Geotechnical Due Diligence Study
Industrial Development
1051 and 1161 East 73rd Avenue
Adams County, Colorado

Starpoint Properties
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Project Number 210104
June 29, 2021

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ATTACHMENTS

1.0 EXECUTIVE SUMMARY

A. G. Wassenaar, Inc. (AGW) has conducted a geotechnical due diligence study for the proposed industrial development at the subject site. Our summary of the data collected during our field and laboratory work and our analysis, opinions, and conclusions are presented. The purpose of our study is to provide preliminary geotechnical concepts for planning, site development, structures, and streets.

The subsurface materials encountered in our test borings consist of up to 1½ feet of topsoil (Test Borings 1 and 2), and between 1 and 4½ feet of fill (Test Borings 3 through 5), over clay and/or sand. Sand and gravel was encountered in all test borings at depths of 6 to 9 feet. Bedrock was not encountered to maximum depths explored. Ground water or wet cave was measured at depths ranging from 10½ to 19 feet during this study.

Site development considerations should include provisions for existing fill, shallow expansive soils, existing structures, loose soils, and ground water.

Based upon results of this study, we anticipate the structures will be founded on spread or pad-type footing foundations bearing on sands or on moisture treated fill. Soil modification should be considered to lower the expansion potential and provide sufficient properly placed and compacted fill to allow for shallower footing foundations and reduce potential for slab heave. **Due to the presence of potentially caving soils, ground water, and depths of bedrock, deep foundations such as drilled piers may not be economically feasible.**

Slabs-on-grade require special consideration because of the very high expansion potential of the clay soils. Structural floor systems are recommended if slab movement cannot be tolerated.

Perimeter subsurface drainage systems will not be necessary unless below grade areas are planned. Current sulfate test results indicate that concrete for the site should be designed for severe (S2) sulfate exposure. Additional recommendations are presented. We encourage the Client to read this report in its entirety and not to solely rely on the cursory information contained in this summary.

2.0 PURPOSE

This report presents results of a geotechnical due diligence study for the proposed industrial development to be located at 1051 and 1161 East 73rd Avenue in Adams County, Colorado. The study was made by AGW to assist in determining preliminary geotechnical related considerations for planning, site development, structures, and pavements. Factual data gathered during the field and laboratory work is summarized on Figures 1 through 3 and in Appendix A. Our opinions and recommendations presented in this report are based on the data generated during the field exploration, laboratory testing, and our experience with similar type projects.

The study was performed in general conformance with our Proposal Number 210104, dated April 21, 2021. This report is not intended to provide design criteria for site development, individual

foundations, or street construction. Additional geotechnical studies will be required to develop these types of final design criteria and construction recommendations.

3.0 PROPOSED CONSTRUCTION

We understand the proposed development will include two industrial distribution structures, with 70,000 to 80,000 square feet per building, and associated parking, truck court, and utility infrastructure. Grading plans were not available. We have assumed maximum cut/fill depths will not exceed 10 feet across the site.

4.0 SITE CONDITIONS

The 9.54 acre site has vegetation consisting of native grasses and weeds. An extension of a storage lot (to the east) was observed on the north ¼ of the eastern half. Existing residences with outbuildings were observed on the southern portion of the site. Ponds (from gravel pit mining) were observed to the north and west, commercial offices to the southwest, and storage units to the east and south. The eastern half of the site was topographically higher (by up to 3 feet) than the western half. The ground surface was relatively flat with a gradual overall slope to the north-northeast, and a moderate slope to the west between the east and west halves of the property. No bedrock outcrops or bodies of water were observed on the site, and Clear Creek, trending southwest to northeast was approximately 0.4 miles to the south.

5.0 FIELD EXPLORATION

Subsurface conditions for the proposed development were explored by drilling five test borings at the approximate locations indicated on Figure 1. The test borings were advanced using a 4-inch diameter, continuous flight auger powered by a truck-mounted drill rig. At frequent intervals, samples of the subsurface materials were obtained using a Modified California sampler which was driven into the soil by dropping a 140-pound hammer through a free fall of 30 inches. The Modified California sampler is a 2.5-inch outside diameter by 2-inch inside diameter device. The number of blows required for the sampler to penetrate 12 inches and/or the number of inches that the sampler is driven by 50 blows gives an indication of the consistency or relative density of the soils encountered. Results of the penetration tests and locations of sampling are presented on the "Test Boring Logs", Figure 2. Ground water measurements were made at the time of drilling and subsequent to drilling.

6.0 LABORATORY TESTING

The samples obtained during drilling were returned to the laboratory where they were visually classified by a geotechnical engineer. Laboratory testing was then assigned to specific samples to evaluate their engineering properties. The laboratory tests included swell-consolidation tests to evaluate the effect of wetting and loading on the selected samples. Gradation analysis and Atterberg limits tests were conducted to evaluate grain size distribution and plasticity. In addition, a representative sample was tested for water soluble sulfates. The test results are summarized on Figures 2 and 3 and presented in Appendix A.

7.0 SUBSURFACE CONDITIONS

The subsurface materials encountered in our test borings consist of up to 1½ feet of topsoil (Test Borings 1 and 2), and between 1 and 4½ feet of fill (Test Borings 3 through 5), over clay and/or sand. Sand and gravel was encountered in all test borings at depths of 6 to 9 feet. Bedrock was not encountered to maximum depths explored. Ground water was measured at depths ranging from 13 to 19 feet in all of the test borings at the time of drilling and at a depth of 13 feet in one of the five test borings when checked 2 days after drilling. Test Boring Numbers 1 through 3 and 5 caved at depths of between 10½ and 11½ feet when checked 2 days after drilling. Cave depths may be indicative of ground water levels. A more complete description of the subsurface conditions is shown on Figures 2 and 3.

7.1 Fill

Fill was encountered in Test Borings 3 through 5 and was between 1 and 4½ feet thick. The fill consisted of medium dense sand that was clayey, slightly moist to moist, and dark brown. Debris was observed in the fill encountered in Test Boring 5.

7.2 Natural Soil

Topsoil was encountered in two of the five test borings. The topsoil consisted of silty, clayey sand to sandy, silty clay that was up to 1½-foot thick. It was organic, moist, and dark brown. The topsoil is not considered capable of supporting structures and should be removed.

Clay was encountered in three of the five test borings, ranging in depth between 1½ and 4½ feet. The clay was stiff to very stiff, slightly sandy to sandy, moist to very moist, and light brown to brown. Based upon our field and laboratory results, the clay exhibited in-situ dry densities ranging from 105 to 111 pounds per cubic foot (pcf), and in-situ moistures ranging from 16 to 22 percent (%).The clay was visually of medium to high plasticity. These soils also exhibited low to very high measured swell (+1.3% to +9.6%) upon wetting and under a loading of 1,000 pounds per square foot (psf). The clay is considered to possess very high expansion potential.

Sand was encountered in one of the five test borings. The sand was loose, trace silty, trace gravelly, slightly moist, and tan to brown to rust. The samples tested exhibited no to low plasticity. The sand is considered to possess low settlement and no to low expansion potential.

Sand and gravel was encountered in all five test borings ranging in depth between 6 and 9 feet. The sand and gravel was medium dense to very dense, slightly silty to silty, slightly clayey, slightly moist to wet, and tan to brown to rust. Based upon our field and laboratory results, the sand and gravel exhibited in-situ moistures ranging from 1 to 2%. The samples tested exhibited no to low plasticity, and is considered to possess no to low expansion potential.

8.0 GEOTECHNICAL CONCERNS

The site is considered suitable for development if proper engineering controls are instituted to alleviate certain geotechnical and geologic concerns across the site. The concerns for development

of the site include existing fill, shallow expansive soils, existing structures, loose soils, and ground water. A discussion of each concern follows.

8.1 Existing Fill

Fill was encountered in three of the five test borings and was between 1 and 4½ feet thick. It is not known whether the existing fill was placed as fill capable of supporting a structure or other structural elements. Unless full and detailed records are produced and deemed acceptable, with maps indicating original and as built topography, all of the existing fill should be excavated prior to placement of new fill, structures, or other structural appurtenances.

8.2 Expansive Soils

Expansive clay was encountered in all five test borings. These materials exhibited very high swell. Expansive soils swell and can heave constructed appurtenances as their moisture content increases. When wetted, the clay may heave sufficiently to damage structures without proper engineering design or site preparation. We believe that this will be a concern across the entire site.

8.3 Demolition of Existing Structures

Care must be taken to verify removal of all structures, foundations, utilities, pavements, underground storage tanks, etc. across the site. Additionally, pre-existing fill around or beneath the structures will also need to be excavated. If the structures were founded on drilled piers they should also be removed or, as a minimum, their locations documented to help in planning the new development.

8.4 Loose Soils

Loose sand was encountered in Test Boring 1. The loose sand may present soil stability concerns for site grading, in foundation excavations, and during pavement construction. Any significant fills placed on top of the loose soils could cause significant settlement over time. It is possible that large, rubber tired equipment will cause rutting. It may be necessary to stabilize the soft areas prior to fill placement. It may also be necessary to stabilize the soils prior to foundation construction.

8.5 Ground Water

Ground water and/or wet cave was encountered at depths ranging from approximately 10½ to 13 feet in all of the test borings two days after drilling. The shallow ground water may pose problems during utility construction where deep cuts are planned. Additionally, the water may cause difficulties during foundation construction. We typically recommend that foundations be constructed at least 4 feet or more above ground water level. Site development should be planned to avoid or control the ground water.

9.0 SITE GRADING

In our opinion, grading of the site may be accomplished using typical earth moving techniques common in this area. Any foundation or other debris encountered will need to be removed and properly disposed of off the site. Existing fill will need to be excavated, evaluated, and either placed as new fill or removed from the site. Excavations and fill slopes will need to be properly designed and constructed to alleviate erosion or stability concerns.

Soil modification, in some form, should be performed to reduce the expansion potential of the clays. Most soil modification in this area is performed by overexcavation of the expansive materials and then placement of the excavated soils as a moisture treated fill. We recommend this be performed beneath the entire building footprints.

10.0 SITE CONCRETE AND CORROSIVITY

Limited testing performed on a selected soil sample indicated water soluble sulfate contents of 6,000 parts per million (ppm). This is considered to be severe concentrations relative to potential corrosive attack on concrete. Therefore, it is anticipated that concrete in contact with the soils on the site could be designed for severe (S2) sulfate exposure in accordance with Section 318 of the most recent edition of the American Concrete Institute (ACI) Design Manual.

11.0 STRUCTURE CONSTRUCTION

Foundation design recommendations for each structure cannot be presented until site grading is complete. The following information presents preliminary concepts for foundations at this site. Additional geotechnical exploration must be performed after completion of site grading to provide specific foundation design recommendations for each structure at the site.

A suitable foundation system for structures would be spread or pad footings extending below the expansive soils bearing on the sand and gravel layer 6 to 9 feet below the existing grade. If shallower footing foundations are desired, soil modification such as overexcavation is recommended. Overexcavation consists of excavating the expansive soils and placing them back as a properly placed and compacted fill. Loose sand soils near footing levels may require stabilization. Deep foundations such as drilled bedrock piers are not recommended due to ground water, caving sand and gravel, and deep bedrock.

Interior floor support will be dependent upon the amount of movement that the Client can tolerate. Existing conditions indicate the risk of significant heave will be very high. To reduce the risk of heave, either the slab bearing soils will need modification or structural floors will be necessary. If finished areas are planned or slab movement cannot be tolerated, structural floors should be constructed.

Due to the nature of the subsurface conditions encountered on the site, drain systems may be required if below grade spaces are planned. Extensive drain systems will be necessary where ground water is found within 4 feet of any below grade spaces.

12.0 PAVEMENTS

The soil found across the site will generally provide adequate pavement support. Pavement thicknesses will vary by type of soil and the amount of truck type traffic imposed. Pavement thickness guides are presented below.

Soil	Parking		Drives		Concrete
	HBP (in.)	HBP/ABC (in.)	HBP (in.)	HBP/ABC (in.)	
A-2-4	5.0-6.0	3.0-4.0 / 5.0-7.0	6.0-7.0	4.0-5.0 / 5.0-7.0	6.0-8.0
A-7-6	7.0-8.0	4.0-5.0 / 7.0-10.0	9.0-10.0	6.0-7.0 / 10.0-14.0	8.0-10.0

Overexcavation and placement of the clay and clayey sand as moisture treated fill within the pavement areas should be expected. Areas with loose soils may require stabilization prior to pavement construction.

13.0 FINAL DESIGN CONSULTATION AND CONSTRUCTION OBSERVATION

This report has been prepared for the exclusive use of Starpoint Properties for the purpose of providing geotechnical criteria for the proposed project. The data gathered and the conclusions and recommendations presented herein are based upon the consideration of many factors including, but not limited to, the type of structures proposed, the configuration of the structures, the proposed usage of the site, the configuration of surrounding structures, the geologic setting, the materials encountered, and our understanding of the level of risk acceptable to the Client. Therefore, the conclusions and recommendations contained in this report should not be considered valid for use by others unless accompanied by written authorization from A. G. Wassenaar, Inc. (AGW).

This study was provided as a due diligence subsurface exploration. More specific site development recommendations, including overlot grading, overexcavation and placement of moisture treated fill as well as pavement design considerations can be provided once proposed site grading plans have been developed and additional test borings drilled to better define the subsurface conditions.

AGW should be contacted if the Client desires an explanation of the contents of this report. AGW should be retained to provide future geotechnical services for the site including, but not limited to, design level geotechnical studies, consultation during design, observation and testing during construction, and other geotechnically related services. Failure to contract with AGW for these services or selection of a firm other than AGW to provide these services will eliminate liability for AGW. We are available to discuss this with you.

14.0 GEOTECHNICAL RISK

The concept of risk is an important aspect of any geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be tempered by engineering judgment and experience. Therefore, the solutions or recommendations presented in any geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structures will perform as desired or intended. What the engineering recommendations presented in the preceding sections do constitute is our judgement of those measures that increase the likelihood for the structures and improvements performing satisfactorily. The Developer, Builder, and Owner

must understand this concept of risk, as it is they who must ultimately decide what is an acceptable level of risk for the proposed development of the site.

15.0 LIMITATIONS

We believe the professional judgments expressed in this report are consistent with that degree of skill and care ordinarily exercised by practicing design professionals performing similar design services in the same locality, at the same time, at the same site and under the same or similar circumstances and conditions. No other warranty, express or implied, is made. In the event that any changes in the nature, design or location of the facility are made, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing. Because of the constantly changing state of the practice in geotechnical engineering, and the potential for site changes after our field exploration, this report must not be relied upon after a period of three years without our firm being given the opportunity to review and, if necessary, revise our findings.

The test borings drilled for this study were widely spaced to obtain an understanding of subsurface conditions for preliminary planning and development purposes. Variations frequently occur from these conditions which are not indicated by the test borings. These variations are sometimes sufficient to necessitate modifications in the designs. If unexpected subsurface conditions are observed by any party during site development, we must be notified to review our recommendations.

Our scope of services for this project did not include, either specifically or by implication, any research, identification, testing, or assessment relative to past or present contamination of the site by any source, including biological (i.e., mold, fungi, bacteria, etc.). If such contamination were present, it is likely that the exploration and testing conducted for this report would not reveal its existence. If the Client is concerned about the potential for such contamination or pollution, additional studies should be undertaken. We are available to discuss the scope of such studies with you.

Our scope of services for this project did not include a local or global geological risk assessment. Therefore, issues such as mine subsidence, slope stability, faults, etc. were not researched or addressed as part of this study. If the Client is concerned about these issues, we are available to discuss the scope of such studies upon your request.

Sincerely,

A. G. Wassenaar, Inc.

Keith E. Asay
Staff Engineer

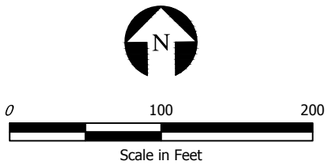
Reviewed by:

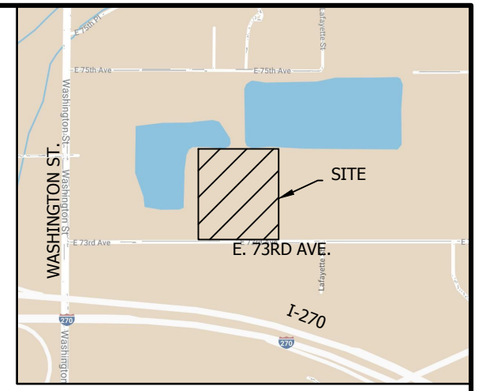
COLORADO LICENSED
MICHAEL R. CONNER
30731
PROFESSIONAL ENGINEER

Michael R. Conner, P.E.
Senior Engineer
Digitally signed by: Michael R Conner
Date: 2021.07.02 12:33:18 -07'00'

KEA/MRC/bab

1051 AND 1161 EAST 73RD AVENUE
ADAMS COUNTY, COLORADO





VICINITY MAP
NOT TO SCALE

NOTES:
1. TEST BORINGS ARE OVERLAID ON THE "CONCEPTUAL SITE PLAN, 73RD & WASHINGTON, ADAMS COUNTY, CO", SHEET 1, PREPARED BY WARE MALCOMB, DATED MARCH 20, 2021.
2. ALL LOCATIONS ARE APPROXIMATE.

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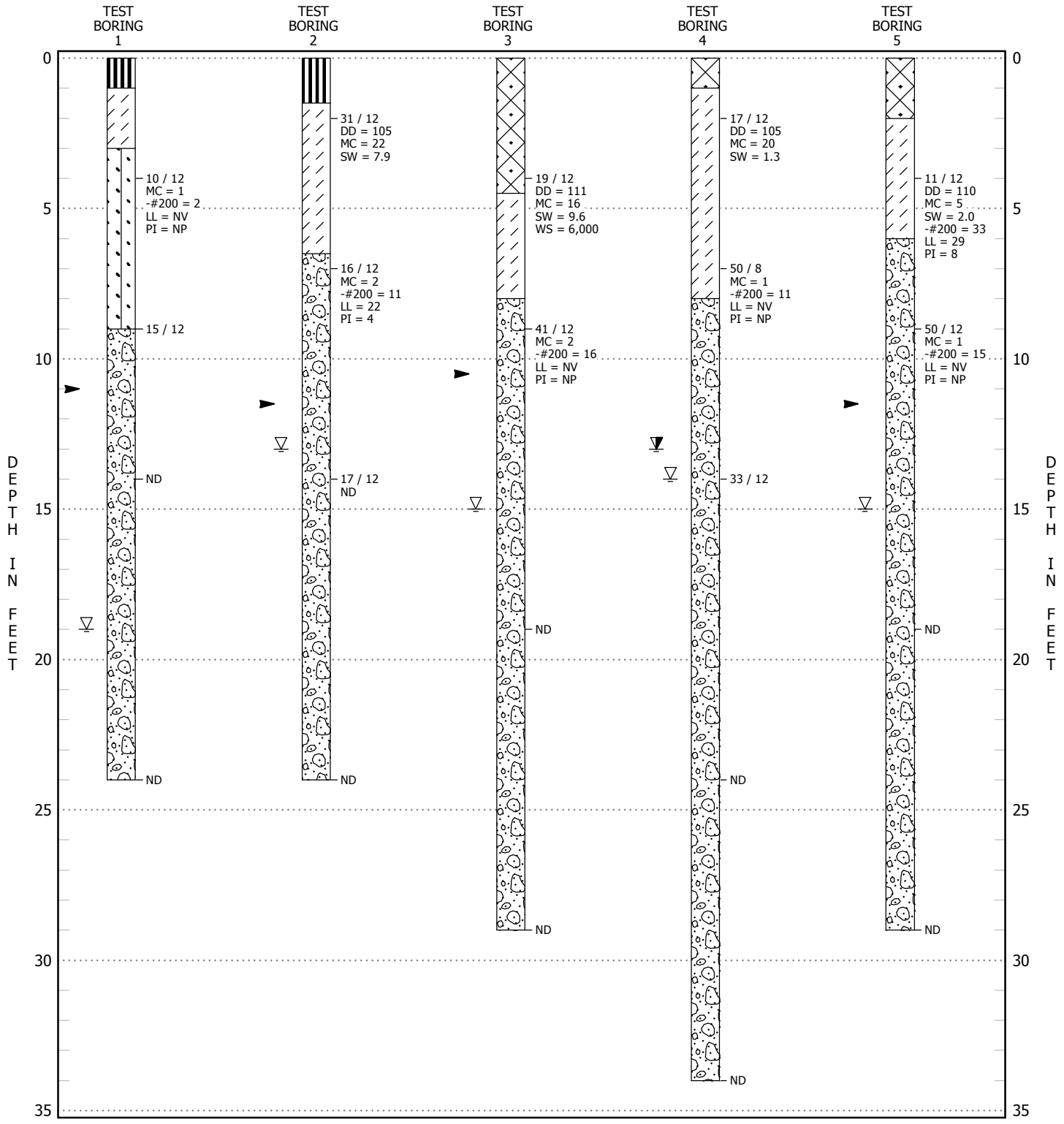
SITE PLAN AND VICINITY MAP

PROJECT NO. 210104
FIGURE 1

A.G. WASSENAAR, INC.

CLIENT Starpoint Properties **PROJECT NAME** 1051 and 1161 East 73rd Avenue

PROJECT NUMBER 210104 **PROJECT LOCATION** Adams County, Colorado



SEE FIGURE 3 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 2

A.G. WASSENAAR, INC.

CLIENT Starpoint Properties

PROJECT NAME 1051 and 1161 East 73rd Avenue

PROJECT NUMBER 210104

PROJECT LOCATION Adams County, Colorado

SOIL DESCRIPTIONS


Fill, sand, medium dense, silty, clayey


Topsoil, clay, sandy, organic


Clay, stiff to very stiff


Sand, loose


Sand and gravel, medium dense to dense, silty

ABBREVIATIONS

DD	Dry density of sample in pounds per cubic foot (pcf)
MC	Moisture content as a percentage of dry weight of soil (%)
SW	Percent swell under a surcharge of 1000 pounds per square foot (psf) upon wetting (%)
COM	Percent compression under a surcharge of 1000 pounds per square foot (psf) upon wetting (%)
UC	Unconfined compressive strength in pounds per square foot (psf)
-#200	Percent passing the Number 200 sieve (%)
LL	Liquid Limit
PI	Plasticity Index
NP	Non-Plastic
NV	No Value
pH	Acidity or alkalinity of sample in pH units
R	Resistivity in ohms.cm
WS	Water soluble sufates in parts per million (ppm)
CL	Chlorides in percent (%)
x/y	X blows of a 140-pound hammer falling 30 inches were required to drive a 2.5-inch outside diameter sampler Y inches
x/y SS	X blows of a 140-pound hammer falling 30 inches were required to drive a 2.0-inch outside diameter sampler Y inches
C-x	Depth of cut to grade (rounded to the nearest foot)
F-x	Depth of fill to grade (rounded to the nearest foot)
FG	Finished grade (rounded to the nearest foot)
NR	No sample recovered
Bounce	Sampler bounced during driving
B	Bulk sample
AS	Auger sample
	Well to very well cemented layer
	Depth at which practical drilling refusal was encountered
	Water level at time of drilling
	Caved depth at time of drilling
	Water level 2 day(s) after drilling
	Caved depth 2 day(s) after drilling

Notes:

1. Test borings were drilled May 25, 2021 .
2. Location of the test borings were staked by AGW using a handheld GPS with coordinates provided by client.
3. The horizontal lines shown on the logs are to differentiate materials and represent the approximate boundaries between materials. The transitions between materials may be gradual.
4. Elevations were not provided.
5. Boring logs shown in this report are subject to the limitations, explanations, and conclusions of this report.

LEGEND AND NOTES

FIGURE 3

APPENDIX A
LABORATORY TEST RESULTS

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
June 29, 2021

Project Number 210104
1051 and 1161 East 73rd Avenue
Adams County, Colorado

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	% Passing #200 Sieve	Atterberg		Water Soluble Sulfates (ppm)
								Liquid Limit LL	Plasticity Index PI	
1	4	Sand, trace silty, trace gravelly					2	NV	NP	
2	2	Clay, slightly sandy	105	22	7.9	17,400				
2	7	Sand and gravel, slightly clayey					11	22	4	
3	4	Clay, slightly sandy	111	16	9.6	26,700				6,000
3	9	Sand and gravel, silty					16	NV	NP	
4	2	Clay, sandy	105	20	1.3	4,600				
4	7	Sand and gravel, slightly silty					11	NV	NP	
5	4	Sand, very clayey (lens)	110	5	2.0	3,000	33	29	8	
5	9	Sand and gravel, silty					15	NV	NP	

Notes:
NV - No Value, NP - Nonplastic

[1] Indicates percent swell or consolidation (-) when wetted under a 1,000 psf load

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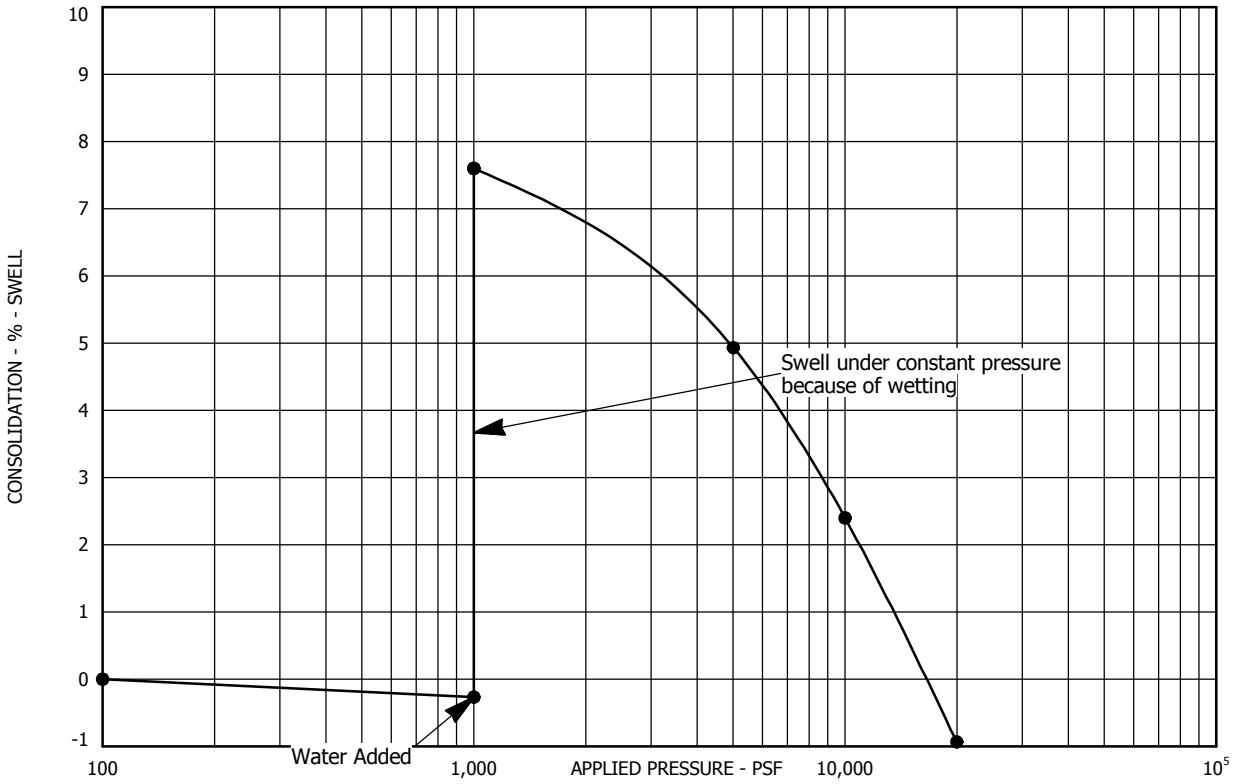
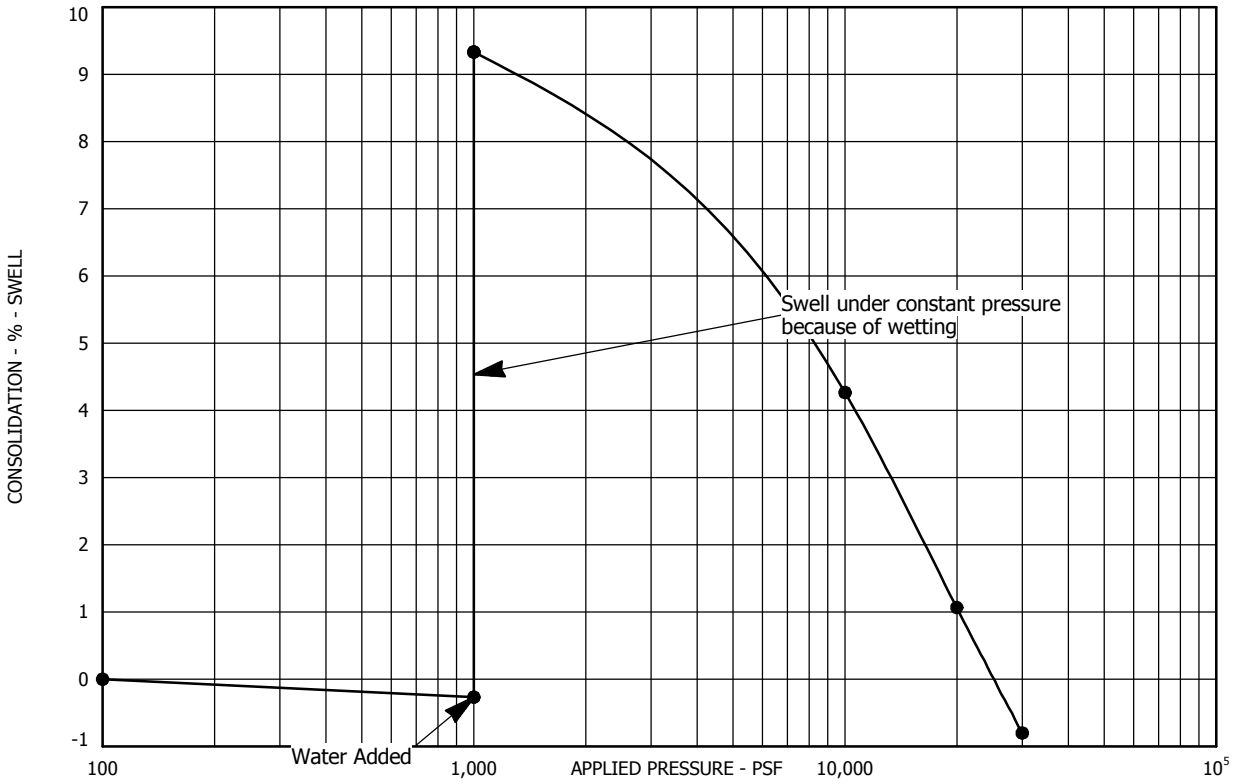


Sample Location: Test Boring No. 2 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 22



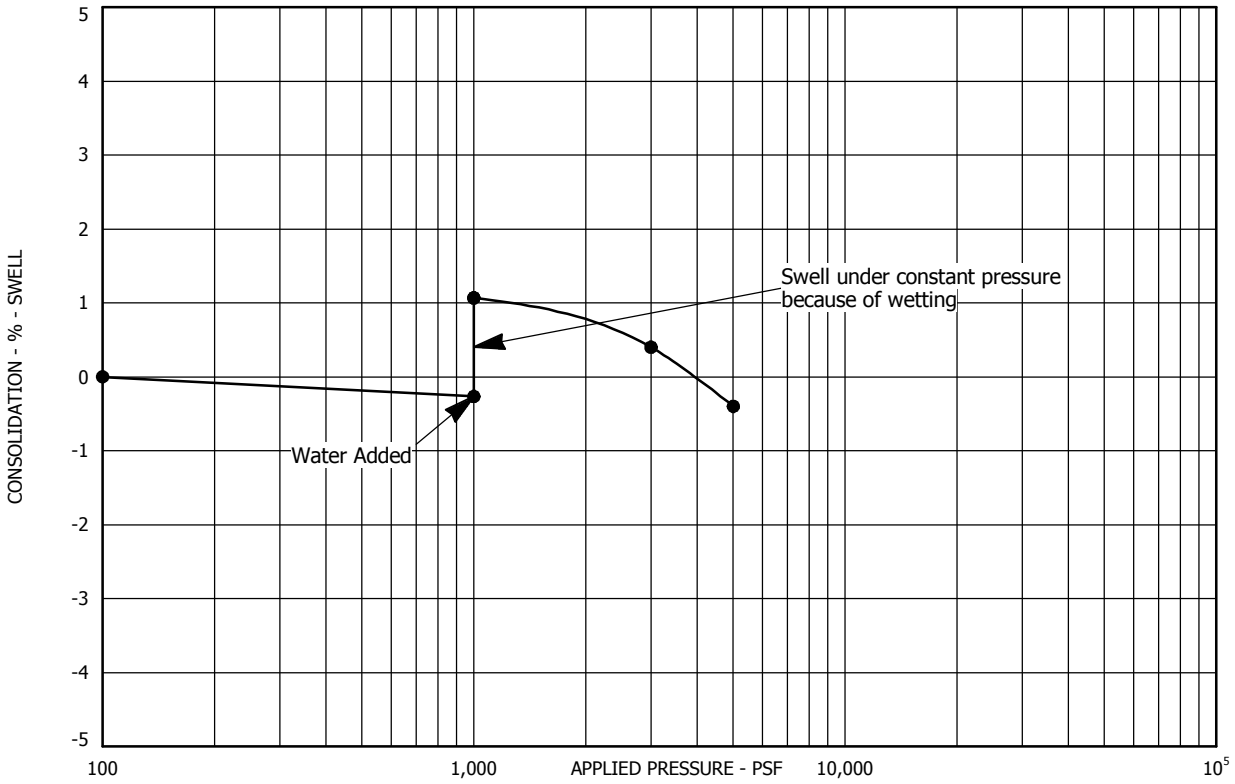
Sample Location: Test Boring No. 3 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 16

SWELL - CONSOLIDATION TEST RESULTS

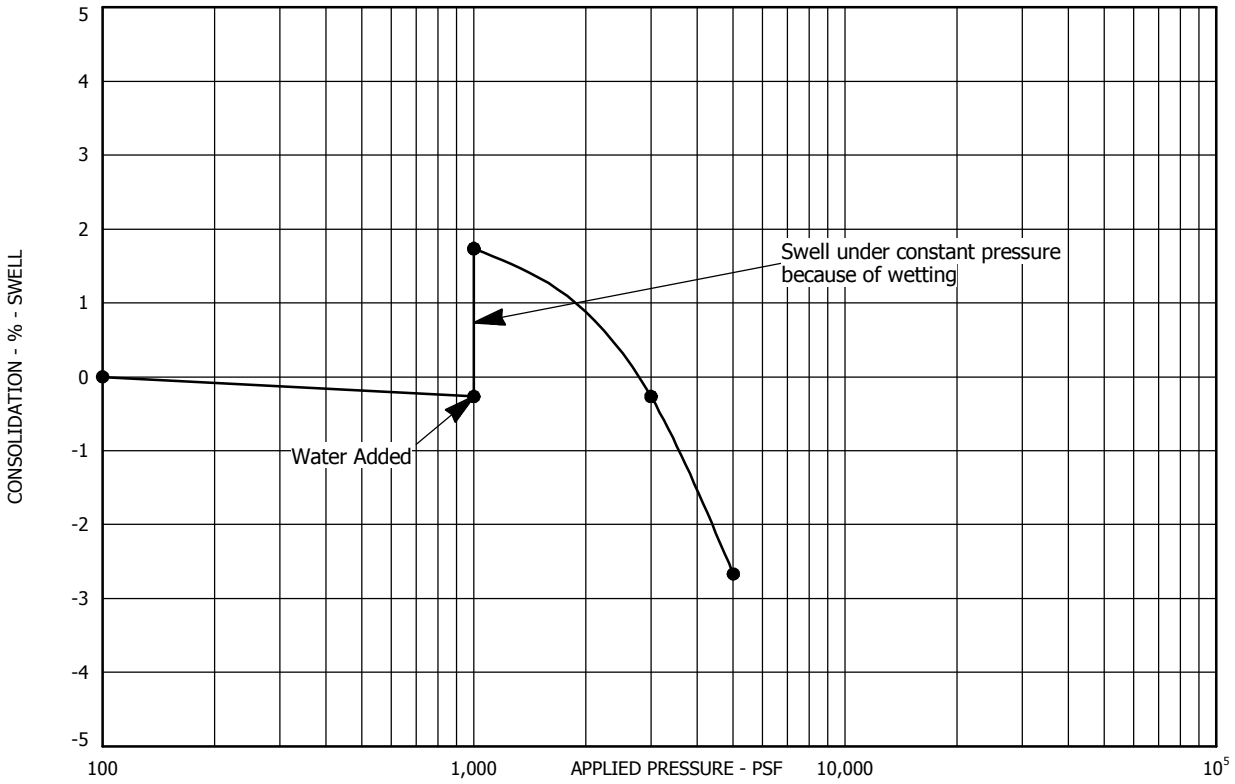
FIGURE A-1

PROJECT NO. 210104

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 4 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 20



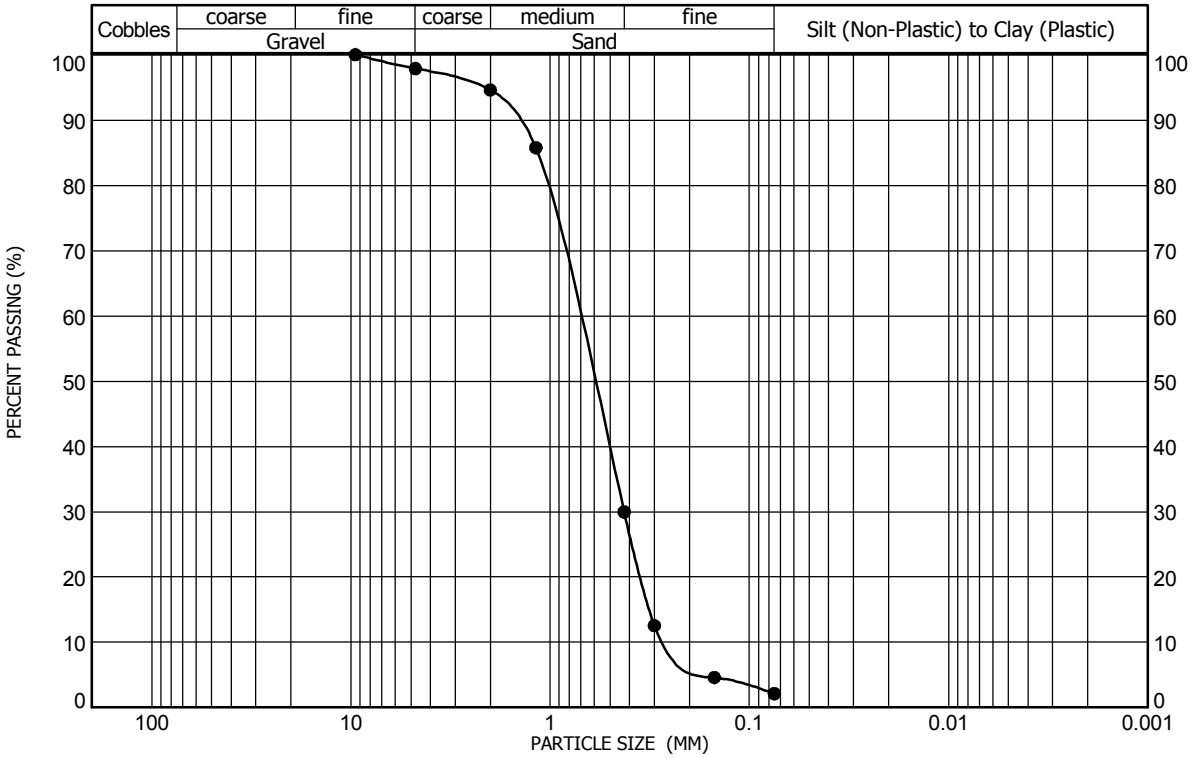
Sample Location: Test Boring No. 5 at a depth of 4 feet
Sample Description: Sand, very clayey
Dry Unit Weight (pcf): 110
Moisture Content (%): 5

SWELL - CONSOLIDATION TEST RESULTS

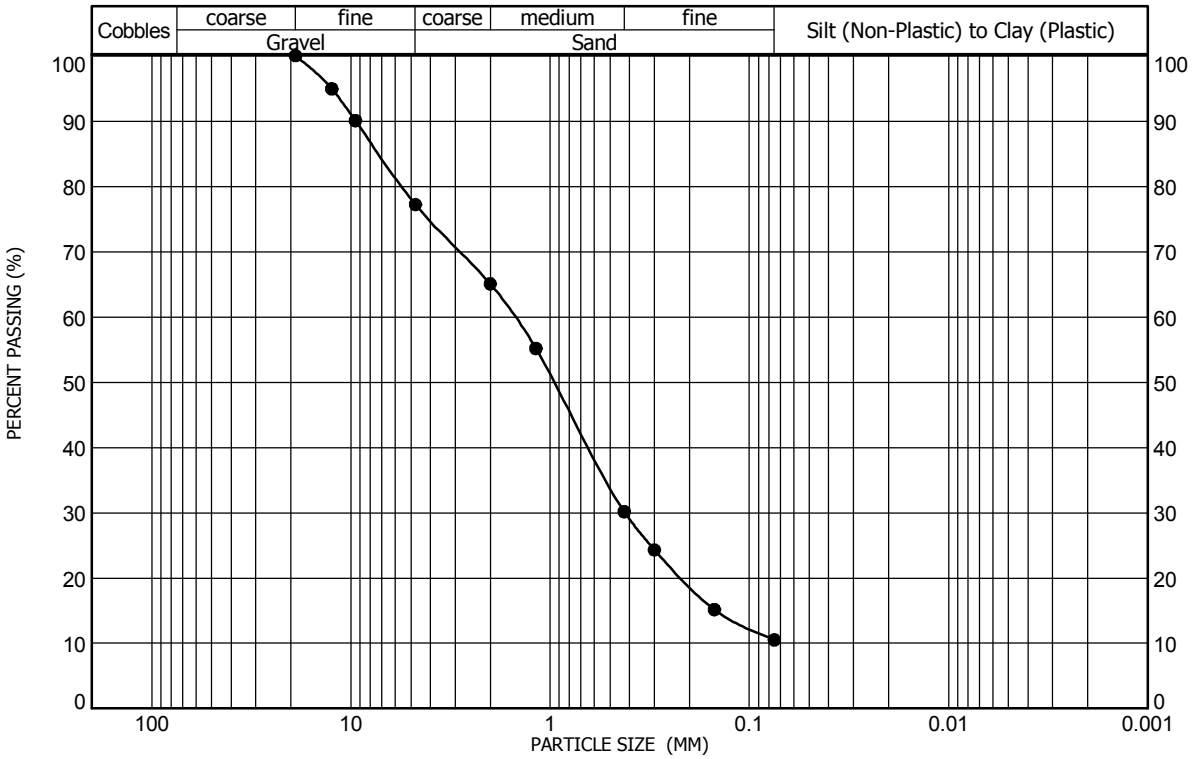
FIGURE A-2

PROJECT NO. 210104

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 1 at a depth of 4 feet — Gravel (%) 2 — Liquid Limit NV
Sample Description Sand, trace silt, trace gravel — Sand (%) 96 — Plasticity Index NP
Classification A-1-b(0), POORLY GRADED SAND(SP) — Clay/Silt (%) 2



Sample Location Test Boring No. 2 at a depth of 7 feet — Gravel (%) 23 — Liquid Limit 22
Sample Description Sand and gravel, slightly clayey — Sand (%) 67 — Plasticity Index 4
Classification A-1-b(0), WELL-GRADED SAND with SILTY CLAY and GRAVEL(SW-SC) — Clay/Silt (%) 11

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-3

PROJECT NO. 210104

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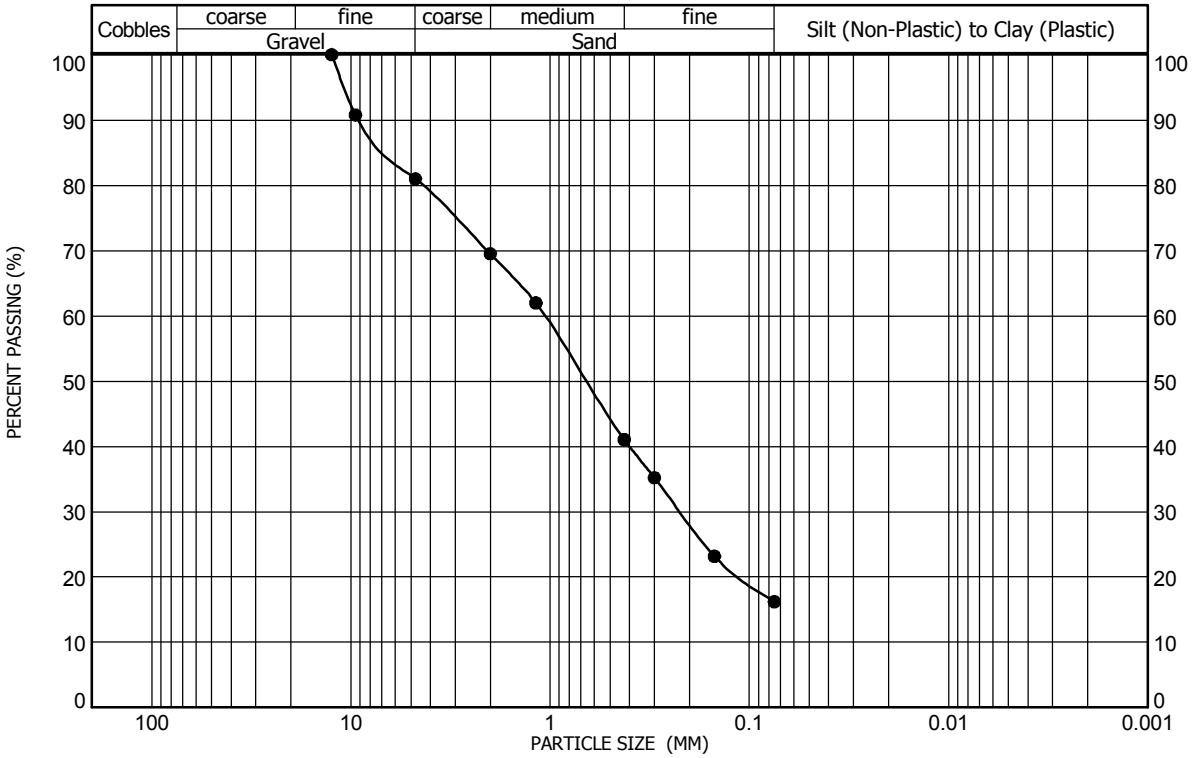
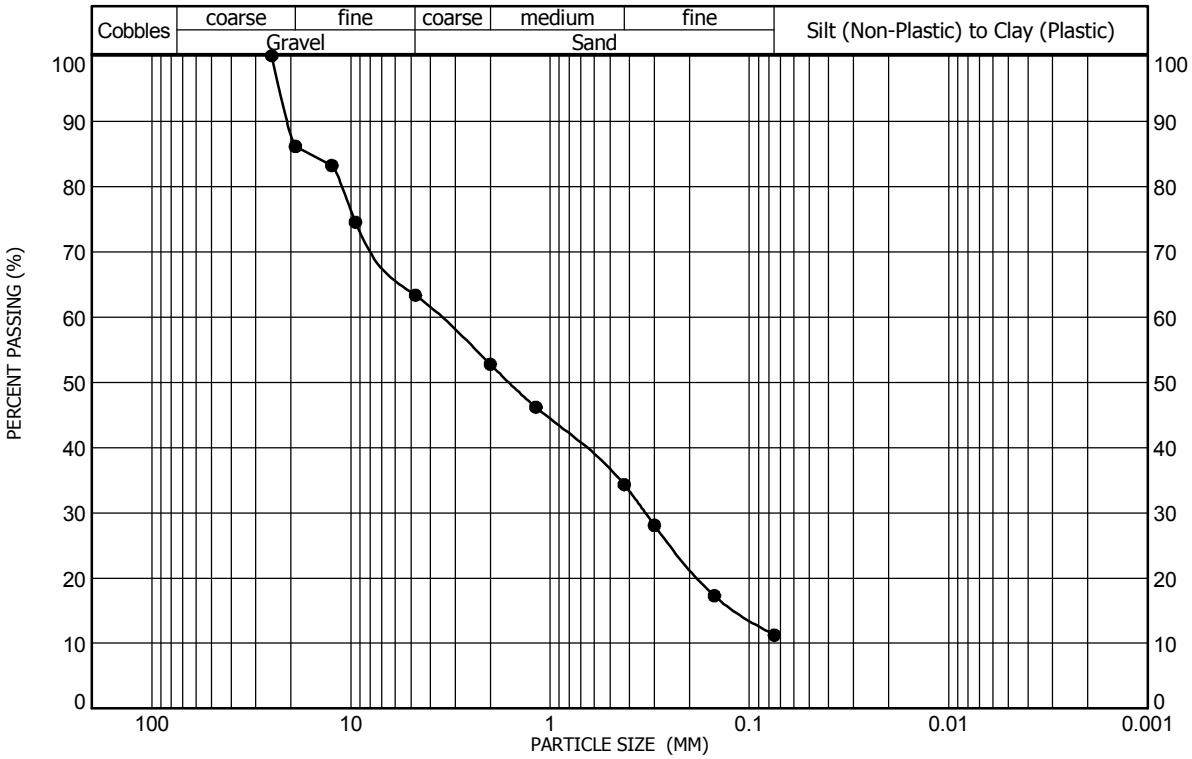


Sample Location Test Boring No. 3 at a depth of 9 feet — Gravel (%) 19 — Liquid Limit NV
Sample Description Sand and gravel, silty — Sand (%) 65 — Plasticity Index NP
Classification A-1-b(0), SILTY SAND with GRAVEL(SM) — Clay/Silt (%) 16



Sample Location Test Boring No. 4 at a depth of 7 feet — Gravel (%) 37 — Liquid Limit NV
Sample Description Sand and gravel, slightly silty — Sand (%) 52 — Plasticity Index NP
Classification A-1-b(0), POORLY GRADED SAND with SILT and GRAVEL(SP-SM) — Clay/Silt (%) 11

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-4

PROJECT NO. 210104

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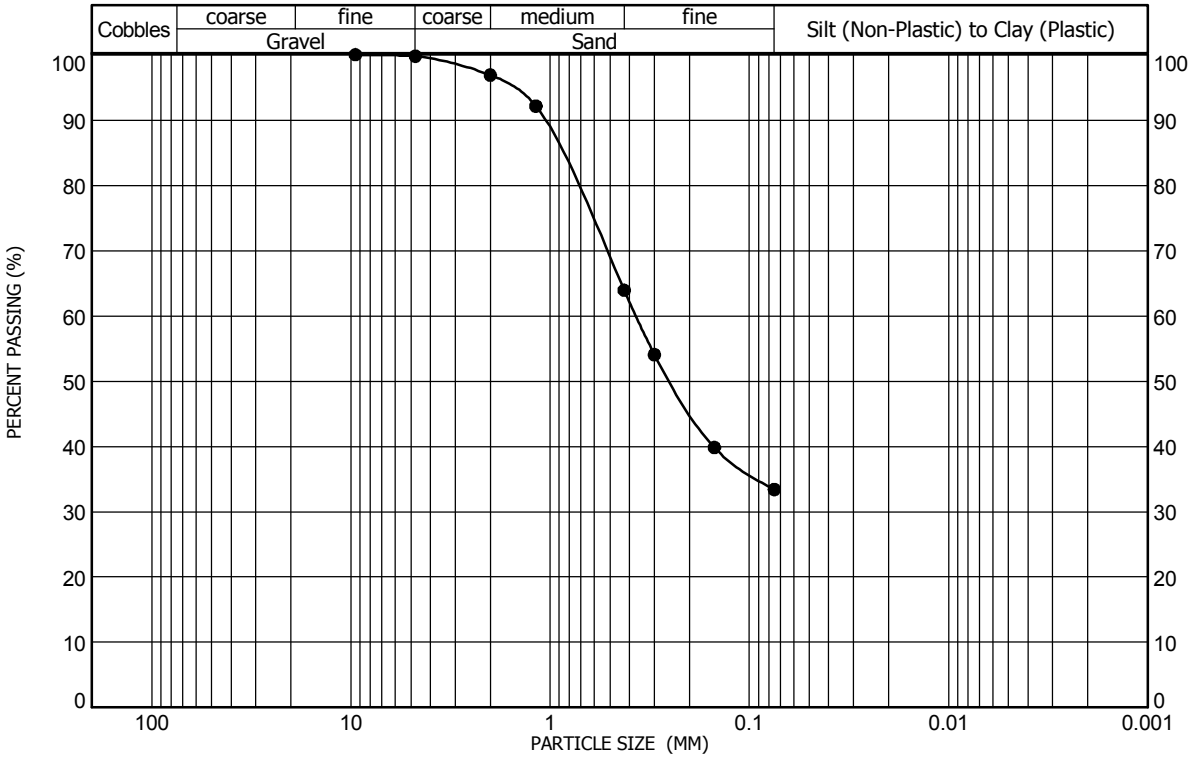
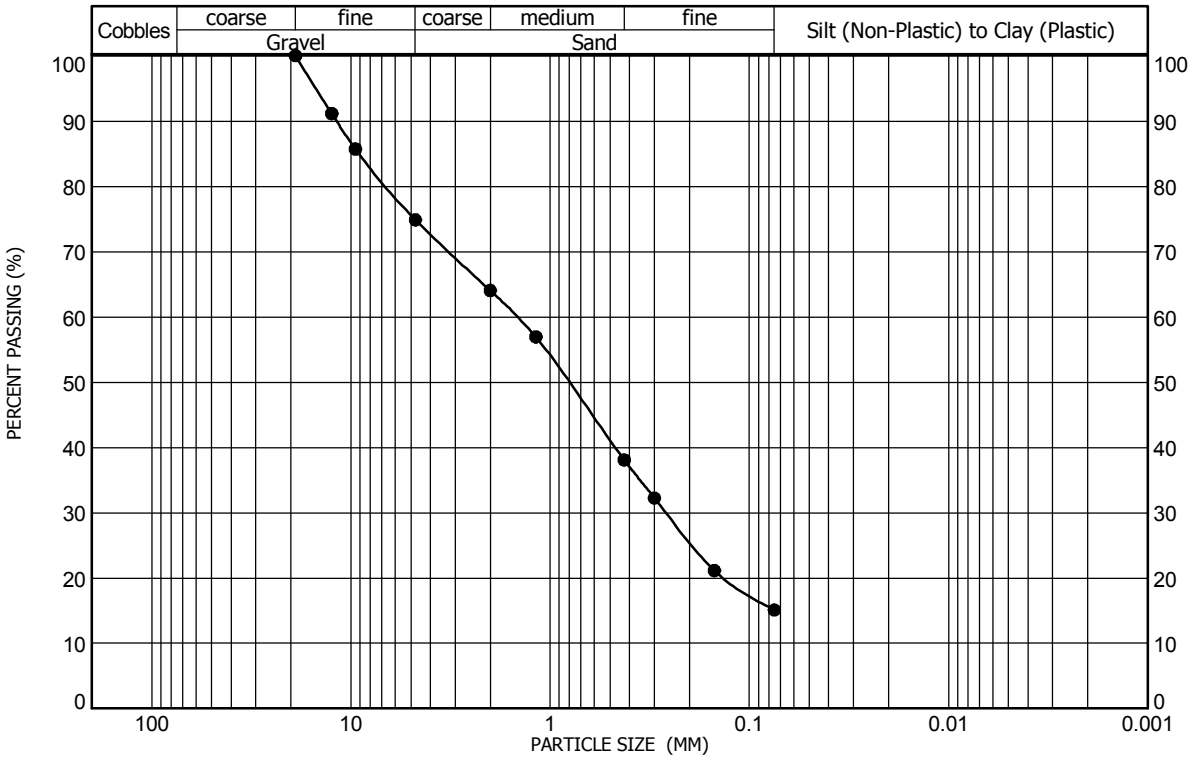


Sample Location Test Boring No. 5 at a depth of 4 feet — Gravel (%) 0 — Liquid Limit 29
Sample Description Sand, very clayey — Sand (%) 66 — Plasticity Index 8
Classification A-2-4(0), CLAYEY SAND(SC) — Clay/Silt (%) 33



Sample Location Test Boring No. 5 at a depth of 9 feet — Gravel (%) 25 — Liquid Limit NV
Sample Description Sand and gravel, silty — Sand (%) 60 — Plasticity Index NP
Classification A-1-b(0), SILTY SAND with GRAVEL(SM) — Clay/Silt (%) 15

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-5

PROJECT NO. 210104

APPENDIX B
SPECIFICATIONS FOR PLACEMENT OF FILL

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GENERAL
AGW, as the Client's representative, should observe fill placement and conduct tests to determine if the materials placed, methods of placement, and compaction are in reasonable conformance with these specifications. Specifications presented in this Appendix are general in nature. They should be used for construction except where specifically superseded by those presented in the attendant geotechnical study.

For the purpose of this specification, structural areas include those areas that will support constructed appurtenances (e.g., foundations, slabs, flatwork, pavements, etc.) and fill embankments or slopes that support significant fills or constructed appurtenances. Structural areas will be as defined by AGW.

FILL MATERIAL
Fill material should consist of on or off-site soils which are relatively free of vegetable matter and rubble. Off-site materials should be evaluated by AGW prior to importation. No organic, frozen, perishable, rock greater than 6 inches, or other unsuitable material should be placed in the fill. For the purpose of this specification, cohesive soil is defined as a mixture of clay, sand, and silt with more than 35% passing a U. S. Standard #200 sieve and a Plasticity Index of at least 11. These materials will classify as an A-6 or A-7 by the AASHTO Classification system. Granular soils are all materials which do not classify as cohesive.

Proposed import material should be a material having 100% finer than 3 inches in diameter and not more than 70% passing a U. S. Standard No. 200 sieve, provided the Plasticity Index is less than 20. Soil not meeting these specifications, but proposed for import fill, must be evaluated by AGW.

PREPARATION OF FILL SUBGRADE
Vegetation, organic topsoil, any existing fill, and any other deleterious materials should be removed from the fill area. The area to be filled should then be scarified, moistened or dried as necessary, and compacted to the moisture content and compaction level specified below prior to placement of subsequent layers of fill.

PLACEMENT OF FILL MATERIAL
The materials should be delivered to the fill in a manner which will permit a well and uniformly compacted fill. Before compacting, the fill material should be properly broken down, mixed, and spread in approximately horizontal layers not greater than 8 inches in loose thickness.

MOISTURE CONTROL
The material must contain uniformly distributed moisture for proper compaction. The Contractor will be required to add moisture to the materials if, in the opinion of AGW, sufficient and uniform moisture is not present in the fill. If the fill materials are too wet for proper compaction, aerating and/or mixing with drier materials will be required.

Moisture content should be controlled as a percentage deviation from optimum. Optimum moisture content is defined as the moisture content corresponding to the maximum density of a laboratory compacted sample performed according to ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The moisture content specifications for the various areas are as follows:

		Cohesive Soils	Granular Soils
1.	Beneath Structural Areas:	0 to +4%	−2 to +2%
2.	Beneath Non-Structural Areas:	−3 to +3%	−3 to +3%
3.	Moisture Treated Fill:	0 to +4%	−2 to +2%

COMPACTION

When the moisture content and conditions of each layer spread are satisfactory, the fill should be compacted. Laboratory moisture-density tests should be performed on typical fill materials to determine the maximum density. Field density tests must then be made to determine fill compaction. The compaction standard to be utilized in determining the maximum density is ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The following compaction specifications should be followed for each area:

1.	Beneath Structural Areas:	95% of Maximum Dry Density
2.	Beneath Non-Structural Areas:	90% of Maximum Dry Density
3.	Moisture Treated Fill:	95% of Maximum Dry Density

If the fill contains less than 10% passing the No. 200 sieve, it may be necessary to control compaction based on relative density (ASTM D2049). If this is the case, then compaction around the structures and beneath walkway or other slabs should be to at least 70% relative density, and compaction beneath foundations and vehicle supporting should be to at least 80% relative density.

DEEP FILLS

In areas where fill depths exceed 20 feet beneath structural areas, additional compaction considerations will be required to reduce fill settlement. Fill placed within 20 feet of final overlot grade should be compacted as required above. Deeper fills should be compacted to 100% of maximum dry density at a moisture content of ±2% of optimum moisture content. Relative density of at least 85% will be required when necessary.

RESPONSIBILITY

Any mention of essentially full-time testing and observation does not mean AGW will accept responsibility for future fill performance. AGW shall not be responsible for constant or exhaustive inspection of the work, the means and methods of construction or the safety procedures employed by Client's contractor. Performance of construction observation services does not constitute a warranty or guarantee of any type, since even with diligent observation, some construction defects, deficiencies or omissions in the Contractor's work may occur undetected. Client shall hold its contractor solely responsible for the quality and completion of the project, including construction in accordance with the construction documents. Any duty hereunder is for the sole benefit of the Client and not for any third party, including the contractor or any subcontractor.