REPORT OF
Preliminary Geotechnical Exploration

CLARKSBURG TOWN CENTER, PHASE 1A

Stormwater Management Facilities
Montgomery County, Maryland

June 21, 2002

Prepared For:

Terrabrook Clarksburg, LLC
1 Piedmont Road
Clarksburg, Maryland 20871

Attn: Mr. Jim Richmond

GTA Job No.: 020424

Prepared By:

Geo-Technology Associates, Inc.
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GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing ASFE Member Firm

June 21, 2002

Terrabrook Clarksburg, LLC
1 Piedmont Road
Clarksburg, MD 20871

Attn: Mr. Jim Richmond

Re: Preliminary Geotechnical Exploration
Stormwater Management Facilities
Clarksburg Town Center, Phase 1A
Montgomery County, Maryland

Dear Jim:

At your request, Geo-Technology Associates, Inc. (GTA) has performed a preliminary geotechnical exploration for the above referenced project. Transmitted herein is a report of our findings and conclusions with respect to geotechnical considerations for the design and construction of stormwater management facilities. The work was performed in accordance with our proposal dated May 7, 2002.

Thank you for the opportunity to assist with this project. This report transmits our findings to date. Should you have any questions or require additional information, please do not hesitate to contact our office.

Very truly yours,
GEO-TECHNOLOGY ASSOCIATES, INC.

Scott C. Rowe
Staff Engineer

J. Patrick Klima, P.E.
Vice President

STATE OF MARYLAND
RAVINDRA P. MALVIYA
No. 14495
PROFESSIONAL ENGINEER

S:\JOB-FILE\A THRU I\CLARKSBURG TC PHASE II\SWM PHASE 1A.DOC
J.O# 020424

cc: Mr. Brian Davila - CPJ

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INTRODUCTION

Terrabrook plans to develop land in the Clarksburg area of Montgomery County, Maryland known as Clarksburg Town Center, for construction of a residential community. Geo-Technology Associates (GTA) understands that Terrabrook will construct the associated development improvements, including proposed stormwater management facilities.

GTA was retained to perform a geotechnical exploration at the locations of proposed stormwater management and water quality facilities within Phase 1A at the project site. The scope of this exploration included 14 Standard Penetration Test (SPT) borings and limited laboratory testing. Two borings were eliminated in the field due to access constraints. Borehole permeability tests were performed at three of the boring locations. Preliminary conclusions and recommendations regarding the proposed stormwater management facilities were derived from engineering analysis of field and laboratory data.

The Phase 1A Water Quality Plan, and the Soil Boring Plan, Phase 1A, dated April 2002, prepared by Charles P. Johnson Associates (CPJ), were referenced for this exploration.

SITE CONDITIONS

The site is located south of the intersection of Maryland Route 121 (Clarksburg Road), in Montgomery County, Maryland. A Site Location Map is included as Figure 1 in Appendix A. The site is generally bound by King Park and a tributary of Little Seneca Creek to the east, Clarksburg Road to the north, Stringtown Road to the south, and the existing town of Clarksburg to the west.

Portions of the site have been subjected to mass grading and utility construction. GTA has provided observation and testing services for the ongoing development. Undeveloped portions of the site include moderately sloping grass-covered fields, and some wooded areas. Terrain slopes generally from northwest to southeast toward a tributary of Little Seneca Creek, which runs from north to south near the eastern boundary of the phase. Existing site grades range from 686 feet above Mean Sea Level (MSL) on a knoll located in the northern property area, to approximately 570 feet MSL near the tributary of Seneca Creek at the southern property corner.

RELEVANT GEOLOGY

According to the Geologic Map of Maryland (1973), the site is located in the Western Piedmont Physiographic Province. The Piedmont lithology generally includes metamorphic rock formations, with younger igneous intrusions, and more recent alluvial deposits. More specifically, the site is underlain by phyllite and schist constituents of the Marburg and Ijamsville Formations. These rocks are generally characterized as quartic and muscovitic schists and phyllite, which decompose to fine sand and silt, with a significant clay fraction in some instances. Differential weathering is common, and as a result, the formation is characterized by irregular rock profiles.

Typical Piedmont rocks weather into a saprolite of variable thickness, underlain by less weathered and then relatively sound rock. Due to differential weathering, depth to competent rock varies throughout the extent of the formation. Please see the referenced publication for more details regarding the geologic unit.

PROPOSED CONSTRUCTION AND SUBSURFACE EXPLORATION

The referenced plan shows a single- and multi-family housing residential community, to be served by public water and sewer systems. GTA drilled 12 borings, designated SWM-1 through SWM-12 in areas that may be considered for water quality or quantity management facilities, as described in Table A. Borings SWM-13 and SWM-14 were not drilled, due to the presence of an existing pond at the boring locations.

TABLE A
Proposed Stormwater Management and Water Quality Facilities

Facility	Boring(s)	Cut to Bottom of Facility (ft)	Fill to Top of Embankment (ft)
Sand Filter 3	SWM-3, 4	5	6
Recharge Facility 1	SWM-8, 9, 10	7	N/A
Recharge Facility 2	SWM-11, 12	10	N/A
Recharge Facility 3	SWM-13,14 (not drilled)	10	N/A
Recharge Facility 5	SWM-5, 6, 7	9	N/A
Facility not designated	SWM-1, 2	N/A	N/A

The boring locations were selected and field located by CPJ at the approximate locations indicated on the Boring Location Plan provided as Figure 2 in Appendix A. The Boring Location Plan is an altered reproduction of the referenced plan prepared by CPJ. Logs of the borings are included in Appendix B.

The proposed boring depths ranged from 10 to 15 feet below existing surface grades. The borings were drilled with a Standard Penetration Test (SPT) rig, which utilizes a hollow auger to advance the boring, and a split spoon sampler to provide soil specimens and the SPT 'N' value. SPT tests were performed and soil samples were taken at 2.5-feet intervals in the upper ten feet of each boring and at 5-feet intervals thereafter.

Soil samples collected from the borings were returned to GTA's laboratory for visual classification and limited testing. Classifications provided on the logs are visual, supplemented by available laboratory test results.

In-situ borehole permeability testing was performed at three boring locations, at depths of 5 to 9.5 feet below existing surface grade. Permeability testing was omitted at several locations due to the presence of shallow rock and/or groundwater as encountered in the associated boring. The permeability test consists of measuring the drop in water level within a solid 5-inch PVC pipe for a period of 4 hours subsequent to a 24-hour pre-soak. The PVC pipes were set in holes drilled within five feet of the referenced boring locations.

SUBSURFACE CONDITIONS

The borings generally confirm the description of materials provided in the Geology section of this report. Beneath a topsoil layer up to 15 inches thick at the boring locations, subsoils consisted predominantly of coarse- to fine-grained silt and sand, with varying amounts of clay and rock fragments. Clay content was generally higher in the near surface soils, while weathered rock content generally increased with depth.

Soils encountered in the upper levels of the borings included plastic silts and clays with rock fragments, and predominantly granular soils with a plastic fine-grained fraction. The soils were classified as USCS SM, SC, ML, CL and MH, and were loose to medium-dense or medium-stiff to very stiff, based on SPT 'N' values of 5 to 22 blows per foot. These fine-grained materials generally extended to depths of 2 to 8 feet in the borings, and reached a depth of 13 feet in Boring SWM-10.

Below the fine-grained soils, the borings encountered predominantly coarse-grained weathered rock materials visually classified as USCS SM, Silty Sand. These materials consisted of loose to dense silt, sand and rock fragments, as indicated by Standard Penetration Test (SPT) 'N' values of 15 to 50 blows per foot (bpf).

Very dense weathered rock was encountered in eight borings, beginning at depths 8 to 14 feet below the ground surface. SPT 'N' values in the very dense weathered rock were as high as 50 blows yielding 3 inches of penetration. Materials hard enough to impede advancement of the augers were encountered in four borings, at depths of 10 to 12 feet.

Groundwater was encountered in eight borings from depths of 1 to 5.4 feet. Please be advised that groundwater levels are expected to fluctuate due to changes in precipitation, drainage, and other factors.

Based on the in-situ permeability testing performed in the borings, the average infiltration rate varied from less than 0.1 to approximately 0.4 inches per hour at the depths and locations explored. Results of the permeability testing are shown on the appropriate boring logs. Please refer to the boring logs, and Table C, Summary of Subsurface Data presented in Appendix B.

LABORATORY TESTING

Selected samples recovered from the borings were submitted for limited laboratory analysis, including natural moisture determination and testing for mechanical properties. The soils were classified in accordance with the United States Department of Agriculture (USDA), Unified (USCS), and American Association of State Highway and Transportation Officials (AASHTO) Classification Systems.

Five SPT jar samples were selected for grain size and index property testing. The results of these tests are summarized in Table B. Please refer to the laboratory test results included Appendix C for additional information.

TABLE B
SUMMARY OF SOIL CLASSIFICATIONS

Boring #	Depth (ft)	Liquid Limit	Plasticity Index	Unified Classification	USDA Classification	AASHTO Classification
SWM-3	5 – 6.5	NP*	NP	SM, Gravel and Sand, little Silt	Sandy Loam	A-1-b
SWM-5	5 – 6.5	44	17	SM, Sand and Clay and Silt	--	A-7-6
SWM-10	2.5 – 4	87	44	MH, High Plasticity Silt, little Sand	Silty Clay (est.)	A-7-5
SWM-11	8.5 - 10	NP	NP	SM, Sand and Gravel, little Silt	Sandy Loam	A-1-a
SWM-12	8.5 – 10	NP	NP	SM, Sand and Gravel, some Silt	Sandy Loam	A-1-a

*Indicates Non-Plastic Soil

CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of GTA's exploration, and review of the referenced reports, it is our opinion that construction of the proposed stormwater management facilities is feasible, given that the following recommendations are observed, and that the standard level of care is maintained during construction. GTA's preliminary recommendations are provided in the following paragraphs.

1. Infiltration Techniques

The Maryland Department of Environment (MDE) recommends a vertical buffer of 2 to 4 feet between the infiltration invert and groundwater or rock. Standards for infiltration practices adopted by Montgomery County state that the minimum acceptable average infiltration rate for stormwater management and water quality applications, as indicated by borehole permeability testing, is 0.52 inch per hour.

GTA understands that infiltration stormwater management techniques are proposed at several facilities. Based on the results of field and laboratory testing, infiltration stormwater management techniques are not considered feasible at the 12 locations explored. Infiltration techniques are precluded due to the generally fine-grained matrix of the near-surface soils with low permeability test results, the presence of shallow groundwater in low-lying areas, and the presence of dense to very dense weathered rock materials at a majority of locations.

Please see Table C in Appendix A, which provides comment on the feasibility of infiltration stormwater management techniques at each location explored, based on the referenced criteria and observed subsurface conditions.

2. Groundwater Recharge Facilities

Based on the field and laboratory data, recharge of groundwater is generally feasible at the locations explored. GTA has discussed the intent and design requirements for recharge facilities with Montgomery County officials. Based on these discussions, and in accordance with the MDE 2000 Maryland Stormwater Design Manual, the proposed recharge facilities should be designed to store a certain minimum volume of surface runoff. The required storage volume is determined for each facility based on the total contributing drainage area, the proposed percentage of impervious area, and the hydrologic classification of the existing soil type.

Based on a review of the Montgomery County Soil Survey, dated 1990, soils classified within Hydrologic Groups B, C and D are present in the project area. The preliminary soil survey map indicates that Group B soils are predominant. The proposed groundwater recharge facilities should be sized as determined using the procedure presented in Section 2.2 of the referenced manual.

The construction of some recharge facilities as proposed will be impacted by the presence of shallow rock and groundwater. The proposed invert of Recharge Facility No. 2 is within very dense weathered and unweathered rock. The proposed inverts of Recharge Facilities No. 1 and No. 5 are below the groundwater levels and saturated soil layers. Please see Table D in Appendix A for a more detailed summary.

The design and location of facilities impacted by shallow rock or groundwater should be modified to minimize excavation into very dense materials, and to provide adequate vertical clearance between the proposed inverts and groundwater.

3. Sand Filter Construction

A. Material Requirements

GTA presumes that Maryland Specification 378 (MD 378), as accepted by Montgomery County governs design and construction of the proposed Sand Filter located at Borings SWM-3 and SWM-4. MD 378 specifies that soils for use in cutoff trench construction meet USCS Classification CL (low plasticity clay), CH (high plasticity clay), SC (clayey sand), or GC (clayey gravel). Furthermore, GTA recommends that similar materials be used for backfill adjacent to the outfall structure. The use of the fine-grained plastic material adjacent to the pipe should decrease the potential for embankment failure induced by "piping" erosional processes.

GTA's exploration identified soils classified as USCS SM, SC, ML, CL, and MH. Based on experience with the adjacent Phases of Clarksburg Town Center, recovery of a sufficient quantity of suitable clayey soils for core and cut-off trench construction may not be feasible from on-site excavation. A test pit exploration may be performed prior to construction to further evaluate potential on-site borrow areas. A contingency for off-site borrow should be provided.

If sufficient materials suitable for cutoff trench construction are not available on site, off-site borrow meeting the required classifications may be used. Off-site borrow should meet the classifications required by MD 378, and be approved by GTA prior to placement as fill.

MD 378 specifies that all of the referenced soil classifications suitable for cutoff trench construction are also suitable for embankment construction. USCS ML and SM soils are also deemed suitable. GTA recommends that the most plastic material available be used for embankment construction.

B. Basin Excavation and Embankment Construction

Based on the referenced plan, excavation up to 5 feet will be required to achieve the proposed basin bottom elevations, and fill up to 6 feet will be required to achieve the proposed embankment top elevations. Based on the boring data, excavations up to 8 feet in these areas can generally be accomplished by standard means, such as scraping and ripping. Excavation below 8 feet will encounter very dense materials.

Blasting to achieve proposed grades should be carefully controlled to minimize the potential for increasing seepage in the embankment and outfall areas. Where feasible, jacking techniques should be utilized to remove shallow rock.

Removal of rock encountered in cut-off trench excavations may not be required, pending evaluation by the geotechnical engineer. Competent rock will generally not interfere with the primary function of the cut-off trench, which is intended to lengthen the seepage path beneath the embankment.

Prior to the placement of compacted fill or the construction of the outfall cradle and structures, areas supporting the proposed pond embankment and structures should be stripped and grubbed to remove all topsoil and other organic matter.

After stripping, the subgrade should be proof-rolled as directed by a geotechnical engineer or his qualified representative. Unstable soils identified by proofrolling should be removed from subgrade. No fills should be placed or foundations constructed until the subgrade is approved by the geotechnical engineer.

Fills for cutoff trench and embankment construction should be placed in eight-inch loose lifts, and compacted to at least 95 percent of the maximum dry density in accordance with the Standard Proctor, ASTM D-698. Fills around the outfall works should be placed in 4-inch lifts and compacted to the same standard with hand equipment. Based on laboratory analysis, on-site soils are likely to be wet of the optimum moisture for compaction, and moisture conditioning may be required. Compactive effort should be monitored with in-place density testing as performed by a qualified representative under the direction of a professional engineer.

CONSTRUCTION MONITORING SCOPE

If requested by Terrabrook, Geo-Technology Associates, Inc. will provide testing and project supervision services for the following construction monitoring program.

- Review final site plans to determine if they conform with the intent of this report.
- Provide testing and monitoring services during site development to observe that the work is being performed in accordance with the intent of this report.
- Monitor the proof-rolling of fill and structure subgrades.

LIMITATIONS

This report has been prepared for the exclusive use of Terrabrook Clarksburg, LLC, in accordance with generally accepted geotechnical engineering practice. No other warranty, express or implied, is made.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the surface materials. The test borings indicate soil conditions only at specific locations and times, and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between the test boring locations.

Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations in subsurface conditions from those described are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. Geo-Technology Associates, Inc. is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the express written authorization of Geo-Technology Associates, Inc.

In accordance with the guidelines of ASFE/The Association of Engineering firms Practicing in the Geosciences, it is recommended that Geo-Technology Associates, Inc. be retained to provide continuous soils engineering services for this project. Participation of GTA will facilitate compliance with GTA's recommendations, and allow changes to be made in these recommendations, in the event that subsurface conditions are found to vary from those anticipated prior to the start of construction.

This report and the attached logs are instruments of service. If certain conditions or items are noted during our investigation, Geo-Technology Associates, Inc. may be required by prevailing statutes to notify and provide information to regulatory or enforcement agencies. Geo-Technology Associates, Inc. will notify our Client should a required disclosure condition exist.

This report was prepared by Geo-Technology Associates, Inc. (GTA) for the sole and exclusive use of Geo-Technology Associates, Inc. and Terrabrook Clarksburg, LLC. Use and reproduction of this report by any other person without the expressed written permission of GTA and Terrabrook Clarksburg, LLC is unauthorized and such use is at the sole risk of the user.

GEO-TECHNOLOGY ASSOCIATES, INC.

June 21, 2002

Terrabrook Clarksburg, LLC
1 Piedmont Road
Clarksburg, MD 20871

Attn: Mr. Jim Richmond

Re: Preliminary Geotechnical Exploration
Stormwater Management Facilities
Clarksburg Town Center, Phase 1A
Montgomery County, Maryland

Dear Jim:

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Very truly yours,
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Staff Engineer

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Vice President

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J.O# 020424

cc: Mr. Brian Davila - CPJ

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one—not even you*—should apply the report for any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

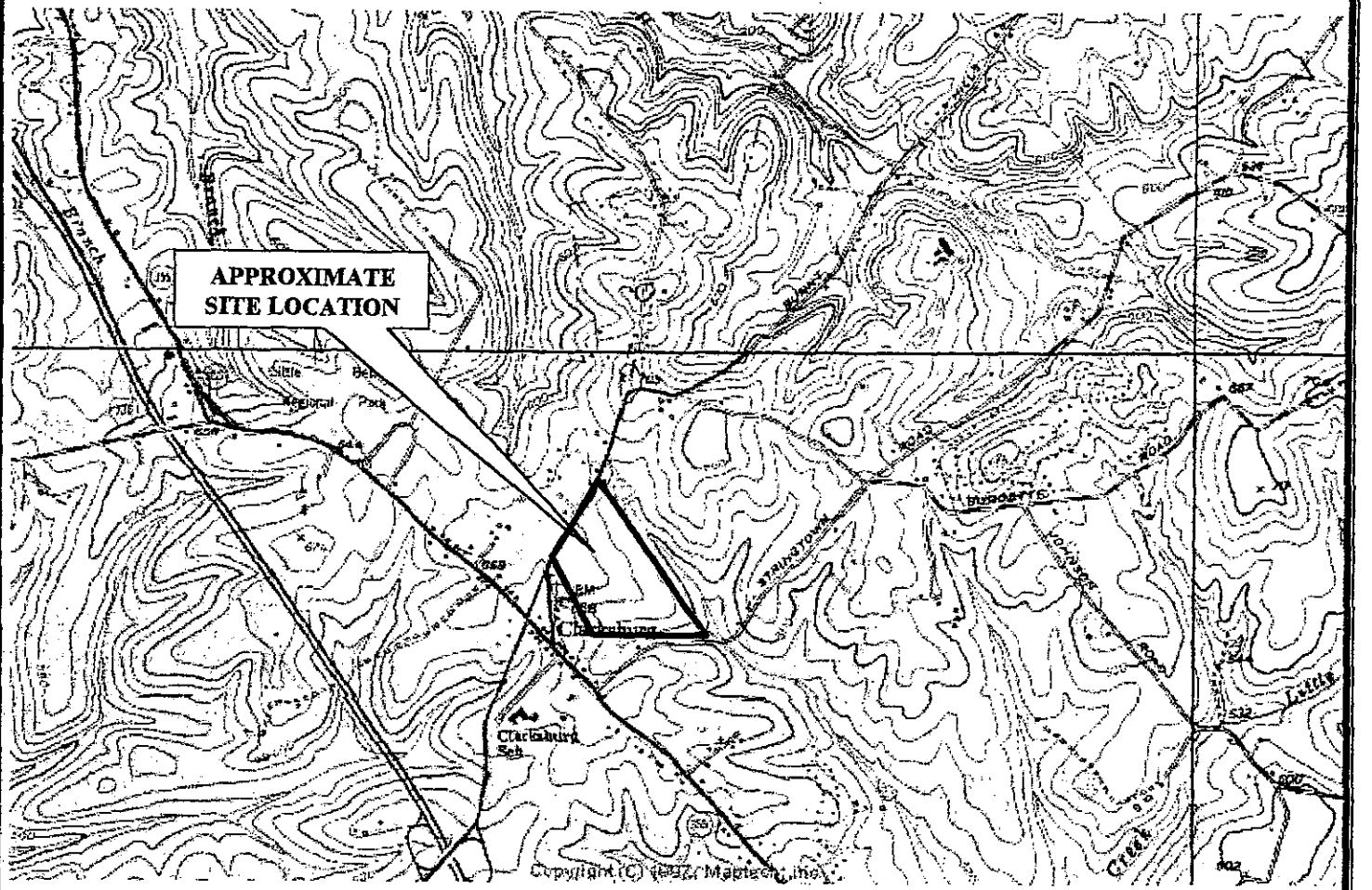
A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

APPENDIX A

FIGURES



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Base map obtained from MAPTECH TERRAIN NAVIGATOR CD-ROM
USGS 7.5-Minute Series (Topographic)
Germantown Quadrangle, Maryland
1953, Photorevised 1979

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Clarksburg Town Center Phase 1A

SITE LOCATION MAP

MONTGOMERY COUNTY, MARYLAND

JOB NO:	DATE:	SCALE:	DRAWN BY:	REVIEWED BY:	FIGURE NO:
020424	June 14, 2002	Not to Scale	SCR	JPK	1

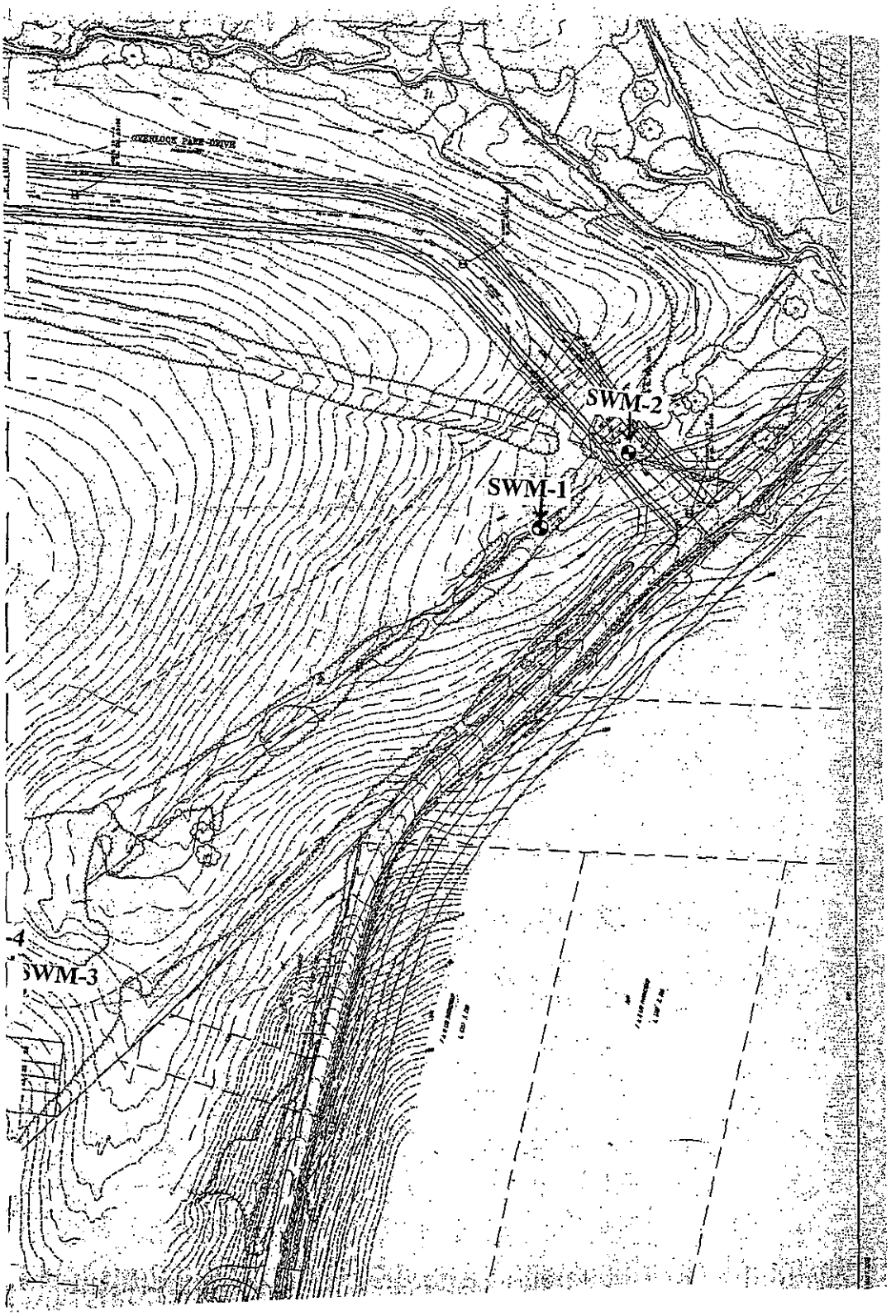

Figure 2

GEO-TECHNOLOGY ASSOCIATES, INC.
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Clarksburg Town Center Phase 1A

BORING LOCATION PLAN

Montgomery County, Maryland

DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.
May 2002	SCR	—	JPK	020424

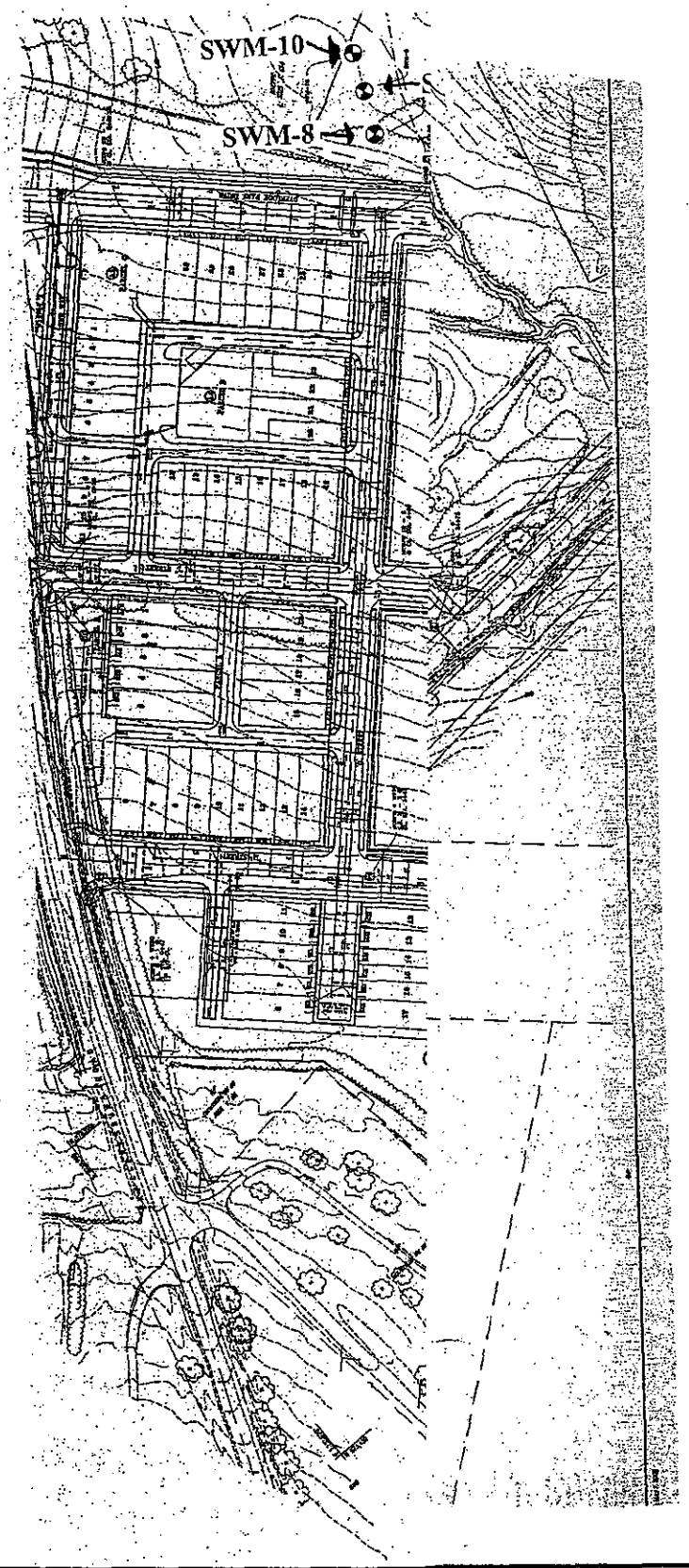


Figure 2

Clarksburg Town Center Phase 1A

BORING LOCATION PLAN

Montgomery County, Maryland

LEGEND:
= APPROXIMATE BORING LOCATION, PERFORMED BY GTA, MAY 200

NOTES:
BASE MAP DEVELOPED FROM A SITE PLAN PREPARED BY CPJ.

REVIEW BY	JOB NO.
JPK	020424

APPENDIX B

SOIL BORING LOGS

Table C
Summary of Borehole Permeability Tests and Feasibility of Infiltration

Boring	Perm Test Depth (ft)	Proposed Infiltration Invert	Estimated Depth to Water (ft)	Measured Borehole Infiltration Rate (in/hr)	Infiltration Feasible at Invert?	Comments Regarding Infiltration at Test Location
SWM-1	Omitted	N/D*	1.9	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-2	Omitted	N/D	1	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-3	5	626	>10	0.4	No	Medium-dense to very dense weathered rock below 2 feet. Permeability less than 0.52 in/hr. Infiltration techniques not considered feasible.
SWM-4	Omitted	658	>10	--	No	Fine-grained material to 2 feet. Dense to very dense weathered rock below 5 feet. Infiltration techniques not considered feasible.
SWM-5	Omitted	661	2.4	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-6	Omitted	682	3	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-7	Omitted	622	5.4	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-8	Omitted	630	2.5	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-9	Omitted	610	2	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-10	Omitted	642	2.5	--	No	Shallow groundwater. Infiltration techniques not considered feasible.
SWM-11	9.5	662	>11	<0.1	No	Possible fill to 2 feet. Fine-grained material to 8 feet. Dense weathered rock below 8 feet. Permeability less than 0.52 in/hr. Infiltration techniques not considered feasible.
SWM-12	9.5	674	>10	0.2	No	Fine-grained material to 5 feet. Medium-dense to very dense weathered rock below 5 feet. Auger refusal at 10 feet. Permeability less than 0.52 in/hr. Infiltration techniques not considered feasible.
SWM-13	Existing Pond at Boring Locations					
SWM-14						

*N/D = Not Designated

Table D
Summary of Subsurface Data

Clarksburg Town Center Phase 1A

Boring Number	Total Depth (ft)	Surface Elevation (ft MSL)	Topsoil (in)	Approx. Depth to Groundwater (ft)	Approx. Depth to Very Dense Materials (ft)	Proposed Invert / Bottom Elevation (ft MSL)	Approx. Elevation of Groundwater (ft MSL)	Approx. Elevation of Very Dense Materials (ft MSL)	Proposed Cut Beneath Groundwater (ft)	Proposed Cut Through Very Dense Materials (ft)
SWM Borings, Phase 1A										
SWM-1	10	583.9	13	1.9	None	N/A	582.0	N/A	N/A	N/A
SWM-2	10	581.7	15	1	None	N/A	580.7	N/A	N/A	N/A
SWM-3	10	630.6	8	Dry	9	625.5	N/A	621.6	N/A	N/A
SWM-4	10	628.9	10	Dry	8	625.5	N/A	620.9	N/A	N/A
SWM-5	10	625.5	10	2.4	None	621.0	623.1	N/A	2.1	N/A
SWM-6	10	626.9	12	3	None	621.0	623.9	N/A	2.9	N/A
SWM-7	15	629.6	9	5.4	14	621.0	624.2	615.6	3.2	N/A
SWM-8	10*	623.1	14	2	9	614.5	621.1	614.1	6.6	N/A
SWM-9	12*	621.3	14	2	11	614.5	619.3	610.3	N/A	N/A
SWM-10	15	621.4	14	2.5	14	614.5	618.9	607.4	N/A	N/A
SWM-11	11*	613.4	11	Dry	10	603.0	N/A	603.4	N/A	0.4
SWM-12	10*	613.3	0	Dry	9	603.0	N/A	604.3	N/A	1.3
SWM-13	N/A	600.2	Existing Pond at Boring Locations			598.0	Exisitng Pond at Boring Locations			
SWM-14	N/A	607.9				598.0				

*Auger Refusal

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

NON COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

Density

Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

Relative Proportions

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

Particle Size Identification

Boulders		- 8-inch diameter or more
Cobbles		- 3- to 8-inch diameter
Gravel	- Coarse	- 1 to 3 inch
	- Medium	- 1/2 to 1 inch
	- Fine	- 1/4 to 1/2 inch
Sand	- Coarse	- 0.6mm to 1/4 inch
	- Medium	- 0.2 mm to 0.6 mm
	- Fine	- 0.05 mm to 0.2 mm
		- 0.06 mm to 0.002 mm

COHESIVE SOILS
(Clay and Silt Combinations)

Consistency

Very Soft	- 3 blow/ft.
Soft	- 4 to 5 blows/ft.
Medium Stiff	- 6 to 10 blows/ft.
Stiff	- 11 to 15 blows/ft.
Very Stiff	- 16 to 30 blows/ft.
Hard	- 31 blows/ft. or more

Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0 - 4
Slight	5 - 7
Medium	8 - 50
High to Very High	Over 50

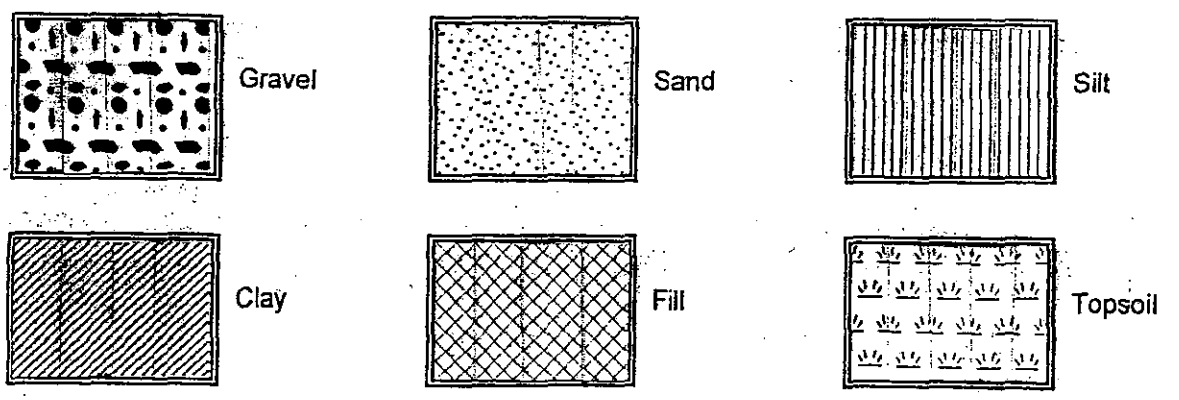
Classification on logs are made by visual inspection.

Standard Penetration Test - Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of one foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the drill log. The standard penetration test results can be obtained by adding at last two figures.

Strata Changes - In the column "Soil Descriptions" on the drill log, the horizontal lines represent approximate strata changes.

Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc. may cause changes in the water levels indicated on the logs.

Graphic Legend:



LOG OF BORING NO. SWM-1

PROJECT: Clarksburg Town Center - Phase 1A
PROJECT NO: 020424
PROJECT LOCATION: Montgomery County, Maryland

WATER LEVEL: ▽ Dry ▼ 1.9 ▼
DATE: 05/09/02 05/10/02
CAVED (ft): 6.0 4.0

DATE STARTED: May 9, 2002
DATE COMPLETED: May 9, 2002
DRILLING CONTRACTOR: GTA
DRILLER: GTA
DRILLING METHOD: HSA
SAMPLING METHOD: Split Spoon

GROUND SURFACE ELEVATION: 583.9
DATUM: MSL
EQUIPMENT: CME 45
LOGGED BY: S.C./B.W.
CHECKED BY: S.R./P.L.

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					583.9	0				
1	0.0	10	3-3-3	6			CL		Brown, moist, soft to stiff, CLAY & SILT, some coarse to fine Sand, some medium to fine Rock Fragments. AASHTO: A-7-6	Topsoil: 13.0 in. ▼ Water Not Encountered While Drilling.
2	2.5	18	3-3-2	5						
3	5.0	18	5-6-5	11		5				
					575.4					
4	8.5	18	5-7-8	15			SM		Brown to gray, dry, medium dense, coarse to fine SAND, some dry Silt, some medium to fine Rock Fragments.	
					573.9	10			AASHTO: A-2-4 Bottom of Hole at 10.0 Feet.	

Coordinates:
N: 572996.0
E: 1234787.0

NOTES:

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LOG OF BORING NO. SWM-1

LOG OF BORING NO. SWM-2

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ 1.6 ▼ 1.0 ▽
DATE: 05/09/02 05/10/02
CAVED (ft): 3.5 3.0

DATE STARTED: **May 9, 2002**
DATE COMPLETED: **May 9, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **581.7**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	13	1-1-2	3	581.7	0	CL		Brown, moist, very soft, CLAY & SILT, little medium to fine Sand. AASHTO: A-7-6	Topsoil: 15.0 in. ▼ ▽
2	2.5	8	1-1-1	2	579.2		SC		Brown, wet, very loose, to loose, coarse to fine SAND and CLAY & SILT, some medium to fine Rock Fragments. AASHTO: A-6	Water Encountered at 3.0 Feet.
3	5.0	8	3-4-5	9		5				
4	8.5	18	7-15-16	31	573.2		SM		Gray to dark gray, moist, dense, coarse to fine SAND, some Silt, some medium to fine Rock Fragments. AASHTO: A-2-4	
					571.7	10			Bottom of Hole at 10.0 Feet.	

Coordinates:
N: **572997.0**
E: **1234943.0**

NOTES:

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LOG OF BORING NO. SWM-2

LOG OF BORING NO. SWM-3

PROJECT: Clarksburg Town Center - Phase 1A
PROJECT NO: 020424
PROJECT LOCATION: Montgomery County, Maryland

WATER LEVEL: ▽ Dry ▼ Dry ▽
DATE: 05/09/02 05/10/02
CAVED (ft): 5.8 5.0

DATE STARTED: May 9, 2002
DATE COMPLETED: May 9, 2002
DRILLING CONTRACTOR: GTA
DRILLER: GTA
DRILLING METHOD: HSA
SAMPLING METHOD: Split Spoon

GROUND SURFACE ELEVATION: 630.6
DATUM: MSL
EQUIPMENT: CME 45
LOGGED BY: S.C./B.W.
CHECKED BY: S.R./P.L.

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	15	3-3-2	5	630.6	0	SM		Gray, dry, very loose to very dense, coarse to fine SAND and fine ROCK FRAGMENTS, little Silt. AASHTO: A-1-b	Topsoil: 8.0 in. Water Not Encountered While Drilling.
2	2.5	18	10-11-11	22						
3	5.0	15	10-7-11	18		5				
4	8.5	18	18-26-32	56	620.6	10			Bottom of Hole at 10.0 Feet. Borehole Permeability Test at 5.0 Feet. Hour / Water Level Drop (in) 1 0.6 2 0.4 3 0.4 4 0.1 Average Infiltration Rate = 0.4 in/hr.	Coordinates: N: 572971.0 E: 1233860.0

NOTES:

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LOG OF BORING NO. SWM-3

LOG OF BORING NO. SWM-4

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ Dry ▼ Dry ▼
DATE: 05/08/02 05/09/02
CAVED (ft): 5.8 5.8

DATE STARTED: **May 8, 2002**
DATE COMPLETED: **May 8, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **628.9**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	6	3-4-4	8	628.9	0	SC		Brown, moist, loose, coarse SAND and CLAY & SILT, some medium to fine Rock Fragments. AASHTO: A-7-6	Topsoil: 10.0 in.
2	2.5	12	3-4-12	16	626.4		SM		Gray, dry, medium dense to very dense, coarse to fine SAND and medium to fine Rock Fragments. AASHTO: A-1-b	Water Not Encountered While Drilling.
3	5.0	18	12-20-19	39		5				
4	8.5	5	50/5"	50/5"	618.9	10			Bottom of Hole at 10.0 Feet.	

Coordinates:
N: **573001.0**
E: **1233865.0**

NOTES:

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LOG OF BORING NO. SWM-4

Sheet 1 of 1

LOG OF BORING NO. SWM-5

PROJECT: Clarksburg Town Center - Phase 1A
PROJECT NO: 020424
PROJECT LOCATION: Montgomery County, Maryland

WATER LEVEL: ▽ Dry ▽ 2.4 ▽
DATE: 05/08/02 05/09/02
CAVED (ft): 6.0 4.8

DATE STARTED: May 8, 2002
DATE COMPLETED: May 8, 2002
DRILLING CONTRACTOR: GTA
DRILLER: GTA
DRILLING METHOD: HSA
SAMPLING METHOD: Split Spoon

GROUND SURFACE ELEVATION: 625.5
DATUM: MSL
EQUIPMENT: CME 45
LOGGED BY: S.C./B.W.
CHECKED BY: S.R./P.L.

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					625.5	0				
1	0.0	12	2-3-4	7			SC		Dark brown, moist, loose, some coarse fine SAND, little medium Gravel. AASHTO: A-7-6	Topsoil: 10. in.
					623.0					▽
2	2.5	18	1-2-3	5			SM		Brown, moist, very loose to loose, coarse to fine SAND and CLAY & SILT, little fine Gravel. AASHTO: A-7-6	
						5				
3	5.0	11	6-4-5	9						Water Not Encountered While Drilling.
					617.0					
4	8.5	12	11-14-18	32			ML		Light yellow, brown, dry, hard, SILT, some coarse to fine Sand, little medium to fine Rock Fragments.	
					615.5	10			AASHTO: A-4 Bottom of Hole at 10.0 Feet.	

Coordinates:

N: 573190.0

E: 1233830.0

NOTES:

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LOG OF BORING NO. SWM-5

Sheet 1 of 1

LOG OF BORING NO. SWM-11

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ Dry ▼ Dry ▼
DATE: 05/09/02 05/10/02
CAVED (ft): 8.0 8.0

DATE STARTED: **May 9, 2002**
DATE COMPLETED: **May 9, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **613.4**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	5	3-3-3	6	613.4	0	SM		Brown, moist, loose, coarse to fine SAND and CLAY & SILT, little medium to fine Rock Fragments. AASHTO: A-6	
2	2.5	18	1-2-2	4	610.9		MH		Red-brown to grey brown, moist, soft to medium stiff, Silty CLAY, little coarse to fine Sand, trace medium to fine Rock Fragments. AASHTO: A-7-6	Water Not Encountered While Drilling.
3	5.0	18	3-2-6	8		5				
4	8.5	18	12-13-30	43	604.9		SM		Gray-brown, dry, dense, fine GRAVEL, some coarse to fine Sand, little Silt. AASHTO: A-1-a	
					602.4	10			Auger Refusal at 11.0 Feet. Bottom of Hole at 11.0 Feet. Borehole Permeability Test at 9.5 Feet. Hour — Water Level Drop (in) 1 — <0.1 2 — <0.1 3 — <0.1 4 — <0.1 Average Infiltration Rate = <0.1 in/hr.	Coordinates: N: 574258.0 E: 1234138.0

NOTES:

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LOG OF BORING NO. SWM-11

LOG OF BORING NO. SWM-6

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ Dry ▼ 3.0 ▼
DATE: 05/08/02 05/09/02
CAVED (ft): 5.8 4.3

DATE STARTED: **May 8, 2002**
DATE COMPLETED: **May 8, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **626.9**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					626.9	0				
1	0.0	9	2-2-5	7			MH		Brown to light brown, medium stiff to soft, Silty CLAY, little medium to fine Sand. AASHTO: A-7-5	Topsoil: 12.0 in.
2	2.5	15	2-2-2	4						▼
					621.9	5				
3	5.0	14	2-4-5	9			ML		Gray brown, moist, medium stiff, SILT & CLAY, little medium to fine Sand. AASHTO: A-4	Water Encountered at 9.0 Feet.
					618.4					
4	8.5	18	6-9-15	24			SM		Grey, dry, medium dense, coarse to fine SAND, some medium to fine Rock Fragments, some Silt.	
					616.9	10			AASHTO: A-1-b Bottom of Hole at 10.0 Feet.	

Coordinates:
N: **573134.0**
E: **1233806.0**

NOTES:

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LOG OF BORING NO. SWM-6

LOG OF BORING NO. SWM-7

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ 5.4 ▼ 5.4 ▽ ____
DATE: 05/08/02 05/09/02 ____
CAVED (ft): 8.4 8.1 ____

DATE STARTED: **May 8, 2002**
DATE COMPLETED: **May 8, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **629.6**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					629.6	0				
1	0.0	12	3-3-7	10			MH		Brown, moist, medium stiff to very soft, Silty CLAY, little medium to fine Sand. AASHTO: A-7-6	Topsoil: 9.0 in. Water Encountered at 7.5 Feet.
2	2.5	0.5	1-1-2	3						
					624.6	5				▼
3	5.0	18	4-9-11	20			SM		Gray brown to gray, dry to wet, medium dense to very dense, coarse to fine SAND, some medium to fine Rock Fragments, little Silt. AASHTO: A-1-b	
4	8.5	18	6-8-13	21		10				
5	13.5	9	16-24-32	56						
					614.6	15			Bottom of Hole at 15.0 Feet.	Coordinates: N: **573071.0** E: **1233801.0**

NOTES:

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LOG OF BORING NO. SWM-7

Sheet 1 of 1

LOG OF BORING NO. SWM-8

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ 5.0 ▼ 2.5 ▼
DATE: 05/10/02 05/11/02
CAVED (ft): 7.0 2.6

DATE STARTED: **May 10, 2002**
DATE COMPLETED: **May 10, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **623.1**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					623.1	0				
1	0.0	16	2-2-2	4			MH		Dark brown, moist, soft, CLAY & SILT, some coarse to fine Sand, little fine Rock Fragments. AASHTO; A-7-6	Topsoil: 14.0 in.
					620.6					
2	2.5	18	4-4-4	8			ML		Light brown, moist, medium stiff to stiff, Clayey SILT, some coarse to fine Sand, little medium to fine Rock Fragments.	▽ Water Encountered at 8.0 Feet.
3	5.0	18	4-6-6	12		5				
					614.6					
4	8.5	3	42-50/3"	50/3"			SM		Gray, dry, very dense, coarse to fine SAND, some medium to fine Rock Fragments and Silt.	
					613.1	10			AASHTO: A-4 Bottom of Hole at 10.0 Feet.	

Coordinates:
N: **574522.0**
E: **1233885.0**

NOTES:

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LOG OF BORING NO. SWM-8

LOG OF BORING NO. SWM-9

PROJECT: Clarksburg Town Center - Phase 1A
PROJECT NO: 020424
PROJECT LOCATION: Montgomery County, Maryland

WATER LEVEL: ▽ 6.4 ▼ 2.0 ▼
DATE: 05/10/02 05/11/02
CAVED (ft): 6.5 3.0

DATE STARTED: May 10, 2002
DATE COMPLETED: May 10, 2002
DRILLING CONTRACTOR: GTA
DRILLER: GTA
DRILLING METHOD: HSA
SAMPLING METHOD: Split Spoon

GROUND SURFACE ELEVATION: 621.3
DATUM: MSL
EQUIPMENT: CME 45
LOGGED BY: S.C./B.W.
CHECKED BY: S.R./P.L.

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					621.3	0				
1	0.0	10	4-3-3	6			MH		Brown to light brown, moist, medium stiff to stiff, Silty CLAY, little medium to fine Sand, trace fine Gravel. AASHTO: A-7-5	Topsoil: 14.0 in. ▼ Water Encountered at 8.0 Feet.
2	2.5	18	2-3-3	6						
3	5.0	18	5-5-7	12		5				▽
					612.8					
4	8.5	18	10-17-25	42			ML		Gray, wet, dense, SILT, some coarse to fine Sand, some medium to fine Rock Fragments. AASHTO: A-7-5	
						10				
					609.3				Bottom of Hole at 12.0 Feet.	

Coordinates:
N: 574569.0
E: 1233913.0

NOTES:

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LOG OF BORING NO. SWM-9

LOG OF BORING NO. SWM-10

PROJECT: **Clarksburg Town Center - Phase 1A**
PROJECT NO: **020424**
PROJECT LOCATION: **Montgomery County, Maryland**

WATER LEVEL: ▽ 3.5 ▼ 2.5 ▽
DATE: 05/09/02 05/10/02
CAVED (ft): 10.7 3.0

DATE STARTED: **May 10, 2002**
DATE COMPLETED: **May 10, 2002**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **Split Spoon**

GROUND SURFACE ELEVATION: **621.4**
DATUM: **MSL**
EQUIPMENT: **CME 45**
LOGGED BY: **S.C./B.W.**
CHECKED BY: **S.R./P.L.**

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					621.4	0				
1	0.0	10	1-1-1	2			MH		Brown to yellow-brown, moist, very soft to soft, CLAY, little coarse to fine Sand, little fine Gravel. AASHTO: A-7-5	Topsoil: 14.0 in. ▼ ▽
2	2.5	13	1-2-2	4	617.4					
						5	ML		Brown to gray brown, moist, medium stiff to stiff, SILT & CLAY, some coarse to fine Sand, little medium to fine Gravel. AASHTO: A-4	Water Encountered at 8.5 Feet.
3	5.0	18	2-3-4	7						
4	8.5	18	3-5-6	11		10				
					607.9					
5	13.5	5	22-27-50/5"	50/5"			SM		Gray, dry, very dense, coarse to fine SAND and SILT, some medium to to fine Fragments	
					606.4	15			Bottom of Hole at 15.0 Feet.	Coordinates: N: **574606.0** E: **1233930.0**

NOTES:

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LOG OF BORING NO. SWM-10

Sheet 1 of 1

LOG OF BORING NO. SWM-12

PROJECT: Clarksburg Town Center - Phase 1A
PROJECT NO: 020424
PROJECT LOCATION: Montgomery County, Maryland

WATER LEVEL: ▽ Dry ▼ Dry ▽
DATE: 05/09/02 05/10/02
CAVED (ft): 6.0 6.0

DATE STARTED: May 9, 2002
DATE COMPLETED: May 9, 2002
DRILLING CONTRACTOR: GTA
DRILLER: GTA
DRILLING METHOD: HSA
SAMPLING METHOD: Split Spoon

GROUND SURFACE ELEVATION: 613.3
DATUM: MSL
EQUIPMENT: CME 45
LOGGED BY: S.C./B.W.
CHECKED BY: S.R./P.L.

SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (in)	SAMPLE BLOWS/6 inches	N (blows/ft)	ELEVATION (ft)	DEPTH (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	10	6-4-5	9	613.3	0	MH		Brown, moist, medium stiff, Silty CLAY, some coarse to fine Sand, trace gray fine Rock Fragments. AASHTO: A-7-6	Water Not Encountered While Drilling.
2	2.5	18	4-4-6	10						
3	5.0	18	10-12-13	25	608.3	5	SM		Gray to gray-brown, coarse to fine SAND, little Silt. AASHTO: A-1-a	
4	8.5	18	15-27-29	56	603.3	10			Bottom of Hole at 10.0 Feet. Borehole Permeability Test at 9.5 Feet. Hour / Water Level Drop (in) 1 0.4 2 0.4 3 0.1 4 <0.1 Average Infiltration Rate = 0.2 in/hr.	Coordinates: N: 574190.0 E: 1234240.0

NOTES:

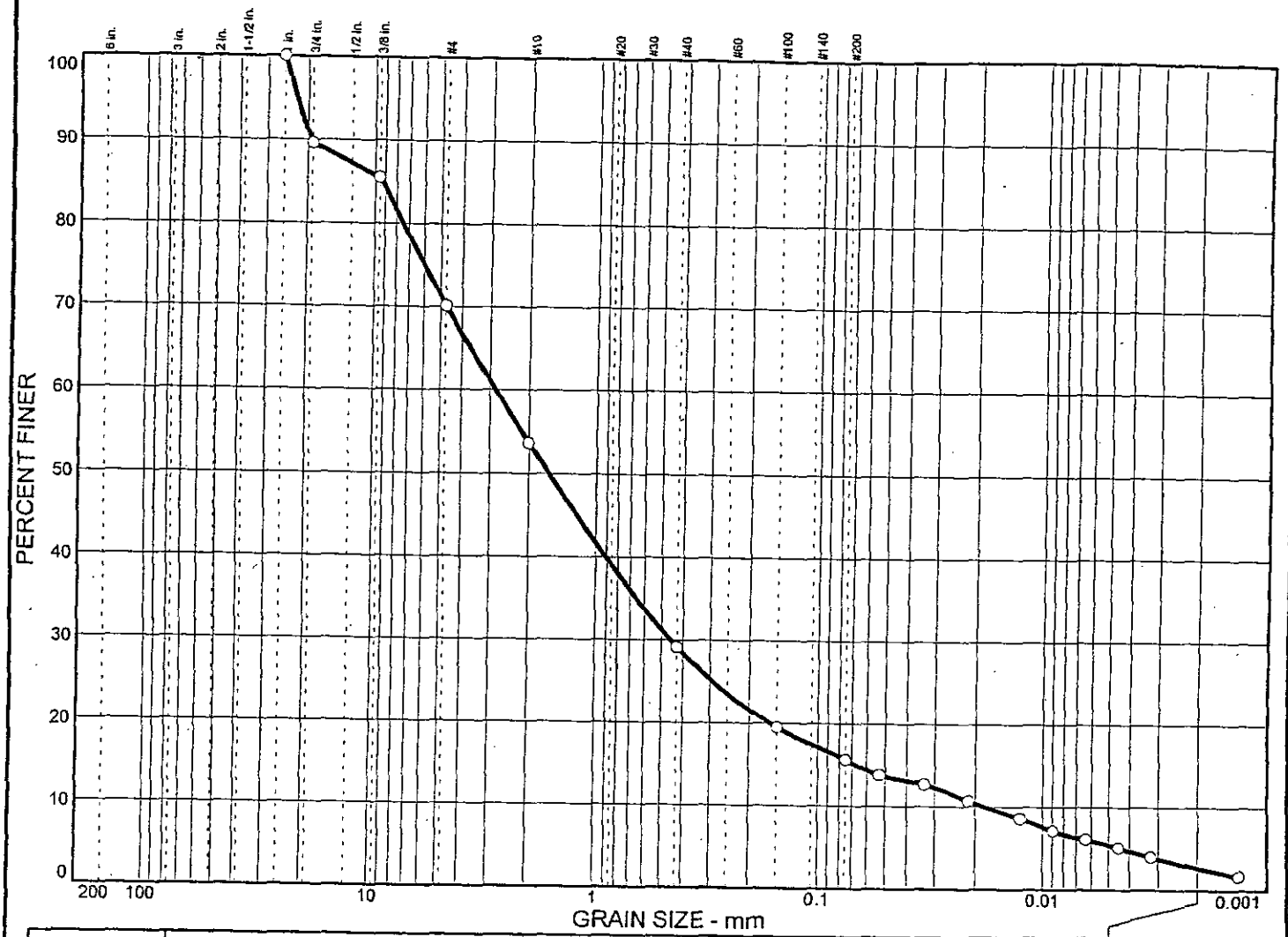
GEO-TECHNOLOGY ASSOCIATES, INC.
9090 Junction Drive, Suite 9

LOG OF BORING NO. SWM-12

APPENDIX C

LABORATORY TEST RESULTS

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	46.4	39.8	11.1	2.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	9.32	2.84	1.63	0.457	0.0676	0.0181	4.05	156.63

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown coarse to fine GRAVEL and coarse to fine SAND, little Silt.	SM	A-1-b

Project No. 020424 **Client:**

Project: Clarksburg T.C.

○ **Source:** SWM-3 **Sample No.:** S-3 **Elev./Depth:** 5.0'-6.5'

Remarks:

○ Natural Moisture: 9.7%

USDA: Sandy loam

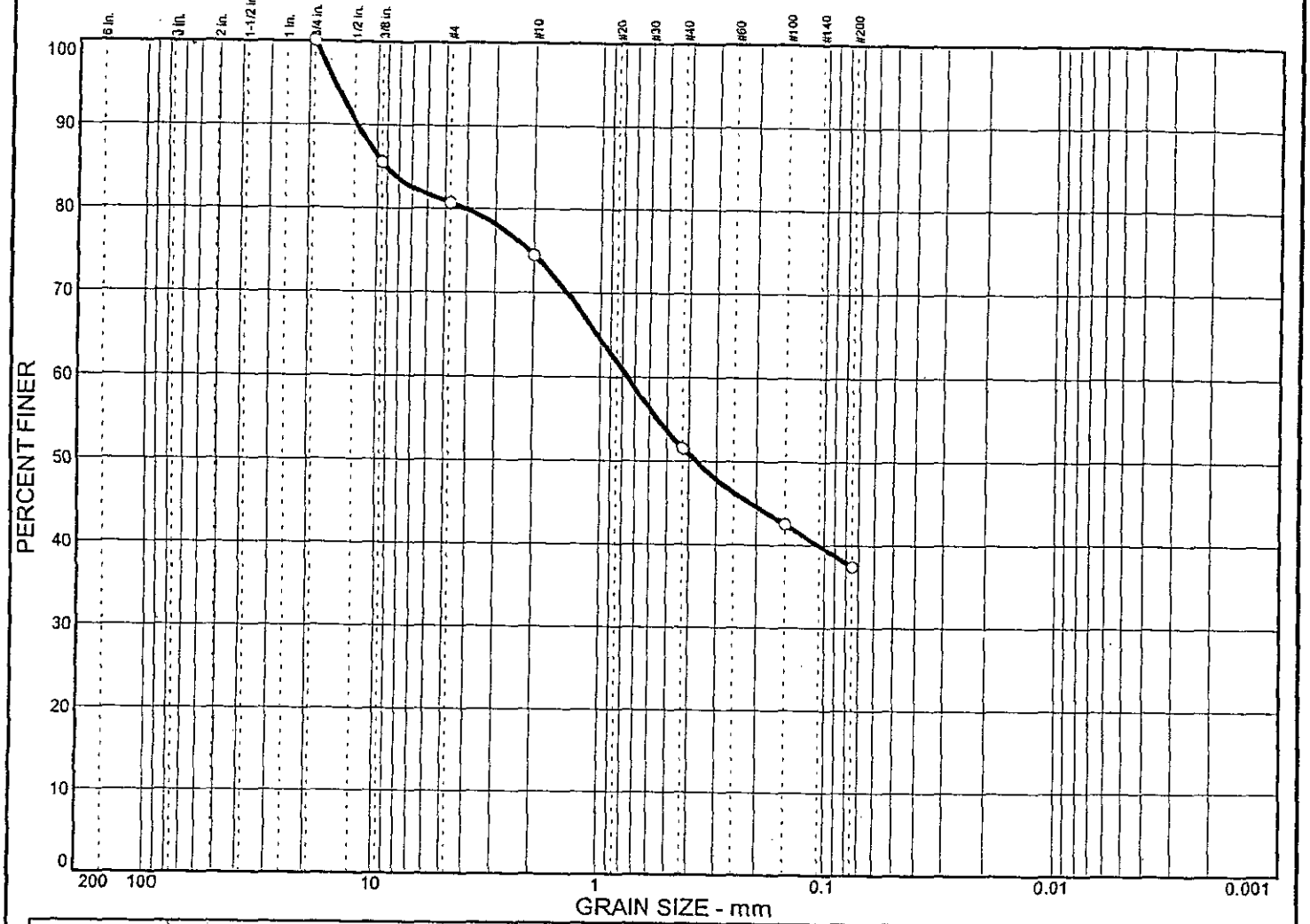
May 20, 2002

PARTICLE SIZE DISTRIBUTION TEST REPORT

GEO-TECHNOLOGY ASSOCIATES, INC.

Plate 5

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	19.3	43.3	37.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	44	17	9.17	0.761	0.373					

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown coarse to fine SAND and CLAY & SILT, little fine Gravel.	SM	A-7-6(2)

Project No. 020424 **Client:**

Project: Clarksburg T.C.

○ **Source:** SWM-5 **Sample No.:** S-3 **Elev./Depth:** 5.0'-6.5'

Remarks:

○ Natural Moisture: 16.0%

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PARTICLE SIZE DISTRIBUTION TEST REPORT

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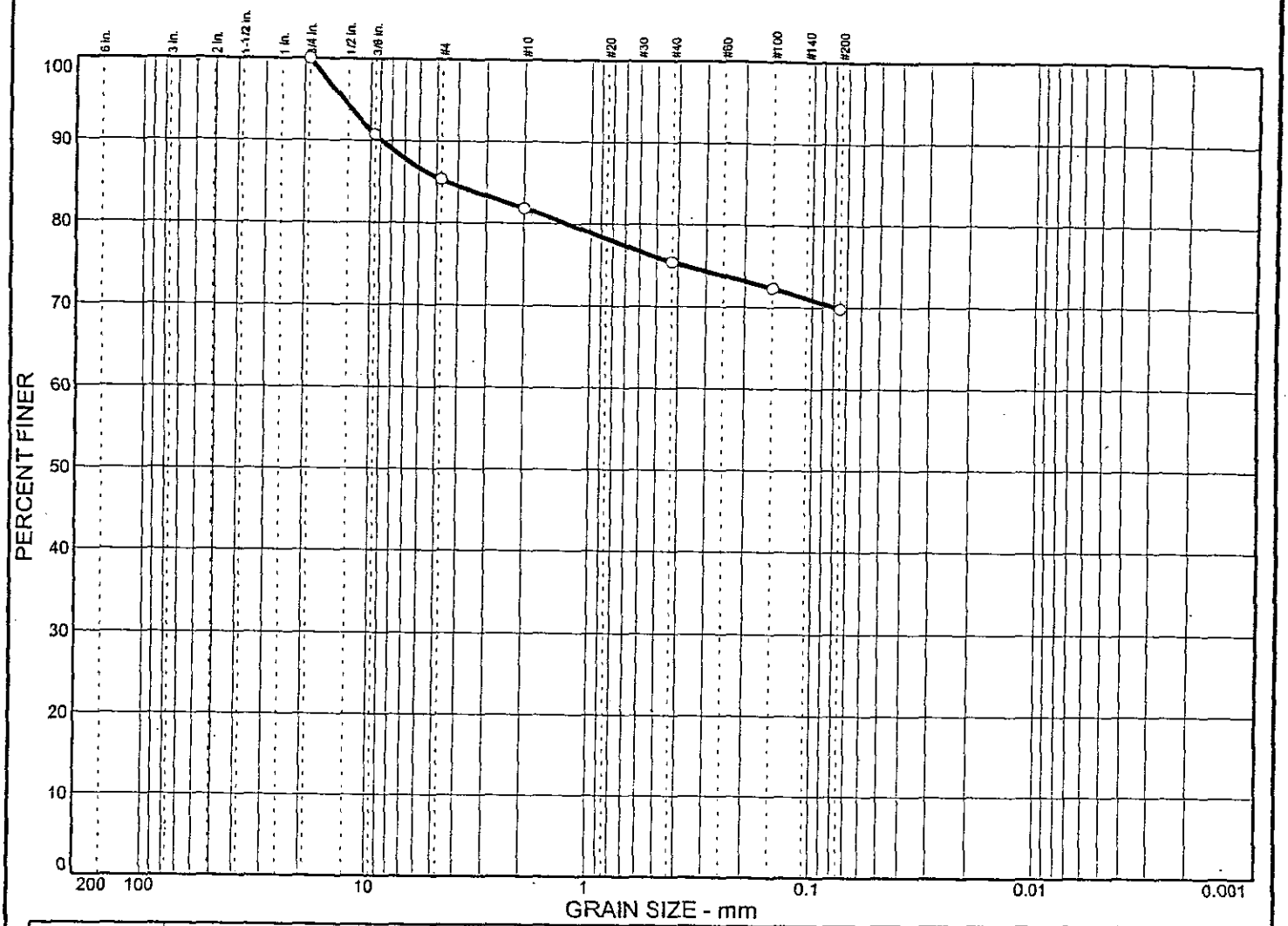
Plate 6

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	14.7	15.5	69.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	87	44	4.48							

MATERIAL DESCRIPTION	USCS	AASHTO
○ Yellow brown CLAY, little coarse to fine Sand, little fine Gravel.	MH	A-7-5(34)

Project No. 020424 **Client:**

Project: Clarksburg T.C.

○ **Source:** SWM-10 **Sample No.:** S-2 **Elev./Depth:** 2.5'-4.0'

Remarks:

○ Natural Moisture: 32.8%

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PARTICLE SIZE DISTRIBUTION TEST REPORT

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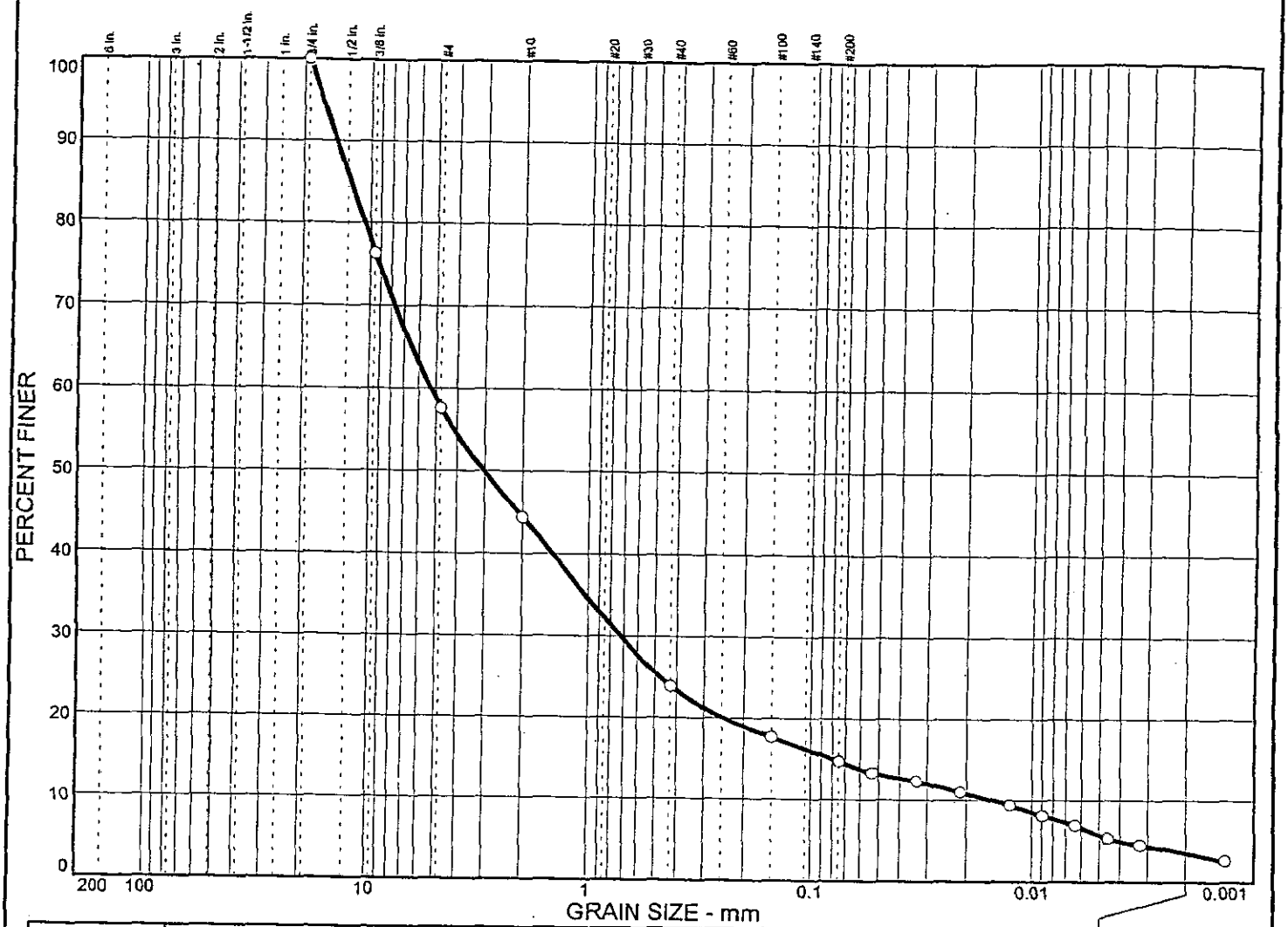
Plate 7

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	55.6	31.1	9.8	3.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	12.4	5.30	3.04	0.722	0.0802	0.0151	6.54	351.87

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown fine GRAVEL, some coarse to fine Sand, little Silt.	SM	A-1-a

Project No. 020424 **Client:**

Project: Clarksburg T.C.

○ **Source:** SWM-11 **Sample No.:** S-4 **Elev./Depth:** 8.5'-10.0'

Remarks:

○ Natural Moisture: 5.7%

USDA: Sandy loam

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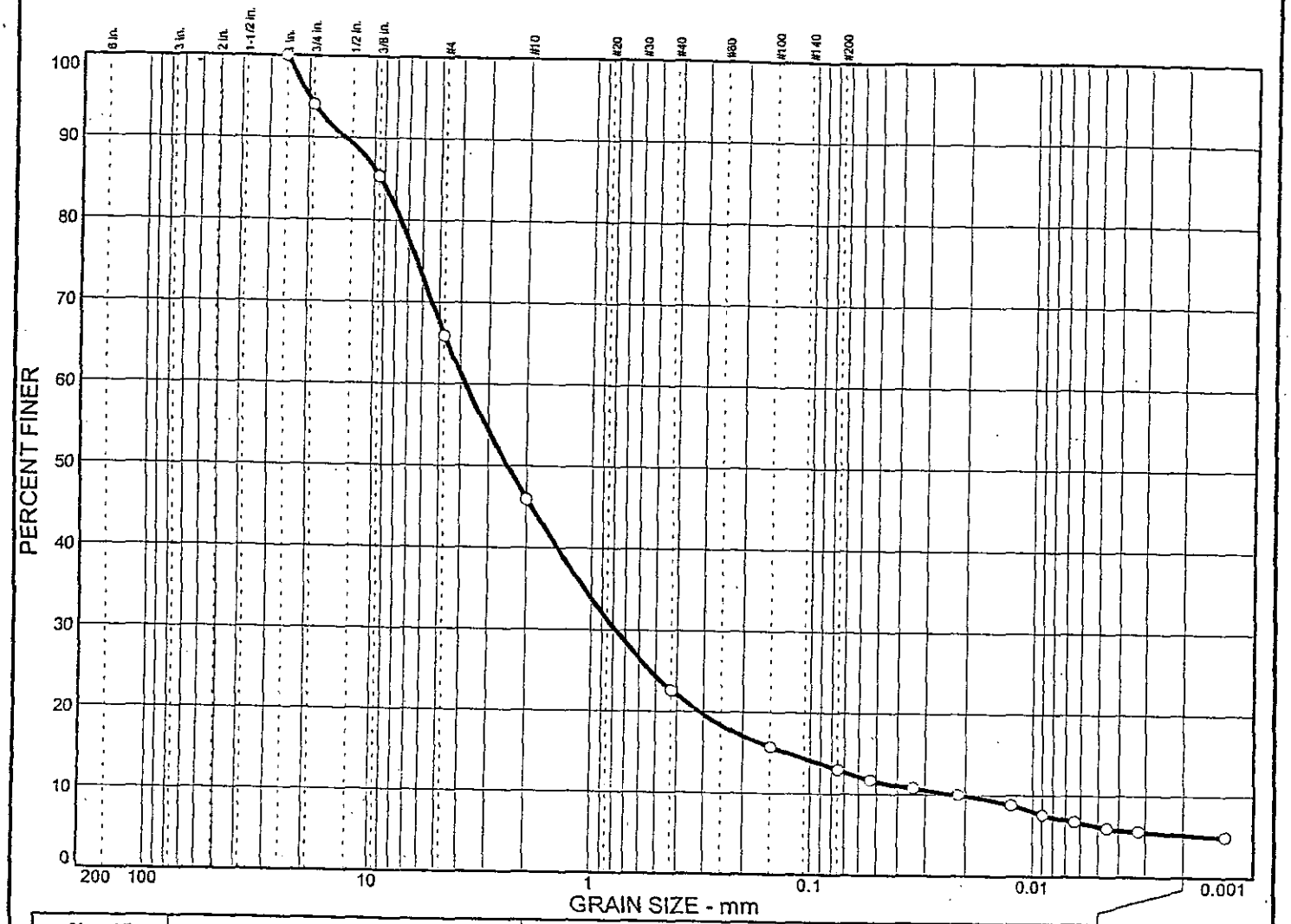
PARTICLE SIZE DISTRIBUTION TEST REPORT

GEO-TECHNOLOGY ASSOCIATES, INC.

Plate 8

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	54.1	34.2	6.4	5.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	9.38	3.82	2.46	0.782	0.127	0.0216	7.40	177.07

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown coarse to fine GRAVEL, some coarse to fine Sand, little Silt.	SM	A-1-a

Project No. 020424 **Client:**

Project: Clarksburg T.C.

○ **Source:** SWM-12 **Sample No.:** S-4 **Elev./Depth:** 8.5'-10.0'

Remarks:

○ Natural Moisture: 8.1%

USDA: Sandy loam

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PARTICLE SIZE DISTRIBUTION TEST REPORT

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Plate 9