.0	17.0	19.5	
Dry Unit Weight (pcf)	119.9	115.5	110.4	

Tested By AMS *Date* 2/4/16 *Checked By* GEM *Date* 2/5/16

DCN:CT-S12 DATE:5/1/13 REVISION: 14 *PROCTOR.xls*

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ATTERBERG LIMIT

ASTM D 4318-10

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-2
Lab ID	2016-625-001-002	Visual Description	**TAN**
			(MInus No. 40 sieve material, Wet Method)

NON - PLASTIC MATERIAL

Tested By *TB* *Date* *2/1/16* *Checked By* *GEM* *Date* 2/2/16

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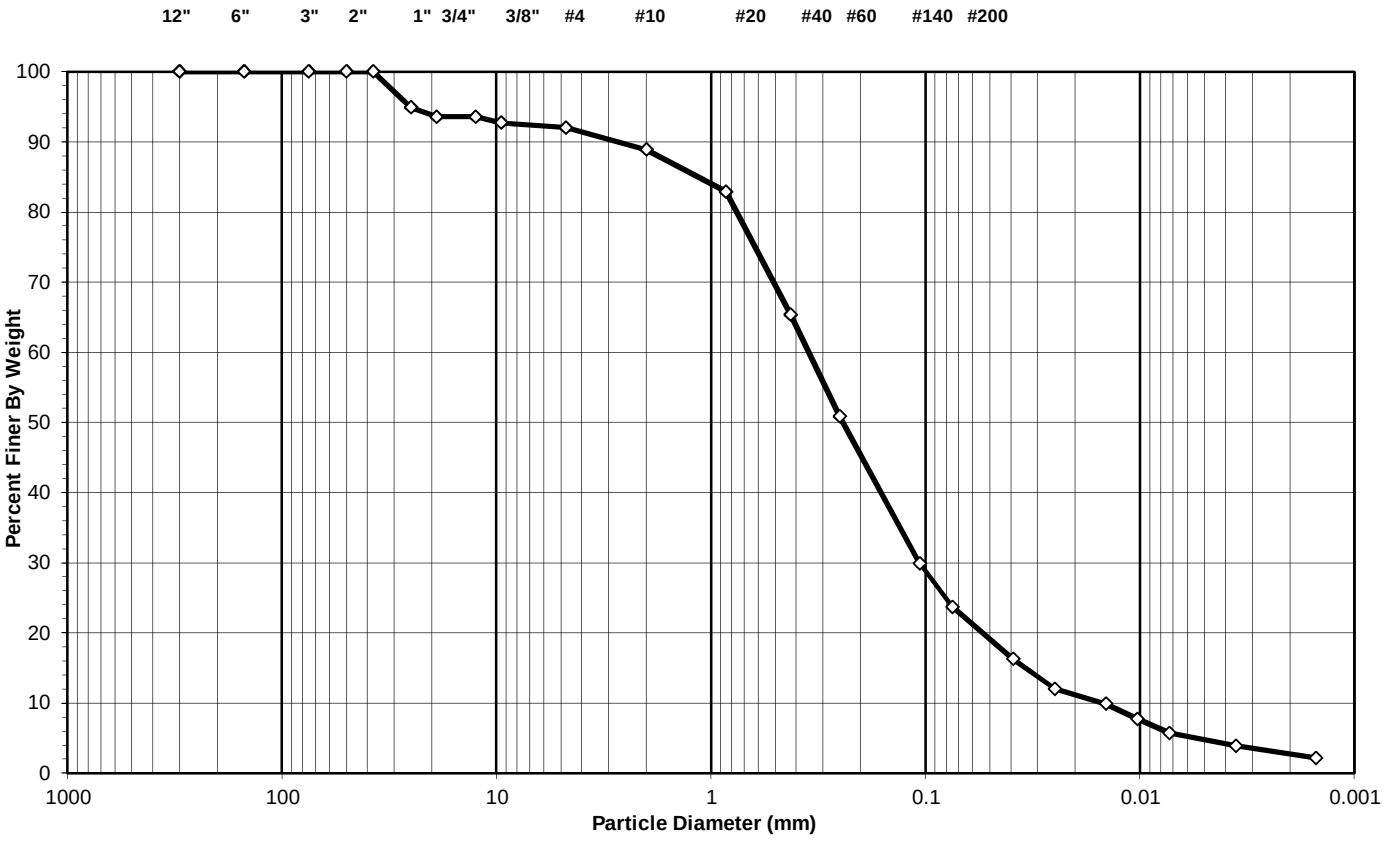
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-2
Lab ID	2016-625-001-002	Soil Color	TAN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	7.96
#4 To #200	*Sand*	68.37
Finer Than #200	*Silt & Clay*	23.67

USCS Symbol ***SM, TESTED (NON PLASTIC FINES)***

USCS Classification ***SILTY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-001-002 SIEVEHYD10.xls]Sheet1*

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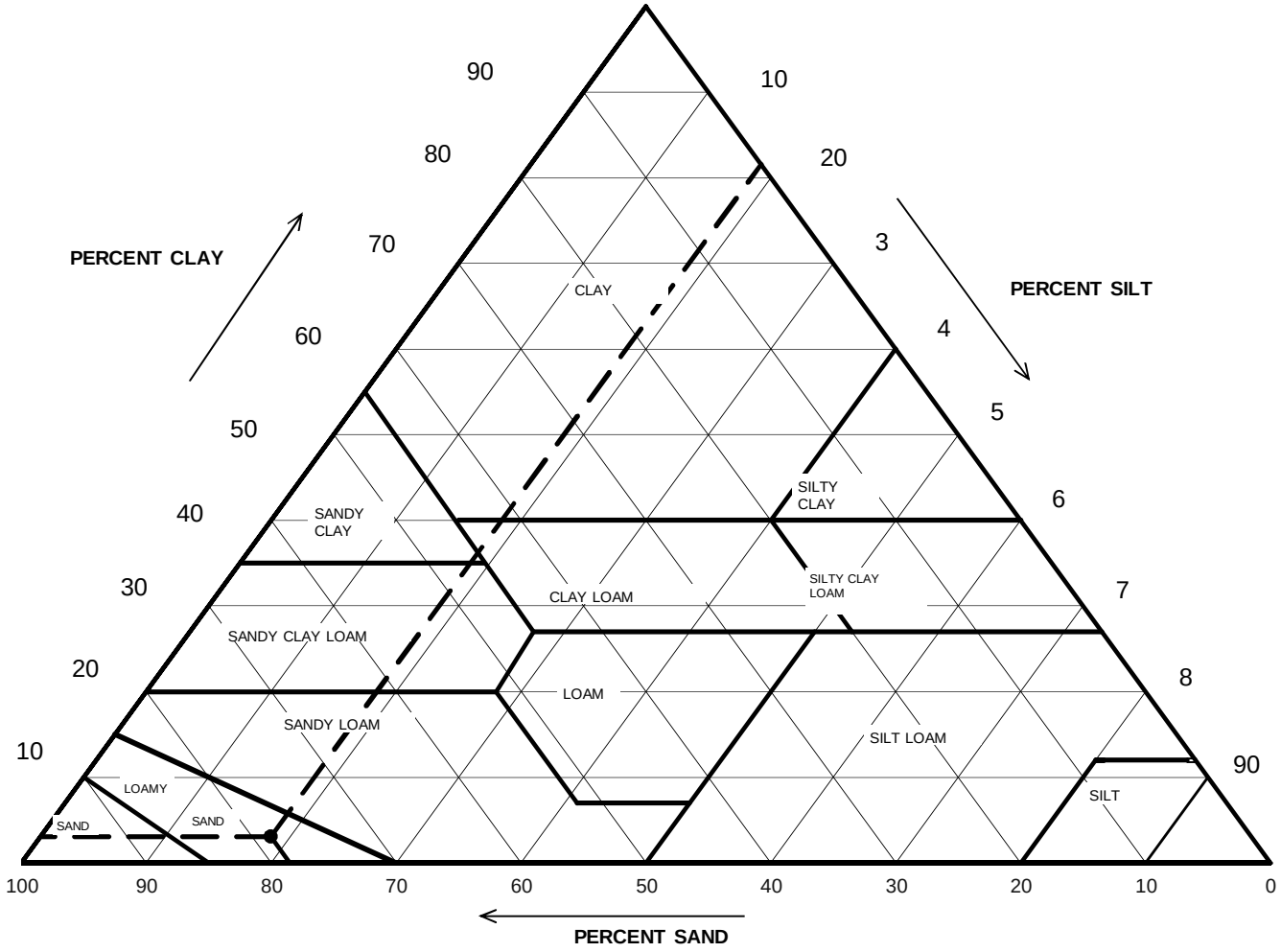
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-2
Lab ID	2016-625-001-002	Soil Color	TAN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	11.13	**0.00**
2	88.87	*Sand*	69.77	**78.51**
0.05	19.10	*Silt*	16.36	**18.41**
0.002	2.74	*Clay*	2.74	**3.09**

USDA Classification: ***LOAMY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-001-002 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-2
Lab ID	2016-625-001-002	Soil Color	**TAN**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	P-1	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	35.27	Corrected Dry Wt. of - #10 Material (g)	44.17
Wgt.Tare + Dry Soil (g)	33.76		
Weight of Tare (g)	22.31	Weight of - #200 Material (g)	11.76
Weight of Water (g)	1.51	Weight of - #10 ; + #200 Material (g)	32.41
Weight of Dry Soil (g)	11.45		
Moisture Content (%)	**13.2**	**J-FACTOR (%FINER THAN #10)**	**0.8887**
Soil Specimen Data			
Tare No.	164		
Wgt.Tare + Air Dry Soil (g)	1343.94		
Weight of Tare (g)	242.72		
Air Dried Wgt. Total Sample (g)	1101.22	Dry Weight of Material Retained on #10 (g)	109.69
Total Dry Sample Weight (g)	985.69	Corrected Dry Sample Wt - #10 (g)	876.00

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	50.40	5.1	5.1	94.9	**94.9**
3/4"	19.0	12.72	1.3	6.4	93.6	**93.6**
1/2"	12.5	0.00	0.0	6.4	93.6	**93.6**
3/8"	9.50	8.60	0.9	7.3	92.7	**92.7**
#4	4.75	6.73	0.7	8.0	92.0	**92.0**
#10	2.00	31.24	3.2	11.1	88.9	**88.9**
#20	0.85	2.97	6.7	6.7	93.3	**82.9**
#40	0.425	8.69	19.7	26.4	73.6	**65.4**
#60	0.250	7.25	16.4	42.8	57.2	**50.8**
#140	0.106	10.40	23.5	66.4	33.6	**29.9**
#200	0.075	3.10	7.0	73.4	26.6	**23.7**
Pan	-	11.76	26.6	100.0	-	**-**

Notes :

Tested By EL Date 2/3/16 Checked By GEM Date 2/4/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-001-002 SIEVEHYD10.xls]Sheet1

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-001	Sample No.	BS-2
Lab ID	2016-625-001-002	Soil Color	**TAN**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	12.0	22.7	4.35	7.6	18.3	0.01450	0.0388	**16.2**
5	10.0	22.7	4.35	5.6	13.5	0.01450	0.0248	**12.0**
15	9.0	22.7	4.35	4.6	11.1	0.01450	0.0144	**9.9**
30	8.0	22.7	4.35	3.6	8.7	0.01450	0.0102	**7.8**
60	7.0	22.8	4.32	2.7	6.4	0.01448	0.0073	**5.7**
250	6.0	23.3	4.17	1.8	4.4	0.01440	0.0036	**3.9**
1440	5.5	22.3	4.48	1.0	2.4	0.01457	0.0015	**2.2**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	44.17	Hygroscopic Moisture Factor	0.883	
Weight of Deflocculant (g)	5.0			
		a - Factor	1.056	
		Percent Finer than # 10	88.87	
		Specific Gravity	2.37	Assumed

Notes:

Tested By TB Date 2/1/16 Checked By GEM Date 2/4/16

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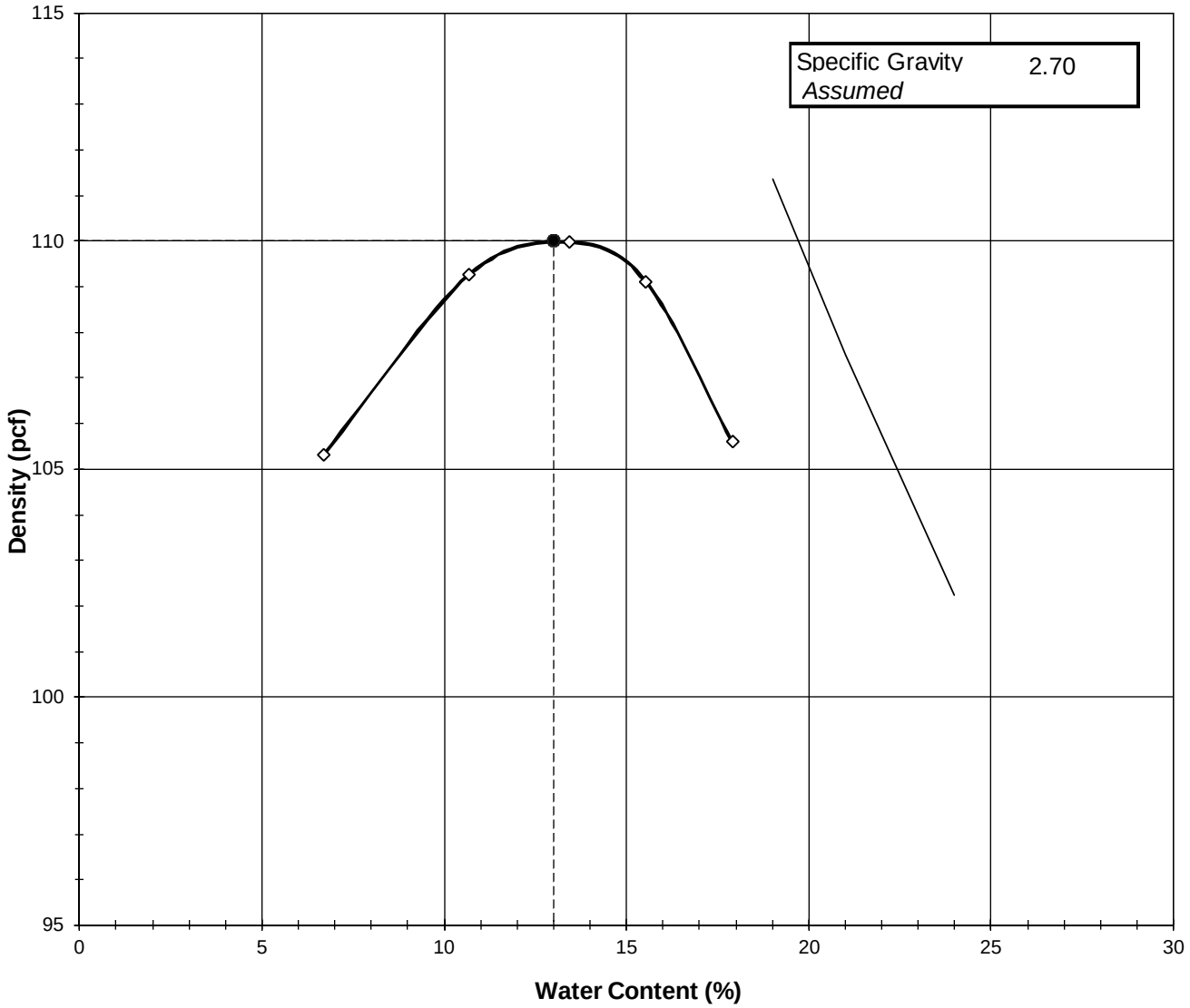
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-001	Sample No.:	BS-2
Lab ID:	2016-625-001-002	Test Method	**STANDARD**

Visual Description: TAN SILTY SAND

Optimum Water Content **13.0**
Maximum Dry Density **110.0**



Tested By *AMS* *Date* *2/4/16* *Checked By* *GEM* *Date* *2/5/16*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-001	Sample No.:	BS-2
Lab ID:	2016-625-001-002		

Visual Description: TAN SILTY SAND

Total Weight of the Sample (g)	19300
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	1
Percent Retained on 3/8"	1
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	B

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4161
Volume of the Mold (cm^3)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5856	5986	6044	6063	6040
Wt.of Mold (g)	4161	4161	4161	4161	4161
Wt. of Wet Sample (g)	1696	1826	1883	1903	1879
Mold Volume (cm^3)	942	942	942	942	942

Moisture Content / Density

Tare Number	314	312	368	307	866
Wt. of Tare & Wet Sample (g)	432.30	401.10	426.80	432.00	421.80
Wt. of Tare & Dry Sample (g)	410.50	370.50	389.40	388.70	370.90
Wt. of Tare (g)	84.50	84.30	111.10	109.90	86.50
Wt. of Water (g)	21.80	30.60	37.40	43.30	50.90
Wt. of Dry Sample (g)	326.00	286.20	278.30	278.80	284.40

Wet Density (g/cm^3)	1.80	1.94	2.00	2.02	2.00
Wet Density (pcf)	112.3	121.0	124.7	126.1	124.5
Moisture Content (%)	**6.7**	**10.7**	**13.4**	**15.5**	**17.9**
Dry Density (pcf)	**105.3**	**109.3**	**110.0**	**109.1**	**105.6**

Zero Air Voids

Moisture Content (%)	19.0	21.0	24.0
Dry Unit Weight (pcf)	111.4	107.5	102.2

Tested By AMS *Date* 2/4/16 *Checked By* GEM *Date* 2/5/16

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February 11, 2016

Project No. 2016-625-002

Mr. Carter Shore
Smith + Gardner, Inc.
14 N. Boylan Ave.
Raleigh, NC 27603

cshore@smithgardnerinc.com

Transmittal
Laboratory Test Results
Brownfield C & D Landfill

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89-10

Client:	SMITH + GARDNER, INC.	Boring No.:	SMALL STOCKPILE
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-002	Sample No.:	RED SANDY CLAY
Lab ID:	2016-625-002-001	Soil Description:	**RED LEAN CLAY**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

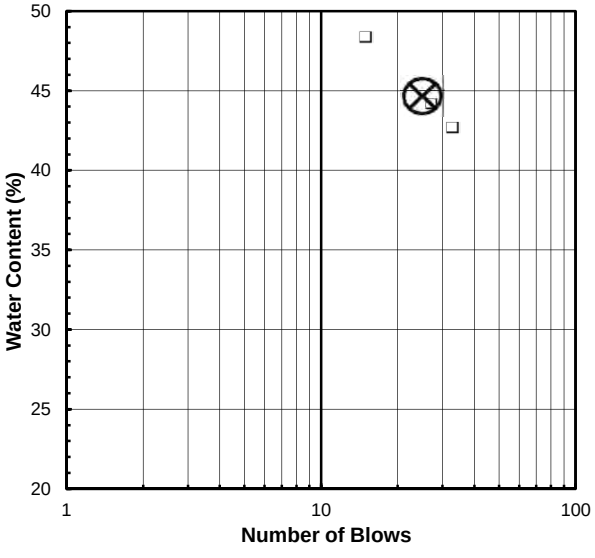
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	I	1M	O	**U**
Wt. of Tare & Wet Sample (g)	29.44	27.90	28.73	**L**
Wt. of Tare & Dry Sample (g)	25.19	24.20	24.33	**T**
Wt. of Tare (g)	15.22	15.82	15.22	**I**
Wt. of Water (g)	4.3	3.7	4.4	**P**
Wt. of Dry Sample (g)	10.0	8.4	9.1	**O**
				I
Moisture Content (%)	**42.6**	**44.2**	**48.3**	**N**
Number of Blows	**33**	**27**	**15**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-B	4M	
Wt. of Tare & Wet Sample (g)	22.50	24.38	
Wt. of Tare & Dry Sample (g)	21.16	22.68	
Wt. of Tare (g)	15.50	15.59	
Wt. of Water (g)	1.3	1.7	
Wt. of Dry Sample (g)	5.7	7.1	
Moisture Content (%)	**23.7**	**24.0**	**-0.3**

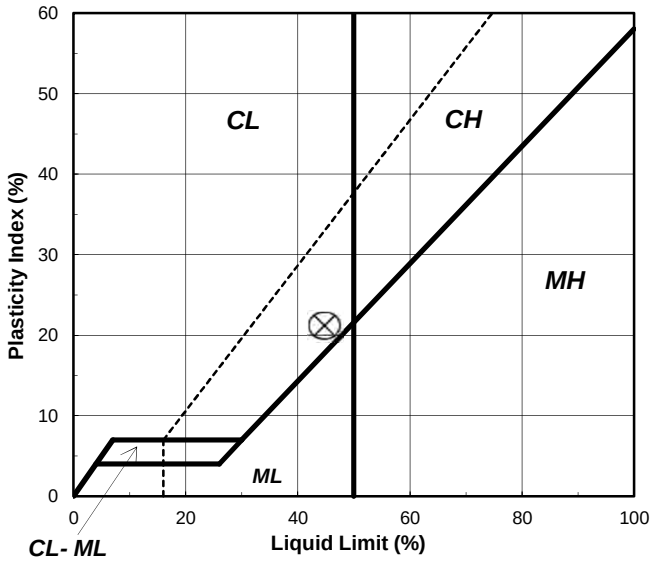
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**24**
Plasticity Index (%)	**21**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By NE *Date* 2/10/16 *Checked By* GEM *Date* 2/11/16

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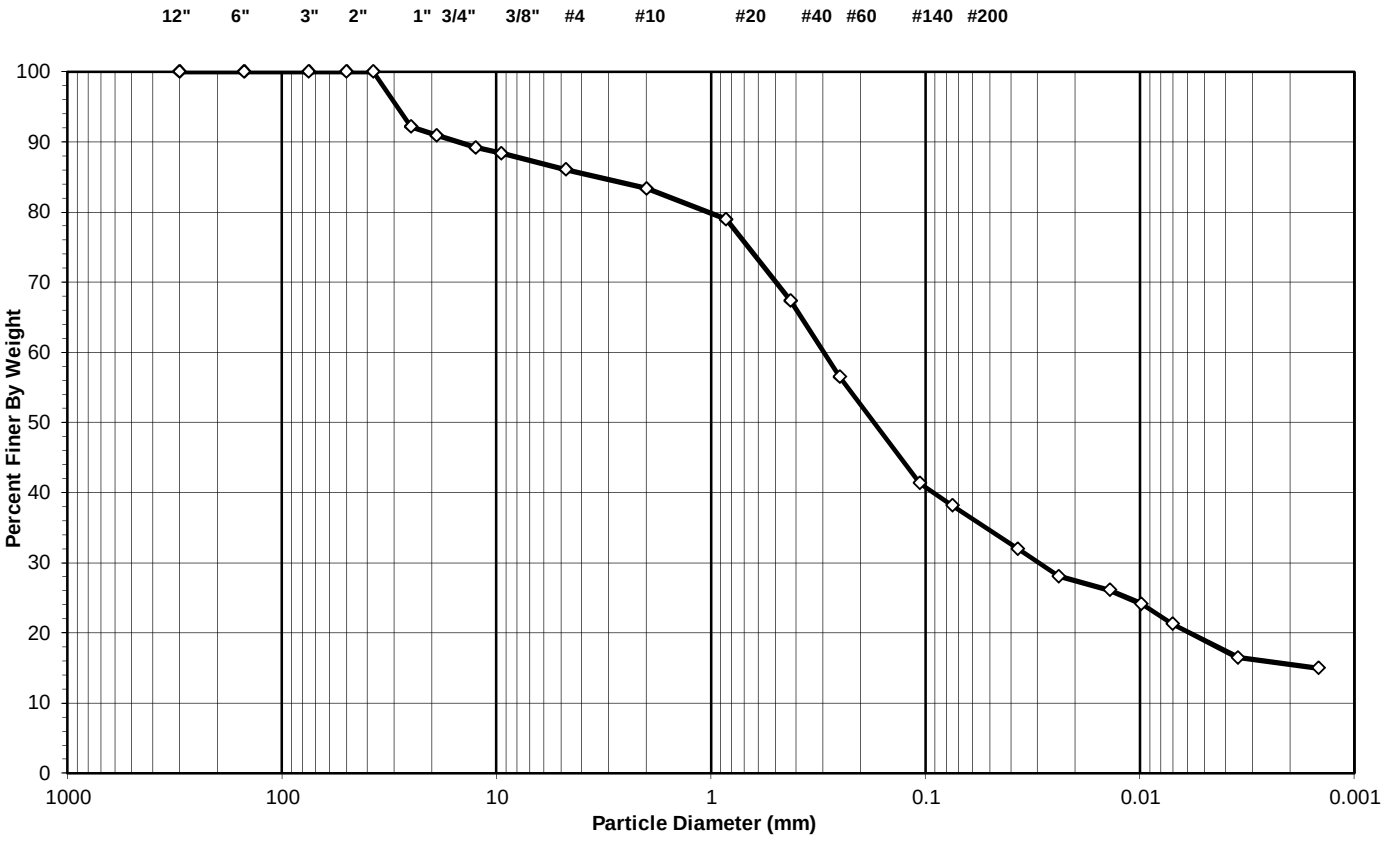
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	RED SANDY CLAY
Lab ID	2016-625-002-001	Soil Color	RED

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	13.95
#4 To #200	*Sand*	47.90
Finer Than #200	*Silt & Clay*	38.15

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-002-001 SIEVEHYD10.xls]Sheet1*

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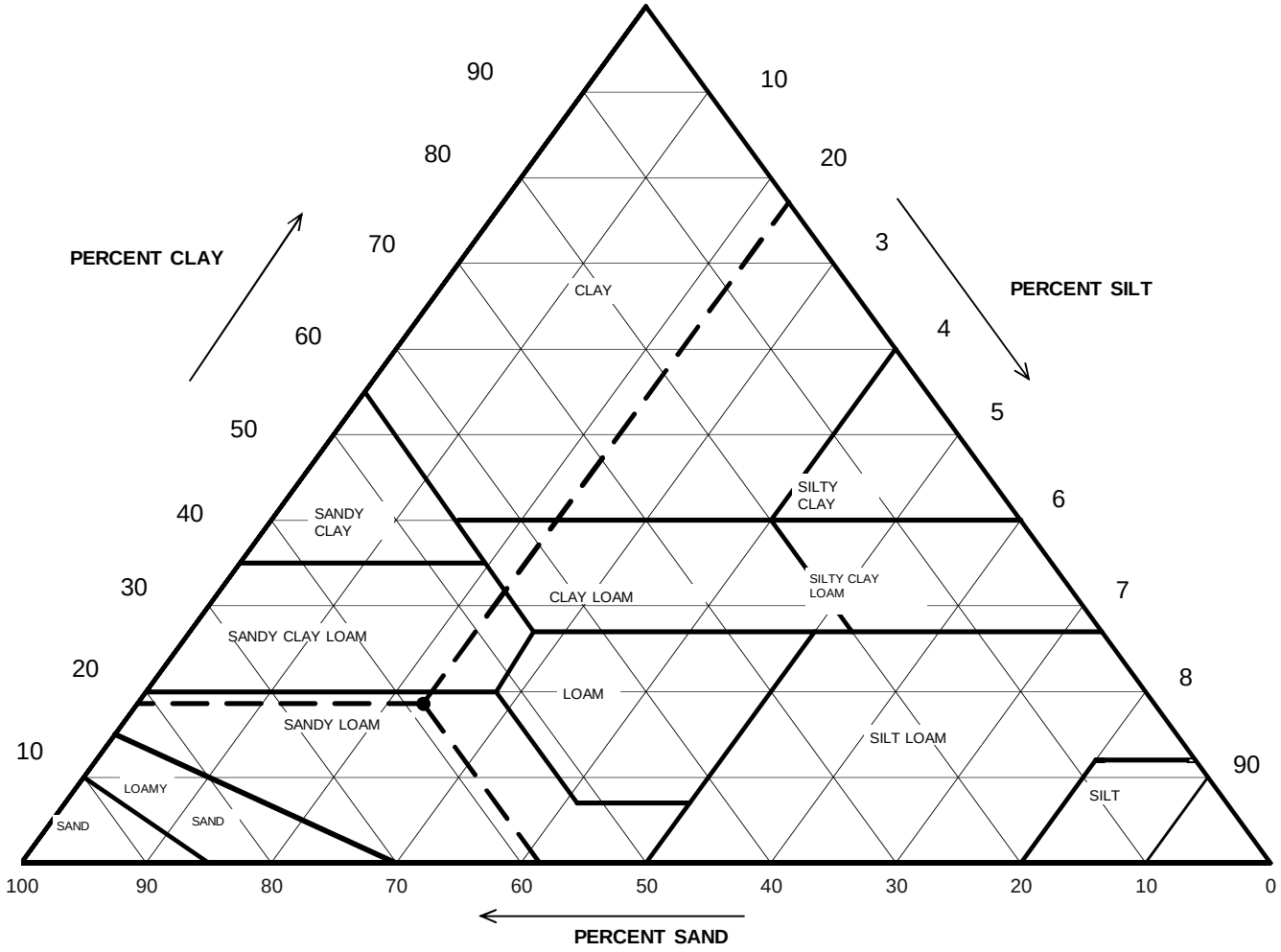
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	RED SANDY CLAY
Lab ID	2016-625-002-001	Soil Color	RED



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	16.63	**0.00**
2	83.37	*Sand*	48.78	**58.51**
0.05	34.59	*Silt*	19.06	**22.86**
0.002	15.53	*Clay*	15.53	**18.63**

USDA Classification: ***SANDY LOAM***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-002-001 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	RED SANDY CLAY
Lab ID	2016-625-002-001	Soil Color	**RED**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	N-1	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	29.41	Corrected Dry Wt. of - #10 Material (g)	44.97
Wgt.Tare + Dry Soil (g)	28.04		
Weight of Tare (g)	15.80	Weight of - #200 Material (g)	20.58
Weight of Water (g)	1.37	Weight of - #10 ; + #200 Material (g)	24.39
Weight of Dry Soil (g)	12.24		
Moisture Content (%)	**11.2**	**J-FACTOR (%FINER THAN #10)**	**0.8337**
Soil Specimen Data			
Tare No.	319		
Wgt.Tare + Air Dry Soil (g)	2004.98		
Weight of Tare (g)	209.12		
Air Dried Wgt. Total Sample (g)	1795.86	Dry Weight of Material Retained on #10 (g)	273.16
Total Dry Sample Weight (g)	1642.58	Corrected Dry Sample Wt - #10 (g)	1369.42

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	128.82	7.8	7.8	92.2	**92.2**
3/4"	19.0	20.36	1.2	9.1	90.9	**90.9**
1/2"	12.5	27.88	1.7	10.8	89.2	**89.2**
3/8"	9.50	13.57	0.8	11.6	88.4	**88.4**
#4	4.75	38.51	2.3	13.9	86.1	**86.1**
#10	2.00	44.02	2.7	16.6	83.4	**83.4**
#20	0.85	2.36	5.2	5.2	94.8	**79.0**
#40	0.425	6.28	14.0	19.2	80.8	**67.4**
#60	0.250	5.86	13.0	32.2	67.8	**56.5**
#140	0.106	8.17	18.2	50.4	49.6	**41.3**
#200	0.075	1.72	3.8	54.2	45.8	**38.2**
Pan	-	20.58	45.8	100.0	-	**-**

Notes :

Tested By BW Date 2/11/16 Checked By GEM Date 2/11/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	RED SANDY CLAY
Lab ID	2016-625-002-001	Soil Color	**RED**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	21.0	21.7	4.66	16.3	38.4	0.01467	0.0372	**32.0**
5	19.0	21.7	4.66	14.3	33.7	0.01467	0.0238	**28.1**
15	18.0	21.7	4.66	13.3	31.3	0.01467	0.0138	**26.1**
30	17.0	21.7	4.66	12.3	29.0	0.01467	0.0098	**24.2**
60	15.5	21.8	4.63	10.9	25.5	0.01466	0.0070	**21.3**
250	13.0	22	4.57	8.4	19.8	0.01462	0.0035	**16.5**
1440	12.5	21.1	4.85	7.7	18.0	0.01478	0.0015	**15.0**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	44.97	Hygroscopic Moisture Factor	0.899	
Weight of Deflocculant (g)	5.0			
		a - Factor	1.056	
		Percent Finer than # 10	83.37	
		Specific Gravity	2.37	Assumed

Notes:

Tested By TB Date 2/9/16 Checked By GEM Date 2/11/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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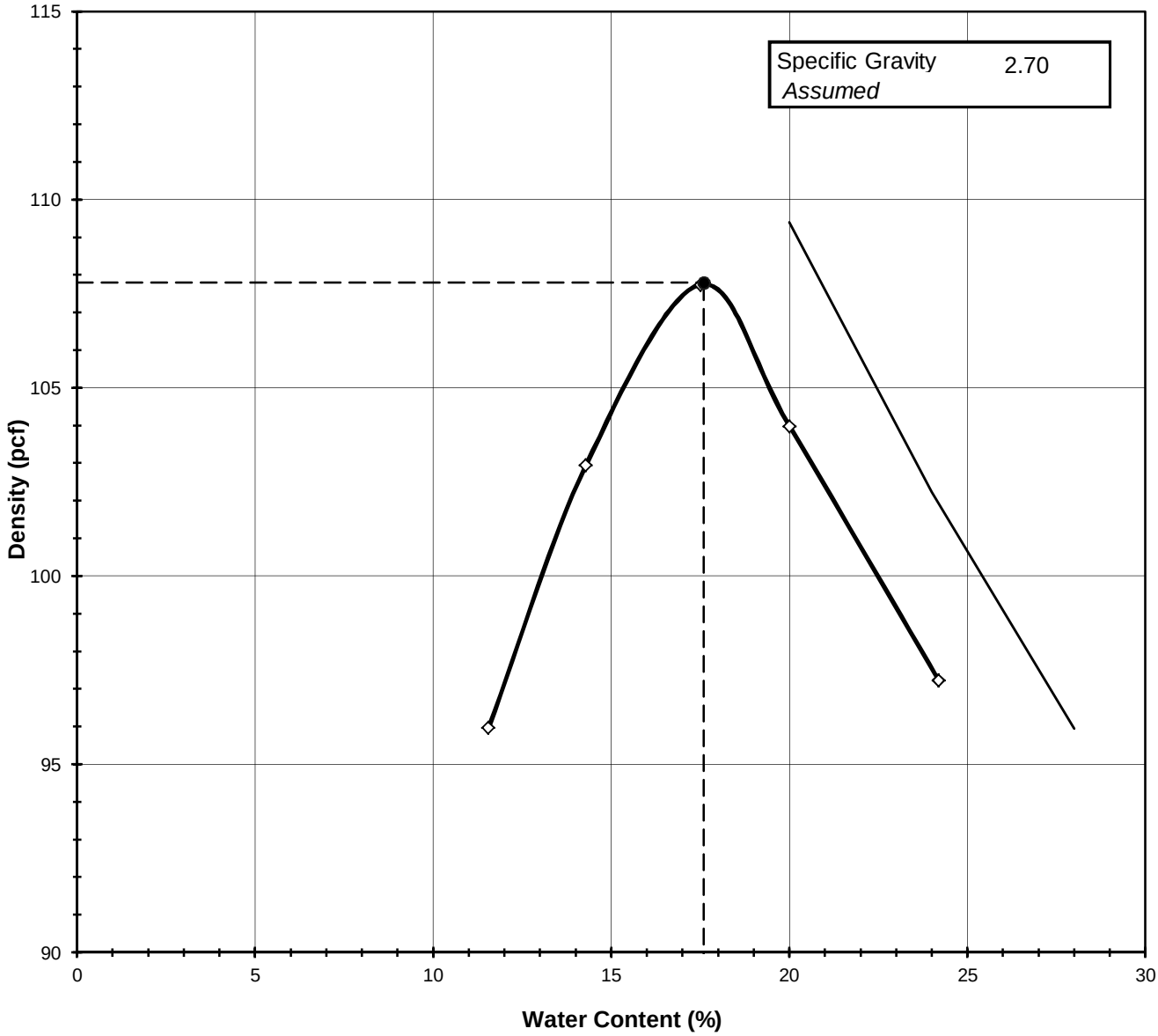
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	SMALL STOCKPILE
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-002	Sample No.:	RED SANDY CLAY
Lab ID:	2016-625-002-001	Test Method	**STANDARD**

Visual Description: RED CLAYEY SAND

Optimum Water Content	**17.6**
Maximum Dry Density	**107.8**



Tested By AMS *Date* 2/8/16 *Checked By* GEM *Date* 2/9/16

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	SMALL STOCKPILE
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-002	Sample No.:	RED SANDY CLAY
Lab ID:	2016-625-002-001		

Visual Description: RED CLAYEY SAND

Total Weight of the Sample (g)	20800
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	3
Percent Retained on 3/8"	1
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	173
Mold diameter		6"
Weight of the Mold (g)		5529
Volume of the Mold (cm^3)		2119

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	9165	9525	9829	9767	9630
Wt.of Mold (g)	5529	5529	5529	5529	5529
Wt. of Wet Sample (g)	3636	3996	4300	4238	4101
Mold Volume (cm^3)	2119	2119	2119	2119	2119

Moisture Content / Density

Tare Number	866	317	398	312	310
Wt. of Tare & Wet Sample (g)	414.80	446.20	432.90	408.20	437.30
Wt. of Tare & Dry Sample (g)	380.80	400.90	380.90	354.20	373.90
Wt. of Tare (g)	86.60	83.90	84.00	84.30	111.80
Wt. of Water (g)	34.00	45.30	52.00	54.00	63.40
Wt. of Dry Sample (g)	294.20	317.00	296.90	269.90	262.10

Wet Density (g/cm^3)	1.72	1.89	2.03	2.00	1.94
Wet Density (pcf)	107.1	117.7	126.6	124.8	120.8
Moisture Content (%)	**11.6**	**14.3**	**17.5**	**20.0**	**24.2**
Dry Density (pcf)	**96.0**	**102.9**	**107.7**	**104.0**	**97.2**

Zero Air Voids

Moisture Content (%)	20.0	24.0	28.0
Dry Unit Weight (pcf)	109.4	102.2	95.9

Tested By AMS *Date* 2/8/16 *Checked By* GEM *Date* 2/9/16

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89-10

Client:	SMITH + GARDNER, INC.	Boring No.:	SMALL STOCKPILE
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-002	Sample No.:	LT. BROWN SILT SAND
Lab ID:	2016-625-002-002	Soil Description:	**LIGHT BROWN LEAN CLAY**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

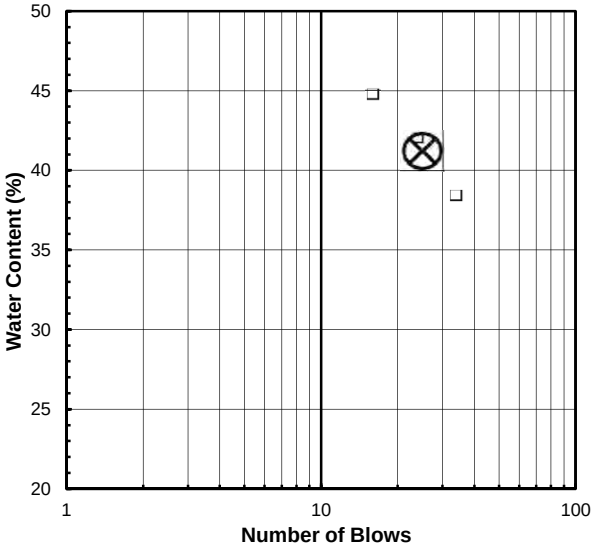
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	M	A-N	W-5	**U**
Wt. of Tare & Wet Sample (g)	30.18	29.68	36.35	**L**
Wt. of Tare & Dry Sample (g)	26.01	25.47	29.94	**T**
Wt. of Tare (g)	15.15	15.44	15.61	**I**
Wt. of Water (g)	4.2	4.2	6.4	**P**
Wt. of Dry Sample (g)	10.9	10.0	14.3	**O**
				I
Moisture Content (%)	**38.4**	**42.0**	**44.7**	**N**
Number of Blows	**34**	**24**	**16**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	Y-3	D-1	
Wt. of Tare & Wet Sample (g)	25.61	25.85	
Wt. of Tare & Dry Sample (g)	23.85	24.06	
Wt. of Tare (g)	15.64	15.29	
Wt. of Water (g)	1.8	1.8	
Wt. of Dry Sample (g)	8.2	8.8	
Moisture Content (%)	**21.4**	**20.4**	**1.0**

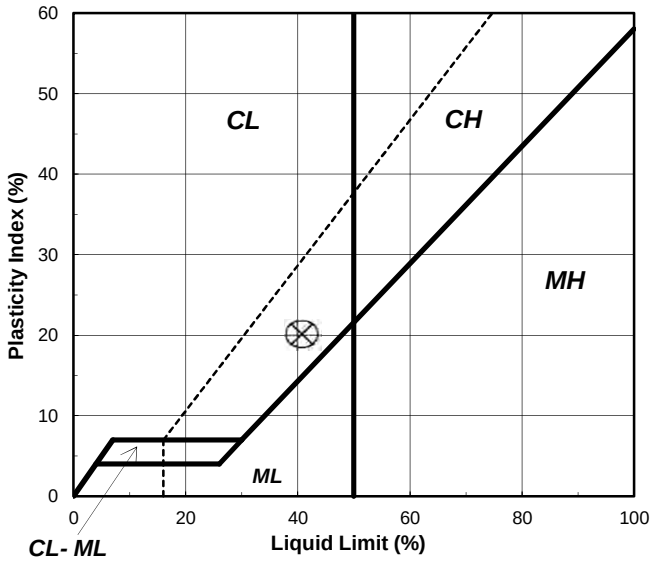
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**41**
Plastic Limit (%)	**21**
Plasticity Index (%)	**20**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By TB *Date* 2/9/16 *Checked By* GEM *Date* 2/10/16

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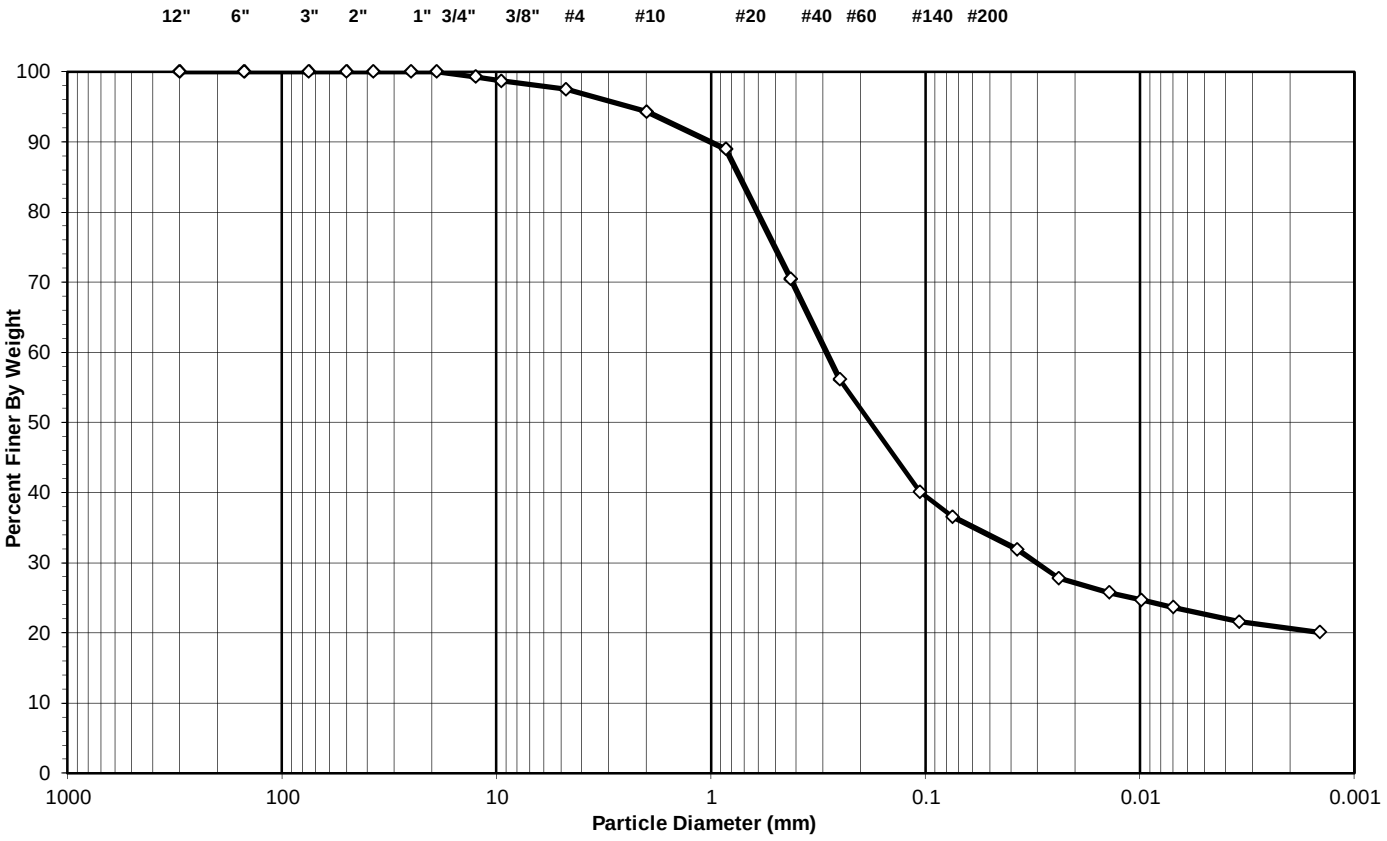
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	LT. BROWN SILT SAND
Lab ID	2016-625-002-002	Soil Color	LIGHT BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	2.52
#4 To #200	*Sand*	60.91
Finer Than #200	*Silt & Clay*	36.58

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-002-002 SIEVEHYD10.xls]Sheet1*

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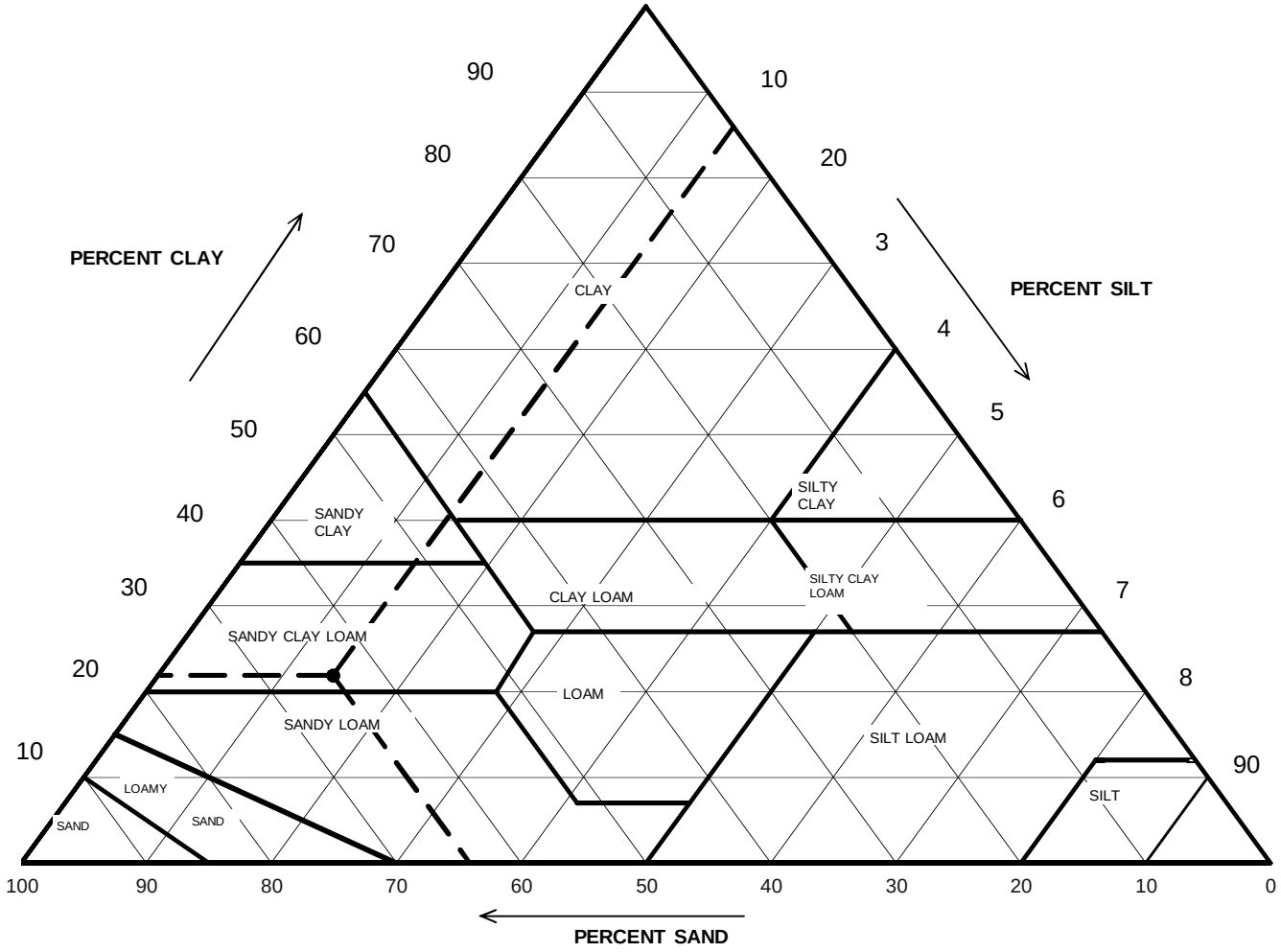
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	LT. BROWN SILT SAND
Lab ID	2016-625-002-002	Soil Color	LIGHT BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	5.70	**0.00**
2	94.30	*Sand*	60.44	**64.10**
0.05	33.85	*Silt*	13.22	**14.02**
0.002	20.63	*Clay*	20.63	**21.88**

USDA Classification: ***SANDY CLAY LOAM***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-002-002 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	LT. BROWN SILT SAND
Lab ID	2016-625-002-002	Soil Color	**LIGHT BROWN**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	R-1	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	35.90	Corrected Dry Wt. of - #10 Material (g)	47.87
Wgt.Tare + Dry Soil (g)	35.32		
Weight of Tare (g)	22.31	Weight of - #200 Material (g)	18.57
Weight of Water (g)	0.58	Weight of - #10 ; + #200 Material (g)	29.30
Weight of Dry Soil (g)	13.01		
Moisture Content (%)	**4.5**	**J-FACTOR (%FINER THAN #10)**	**0.9430**
Soil Specimen Data			
Tare No.	AF-09		
Wgt.Tare + Air Dry Soil (g)	758.24		
Weight of Tare (g)	228.01		
Air Dried Wgt. Total Sample (g)	530.23	Dry Weight of Material Retained on #10 (g)	29.02
Total Dry Sample Weight (g)	508.84	Corrected Dry Sample Wt - #10 (g)	479.82

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	3.68	0.7	0.7	99.3	**99.3**
3/8"	9.50	2.88	0.6	1.3	98.7	**98.7**
#4	4.75	6.24	1.2	2.5	97.5	**97.5**
#10	2.00	16.22	3.2	5.7	94.3	**94.3**
#20	0.85	2.71	5.7	5.7	94.3	**89.0**
#40	0.425	9.36	19.6	25.2	74.8	**70.5**
#60	0.250	7.30	15.3	40.5	59.5	**56.1**
#140	0.106	8.13	17.0	57.5	42.5	**40.1**
#200	0.075	1.80	3.8	61.2	38.8	**36.6**
Pan	-	18.57	38.8	100.0	-	**-**

Notes :

Tested By BW Date 2/11/16 Checked By GEM Date 2/11/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	SMALL STOCKPILE
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-002	Sample No.	LT. BROWN SILT SAND
Lab ID	2016-625-002-002	Soil Color	**LIGHT BROWN**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	20.0	21.7	4.66	15.3	33.8	0.01467	0.0374	**31.9**
5	18.0	21.8	4.63	13.4	29.5	0.01466	0.0239	**27.8**
15	17.0	21.8	4.63	12.4	27.3	0.01466	0.0139	**25.7**
30	16.5	21.8	4.63	11.9	26.2	0.01466	0.0099	**24.7**
60	16.0	21.8	4.63	11.4	25.1	0.01466	0.0070	**23.7**
250	15.0	21.8	4.63	10.4	22.9	0.01466	0.0034	**21.6**
1440	14.5	21.1	4.85	9.7	21.3	0.01478	0.0015	**20.1**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	47.87	Hygroscopic Moisture Factor	0.957	
Weight of Deflocculant (g)	5.0			
		a - Factor	1.056	
		Percent Finer than # 10	94.30	
		Specific Gravity	2.37	Assumed

Notes:

Tested By TB Date 2/9/16 Checked By GEM Date 2/11/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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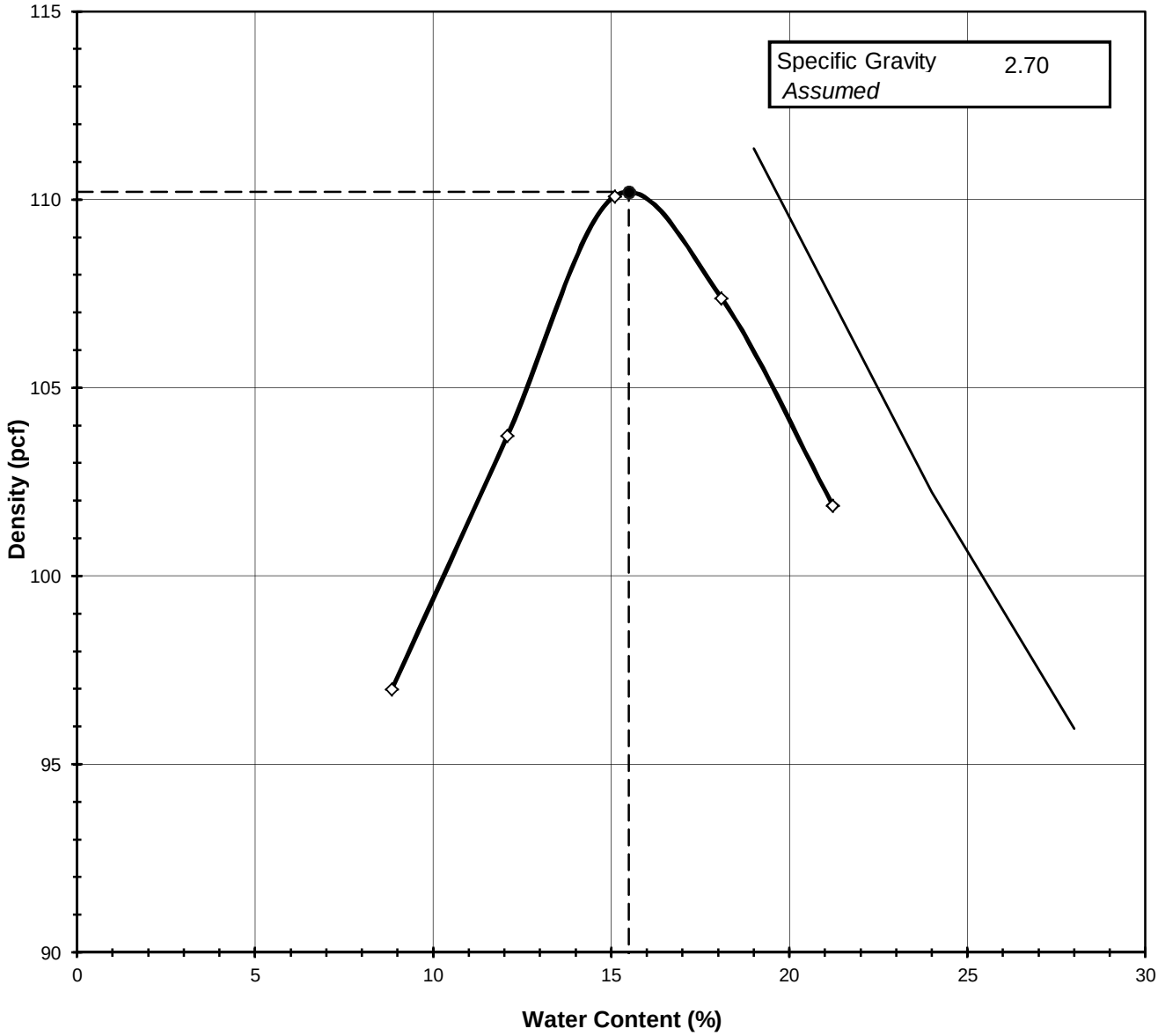
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	SMALL STOCKPILE
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-002	Sample No.:	LT BROWN SILT SAND
Lab ID:	2016-625-002-002	Test Method	**STANDARD**

Visual Description: LIGHT BROWN CLAYEY SAND

Optimum Water Content **15.5**
Maximum Dry Density **110.2**



Tested By BW *Date* 2/8/16 *Checked By* GEM *Date* 2/10/16

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	SMALL STOCKPILE
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-002	Sample No.:	LT BROWN SILT SAND
Lab ID:	2016-625-002-002		

Visual Description: LIGHT BROWN CLAYEY SAND

Total Weight of the Sample (g)	18300
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	2
Percent Retained on 3/8"	1
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	173
Mold diameter		6"
Weight of the Mold (g)		5529
Volume of the Mold (cm^3)		2119

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	9115	9478	9833	9836	9724
Wt.of Mold (g)	5529	5529	5529	5529	5529
Wt. of Wet Sample (g)	3586	3949	4304	4307	4195
Mold Volume (cm^3)	2119	2119	2119	2119	2119

Moisture Content / Density

Tare Number	866	300	398	368	305
Wt. of Tare & Wet Sample (g)	507.40	622.20	562.80	681.90	626.80
Wt. of Tare & Dry Sample (g)	473.20	567.10	500.00	594.50	531.90
Wt. of Tare (g)	86.50	111.20	84.10	111.60	84.80
Wt. of Water (g)	34.20	55.10	62.80	87.40	94.90
Wt. of Dry Sample (g)	386.70	455.90	415.90	482.90	447.10

Wet Density (g/cm^3)	1.69	1.86	2.03	2.03	1.98
Wet Density (pcf)	105.6	116.3	126.7	126.8	123.5
Moisture Content (%)	**8.8**	**12.1**	**15.1**	**18.1**	**21.2**
Dry Density (pcf)	**97.0**	**103.7**	**110.1**	**107.4**	**101.9**

Zero Air Voids

Moisture Content (%)	19.0	24.0	28.0	
Dry Unit Weight (pcf)	111.4	102.2	95.9	

Tested By BW *Date* 2/8/16 *Checked By* GEM *Date* 2/10/16

DCN:CT-S12 DATE:5/1/13 REVISION: 14

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MOISTURE CONTENT

ASTM D 2216-10

Client:	SMITH + GARDNER, INC.
Client Reference:	BROWNFIELD C&D LF
Project No.:	2016-625-003

Lab ID:	001
Boring No.:	NA
Depth (ft):	SUBSURFACE
Sample No.:	POND DAM
Tare Number	807
Wt. of Tare & Wet Sample (g)	246.07
Wt. of Tare & Dry Sample (g)	224.07
Weight of Tare (g)	103.06
Weight of Water (g)	22.00
Weight of Dry Sample (g)	121.01
Water Content (%)	**18.2**

Notes :

Tested By *AMS* *Date* *2/17/16* *Checked By* *GEM* *Date* *2/18/16*

DCN: CT-S1 DATE: 3/18/13 REVISION: 4

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89-10

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	SUBSURFACE
Project No.:	2016-625-003	Sample No.:	POND DAM
Lab ID:	2016-625-003-001	Soil Description:	**ORANGE SILT**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

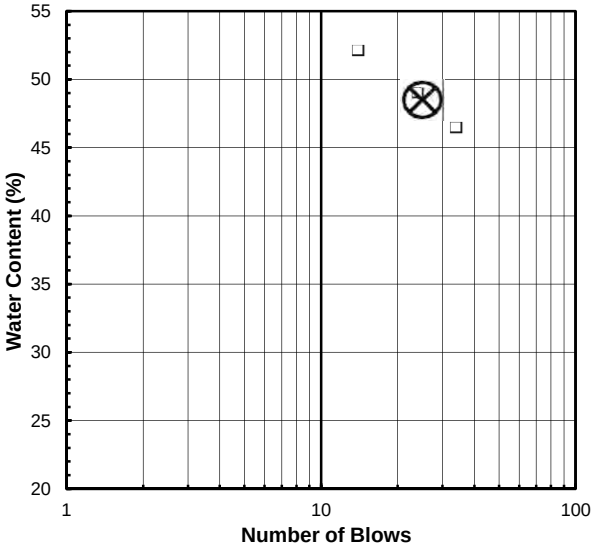
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	I	4M	1M	**U**
Wt. of Tare & Wet Sample (g)	28.63	29.44	27.77	**L**
Wt. of Tare & Dry Sample (g)	24.38	24.89	23.68	**T**
Wt. of Tare (g)	15.22	15.59	15.82	**I**
Wt. of Water (g)	4.3	4.6	4.1	**P**
Wt. of Dry Sample (g)	9.2	9.3	7.9	**O**
				I
Moisture Content (%)	**46.4**	**48.9**	**52.0**	**N**
Number of Blows	**34**	**24**	**14**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-B	O	
Wt. of Tare & Wet Sample (g)	22.90	22.95	
Wt. of Tare & Dry Sample (g)	20.82	20.75	
Wt. of Tare (g)	15.50	15.22	
Wt. of Water (g)	2.1	2.2	
Wt. of Dry Sample (g)	5.3	5.5	
Moisture Content (%)	**39.1**	**39.8**	**-0.7**

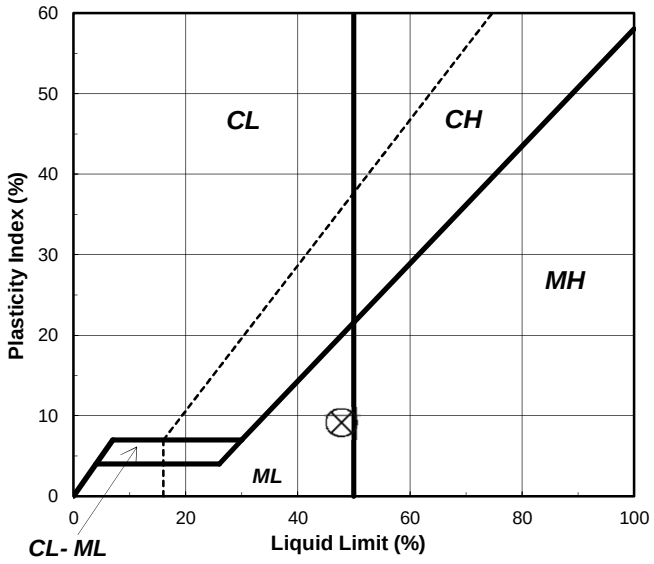
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**48**
Plastic Limit (%)	**39**
Plasticity Index (%)	**9**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By TB *Date* 2/15/16 *Checked By* GEM *Date* 2/17/16

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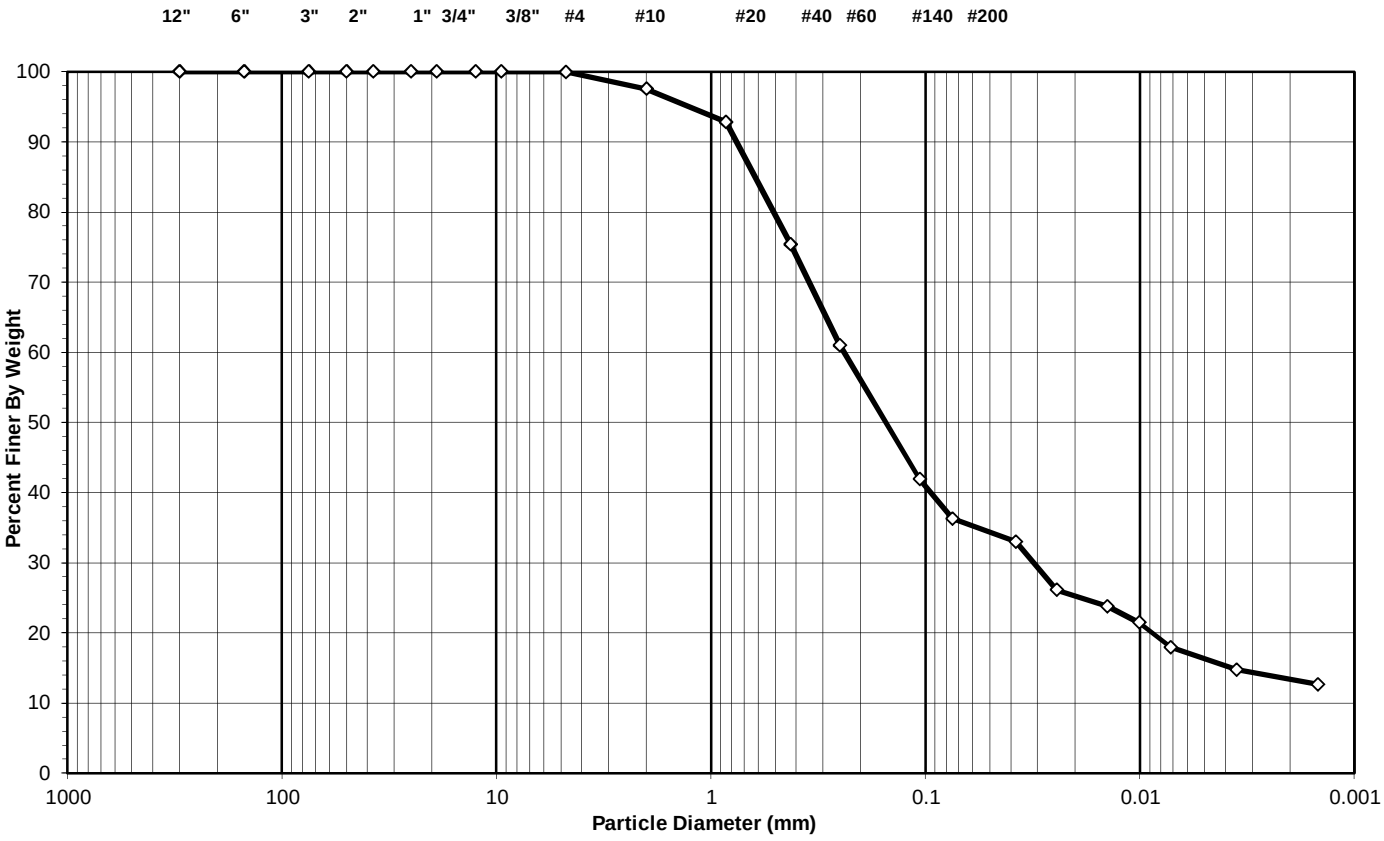
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-003	Sample No.	POND DAM
Lab ID	2016-625-003-001	Soil Color	ORANGE

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.03
#4 To #200	*Sand*	63.71
Finer Than #200	*Silt & Clay*	36.26

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-003-001 SIEVEHYD10.xls]Sheet1*

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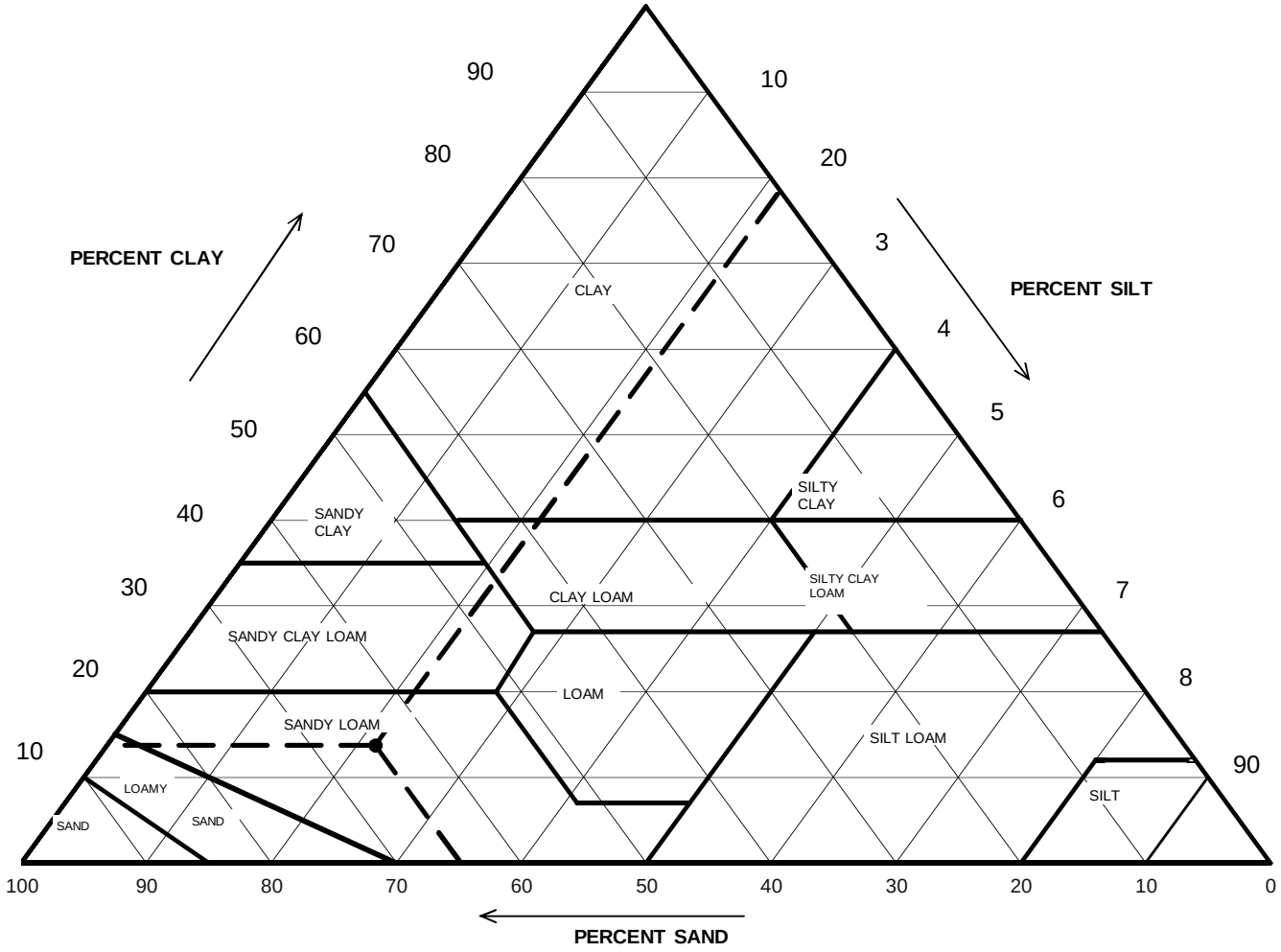
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-003	Sample No.	POND DAM
Lab ID	2016-625-003-001	Soil Color	ORANGE



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	2.45	**0.00**
2	97.55	*Sand*	63.22	**64.81**
0.05	34.33	*Silt*	20.95	**21.48**
0.002	13.38	*Clay*	13.38	**13.71**

USDA Classification: ***SANDY LOAM***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-003-001 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-003	Sample No.	POND DAM
Lab ID	2016-625-003-001	Soil Color	**ORANGE**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	E-2	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	38.64	Corrected Dry Wt. of - #10 Material (g)	44.26
Wgt.Tare + Dry Soil (g)	36.79		
Weight of Tare (g)	22.52	Weight of - #200 Material (g)	16.45
Weight of Water (g)	1.85	Weight of - #10 ; + #200 Material (g)	27.81
Weight of Dry Soil (g)	14.27		
Moisture Content (%)	**13.0**	**J-FACTOR (%FINER THAN #10)**	**0.9755**
Soil Specimen Data			
Tare No.	AF-05		
Wgt.Tare + Air Dry Soil (g)	809.33		
Weight of Tare (g)	227.97		
Air Dried Wgt. Total Sample (g)	581.36	Dry Weight of Material Retained on #10 (g)	12.65
Total Dry Sample Weight (g)	516.09	Corrected Dry Sample Wt - #10 (g)	503.44

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	0.16	0.0	0.0	100.0	**100.0**
#10	2.00	12.49	2.4	2.5	97.5	**97.5**
#20	0.85	2.13	4.8	4.8	95.2	**92.9**
#40	0.425	7.90	17.8	22.7	77.3	**75.4**
#60	0.250	6.55	14.8	37.5	62.5	**61.0**
#140	0.106	8.67	19.6	57.0	43.0	**41.9**
#200	0.075	2.56	5.8	62.8	37.2	**36.3**
Pan	-	16.45	37.2	100.0	-	**-**

Notes :

Tested By EL Date 2/17/16 Checked By GEM Date 2/19/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-003-001 SIEVEHYD10.xls]Sheet1

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-003	Sample No.	POND DAM
Lab ID	2016-625-003-001	Soil Color	**ORANGE**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	19.0	21.2	4.82	14.2	33.8	0.01476	0.0379	**33.0**
5	16.0	21.3	4.78	11.2	26.8	0.01474	0.0244	**26.1**
15	15.0	21.3	4.78	10.2	24.4	0.01474	0.0142	**23.8**
30	14.0	21.3	4.78	9.2	22.0	0.01474	0.0101	**21.4**
60	12.5	21.3	4.78	7.7	18.4	0.01474	0.0072	**18.0**
250	11.0	21.7	4.66	6.3	15.1	0.01467	0.0035	**14.8**
1440	10.0	22	4.57	5.4	13.0	0.01462	0.0015	**12.6**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	44.26	Hygroscopic Moisture Factor	0.885	
Weight of Deflocculant (g)	5.0			
		a - Factor	1.056	
		Percent Finer than # 10	97.55	
		Specific Gravity	2.37	Assumed

Notes:

Tested By TB Date 2/12/16 Checked By GEM Date 2/19/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-003-001 SIEVEHYD10.xls]Sheet1*

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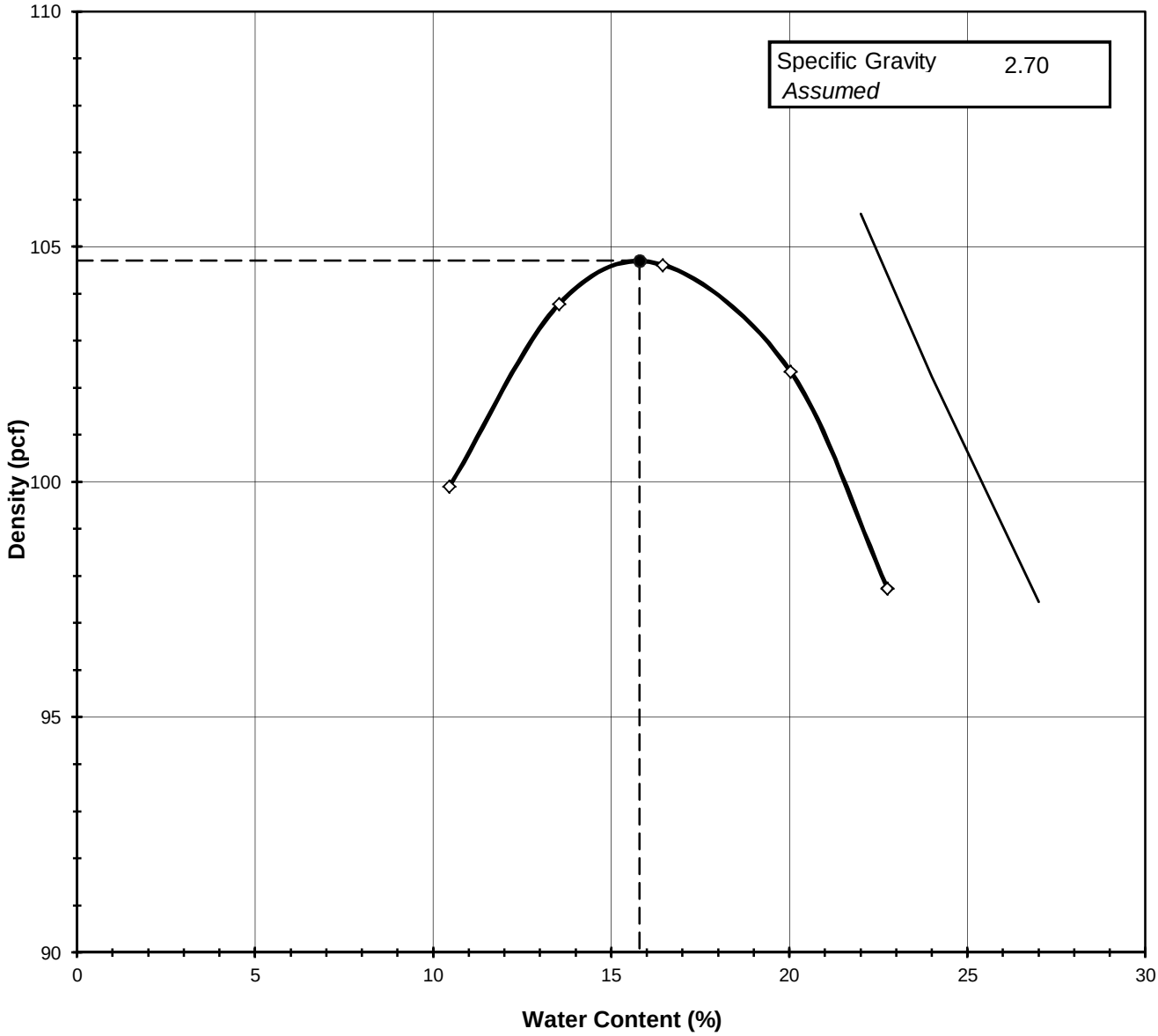
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	SUBSURFACE
Project No.:	2016-625-003	Sample No.:	POND DAM
Lab ID:	2016-625-003-001	Test Method	**STANDARD**

Visual Description: ORANGE SILTY SAND

Optimum Water Content **15.8**
Maximum Dry Density **104.7**



Tested By *AMS* *Date* *2/17/16* *Checked By* *GEM* *Date* *2/18/16*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	SUBSURFACE
Project No.:	2016-625-003	Sample No.:	POND DAM
Lab ID:	2016-625-003-001		

Visual Description: ORANGE SILTY SAND

Total Weight of the Sample (g)	18900
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4160
Volume of the Mold (cm^3)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5826	5939	5999	6014	5971
Wt.of Mold (g)	4160	4160	4160	4160	4160
Wt. of Wet Sample (g)	1666	1779	1839	1854	1811
Mold Volume (cm^3)	942	942	942	942	942

Moisture Content / Density

Tare Number	866	398	307	317	314
Wt. of Tare & Wet Sample (g)	407.60	405.20	417.00	409.90	429.10
Wt. of Tare & Dry Sample (g)	377.20	366.90	373.60	355.50	365.20
Wt. of Tare (g)	86.60	84.00	109.90	84.00	84.40
Wt. of Water (g)	30.40	38.30	43.40	54.40	63.90
Wt. of Dry Sample (g)	290.60	282.90	263.70	271.50	280.80

Wet Density (g/cm^3)	1.77	1.89	1.95	1.97	1.92
Wet Density (pcf)	110.4	117.8	121.8	122.9	120.0
Moisture Content (%)	**10.5**	**13.5**	**16.5**	**20.0**	**22.8**
Dry Density (pcf)	**99.9**	**103.8**	**104.6**	**102.3**	**97.7**

Zero Air Voids

Moisture Content (%)	22.0	24.0	27.0
Dry Unit Weight (pcf)	105.7	102.2	97.4

Tested By AMS *Date* 2/17/16 *Checked By* GEM *Date* 2/18/16

DCN:CT-S12 DATE:5/1/13 REVISION: 14

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89-10

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	SUBSURFACE
Project No.:	2016-625-004	Sample No.:	POND DAM #2
Lab ID:	2016-625-004-001	Soil Description:	**ORANGE LEAN CLAY**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

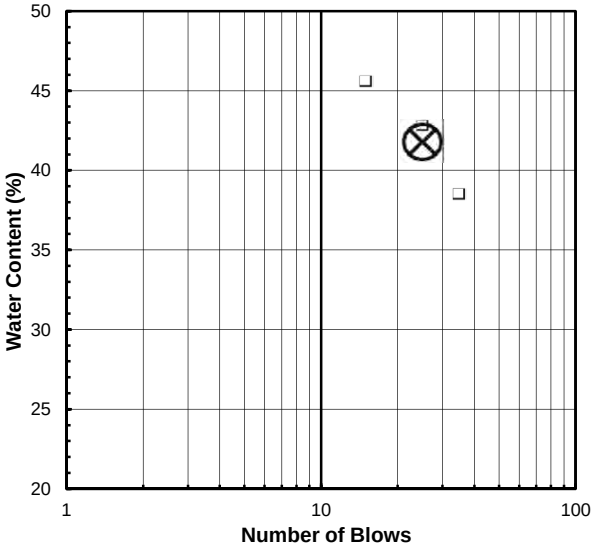
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	R	V-2	B4	**U**
Wt. of Tare & Wet Sample (g)	28.69	32.21	32.01	**L**
Wt. of Tare & Dry Sample (g)	24.93	27.24	26.83	**T**
Wt. of Tare (g)	15.16	15.62	15.46	**I**
Wt. of Water (g)	3.8	5.0	5.2	**P**
Wt. of Dry Sample (g)	9.8	11.6	11.4	**O**
				I
Moisture Content (%)	**38.5**	**42.8**	**45.6**	**N**
Number of Blows	**35**	**25**	**15**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	Z-4	A-K	
Wt. of Tare & Wet Sample (g)	25.33	24.63	
Wt. of Tare & Dry Sample (g)	23.64	23.14	
Wt. of Tare (g)	15.59	15.55	
Wt. of Water (g)	1.7	1.5	
Wt. of Dry Sample (g)	8.1	7.6	
Moisture Content (%)	**21.0**	**19.6**	**1.4**

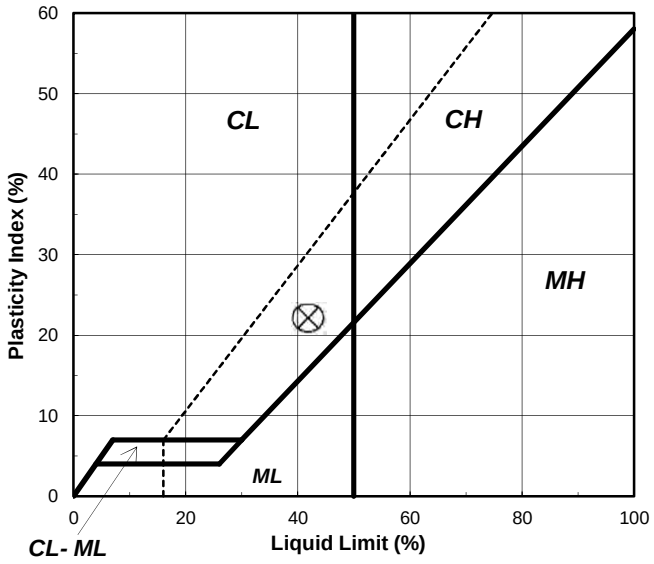
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**42**
Plastic Limit (%)	**20**
Plasticity Index (%)	**22**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



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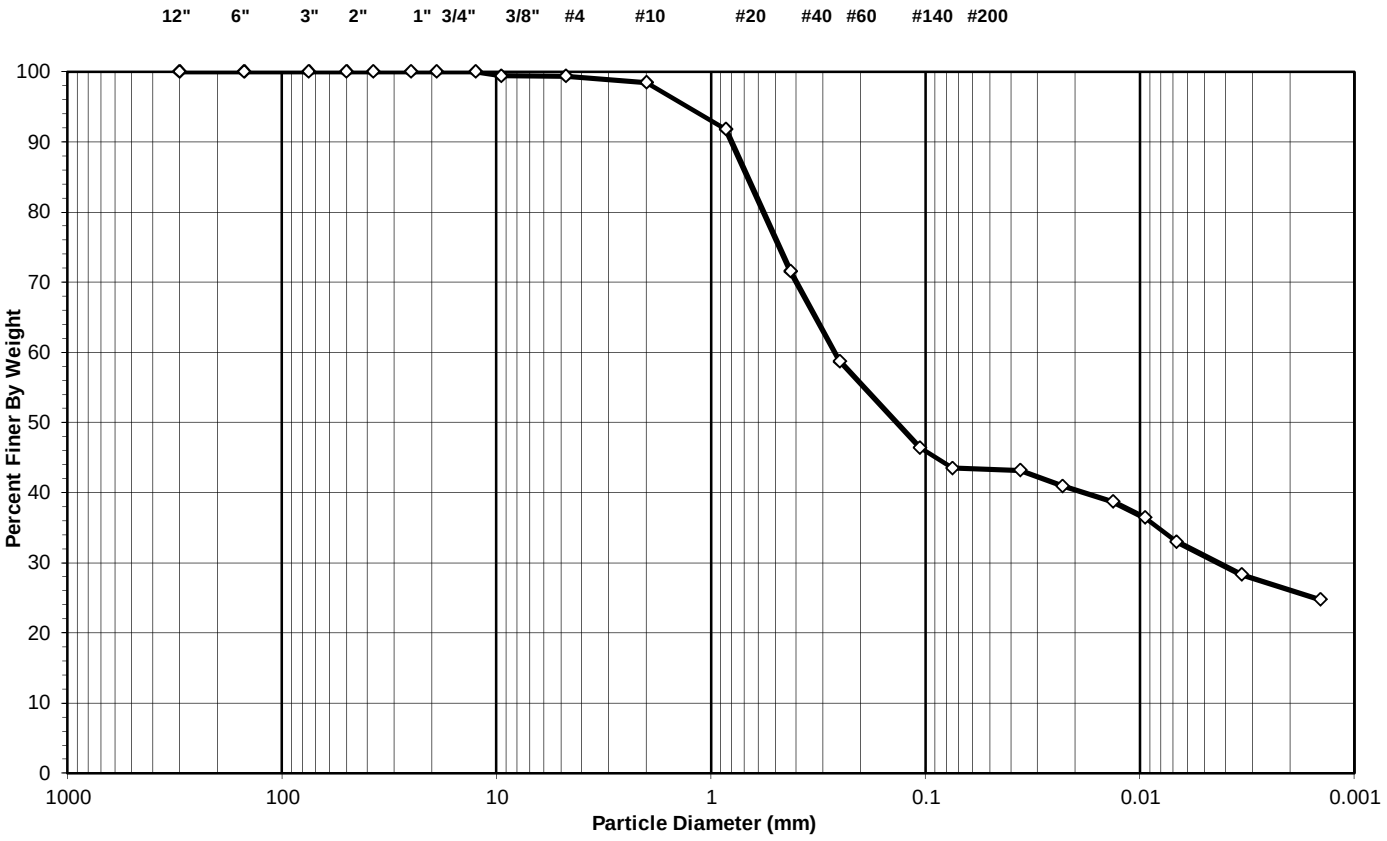
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-004	Sample No.	POND DAM #2
Lab ID	2016-625-004-001	Soil Color	ORANGE

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.62
#4 To #200	*Sand*	55.88
Finer Than #200	*Silt & Clay*	43.50

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-004-001 SIEVEHYD10.xls]Sheet1*

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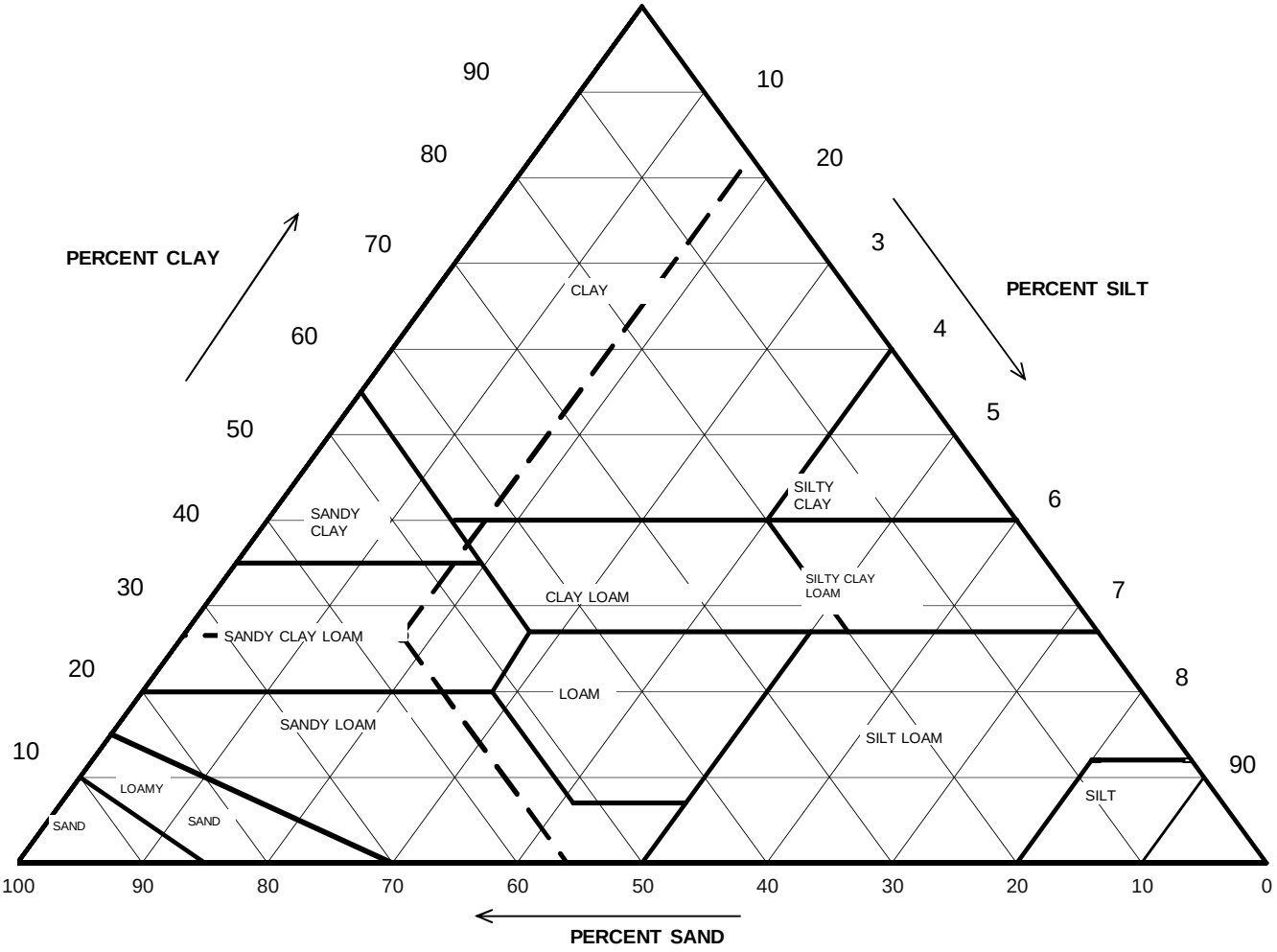
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-004	Sample No.	POND DAM #2
Lab ID	2016-625-004-001	Soil Color	ORANGE



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.55	**0.00**
2	98.45	*Sand*	55.14	**56.01**
0.05	43.31	*Silt*	17.18	**17.45**
0.002	26.13	*Clay*	26.13	**26.54**

USDA Classification: ***SANDY CLAY LOAM***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-004-001 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-004	Sample No.	POND DAM #2
Lab ID	2016-625-004-001	Soil Color	**ORANGE**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	B-2	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	33.48	Corrected Dry Wt. of - #10 Material (g)	45.29
Wgt.Tare + Dry Soil (g)	32.41		
Weight of Tare (g)	22.12	Weight of - #200 Material (g)	20.01
Weight of Water (g)	1.07	Weight of - #10 ; + #200 Material (g)	25.28
Weight of Dry Soil (g)	10.29		
Moisture Content (%)	**10.4**	**J-FACTOR (%FINER THAN #10)**	**0.9845**
Soil Specimen Data			
Tare No.	NE-06		
Wgt.Tare + Air Dry Soil (g)	816.43		
Weight of Tare (g)	227.18		
Air Dried Wgt. Total Sample (g)	589.25	Dry Weight of Material Retained on #10 (g)	8.26
Total Dry Sample Weight (g)	534.53	Corrected Dry Sample Wt - #10 (g)	526.27

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	3.11	0.6	0.6	99.4	**99.4**
#4	4.75	0.18	0.0	0.6	99.4	**99.4**
#10	2.00	4.97	0.9	1.5	98.5	**98.5**
#20	0.85	3.06	6.8	6.8	93.2	**91.8**
#40	0.425	9.31	20.6	27.3	72.7	**71.6**
#60	0.250	5.90	13.0	40.3	59.7	**58.7**
#140	0.106	5.67	12.5	52.9	47.1	**46.4**
#200	0.075	1.34	3.0	55.8	44.2	**43.5**
Pan	-	20.01	44.2	100.0	-	**-**

Notes :

Tested By EL Date 2/23/16 Checked By GEM Date 2/25/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	SUBSURFACE
Project No.	2016-625-004	Sample No.	POND DAM #2
Lab ID	2016-625-004-001	Soil Color	**ORANGE**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.2	4.20	18.8	43.8	0.01442	0.0361	**43.2**
5	22.0	23.3	4.17	17.8	41.6	0.01440	0.0229	**40.9**
15	21.0	23.4	4.14	16.9	39.3	0.01438	0.0133	**38.7**
30	20.0	23.4	4.14	15.9	37.0	0.01438	0.0095	**36.4**
60	18.5	23.4	4.14	14.4	33.5	0.01438	0.0068	**33.0**
250	16.5	23.3	4.17	12.3	28.8	0.01440	0.0034	**28.3**
1440	15.5	21.5	4.72	10.8	25.1	0.01471	0.0014	**24.7**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	45.29	Hygroscopic Moisture Factor	0.906	
Weight of Deflocculant (g)	5.0			
		a - Factor	1.056	
		Percent Finer than # 10	98.45	
		Specific Gravity	2.37	Assumed

Notes:

Tested By TB Date 2/23/16 Checked By GEM Date 2/25/16

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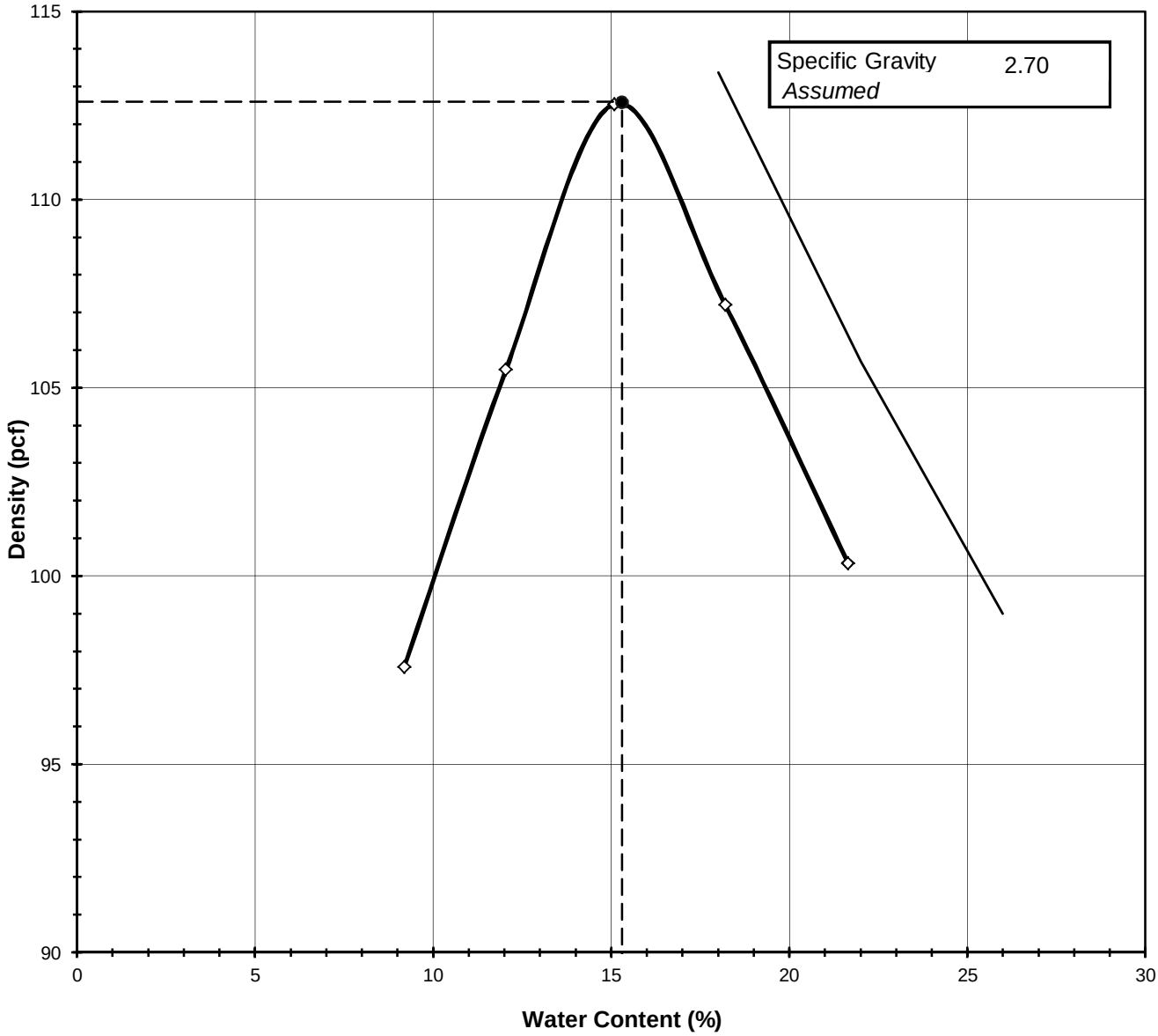
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	SUBSURFACE
Project No.:	2016-625-004	Sample No.:	POND DAM #2
Lab ID:	2016-625-004-001	Test Method	**STANDARD**

Visual Description: ORANGE CLAYEY SAND

Optimum Water Content **15.3**
Maximum Dry Density **112.6**



Tested By *BW/TB* *Date* *2/18/16* *Checked By* *GEM* *Date* *2/25/16*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	SUBSURFACE
Project No.:	2016-625-004	Sample No.:	POND DAM #2
Lab ID:	2016-625-004-001		

Visual Description: ORANGE CLAYEY SAND

Total Weight of the Sample (g)	16100
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4160
Volume of the Mold (cm^3)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5769	5944	6115	6073	6003
Wt.of Mold (g)	4160	4160	4160	4160	4160
Wt. of Wet Sample (g)	1609	1784	1955	1913	1843
Mold Volume (cm^3)	942	942	942	942	942

Moisture Content / Density

Tare Number	311	842	840	837	318
Wt. of Tare & Wet Sample (g)	454.80	647.90	573.40	663.30	448.60
Wt. of Tare & Dry Sample (g)	423.60	605.80	532.74	601.49	384.17
Wt. of Tare (g)	84.20	256.30	263.40	261.90	86.60
Wt. of Water (g)	31.20	42.10	40.66	61.81	64.43
Wt. of Dry Sample (g)	339.40	349.50	269.34	339.59	297.57

Wet Density (g/cm^3)	1.71	1.89	2.08	2.03	1.96
Wet Density (pcf)	106.6	118.2	129.5	126.7	122.1
Moisture Content (%)	**9.2**	**12.0**	**15.1**	**18.2**	**21.7**
Dry Density (pcf)	**97.6**	**105.5**	**112.5**	**107.2**	**100.3**

Zero Air Voids

Moisture Content (%)	18.0	22.0	26.0	
Dry Unit Weight (pcf)	113.4	105.7	99.0	

Tested By *BW/TB* *Date* *2/18/16* *Checked By* *GEM* *Date* 2/25/16

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MOISTURE CONTENT

ASTM D 2216-10

Client:	SMITH + GARDNER, INC.
Client Reference:	BROWNFIELD C&D LF
Project No.:	2016-625-005

Lab ID:	001	002
Boring No.:	NA	NA
Depth (ft):	NA	NA
Sample No.:	BS-3	BS-4
Tare Number	821	TB-04
Wt. of Tare & Wet Sample (g)	388.47	365.35
Wt. of Tare & Dry Sample (g)	348.91	334.27
Weight of Tare (g)	130.52	134.79
Weight of Water (g)	39.56	31.08
Weight of Dry Sample (g)	218.39	199.48
Water Content (%)	**18.1**	**15.6**

Notes :

Tested By BW *Date* 3/16/16 *Checked By* GEM *Date* 3/17/16

DCN: CT-S1 DATE: 3/18/13 REVISION: 4

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89-10

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-005	Sample No.:	BS-3
Lab ID:	2016-625-005-001	Soil Description:	**BROWN SILT**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

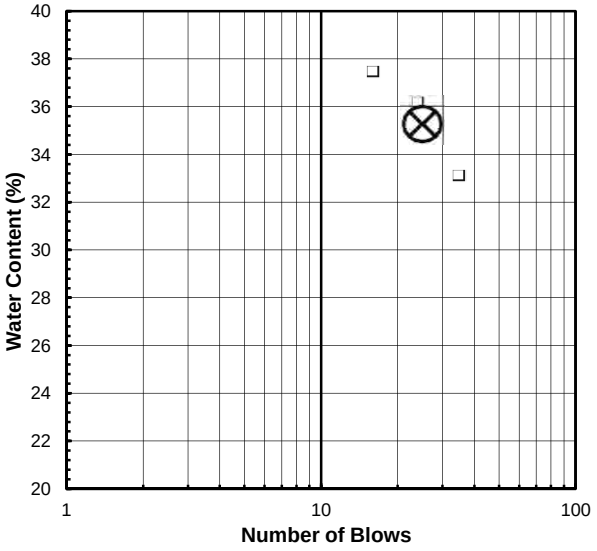
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	KP	AP	Y	**U**
Wt. of Tare & Wet Sample (g)	34.14	30.41	28.30	**L**
Wt. of Tare & Dry Sample (g)	29.52	26.47	24.85	**T**
Wt. of Tare (g)	15.55	15.57	15.63	**I**
Wt. of Water (g)	4.6	3.9	3.5	**P**
Wt. of Dry Sample (g)	14.0	10.9	9.2	**O**
				I
Moisture Content (%)	**33.1**	**36.1**	**37.4**	**N**
Number of Blows	**35**	**24**	**16**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-M	U	
Wt. of Tare & Wet Sample (g)	27.09	26.23	
Wt. of Tare & Dry Sample (g)	24.77	24.01	
Wt. of Tare (g)	15.40	15.19	
Wt. of Water (g)	2.3	2.2	
Wt. of Dry Sample (g)	9.4	8.8	
Moisture Content (%)	**24.8**	**25.2**	**-0.4**

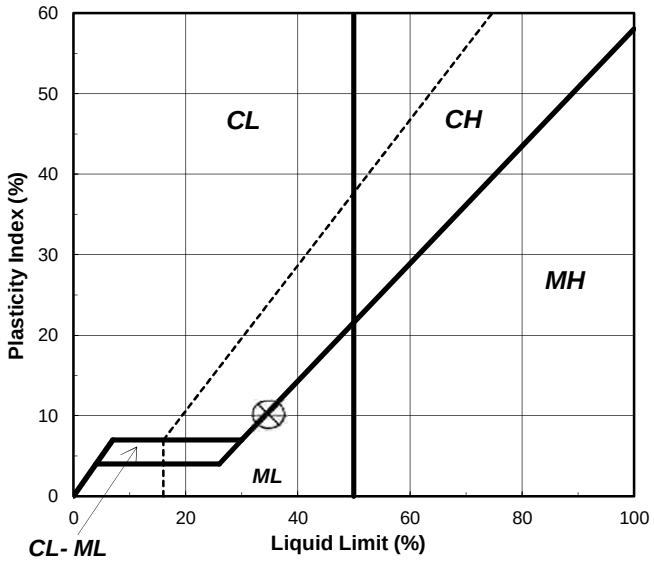
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**35**
Plastic Limit (%)	**25**
Plasticity Index (%)	**10**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



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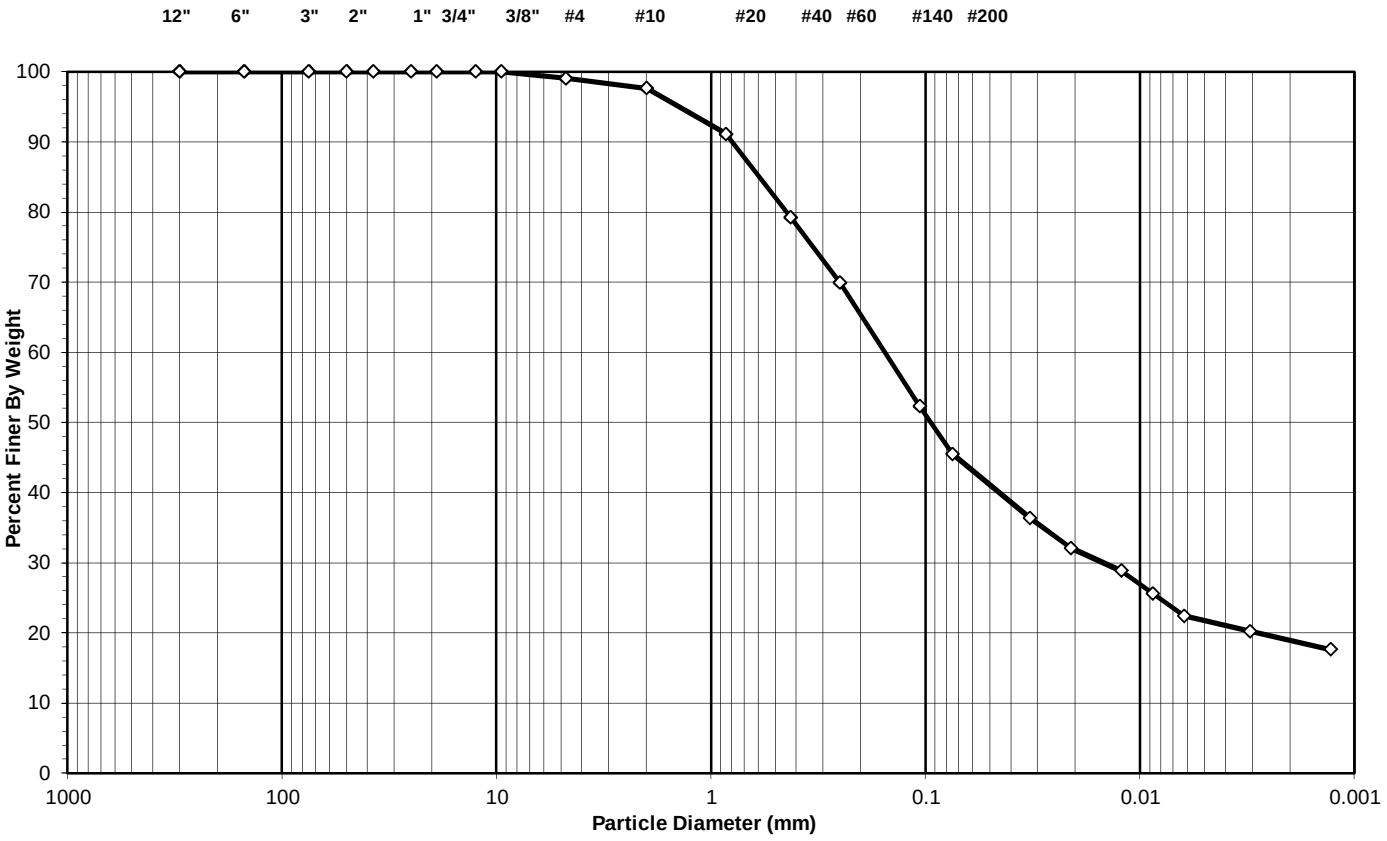
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-3
Lab ID	2016-625-005-001	Soil Color	BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.97
#4 To #200	*Sand*	53.54
Finer Than #200	*Silt & Clay*	45.49

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-005-001 SIEVEHYD10.xls]Sheet1*

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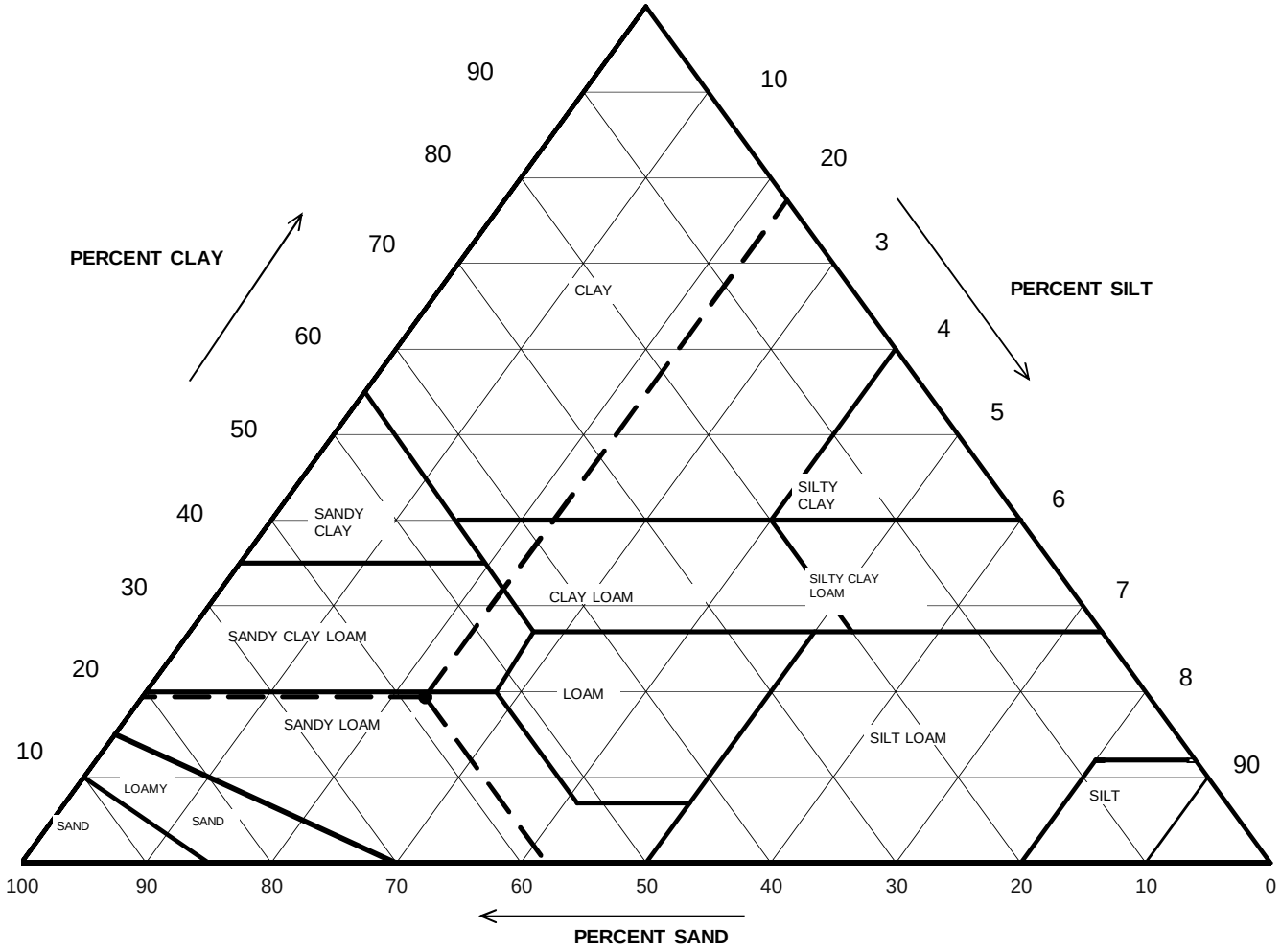
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-3
Lab ID	2016-625-005-001	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	2.35	**0.00**
2	97.65	*Sand*	56.61	**57.98**
0.05	41.04	*Silt*	22.08	**22.61**
0.002	18.96	*Clay*	18.96	**19.42**

USDA Classification: ***SANDY LOAM***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-005-001 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-3
Lab ID	2016-625-005-001	Soil Color	**BROWN**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	N-1	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	35.14	Corrected Dry Wt. of - #10 Material (g)	45.01
Wgt.Tare + Dry Soil (g)	33.21		
Weight of Tare (g)	15.81	Weight of - #200 Material (g)	20.97
Weight of Water (g)	1.93	Weight of - #10 ; + #200 Material (g)	24.04
Weight of Dry Soil (g)	17.40		
Moisture Content (%)	**11.1**	**J-FACTOR (%FINER THAN #10)**	**0.9765**
Soil Specimen Data			
Tare No.	AF-08		
Wgt.Tare + Air Dry Soil (g)	734.76		
Weight of Tare (g)	228.15		
Air Dried Wgt. Total Sample (g)	506.61	Dry Weight of Material Retained on #10 (g)	10.73
Total Dry Sample Weight (g)	457.10	Corrected Dry Sample Wt - #10 (g)	446.37

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	4.42	1.0	1.0	99.0	**99.0**
#10	2.00	6.31	1.4	2.3	97.7	**97.7**
#20	0.85	3.01	6.7	6.7	93.3	**91.1**
#40	0.425	5.47	12.2	18.8	81.2	**79.3**
#60	0.250	4.28	9.5	28.4	71.6	**70.0**
#140	0.106	8.15	18.1	46.5	53.5	**52.3**
#200	0.075	3.13	7.0	53.4	46.6	**45.5**
Pan	-	20.97	46.6	100.0	-	**-**

Notes :

Tested By TB Date 3/16/16 Checked By GEM Date 3/16/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-005-001 SIEVEHYD10.xls]Sheet1*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-3
Lab ID	2016-625-005-001	Soil Color	**BROWN**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	21.0	23.6	4.07	16.9	37.2	0.01288	0.0327	**36.4**
5	19.0	23.6	4.07	14.9	32.8	0.01288	0.0209	**32.1**
15	17.5	23.6	4.07	13.4	29.5	0.01288	0.0122	**28.8**
30	16.0	23.6	4.07	11.9	26.2	0.01288	0.0087	**25.6**
60	14.5	23.6	4.07	10.4	22.9	0.01288	0.0062	**22.4**
250	13.5	23.6	4.07	9.4	20.7	0.01288	0.0031	**20.2**
1440	12.5	22.9	4.29	8.2	18.1	0.01299	0.0013	**17.6**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	45.01	Hygroscopic Moisture Factor	0.900	
Weight of Deflocculant (g)	5.0			
		a - Factor	0.99	
		Percent Finer than # 10	97.65	
		Specific Gravity	2.70	Assumed

Notes:

Tested By TB Date 3/15/16 Checked By GEM Date 3/16/16

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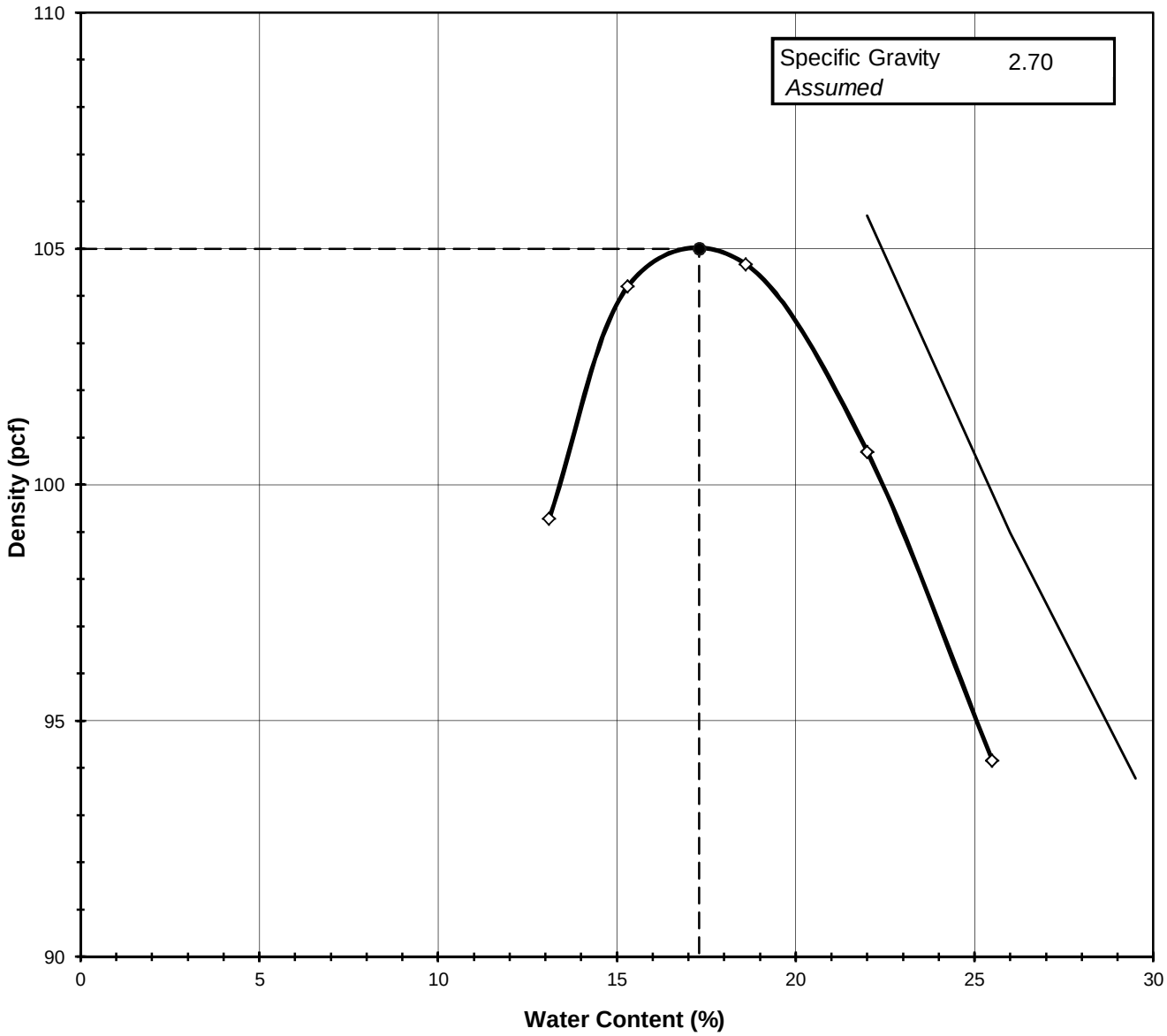
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-005	Sample No.:	BS-3
Lab ID:	2016-625-005-001	Test Method	**STANDARD**

Visual Description: BROWN SILTY SAND

Optimum Water Content	**17.3**
Maximum Dry Density	**105.0**



Tested By NE *Date* 3/14/16 *Checked By* GEM *Date* 3/16/16

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-005	Sample No.:	BS-3
Lab ID:	2016-625-005-001		

Visual Description: BROWN SILTY SAND

Total Weight of the Sample (g)	20700
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	0
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	A

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4160
Volume of the Mold (cm^3)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5855	5973	6033	6014	5943
Wt.of Mold (g)	4160	4160	4160	4160	4160
Wt. of Wet Sample (g)	1695	1814	1874	1854	1784
Mold Volume (cm^3)	942	942	942	942	942

Moisture Content / Density

Tare Number	305	300	312	317	304
Wt. of Tare & Wet Sample (g)	481.80	422.50	505.10	470.00	552.75
Wt. of Tare & Dry Sample (g)	435.80	381.10	439.10	400.40	462.90
Wt. of Tare (g)	84.80	110.60	84.30	84.00	110.50
Wt. of Water (g)	46.00	41.40	66.00	69.60	89.85
Wt. of Dry Sample (g)	351.00	270.50	354.80	316.40	352.40

Wet Density (g/cm^3)	1.80	1.93	1.99	1.97	1.89
Wet Density (pcf)	112.3	120.2	124.1	122.9	118.2
Moisture Content (%)	**13.1**	**15.3**	**18.6**	**22.0**	**25.5**
Dry Density (pcf)	**99.3**	**104.2**	**104.7**	**100.7**	**94.2**

Zero Air Voids

Moisture Content (%)	22.0	26.0	29.5
Dry Unit Weight (pcf)	105.7	99.0	93.8

Tested By NE *Date* 3/14/16 *Checked By* GEM *Date* 3/16/16

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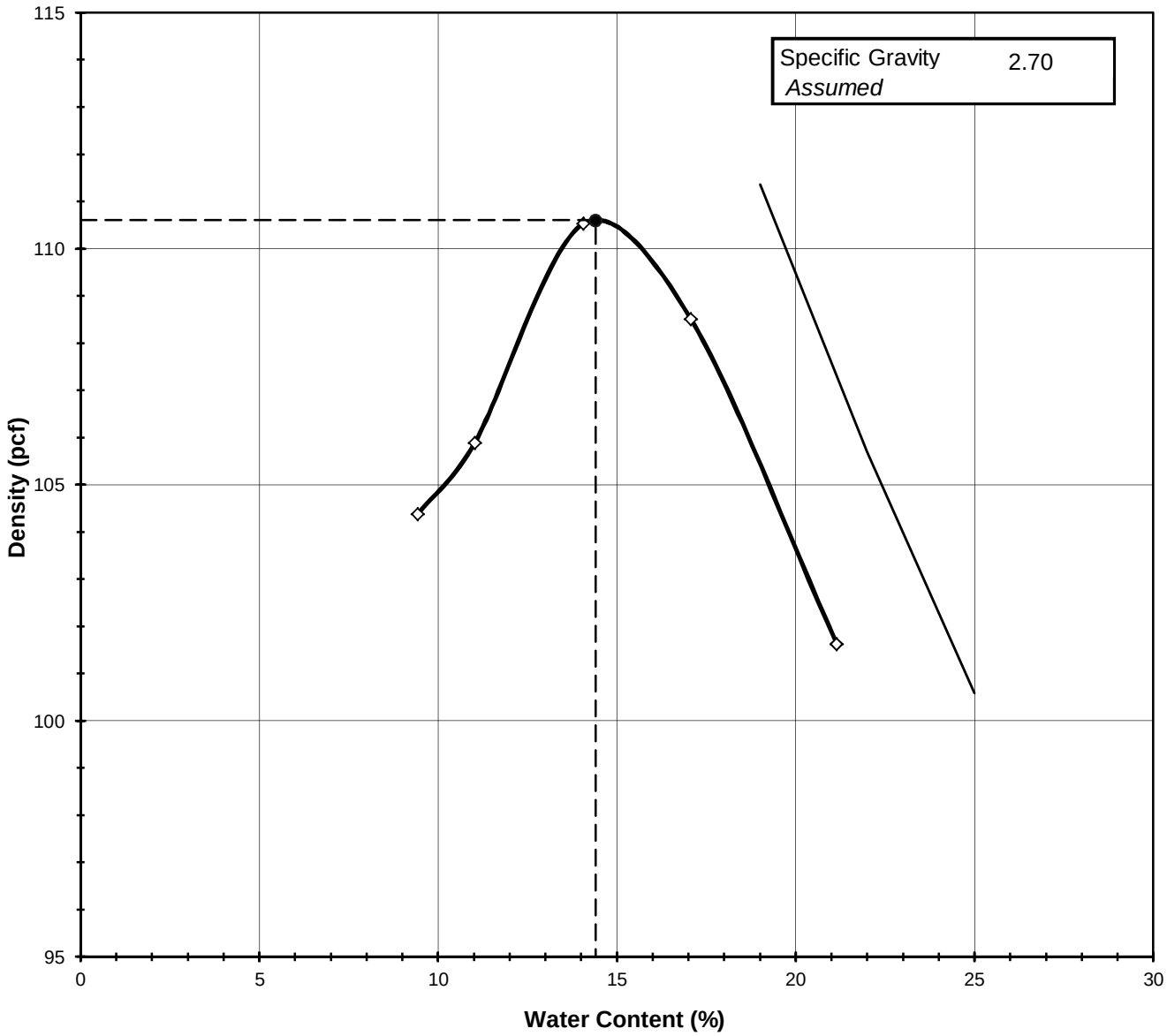
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-005	Sample No.:	BS-4
Lab ID:	2016-625-005-002	Test Method	**STANDARD**

Visual Description: LIGHT BROWN SILTY SAND

Optimum Water Content	**14.4**
Maximum Dry Density	**110.6**



Tested By BW *Date* 3/16/16 *Checked By* GEM *Date* 3/17/16

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-005	Sample No.:	BS-4
Lab ID:	2016-625-005-002		

Visual Description: LIGHT BROWN SILTY SAND

Total Weight of the Sample (g)	13800
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	0
Percent Retained on #4	1
Oversize Material	Not included
Procedure Used	A

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4160
Volume of the Mold (cm^3)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5884	5934	6063	6077	6018
Wt.of Mold (g)	4160	4160	4160	4160	4160
Wt. of Wet Sample (g)	1724	1775	1903	1918	1859
Mold Volume (cm^3)	942	942	942	942	942

Moisture Content / Density

Tare Number	317	305	312	300	304
Wt. of Tare & Wet Sample (g)	421.90	451.30	443.40	485.10	492.00
Wt. of Tare & Dry Sample (g)	392.80	414.90	399.10	430.50	425.40
Wt. of Tare (g)	84.30	84.80	84.10	110.60	110.50
Wt. of Water (g)	29.10	36.40	44.30	54.60	66.60
Wt. of Dry Sample (g)	308.50	330.10	315.00	319.90	314.90

Wet Density (g/cm^3)	1.83	1.88	2.02	2.04	1.97
Wet Density (pcf)	114.2	117.6	126.1	127.0	123.1
Moisture Content (%)	**9.4**	**11.0**	**14.1**	**17.1**	**21.1**
Dry Density (pcf)	**104.4**	**105.9**	**110.5**	**108.5**	**101.6**

Zero Air Voids

Moisture Content (%)		19.0	22.0	25.0
Dry Unit Weight (pcf)		111.4	105.7	100.6

Tested By BW *Date* 3/16/16 *Checked By* GEM *Date* 3/17/16

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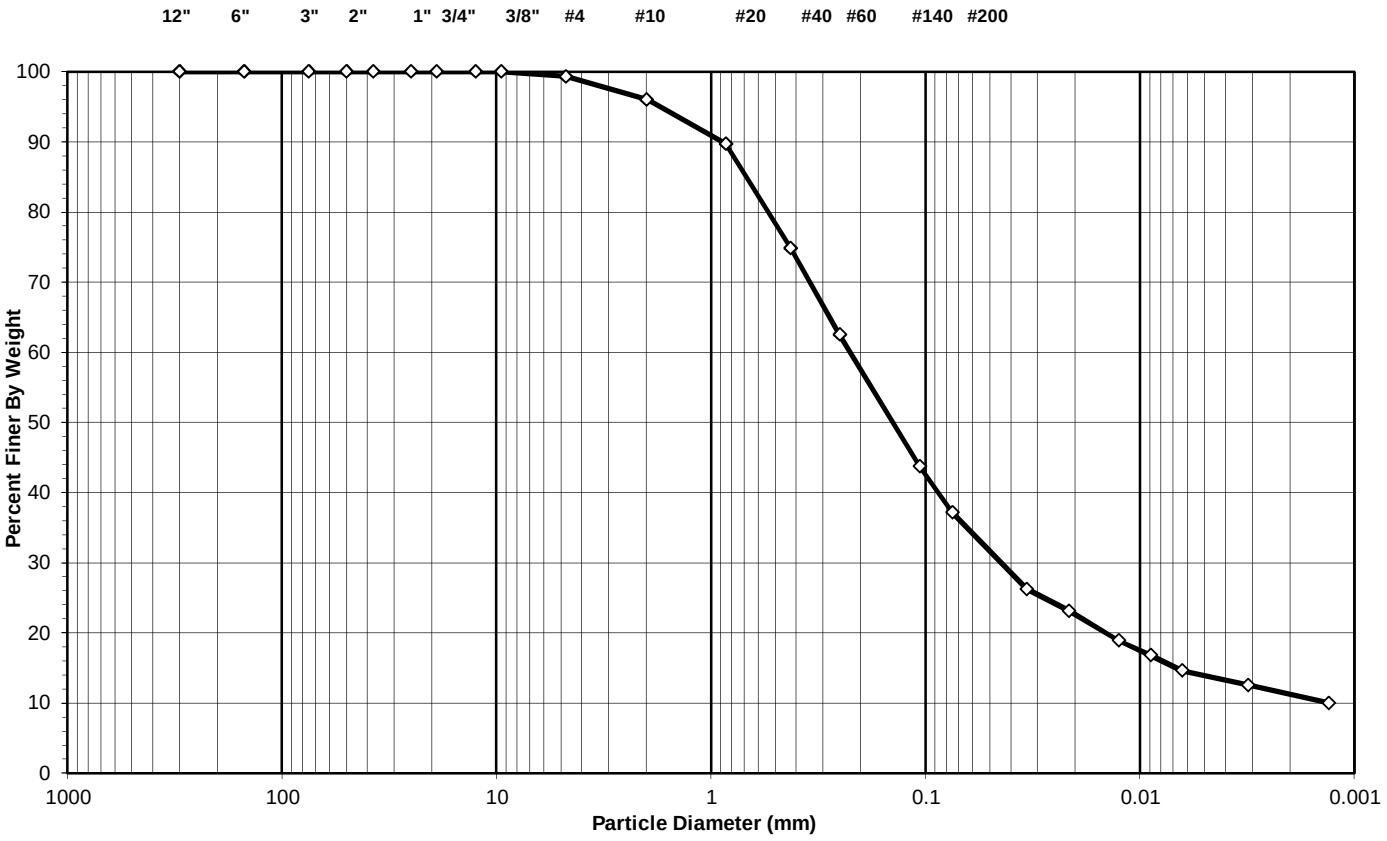
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-4
Lab ID	2016-625-005-002	Soil Color	LIGHT BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.66
#4 To #200	*Sand*	62.18
Finer Than #200	*Silt & Clay*	37.16

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-005-002 SIEVEHYD10.xls]Sheet1*

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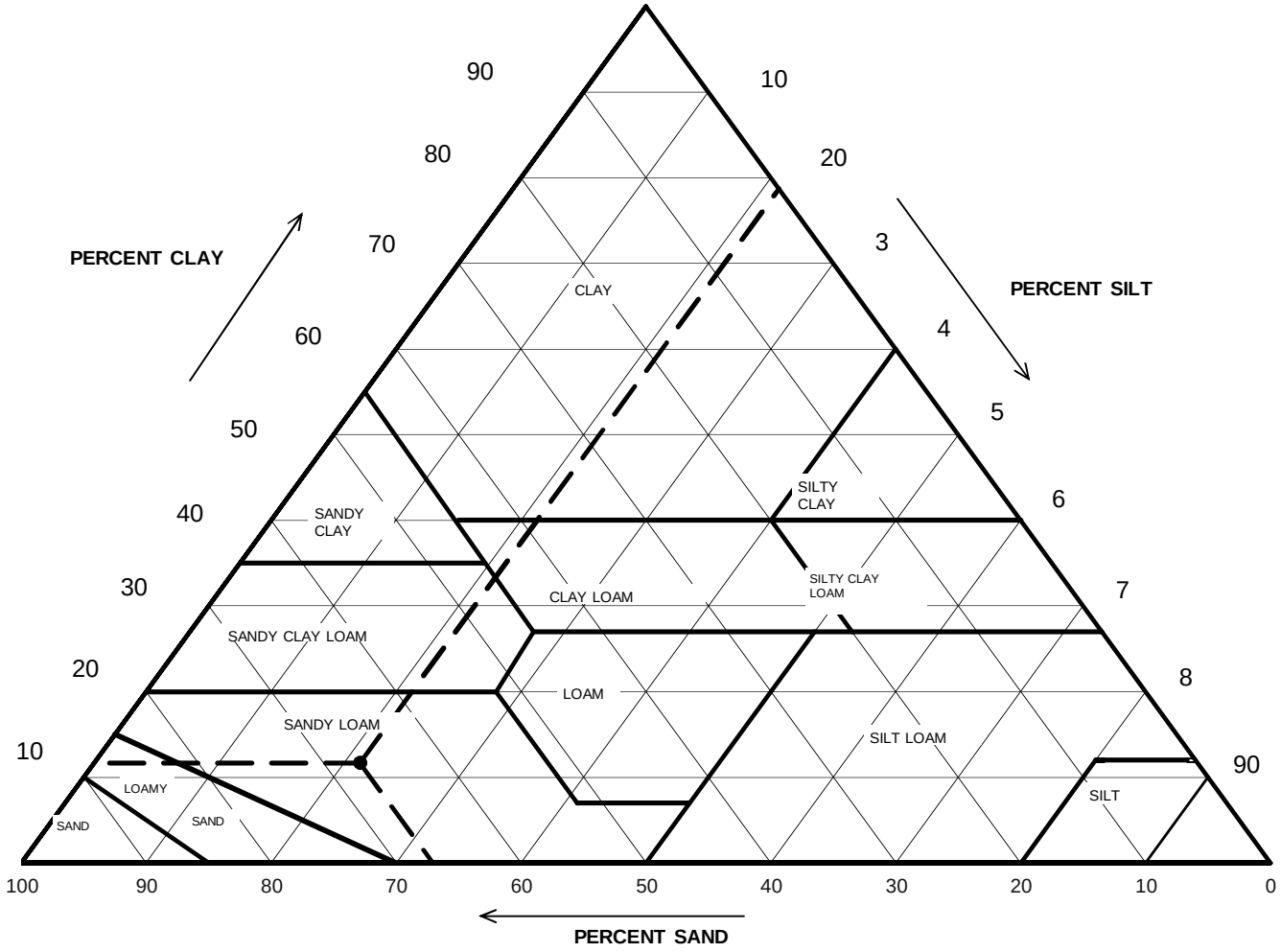
USDA CLASSIFICATION CHART

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-4
Lab ID	2016-625-005-002	Soil Color	LIGHT BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.93	**0.00**
2	96.07	*Sand*	64.41	**67.05**
0.05	31.66	*Silt*	20.43	**21.26**
0.002	11.23	*Clay*	11.23	**11.69**

USDA Classification: ***SANDY LOAM***

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8 *T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-005-002 SIEVEHYD10.xls]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-4
Lab ID	2016-625-005-002	Soil Color	**LIGHT BROWN**

Minus #10 for Hygroscopic Moisture Content		**Hydrometer Specimen Data**	
Tare No.	E-20	Air Dried - #10 Hydrometer Material (g)	50.00
Wgt.Tare + Wet Soil (g)	34.83	Corrected Dry Wt. of - #10 Material (g)	44.88
Wgt.Tare + Dry Soil (g)	33.51		
Weight of Tare (g)	21.94	Weight of - #200 Material (g)	17.36
Weight of Water (g)	1.32	Weight of - #10 ; + #200 Material (g)	27.52
Weight of Dry Soil (g)	11.57		
Moisture Content (%)	**11.4**	**J-FACTOR (%FINER THAN #10)**	**0.9607**
Soil Specimen Data			
Tare No.	AF-03		
Wgt.Tare + Air Dry Soil (g)	808.03		
Weight of Tare (g)	229.17		
Air Dried Wgt. Total Sample (g)	578.86	Dry Weight of Material Retained on #10 (g)	20.50
Total Dry Sample Weight (g)	521.68	Corrected Dry Sample Wt - #10 (g)	501.18

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	3.44	0.7	0.7	99.3	**99.3**
#10	2.00	17.06	3.3	3.9	96.1	**96.1**
#20	0.85	2.97	6.6	6.6	93.4	**89.7**
#40	0.425	6.93	15.4	22.1	77.9	**74.9**
#60	0.250	5.78	12.9	34.9	65.1	**62.5**
#140	0.106	8.77	19.5	54.5	45.5	**43.7**
#200	0.075	3.07	6.8	61.3	38.7	**37.2**
Pan	-	17.36	38.7	100.0	-	**-**

Notes :

Tested By TB Date 3/16/16 Checked By GEM Date 3/16/16

DCN: CT-S3OR DATE: 7/26/13 REVISION: 8

T:\2016 PROJECTS\2016-625 SMITH + GARDNER - BROWNFIELD C&D LF\[2016-625-005-002 SIEVEHYD10.xls]Sheet1

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client	SMITH + GARDNER, INC.	Boring No.	NA
Client Reference	BROWNFIELD C&D LF	Depth (ft)	NA
Project No.	2016-625-005	Sample No.	BS-4
Lab ID	2016-625-005-002	Soil Color	**LIGHT BROWN**

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	16.5	23.5	4.10	12.4	27.3	0.01290	0.0336	**26.3**
5	15.0	23.6	4.07	10.9	24.1	0.01288	0.0214	**23.2**
15	13.0	23.6	4.07	8.9	19.7	0.01288	0.0125	**18.9**
30	12.0	23.6	4.07	7.9	17.5	0.01288	0.0089	**16.8**
60	11.0	23.5	4.10	6.9	15.2	0.01290	0.0063	**14.6**
250	10.0	23.6	4.07	5.9	13.1	0.01288	0.0031	**12.6**
1440	9.0	22.9	4.29	4.7	10.4	0.01299	0.0013	**10.0**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	44.88	Hygroscopic Moisture Factor	0.898	
Weight of Deflocculant (g)	5.0			
		a - Factor	0.99	
		Percent Finer than # 10	96.07	
		Specific Gravity	2.70	Assumed

Notes:

Tested By TB Date 3/15/16 Checked By GEM Date 3/16/16

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89-10

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD C&D LF	Depth (ft):	NA
Project No.:	2016-625-005	Sample No.:	BS-4
Lab ID:	2016-625-005-002	Soil Description:	**LIGHT BROWN SILT**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**
Tare Number	W-5	M	D-1
Wt. of Tare & Wet Sample (g)	32.07	33.08	29.13
Wt. of Tare & Dry Sample (g)	27.67	28.19	25.07
Wt. of Tare (g)	15.61	15.15	15.29
Wt. of Water (g)	4.4	4.9	4.1
Wt. of Dry Sample (g)	12.1	13.0	9.8
Moisture Content (%)	**36.5**	**37.5**	**41.5**
Number of Blows	**31**	**25**	**15**

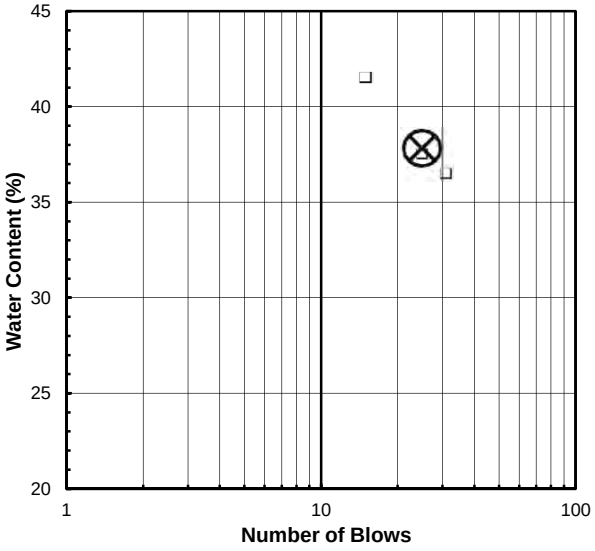
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-N	Y-3	
Wt. of Tare & Wet Sample (g)	23.14	24.34	
Wt. of Tare & Dry Sample (g)	21.41	22.26	
Wt. of Tare (g)	15.44	15.66	
Wt. of Water (g)	1.7	2.1	
Wt. of Dry Sample (g)	6.0	6.6	
Moisture Content (%)	**29.0**	**31.5**	**-2.5**

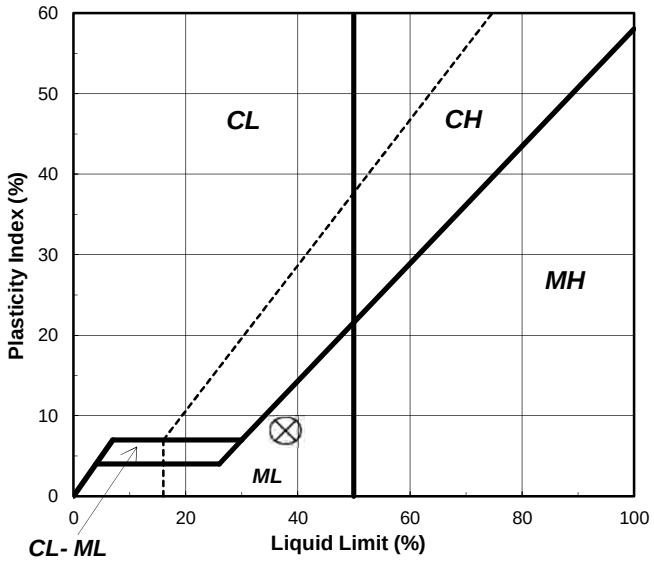
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**38**
Plastic Limit (%)	**30**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By TB *Date* 3/11/16 *Checked By* GEM *Date* 3/14/16

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