DRAFT Report of Geotechnical Exploration – Phase V

C-44 RSTA Project

Additional Test Pit Excavation, Soil Washing,

Soil Cement Mix Design Testing

February 11, 2015

Laboratory testing for all samples was not complete prior to this draft report. Blank fields in the tables indicate that laboratory testing results were not yet available but will be forthcoming and included in the final report.

Prepared by
AMEC Foster Wheeler Environment & Infrastructure, Inc.
6256 Greenland Road
Jacksonville, Florida 32258, USA

AMEC Project No. 6734-14-9799

February 9, 2015

Ms. Deborah Brost
Contract Specialist
A/E Construction Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Subject: **DRAFT Report of Geotechnical Exploration and Laboratory Testing Phase V**
Additional Soil Cement Testing at Soil Borrow Source
C-44 Reservoir and Stormwater Treatment Area
Martin County, Florida
Contract No. W912EP-11-D-0002
Task Work Order No. 0114
AMEC Project No. 6734-14-9799

Dear Ms. Brost:

AMEC Environment & Infrastructure, Inc., (AMEC) has performed a geotechnical exploration for the subject project in general accordance with our Proposal No., 14PROP0002.0083, dated November 19, 2014. Authorization for our services was provided by the Order for Supplies or Services as part of our Contract No. W912EP-11-D-0002, dated November 24, 2014, signed by Ms. Pamela Shirley of the U.S. Army Corps of Engineers (USACE). Task Order 0119, which was received on via email on January 16, 2015, was issued to include an additional 108 Unconfined Compressive Strength for Soil Cement tests. A summary of requested services is presented in the Geotechnical Exploration Scope section of this report.

In summary, this report presents the results of six test pits, performed by Phillips and Jordan, Inc. (P&J), and subcontracted by AMEC. This report also presents the associated laboratory testing results performed by our office and the "as-excavated" survey coordinates of the subject test pit locations, conducted by our Orlando office.

We have enjoyed assisting you on this project and look forward to serving as your geotechnical consultant on this and other important projects. If you have any questions concerning this report, please contact us.

Sincerely,

AMEC ENVIRONMENT & INFRASTRUCTURE, INC.
State of Florida Board of Professional Engineers Certificate of Authorization No. 5392

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1.0 FIELD SAMPLING AND LABORATORY TESTING SCOPE

The subject project is located at the C-44 Reservoir and Stormwater Treatment Area (RSTA) due north of C-44 Canal at the intersection of Florida Route 76 and Florida Route 70, in Martin County, Florida. In order to evaluate the subsurface conditions in the areas of the planned C-44 RSTA project, field soil and water sampling and associated laboratory tests were requested. The field sampling and laboratory test details were provided in the Scope of Work titled Contract No. W912EP-11-D-0002 Architect-Engineer Services for C-44 RSTA Contract 2 Geotechnical Investigation – Phase V Additional Soil Cement Testing at Soil Borrow Source, revision dated November 20, 2014. A second task order (TO 0119) was then issued on January 15, 2015, increasing the laboratory testing scope of work to include the addition of 108 unconfined compressive strength tests on soil cement samples.

The requested field and laboratory scopes are discussed in the subsequent sections and the actual scope performed is discussed in Sections 6.0 and 7.0.

1.1 Field Sampling Scope

The requested field sampling and on-site soil sample compositing and washing at C-44 RSTA consisted of the following:

1) Test Pit Soil Sampling
   a) Perform a total of six test pits, designated as CP14-IRC44-TP-513 through CP14-IRC44-TP-518. Excavate each to a maximum depth of 12 feet below the ground surface.
   b) Collect 20, five- gallon buckets of soil excavated from target depth of 2 to 5 feet below existing grade. Collect ten, five-gallon buckets of soil excavated from target depth of 5 to 7 feet below existing grade. Collect ten, five-gallon buckets of soil excavated from target depth of 9 to 11 feet below existing grade. A total of 40, five-gallon buckets of soils were collected from each test pit. Sealable lids were to be placed on the buckets once sampling was completed.

2) Composite samples for each target depth
   a) For each of the three target depths, mix together all the five-gallon sample buckets collected at each respective depth. A total of 40 five-gallon buckets will be mixed per test pit. Mixing efforts to be performed on-site by placing all buckets of each target sample on clean sheets of plywood.
   b) The soils mixed for target depth of 2 to 5 feet will have a testing sample designation of S-2/5, for a total of 60 sample buckets (10 per test pit).

c) Mix five, five-gallon sample buckets from each of the two target depths of 5 to 7 feet and 9 to 11 feet (for a total of 10 sample buckets). Mix the soil samples together to prepare a target depth composite sample, for a total of 10 individual composite samples. These composited soils will have a testing sample designation of C-5/11, for a total of 60 sample buckets (10 per test pit).
d) A total of 120, five gallon buckets of soil samples will be washed. 120, five gallon buckets of soil samples will be held in reserve.

3) Generating Test Samples

a) Sort the 120 five-gallon buckets of soil samples in three different condition designations – Unwashed (UW), Lightly Washed (LW), and Medium Washed (MdW). Three, five-gallon buckets will be prepared for each condition designation for each of the two testing sample designations. One, five-gallon bucket will account for the loss soil sample at each target depth.

4) Sample Washing

a) All washing of soil will be performed in the field using well water from the on-site source.
b) Approximately 2.5 gallons of soil will be placed into a cement mixer. Water will be added into the mixer.
c) The drum will be rotated and the material thoroughly mixed with the water until all the fines are in suspension and the water appears to be "muddy."
d) The water will be carefully decanted and sampled after a defined number of drum rotations, which will be determined during the pilot washing.
e) After the water is decanted, fresh water will be added and steps c and d will be repeated, and so forth. Steps b through d define one cycle. The number of rotations and cycles per operation are defined below.

5) Pilot Washing

a) The pilot washing operation will have the same set up as described above. Pilot washing will be performed on two test pit samples (reserve buckets will be used) with different silt contents (SP-SM approximately 5%, SM approximately 25%).
b) The samples will be washed as described in the Sample Washing section above.
c) One wash water sample from each decanter will be collected in a 100 mL vial and set aside to allow the fines to settle out. This is to estimate the percentage of fines washed out in each cycle. The process of rotating and decanting will be repeated until the decanted water is close to being clear.
d) The light wash shall wash approximately 25% of the fines out. The medium wash shall wash approximately 50% of the fines out. The vials, with the collected decanted water, will be used to estimate 25% and 50% wash rates, respectively.
e) After the pilot washing, estimates will be obtained of the following:
    - The number of rotations to achieve on cycle;
    - The number of cycles needed for a light wash;
    - The number of cycles needed for a medium wash.

6) Light Washing

   a) Enough material from each Testing Sample will be lightly washed to have three, five-gallon buckets of lightly washed material. The material will be washed using the number of rotations and cycles determined by the pilot washing, and agreed upon by the government representative during the pilot wash operation.

7) Medium Washing

   a) Enough material from each Testing Sample will be medium washed to have three, five-gallon buckets of lightly washed material. The material will be washed using the number of rotations and cycles determined by the pilot washing, and agreed upon by the government representative during the pilot wash operation.

8) Water-Well Sampling:

   a) Collection of three, 15-gallon containers of water from the on-site water-well for associated soil cement testing.

1.2 Geotechnical Laboratory Testing Scope

1.2.1 Geotechnical Index Testing

The anticipated laboratory index testing of the soil samples obtained at the site were as follows:

- 48 Sieve Analysis (Sieve Sizes No. ¾", ⅜", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, 230) – ASTM D6913
- 48 visual percent shell classifications
- 48 Hydrometer Analysis – ASTM D422
- 48 Carbonate Content tests – ASTM D4373
- 48 Atterberg Limit tests – ASTM D4318, Wet Preparation Method (Test Method A – Multipoint)
- 48 Organic Content – ASTM D2974, Test Method C
- 48 Specific Gravity for Soil – ASTM D854
- 48 pH (EPA SW-846 9045C)
- 36 Sand Equivalent Testing – ASTM D2419

1.2.2 Soil Cement Mix Design Testing

1) All soil samples were to be screened through a ¾ inch sieve before testing to remove particles greater than ¾ inch.

2) Moisture-Density Tests

   a) The optimum-moisture / maximum-density relationship for the soil samples were conducted in accordance with ASTM D 558, Test Method B, for a total of 36 Moisture Density Tests. The sampled well-water was utilized on all samples for the Moisture Density testing.

3) Compressive Strength Tests (14% Cement, 100% Compaction)
   a) Three cylinders for 7-day and three cylinders for 28-day compressive strength testing each were to be prepared in accordance with ASTM D 1633 for each of the 36 samples, resulting in 216 specimens.
   b) The specimens were to be prepared to a target density of 100% of the maximum dry density as determined by ASTM D 558.
   c) All specimens were to be prepared using the sampled well-water.
   d) For each cylinder, an estimate of the water/cement ratio was to be performed.
   e) The test specimens were to be tested at 7 days and 28 days from the date of preparation.

4) Compressive Strength Tests (14% Cement, 95% Compaction)
   a) Three cylinders for 7-day compressive strength testing were to be prepared in accordance with ASTM D 1633 for each of the 36 samples, resulting in 108 specimens.
   b) The specimens were to be prepared to a target density of 95% of the maximum dry density as determined by ASTM D 558.
   c) All specimens were to be prepared using the samples well-water.
   d) For each cylinder, an estimate of the water/cement ratio was to be performed.
   e) The test specimens were to be tested at 7 days and 28 days from the date of preparation.
5) 36 Wetting and Drying of Soil Cement – ASTM D559
6) 36 Freezing and Thawing of Compacted Soil Cement Mixtures – ASTM D560-03

2.0 PURPOSE OF EXPLORATION

The purpose of this exploration was to excavate and collect representative soil and water samples within the project area as well as to provide field and laboratory data in support of the C-44 reservoir design. The representative field and laboratory data obtained from this exploration as well as from our 2012 exploration and our 2013/2014 exploration will be used by others to verify the suitability of the borrow area. The results obtained from these findings will aide in the soil-cement mix design in support of the overall engineering design and construction of the reservoir embankment interior slope armoring of the C-44 Reservoir and Stormwater Treatment Area. The following sections briefly describe the field and laboratory testing activities and present the findings.

3.0 PERTINENT PROJECT INFORMATION

3.1 Site Location

The C-44 Reservoir and Stormwater Treatment Area Project (RSTA) is located in southeastern Florida. More specifically, the project site is located in north central Martin County, and at the intersection of SR 710 (SW Warfield Boulevard) and Country Road 726 (Citrus Boulevard) near Indiantown, Florida.

3.2 Project Background

The C-44 RSTA is part of the Indian River Lagoon South Restoration Project. The proposed land improvements will consist of an above-ground reservoir and six Stormwater Treatment Area (STA) cells. The reservoir will have a 3,400 acre footprint and a design storage capacity of 56,000 acre-feet with a normal full storage level of 15 feet. The primary purpose of the C-44 RSTA will be to improve water quality by capturing and storing stormwater runoff from the C-44 Basin within the reservoir and then filter it through the STA cells prior to discharging back into the C-44 (St. Lucie) Canal after passage through the STA. These project components are designed to attenuate flows and reduce nutrient loading to the St. Lucie Estuary.

The geotechnical sampling performed in this scope of work is within the footprint of the proposed C-44 Reservoir in the northwestern portion of the C-44 project site. There were no construction activities ongoing at the sampling area.

Historically, the land use within the footprint of the planned C-44 RSTA project consisted of citrus grove (orange and grapefruit), row crops (tomatoes, potatoes, and watermelons), and sod production.

3.3 Project Information

Project information was provided by Ms. Felicia Copeland, Ms. Deborah Brost, and Ms. Barbara Nist, P.G., of the USACE during the period of October 21, 2014 to February 6, 2015. We were furnished with copies of a Scope of Work (SOW) and revised SOW, titled C-44 RSTA Contract 2 Geotechnical Investigation – Phase V Additional Soil Cement Testing at Soil Borrow Source, prepared by the USACE. The final SOW was dated November 20, 2014. We have also been furnished with the following information:

- Vicinity Map (Plate B-1)
  C-44 RSTA - Geotechnical Investigation
  Martin County, FL
  Prepared by: USACE
  Dated: November 2012

- Site Map (Plate B-2)
  C-44 RSTA - Geotechnical Investigation 2014
  Martin County, FL
  Prepared by: USACE
  Dated: September 2014

- Proposed Test-Pit Locations (Plate B-3)
  C-44 RSTA - Geotechnical Investigation 2014
  Martin County, FL
  Prepared by: USACE

- Range of Concentrations Measured Versus Regulatory Requirements
  Provided by: USACE

- Listing of Available Survey Control Monuments
  Provided by: USACE

- Coordinates for Impacted Zones
  Provided by: USACE

- Sample Bucket Flow Chart
  Provided by: USACE

The requested test pit excavation locations were shown on the furnished Geotechnical Investigation 2014 Proposed Test-Pit Locations (Plate B-3) attached to the SOW. We have not been furnished with any plans or structural loading information.

4.0 GEOLOGICAL SETTING

The Florida Platform lies in the south-central part of the North American Plate that extends to the southeast part of the continent and is separated by the Atlantic Ocean and the Gulf of Mexico. Most of the state lies within the Florida Platform except for the Panhandle, which is a section of the Gulf Coastal Plain. The subject site overlies the Florida Platform, which is formed of igneous and metamorphic rocks overlain by approximately 13,000 feet of sedimentary rocks, mostly of marine origin, comprising the Florida Platform.

The geologic formations underlying Martin County may be described as consisting of two aquifers and an intermediate confining unit. The upper water table or non-artesian aquifer conditions extend from the ground surface to depths of about 150 feet below land surface, and are comprised of Pamlico sand and the Anastasia Formation of Pleistocene age and possibly a portion of the upper part of the Tamiami Formation of the late Miocene age group. The intermediate confining unit is comprised of the Hawthorn Formation of the Miocene age which underlies the surficial aquifer. Beneath the intermediate confining unit is the Floridan aquifer, which underlies all of Florida and southern Georgia. In Martin County, the top of the Floridan aquifer is usually between 600 and 800 feet below land surface.

Three different physiographic subdivisions cover Martin County. The Eastern Flatlands covers the majority of the area, including the subject site, and is located in the central part of the county. The Everglades is adjacent to Lake Okeechobee on the western portion of the county, and the Atlantic Coastal Ridge is in the eastern portion of the county.

The following table summarizes the geologic formations adjacent to Martin County (Scott (1) and USGS (6)), based on water wells drilled to depths of up to approximately 600 feet below mean sea level.

Table 1: Summary of General Geologic Stratigraphy of South Central Florida

Approx. El. Range (feet, MSL)	Geologic Period	Geologic Epoch	Stratigraphic Symbol and Formation		General Lithology	General Material Description
0 to -100	Tertiary/ Quaternary	Pliocene/ Pleistocene	TQsu	Shelly Sediments of Pliocene-Pleistocene age	Shells, sand, clay	Complex, varying from unconsolidated, variably calcareous and fossiliferous quartz sands to well-indurated, sandy fossiliferous limestones–both marine and freshwater. Clayey sands and sandy clays are present. These sediments form part of the surficial aquifer system.
-100 to -200	Tertiary	Pliocene	Tt	Tamiami Formation	Limestone, sand, clay	Light gray to tan, unconsolidated, fine to coarse grained, fossiliferous sand; light gray to green, poorly consolidated, fossiliferous sandy clay to clayey sand; light gray, poorly consolidated, very fine to medium grained, calcareous, fossiliferous sand; white to light gray, poorly consolidated, sandy, fossiliferous limestone; and white to light gray, moderately to well

Table 1: Summary of General Geologic Stratigraphy of South Central Florida						
Approx. El. Range (feet, MSL)	**Geologic Period**	**Geologic Epoch**	**Stratigraphic Symbol and Formation**		**General Lithology**	**General Material Description**
						indurated, sandy, fossiliferous limestone. Limited quantities of phosphate are present in sand- to gravel-sized grains. Fossils present occur as molds, casts, and original material.
-200 to -600+	Tertiary	Miocene	Th	Hawthorn Formation	Dolostone, limestone, sand, clay, phosphate	Light olive gray, blue-gray, green and gray-green in unweathered sections to reddish brown in deeply weathered sections, poorly to moderately consolidated, clayey sands to silty clays, sandy clays and relatively pure clays. Clays contains lenses or stringers of sands and gravels, and thin layers of limestone and shells.

Lichtler (2) provides a more site-specific geologic stratification through his analysis of well logs located near the subject site in Martin County. The nearest well that was reported was installed at SE¼ NW¼ sec. 36, T39S, R38E, located approximately 7 miles away from the subject site, and was drilled to a depth of approximately 1155 feet below ground surface, according to the literature. Table 2 below presents a general stratigraphy of the materials encountered.

Table 2: Summary of General Geologic Stratigraphy at Central Martin County Wells			
Approx. Depth Range (feet)	**Geologic Epoch**	**Stratigraphic Name**	**General Material Description**
0 to 10	Pleistocene	Pamlico Sand	Gray or brown quartz sand
10 to 100		Anastasia Formation	Sand, shell beds, and thin discontinuous layers of sandy limestone or sandstone.
100 to 150	Pliocene	Caloosahatchee Marl	Primarily consists of sand and shell
150 to 189	Miocene	Tamiami Formation	Dark green to white phosphatic clay containing silt and quartz sand.
189 to 756		Hawthorn Formation	
756 to 777	Oligocene	Suwannee Limestone	Cream colored, slightly porous, soft, granular mass of limy particles, many of which seem to be of organic origin. Contains very few distinguishable fossils.
777 to 798	Eocene	Ocala Group	White to cream or slightly pink, soft to medium hard limestone with some crystalline calcite and miliolid foraminifera.
798 to 1155		Avon Park Limestone	Cream to tan, hard to medium soft, chalky to finely crystalline limestone with foraminifers.

REFERENCES

1. Scott, Thomas M., P.G., 2001. *Text to Accompany the Geologic Map of Florida – Open-File Report No. 80*. Florida Geological Survey, pages1-22.
2. Lichtler, William F., 1960. *Geology and Ground-Water Resources of Martin County – Report of Investigations No. 23*. Florida Geological Survey, pages 1-160.
3. Lichtler, William F., 1957. *Ground-Water Resources of the Stuart Area, Martin County, Florida – Information Circular No. 12*. Florida Geological Survey, pages 1-52.
4. Crandall, C.A., 2000. *Distribution, Movement, and Fate of Nitrate in the Surficial Aquifer Beneath Citrus Groves, Indian River, Martin, and St. Lucie Counties, Florida – Water-Resources Investigations Report 00-4057*. U.S. Geological Survey, pages 1-76.
5. Miller, R. Adam, 1978. *Water-Resources Setting, Martin County, Florida – Water-Resources Investigation 77-68*. U.S. Geological Survey, page 139.
6. United States Geological Survey (USGS), South Florida Information Access Website: http://sofia.usgs.gov.

5.0 AMEC PREVIOUS AREA EXPERIENCE

AMEC has previously performed geotechnical explorations for the USACE along the alignment of the Herbert Hoover Dike near Port Mayaca as well as for the Florida Inland Navigation District (FIND) at 0-7 Dredge Material Management Area (DMMA) located east of the subject site and adjacent (due north) of the C-44 (St. Lucie) Canal and navigation lock. Additionally, our predecessor company, MACTEC, performed a geotechnical exploration at this C44 site from 2012 through 2014 consisting of subsurface Standard Penetration Test (SPT) borings, test pits, and well water testing, and soil cement mix design testing. These reports are summarized below:

- **FINAL Report of Geotechnical Exploration Volume 1**
  SPT Borings and Laboratory Testing
  C-44 Reservoir and Stormwater Treatment Area
  Martin County, Florida
  Contract No. W912EP-11-D-0002
  Task Work Order No. 0040, and Modification No. 1
  AMEC Project No. 6734-12-9680
  Dated: December 4, 2012
  Prepared for: USACE

- **FINAL Report of Geotechnical Exploration Volume 2**
  Test Pits, Water Sampling, and Laboratory Testing
  C-44 Reservoir and Stormwater Treatment Area
  Martin County, Florida
  Contract No. W912EP-11-D-0002
  Task Work Order No. 0040, and Modification No. 1

AMEC Project No. 6734-12-9680
Dated: February 13, 2013
Prepared for: USACE

- **FINAL Report of Geotechnical Exploration and Laboratory Testing**
  Test Pits, Water Sampling, and Laboratory Testing
  C-44 Reservoir and Stormwater Treatment Area
  Martin County, Florida
  Contract No. W912EP-11-D-0002
  Task Work Order No. 0070
  AMEC Project No. 6734-13-9741
  Dated: November 21, 2014
  Prepared for: USACE

6.0 FIELD EXPLORATION AND SAMPLE COLLECTION

6.1 Site Conditions

The site contains a network of drainage ditches and distribution canals that were previously used during citrus, row crop, and sod production. Except where unpaved roadways have been created, vegetation over much of the site consists of small to medium brush and small trees in a medium to thick density. During periods of relatively low rainfall there are isolated areas of standing water, including the drainage ditches, but there are also many areas with no standing water. Following periods of heavy rainfall there are frequent localized areas of ponded water.

6.2 Clearing and Grubbing

Vegetation and land clearing activities were subcontracted and performed by Phillips and Jordan, Inc. operating rubber tired front-end loader heavy construction equipment with the support of AMEC's West Palm Beach on-site Biologist and Professional Engineer. Clearing activities were performed during test pit excavation operations.

Prior to commencing the clearing and grubbing, all personnel involved completed training for threatened and endangered species. This training was given by Randy Telford, Biologist with AMEC. In addition, Mr. Telford was on site during all clearing and grubbing operations. The clearing and grubbing was accomplished during the period of December 9, 2014, through December 11, 2014.

6.3 Test Pit Excavations

In general, the test pit excavations were performed starting at the existing ground surface and excavated to a maximum depth of approximately 12 feet as noted in Table 3. During the test pit excavations, three depth intervals were sampled (approximate depths of 2 to 5 feet, 5 to 7 feet, and 9 to 11 feet below existing grade). The material was stockpiled and then placed into pre-labeled sealable, 5-gallon sample buckets and transported to the on-site field yard for compositing and sample washing. The samples were then delivered to our materials testing laboratory for subsequent laboratory soil cement testing.

The approximate test pit locations are shown on the Field Exploration Plan in Appendix B. The test pit locations were selected by the USACE. We were provided with State Plane Coordinates for each field test location. We converted the State Plane Coordinates into Latitude/Longitude coordinates for use with our hand-held Global Positioning System (GPS) device. The excavations were performed at or adjacent to the requested locations with some allowances for adjacent canals. Test pit CP14-IRC44-TP-514 was moved due to proximity to a built-up roadway, canal excavation, and irrigation pipes. The relocated test pit was named CP14-IRC44-TP-514A. The test pit relocation was approved by the USACE TPOC.

The test pits were excavated by our subcontractor Phillips and Jordan, Inc. A Professional Engineer (P.E.) from our West Palm Beach office was present to provide direction during the test pit excavations. The heavy construction equipment utilized to access and excavate each of the test pits was a track-mounted Komatsu PC 210 LC excavator. The test pits were excavated during the period of December 9 through 11, 2014. A summary of the test pit locations and depths excavated is provided below in Table 3.

Table 3: Summary of Test Pit Excavations Performed for Project

Field Test Designation	Dates Performed[D]	Survey Coordinates		Ground Surface Elevation NAVD88[B] (feet)	Approx. Excavation Depth (feet)[C]	Approx. Excavation Elevation NAVD88 (feet)
		Northing NAD83 (2007)[A] (feet)	Easting NAD83 (2007)[A] (feet)			
CP14-IRC44-TP-513	12-9-14	1004733	837282	+26.2	11.0	+15.2
CP14-IRC44-TP-514[E]	12-9-14	1003765	835426	+24.3	7.0	+17.3

Table 3: Summary of Test Pit Excavations Performed for Project						
		Survey Coordinates				
Field Test Designation	Dates Performed[D]	Northing NAD83 (2007)[A] (feet)	Easting NAD83 (2007)[A] (feet)	Ground Surface Elevation NAVD88[B] (feet)	Approx. Excavation Depth (feet)[C]	Approx. Excavation Elevation NAVD88 (feet)
CP14-IRC44-TP-514A	12-10-14	1003776	835628	+26.8	11.0	+15.8
CP14-IRC44-TP-515	12-10-14	1001649	835607	+26.5	12.0	+14.5
CP14-IRC44-TP-516	12-10-14	1001372	837233	+26.5	11.5	+15.0
CP14-IRC44-TP-517	12-10-14	1000988	835210	+26.7	11.0	+15.7
CP14-IRC44-TP-518	12-11-14	1000116	837236	+26.6	11.0	+15.6

A – National American Datum 1983.
B – North American Vertical Datum 1988.
C – Depth below existing ground surface.
D – Performed test pit with a Komatsu PC 210 LC track-mounted excavation.
E – Test pit terminated due to built-up roadway, canal excavation, and irrigation pipes.

From each test pit the following target-depth samples were collected:

20 buckets .....from 2-3 feet
10 buckets .....from 5-7 feet
10 buckets .....from 9-11 feet

The Test-Pit Logs, presented on the Boring Drilling Log forms in Appendix C, present the soil descriptions for each test pit excavation. The stratification lines and depth designations on the test pit records represent the approximate boundaries between soil types. In some instances, the transition between soil types may be gradual. Brief descriptions of the excavation and sampling techniques used are presented in the Field Procedures section in Appendix A.

6.4 Sampling and Sample Compositing and Washing

The sample buckets were transported to the on-site trailer compound. The sample material was there composited and washed as described below

1. Compositing:

Samples from each target depth were composited according to the scope described in paragraph 1.1 field sampling.

For each test-pit, a combined sample was created from the two lower target depths: 5-7 feet and 9-11 feet. This combined sample for each test pit was designated C-5/11.
The table below summarized the compositing and combining for each test pit.

Target Depth Composite Samples	Testing Samples to be Washed for each Test Pit
2-5	Target Sample **S-2/5**
5-7	Combined samples from target depth 5-7' and 9'11' **C-5/11**
9-11	

2. Washing:

The sample material of the target samples S-2/5 and the combined samples C-5/11 from each test pit were washed. Three buckets of each sample were washed lightly and three buckets were medium washed according to the scope outlined in paragraph 1.1 and detailed description and illustration with pictures in **Appendix A**.

The table below summarizes the steps taken to create the sample material for each test pit to be tested in the laboratory. The last column shows the sample designations.

1. Step	2. Step	3. Step	4. Step
Test Pit Excavation	**Sample Material Composited and Combined**	**Washing of Samples**	**Lab Sample Designation**
Target samples collected	Target sample from 2-5 feet S-2/5	Unwashed (UW)	UW-S-2/5
		Lightly Washed (LW)	LW-S-2/5
		Medium Washed (MW)	MdW-S-2/5
	Combine samples from target depth 5-7' and 9'11' C-5/11	Unwashed (UW)	UW-C-5/11
		Lightly Washed (LW)	LW-C-5/11
		Medium Washed (MW)	MdW-C-5/11

6.5 Collection of Wash Water Samples

100mL of wash water was collected from each decanter obtained from each wash condition and test sample designation (i.e. LW at Target Sample S-2/5). The collected decanted wash was combined, thoroughly mixed to form one composite was water sample, and was poured into a half-gallon glass water sampling container. A total of six water samples were collected, one per wash condition and test sample designation, for a total of 24, half-gallon glass containers. In addition, one, half-gallon sample was collected from the on-site well water source. In total 25, half-gallon glass containers were collected

and shipped off to the U.S. Army Environmental Laboratory (ERDC) for subsequent chemical analysis.

6.6 Water Collection for Soil-Cement Testing

Water was collected for associated soil-cement laboratory testing utilizing the potable well-water source at the on-site area office. The sampled water was pumped on December 12, 2014, from the on-site water-well and placed into 15 gallon plastic containers.

7.0 LABORATORY TESTING

7.1 General

In order to aid in classifying the soils and to help quantify and correlate engineering properties, geotechnical laboratory classification tests were performed on the soil samples obtained from the 6 test pits during this exploration. The quantity and types of tests were selected by USACE personnel.

The laboratory testing was categorized into two general areas:

- Geotechnical Index Testing Requirement (Table 5 SOW)
- Soil-Cement Mix Design Testing Requirements (Tables 6 SOW)

7.2 Geotechnical Classification Testing

The laboratory classification testing performed for this project included the following:

- 48 Sieve Analysis (Sieve Sizes No. ¾", ⅜", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, 230) – ASTM D6913
- 48 visual percent shell classifications
- 48 Hydrometer Analysis – ASTM D422
- 48 Carbonate Content tests – ASTM D4373
- 48 Atterberg Limit tests – ASTM D4318, Wet Preparation Method (Test Method A – Multipoint)
- 48 Organic Content – ASTM D2974, Test Method C
- 48 Specific Gravity for Soil – ASTM D854
- 48 pH (EPA SW-846 9045C)
- 36 Sand Equivalent Testing – ASTM D2419

A summary of the classification testing results is provided below in Table 4. A summary of the Sand Equivalent Testing results are provided in Table 5. These results are also presented in Appendices B and C.

Table 4: Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-513	UW-S-2/5	2	5.0	SW-SM	16	16	0	2.0	2.72	33.5	52	10.7	5.9	4.8	11.07	0	8.6
CP14-IRC44-TP-513	LW-S-2/5	2.0	5.0	SP-SM	NP	NP	NP	0.3	2.62	31.7	56.1	6.9	3.6	3.3	34.94	0	8.2
CP14-IRC44-TP-513	MdW-S-2/5	2.0	5.0	SP	NP	NP	NP	0.2	2.67	17.7	71.7	3.5	1.7	1.8	10.42	0	8.5
CP14-IRC44-TP-513	UW-C-5/11	5.0	11.0	SW-SC	26	17	9	3.2	2.7	21.0	57.7	11.9	2.2	9.7	9.33	0	8.6
CP14-IRC44-TP-513	LW-C-5/11	5.0	11.0	SP	NP	NP	NP	0.7	2.76	17.4	76.4	3.8	3	0.8	11.2	0.1	9.4
CP14-IRC44-TP-513	MdW-C-5/11	5.0	11.0	SP	NP	NP	NP	0.3	2.69	19.6	77.3	1.8	0.5	1.3	5.05	0.2	8.4
CP14-IRC44-TP-513	UW-R-5/7	5.0	7.0	SP-SC	24	17	7	1.4	2.76	27.4	58.1	9.3	3.1	6.2	5.8	0	8.4
CP14-IRC44-TP-513	UW-R-9/11	9.0	11.0	SP-SC	25	17	8	0.3	2.78	23.9	58.4	9.6	2.5	7.1	15.39	0.2	8.8
CP14-IRC44-TP-514A	UW-S-2/5	2.0	5.0	SP-SM	20	18	2	2	2.68	5.5	83.2	11.3	3.4	7.9	4.91	1	8.7
CP14-IRC44-TP-514A	LW-S-2/5	2.0	5.0	SP-SM	0	0	0	0.6	2.75	22.8	71.9	3.3	0.9	2.4	5.3	0.5	9.2
CP14-IRC44-TP-514A	MdW-S-2/5	2.0	5.0	SP	0	0	0	0	2.64	17.7	79.9	2.4	0.6	1.8	4.44	2	8.4
CP14-IRC44-TP-514A	UW-C-5/11	5.0	11.0	SW-SM	20	18	2	1.6	2.71	16.6	72.3	10.8	3.1	7.7	11.75	41.5	8.9
CP14-IRC44-TP-514A	LW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.2	2.44	0.1	93.9	6.0	5.7	0.3	6.64	0.4	8.8
CP14-IRC44-TP-514A	MdW-C-5/11	5.0	11.0	SP	0	0	0	0.3	2.61	18.4	73.1	1.5	1.5	0	10.77	3.4	9.6
CP14-IRC44-TP-514A	UW-R-5/7	5.0	7.0	SP-SM	21	18	3	0.3	2.65	37	54.6	6	1.8	4.2	12.17	2	8.9
CP14-IRC44-TP-514A	UW-R-9/11	9.0	11.0	SP-SC	23	17	6	2.2	2.67	28.5	61.4	10.1	2.6	7.5	24	24	8.8
CP14-IRC44-TP-515	UW-S-2/5	2.0	5.0	SP-SC	20	15	5	2.2	2.68	22.2	67.4	8	1.6	6.4	7.64	0	9.2
CP14-IRC44-TP-515	LW-S-2/5	2.0	5.0	SP	0	0	0	1.5	2.54	25.5	70.4	3.4	2.8	0.6	8.1	0	8.1
CP14-IRC44-TP-515	MdW-S-2/5	2.0	5.0	SP	0	0	0	0.3	2.62	0	97.5	2.5	1.7	0.8	7.46	0.4	8.4
CP14-IRC44-TP-515	UW-C-5/11	5.0	11.0	SC	24	12	12	3	2.69	7.4	76.7	14.6	2.2	12.4	8.95	0.1	8.6
CP14-IRC44-TP-515	LW-C-5/11	5.0	11.0	SP	0	0	0	0.7	2.75	16.4	74.6	4.2	2.6	1.6	13.6	0.5	8.8
CP14-IRC44-TP-515	MdW-C-5/11	5.0	11.0	SP	0	0	0	0.5	2.66	20.6	75.6	2.6	1.7	0.9	7.04	0.3	9.5
CP14-IRC44-TP-515	UW-R-5/7	5.0	7.0	SC	28	15	13	1.5	2.63	11.7	68.4	19.9	6.5	13.4	14.21	0	8.6
CP14-IRC44-TP-515	UW-R-9/11	9.0	11.0	SW-SM	0	0	0	1.2	2.67	5.6	84.1	10	0.6	9.4	1.95	0	8.5

Table 4: Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-516	UW-S-2/5	2.0	5.0	SP-SC	24	16	8	2.2	2.33	14.7	67.1	9.5	0.9	8.6	4.08	0	8.6
CP14-IRC44-TP-516	LW-S-2/5	2.0	5.0	SP	0	0	0	0.6	2.65	6.7	82.8	3	2	1	3.63	0.2	8.6
CP14-IRC44-TP-516	MdW-S-2/5	2.0	5.0	SP	0	0	0	18	2.74	23	68.2	1.6	1	0.6	3.48	0.1	9.6
CP14-IRC44-TP-516	UW-C-5/11	5.0	11.0	SC	26	18	8	3.8	2.7	3.9	77.2	18.9	4.1	14.7	7.61	0.4	8.6
CP14-IRC44-TP-516	LW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.1	2.69	13.5	81.4	5.1	1	4.1	3.83	5.3	9.0
CP14-IRC44-TP-516	MdW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.2	2.99	10.7	82	6.5	0.5	6	3.72	0.5	8.6
CP14-IRC44-TP-516	UW-R-5/7	5.0	7.0	SC	36	15	21	2.4	2.59	14.8	64.6	19.7	3.7	16	4.9	0	8.6
CP14-IRC44-TP-516	UW-R-9/11	9.0	11.0	SM	25	18	7	1.7	2.7	3.6	77.1	19.3	3.6	15.7	3.17	0.1	8.5
CP14-IRC44-TP-517	UW-S-2/5	2.0	5.0	SW-SM	0	0	0	1.4	2.48	8.3	79.6	11.1	2.6	8.5	7.47	0	8.8
CP14-IRC44-TP-517	LW-S-2/5	2.0	5.0	SP	0	0	0	0.7	2.72	22.2	70.7	3.6	1.7	1.9	9.31	0	8.6
CP14-IRC44-TP-517	MdW-S-2/5	2.0	5.0	SP	0	0	0	0.4	2.61	17.0	80.6	2.4	2.1	0.3	6.06	0	8.5
CP14-IRC44-TP-517	UW-C 5/11	5.0	11.0	SP-SM	0	0	0	1.1	2.67	6.5	84.3	9.2	3.3	5.9	7.23	0.6	8.8
CP14-IRC44-TP-517	LW-C 5/11	5.0	11.0	SP	0	0	0	1.7	2.68	14.2	82.6	3.2	1.5	1.7	5.91	1.4	9.4
CP14-IRC44-TP-517	MdW-C 5/11	5.0	11.0	SP	0	0	0	0.4	2.66	24.9	72.8	2.3	1.3	1	7.74	0.5	8.4
CP14-IRC44-TP-517	UW-R-5/7	5.0	7.0	SP-SM	0	0	0	0.6	2.67	6.0	83.7	10.3	3.5	6.8	10.91	0	8.9
CP14-IRC44-TP-517	UW-R 9/11	9.0	11.0	SW-SM	0	0	0	0.5	2.67	3.1	86.7	10.2	3.6	6.6	8.77	0.3	8.9
CP14-IRC44-TP-518	UW-S-2/5	2.0	5.0	SP-SM	0	0	0	1.7	2.66	0	90.3	9.7	2.7	7	1.48	0	8.2
CP14-IRC44-TP-518	LW-S-2/5	2.0	5.0	SP-SM	0	0	0	1.4	2.79	0	92.4	7.6	4.3	3.3	3.68	0	8.9
CP14-IRC44-TP-518	MdW-S-2/5	2.0	5.0	SP	0	0	0	0	2.67	0	96.7	3.3	1.1	2.2	0.45	0	9.1
CP14-IRC44-TP-518	UW-C 5/11	5.0	11.0	SC	22	14	8	2.5	2.72	12.3	70.3	14.8	5.1	9.7	12.15	1	8.6
CP14-IRC44-TP-518	LW-C 5/11	5.0	11.0	SP-SM	0	0	0	0.6	2.64	14.2	78.7	6.2	1.5	4.7	11.9	3	8.9
CP14-IRC44-TP-518	MdW-C 5/11	5.0	11.0	SP	0	0	0	0.2	2.73	22.5	72	2.6	2	0.6	10.5	36.5	9.4
CP14-IRC44-TP-518	UW-R-5/7	5.0	7.0	SW-SC	21	14	7	1.4	2.68	26.6	53.4	10.6	4	6.6	13.5	0	8.7
CP14-IRC44-TP-518	UW-R-9/11	9.0	11.0	SC	28	18	10	1.6	2.61	9.4	73.8	16.4	4.3	12.1	5.93	0.6	8.3

Table 5: Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trail No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-513						
2-5	UW-S-2/5	1	12.8	2.1	17	17
		2	12.6	2.0	16	
		3	12.5	2.1	17	
	LW-S-2/5	1	13.6	3.4	25	25
		2	13.6	3.4	25	
		3	13.6	3.4	25	
	MdW-S-2/5	1	7.0	3.6	52	51
		2	7.1	3.5	50	
		3	7.0	3.5	50	
5-11	UW-C-5/11	1	14.5	2.2	16	16
		2	14.4	2.2	16	
		3	14.3	2.2	16	
	LW-C-5/11	1	13.5	3.5	26	25
		2	13.3	3.3	25	
		3	13.3	3.3	25	
	MdW-C-5/11	1	10.6	3.6	34	34
		2	10.6	3.6	34	
		3	11.0	3.6	33	
CP14-IRC44-TP-514A						
2-5	UW-S-2/5	1	12.9	2.1	17	16
		2	12.6	1.9	16	
		3	12.7	2.0	16	
	LW-S-2/5	1	12.7	3.5	28	28
		2	12.5	3.5	28	
		3	12.3	3.5	29	
	MdW-S-2/5	1	10.6	3.5	33	33
		2	10.0	3.2	32	
		3	10.3	3.6	35	
5-11	UW-C-5/11	1	13.5	2.2	17	17
		2	13.5	2.3	17	
		3	13.5	2.3	17	
	LW-C-5/11	1	11.8	3.3	28	28
		2	11.7	3.2	28	
		3	11.7	3.3	29	
	MdW-C-5/11	1	7.0	3.5	50	50
		2	7.1	3.6	51	
		3	7.1	3.5	50	
CP14-IRC44-TP-515						
2-5	UW-S-2/5	1	13.9	2.4	18	19
		2	14.1	2.6	19	
		3	14.2	2.6	19	
	LW-S-2/5	1	11.9	3.4	29	29
		2	12.1	3.5	29	
		3	11.8	3.5	30	
	MdW-S-2/5	1	6.5	3.4	53	53
		2	6.5	3.4	53	
		3	6.4	3.4	54	
5-11	UW-C-5/11	1	13.3	2.5	19	18
		2	13.6	2.3	17	
		3	13.6	2.2	17	
	LW-C-5/11	1	13.0	3.1	24	26
		2	13.0	3.4	27	
		3	13.0	3.6	28	

Table 5: Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trail No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-515						
5-11	MdW-C-5/11	1	11.5	3.8	33	33
		2	12.0	3.8	32	
		3	11.7	3.8	33	
CP14-IRC44-TP-516						
2-5	UW-S-2/5	1	14.0	2.4	18	18
		2	14.1	2.4	17	
		3	13.9	2.4	18	
	LW-S-2/5	1	10.4	3.7	36	35
		2	10.4	3.4	33	
		3	10.4	3.6	35	
	MdW-S-2/5	1	11.2	3.5	32	32
		2	11.4	3.7	33	
		3	11.4	3.6	32	
5-11	UW-C-5/11	1	13.8	3.4	25	25
		2	13.7	3.4	25	
		3	13.8	3.4	25	
	LW-C-5/11	1	13.8	2.4	18	16
		2	13.4	2.0	15	
		3	13.6	2.1	16	
	MdW-C-5/11	1	14.3	3.1	22	22
		2	14.2	3.0	22	
		3	14.3	3.0	21	
CP14-IRC44-TP-517						
2-5	UW-S-2/5	1	14.3	2.2	16	15
		2	14.2	2.1	15	
		3	14.1	2.0	15	
	LW-S-2/5	1	11.3	3.6	32	30
		2	11.1	3.3	30	
		3	11.2	3.2	29	
	MdW-S-2/5	1	10.6	3.8	36	37
		2	10.5	3.9	38	
		3	10.5	3.9	38	
5-11	UW-C-5/11	1	13.6	2.8	21	20
		2	13.2	2.4	19	
		3	13.2	2.6	20	
	LW-C-5/11	1	8.1	3.0	37	36
		2	8.7	3.1	36	
		3	8.7	3.0	35	
	MdW-C-5/11	1	6.2	3.5	57	56
		2	6.3	3.2	51	
		3	6.2	3.6	59	
CP14-IRC44-TP-518						
2-5	UW-S-2/5	1	14.5	1.7	12	13
		2	14.5	1.8	13	
		3	14.6	1.9	13	
	LW-S-2/5	1	11.2	2.9	26	26
		2	12.0	3.0	25	
		3	11.7	3.1	27	
	MdW-S-2/5	1	13.5	3.7	28	28
		2	13.5	3.6	27	
		3	13.4	3.7	28	

Table 5: Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trail No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-518						
5-11	UW-C-5/11	1	14.8	2.3	16	18
		2	14.1	2.7	20	
		3	14.3	2.6	19	
	LW-C-5/11	1	13.0	3.6	28	27
		2	12.8	3.4	27	
		3	12.7	3.4	27	
	MdW-C-5/11	1	10.4	3.8	37	36
		2	10.4	3.7	36	
		3	10.6	3.7	35	

7.3 Soil Cement Design Testing

The laboratory soil cement testing performed for this project included the following:

- 36 Moisture density tests of soil cement samples – ASTM D558
- 324 Unconfined compression strength tests for soil cement samples – ASTM D1633, Test Method A
- 36 Wetting and Drying of Soil Cement – ASTM D559
- 36 Freezing and Thawing of Compacted Soil Cement Mixtures – ASTM D560-03

A summary of the unconfined compressive strength test results is provided in Table 6 and Table 7. A summary of the Wetting/Drying and Freezing/Thawing test results are provided in Table 8. These results are also presented in Appendices B and C.

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-513 UW-S-2/5								
14%	1	7	0.78	126.1	10.0	125.8	9.6	1060
	2	7	0.78	126.1	10.0	126.4	9.6	890
	3	7	0.76	126.1	10.0	126.2	9.3	825
	4	28	0.76	126.1	10.0	126.2	9.3	NT
	5	28	0.77	126.1	10.0	126.0	9.4	NT
	6	28	0.77	126.1	10.0	126.3	9.4	NT
CP14-IRC44-TP-513 UW-C-5/11								
14%	1	7	0.97	117.3	12.0	117.6	12.0	785
	2	7	0.97	117.3	12.0	117.6	12.0	825
	3	7	0.93	117.3	12.0	118.0	11.4	795
	4	28	0.93	117.3	12.0	118.1	11.4	NT
	5	28	0.96	117.3	12.0	117.8	11.8	NT
	6	28	0.96	117.3	12.0	117.8	11.8	NT

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-513 LW-S-2/5								
14%	1	7	0.59	127.7	8.6	129.3	7.2	1600
	2	7	0.59	127.7	8.6	129.6	7.2	1295
	3	7	0.60	127.7	8.6	129.2	7.3	1345
	4	28	0.60	127.7	8.6	129.2	7.3	1805
	5	28	0.65	127.7	8.6	128.8	7.8	1425
	6	28	0.65	127.7	8.6	128.5	7.8	1680
CP14-IRC44-TP-513 LW-C-5/11								
14%	1	7	0.86	125.3	10.6	125.3	10.5	765
	2	7	0.86	125.3	10.6	125.0	10.5	1370
	3	7	0.86	125.3	10.6	124.6	10.6	1250
	4	28	0.86	125.3	10.6	124.8	10.6	NT
	5	28	0.84	125.3	10.6	125.5	10.4	NT
	6	28	0.84	125.3	10.6	125.5	10.4	NT
CP14-IRC44-TP-513 MdW-S-2/5								
14%	1	7	0.70	124.5	10.4	126.3	8.6	1585
	2	7	0.70	124.5	10.4	126.6	8.6	1355
	3	7	0.75	124.5	10.4	125.9	9.2	1590
	4	28	0.75	124.5	10.4	125.9	9.2	1755
	5	28	0.73	124.5	10.4	126.2	9.0	1895
	6	28	0.73	124.5	10.4	125.9	9.0	1885
CP14-IRC44-TP-513 MdW-C-5/11								
14%	1	7	0.78	126.3	9.2	125.5	9.6	1030
	2	7	0.78	126.3	9.2	125.5	9.6	1190
	3	7	0.81	126.3	9.2	125.1	10.0	1190
	4	28	0.81	126.3	9.2	125.1	10.0	1405
	5	28	0.82	126.3	9.2	125.0	10.0	1665
	6	28	0.82	126.3	9.2	125.0	10.0	1760
CP14-IRC44-TP-514A UW-S-2/5								
14%	1	7	0.81	121.1	11.8	122.9	10.0	630
	2	7	0.81	121.1	11.8	122.8	10.0	690
	3	7	0.77	121.1	11.8	123.6	9.4	810
	4	28	0.77	121.1	11.8	123.6	9.4	NT
	5	28	0.81	121.1	11.8	122.7	9.9	NT
	6	28	0.81	121.1	11.8	122.5	9.9	NT

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-514A UW-C-5/11								
14%	1	7	0.97	120.9	11.5	120.7	11.9	820
	2	7	0.97	120.9	11.5	120.7	11.9	965
	3	7	0.96	120.9	11.5	120.8	11.8	945
	4	28	0.96	120.9	11.5	120.7	11.8	NT
	5	28	0.94	120.9	11.5	120.7	11.6	NT
	6	28	0.94	120.9	11.5	121.1	11.6	NT
CP14-IRC44-TP-514A LW-S-2/5								
14%	1	7	2.89	123.3	10.6	123.8	9.6	1195
	2	7	2.34	123.3	10.6	124.2	9.6	1205
	3	7	2.43	123.3	10.6	124.3	9.6	1135
	4	28	0.79	123.3	10.6	123.7	9.6	NT
	5	28	0.79	123.3	10.6	123.6	9.7	NT
	6	28	0.79	123.3	10.6	123.6	9.7	NT
CP14-IRC44-TP-514A LW-C-5/11								
14%	1	7	0.81	125.3	11	125.7	10.0	765
	2	7	0.81	125.3	11	125.4	10.0	1370
	3	7	0.88	125.3	11	124.5	10.8	1250
	4	28	0.88	125.3	11	124.7	10.8	NT
	5	28	0.92	125.3	11	123.9	11.2	NT
	6	28	0.92	125.3	11	123.9	11.2	NT
CP14-IRC44-TP-514A MdW-S-2/5								
14%	1	7	0.62	123.9	8.9	124.1	7.6	790
	2	7	0.62	123.9	8.9	124.1	7.6	1195
	3	7	0.69	123.9	8.9	123.2	8.5	990
	4	28	0.69	123.9	8.9	123.5	8.5	1585
	5	28	0.67	123.9	8.9	123.5	8.2	1240
	6	28	0.67	123.9	8.9	123.5	8.2	1340
CP14-IRC44-TP-514A MdW-C-5/11								
14%	1	7	0.67	125.1	9.4	122.8	8.2	1120
	2	7	0.67	125.1	9.4	122.5	8.2	1385
	3	7	0.71	125.1	9.4	122.0	8.7	1265
	4	28	0.71	125.1	9.4	122.0	8.7	1785
	5	28	0.70	125.1	9.4	123.0	8.6	1855
	6	28	0.70	125.1	9.4	123.0	8.6	1660

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-515 UW-S-2/5								
14%	1	7	0.72	123.1	10.4	124.3	8.7	715
	2	7	0.72	123.1	10.4	124.9	8.7	950
	3	7	0.84	123.1	10.4	122.8	10.1	955
	4	28	0.84	123.1	10.4	123.4	10.1	NT
	5	28	0.73	123.1	10.4	124.3	8.8	NT
	6	28	0.73	123.1	10.4	124.6	8.8	NT
CP14-IRC44-TP-515 UW-C-5/11								
14%	1	7	0.84	118.3	12.3	120.1	10.3	835
	2	7	0.84	118.3	12.3	120.1	10.3	625
	3	7	0.85	118.3	12.3	120.3	10.4	765
	4	28	0.85	118.3	12.3	120.0	10.4	NT
	5	28	0.98	118.3	12.3	118.3	12.1	NT
	6	28	0.98	118.3	12.3	118.3	12.1	NT
CP14-IRC44-TP-515 LW-S-2/5								
14%	1	7	0.75	123.8	10.1	124.8	9.2	1250
	2	7	0.78	123.8	10.1	124.3	9.5	1305
	3	7	0.78	123.8	10.1	124.4	9.5	1660
	4	28	0.73	123.8	10.1	124.7	8.9	NT
	5	28	0.79	123.8	10.1	124.0	9.6	NT
	6	28	0.78	123.8	10.1	124.1	9.5	NT
CP14-IRC44-TP-515 LW-C-5/11								
14%	1	7	0.81	125.7	9.9	125.1	9.9	940
	2	7	0.81	125.7	9.9	125.1	9.9	1135
	3	7	0.79	125.7	9.9	125.6	9.6	995
	4	28	0.79	125.7	9.9	125.3	9.6	NT
	5	28	0.82	125.7	9.9	125.0	10.0	NT
	6	28	0.82	125.7	9.9	125.0	10.0	NT

Table 6: Summary of Soil Cement Testing AT 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-515 MdW-S-2/5								
14%	1	7	0.78	125.0	8.3	123.7	9.6	950
	2	7	0.78	125.0	8.3	123.7	9.6	910
	3	7	0.80	125.0	8.3	123.5	9.8	990
	4	28	0.80	125.0	8.3	123.2	9.8	1365
	5	28	0.81	125.0	8.3	123.6	9.9	1380
	6	28	0.81	125.0	8.3	123.0	9.9	1500
CP14-IRC44-TP-515 MdW-C-5/11								
14%	1	7	0.83	124.3	10.1	123.9	10.2	1115
	2	7	0.83	124.3	10.1	124.1	10.2	1070
	3	7	0.82	124.3	10.1	124.1	10.1	1210
	4	28	0.82	124.3	10.1	124.5	10.1	NT
	5	28	0.82	124.3	10.1	124.7	10.1	NT
	6	28	0.82	124.3	10.1	124.5	10.1	NT
CP14-IRC44-TP-516 UW-S-2/5								
14%	1	7	0.81	122.0	10.2	121.7	9.9	915
	2	7	0.81	122.0	10.2	122.3	9.9	815
	3	7	0.79	122.0	10.2	121.9	9.7	840
	4	28	0.79	122.0	10.2	122.3	9.7	NT
	5	28	0.76	122.0	10.2	122.3	9.4	NT
	6	28	0.76	122.0	10.2	122.5	9.4	NT
CP14-IRC44-TP-516 UW-C-5/11								
14%	1	7	1.23	118.0	13.3	111.4	15.1	355
	2	7	1.23	118.0	13.3	111.4	15.1	460
	3	7	1.20	118.0	13.3	112.2	14.8	435
	4	28	1.20	118.0	13.3	112.3	14.8	NT
	5	28	1.16	118.0	13.3	112.9	14.2	NT
	6	28	1.16	118.0	13.3	118.7	14.2	NT

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-516 LW-S-2/5								
14%	1	7	0.85	121.5	10.1	120.6	10.5	1095
	2	7	0.85	121.5	10.1	120.9	10.5	1295
	3	7	0.80	121.5	10.1	121.3	9.8	1065
	4	28	0.80	121.5	10.1	121.2	9.8	NT
	5	28	0.80	121.5	10.1	121.2	9.8	NT
	6	28	0.80	121.5	10.1	121.7	9.8	NT
CP14-IRC44-TP-516 LW-C-5/11								
14%	1	7	0.91	121.8	11.7	122.2	11.2	715
	2	7	0.91	121.8	11.7	122.2	11.2	605
	3	7	0.86	121.8	11.7	122.8	10.6	750
	4	28	0.86	121.8	11.7	122.9	10.6	975
	5	28	1.02	121.8	11.7	120.8	12.5	1065
	6	28	1.02	121.8	11.7	120.4	12.5	970
CP14-IRC44-TP-516 MdW-S-2/5								
14%	1	7	0.75	122.4	10.2	123.4	9.2	1585
	2	7	0.74	122.4	10.2	123.5	9.2	1465
	3	7	0.74	122.4	10.2	123.2	9.2	1665
	4	28	0.74	122.4	10.2	123.8	9.2	NT
	5	28	0.73	122.4	10.2	123.6	9.0	NT
	6	28	0.73	122.4	10.2	124.1	9.0	NT
CP14-IRC44-TP-516 MdW-C-5/11								
14%	1	7	0.70	122.0	10.3	123.7	8.6	1070
	2	7	0.70	122.0	10.3	123.7	8.6	950
	3	7	0.69	122.0	10.3	124.4	8.4	970
	4	28	0.69	122.0	10.3	124.4	8.4	NT
	5	28	0.68	122.0	10.3	123.8	8.4	NT
	6	28	0.68	122.0	10.3	123.8	8.4	NT

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-517 UW-S-2/5								
14%	1	7	0.87	120.2	11.4	121.3	10.7	1025
	2	7	0.87	120.2	11.4	121.3	10.7	850
	3	7	0.83	120.2	11.4	121.8	10.1	1000
	4	28	0.83	120.2	11.4	121.8	10.1	NT
	5	28	0.80	120.2	11.4	122.0	9.9	NT
	6	28	0.80	120.2	11.4	122.1	9.9	NT
CP14-IRC44-TP-517 UW-C-5/11								
14%	1	7	0.87	123.4	11.0	121.3	10.7	1025
	2	7	0.87	123.4	11.0	121.3	10.7	850
	3	7	0.83	123.4	11.0	121.8	10.1	1000
	4	28	0.83	123.4	11.0	121.8	10.1	NT
	5	28	0.80	123.4	11.0	122.0	9.9	NT
	6	28	0.80	123.4	11.0	122.1	9.9	NT
CP14-IRC44-TP-517 LW-S-2/5								
14%	1	7	0.75	122.7	10.4	123.8	9.2	1315
	2	7	0.75	122.7	10.4	123.8	9.2	1100
	3	7	0.75	122.7	10.4	123.7	9.3	1240
	4	28	0.75	122.7	10.4	124.3	9.3	NT
	5	28	0.74	122.7	10.4	124.1	9.0	NT
	6	28	0.74	122.7	10.4	124.0	9.0	NT
CP14-IRC44-TP-517 LW-C-5/11								
14%	1	7	0.70	122.6	9.5	123.4	8.6	NT
	2	7	0.70	122.6	9.5	123.9	8.6	NT
	3	7	0.72	122.6	9.5	123.1	8.8	NT
	4	28	0.72	122.6	9.5	123.1	8.8	NT
	5	28	0.71	122.6	9.5	123.1	8.8	NT
	6	28	0.71	122.6	9.5	123.2	8.8	NT

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-517 MdW-S-2/5								
14%	1	7	0.75	122.2	10.2	122.9	9.3	1265
	2	7	0.75	122.2	10.2	123.3	9.3	1190
	3	7	0.76	122.2	10.2	123.2	9.4	1385
	4	28	0.76	122.2	10.2	123.1	9.4	NT
	5	28	0.76	122.2	10.2	122.9	9.3	NT
	6	28	0.76	122.2	10.2	123.4	9.3	NT
CP14-IRC44-TP-517 MdW-C-5/11								
14%	1	7	0.66	123.3	9.1	123.8	8.1	1365
	2	7	0.66	123.3	9.1	123.8	8.1	1305
	3	7	0.65	123.3	9.1	123.9	8.0	1465
	4	28	0.65	123.3	9.1	124.4	8.0	NT
	5	28	0.68	123.3	9.1	123.4	8.4	NT
	6	28	0.68	123.3	9.1	124.1	8.4	NT
CP14-IRC44-TP-518 UW-S-2/5								
14%	1	7	0.75	116.5	12.6	120.0	9.2	845
	2	7	0.75	116.5	12.6	119.9	9.2	900
	3	7	0.77	116.5	12.6	119.8	9.5	795
	4	28	0.77	116.5	12.6	119.8	9.5	NT
	5	28	0.77	116.5	12.6	119.8	9.4	NT
	6	28	0.77	116.5	12.6	119.7	9.4	NT
CP14-IRC44-TP-518 UW-C-5/11								
14%	1	7	0.81	121.6	12.2	124.0	9.9	NT
	2	7	0.81	121.6	12.2	124.0	9.9	NT
	3	7	1.00	121.6	12.2	121.5	12.3	NT
	4	28	1.00	121.6	12.2	121.3	12.3	NT
	5	28	0.84	121.6	12.2	123.4	10.3	NT
	6	28	0.84	121.6	12.2	123.5	10.3	NT

Table 6: Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-518 LW-S-2/5								
14%	1	7	0.81	121.0	11.1	122.2	9.9	1050
	2	7	0.81	121.0	11.1	122.6	9.9	935
	3	7	0.82	121.0	11.1	122.2	10.1	1000
	4	28	0.82	121.0	11.1	121.9	10.1	NT
	5	28	0.81	121.0	11.1	122.2	9.9	NT
	6	28	0.81	121.0	11.1	122.0	9.9	NT
CP14-IRC44-TP-518 LW-C-5/11								
14%	1	7	0.77	126.2	10.3	127.0	9.5	NT
	2	7	0.77	126.2	10.3	127.3	9.5	NT
	3	7	1.08	126.2	10.3	122.6	13.3	NT
	4	28	1.08	126.2	10.3	122.6	13.3	NT
	5	28	0.81	126.2	10.3	126.4	9.9	NT
	6	28	0.81	126.2	10.3	126.5	9.9	NT
CP14-IRC44-TP-518 MdW-S-2/5								
14%	1	7	0.76	118.0	10.7	119.6	9.3	1110
	2	7	0.76	118.0	10.7	119.2	9.3	1150
	3	7	0.81	118.0	10.7	118.6	10.0	1190
	4	28	0.81	118.0	10.7	118.7	10.0	NT
	5	28	0.80	118.0	10.7	119.2	9.9	NT
	6	28	0.80	118.0	10.7	119.2	9.9	NT
CP14-IRC44-TP-518 MdW-C-5/11								
14%	1	7	0.76	123.6	10.4	124.1	9.3	1140
	2	7	0.76	123.6	10.4	124.1	9.3	1215
	3	7	0.78	123.6	10.4	123.8	9.6	1265
	4	28	0.78	123.6	10.4	124.4	9.6	NT
	5	28	0.77	123.6	10.4	124.3	9.5	NT
	6	28	0.77	123.6	10.4	124.6	9.5	NT

NT: Not tested as of date of report preparation.

Table 7: Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		PSI			Average*
		1	2	3	
TP-513	UW-S-2/5				
TP-513	LW-S-2/5	**945**	**1215**	**1410**	1190
TP-513	MdW-S-2/5	**1100**	**995**	**920**	1005
TP-513	UW-C-5/11				
TP-513	LW-C-5/11				
TP-513	MdW-C-5/11	**385**	**455**	**455**	432
TP-514	UW-S-2/5				
TP-514	LW-S-2/5	**720**	**1235**	**1115**	1023
TP-514	MdW-S-2/5	**860**	**925**	**870**	885
TP-514	UW-C-5/11				
TP-514	LW-C-5/11				
TP-514	MdW-C-5/11	**1135**	**1035**	**1155**	1108
TP-515	UW-S-2/5				
TP-515	LW-S-2/5	**1275**	**1333**	**1197**	1268
TP-515	MdW-S-2/5	**1020**	**930**	**925**	958
TP-515	UW-C-5/11				
TP-515	LW-C-5/11				
TP-515	MdW-C-5/11	**850**	**880**	**1000**	910
TP-516	UW-S-2/5				
TP-516	LW-S-2/5	**1165**	**1045**	**1110**	1107
TP-516	MdW-S-2/5	**940**	**970**	**1065**	992
TP-516	UW-C-5/11				
TP-516	LW-C-5/11				
TP-516	MdW-C-5/11				
TP-517	UW-S-2/5				
TP-517	LW-S-2/5	**940**	**1250**	**1210**	1133
TP-517	MdW-S-2/5	**975**	**805**	**965**	915
TP-517	UW-C-5/11				
TP-517	LW-C-5/11				
TP-517	MdW-C-5/11				
TP-518	UW-S-2/5				
TP-518	LW-S-2/5	**905**	**800**	**935**	880
TP-518	MdW-S-2/5	**1360**	**945**	**1355**	1220
TP-518	UW-C-5/11				
TP-518	LW-C-5/11				
TP-518	MdW-C-5/11				

*Testing still in progress.

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-513 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.77	126.1	10.00	126.5	9.3	NT	NT	--
		0.77	126.1	10.00	126.9	9.3	NT	NT	--
Freezing and Thawing	14	0.80	126.1	10.00	126.0	9.7	NT	NT	--
		0.80	126.1	10.00	126.5	9.7	NT	NT	--
CP14-IRC44-TP-513 UW-C-5/11									
Wetting and Drying	14	0.94	117.3	12.00	117.9	11.4	NT	NT	--
		0.94	117.3	12.00	118.0	11.4	NT	NT	--
Freezing and Thawing	14	0.97	117.3	12.00	117.6	11.8	NT	NT	--
		0.97	117.3	12.00	117.6	11.8	NT	NT	--
CP14-IRC44-TP-513 LW-S-2/5									
Wetting and Drying	14	0.66	127.7	8.60	128.7	8.0	130.8	0.0	--
		0.66	127.7	8.60	128.4	8.0	130.1	0.0	--
Freezing and Thawing	14	0.65	127.7	8.60	128.6	7.8	NT	NT	--
		0.65	127.7	8.60	128.9	7.8	NT	NT	--
CP14-IRC44-TP-513 LW-C-5/11									
Wetting and Drying	14	0.90	125.3	10.60	124.7	0.1	NT	NT	--
		0.90	125.3	10.60	124.6	0.1	NT	NT	--
Freezing and Thawing	14	0.95	125.3	10.00	124.2	0.1	NT	NT	--
		0.95	125.3	10.00	124.0	0.1	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-513 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.73	124.5	10.40	126.4	8.9	NT	NT	--
		0.73	124.5	10.40	126.4	8.9	NT	NT	--
Freezing and Thawing	14	0.73	124.5	10.40	127.3	8.9	NT	NT	--
		0.73	124.5	10.40	127.6	8.9	NT	NT	--
CP14-IRC44-TP-513 MdW-C-5/11									
Wetting and Drying	14	0.85	126.3	9.20	125.1	10.3	NT	NT	--
		0.85	126.3	9.20	124.8	10.3	NT	NT	--
Freezing and Thawing	14	0.82	126.3	9.20	125.2	10.0	NT	NT	--
		0.82	126.3	9.20	125.2	10.0	NT	NT	--
CP14-IRC44-TP-514 UW-S-2/5									
Wetting and Drying	14	0.84	121.1	11.80	123.0	10.1	NT	NT	--
		0.84	121.1	11.80	123.0	10.1	NT	NT	--
Freezing and Thawing	14	0.84	121.1	11.80	125.6	10.0	NT	NT	--
		0.84	121.1	11.80	126.1	10.0	NT	NT	--
CP14-IRC44-TP-514 UW-C-5/11									
Wetting and Drying	14	0.94	120.9	11.50	120.3	11.5	NT	NT	--
		0.94	120.9	11.50	120.8	11.5	NT	NT	--
Freezing and Thawing	14	0.92	120.9	11.50	120.9	11.3	NT	NT	--
		0.92	120.9	11.50	120.7	11.3	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-514 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.78	123.3	10.60	124.0	9.5	130.8	0.2	--
		0.78	123.3	10.60	124.0	9.5	130.1	0.2	--
Freezing and Thawing	14	0.76	123.3	10.60	124.2	9.3	NT	NT	--
		0.76	123.3	10.60	124.2	9.3	NT	NT	--
CP14-IRC44-TP-514 LW-C-5/11									
Wetting and Drying	14	0.94	120.9	11.50	120.3	11.5	NT	NT	--
		0.94	120.9	11.50	120.8	11.5	NT	NT	--
Freezing and Thawing	14	0.92	120.9	11.50	120.9	11.3	NT	NT	--
		0.92	120.9	11.50	120.7	11.3	NT	NT	--
CP14-IRC44-TP-514 MdW-S-2/5									
Wetting and Drying	14	0.75	123.9	8.90	123.2	9.0	NT	NT	--
		0.75	123.9	8.90	122.6	9.0	NT	NT	--
Freezing and Thawing	14	0.72	123.9	8.90	123.0	8.7	NT	NT	--
		0.72	123.9	8.90	123.0	8.7	NT	NT	--
CP14-IRC44-TP-514 MdW-C-5/11									
Wetting and Drying	14	0.74	125.1	9.40	122.0	9.1	NT	NT	--
		0.74	125.1	9.40	122.6	9.1	NT	NT	--
Freezing and Thawing	14	0.71	125.1	9.40	122.1	8.7	NT	NT	--
		0.71	125.1	9.40	122.4	8.7	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-515 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.77	123.1	10.40	123.8	9.3	NT	NT	--
		0.77	123.1	10.40	124.4	9.3	NT	NT	--
Freezing and Thawing	14	0.80	123.1	10.40	123.9	9.7	NT	NT	--
		0.80	123.1	10.40	123.9	9.7	NT	NT	--
CP14-IRC44-TP-515 UW-C-5/11									
Wetting and Drying	14	1.01	118.3	12.30	117.9	12.1	NT	NT	--
		1.01	118.3	12.30	118.0	12.1	NT	NT	--
Freezing and Thawing	14	0.96	118.3	12.30	119.1	11.6	NT	NT	--
		0.96	118.3	12.30	119.1	11.6	NT	NT	--
CP14-IRC44-TP-515 LW-S-2/5									
Wetting and Drying	14	0.77	123.8	10.10	124.5	9.3	130.8	NT	--
		0.77	123.8	10.10	124.4	9.3	130.1	NT	--
Freezing and Thawing	14	0.80	123.8	10.10	123.8	9.8	NT	NT	--
		0.80	123.8	10.10	124.2	9.8	NT	NT	--
CP14-IRC44-TP-515 LW-C-5/11									
Wetting and Drying	14	0.94	120.9	11.50	120.3	11.5	NT	NT	--
		0.94	120.9	11.50	120.8	11.5	NT	NT	--
Freezing and Thawing	14	0.92	120.9	11.50	120.9	11.3	NT	NT	--
		0.92	120.9	11.50	120.7	11.3	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-515 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.82	125.0	8.30	123.0	10.0	NT	NT	--
		0.82	125.0	8.30	123.0	10.0	NT	NT	--
Freezing and Thawing	14	0.83	125.0	8.30	122.8	10.2	NT	NT	--
		0.83	125.0	8.30	122.8	10.2	NT	NT	--
CP14-IRC44-TP-515 MdW-C-5/11									
Wetting and Drying	14	0.79	124.3	10.10	124.6	9.6	NT	NT	--
		0.79	124.3	10.10	124.6	9.6	NT	NT	--
Freezing and Thawing	14	0.84	124.3	10.10	124.1	10.3	NT	NT	--
		0.84	124.3	10.10	124.3	10.3	NT	NT	--
CP14-IRC44-TP-516 UW-S-2/5									
Wetting and Drying	14	0.79	122.0	10.20	122.7	9.6	NT	NT	--
		0.79	122.0	10.20	122.2	9.6	NT	NT	--
Freezing and Thawing	14	0.80	122.0	10.20	122.0	9.7	NT	NT	--
		0.80	122.0	10.20	122.6	9.7	NT	NT	--
CP14-IRC44-TP-516 UW-C-5/11									
Wetting and Drying	14	1.17	118.0	13.30	112.5	14.3	NT	NT	--
		1.17	118.0	13.30	112.5	14.3	NT	NT	--
Freezing and Thawing	14	1.17	118.0	13.30	112.5	14.4	NT	NT	--
		1.17	118.0	13.30	111.9	14.4	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-516 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.91	121.5	10.10	120.9	11.0	130.8	0.0	--
		0.91	121.5	10.10	120.9	11.0	130.1	0.0	--
Freezing and Thawing	14	0.87	121.5	10.10	120.2	10.6	NT	NT	--
		0.87	121.5	10.10	120.0	10.6	NT	NT	--
CP14-IRC44-TP-516 LW-C-5/11									
Wetting and Drying	14	1.03	121.8	11.70	120.6	12.6	NT	NT	--
		1.03	121.8	11.70	120.5	12.6	NT	NT	--
Freezing and Thawing	14	1.01	121.8	11.70	120.4	12.4	NT	NT	--
		1.01	121.8	11.70	120.6	12.4	NT	NT	--
CP14-IRC44-TP-516 MdW-S-2/5									
Wetting and Drying	14	0.78	122.4	10.20	123.2	9.6	NT	NT	--
		0.78	122.4	10.20	122.9	9.6	NT	NT	--
Freezing and Thawing	14	0.74	122.4	10.20	123.7	9.2	NT	NT	--
		0.74	122.4	10.20	123.9	9.2	NT	NT	--
CP14-IRC44-TP-516 MdW-C-5/11									
Wetting and Drying	14	0.70	122.0	10.30	124.1	8.5	NT	NT	--
		0.70	122.0	10.30	123.9	8.5	NT	NT	--
Freezing and Thawing	14	0.70	122.0	10.30	124.5	8.5	NT	NT	--
		0.70	122.0	10.30	124.0	8.5	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-517 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.83	120.2	11.40	121.5	10.0	NT	NT	--
		0.83	120.2	11.40	121.5	10.0	NT	NT	--
Freezing and Thawing	14	0.84	120.2	11.40	121.6	10.1	NT	NT	--
		0.84	120.2	11.40	121.6	10.1	NT	NT	--
CP14-IRC44-TP -517 UW-C-5/11									
Not Tested as of date of report preparation.									
CP14-IRC44-TP-517 LW-S-2/5									
Wetting and Drying	14	0.78	122.7	10.40	123.3	9.5	130.8	0.0	--
		0.78	122.7	10.40	123.2	9.5	130.1	0.0	--
Freezing and Thawing	14	0.76	122.7	10.40	123.7	9.3	NT	NT	--
		0.76	122.7	10.40	123.7	9.3	NT	NT	--
CP14-IRC44-TP-517 LW-C-5/11									
Wetting and Drying	14	0.78	122.6	9.50	121.8	10.0	NT	NT	--
		0.78	122.6	9.50	121.6	10.0	NT	NT	--
Freezing and Thawing	14	0.82	122.6	9.50	122.1	9.6	NT	NT	--
		0.82	122.6	9.50	122.1	9.6	NT	NT	--

*

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-517 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.76	122.2	10.20	123.5	9.4	NT	NT	--
		0.76	122.2	10.20	123.0	9.4	NT	NT	--
Freezing and Thawing	14	0.75	122.2	10.20	123.4	9.3	NT	NT	--
		0.75	122.2	10.20	123.5	9.3	NT	NT	--
CP14-IRC44-TP-517 MdW-C-5/11									
Wetting and Drying	14	0.72	123.3	9.10	123.1	8.8	NT	NT	--
		0.72	123.3	9.10	123.1	8.8	NT	NT	--
Freezing and Thawing	14	0.71	123.3	9.10	123.8	8.7	NT	NT	--
		0.71	123.3	9.10	123.8	8.7	NT	NT	--
CP14-IRC44-TP-518 UW-S-2/5									
Wetting and Drying	14	0.80	116.5	12.60	119.5	9.5	NT	NT	--
		0.80	116.5	12.60	119.8	9.5	NT	NT	--
Freezing and Thawing	14	0.79	116.5	12.60	119.9	9.3	NT	NT	--
		0.79	116.5	12.60	119.4	9.3	NT	NT	--
CP14-IRC44-TP-518 UW-C-5/11									
Wetting and Drying	14	1.15	121.6	12.20	119.3	13.9	NT	NT	--
		1.18	121.6	12.20	119.3	14.2	NT	NT	--
Freezing and Thawing	14	0.95	121.6	12.20	122.2	11.5	NT	NT	--
		0.95	121.6	12.20	122.3	11.5	NT	NT	--

Table 8: Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-518 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.86	121.0	11.10	121.2	10.5	130.8	0.0	--
		0.86	121.0	11.10	121.7	10.5	130.1	0.0	--
Freezing and Thawing	14	0.84	121.0	11.10	121.5	10.2	NT	NT	--
		0.84	121.0	11.10	121.9	10.2	NT	NT	--
CP14-IRC44-TP-518 LW-C-5/11									
Wetting and Drying	14	0.85	126.2	10.30	126.9	9.6	NT	NT	--
		0.85	126.2	10.30	127.0	9.6	NT	NT	--
Freezing and Thawing	14	0.79	126.2	10.30	125.6	10.3	NT	NT	--
		0.79	126.2	10.30	125.6	10.3	NT	NT	--
CP14-IRC44-TP-518 MdW-S-2/5									
Wetting and Drying	14	0.80	118.0	10.70	119.2	10.0	NT	NT	--
		0.80	118.0	10.70	119.2	10.0	NT	NT	--
Freezing and Thawing	14	0.82	118.0	10.70	118.7	10.2	NT	NT	--
		0.82	118.0	10.70	118.9	10.2	NT	NT	--
CP14-IRC44-TP-518 MdW-C-5/11									
Wetting and Drying	14	0.79	123.6	10.40	124.8	9.3	NT	NT	--
		0.79	123.6	10.40	125.1	9.3	NT	NT	--
Freezing and Thawing	14	0.77	123.6	10.40	124.2	9.6	NT	NT	--
		0.77	123.6	10.40	124.5	9.6	NT	NT	--

NT: Not tested as of date of report preparation.

8.0 SUBSURFACE CONDITIONS

The Test-Pit Logs in Appendix C should be consulted for a detailed description of the subsurface conditions encountered at test pit location. When reviewing the logs, it should be understood that the soil conditions may vary between and away from the test pit locations.

In general, subsurface profile consisted of fine-grained sands and sands with silt and clay underlain by alternating layers of cohesive soils and sands. The groundwater level was measured at the time of the excavation of the test pit. The groundwater levels varied between 8.5 and 10 feet below existing ground surface (elevation of approximately +16.6 to +18.7 feet, NAVD88). Table 9 below summarizes general information relative to the groundwater levels (depth and elevations) measured during our field exploration.

Table 9: Summary of Generalized Groundwater

Test Pit Location	Ground Surface Elevation, NAVD88 (feet)	Approx. Groundwater Depth (feet)[A]	Approx. Groundwater Elevation, NAVD88 (feet)[A]
CP14-IRC44-TP-513	+26.2	8.5	+17.7
CP14-IRC44-TP-514[B]	+24.3	NE	NE
CP14-IRC44-TP-514A[B]	+26.8	NE	NE
CP14-IRC44-TP-515	+26.5	9.0	+17.5
CP14-IRC44-TP-516[B]	+26.5	NE	NE
CP14-IRC44-TP-517	+26.7	8.0	+18.7
CP14-IRC44-TP-518	+26.6	10.0	+16.6

[A] Groundwater elevation referenced at the time of excavation.
[B] NE = Groundwater level not encountered during test pit excavation

9.0 GEOTECHNICAL COMMENTARY

The purpose of this study was to provide geotechnical data which will be used by others to evaluate the subsurface conditions in support of the overall engineering effort for the site improvements at C-44 Reservoir and Stormwater Treatment Area. The details of the engineering design are not known to us at this time.

In summary, the upper zones of the profile were relatively uniform in nature. The near-surface soils consisted of fine-grained quartz sand and fine-grained quartz sand with silt (Unified Soil Classification Symbols SP and SP-SM). This material was encountered at the ground surface and extended to a depth of 2 feet below the site grade. These soils were generally brown and pale orange-yellow in color. Varying degrees of limestone was encountered at about 1 foot below existing grade. Below the surficial soils, fine-grained quartz sand and fine-grained quartz sand with silt and clay (Unified Soil Classification Symbols SP, SP-SM, SW-SM, and SW-SC) were generally encountered to the maximum excavated depth of 12 feet. These soils were generally light brown, light gray, and pale orange-yellow in color. Varying degrees limestone and shell content were encountered throughout this zone. Test Pits CP14-IRC44-TP-515, CP14-IRC44-TP-516 and CP14-IRC44-TP-518 encountered a zone of cohesive soils consisting of pale orange-yellow, light brownish gray, and light gray clayey fine sand (SC) with varying degrees of limestone and shell content in the depth range of 5 to 11 feet below the existing site grade.

10.0 EXPLORATION LIMITATIONS

In accordance with the Scope of Work for Contract No. W912EP-11-D-0002, AMEC was requested to perform a total of 6 test pits designated as CP14-IRC44-TP-513 through CP14-IRC44-TP-518.

Test pit CP14-IRC44-TP-514 was terminated at the direction of the USACE's TPOC at depth of approximately 7 feet below the existing site grade due to proximity to built-up roadway, canal excavation, and irrigation pipe. The USACE's TPOC provided approval on December 9, 2014, to relocate and perform Test Pit CP14-IRC44-TP-514A approximately 300 feet to the east.

APPENDIX A

FIELD AND LABORATORY PROCEDURES

Field Procedures

Test Pits - Test pits were excavated by means of a tractor-mounted backhoe. The subsurface conditions were recorded by a geotechnical engineer as they were encountered. Samples were obtained of representative materials for laboratory testing.

Laboratory Procedures

Atterberg Limits (Plasticity) - A soil's Plasticity Index (PI) is the numerical difference between the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in general accordance with ASTM D 4318. The PL is the moisture content at which the soil begins to crumble when rolled into a small thread and is also determined in general accordance with ASTM D 4318.

The Liquidity Index (I_L) was computed from the above test data. The (I_L) is an expression which compares the relative natural moisture state of the soil with its liquid and plastic limits and is an indicator of various other physical properties such as strength and preconsolidation characteristics.

Grain Size Distribution/Hydrometer - The grain size distribution tests were performed to determine the particle sizes and distribution of each sample tested. The sample was dried, weighed, and washed over a No. 200 mesh sieve. The dried sample was then passed through a standard set of nested sieves to determine the grain size distribution of the soil particles coarser than the No. 200 sieve. In some instances, materials passing the No. 10 mesh sieve were suspended in water in a hydrometer test cylinder and the grain size distribution was measured by the rate of settlement of the soil particles. The purpose of the hydrometer tests was to determine the grain size distribution of the soil particles finer than the No. 200 mesh sieve. This test is similar to that described by ASTM D 422.

Specific Gravity - The specific gravity of soil solids is the ratio of the weight in air of a given volume of soil particles to the weight in air of an equal volume of water. This test was conducted in general accordance with ASTM D 854.

Visual Percent Shell – The visual percent shell is a weighted average of the estimated percent shell retained on each individual sieve for a single sample and rounded to the nearest five percent for tests

conducted in conjunction with a sieve analysis. For stand-alone estimates, the visual percent shell is a visual estimate of the shell content present in the sample, rounded to the nearest 5 percent.

Carbonate Testing – This test is conducted in accordance with a modified "insoluble residue" analysis using the 1941 method described by Twenhofel Tyler. The sample is oven dried to a constant weight and then washed over a No. 200 sieve. After drying to a constant weight, the sand-sized or greater portion of the sample is sieved (if requested) and visual shell noted (if requested). The sample is then placed in a glass beaker and a diluted hydrochloric acid solution is slowly added. The sample is stirred and more acid solution added until there is no reaction, indicating that all carbonate matter has been digested. After digestion, the sample is washed over a #200 sieve to remove all residual acid, and dried to a constant weight. The percent loss (percent carbonate) is determined by subtracting the post acid weight from the dried, washed weight (after sieving), divided by the dried, washed weight. This test was conducted in general accordance with ASTM D 4373.

Organic Content (Organic Loss on Ignition) - The amount of organic material in a sample is determined in this test. The sample is first dried and weighed, then ignited and reweighed. The amount of organic material is expressed as a percentage of the total dry weight of the sample prior to ignition. This test was conducted in general accordance with ASTM D 2974.

pH - The pH is an expression of the concentration of dissociated hydrogen ions present in aqueous solution. pH values range from 1 to 14 with values below 7 indicating acidic conditions and values above 7 indicating alkaline conditions. This test is performed using a calibrated electronic pH meter with a sensing probe. The meter is calibrated by immersing the probe in a solution with a known pH. The soil pH is determined by mixing equal weights of soil and distilled water and testing the supernatent solution with the pH probe. These tests were performed in general accordance with EPA SW-846 9045C.

Sand Cleanliness Test - Refer to Appendix H of the SOW.

Sand Equivalent Test – The sand equivalent tests were performed to determine the relative proportion of gravel soils present in each sample tested. These tests were performed in general accordance with ASTM D2419.

Moisture Density of Soil Cement Mixture - The moisture density tests were performed in general accordance with ASTM D-558, test method B except the material retained on the ¾" sieve was discarded and not included in the test procedure. The soil obtained from the test pit was air dried and sieved into two groups, material retained on the #4 sieve and material passing the #4 sieve, recording the percentages of each fraction. The plus #4 material (if present) was moistened to a saturated surface dry condition and sealed. The minus #4 fraction was moistened at the desired moisture points and allowed to soak overnight. The plus #4 and -#4 materials were then recombined by percentage and the desired amount of Type I Portland cement added to each point. The combined material was then compacted using a standard compactive effort and weighed. A moisture sample was obtained from the mixture and oven dried to a constant weight. After drying, the wet density and dry density of the compacted samples were determined.

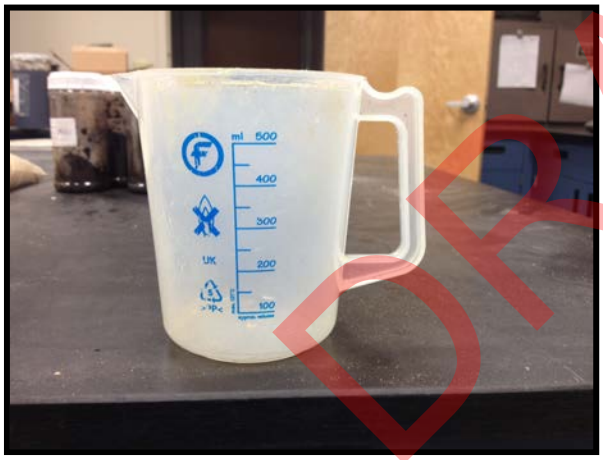
Compressive Strength for Soil Cement - The test sample was prepared using material sieved and prepared in the moisture density test. The compressive strength test samples were tested in general accordance with ASTM D-1633, method A. The remolded sample was compacted to 95% of the standard compactive effort. The samples were molded and allowed to cure 7 days in our moist curing room which is maintained at 100% humidity and 73 degrees Fahrenheit. After the seven day curing period, the samples were removed from the moist curing room and submerged in water for a period of 4 hours. After the four hour soak, the samples were removed one at a time, the diameter measured and recorded and the end condition checked and ground if necessary, and placed in our compression test machine. A compressive load was applied at an approximate loading rate of 20 psi per second to each until failure occurred.

Wetting and Drying for Soil Cement – These tests were performed to determine the soil-cement losses, water content changes, and volume changes due to cyclical wetting and drying of hardened soil-cement specimens. These tests were performed in general accordance with ASTM D559 (Method B). We note that before hydration of the soil-cement specimens commenced, preparation of the soil samples to determine the maximum density and optimum water contents were performed in accordance with ASTM D558 (Method B).

Freezing and Thawing for Soil Cement – These tests were performed to determine the soil-cement losses, water content changes, and volume changes due to cyclical freezing and thawing of hardened soil-cement specimens. These tests were performed in general accordance with ASTM D560 (Method B). We note that before hydration of the soil-cement specimens commenced, preparation of the soil samples to determine the maximum density and optimum water contents were performed in accordance with ASTM D558 (Method B).

EQUIPMENT NEEDED

3 Cubic Ft. Cement Mixer



500mL Measuring Cup

5-Gallon Bucket. Mark a "Fill Line" on the bucket to approximate the same volume of wash water to be used during each wash cycle

EQUIPMENT NEEDED, cont'd.

Composite Sample – previously mixed per specifications

Spigot and Hose (on-site well water source)

PILOT WASHING

1. Soil sample and water preparation (began pilot washing with test soil samples from TP-516, 9' to 11')

Place approximately 50 percent of previously mixed soil sample into cement mixer.

Fill 5-gallon bucket ½ to ¾ full with well water from on-site source. Pour well water into cement mixer. This quantity of water should just cover the soil sample in the mixer.

2. Sample Washing & Water Decanting

Set drum at a 45 degree angle to ensure material is not lost during the mixing process. Initiate washing and continue to mix until sample is saturated and in suspension, not adhering to bottom of drum. At this juncture, rotate drum 10 revolutions, then stop the mixer.

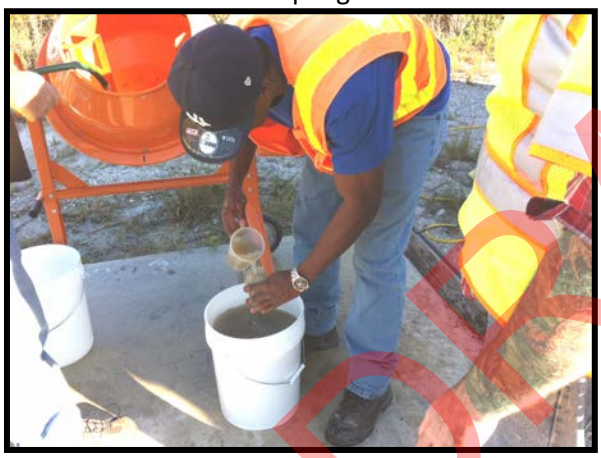
Decant wash water from mixer into clean (rinsed) 5-gallon collection bucket.

- Introduce additional well water into the mixer, enough to ensure the previously decanted wash sample is just covered. Rotate mixer for 10 revolutions. Decant wash. Repeat water addition, sample washing and water decanting until the wash water visually appears to contain less than 10 percent of the initial fines (translucent) in suspension.

  Note: After 70 revolutions, clay nodules will need to be manually agitated (broken apart). Perform manual agitation inside the drum. Upon completion of manual agitation, rotate drum for 10 more revolutions. Decant wash waster.

Manually break apart clay nodules. Wash sample is still in suspension and manual agitation is complete. Rotate drum for 10 more revolutions.

3. Decanted Water Sampling



Sample the decanted wash water with a 500mL measuring cup and pour into a glass sample jar. Seal jar with a lid. Label jars and lids.

4. Decanted Water Storage

Record test pit designation, wash cycle number, and revolution number on jars and lids. Set jars aside. (Note: Revolutions are to be recorded on lids as R-#, with number designation representing cumulative revolutions).

5. Procedural Changes to TP-516 (9’ to 11’)
    - It was determined that the same volume of wash water should be used with each wash cycle. A “Fill Line” was marked on a 5-gallon bucket to approximate ¾-volume of the bucket.
    - Clay nodules were manually agitated after 20 revolutions. When manual agitation was complete, the drum was rotated 10 more revolutions.
    - The procedural changes were utilized on test soil samples obtained from TP-517 (5’ to 7’).

6. Pilot Wash Findings
    - Manual breaking/agitation of the clay nodules expedited the removal of the fines.
    - After 10 revolutions, 25 percent of the fines (from the parent test sample) appear to have been removed during washing.
    - After 20 revolutions, 50 percent of the fines appear to have been removed during washing.
    - The production wash procedure for Light-Wash and Medium-Wash operations was fine tuned. Refer to Light-Wash Operations and Medium-Wash Operations for details.

LIGHT-WASH OPERATIONS

STEP 1: Place 2.5 gallons of soil sample into cement mixer (equivalent to half of a 5-gallon bucket's worth of soil).

STEP 2: Fill the pre-marked, 5-gallon water bucket with well water. Pour water into cement mixer.

STEP 3: Set drum at a 45 degree angle to ensure material is not lost during the mixing process.

STEP 4: Initiate washing and continue to mix until sample is saturated and in suspension, not adhering to bottom of drum. At this point, rotate drum for 5 revolutions then stop the mixer.

STEP 5: Manually agitate clay nodules.
STEP 6: Mechanically mix for 5 additional revolutions.

STEP 7: Decant wash water from mixer into a collection bucket, then set aside. This water will be collected later (refer to procedure for Water Sampling).

STEP 8: Place washed soil sample into a clean, labeled 5-gallon bucket.

STEP 9: Repeat sample washing, wash water decanting, and soil sample collection cycle for remaining soil sample in bucket. When 5-gallon bucket is full of the washed soil sample, decant the free water. This decanted water does not need to be collected. Place lid on bucket and set aside.

MEDIUM-WASH OPERATIONS

Follow Steps 1 through 7 from Light-Wash Operations. After decanting (Step 7), introduce additional well water into the mixer just enough to cover the wash sample. Rotate mixer 10 revolutions (at this juncture, a total of 20 revolutions have occurred). Repeat Steps 7 through 9 from Light-Wash Operations.

WATER SAMPLING

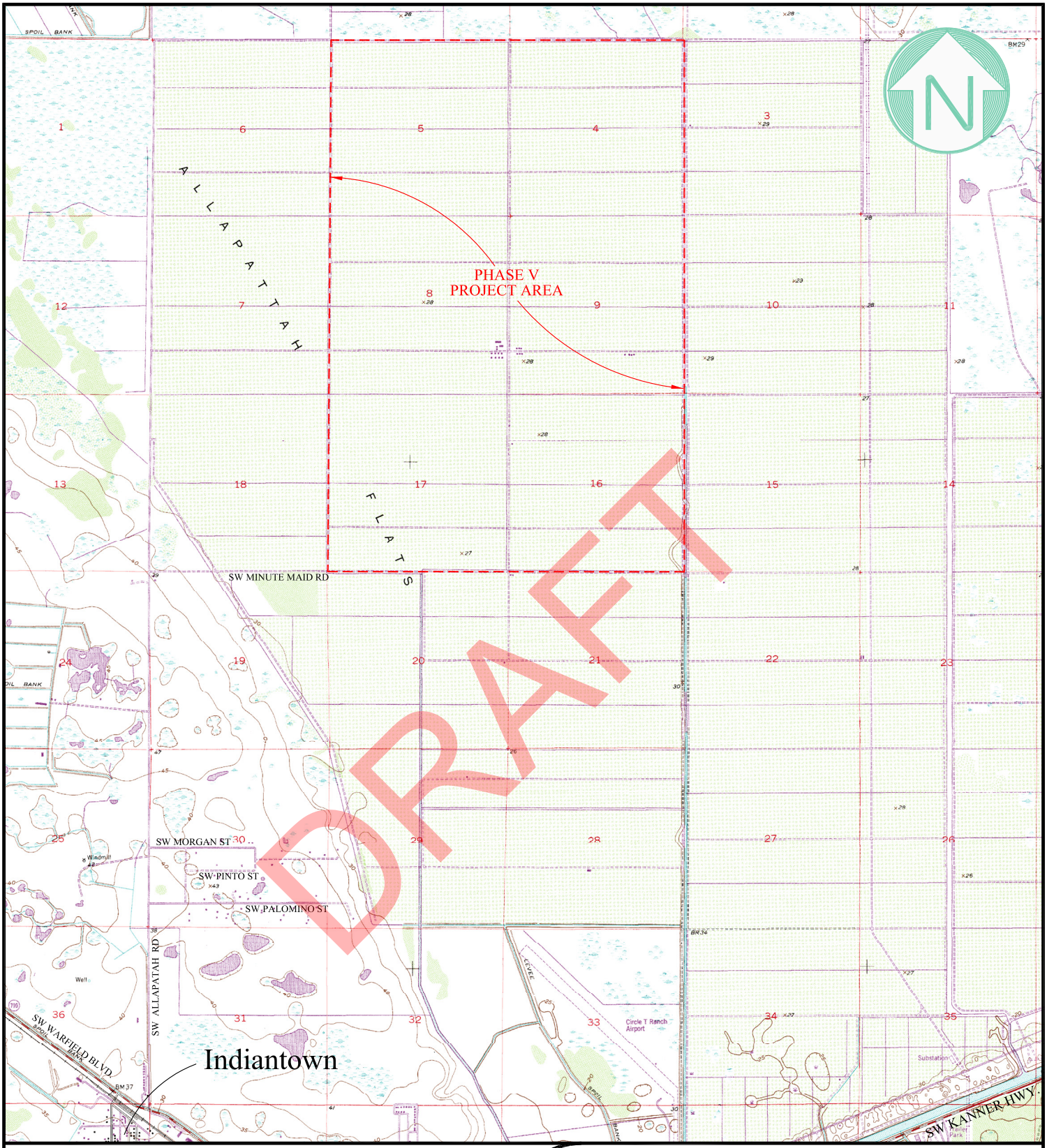
- Light Wash: Collect 200mL of decanted wash water after every 10 revolutions, for each wash sample (2 wash samples per 5-gallon bucket of soil sample).
- Medium Wash: Collect 100mL of decanted wash water after every 10 revolutions from each wash cycle (4 wash samples per 5-gallon bucket of soil sample).

Collect decanted wash water from collection bucket using a 500mL measuring cup.

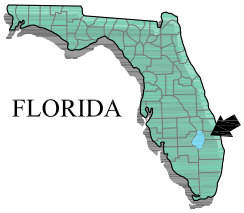
Pour collected decanted wash water into a labeled glass jar. Place lid on jar. Label jar and lid.

The collected decanted wash water will be shipped off for subsequent laboratory testing (to be performed by others).

APPENDIX B



REFERENCE: TOPOGRAPHIC MAP
INDIANTOWN QUADRANGLE; FLORIDA
DATED: 1953; PHOTOREVISED: 1983
U.S. GEOLOGICAL SURVEY



QUADRANGLE LOCATION

0 2000' 4000'

GRAPHIC SCALE
(APPROXIMATE)

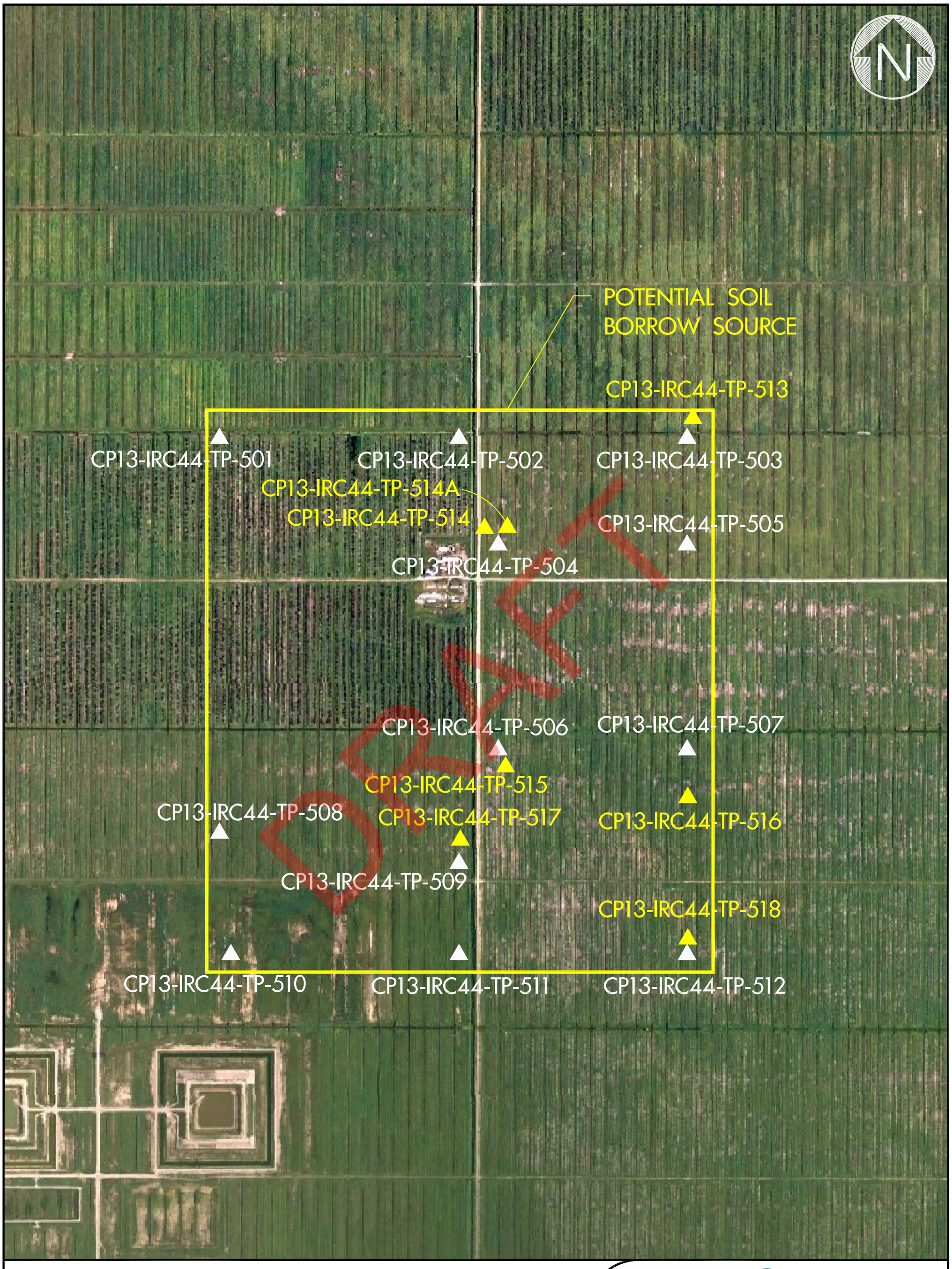
amec

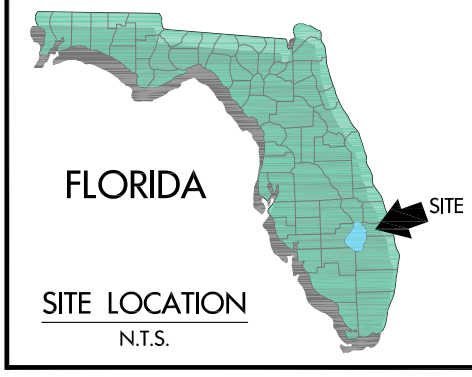
3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

SITE LOCATION MAP

C-44 Reservoir and Stormwater Treatment Area - Phase V
Martin County, Florida
Contract No. W912EP-11-D-0002

DRAWN: JP	DATE: 2/2/15	SCALE: 1"=4000'
CHECKED:	PROJ. NO. 6734-14-9799	APPROX.





SITE LOCATION
N.T.S.

LEGEND

TEST PIT LOCATION

0 400' 800'
GRAPHIC SCALE
(APPROXIMATE)

REFERENCE: Aerial Photograph
USDA Farm Service Agency
Dated: 2007

amec
3901 CARMICHAEL AVENUE
JACKSONVILLE, FL 32207
(904) 396-5173

FIELD EXPLORATION PLAN
C-44 Reservoir and Stormwater Treatment Area - Phase V
Martin County, Florida
Contract No. W912EP-11-D-0002

DRAWN: JP	DATE: 2/2/15	SCALE: 1"=800'
CHECKED:	PROJ. NO. 6734-14-9799	APPROX.

SURVEYOR'S REPORT for SPECIFIC PURPOSE SURVEY

C-44 Reservoir and Stormwater Treatment Area (C-44 RSTA Contract 2)
Geotechnical Investigation- Phase V Additional Soil Cement Testing at Borrow Pit Source
Martin County, FL
Contract No. W912EP-11-D-0002, Task 0114
AMEC Project No. 6734-14-9799

Location

The project site is located in north central Martin County and due north of the C-44 Canal at the intersection of SR 76 and SR 710, just northeast of Indiantown, Florida. The project site is planned as a 3400 acre reservoir and stormwater treatment area.

Purpose

The survey was performed to determine the horizontal locations and elevations of seven (7) test pits installed as part of the geotechnical investigation.

Project Datums

The horizontal locations of the test pits were determined relative to the North American Datum of 1983 (NAD83) and were expressed in U.S. Survey Feet as Florida State Plane Coordinates (FSPC), Florida East Zone 901.

The ground elevations of these locations were determined relative to the North American Vertical Datum of 1988 (NAVD88) and expressed in feet.

Survey Methodologies

The survey was performed utilizing Global Positioning System (GPS) technology operating in Real Time Kinematic (RTK) mode.

Control - National Spatial Reference System (NSRS) control stations with designations F007 and F008 located in the vicinity of the work were recovered. Prior to beginning the site survey GPS RTK measurements relative to these NSRS respective stations indicated acceptable correlation for horizontal position and elevation.

Using a Trimble Model R8 GPS rover unit operating in RTK mode with the Trimble Virtual Reference System (VRS Now) network, the NAVD88 elevations and NAD83 geographic positions (expressed as FSPC) were determined for the approximate center of each of the test pits, as pointed out by the site geotechnical engineer, by occupying each location for a 1- minute measurement. This was followed by a redundant measurement at each test pit site. Following the measurements at the test pit sites another measurement was made to control station F008 to confirm system measurement integrity.

AMEC Environment and Infrastructure, Inc.
75 East Amelia Street, Suite 200
Orlando, FL 32801
407-522-7570
407-522-7576 (fax)

Summary of Survey Data

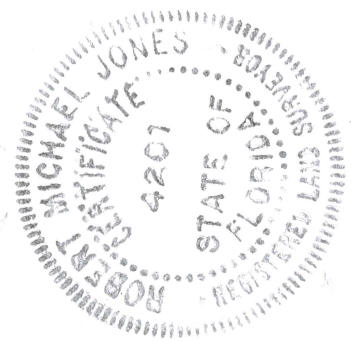
	NAD83/11 FSPC (USFt.)		NAVD88 (Ft.)	
Designation	Northing	Easting	Elevation	Description
CP14-IRC44-TP-513	1004733	837282	26.2	TEST PIT
CP14-IRC44-TP-514	1003765	835426	24.3	TEST PIT
CP14-IRC44-TP-514A	1003776	835628	26.8	TEST PIT
CP14-IRC44-TP-515	1001649	835607	26.5	TEST PIT
CP14-IRC44-TP-516	1001372	837233	26.5	TEST PIT
CP14-IRC44-TP-517	1000988	835210	26.7	TEST PIT
CP14-IRC44-TP-518	1000116	837236	26.6	TEST PIT

Surveyor's Notes

1. This Surveyor's Report for Specific Purpose Survey is not valid without the signature and original embossed seal of the Florida licensed surveyor and mapper in responsible charge.
2. This survey was performed on December 12, 2014.
3. This work was performed for the sole benefit of the U.S. Army Corps of Engineers.
4. Field notes for this survey can be found in Field Book No. 1269.
5. The following NSRS geodetic control stations with published values are listed below

Station Designation	FSPC, FL East Zone 901		Elevation, NAVD88 (feet)
	Northing NAD83 (US Survey feet)	Easting NAD83 (US Survey feet)	
F007	983,118.06	824,655.74	38.23
F008	1,012,642.97	824,675.55	28.59

For the Firm,
AMEC Environment and Infrastructure, Inc.



Robert Michael Jones, PLS
Florida Licensed Surveyor and Mapper No. LS004201
AMEC Environment and Infrastructure, Inc., LB 0007932
75 East Amelia Street, Suite 200
Orlando, Florida 32801
407-522-7570 407-522-7576 (fax)

Summary of Classification Testing

Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-513	UW-S-2/5	2	5.0	SW-SM	16	16	0	2.0	2.72	33.5	52	10.7	5.9	4.8	11.07	0	8.6
CP14-IRC44-TP-513	LW-S-2/5	2.0	5.0	SP-SM	NP	NP	NP	0.3	2.62	31.7	56.1	6.9	3.6	3.3	34.94	0	8.2
CP14-IRC44-TP-513	MdW-S-2/5	2.0	5.0	SP	NP	NP	NP	0.2	2.67	17.7	71.7	3.5	1.7	1.8	10.42	0	8.5
CP14-IRC44-TP-513	UW-C-5/11	5.0	11.0	SW-SC	26	17	9	3.2	2.7	21.0	57.7	11.9	2.2	9.7	9.33	0	8.6
CP14-IRC44-TP-513	LW-C-5/11	5.0	11.0	SP	NP	NP	NP	0.7	2.76	17.4	76.4	3.8	3	0.8	11.2	0.1	9.4
CP14-IRC44-TP-513	MdW-C-5/11	5.0	11.0	SP	NP	NP	NP	0.3	2.69	19.6	77.3	1.8	0.5	1.3	5.05	0.2	8.4
CP14-IRC44-TP-513	UW-R-5/7	5.0	7.0	SP-SC	24	17	7	1.4	2.76	27.4	58.1	9.3	3.1	6.2	5.8	0	8.4
CP14-IRC44-TP-513	UW-R-9/11	9.0	11.0	SP-SC	25	17	8	0.3	2.78	23.9	58.4	9.6	2.5	7.1	15.39	0.2	8.8
CP14-IRC44-TP-514A	UW-S-2/5	2.0	5.0	SP-SM	20	18	2	2	2.68	5.5	83.2	11.3	3.4	7.9	4.91	1	8.7
CP14-IRC44-TP-514A	LW-S-2/5	2.0	5.0	SP-SM	0	0	0	0.6	2.75	22.8	71.9	3.3	0.9	2.4	5.3	0.5	9.2
CP14-IRC44-TP-514A	MdW-S-2/5	2.0	5.0	SP	0	0	0	0	2.64	17.7	79.9	2.4	0.6	1.8	4.44	2	8.4
CP14-IRC44-TP-514A	UW-C-5/11	5.0	11.0	SW-SM	20	18	2	1.6	2.71	16.6	72.3	10.8	3.1	7.7	11.75	41.5	8.9
CP14-IRC44-TP-514A	LW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.2	2.44	0.1	93.9	6.0	5.7	0.3	6.64	0.4	8.8
CP14-IRC44-TP-514A	MdW-C-5/11	5.0	11.0	SP	0	0	0	0.3	2.61	18.4	73.1	1.5	1.5	0	10.77	3.4	9.6
CP14-IRC44-TP-514A	UW-R-5/7	5.0	7.0	SP-SM	21	18	3	0.3	2.65	37	54.6	6	1.8	4.2	12.17	2	8.9
CP14-IRC44-TP-514A	UW-R-9/11	9.0	11.0	SP-SC	23	17	6	2.2	2.67	28.5	61.4	10.1	2.6	7.5	24	24	8.8
CP14-IRC44-TP-515	UW-S-2/5	2.0	5.0	SP-SC	20	15	5	2.2	2.68	22.2	67.4	8	1.6	6.4	7.64	0	9.2
CP14-IRC44-TP-515	LW-S-2/5	2.0	5.0	SP	0	0	0	1.5	2.54	25.5	70.4	3.4	2.8	0.6	8.1	0	8.1
CP14-IRC44-TP-515	MdW-S-2/5	2.0	5.0	SP	0	0	0	0.3	2.62	0	97.5	2.5	1.7	0.8	7.46	0.4	8.4
CP14-IRC44-TP-515	UW-C-5/11	5.0	11.0	SC	24	12	12	3	2.69	7.4	76.7	14.6	2.2	12.4	8.95	0.1	8.6
CP14-IRC44-TP-515	LW-C-5/11	5.0	11.0	SP	0	0	0	0.7	2.75	16.4	74.6	4.2	2.6	1.6	13.6	0.5	8.8
CP14-IRC44-TP-515	MdW-C-5/11	5.0	11.0	SP	0	0	0	0.5	2.66	20.6	75.6	2.6	1.7	0.9	7.04	0.3	9.5
CP14-IRC44-TP-515	UW-R-5/7	5.0	7.0	SC	28	15	13	1.5	2.63	11.7	68.4	19.9	6.5	13.4	14.21	0	8.6
CP14-IRC44-TP-515	UW-R-9/11	9.0	11.0	SW-SM	0	0	0	1.2	2.67	5.6	84.1	10	0.6	9.4	1.95	0	8.5

Summary of Classification Testing

Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-516	UW-S-2/5	2.0	5.0	SP-SC	24	16	8	2.2	2.33	14.7	67.1	9.5	0.9	8.6	4.08	0	8.6
CP14-IRC44-TP-516	LW-S-2/5	2.0	5.0	SP	0	0	0	0.6	2.65	6.7	82.8	3	2	1	3.63	0.2	8.6
CP14-IRC44-TP-516	MdW-S-2/5	2.0	5.0	SP	0	0	0	18	2.74	23	68.2	1.6	1	0.6	3.48	0.1	9.6
CP14-IRC44-TP-516	UW-C-5/11	5.0	11.0	SC	26	18	8	3.8	2.7	3.9	77.2	18.9	4.1	14.7	7.61	0.4	8.6
CP14-IRC44-TP-516	LW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.1	2.69	13.5	81.4	5.1	1	4.1	3.83	5.3	9.0
CP14-IRC44-TP-516	MdW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.2	2.99	10.7	82	6.5	0.5	6	3.72	0.5	8.6
CP14-IRC44-TP-516	UW-R-5/7	5.0	7.0	SC	36	15	21	2.4	2.59	14.8	64.6	19.7	3.7	16	4.9	0	8.6
CP14-IRC44-TP-516	UW-R-9/11	9.0	11.0	SM	25	18	7	1.7	2.7	3.6	77.1	19.3	3.6	15.7	3.17	0.1	8.5
CP14-IRC44-TP-517	UW-S-2/5	2.0	5.0	SW-SM	0	0	0	1.4	2.48	8.3	79.6	11.1	2.6	8.5	7.47	0	8.8
CP14-IRC44-TP-517	LW-S-2/5	2.0	5.0	SP	0	0	0	0.7	2.72	22.2	70.7	3.6	1.7	1.9	9.31	0	8.6
CP14-IRC44-TP-517	MdW-S-2/5	2.0	5.0	SP	0	0	0	0.4	2.61	17.0	80.6	2.4	2.1	0.3	6.06	0	8.5
CP14-IRC44-TP-517	UW-C 5/11	5.0	11.0	SP-SM	0	0	0	1.1	2.67	6.5	84.3	9.2	3.3	5.9	7.23	0.6	8.8
CP14-IRC44-TP-517	LW-C 5/11	5.0	11.0	SP	0	0	0	1.7	2.68	14.2	82.6	3.2	1.5	1.7	5.91	1.4	9.4
CP14-IRC44-TP-517	MdW-C 5/11	5.0	11.0	SP	0	0	0	0.4	2.66	24.9	72.8	2.3	1.3	1	7.74	0.5	8.4
CP14-IRC44-TP-517	UW-R-5/7	5.0	7.0	SP-SM	0	0	0	0.6	2.67	6.0	83.7	10.3	3.5	6.8	10.91	0	8.9
CP14-IRC44-TP-517	UW-R 9/11	9.0	11.0	SW-SM	0	0	0	0.5	2.67	3.1	86.7	10.2	3.6	6.6	8.77	0.3	8.9
CP14-IRC44-TP-518	UW-S-2/5	2.0	5.0	SP-SM	0	0	0	1.7	2.66	0	90.3	9.7	2.7	7	1.48	0	8.2
CP14-IRC44-TP-518	LW-S-2/5	2.0	5.0	SP-SM	0	0	0	1.4	2.79	0	92.4	7.6	4.3	3.3	3.68	0	8.9
CP14-IRC44-TP-518	MdW-S-2/5	2.0	5.0	SP	0	0	0	0	2.67	0	96.7	3.3	1.1	2.2	0.45	0	9.1
CP14-IRC44-TP-518	UW-C 5/11	5.0	11.0	SC	22	14	8	2.5	2.72	12.3	70.3	14.8	5.1	9.7	12.15	1	8.6
CP14-IRC44-TP-518	LW-C 5/11	5.0	11.0	SP-SM	0	0	0	0.6	2.64	14.2	78.7	6.2	1.5	4.7	11.9	3	8.9
CP14-IRC44-TP-518	MdW-C 5/11	5.0	11.0	SP	0	0	0	0.2	2.73	22.5	72	2.6	2	0.6	10.5	36.5	9.4
CP14-IRC44-TP-518	UW-R-5/7	5.0	7.0	SW-SC	21	14	7	1.4	2.68	26.6	53.4	10.6	4	6.6	13.5	0	8.7
CP14-IRC44-TP-518	UW-R-9/11	9.0	11.0	SC	28	18	10	1.6	2.61	9.4	73.8	16.4	4.3	12.1	5.93	0.6	8.3

APPENDIX C

Boring Designation CP14-IRC44-TP-513

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF
	South Atlantic	Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT: C-44 RSTA-Geotechnical Investigation-Phase V Phase V		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP14-IRC44-TP-513	LOCATION COORDINATES: X = 1,004,733 Y = 837,282	11. MANUFACTURER'S DESIGNATION OF DRILL: Komatsu 210 LC	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Phillips & Jordan	CONTRACTOR FILE NO.: 6734-14-9799	12. TOTAL SAMPLES	DISTURBED: 8 / UNDISTURBED (UD): 0
4. NAME OF DRILLER: Chuck Floyd		13. TOTAL NUMBER CORE BOXES: 0	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER: 17.7 Ft.	8.5
		15. DATE BORING	STARTED: 12-09-14 / COMPLETED: 12-09-14
6. THICKNESS OF OVERBURDEN: N/A		16. ELEVATION TOP OF BORING: 26.2 Ft.	
7. DEPTH DRILLED INTO ROCK: N/A		17. TOTAL RECOVERY FOR BORING: N/A	
8. TOTAL DEPTH OF BORING: 11.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
26.2	0.0						26.2		
25.2	1.0		SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, few silt, 10YR 4/2 dark grayish brown (SP-SM)				Test Pit		
24.2	2.0		SAND, poorly-graded, mostly fine-grained sand-sized quartz, trace silt, 10YR 9/2 pale orange yellow (SP)				24.2		
			SAND, well-graded with silt, mostly sand to gravel-sized limestone, some fine-grained sand-sized quartz, few silt, occasional seams of cemented nodules, occasional fine sand seams, 10YR 8/4 very pale brown (SW-SM)		MdW-S-2/5 LW-S-2/5 UW-S-2/5		24.2 24.2		
			At El. 21.2 Ft., few clay, occasional clay seams				21.2 21.2		
			At El. 20.2 Ft., 10YR 7/2 light gray		UW-R-5/7		21.2 21.2		
			At El. 19.2 Ft., 10G 2.5/2 Dark Grayish Green						
					MdW-C-5/11 LW-C-5/11 UW-C-5/11		17.2		
			At El. 17.2 Ft., 10YR 8/3 very pale brown						
					UW-R-9/11				
15.2	11.0						15.2		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE SAMPLE LABORATORY

Abbreviations:

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION		SHEET 2 OF 2 SHEETS
	Jacksonville District		
PROJECT	**COORDINATE SYSTEM/DATUM**	**HORIZONTAL**	**VERTICAL**
C-44 RSTA-Geotechnical Investigation-Phase V	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88
LOCATION COORDINATES	**ELEVATION TOP OF BORING**		
X = 1,004,733 Y = 837,282	26.2 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE

ID	DEPTH	CLASSIFICATION
LW-S-2/5	2.0/5.0	SP-SM*
MdW-S-2/5	2.0/5.0	SP*
UW-S-2/5	2.0/5.0	SW-SM
UW-R-5/7	5.0/7.0	SP-SC
MdW-C-5/11	5.0/11.0	SP*
UW-C-5/11	5.0/11.0	SW-SC
LW-C-5/11	5.0/11.0	SP*
UW-R-9/11	9.0/11.0	SP-SC

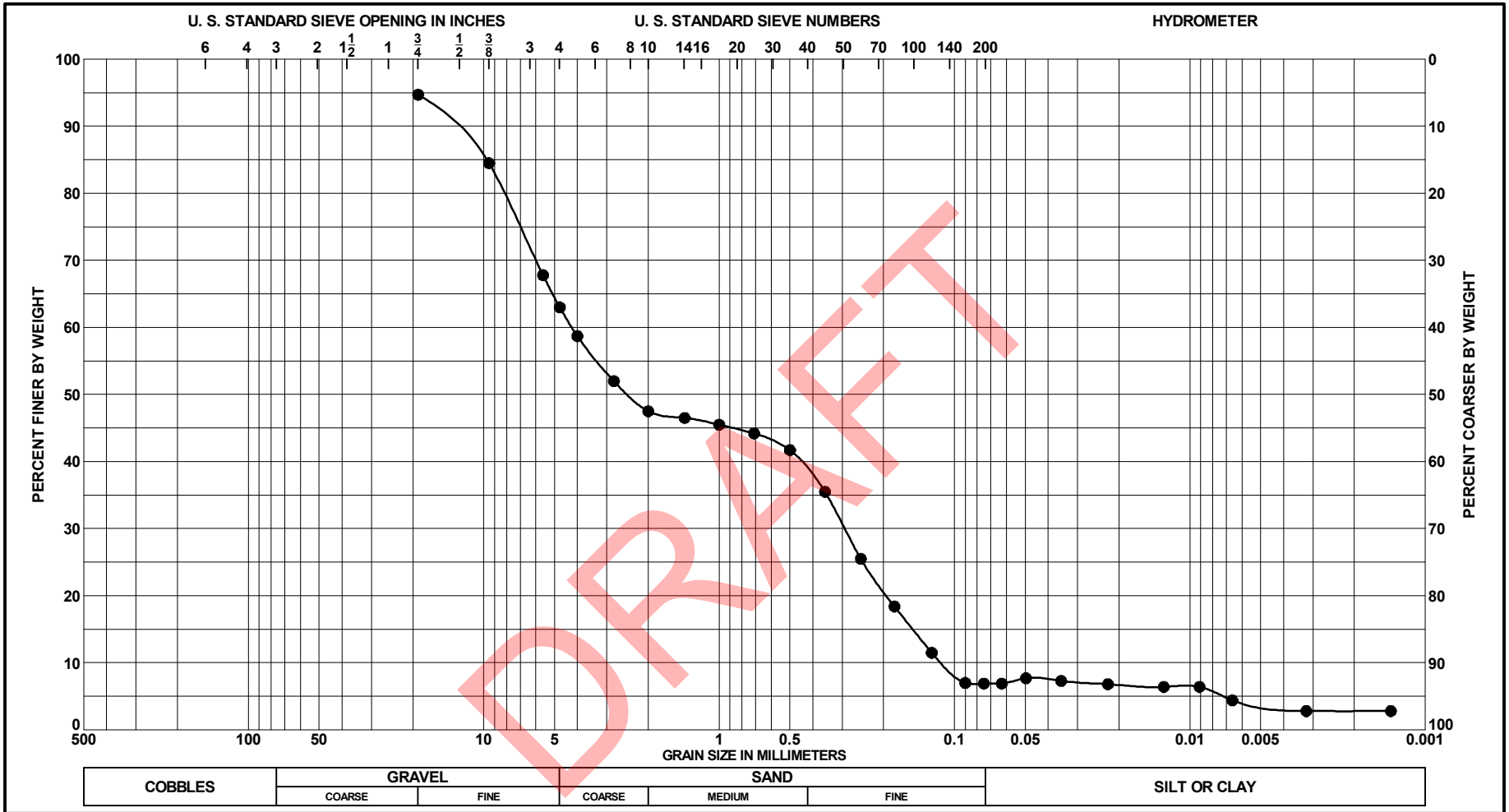
*Lab visual classification based on gradation curve

4. Additional Laboratory Testing

LW-S-2/5Specific Gravity
LW-S-2/5Percent Organic
LW-S-2/5Percent Carbonate
LW-S-2/5Percent Visual Shell
MdW-S-2/5Specific Gravity
MdW-S-2/5Percent Organic
MdW-S-2/5Percent Carbonate
MdW-S-2/5Percent Visual Shell
UW-S-2/5Specific Gravity
UW-S-2/5Atterberg
UW-S-2/5Percent Organic
UW-S-2/5Percent Carbonate
UW-S-2/5Percent Visual Shell
UW-R-5/7Specific Gravity
UW-R-5/7Atterberg
UW-R-5/7Percent Organic
UW-R-5/7Percent Carbonate
UW-R-5/7Percent Visual Shell
MdW-C-5/11Specific Gravity
MdW-C-5/11Percent Organic
MdW-C-5/11Percent Carbonate
MdW-C-5/11Percent Visual Shell
UW-C-5/11Specific Gravity
UW-C-5/11Atterberg
UW-C-5/11Percent Organic
UW-C-5/11Percent Carbonate
UW-C-5/11Percent Visual Shell
LW-C-5/11Specific Gravity
LW-C-5/11Percent Organic
LW-C-5/11Percent Carbonate
LW-C-5/11Percent Visual Shell
UW-R-9/11Specific Gravity
UW-R-9/11Atterberg
UW-R-9/11Percent Organic
UW-R-9/11Percent Carbonate
UW-R-9/11Percent Visual Shell

15 20 25 30 35

Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-513	UW-S-2/5	2	5.0	SW-SM	16	16	0	2.0	2.72	33.5	52	10.7	5.9	4.8	11.07	0	8.6
CP14-IRC44-TP-513	LW-S-2/5	2.0	5.0	SP-SM	NP	NP	NP	0.3	2.62	31.7	56.1	6.9	3.6	3.3	34.94	0	8.2
CP14-IRC44-TP-513	MdW-S-2/5	2.0	5.0	SP	NP	NP	NP	0.2	2.67	17.7	71.7	3.5	1.7	1.8	10.42	0	8.5
CP14-IRC44-TP-513	UW-C-5/11	5.0	11.0	SW-SC	26	17	9	3.2	2.7	21.0	57.7	11.9	2.2	9.7	9.33	0	8.6
CP14-IRC44-TP-513	LW-C-5/11	5.0	11.0	SP	NP	NP	NP	0.7	2.76	17.4	76.4	3.8	3	0.8	11.2	0.1	9.4
CP14-IRC44-TP-513	MdW-C-5/11	5.0	11.0	SP	NP	NP	NP	0.3	2.69	19.6	77.3	1.8	0.5	1.3	5.05	0.2	8.4
CP14-IRC44-TP-513	UW-R-5/7	5.0	7.0	SP-SC	24	17	7	1.4	2.76	27.4	58.1	9.3	3.1	6.2	5.8	0	8.4
CP14-IRC44-TP-513	UW-R-9/11	9.0	11.0	SP-SC	25	17	8	0.3	2.78	23.9	58.4	9.6	2.5	7.1	15.39	0.2	8.8

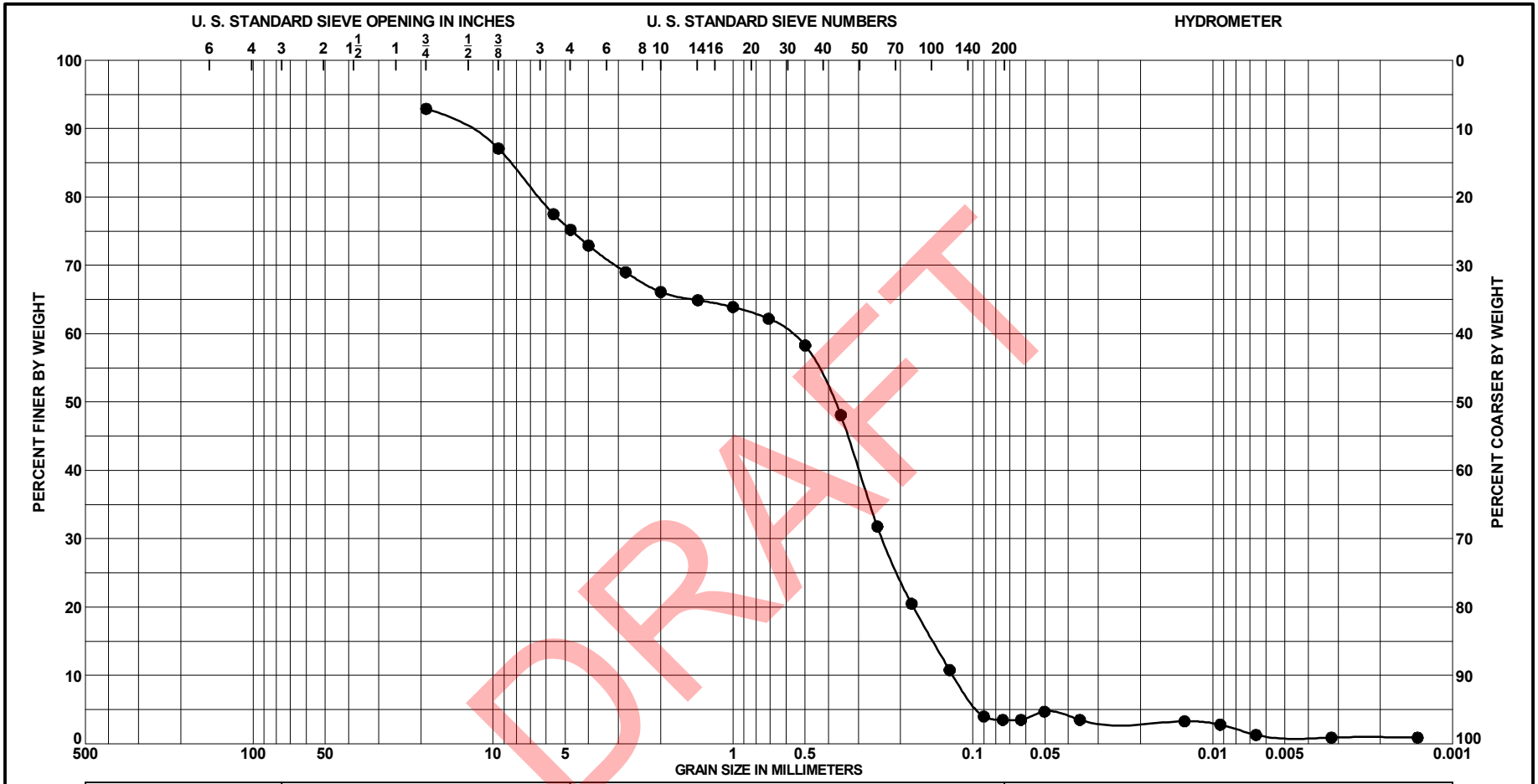


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
● LW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 8/4	0	35	2.62	0				
		sand to gravel-sized limestone, some									
		fine-grained sand-sized quartz, few									
		silt, very pale brown (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

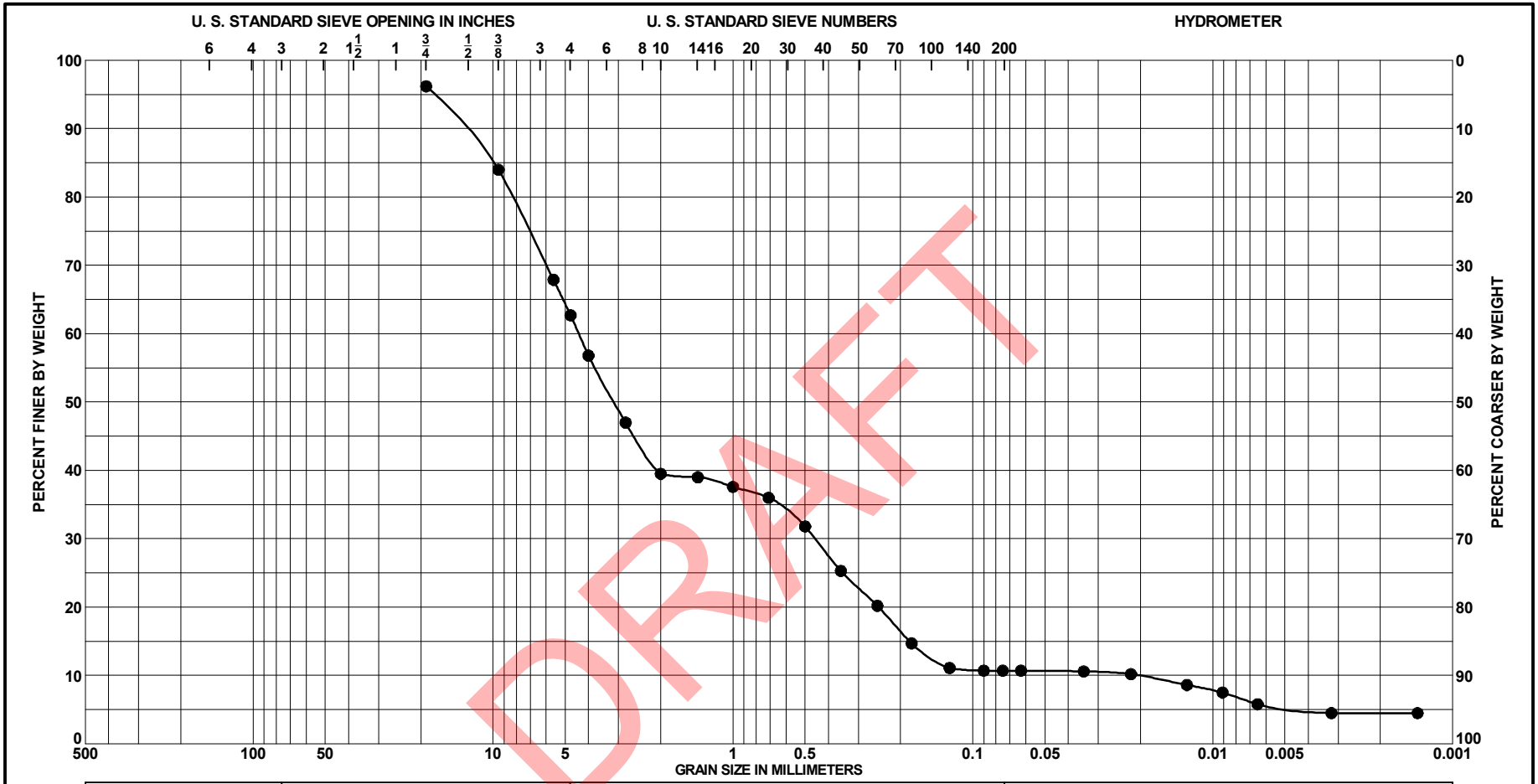


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●MdW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly	10YR 8/4	0	10	2.67	0				
		fine-grained sand-sized quartz, some									
		sand to gravel-sized limestone, trace									
		silt, very pale brown (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-S-2/5	2.0 to 5.0 Ft.	SAND, well-graded with silt, mostly sand to gravel-sized limestone, some fine-grained sand-sized quartz, few silt, very pale brown (SW-SM)	10YR 8/4	0	11	2.72	2		16	16	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
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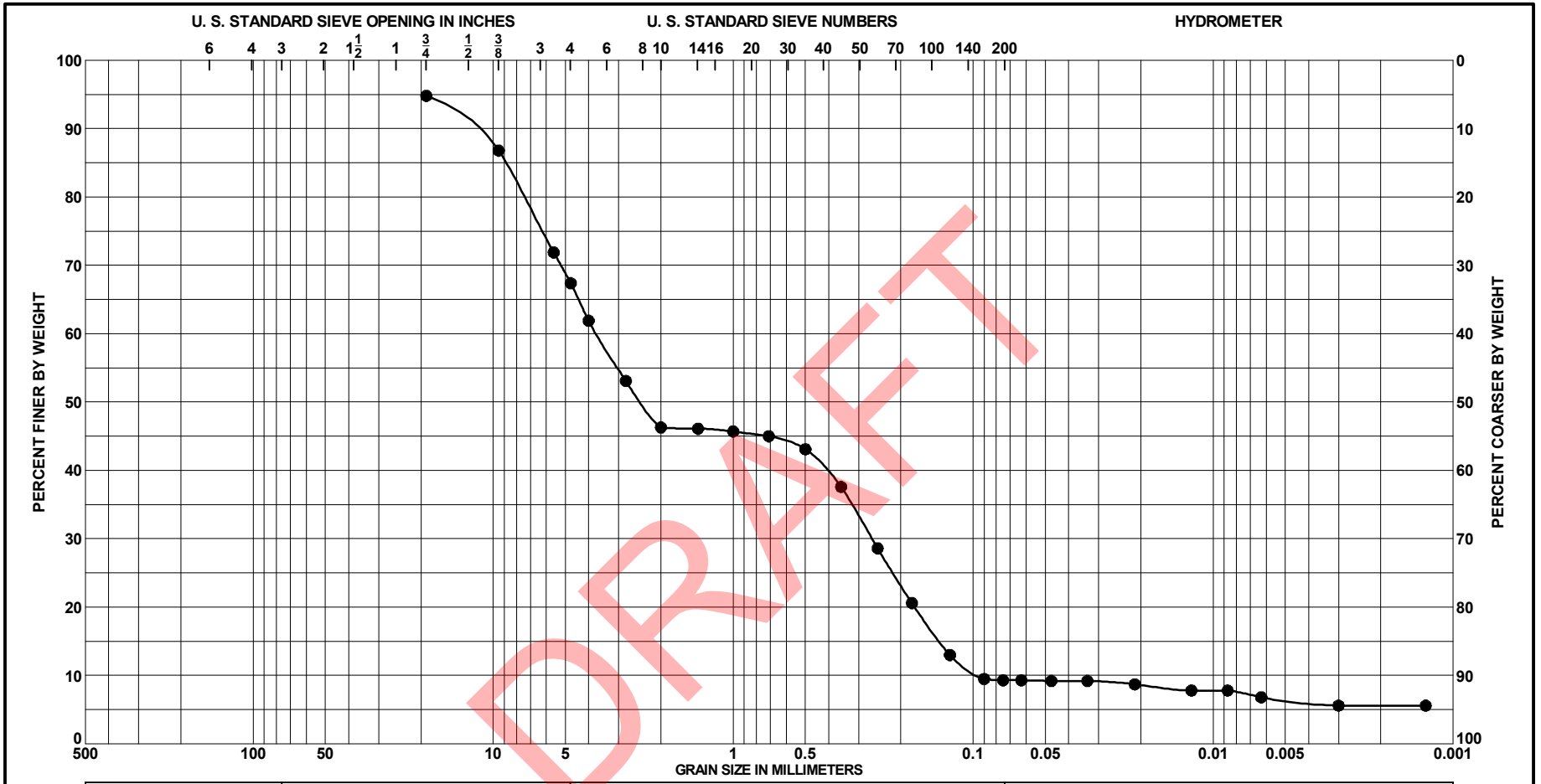
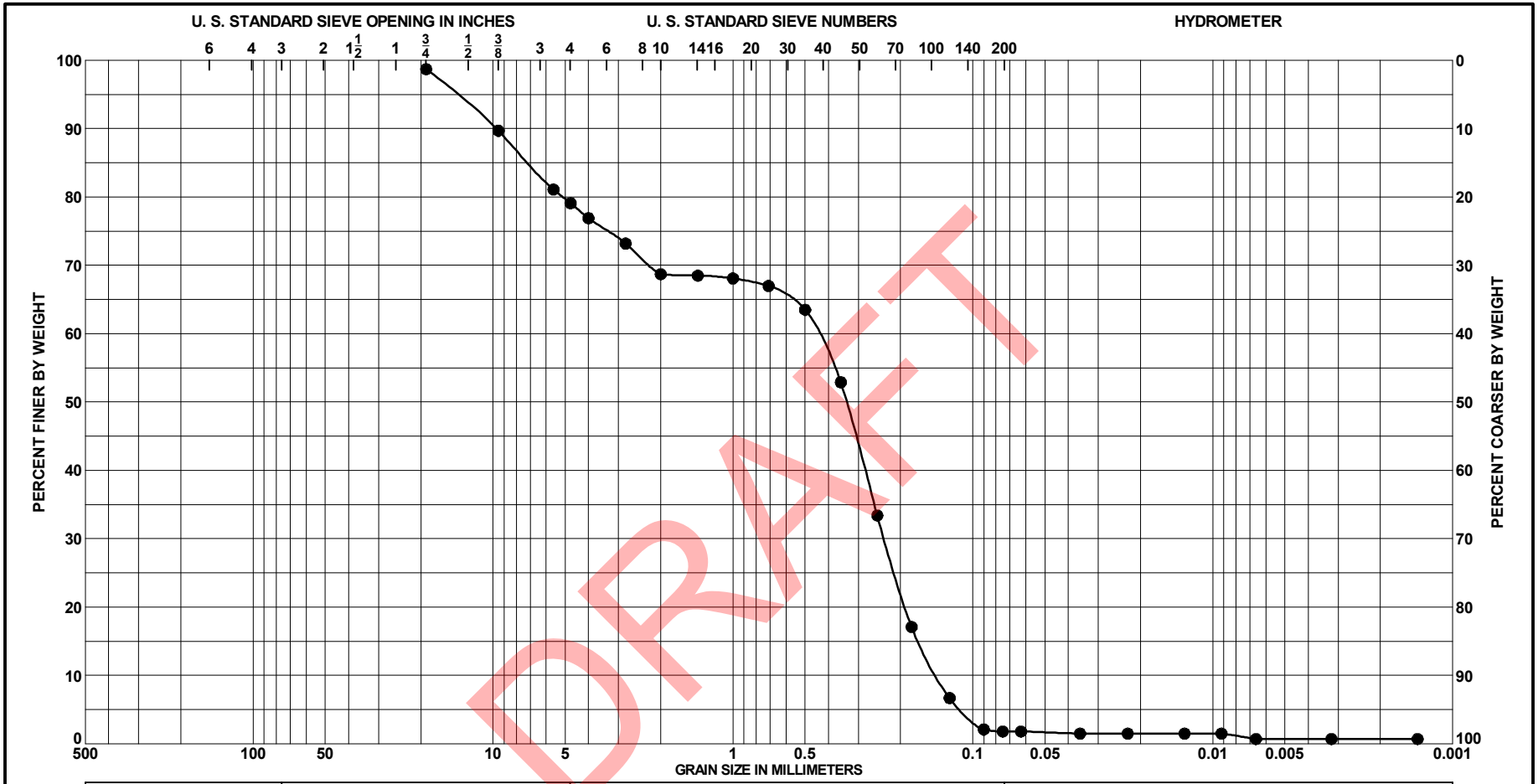


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-5/7	5.0 to 7.0 Ft.	SAND, poorly-graded with clay, mostly	10YR 8/4	0	6	2.76	1		24	17	7
		sand to gravel-sized limestone, some									
		fine-grained sand-sized quartz, few									
		clay, very pale brown (SP-SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

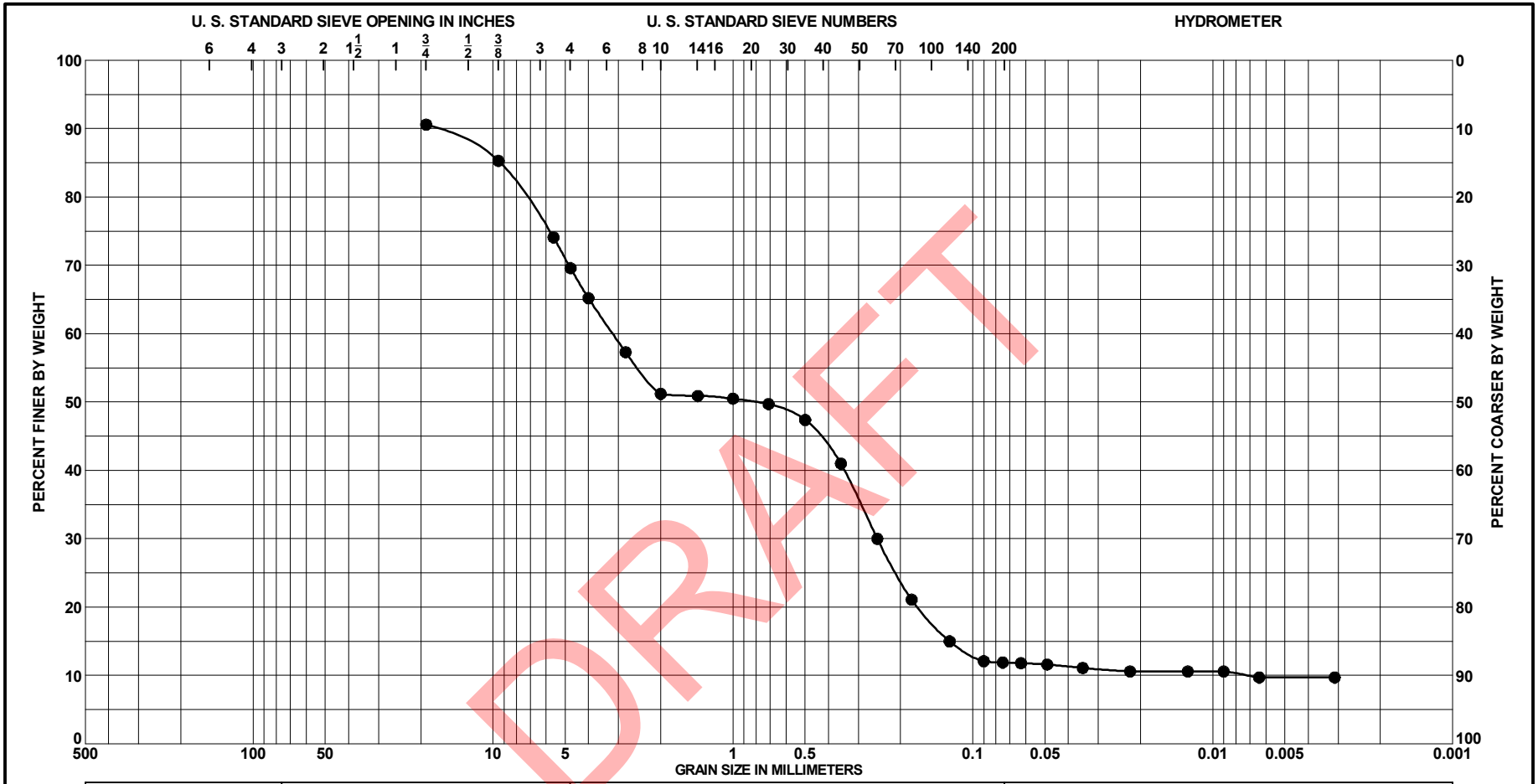


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-C-5/11	5.0 to 11.0 Ft.	SAND, poorly-graded, mostly	10YR 8/4	0	5	2.69	0				
		fine-grained sand-sized quartz, some									
		sand to gravel-sized limestone, trace									
		silt, very pale brown (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

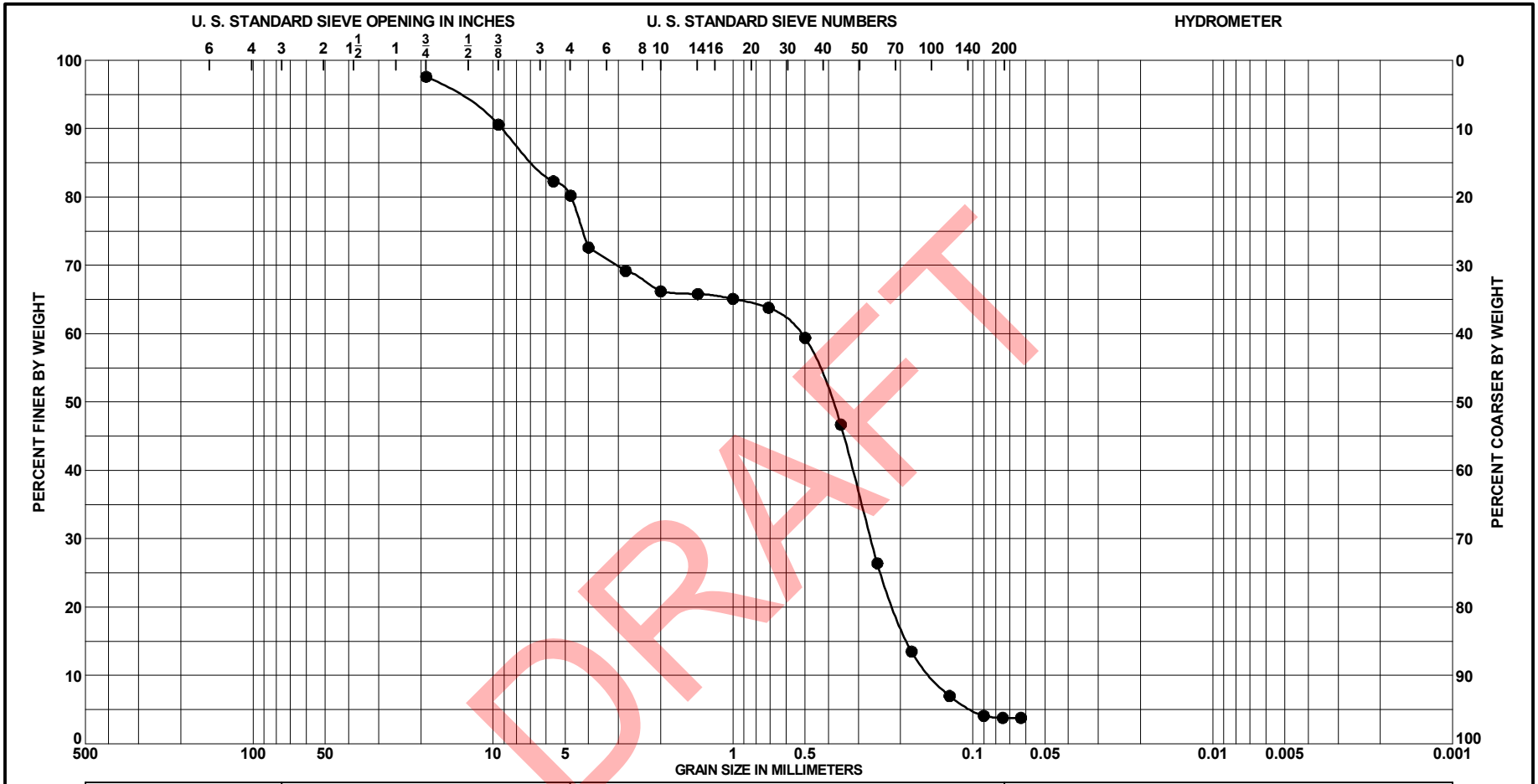


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-C-5/11	5.0 to 11.0 Ft.	SAND, well-graded with clay, mostly	10YR 8/4	0	9	2.70	3		26	17	9
		sand to gravel-sized limestone, some									
		fine-grained sand-sized quartz, few									
		clay, very pale brown (SW-SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

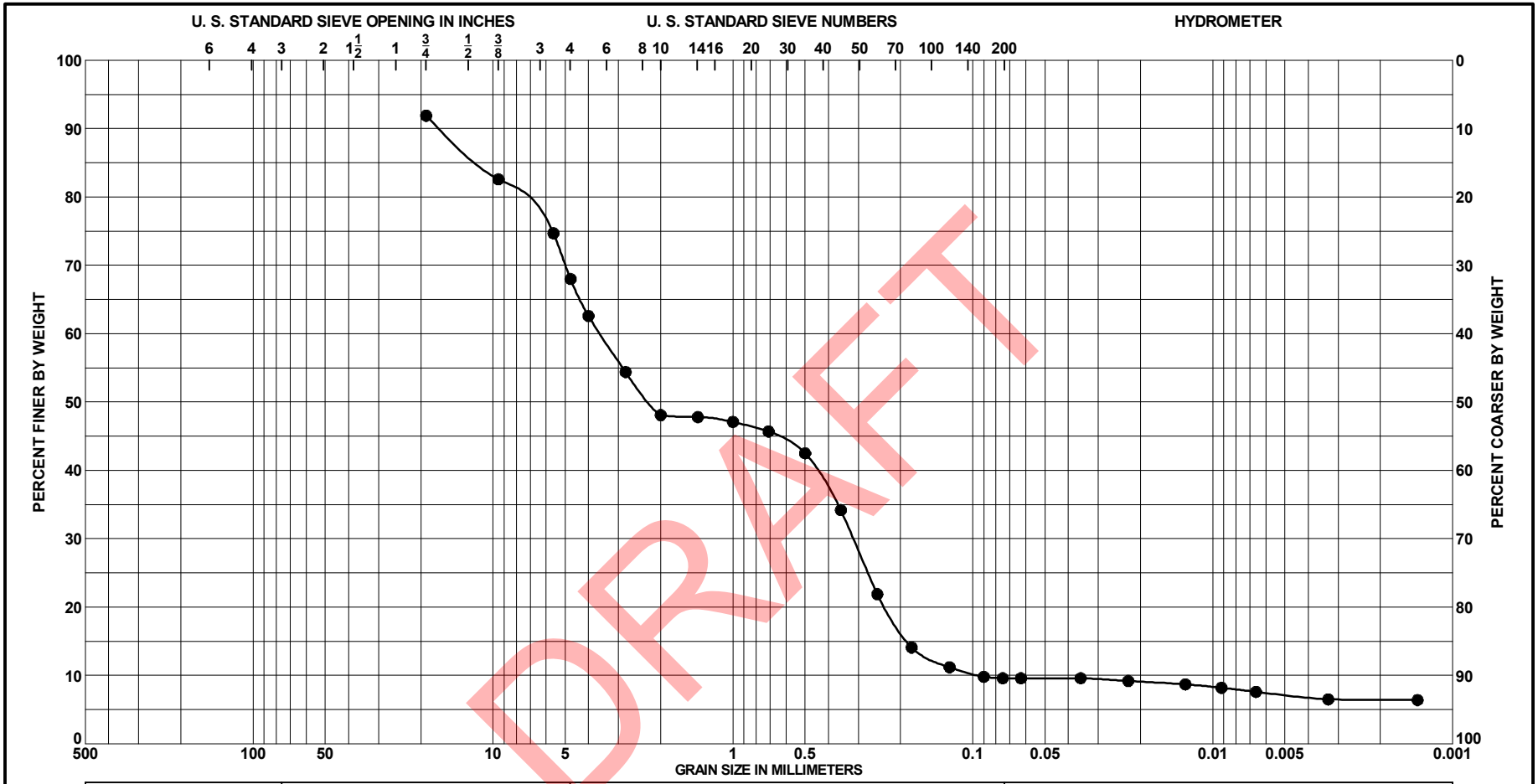


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●LW-C-5/11	5.0 to 11.0 Ft.	SAND, poorly-graded, mostly fine	10YR 8/4	0	11	2.76	1				
		grained sand-sized quartz, some sand									
		to gravel-sized limestone, trace silt,									
		very pale brown (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-9/11	9.0 to 11.0 Ft.	SAND, poorly-graded with clay, mostly	10YR 8/3	0	15	2.78	0		25	17	8
		sand to gravel-sized limestone, some									
		fine-grained sand-sized quartz, few									
		clay, very pale brown (SP-SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-513
BORING ELEV.	26.2 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-513 UW-S-2/5								
14%	1	7	0.78	126.1	10.0	125.8	9.6	1060
	2	7	0.78	126.1	10.0	126.4	9.6	890
	3	7	0.76	126.1	10.0	126.2	9.3	825
	4	28	0.76	126.1	10.0	126.2	9.3	NT
	5	28	0.77	126.1	10.0	126.0	9.4	NT
	6	28	0.77	126.1	10.0	126.3	9.4	NT
CP14-IRC44-TP-513 UW-C-5/11								
14%	1	7	0.97	117.3	12.0	117.6	12.0	785
	2	7	0.97	117.3	12.0	117.6	12.0	825
	3	7	0.93	117.3	12.0	118.0	11.4	795
	4	28	0.93	117.3	12.0	118.1	11.4	NT
	5	28	0.96	117.3	12.0	117.8	11.8	NT
	6	28	0.96	117.3	12.0	117.8	11.8	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-513 LW-S-2/5								
14%	1	7	0.59	127.7	8.6	129.3	7.2	1600
	2	7	0.59	127.7	8.6	129.6	7.2	1295
	3	7	0.60	127.7	8.6	129.2	7.3	1345
	4	28	0.60	127.7	8.6	129.2	7.3	1805
	5	28	0.65	127.7	8.6	128.8	7.8	1425
	6	28	0.65	127.7	8.6	128.5	7.8	1680
CP14-IRC44-TP-513 LW-C-5/11								
14%	1	7	0.86	125.3	10.6	125.3	10.5	765
	2	7	0.86	125.3	10.6	125.0	10.5	1370
	3	7	0.86	125.3	10.6	124.6	10.6	1250
	4	28	0.86	125.3	10.6	124.8	10.6	NT
	5	28	0.84	125.3	10.6	125.5	10.4	NT
	6	28	0.84	125.3	10.6	125.5	10.4	NT

NT: Not tested as of date of report preparation.

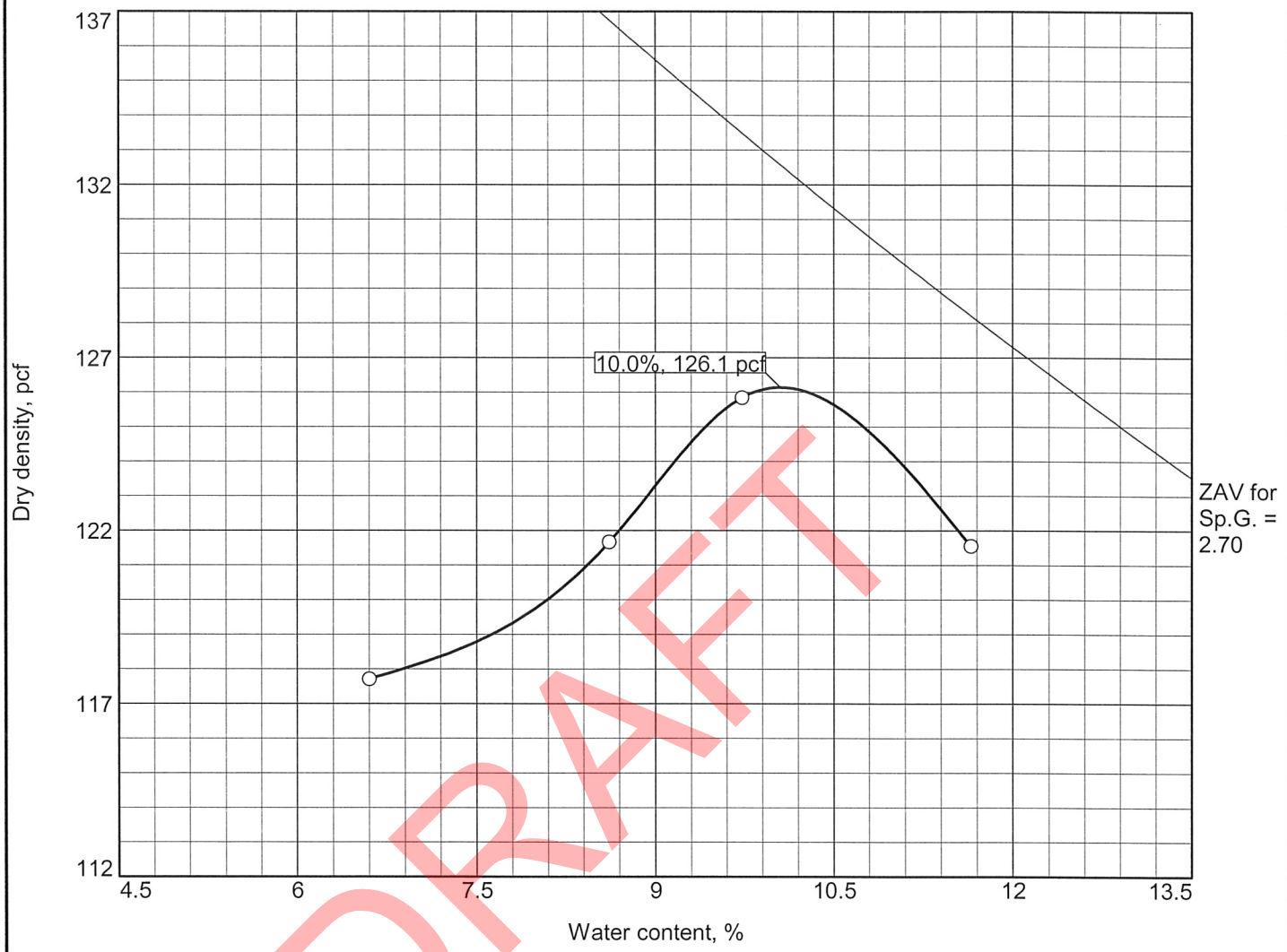
Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-513 MdW-S-2/5								
14%	1	7	0.70	124.5	10.4	126.3	8.6	1585
	2	7	0.70	124.5	10.4	126.6	8.6	1355
	3	7	0.75	124.5	10.4	125.9	9.2	1590
	4	28	0.75	124.5	10.4	125.9	9.2	1755
	5	28	0.73	124.5	10.4	126.2	9.0	1895
	6	28	0.73	124.5	10.4	125.9	9.0	1885
CP14-IRC44-TP-513 MdW-C-5/11								
14%	1	7	0.78	126.3	9.2	125.5	9.6	1030
	2	7	0.78	126.3	9.2	125.5	9.6	1190
	3	7	0.81	126.3	9.2	125.1	10.0	1190
	4	28	0.81	126.3	9.2	125.1	10.0	1405
	5	28	0.82	126.3	9.2	125.0	10.0	1665
	6	28	0.82	126.3	9.2	125.0	10.0	1760

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		**PSI***			**AVG.***
		1	**2**	**3**	
TP-513	UW-S-2/5				
TP-513	LW-S-2/5	**945**	**1215**	**1410**	1190
TP-513	MdW-S-2/5	**1100**	**995**	**920**	1005
TP-513	UW-C-5/11				
TP-513	LW-C-5/11				
TP-513	MdW-C-5/11	**385**	**455**	**455**	432

* Testing still in progress

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SW-SM	A-1-a			16	NP	37.3	10.7

TEST RESULTS

Maximum dry density = 126.1 pcf

Optimum moisture = 10.0 %

MATERIAL DESCRIPTION

SAND, well-graded with silt, mostly sand to gravel-sized limestone, some fine-grained sand-sized quartz, few silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-513 **Sample Number:** UW-S-2/5

AMEC E&I

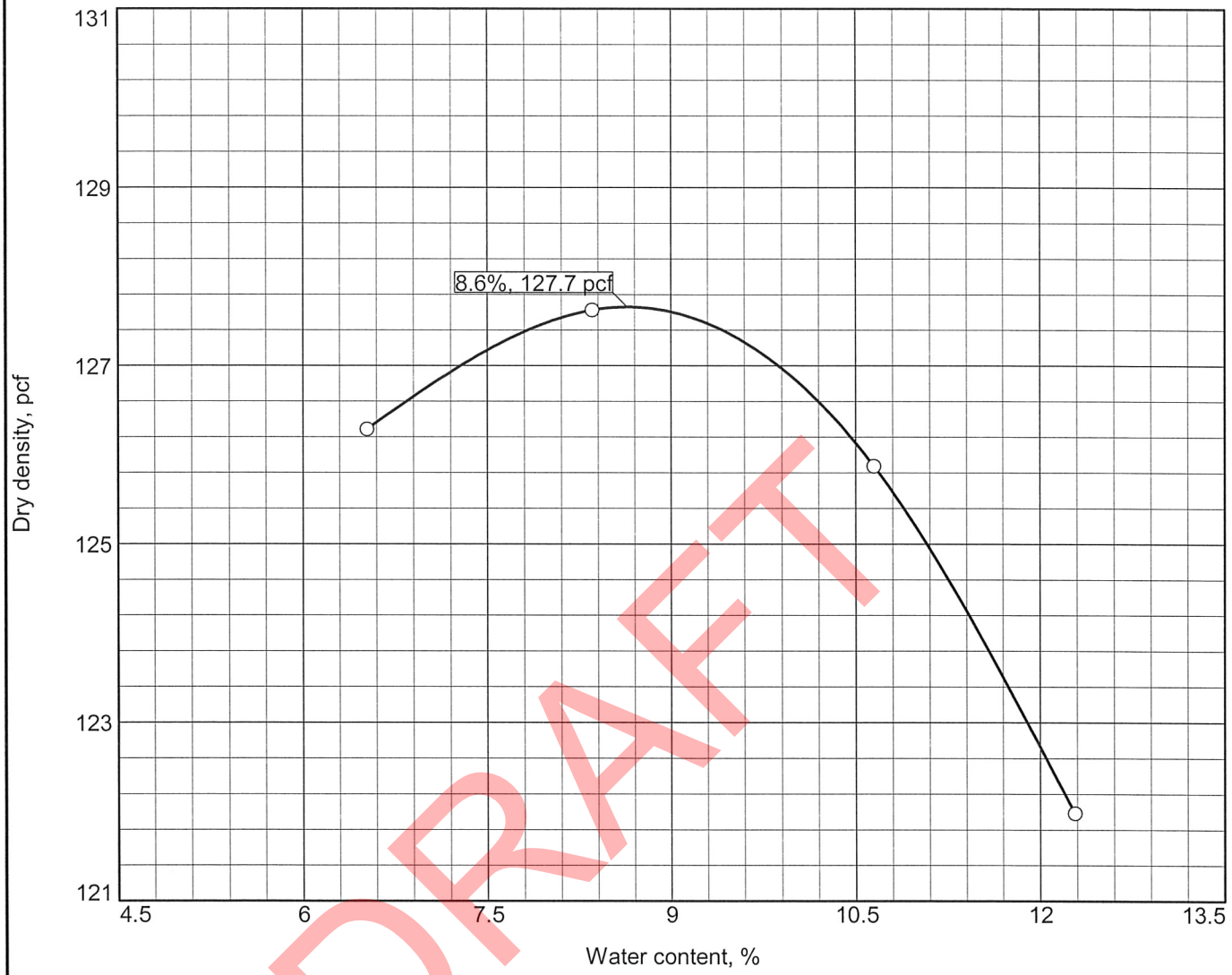
Jacksonville, Florida

Remarks:

Figure

Tested By: W. Martin **Checked By:** Stephanie A. Setser, P.E.

COMPACTION TEST REPORT



Test specification: AASHTO T 99 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP-SM	A-1-b			NV	NP	37.0	6.9

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 127.7 pcf Optimum moisture = 8.6 %	SAND, poorly-graded with silt, mostly sand to gravel-sized limestone, some fine-grained sand-sized quartz, few silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-513 **Sample Number:** LW-S-2/5

AMEC E&I

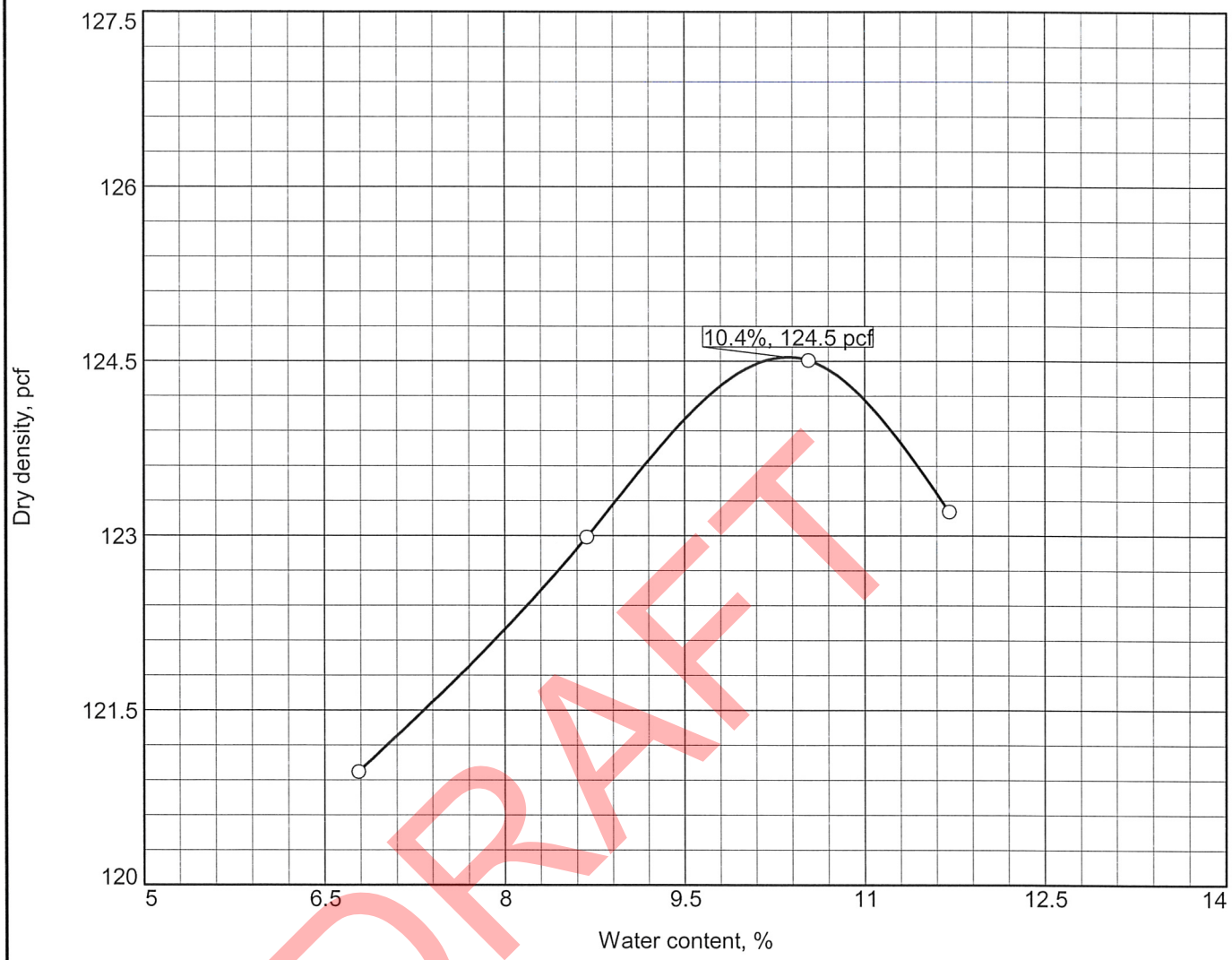
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie A. Setser, P.E.

COMPACTION TEST REPORT



Test specification: AASHTO T 99 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NV	NP	24.8	3.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 124.5 pcf Optimum moisture = 10.4 %	SAND, poorly-graded, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-513 **Sample Number:** MdW-S-2/5

AMEC E&I

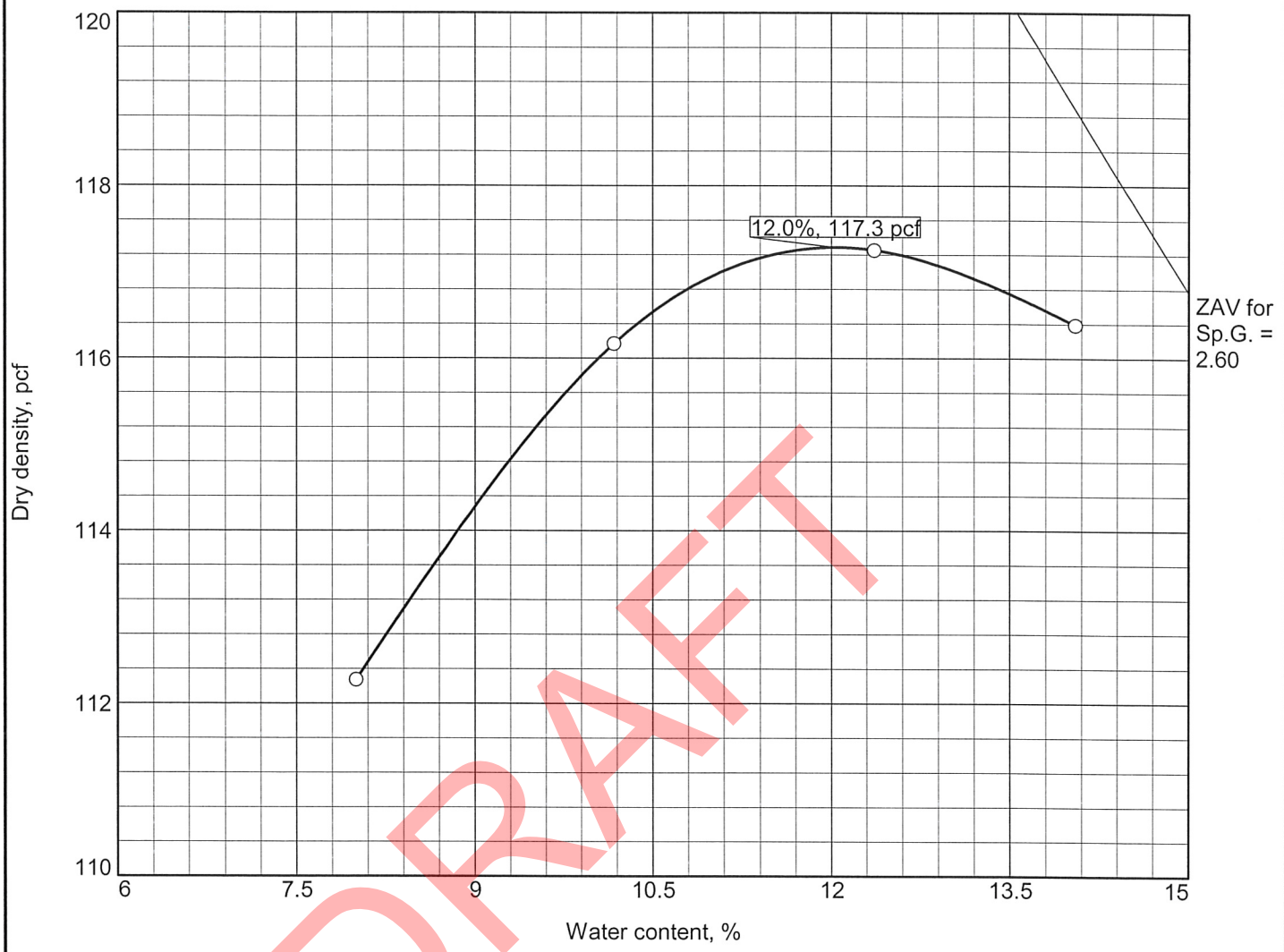
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie A. Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SW-SC	A-2-4(0)			26	9	30.4	11.9

TEST RESULTS

Maximum dry density = 117.3 pcf

Optimum moisture = 12.0 %

MATERIAL DESCRIPTION

SAND, well-graded with clay, mostly sand to gravel-sized limestone, some fine-grained sand-sized quartz, few clay

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-513 **Sample Number:** UW-C-5/11

AMEC E&I

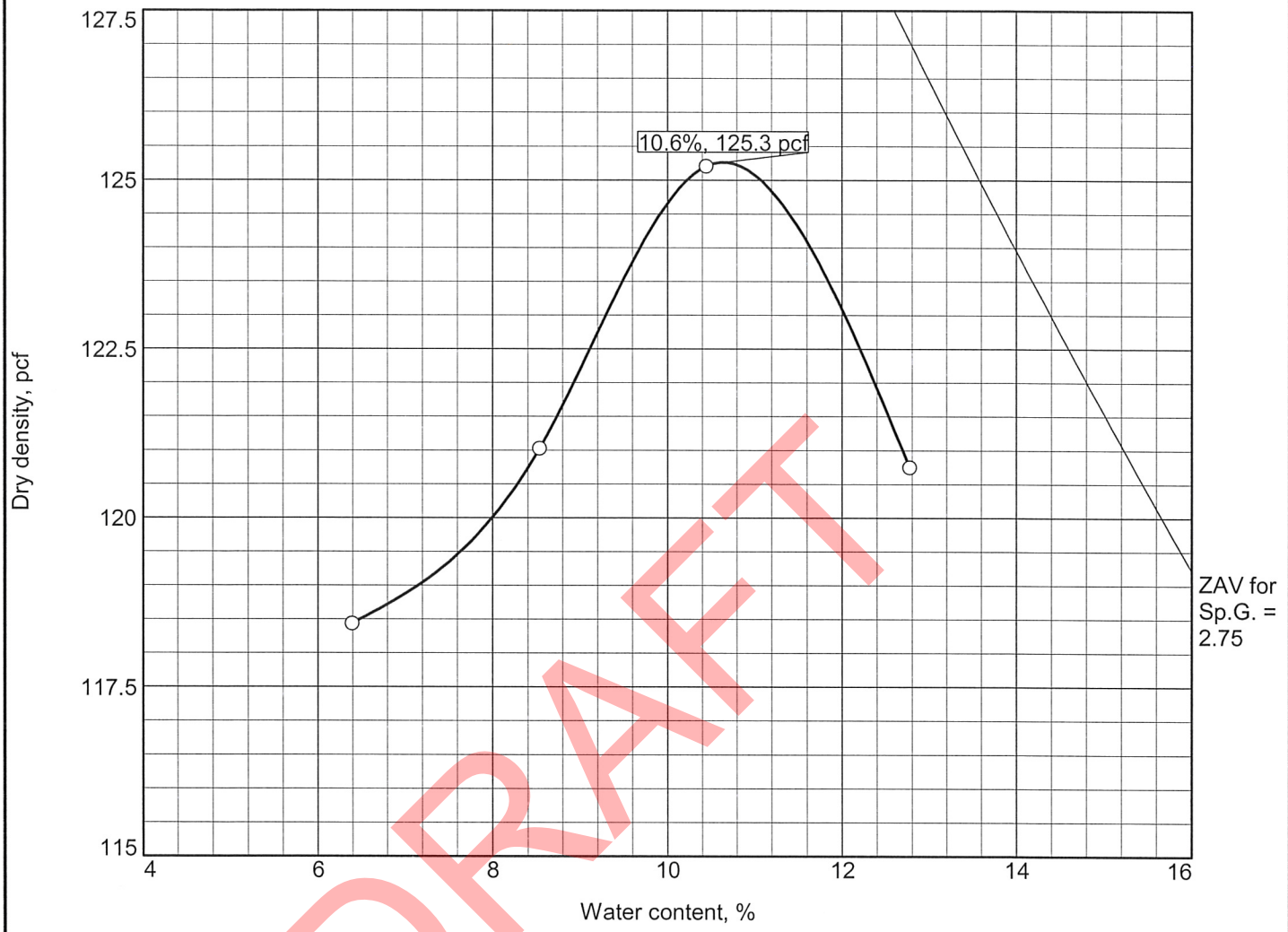
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie A. Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-3			NP	NP	19.8	3.8

TEST RESULTS

Maximum dry density = 125.3 pcf

Optimum moisture = 10.6 %

MATERIAL DESCRIPTION

SAND, poorly-graded, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-513 **Sample Number:** LW-C-5/11

AMEC E&I

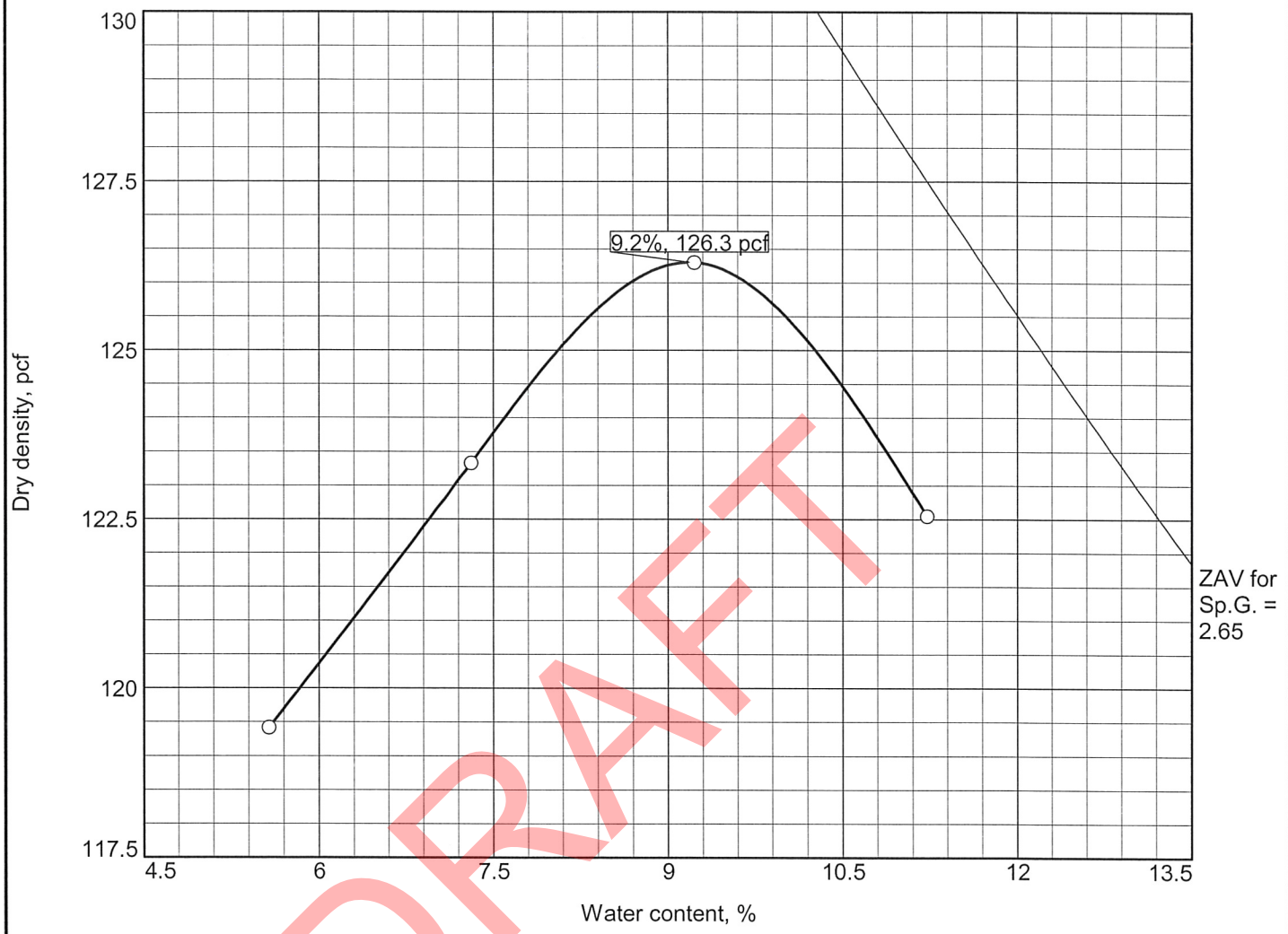
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie A. Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-3			NP	NP	20.9	1.8

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 126.3 pcf Optimum moisture = 9.2 %	SAND, poorly-graded, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-513 **Sample Number:** MdW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie A. Setser, P.E.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-513 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.77	126.1	10.00	126.5	9.3	NT	NT	--
		0.77	126.1	10.00	126.9	9.3	NT	NT	--
Freezing and Thawing	14	0.80	126.1	10.00	126.0	9.7	NT	NT	--
		0.80	126.1	10.00	126.5	9.7	NT	NT	--
CP14-IRC44-TP-513 UW-C-5/11									
Wetting and Drying	14	0.94	117.3	12.00	117.9	11.4	NT	NT	--
		0.94	117.3	12.00	118.0	11.4	NT	NT	--
Freezing and Thawing	14	0.97	117.3	12.00	117.6	11.8	NT	NT	--
		0.97	117.3	12.00	117.6	11.8	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-513 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.66	127.7	8.60	128.7	8.0	130.8	0.0	--
		0.66	127.7	8.60	128.4	8.0	130.1	0.0	--
Freezing and Thawing	14	0.65	127.7	8.60	128.6	7.8	NT	NT	--
		0.65	127.7	8.60	128.9	7.8	NT	NT	--
CP14-IRC44-TP-513 LW-C-5/11									
Wetting and Drying	14	0.90	125.3	10.60	124.7	0.1	NT	NT	--
		0.90	125.3	10.60	124.6	0.1	NT	NT	--
Freezing and Thawing	14	0.95	125.3	10.00	124.2	0.1	NT	NT	--
		0.95	125.3	10.00	124.0	0.1	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-513 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.73	124.5	10.40	126.4	8.9	NT	NT	--
		0.73	124.5	10.40	126.4	8.9	NT	NT	--
Freezing and Thawing	14	0.73	124.5	10.40	127.3	8.9	NT	NT	--
		0.73	124.5	10.40	127.6	8.9	NT	NT	--
CP14-IRC44-TP-513 MdW-C-5/11									
Wetting and Drying	14	0.85	126.3	9.20	125.1	10.3	NT	NT	--
		0.85	126.3	9.20	124.8	10.3	NT	NT	--
Freezing and Thawing	14	0.82	126.3	9.20	125.2	10.0	NT	NT	--
		0.82	126.3	9.20	125.2	10.0	NT	NT	--

NT: Not tested as of date of report preparation.

Table 5: Summary of Sand Cleanliness and Sand Equivalent Testing

Sample Depth Range (feet)	Sample No.	Trial No.	Clay Reading	Sand Reading	Sand Equivalent (%)	Average Sand Equivalent (%)
CP14-IRC44-TP-513						
2-5	UW-S-2/5	1	12.8	2.1	17	17
		2	12.6	2.0	16	
		3	12.5	2.1	17	
	LW-S-2/5	1	13.6	3.4	25	25
		2	13.6	3.4	25	
		3	13.6	3.4	25	
	MdW-S-2/5	1	7.0	3.6	52	51
		2	7.1	3.5	50	
		3	7.0	3.5	50	
5-11	UW-C-5/11	1	14.5	2.2	16	16
		2	14.4	2.2	16	
		3	14.3	2.2	16	
	LW-C-5/11	1	13.5	3.5	26	25
		2	13.3	3.3	25	
		3	13.3	3.3	25	
	MdW-C-5/11	1	10.6	3.6	34	34
		2	10.6	3.6	34	
		3	11.0	3.6	33	

Test Pit 513 View S

Test Pit 513 View E – Depth Measurement

Test Pit 513 View S

Test Pit 513 View E

Test Pit 513 View N

Test Pit 513 View W

Test Pit 513 View NW

Test Pit 513 View W – Sample Collection

Test Pit 513 – Backfilled Condition

Boring Designation CP14-IRC44-TP-514A

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF
	South Atlantic	Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT: C-44 RSTA-Geotechnical Investigation-Phase V Phase V		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP14-IRC44-TP-514A	LOCATION COORDINATES: X = 1,003,765 Y = 835,426	11. MANUFACTURER'S DESIGNATION OF DRILL: Komatsu 210 LC	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Phillips & Jordan	CONTRACTOR FILE NO.: 6734-14-9799	12. TOTAL SAMPLES	DISTURBED: 8 / UNDISTURBED (UD): 0
4. NAME OF DRILLER: Chuck Floyd		13. TOTAL NUMBER CORE BOXES: 0	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL	BEARING	14. ELEVATION GROUND WATER
		15. DATE BORING	STARTED: 12-09-14 / COMPLETED: 12-09-14
6. THICKNESS OF OVERBURDEN: N/A		16. ELEVATION TOP OF BORING: 24.3 Ft.	
7. DEPTH DRILLED INTO ROCK: N/A		17. TOTAL RECOVERY FOR BORING: N/A	
8. TOTAL DEPTH OF BORING: 11.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
24.3	0.0						24.3		
			SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, little sand to gravel-sized limestone, few silt, trace shell, 10YR 6/3 pale brown (SP-SM)				Test Pit		
							22.3		
					MdW-S-2/5 LW-S-2/5 UW-S-2/5		22.3 22.3		
			At El. 19.3 Ft., 10YR 7/2 light gray				19.3		
					UW-R-5/7		19.3 19.3 19.3		
17.3	7.0								
			SAND, well-graded with silt, mostly fine-grained sand-sized quartz, some sand to gravel-sized shell, few silt, few medium-grained sand-sized limestone, 10YR 7/2 light gray (SW-SM)		MdW-C-5/11 LW-C-5/11 UW-C-5/11		15.3		
15.3	9.0								
			SAND, poorly-graded with clay, some fine-grained sand-sized quartz, little sand to gravel-sized limestone, little sand to gravel-sized shell, few clay, 5G 6/1 greenish gray (SP-SC) At El. 14.3 Ft.		UW-R-9/11		13.3		
13.3	11.0								
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Test pit TP-514 was terminated at the request of USACOE. Test pit located adjacent to built-up roadway and excavated canal.				Abbreviations:		

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 2 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
C-44 RSTA-Geotechnical Investigation-Phase V	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 1,003,765 Y = 835,426	24.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE

Irrigation pipes encountered.

4. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
UW-S-2/5	2.0/5.0	SP-SM
LW-S-2/5	2.0/5.0	SP-SM
MdW-S-2/5	2.0/5.0	SP
UW-C-5/11	5.0/11.0	SW-SM
LW-C-5/11	5.0/11.0	SP-SM
MdW-C-5/11	5.0/11.0	SP
UW-R-5/7	5.0/7.0	SP-SM
UW-R-9/11	9.0/11.0	SP-SC

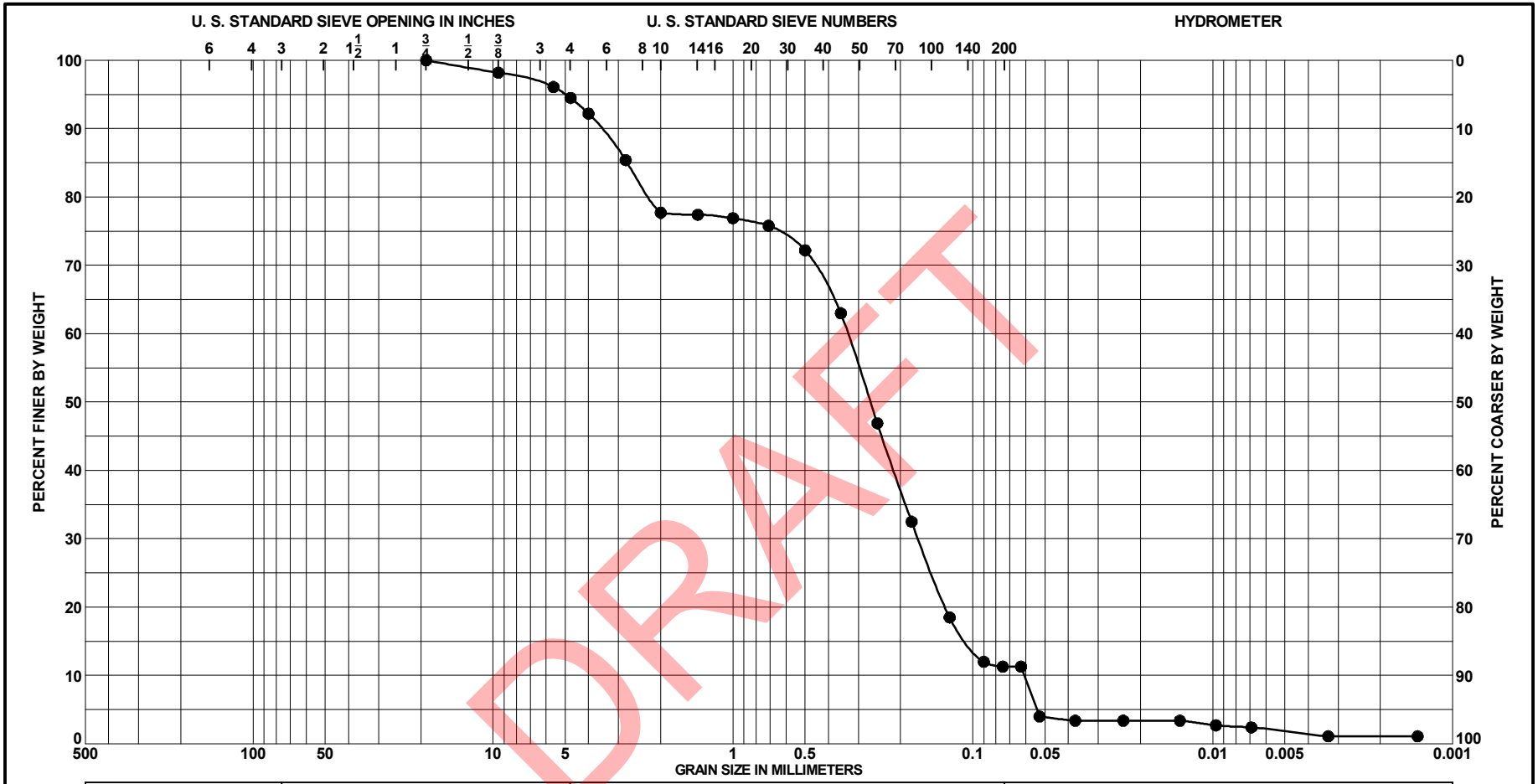
not on atterberg limits.

5. Additional Laboratory Testing

UW-S-2/5Specific Gravity
UW-S-2/5Atterberg
UW-S-2/5Percent Organic
UW-S-2/5Percent Carbonate
UW-S-2/5Percent Visual Shell
LW-S-2/5Specific Gravity
LW-S-2/5Atterberg
LW-S-2/5Percent Organic
LW-S-2/5Percent Carbonate
LW-S-2/5Percent Visual Shell
MdW-S-2/5Specific Gravity
MdW-S-2/5Atterberg
MdW-S-2/5Percent Organic
MdW-S-2/5Percent Carbonate
MdW-S-2/5Percent Visual Shell
UW-C-5/11Specific Gravity
UW-C-5/11Atterberg
UW-C-5/11Percent Organic
UW-C-5/11Percent Carbonate
UW-C-5/11Percent Visual Shell
LW-C-5/11Specific Gravity
LW-C-5/11Atterberg
LW-C-5/11Percent Organic
LW-C-5/11Percent Carbonate
LW-C-5/11Percent Visual Shell
MdW-C-5/11Specific Gravity
MdW-C-5/11Atterberg
MdW-C-5/11Percent Organic
MdW-C-5/11Percent Carbonate
MdW-C-5/11Percent Visual Shell
UW-R-5/7Specific Gravity
UW-R-5/7Atterberg
UW-R-5/7Percent Organic
UW-R-5/7Percent Carbonate
UW-R-5/7Percent Visual Shell
UW-R-9/11Specific Gravity
UW-R-9/11Atterberg
UW-R-9/11Percent Organic
UW-R-9/11Percent Carbonate
UW-R-9/11Percent Visual Shell

15
20
25
30
35

Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-514A	UW-S-2/5	2.0	5.0	SP-SM	20	18	2	2	2.68	5.5	83.2	11.3	3.4	7.9	4.91	1	8.7
CP14-IRC44-TP-514A	LW-S-2/5	2.0	5.0	SP-SM	0	0	0	0.6	2.75	22.8	71.9	3.3	0.9	2.4	5.3	0.5	9.2
CP14-IRC44-TP-514A	MdW-S-2/5	2.0	5.0	SP	0	0	0	0	2.64	17.7	79.9	2.4	0.6	1.8	4.44	2	8.4
CP14-IRC44-TP-514A	UW-C-5/11	5.0	11.0	SW-SM	20	18	2	1.6	2.71	16.6	72.3	10.8	3.1	7.7	11.75	41.5	8.9
CP14-IRC44-TP-514A	LW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.2	2.44	0.1	93.9	6.0	5.7	0.3	6.64	0.4	8.8
CP14-IRC44-TP-514A	MdW-C-5/11	5.0	11.0	SP	0	0	0	0.3	2.61	18.4	73.1	1.5	1.5	0	10.77	3.4	9.6
CP14-IRC44-TP-514A	UW-R-5/7	5.0	7.0	SP-SM	21	18	3	0.3	2.65	37	54.6	6	1.8	4.2	12.17	2	8.9
CP14-IRC44-TP-514A	UW-R-9/11	9.0	11.0	SP-SC	23	17	6	2.2	2.67	28.5	61.4	10.1	2.6	7.5	24	24	8.8



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 7/4	1	5	2.68	2		20	18	2
		fine-grained sand-sized quartz, little									
		sand to gravel-sized limestone, few									
		silt, trace shell, very pale brown									
		(SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

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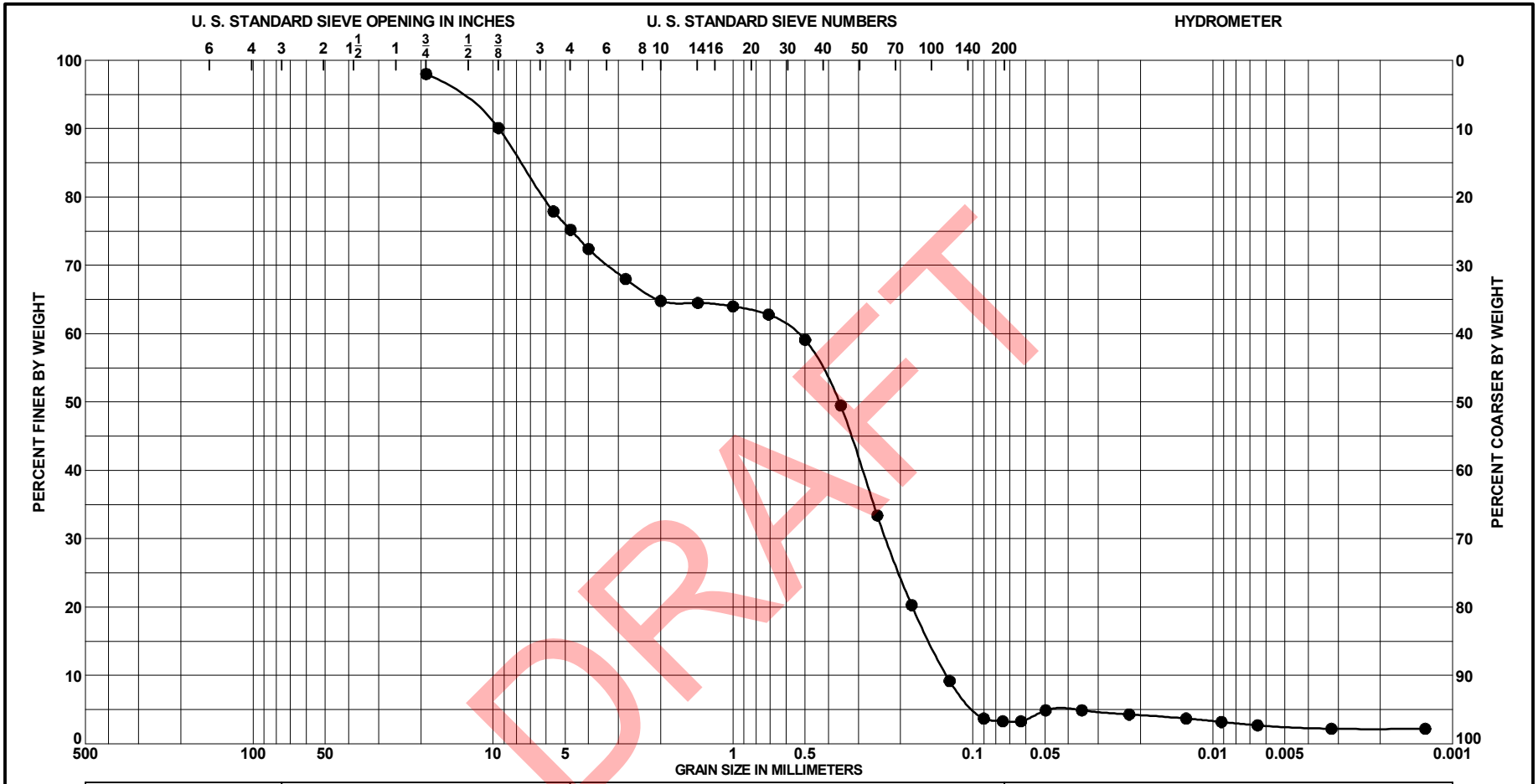

Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
● LW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 7/4	1	5	2.75	1		0	0	NP
		fine-grained sand-sized quartz, little									
		sand to gravel-sized limestone, few									
		silt, trace shell, very pale brown									
		(SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

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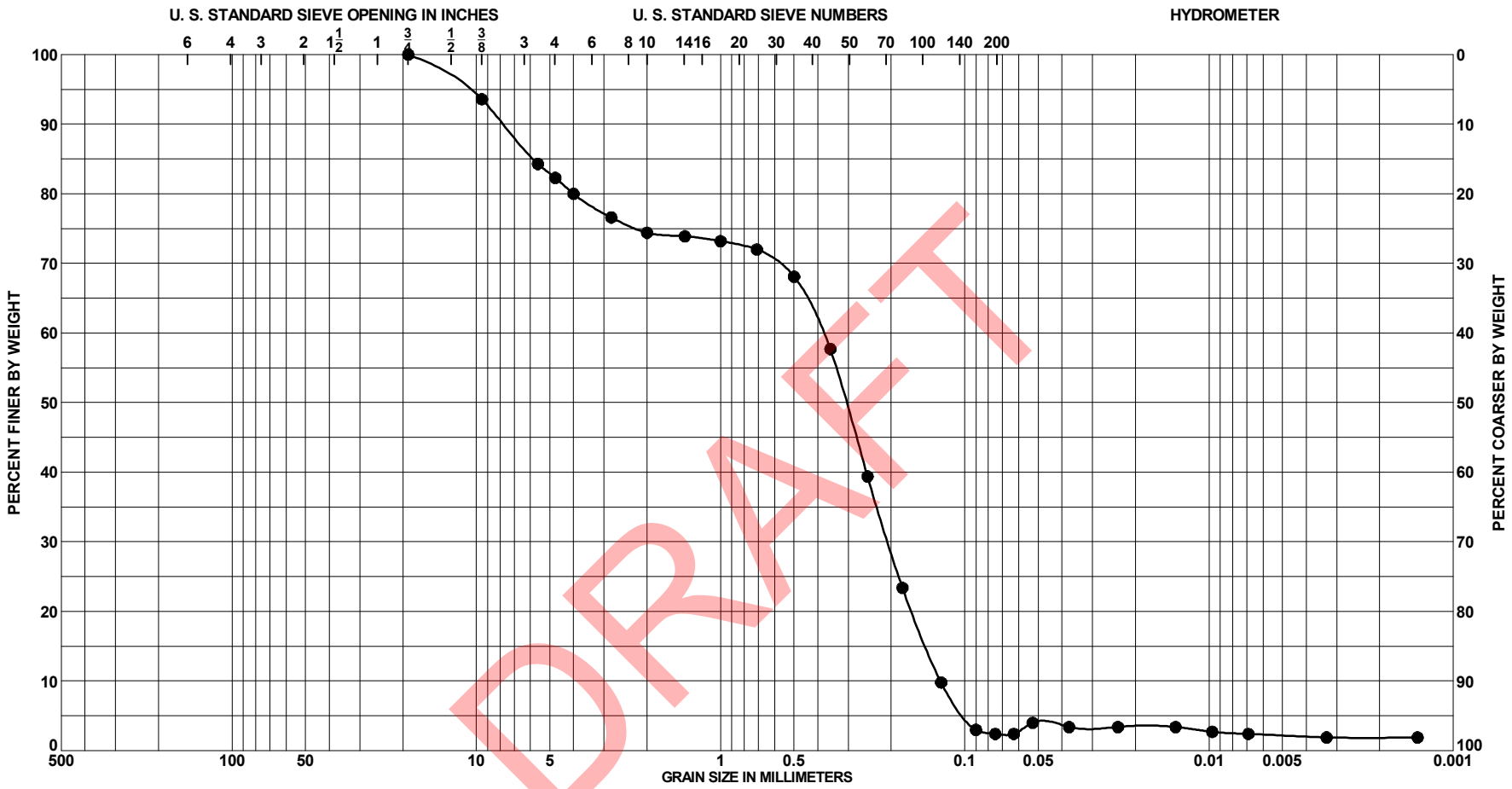

Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, little sand to gravel-sized limestone, few silt, trace shell, very pale brown (SP)	10YR 7/4	2	4	2.64	0		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

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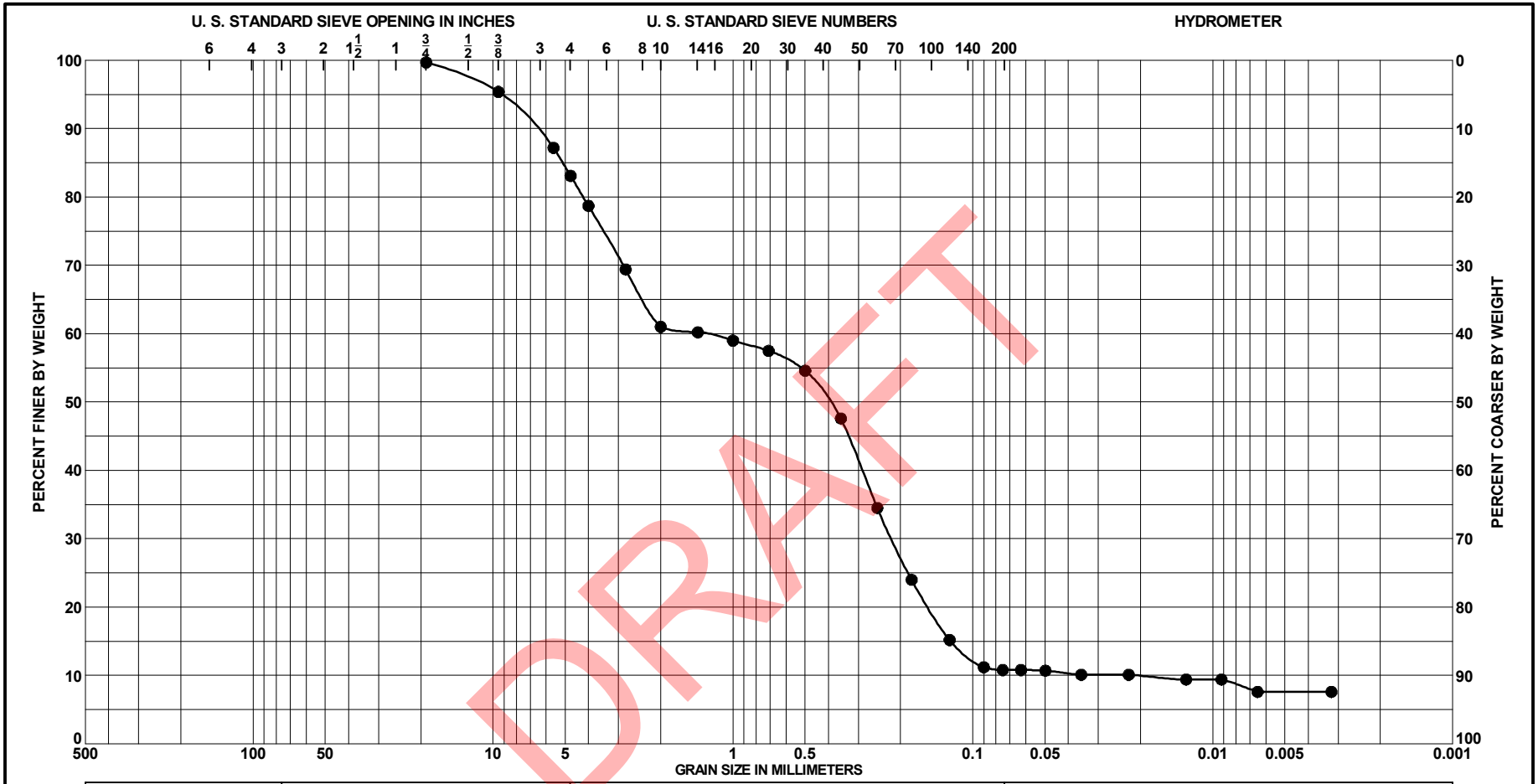

Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-C-5/11	5.0 to 11.0 Ft.	SAND, w-g /silt, mostly fine-grained	10YR 7/2	42	12	2.71	2		20	18	2
		s-sized quartz, some sand to gr-sized									
		shell, few medium-grained s-sized									
		limestone, few silt, light gray									
		(SW-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

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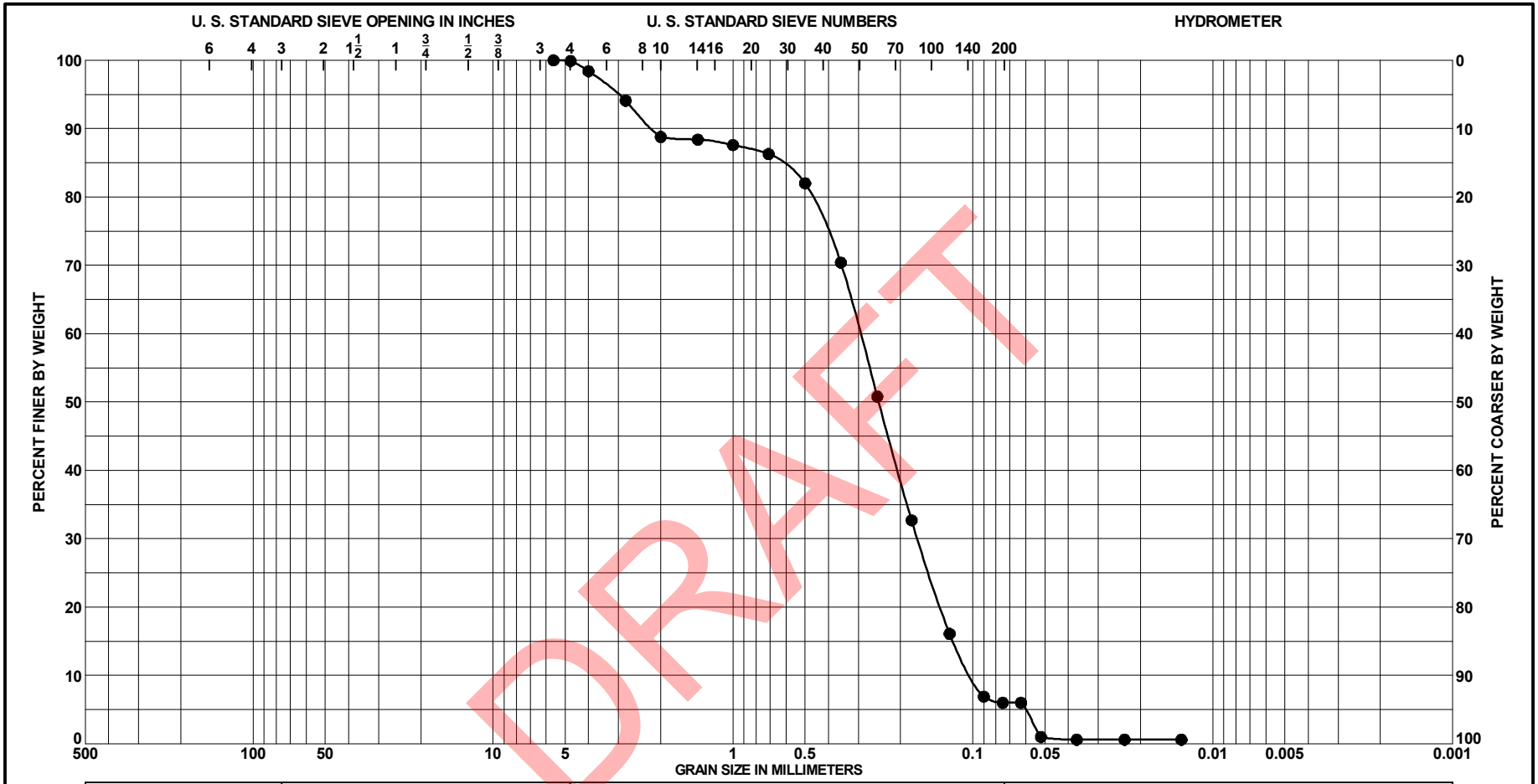
JUN 02

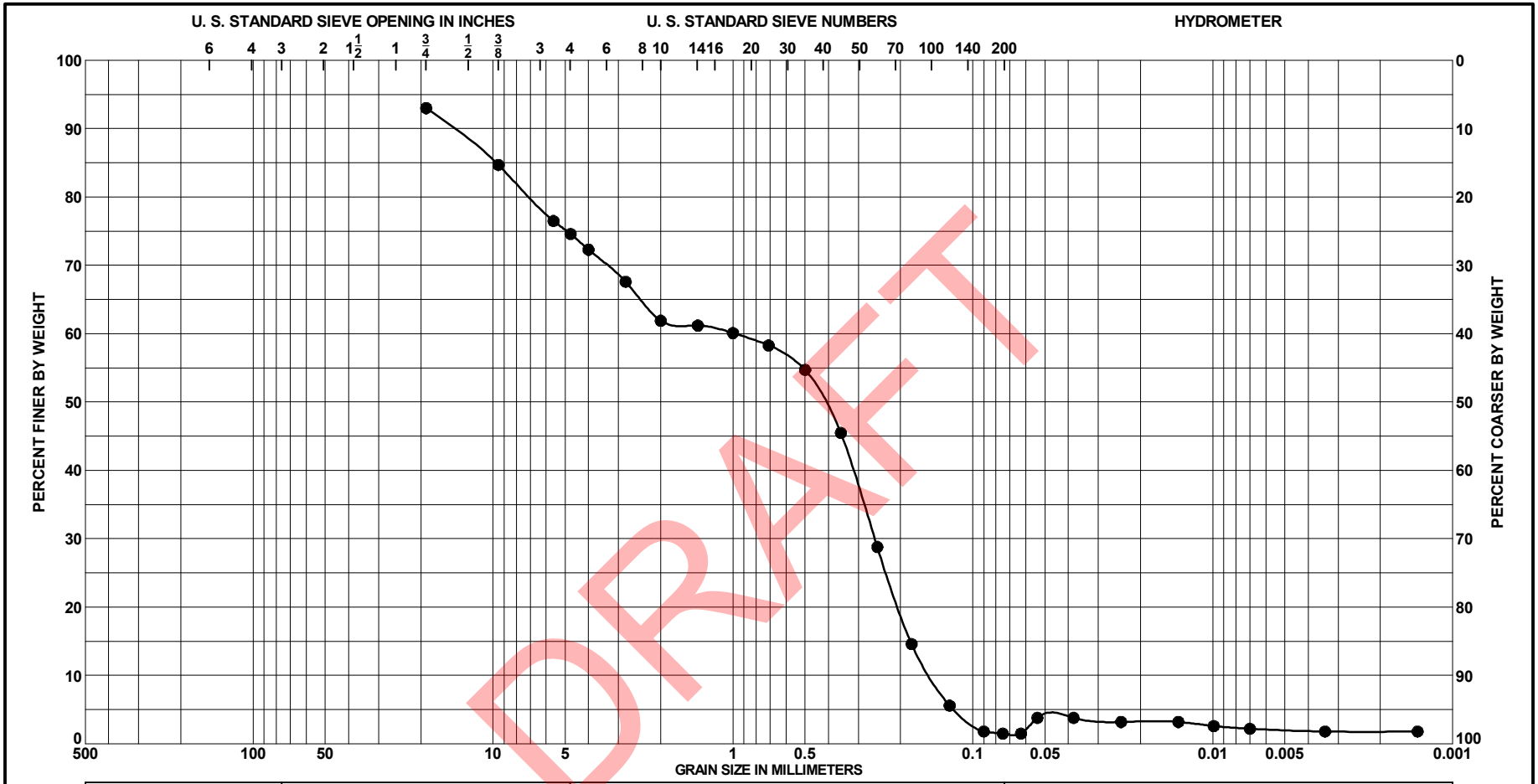


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●LW-C-5/11	5.0 to 11.0 Ft.	SAND, p-g w/ silt, mostly fine to	10YR 7/2	0	7	2.44	1		0	0	NP
		med-grained sand-sized quartz, little									
		med to coarse-grained sand-sized									
		limestone, few silt, light gray (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

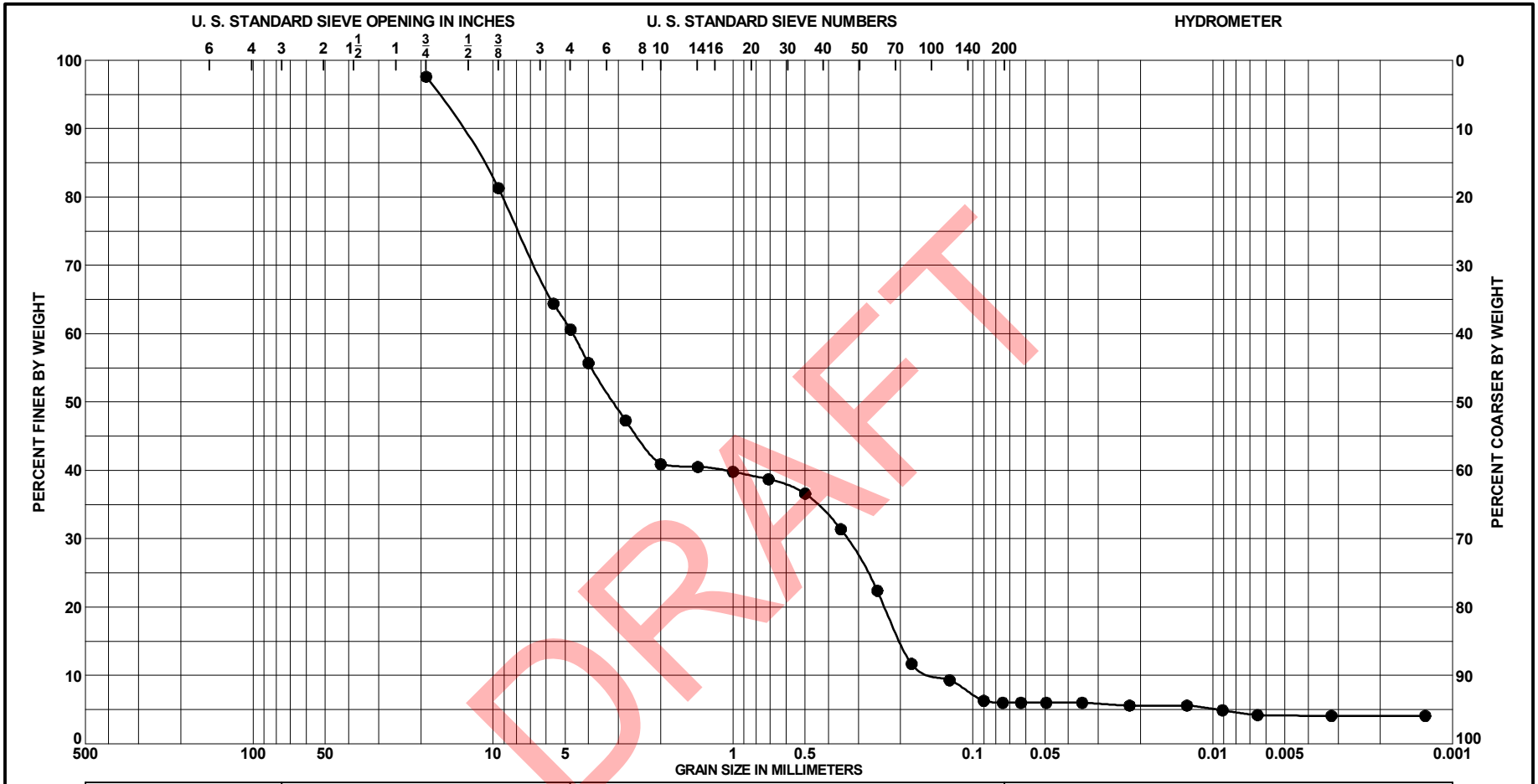


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-C-5/11	5.0 to 11.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt, trace shell, light gray (SP)	10YR 7/2	3	11	2.61	0		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

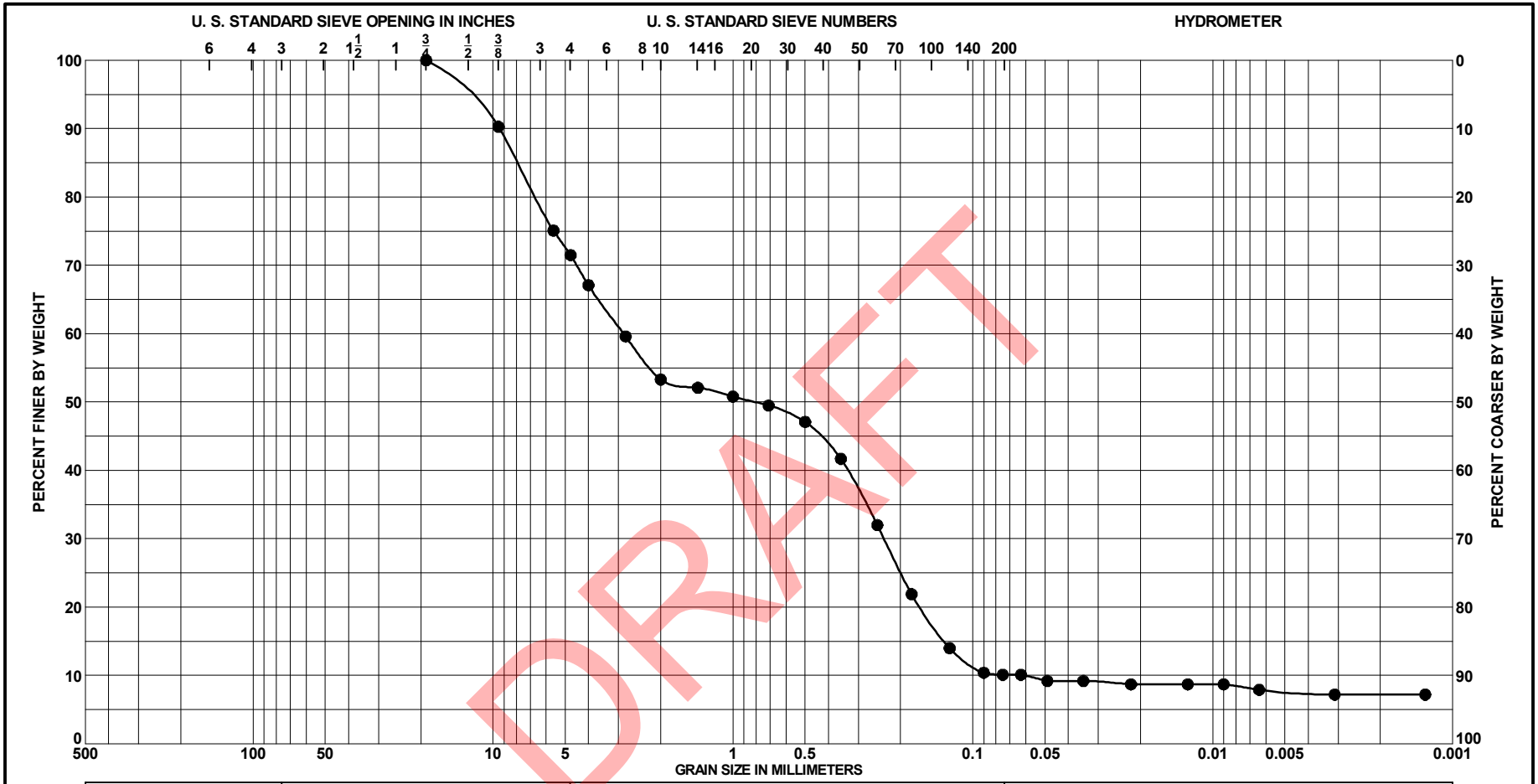


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-5/7	5.0 to 7.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 7/2	2	12	2.65	0		21	18	3
		fine-grained sand-sized quartz, little									
		sand to gravel-sized limestone, few									
		silt, trace shell, light gray (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-9/11	9.0 to 11.0 Ft.	SAND, p-g with clay, some	5G 6/1	24	24	2.67	2		23	17	6
		fine-grained sand-sized quartz, little									
		sand to gravel-sized limestone, little									
		sand to gravel-sized shell, few clay,									
		greenish gray (SP-SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-514A
BORING ELEV.	24.3 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-514A UW-S-2/5								
14%	1	7	0.81	121.1	11.8	122.9	10.0	630
	2	7	0.81	121.1	11.8	122.8	10.0	690
	3	7	0.77	121.1	11.8	123.6	9.4	810
	4	28	0.77	121.1	11.8	123.6	9.4	NT
	5	28	0.81	121.1	11.8	122.7	9.9	NT
	6	28	0.81	121.1	11.8	122.5	9.9	NT
CP14-IRC44-TP-514A UW-C-5/11								
14%	1	7	0.97	120.9	11.5	120.7	11.9	820
	2	7	0.97	120.9	11.5	120.7	11.9	965
	3	7	0.96	120.9	11.5	120.8	11.8	945
	4	28	0.96	120.9	11.5	120.7	11.8	NT
	5	28	0.94	120.9	11.5	120.7	11.6	NT
	6	28	0.94	120.9	11.5	121.1	11.6	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-514A LW-S-2/5								
14%	1	7	2.89	123.3	10.6	123.8	9.6	1195
	2	7	2.34	123.3	10.6	124.2	9.6	1205
	3	7	2.43	123.3	10.6	124.3	9.6	1135
	4	28	0.79	123.3	10.6	123.7	9.6	NT
	5	28	0.79	123.3	10.6	123.6	9.7	NT
	6	28	0.79	123.3	10.6	123.6	9.7	NT
CP14-IRC44-TP-514A LW-C-5/11								
14%	1	7	0.81	125.3	11	125.7	10.0	765
	2	7	0.81	125.3	11	125.4	10.0	1370
	3	7	0.88	125.3	11	124.5	10.8	1250
	4	28	0.88	125.3	11	124.7	10.8	NT
	5	28	0.92	125.3	11	123.9	11.2	NT
	6	28	0.92	125.3	11	123.9	11.2	NT

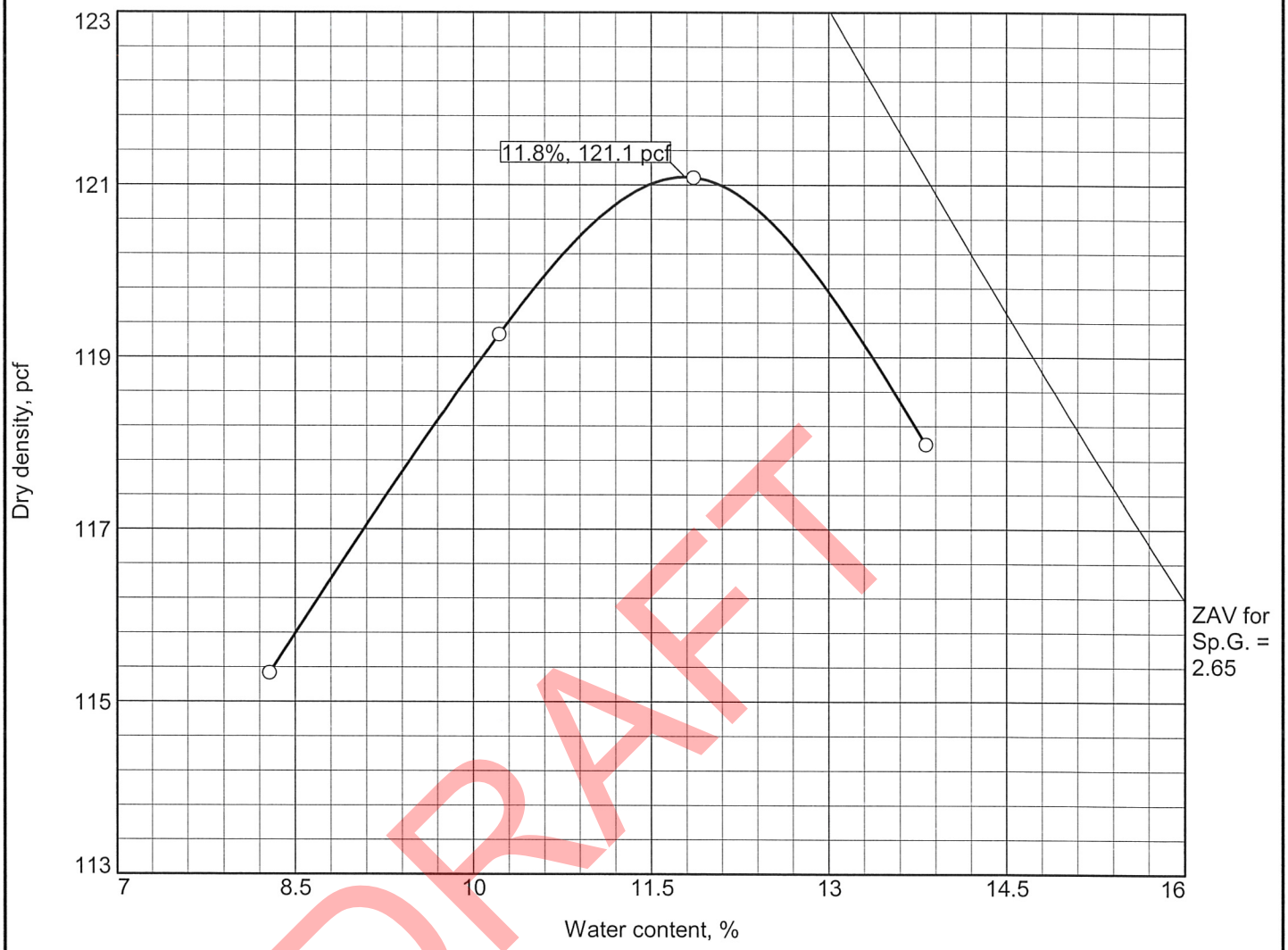
NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-514A MdW-S-2/5								
14%	1	7	0.62	123.9	8.9	124.1	7.6	790
	2	7	0.62	123.9	8.9	124.1	7.6	1195
	3	7	0.69	123.9	8.9	123.2	8.5	990
	4	28	0.69	123.9	8.9	123.5	8.5	1585
	5	28	0.67	123.9	8.9	123.5	8.2	1240
	6	28	0.67	123.9	8.9	123.5	8.2	1340
CP14-IRC44-TP-514A MdW-C-5/11								
14%	1	7	0.67	125.1	9.4	122.8	8.2	1120
	2	7	0.67	125.1	9.4	122.5	8.2	1385
	3	7	0.71	125.1	9.4	122.0	8.7	1265
	4	28	0.71	125.1	9.4	122.0	8.7	1785
	5	28	0.70	125.1	9.4	123.0	8.6	1855
	6	28	0.70	125.1	9.4	123.0	8.6	1660

Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		PSI*			AVG.*
		1	2	3	
TP-514A	UW-S-2/5				
TP-514A	LW-S-2/5	**720**	**1235**	**1115**	1023
TP-514A	MdW-S-2/5	**860**	**925**	**870**	885
TP-514A	UW-C-5/11				
TP-514A	LW-C-5/11				
TP-514A	MdW-C-5/11	**1135**	**1035**	**1155**	1108

* Testing still in progress

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP-SM	A-2-4(0)			20	2	5.5	11.3

TEST RESULTS

Maximum dry density = 121.1 pcf

Optimum moisture = 11.8 %

MATERIAL DESCRIPTION

SAND, poorly-graded with silt, mostly fine-grained sand sized quartz, little sand to gravel-sized limestone, few silt, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-514A **Sample Number:** UW-S-2/5

AMEC E&I

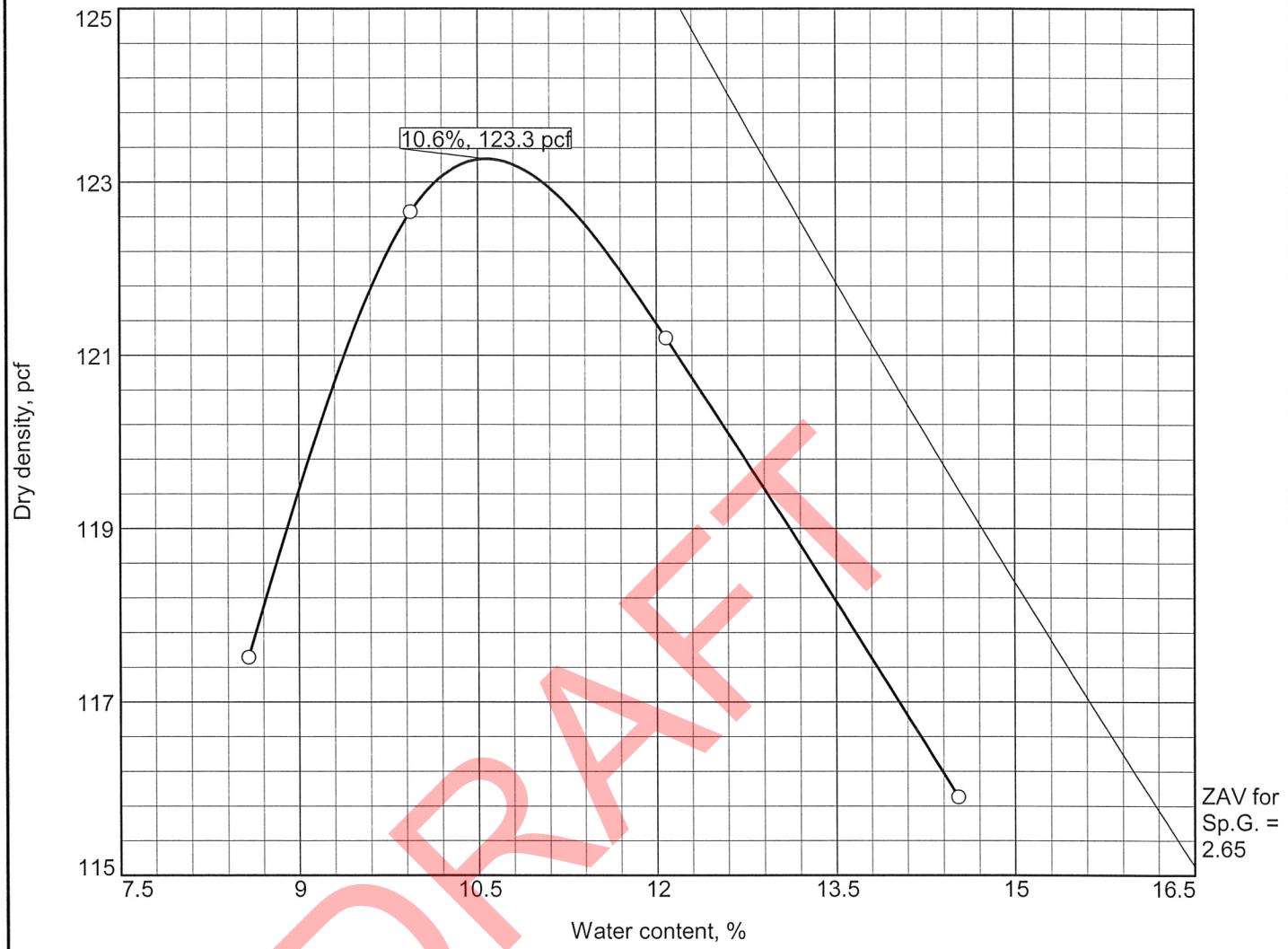
Jacksonville, Florida

Remarks:

Figure

Tested By: W. Martin **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NV	NP	24.8	3.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.3 pcf Optimum moisture = 10.6 %	SAND, poorly-graded with silt, mostly fine-grained sand sized quartz, little sand to gravel-sized limestone, few silt, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-514A **Sample Number:** LW-S-2/5

AMEC E&I

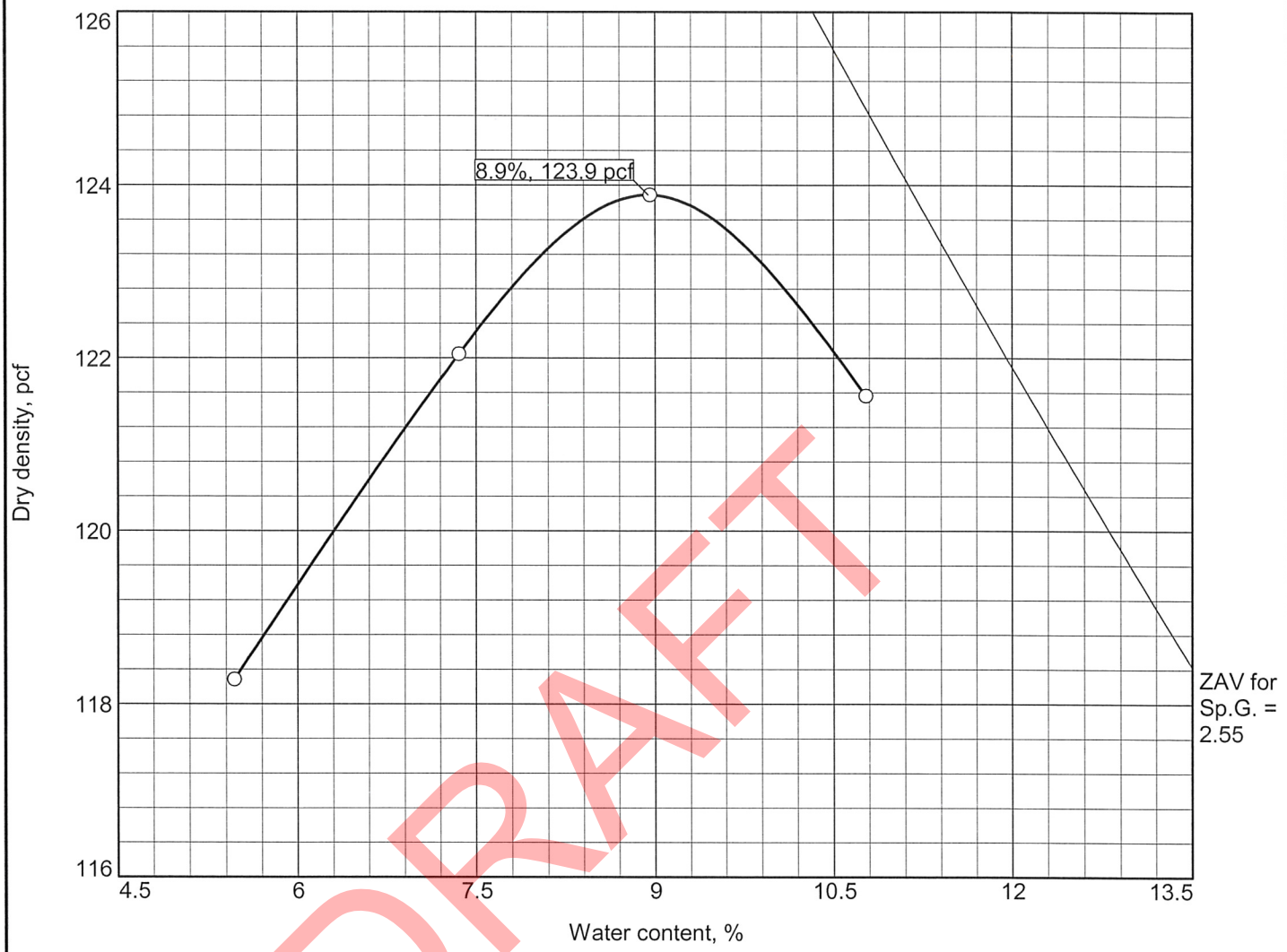
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NV	NP	17.7	2.4

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.9 pcf Optimum moisture = 8.9 %	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, little sand to gravel-sized limestone, few silt, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-514A **Sample Number:** MdW-S-2/5

AMEC E&I

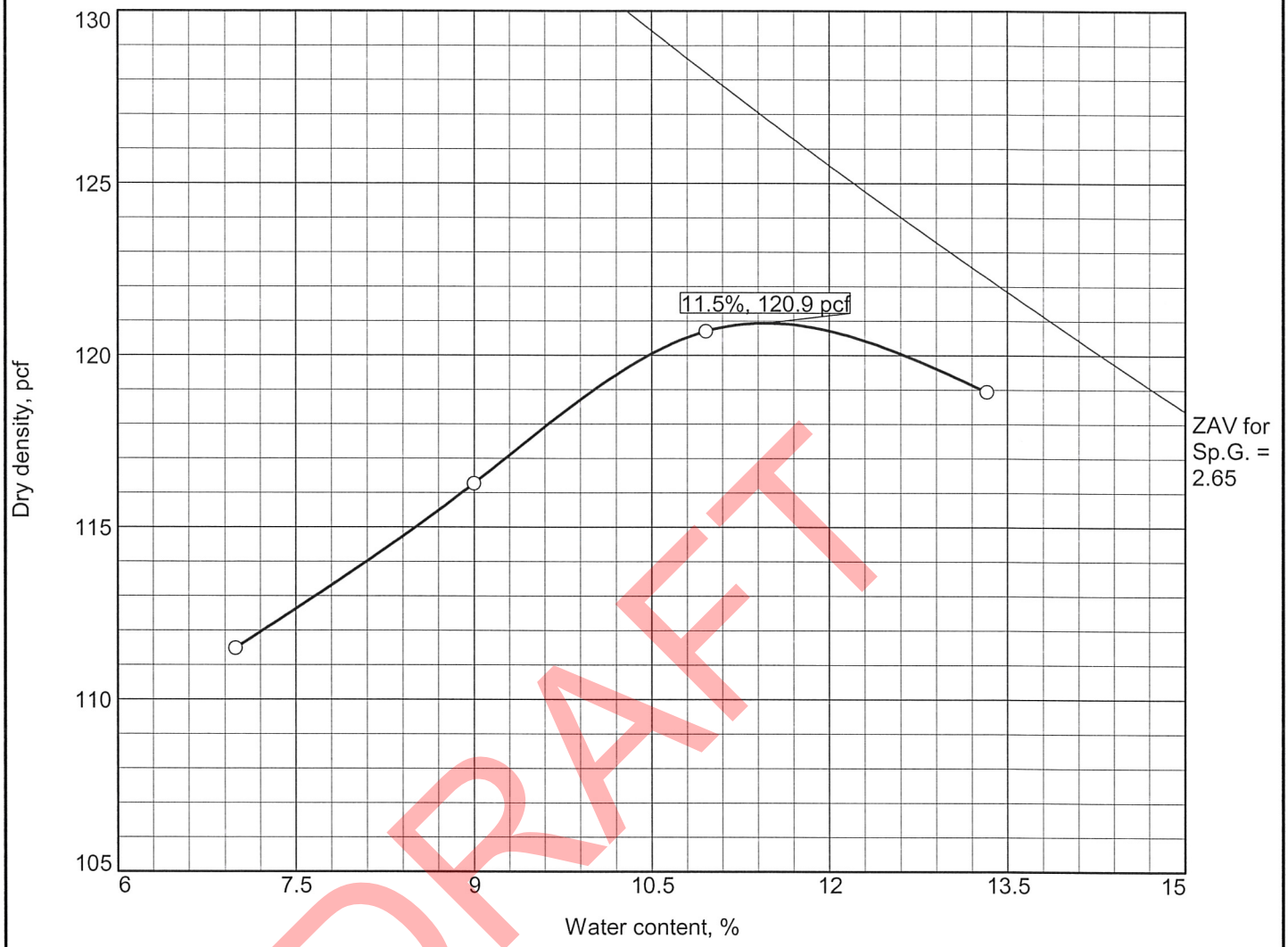
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SW-SM	A-2-4(0)			20	2	16.9	10.8

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.9 pcf Optimum moisture = 11.5 %	SAND, w-g /silt, mostly fine-grained s-sized quartz, some sand to gr-sized shell, few medium-grained s-sized limestone, few silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-514A **Sample Number:** UW-C-5/11

AMEC E&I

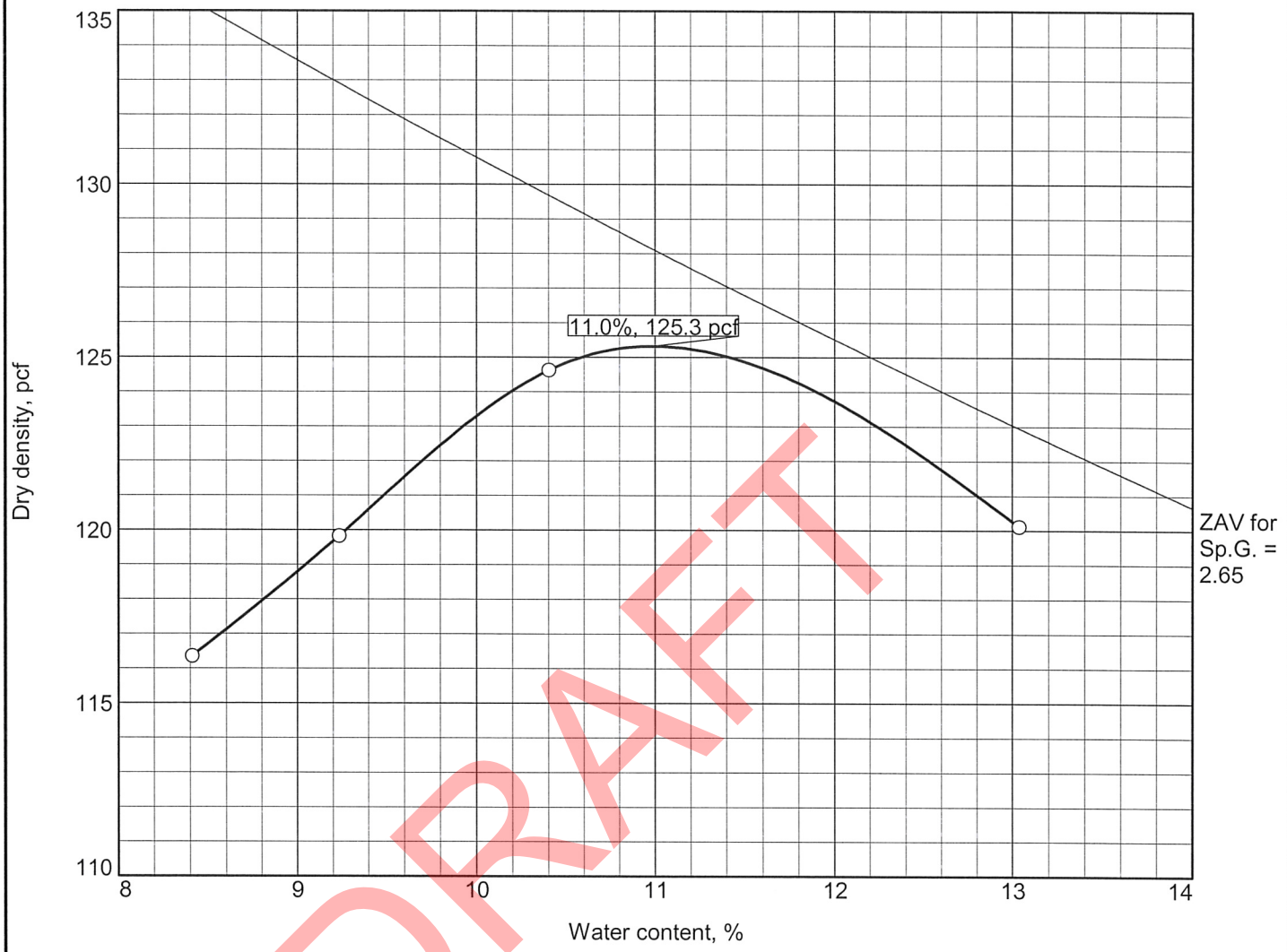
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP-SM	A-3			NP	NP	0.1	6.0

TEST RESULTS

Maximum dry density = 125.3 pcf

Optimum moisture = 11.0 %

MATERIAL DESCRIPTION

SAND, p-g w/ silt, mostly fine to med-grained sand-sized quartz, little med to coarse-grained sand-sized limestone, few silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-514A **Sample Number:** LW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: W. Martin **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT

Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-3			NP	NP	25.4	1.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 125.1 pcf Optimum moisture = 9.4 %	SAND, poorly-graded, mostly fine to medium-grained sand sized quartz, some sand to gravel-sized limestone, trace silt, trace

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-514A **Sample Number:** MdW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-514A UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.84	121.1	11.80	123.0	10.1	NT	NT	--
		0.84	121.1	11.80	123.0	10.1	NT	NT	--
Freezing and Thawing	14	0.84	121.1	11.80	125.6	10.0	NT	NT	--
		0.84	121.1	11.80	126.1	10.0	NT	NT	--
CP14-IRC44-TP-514A UW-C-5/11									
Wetting and Drying	14	0.94	120.9	11.50	120.3	11.5	NT	NT	--
		0.94	120.9	11.50	120.8	11.5	NT	NT	--
Freezing and Thawing	14	0.92	120.9	11.50	120.9	11.3	NT	NT	--
		0.92	120.9	11.50	120.7	11.3	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-514A LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.78	123.3	10.60	124.0	9.5	130.8	0.2	--
		0.78	123.3	10.60	124.0	9.5	130.1	0.2	--
Freezing and Thawing	14	0.76	123.3	10.60	124.2	9.3	NT	NT	--
		0.76	123.3	10.60	124.2	9.3	NT	NT	--
CP14-IRC44-TP-514A LW-C-5/11									
Wetting and Drying	14	0.94	120.9	11.50	120.3	11.5	NT	NT	--
		0.94	120.9	11.50	120.8	11.5	NT	NT	--
Freezing and Thawing	14	0.92	120.9	11.50	120.9	11.3	NT	NT	--
		0.92	120.9	11.50	120.7	11.3	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-514A MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.75	123.9	8.90	123.2	9.0	NT	NT	--
		0.75	123.9	8.90	122.6	9.0	NT	NT	--
Freezing and Thawing	14	0.72	123.9	8.90	123.0	8.7	NT	NT	--
		0.72	123.9	8.90	123.0	8.7	NT	NT	--
CP14-IRC44-TP-514A MdW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.74	125.1	9.40	122.0	9.1	NT	NT	--
		0.74	125.1	9.40	122.6	9.1	NT	NT	--
Freezing and Thawing	14	0.71	125.1	9.40	122.1	8.7	NT	NT	--
		0.71	125.1	9.40	122.4	8.7	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trial No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-514A						
2-5	UW-S-2/5	1	12.9	2.1	17	16
		2	12.6	1.9	16	
		3	12.7	2.0	16	
	LW-S-2/5	1	12.7	3.5	28	28
		2	12.5	3.5	28	
		3	12.3	3.5	29	
	MdW-S-2/5	1	10.6	3.5	33	33
		2	10.0	3.2	32	
		3	10.3	3.6	35	
5-11	UW-C-5/11	1	13.5	2.2	17	17
		2	13.5	2.3	17	
		3	13.5	2.3	17	
	LW-C-5/11	1	11.8	3.3	28	28
		2	11.7	3.2	28	
		3	11.7	3.3	29	
	MdW-C-5/11	1	7.0	3.5	50	50
		2	7.1	3.6	51	
		3	7.1	3.5	50	

Test Pit 514 View SE – Site Preparation

Test Pit 514 View SE – Site Preparation

Test Pit 514A View S - Excavation

Test Pit 514A View E – Depth Measurement

Test Pit 514A View E – Depth Measurement

Test Pit 514A View E - Depth Measurement

Test Pit 514A View S

Test Pit 514A View E

Test Pit 514A View N

Test Pit 514A View W

Test Pit 514A View W – Sampling and Staging Area

Test Pit 514A View SE – Backfilled Condition

Boring Designation CP14-IRC44-TP-515

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 2 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT: C-44 RSTA-Geotechnical Investigation-Phase V Phase V		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP14-IRC44-TP-515	LOCATION COORDINATES: X = 1,001,649 Y = 835,607	11. MANUFACTURER'S DESIGNATION OF DRILL: Komatsu 210 LC	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Phillips & Jordan	CONTRACTOR FILE NO.: 6734-14-9799	12. TOTAL SAMPLES	DISTURBED: 8 / UNDISTURBED (UD): 0
4. NAME OF DRILLER: Chuck Floyd		13. TOTAL NUMBER CORE BOXES: 0	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL:	BEARING:	14. ELEVATION GROUND WATER
		15. DATE BORING	STARTED: 12-10-14 / COMPLETED: 12-10-14
6. THICKNESS OF OVERBURDEN: N/A		16. ELEVATION TOP OF BORING: 26.5 Ft.	
7. DEPTH DRILLED INTO ROCK: N/A		17. TOTAL RECOVERY FOR BORING: N/A	
8. TOTAL DEPTH OF BORING: 12.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
26.5	0.0						26.5		
			SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, few silt, 10YR 3/2 very dark grayish brown (SP-SM)				Test Pit		
			At El. 25.5 Ft., few cemented nodules, 10YR 8/3 very pale brown						
24.5	2.0						24.5		
			SAND, poorly-graded with clay, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, few clay, 10YR 8/3 very pale brown (SP-SC)				24.5		
					MdW-S-2/5 LW-S-2/5 UW-S-2/5				
			At El. 22.5 Ft., 10YR 6/2 light brownish gray						
21.5	5.0						21.5		
			SAND, clayey, some fine-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, 10YR 6/2 light brownish gray (SC)				21.5 21.5		
					UW-R-5/7		21.5		
19.5	7.0								
			SAND, clayey, mostly fine-grained sand-sized quartz (SC)						
					MdW-C-5/11 LW-C-5/11 UW-C-5/11				
17.5	9.0						17.5		
			SAND, well-graded with silt, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, few silt, 5BG 5/1 greenish gray (SW-SM)						
			At El. 16.5 Ft., 10YR 7/3 very pale brown		UW-R-9/11				
14.5	12.0						14.5		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System.				Abbreviations:		

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 2 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
C-44 RSTA-Geotechnical Investigation-Phase V	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 1,001,649 Y = 835,607	26.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
UW-S-2/5	2.0/5.0	SP-SC
LW-S-2/5	2.0/5.0	SP
MdW-S-2/5	2.0/5.0	SP
UW-C-5/11	5.0/11.0	SC
LW-C-5/11	5.0/11.0	SP
MdW-C-5/11	5.0/11.0	SP
UW-R-5/7	5.0/7.0	SC
UW-R-9/11	9.0/11.0	SW-SM

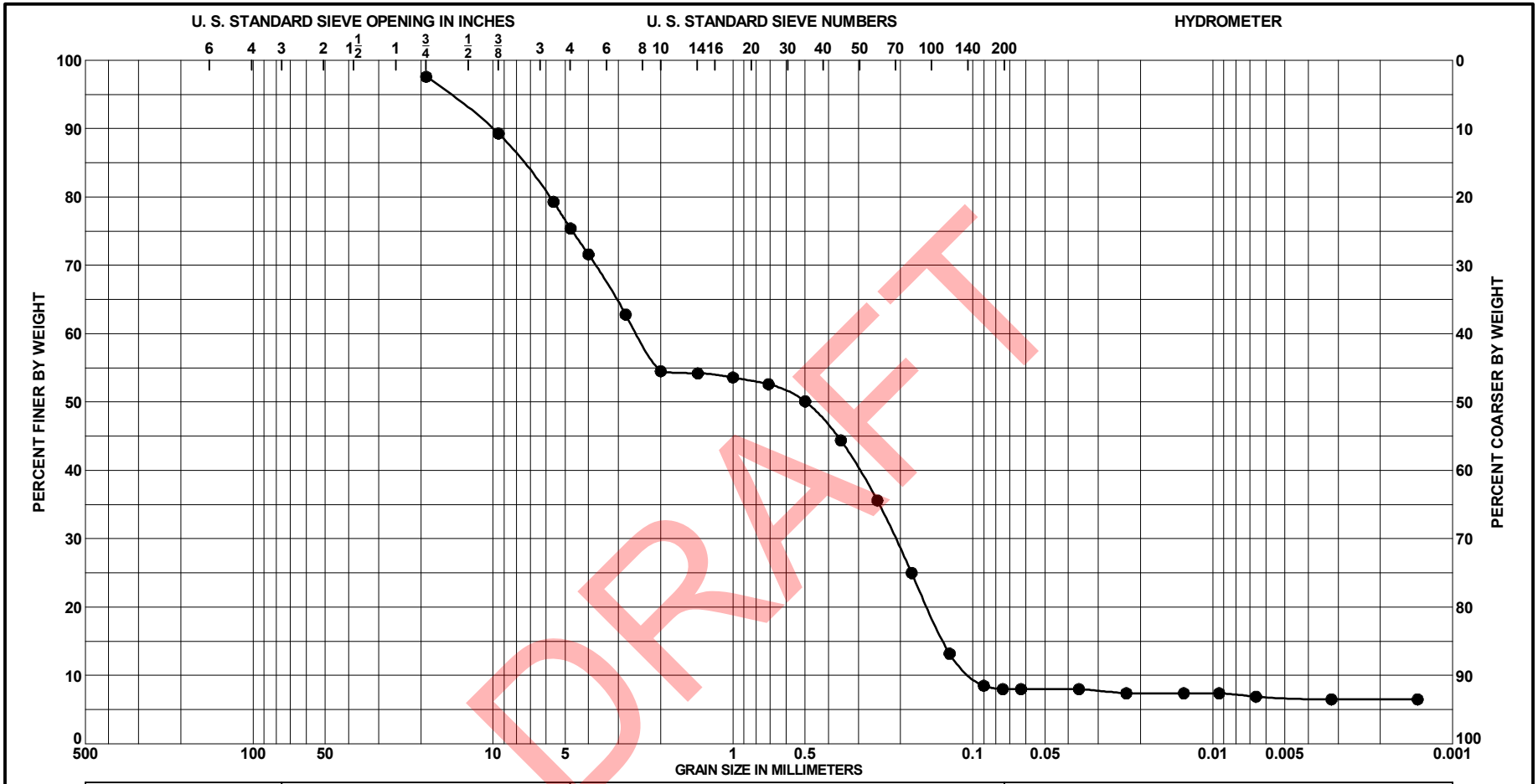
not on atterberg limits.

4. Additional Laboratory Testing

UW-S-2/5Specific Gravity
UW-S-2/5Atterberg
UW-S-2/5Percent Organic
UW-S-2/5Percent Carbonate
UW-S-2/5Percent Visual Shell
LW-S-2/5Specific Gravity
LW-S-2/5Atterberg
LW-S-2/5Percent Organic
LW-S-2/5Percent Carbonate
LW-S-2/5Percent Visual Shell
MdW-S-2/5Specific Gravity
MdW-S-2/5Atterberg
MdW-S-2/5Percent Organic
MdW-S-2/5Percent Carbonate
MdW-S-2/5Percent Visual Shell
UW-C-5/11Specific Gravity
UW-C-5/11Atterberg
UW-C-5/11Percent Organic
UW-C-5/11Percent Carbonate
UW-C-5/11Percent Visual Shell
LW-C-5/11Specific Gravity
LW-C-5/11Atterberg
LW-C-5/11Percent Organic
LW-C-5/11Percent Carbonate
LW-C-5/11Percent Visual Shell
MdW-C-5/11Specific Gravity
MdW-C-5/11Atterberg
MdW-C-5/11Percent Organic
MdW-C-5/11Percent Carbonate
MdW-C-5/11Percent Visual Shell
UW-R-5/7Specific Gravity
UW-R-5/7Atterberg
UW-R-5/7Percent Organic
UW-R-5/7Percent Carbonate
UW-R-5/7Percent Visual Shell
UW-R-9/11Specific Gravity
UW-R-9/11Atterberg
UW-R-9/11Percent Organic
UW-R-9/11Percent Carbonate
UW-R-9/11Percent Visual Shell

15
20
25
30
35

Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-515	UW-S-2/5	2.0	5.0	SP-SC	20	15	5	2.2	2.68	22.2	67.4	8	1.6	6.4	7.64	0	9.2
CP14-IRC44-TP-515	LW-S-2/5	2.0	5.0	SP	0	0	0	1.5	2.54	25.5	70.4	3.4	2.8	0.6	8.1	0	8.1
CP14-IRC44-TP-515	MdW-S-2/5	2.0	5.0	SP	0	0	0	0.3	2.62	0	97.5	2.5	1.7	0.8	7.46	0.4	8.4
CP14-IRC44-TP-515	UW-C-5/11	5.0	11.0	SC	24	12	12	3	2.69	7.4	76.7	14.6	2.2	12.4	8.95	0.1	8.6
CP14-IRC44-TP-515	LW-C-5/11	5.0	11.0	SP	0	0	0	0.7	2.75	16.4	74.6	4.2	2.6	1.6	13.6	0.5	8.8
CP14-IRC44-TP-515	MdW-C-5/11	5.0	11.0	SP	0	0	0	0.5	2.66	20.6	75.6	2.6	1.7	0.9	7.04	0.3	9.5
CP14-IRC44-TP-515	UW-R-5/7	5.0	7.0	SC	28	15	13	1.5	2.63	11.7	68.4	19.9	6.5	13.4	14.21	0	8.6
CP14-IRC44-TP-515	UW-R-9/11	9.0	11.0	SW-SM	0	0	0	1.2	2.67	5.6	84.1	10	0.6	9.4	1.95	0	8.5



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-S-2/5	2.0 to 5.0 Ft.	SAND, p-g w/clay, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, few clay, very pale brown (SP-SC)	10YR 8/3	0	8	2.68	2		20	15	5

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
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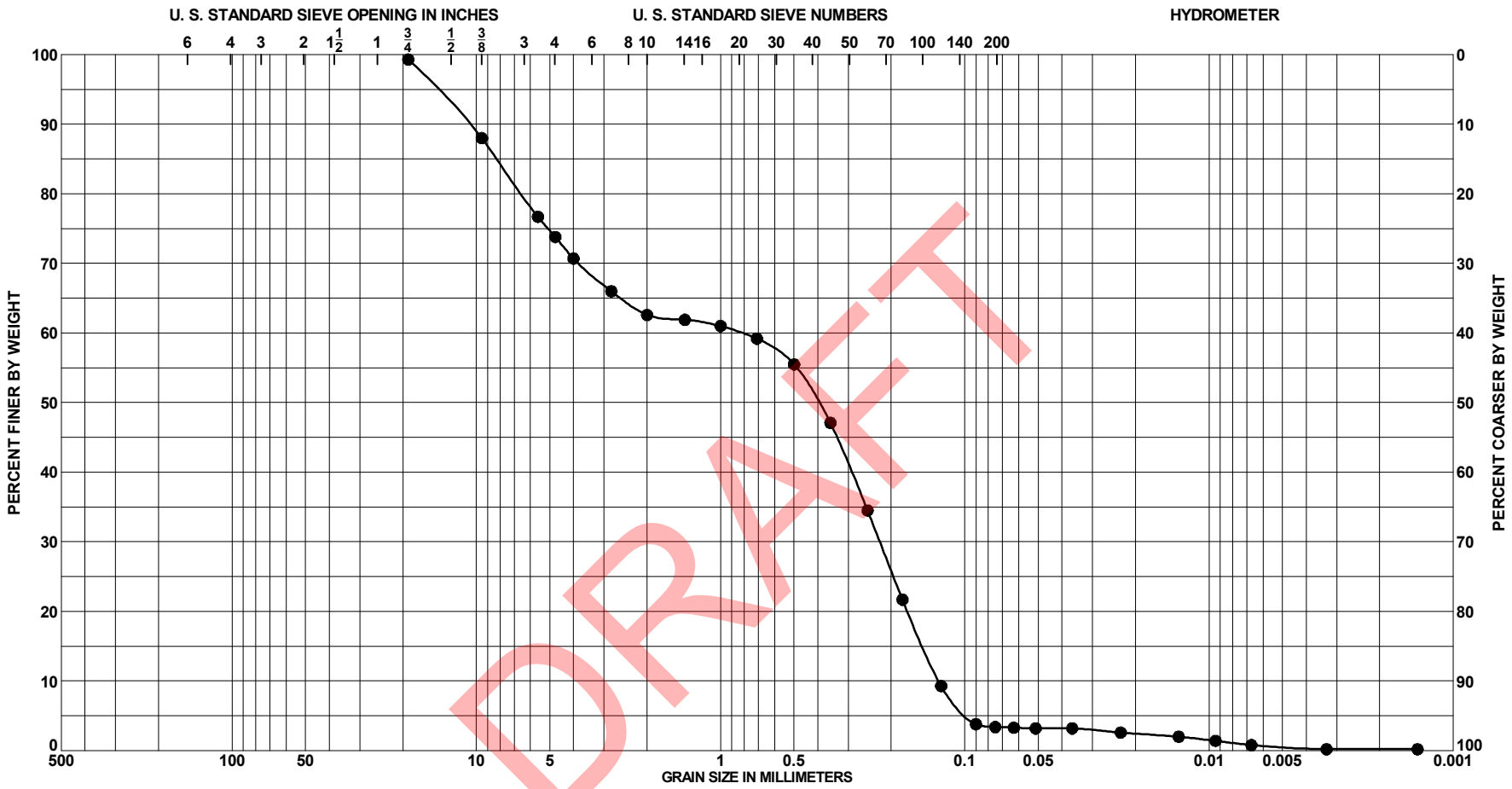
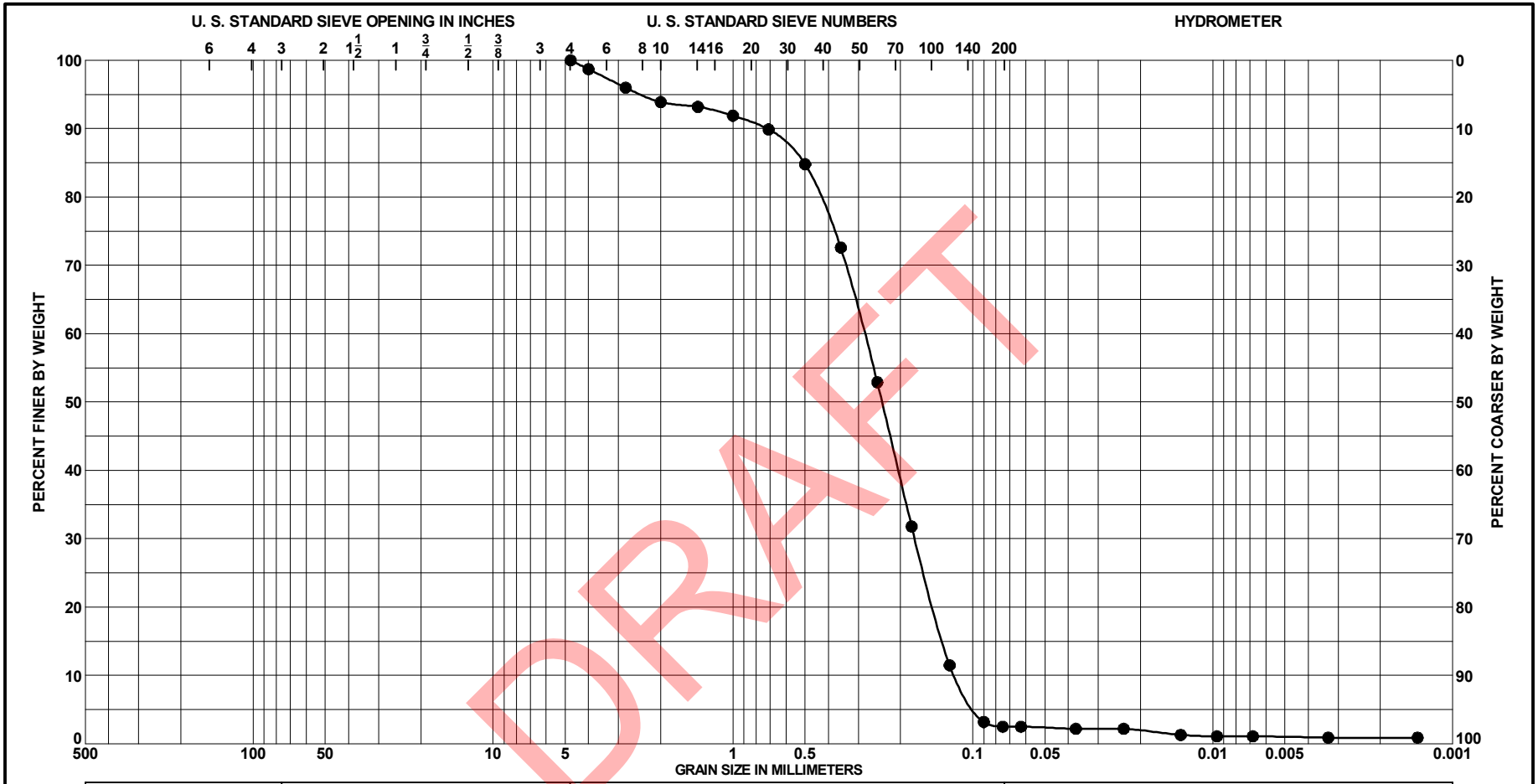


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
● LW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly	10YR 8/3	0	8	2.54	2		0	0	NP
		fine-grained sand-sized quartz, some									
		sand to gravel-sized limestone, trace									
		silt, very pale brown (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

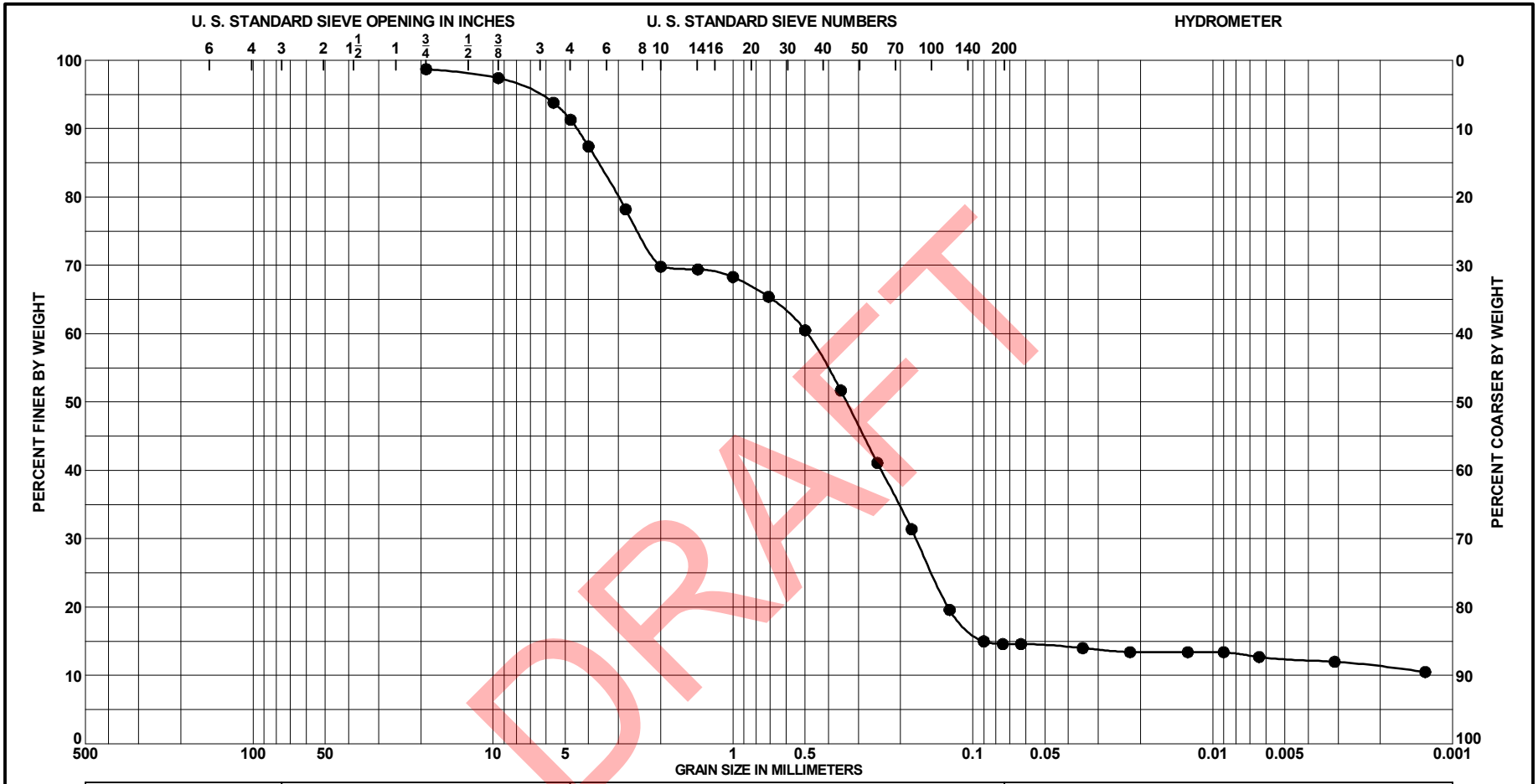


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●MdW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly	10YR 8/3	0	7	2.62	0		0	0	NP
		fine-grained sand-sized quartz, little									
		medium to coarse-grained sand-sized									
		limestone, trace silt, very pale brown									
		(SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

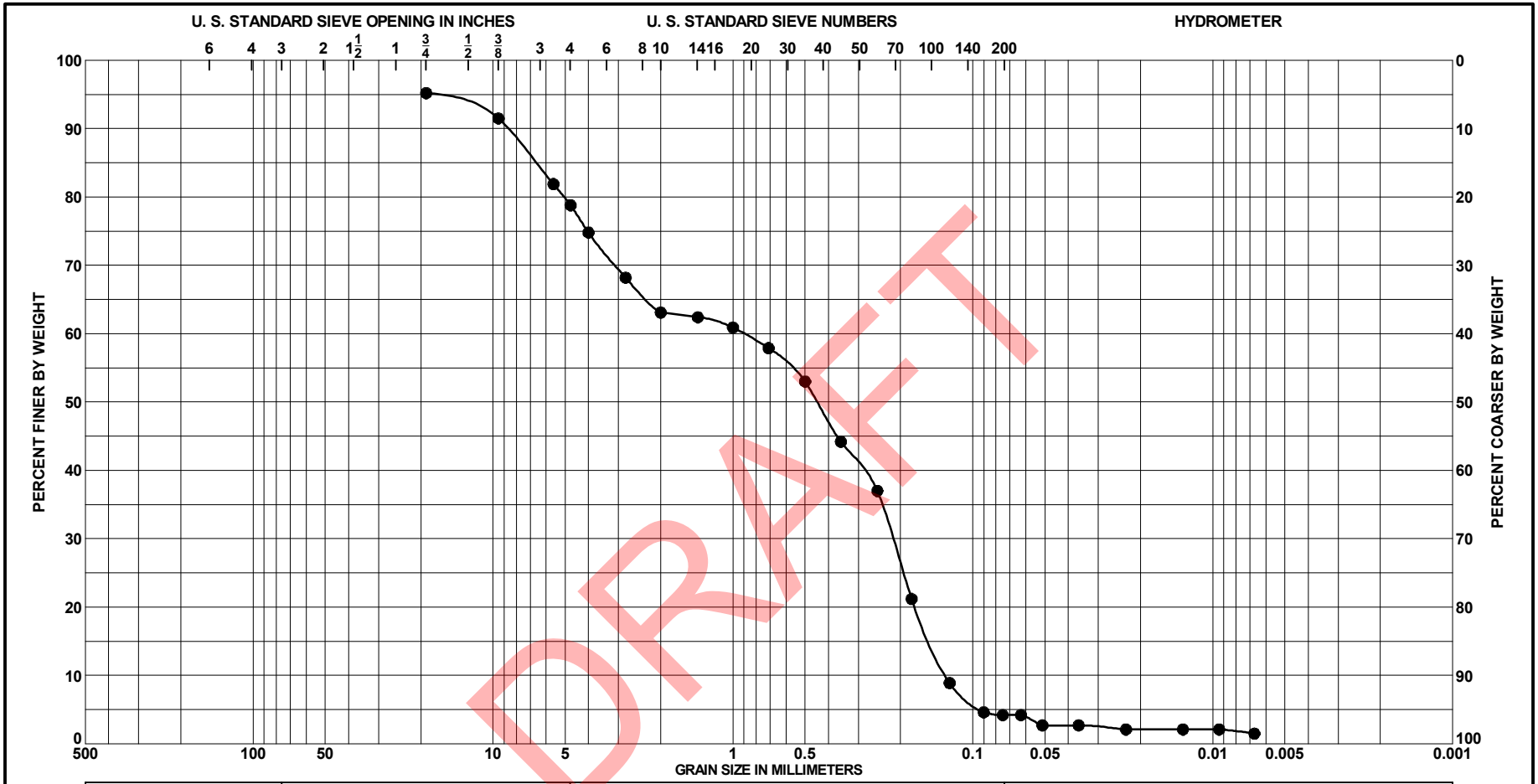


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
UW-C-5/11	5.0 to 11.0 Ft.	SAND, clayey, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, light brownish gray (SC)	10YR 6/2	0	9	2.69	3		24	12	12

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

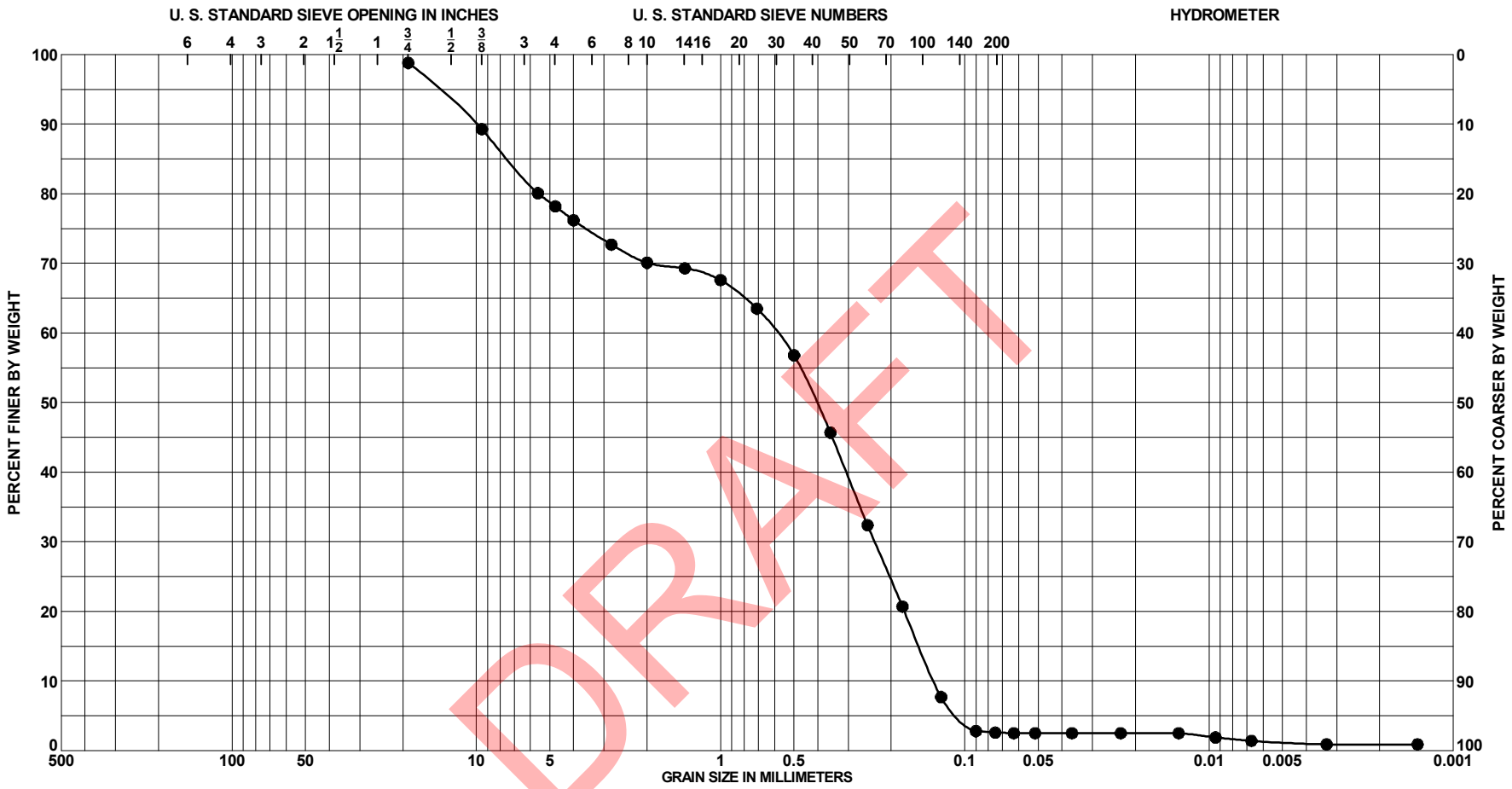


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●LW-C-5/11	5.0 to 11.0 Ft.	SAND, p-g, mostly fine to	10YR 6/2	1	14	2.75	1		0	0	NP
		medium-grained sand-sized quartz,									
		some sand to gravel-sized limestone,									
		trace silt, trace shell, light brownish									
		gray (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

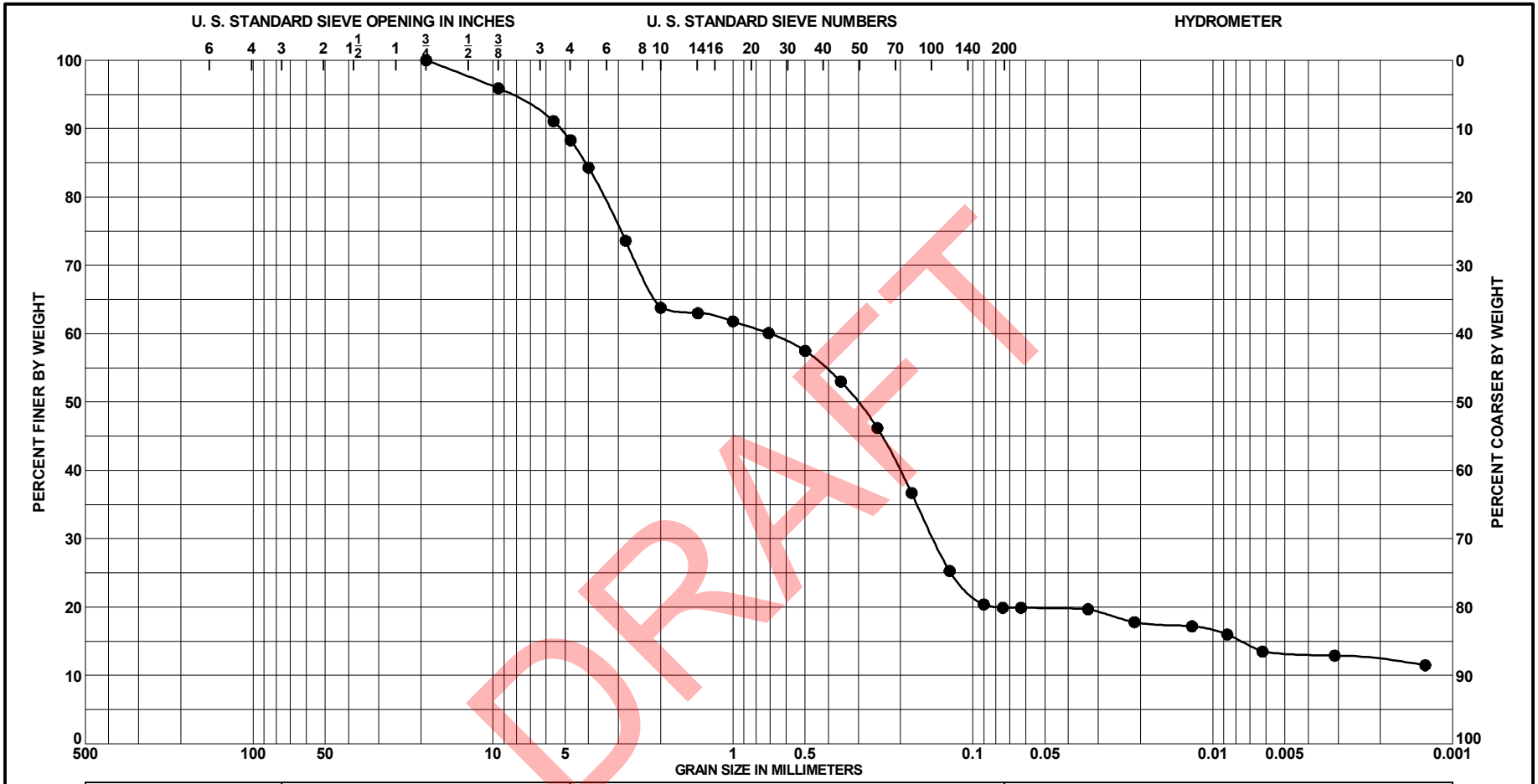


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-C-5/11	5.0 to 11.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt, light brownish gray (SP)	10YR 6/2	0	7	2.66	1		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

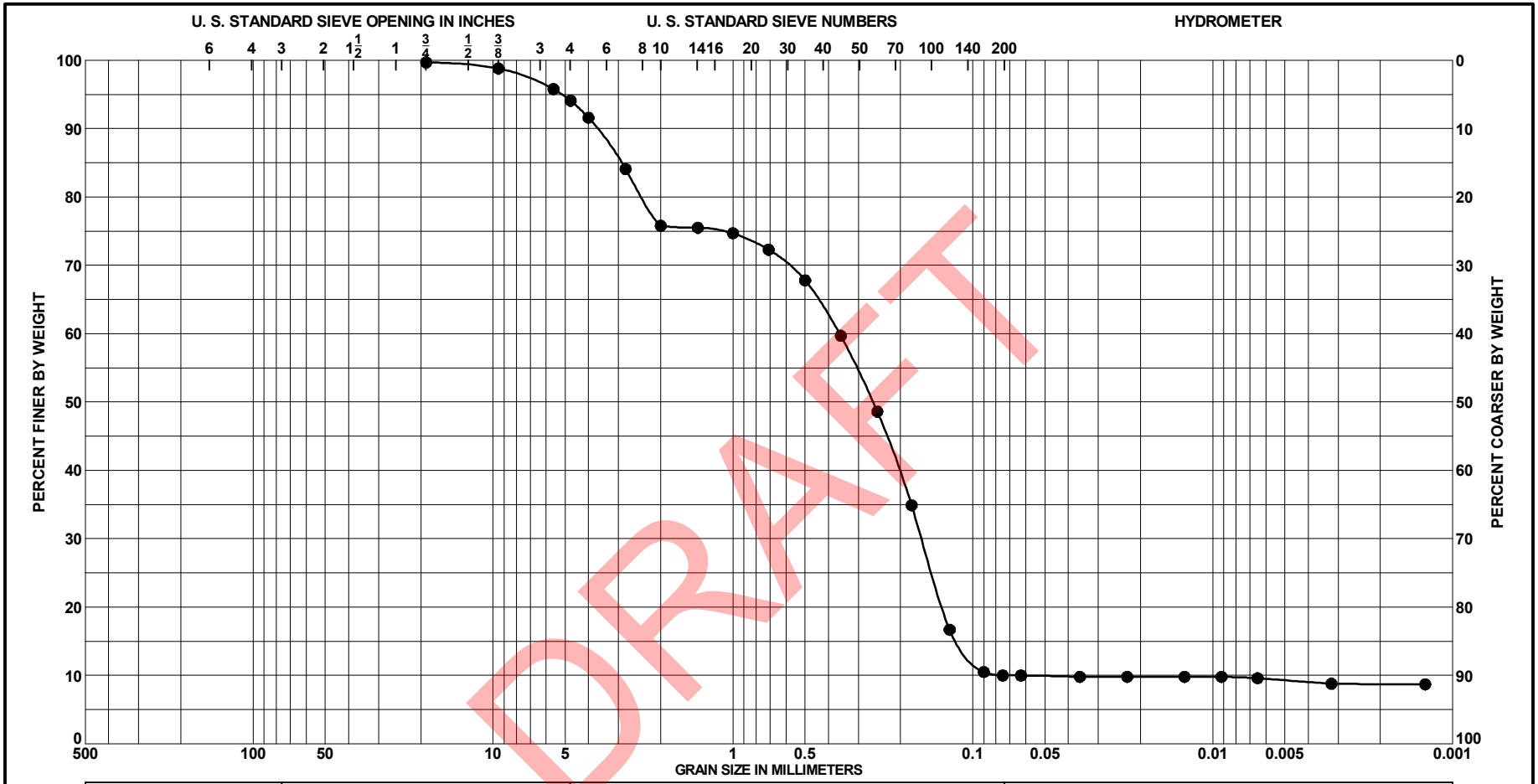


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-5/7	5.0 to 7.0 Ft.	SAND, clayey, some fine-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, light brownish gray (SC)	10YR 6/2	0	14	2.63	2		28	15	13

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-9/11	9.0 to 11.0 Ft.	SAND, w-g w/silt, mostly fine to	5BG 5/1	0	2	2.67	1		0	0	NP
		medium-grained sand-sized quartz,									
		some sand to gravel-sized limestone,									
		few silt, greenish gray (SW-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-515
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-515 UW-S-2/5								
14%	1	7	0.72	123.1	10.4	124.3	8.7	715
	2	7	0.72	123.1	10.4	124.9	8.7	950
	3	7	0.84	123.1	10.4	122.8	10.1	955
	4	28	0.84	123.1	10.4	123.4	10.1	NT
	5	28	0.73	123.1	10.4	124.3	8.8	NT
	6	28	0.73	123.1	10.4	124.6	8.8	NT
CP14-IRC44-TP-515 UW-C-5/11								
14%	1	7	0.84	118.3	12.3	120.1	10.3	835
	2	7	0.84	118.3	12.3	120.1	10.3	625
	3	7	0.85	118.3	12.3	120.3	10.4	765
	4	28	0.85	118.3	12.3	120.0	10.4	NT
	5	28	0.98	118.3	12.3	118.3	12.1	NT
	6	28	0.98	118.3	12.3	118.3	12.1	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-515 LW-S-2/5								
14%	1	7	0.75	123.8	10.1	124.8	9.2	1250
	2	7	0.78	123.8	10.1	124.3	9.5	1305
	3	7	0.78	123.8	10.1	124.4	9.5	1660
	4	28	0.73	123.8	10.1	124.7	8.9	NT
	5	28	0.79	123.8	10.1	124.0	9.6	NT
	6	28	0.78	123.8	10.1	124.1	9.5	NT
CP14-IRC44-TP-515 LW-C-5/11								
14%	1	7	0.81	125.7	9.9	125.1	9.9	940
	2	7	0.81	125.7	9.9	125.1	9.9	1135
	3	7	0.79	125.7	9.9	125.6	9.6	995
	4	28	0.79	125.7	9.9	125.3	9.6	NT
	5	28	0.82	125.7	9.9	125.0	10.0	NT
	6	28	0.82	125.7	9.9	125.0	10.0	NT

NT: Not tested as of date of report preparation.

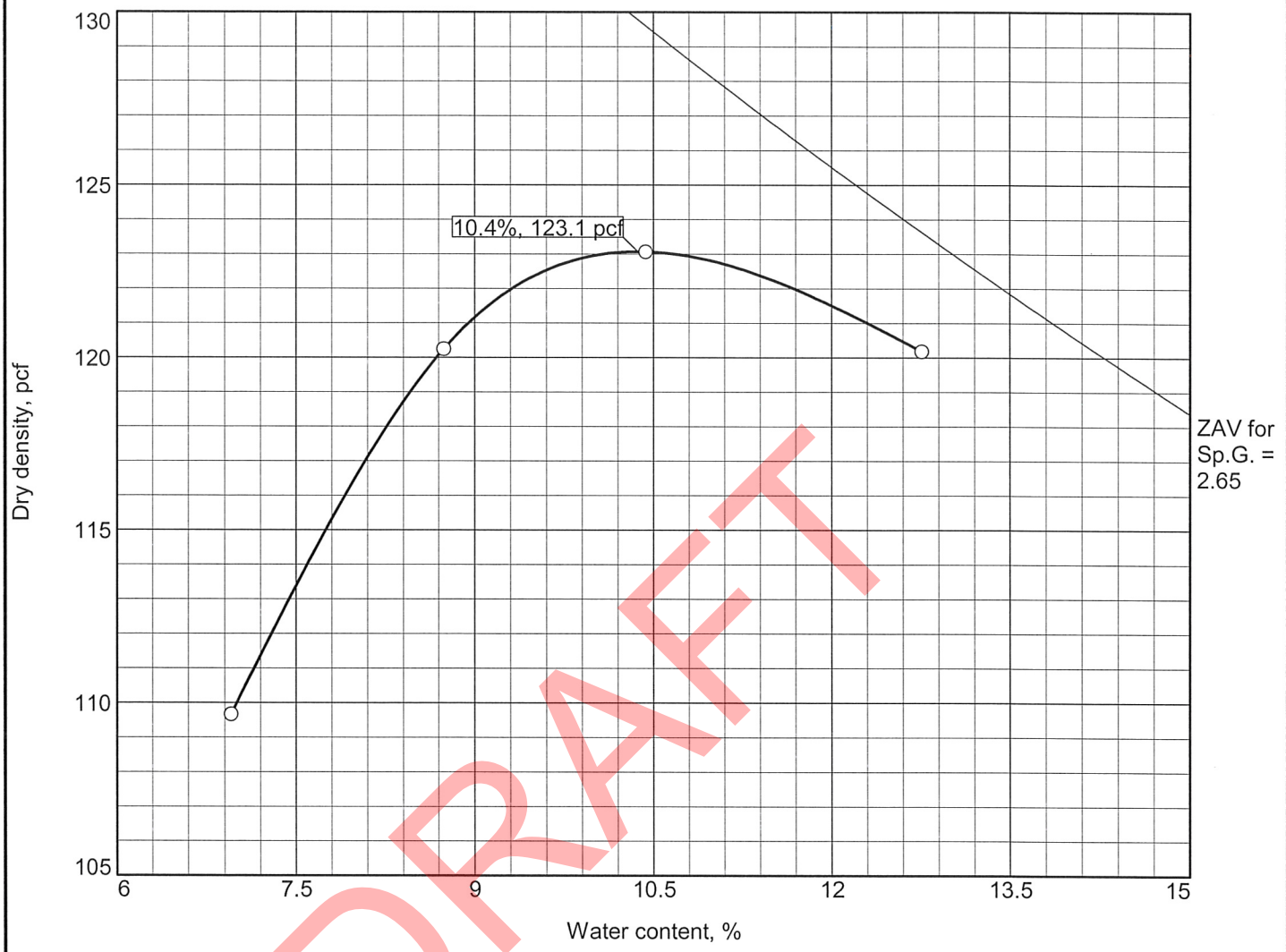
Summary of Soil Cement Testing AT 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-515 MdW-S-2/5								
14%	1	7	0.78	125.0	8.3	123.7	9.6	950
	2	7	0.78	125.0	8.3	123.7	9.6	910
	3	7	0.80	125.0	8.3	123.5	9.8	990
	4	28	0.80	125.0	8.3	123.2	9.8	1365
	5	28	0.81	125.0	8.3	123.6	9.9	1380
	6	28	0.81	125.0	8.3	123.0	9.9	1500
CP14-IRC44-TP-515 MdW-C-5/11								
14%	1	7	0.83	124.3	10.1	123.9	10.2	1115
	2	7	0.83	124.3	10.1	124.1	10.2	1070
	3	7	0.82	124.3	10.1	124.1	10.1	1210
	4	28	0.82	124.3	10.1	124.5	10.1	NT
	5	28	0.82	124.3	10.1	124.7	10.1	NT
	6	28	0.82	124.3	10.1	124.5	10.1	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		PSI*			AVG.*
		1	2	3	
TP-515	UW-S-2/5				
TP-515	LW-S-2/5	**1275**	**1333**	**1197**	1268
TP-515	MdW-S-2/5	**1020**	**930**	**925**	958
TP-515	UW-C-5/11				
TP-515	LW-C-5/11				
TP-515	MdW-C-5/11	**850**	**880**	**1000**	910

* Testing still in progress

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP-SC	A-1-b			20	5	24.6	8.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.1 pcf Optimum moisture = 10.4 %	SAND, p-g w/clay, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, few clay

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-515 **Sample Number:** UW-S-2/5

AMEC E&I

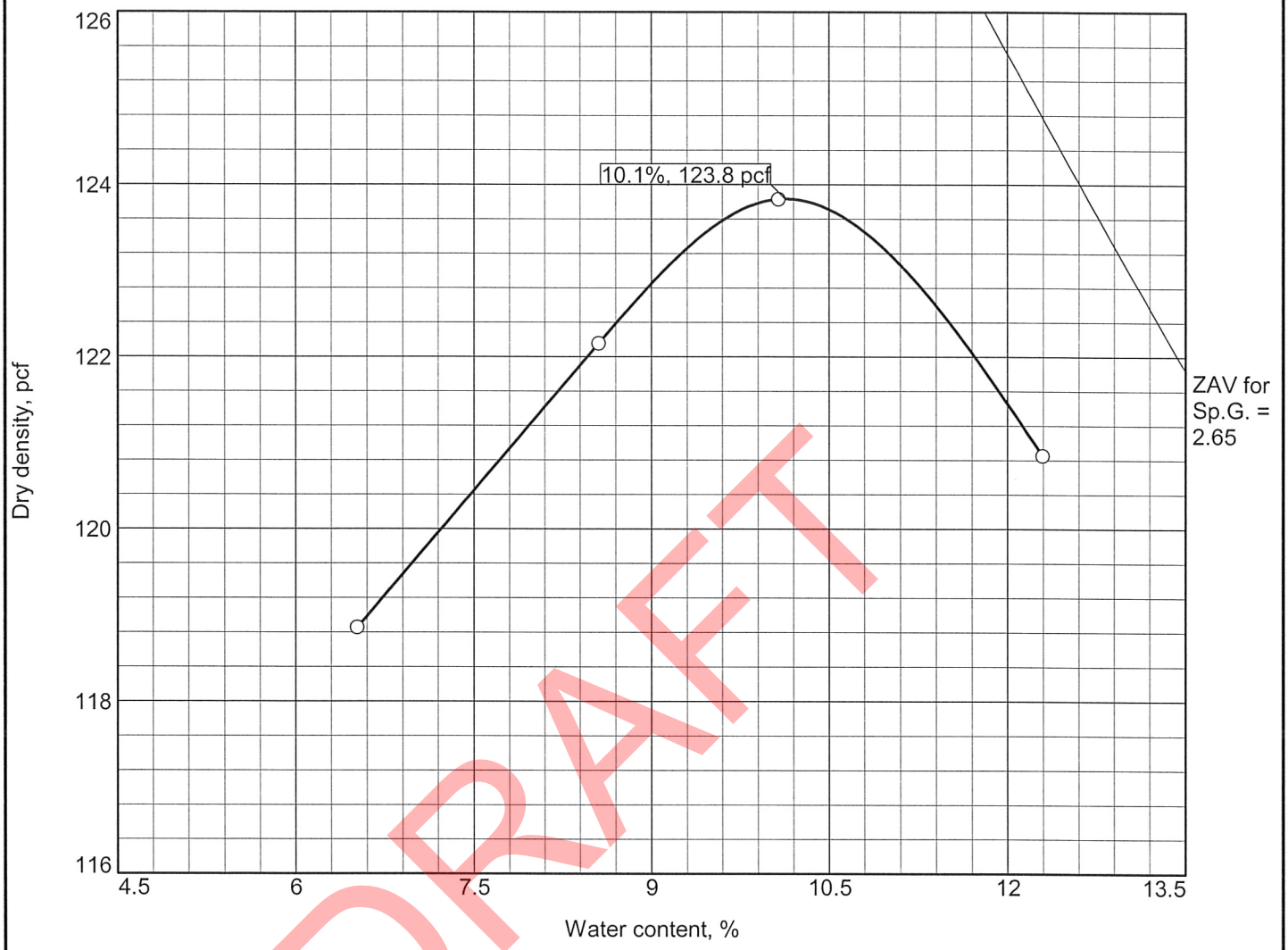
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NP	NP	26.2	3.4

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.8 pcf Optimum moisture = 10.1 %	SAND, poorly-graded, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-515 **Sample Number:** LW-S-2/5

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Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT

Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NV	NP	0.0	2.5

TEST RESULTS

Maximum dry density = 125.0 pcf

Optimum moisture = 8.3 %

MATERIAL DESCRIPTION

SAND, poorly-graded, mostly fine-grained sand-sized quartz, little medium to coarse-grained sand-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-515 **Sample Number:** MdW-S-2/5

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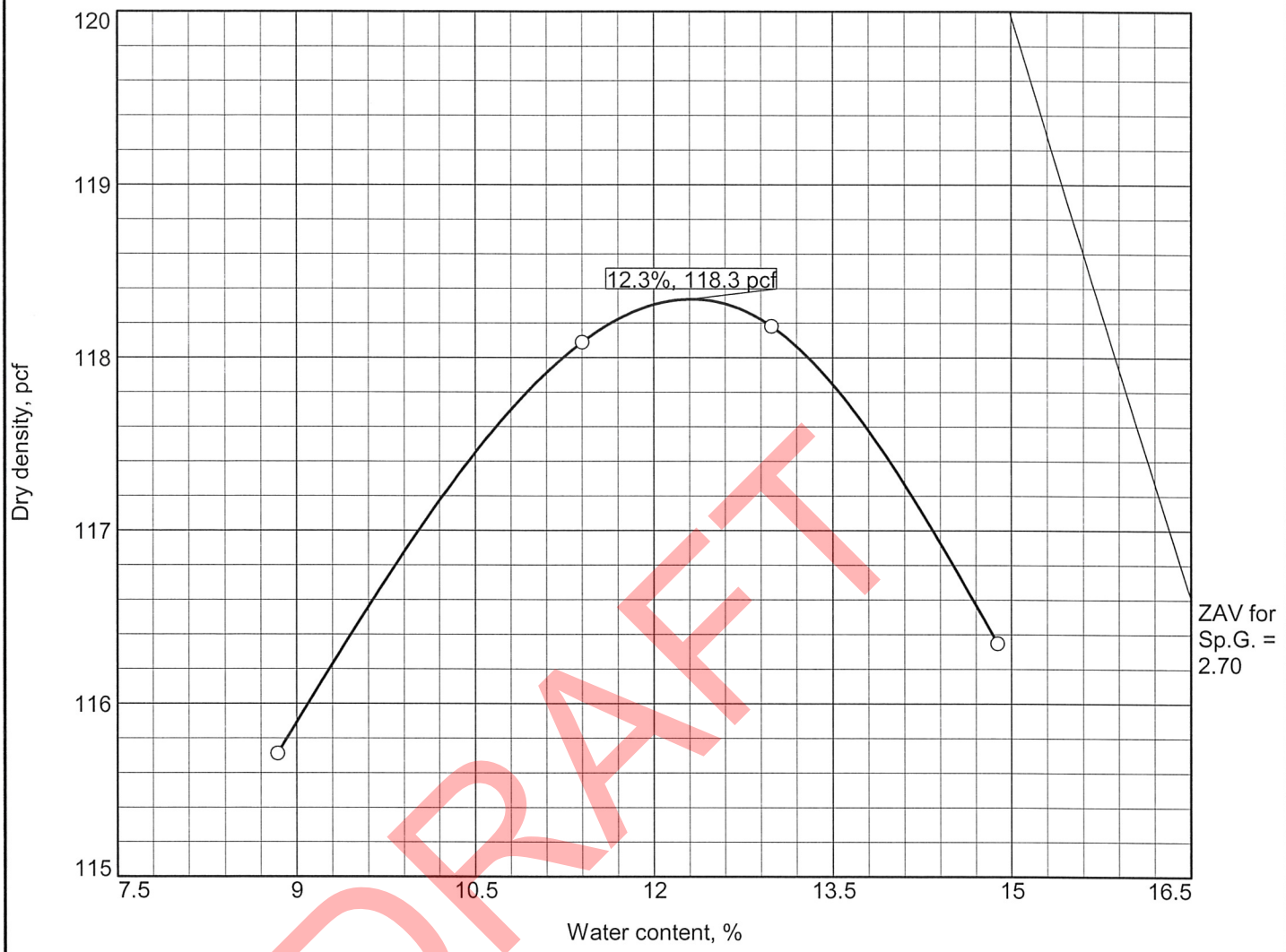
Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SC	A-2-6(0)			24	12	8.7	14.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.3 pcf Optimum moisture = 12.3 %	SAND, clayey, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, little clay

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-515 **Sample Number:** UW-C-5/11

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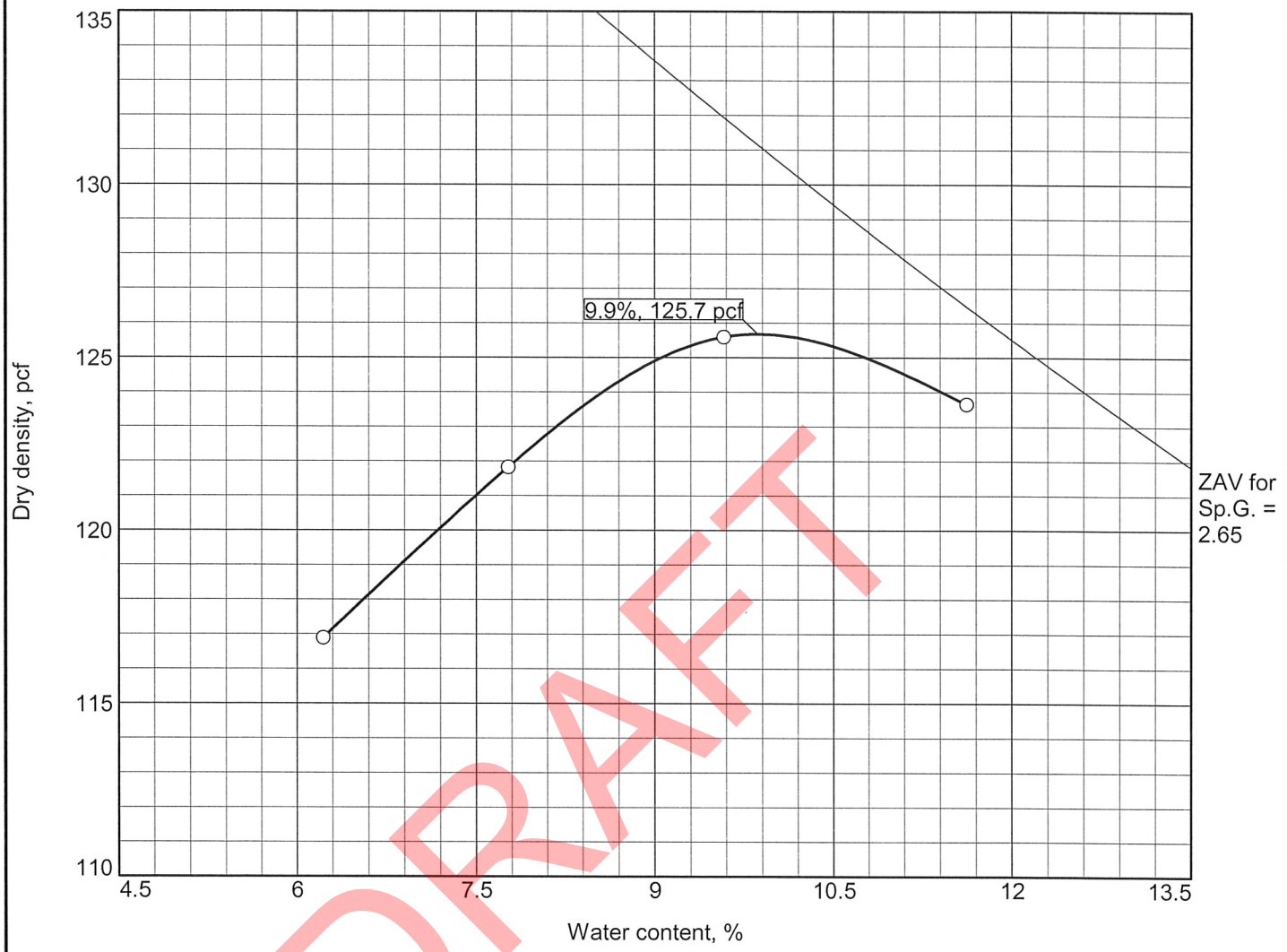
Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-1-b			NV	NP	21.2	4.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 125.7 pcf Optimum moisture = 9.9 %	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-515 **Sample Number:** LW-C-5/11

AMEC E&I

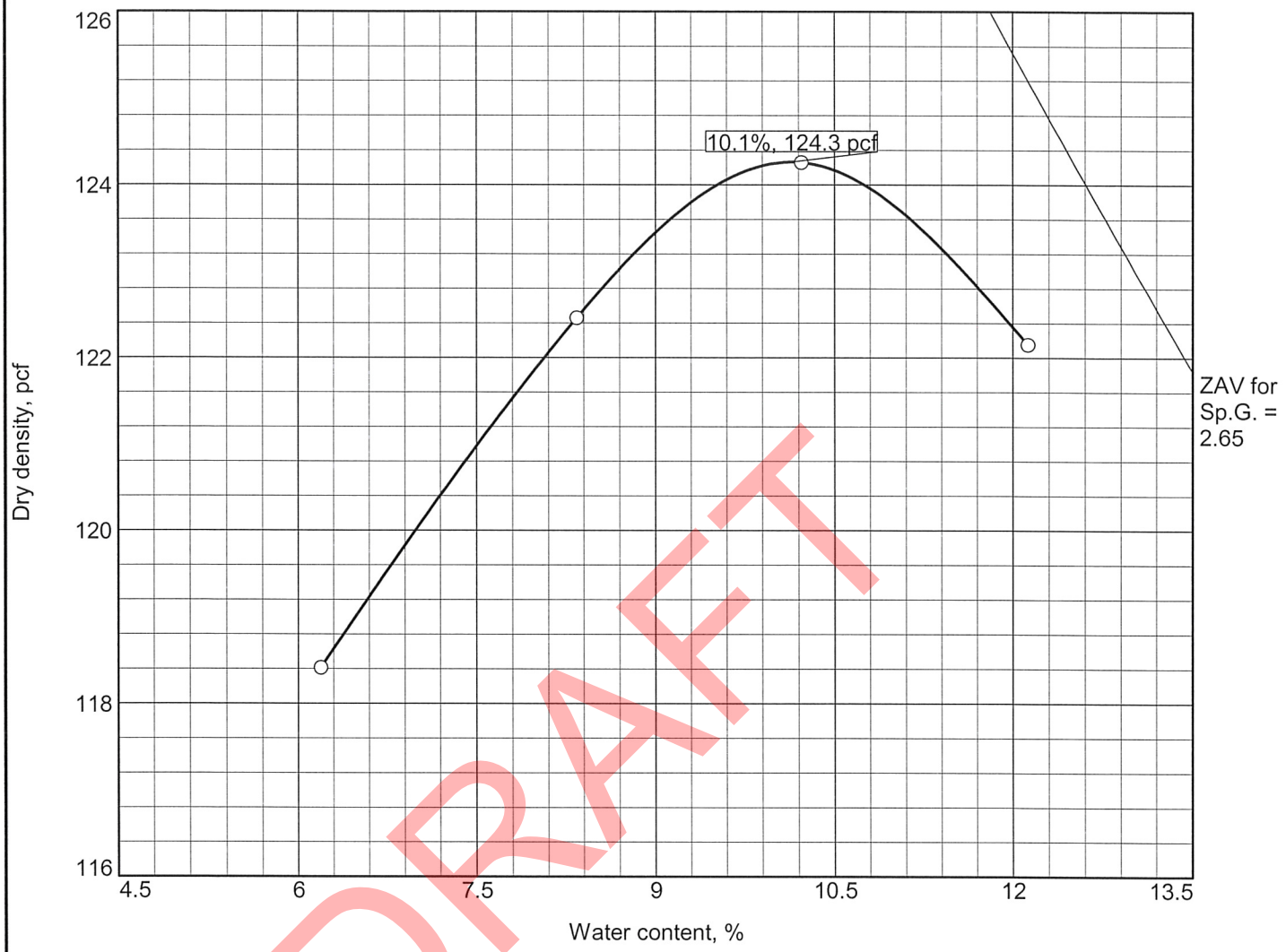
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-3			NP	NP	21.8	2.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 124.3 pcf Optimum moisture = 10.1 %	SAND, poorly-graded, mostly fine to medium-grained sand sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-515 **Sample Number:** MdW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-515 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.77	123.1	10.40	123.8	9.3	NT	NT	--
		0.77	123.1	10.40	124.4	9.3	NT	NT	--
Freezing and Thawing	14	0.80	123.1	10.40	123.9	9.7	NT	NT	--
		0.80	123.1	10.40	123.9	9.7	NT	NT	--
CP14-IRC44-TP-515 UW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	1.01	118.3	12.30	117.9	12.1	NT	NT	--
		1.01	118.3	12.30	118.0	12.1	NT	NT	--
Freezing and Thawing	14	0.96	118.3	12.30	119.1	11.6	NT	NT	--
		0.96	118.3	12.30	119.1	11.6	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-515 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.77	123.8	10.10	124.5	9.3	130.8	NT	--
		0.77	123.8	10.10	124.4	9.3	130.1	NT	--
Freezing and Thawing	14	0.80	123.8	10.10	123.8	9.8	NT	NT	--
		0.80	123.8	10.10	124.2	9.8	NT	NT	--
CP14-IRC44-TP-515 LW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.94	120.9	11.50	120.3	11.5	NT	NT	--
		0.94	120.9	11.50	120.8	11.5	NT	NT	--
Freezing and Thawing	14	0.92	120.9	11.50	120.9	11.3	NT	NT	--
		0.92	120.9	11.50	120.7	11.3	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-515 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.82	125.0	8.30	123.0	10.0	NT	NT	--
		0.82	125.0	8.30	123.0	10.0	NT	NT	--
Freezing and Thawing	14	0.83	125.0	8.30	122.8	10.2	NT	NT	--
		0.83	125.0	8.30	122.8	10.2	NT	NT	--
CP14-IRC44-TP-515 MdW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.79	124.3	10.10	124.6	9.6	NT	NT	--
		0.79	124.3	10.10	124.6	9.6	NT	NT	--
Freezing and Thawing	14	0.84	124.3	10.10	124.1	10.3	NT	NT	--
		0.84	124.3	10.10	124.3	10.3	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trial No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-515						
2-5	UW-S-2/5	1	13.9	2.4	18	19
		2	14.1	2.6	19	
		3	14.2	2.6	19	
	LW-S-2/5	1	11.9	3.4	29	29
		2	12.1	3.5	29	
		3	11.8	3.5	30	
	MdW-S-2/5	1	6.5	3.4	53	53
		2	6.5	3.4	53	
		3	6.4	3.4	54	
5-11	UW-C-5/11	1	13.3	2.5	19	18
		2	13.6	2.3	17	
		3	13.6	2.2	17	
	LW-C-5/11	1	13.0	3.1	24	26
		2	13.0	3.4	27	
		3	13.0	3.6	28	
	MdW-C-5/11	1	11.5	3.8	33	33
		2	12.0	3.8	32	
		3	11.7	3.8	33	

Test Pit 515 View W

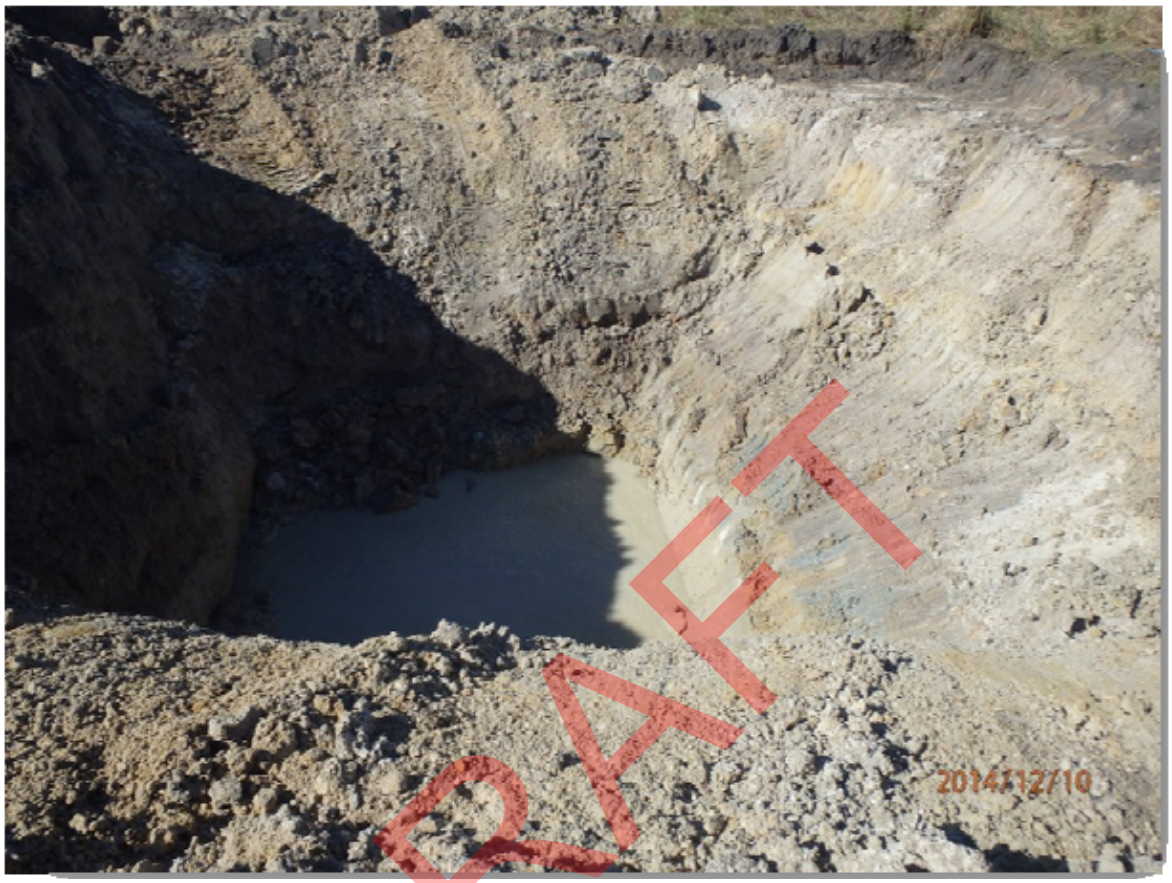
Test Pit 515 View NE – Depth Measurement

Test Pit 515 View E - Depth Measurement

Test Pit 515 View S

Test Pit 515 View E

Test Pit 515 View N



Test Pit 515 View W

Test Pit 515 View W – Sampling and Staging Area

Test Pit 515 View E – Backfilled Condition

Boring Designation CP14-IRC44-TP-516

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 2 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT: C-44 RSTA-Geotechnical Investigation-Phase V Phase V		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP14-IRC44-TP-516	LOCATION COORDINATES: X = 1,001,372 Y = 837,233	11. MANUFACTURER'S DESIGNATION OF DRILL: Komatsu 210 LC	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Phillips & Jordan	CONTRACTOR FILE NO.: 6734-14-9799	12. TOTAL SAMPLES	DISTURBED: 8 / UNDISTURBED (UD): 0
4. NAME OF DRILLER: Chuck Floyd		13. TOTAL NUMBER CORE BOXES: 0	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL	BEARING	14. ELEVATION GROUND WATER
		15. DATE BORING	STARTED: 12-10-14 / COMPLETED: 12-10-14
6. THICKNESS OF OVERBURDEN: N/A		16. ELEVATION TOP OF BORING: 26.5 Ft.	
7. DEPTH DRILLED INTO ROCK: N/A		17. TOTAL RECOVERY FOR BORING: N/A	
8. TOTAL DEPTH OF BORING: 11.5 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
26.5	0.0						26.5		
25.5	1.0		SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, few silt, 10YR 3/2 very dark grayish brown (SP-SM)				Test Pit		
24.5	2.0		SAND, poorly-graded, mostly fine-grained sand-sized quartz, trace silt, 10YR 9/1.5 yellowish white (SP)				24.5		
21.5	5.0		SAND, poorly-graded with clay, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, few clay, 10YR 6/2 light brownish gray (SP-SC)		MdW-S-2/5 LW-S-2/5 UW-S-2/5		24.5 24.5 21.5		
17.5	9.0		SAND, clayey, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, 10YR 6/3 pale brown (SC) At El. 19.5 Ft., mostly fine to medium-grained sand-sized quartz, little medium to coarse-grained sand-sized limestone		UW-R-5/7 MdW-C-5/11 LW-C-5/11 UW-C-5/11		21.5 21.5 21.5 17.5		
15.0	11.5		SAND, silty, mostly fine-grained sand-sized quartz, little medium to coarse-grained sand-sized limestone, little silt, trace organic matter, 10YR 2/1 black (SM) At El. 16.5 Ft., 10GY 6/1 greenish gray		UW-R-9/11		15.0		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Laboratory Testing Results				Abbreviations:		

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 2 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
C-44 RSTA-Geotechnical Investigation-Phase V	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 1,001,372 Y = 837,233	26.5 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
UW-S-2/5	2.0/5.0	SP-SC
LW-S-2/5	2.0/5.0	SP
MdW-S-2/5	2.0/5.0	SP
UW-C-5/11	5.0/11.0	SC
LW-C-5/11	5.0/11.0	SP-SM
MdW-C-5/11	5.0/11.0	SP-SM
UW-R-5/7	5.0/7.0	SC
UW-R-9/11	9.0/11.0	SM

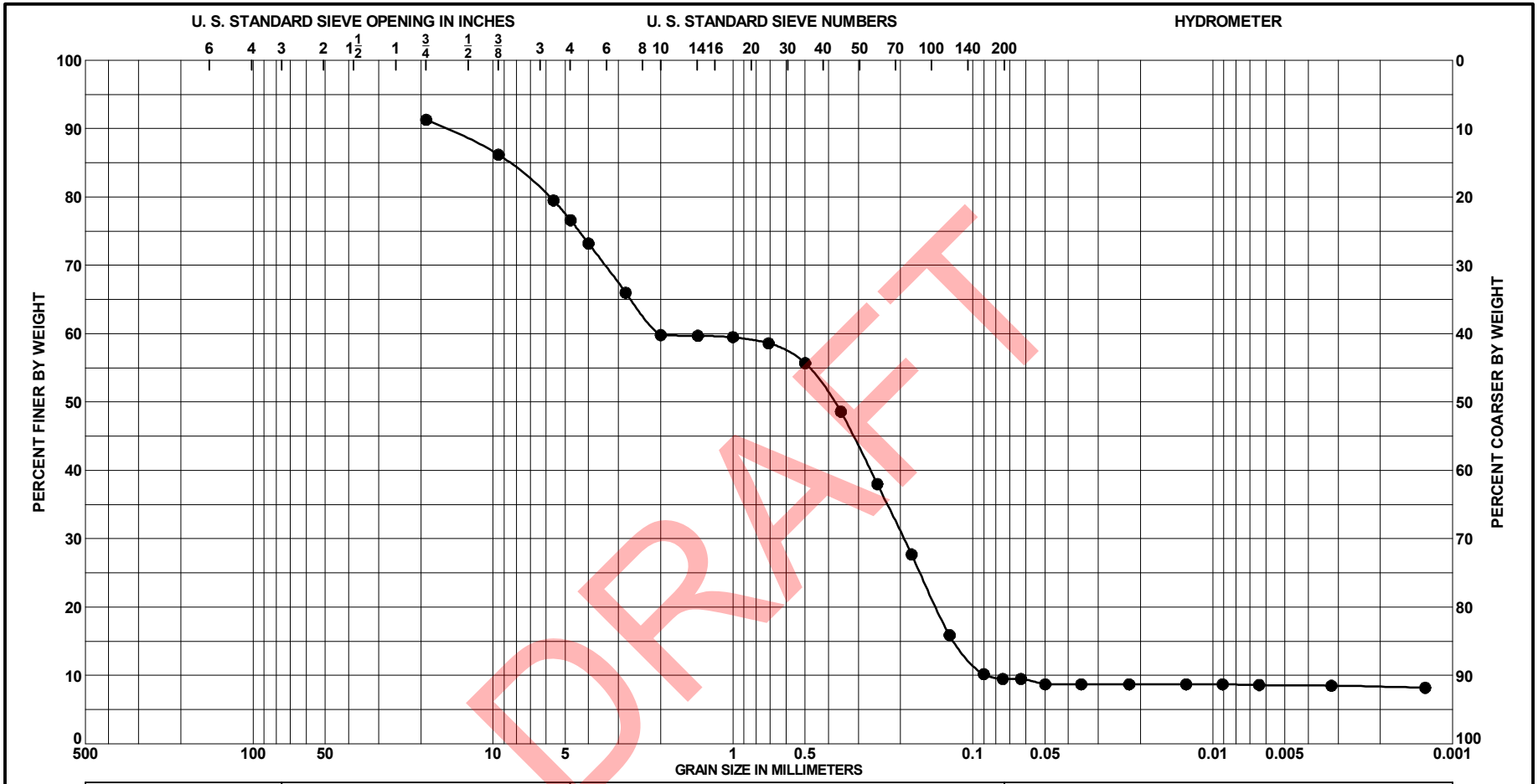
not on atterberg limits.

4. Additional Laboratory Testing

UW-S-2/5Specific Gravity
UW-S-2/5Atterberg
UW-S-2/5Percent Organic
UW-S-2/5Percent Carbonate
UW-S-2/5Percent Visual Shell
LW-S-2/5Specific Gravity
LW-S-2/5Atterberg
LW-S-2/5Percent Organic
LW-S-2/5Percent Carbonate
LW-S-2/5Percent Visual Shell
MdW-S-2/5Specific Gravity
MdW-S-2/5Atterberg
MdW-S-2/5Percent Organic
MdW-S-2/5Percent Carbonate
MdW-S-2/5Percent Visual Shell
UW-C-5/11Specific Gravity
UW-C-5/11Atterberg
UW-C-5/11Percent Organic
UW-C-5/11Percent Carbonate
UW-C-5/11Percent Visual Shell
LW-C-5/11Specific Gravity
LW-C-5/11Atterberg
LW-C-5/11Percent Organic
LW-C-5/11Percent Carbonate
LW-C-5/11Percent Visual Shell
MdW-C-5/11Specific Gravity
MdW-C-5/11Atterberg
MdW-C-5/11Percent Organic
MdW-C-5/11Percent Carbonate
MdW-C-5/11Percent Visual Shell
UW-R-5/7Specific Gravity
UW-R-5/7Atterberg
UW-R-5/7Percent Organic
UW-R-5/7Percent Carbonate
UW-R-5/7Percent Visual Shell
UW-R-9/11Specific Gravity
UW-R-9/11Atterberg
UW-R-9/11Percent Organic
UW-R-9/11Percent Carbonate
UW-R-9/11Percent Visual Shell

15
20
25
30
35

Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-516	UW-S-2/5	2.0	5.0	SP-SC	24	16	8	2.2	2.33	14.7	67.1	9.5	0.9	8.6	4.08	0	8.6
CP14-IRC44-TP-516	LW-S-2/5	2.0	5.0	SP	0	0	0	0.6	2.65	6.7	82.8	3	2	1	3.63	0.2	8.6
CP14-IRC44-TP-516	MdW-S-2/5	2.0	5.0	SP	0	0	0	18	2.74	23	68.2	1.6	1	0.6	3.48	0.1	9.6
CP14-IRC44-TP-516	UW-C-5/11	5.0	11.0	SC	26	18	8	3.8	2.7	3.9	77.2	18.9	4.1	14.7	7.61	0.4	8.6
CP14-IRC44-TP-516	LW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.1	2.69	13.5	81.4	5.1	1	4.1	3.83	5.3	9.0
CP14-IRC44-TP-516	MdW-C-5/11	5.0	11.0	SP-SM	0	0	0	1.2	2.99	10.7	82	6.5	0.5	6	3.72	0.5	8.6
CP14-IRC44-TP-516	UW-R-5/7	5.0	7.0	SC	36	15	21	2.4	2.59	14.8	64.6	19.7	3.7	16	4.9	0	8.6
CP14-IRC44-TP-516	UW-R-9/11	9.0	11.0	SM	25	18	7	1.7	2.7	3.6	77.1	19.3	3.6	15.7	3.17	0.1	8.5



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded with clay, mostly	10YR 6/2	0	4	2.33	2		24	16	8
		fine-grained sand-sized quartz, some									
		sand to gravel-sized limestone, few									
		clay, light brownish gray (SP-SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

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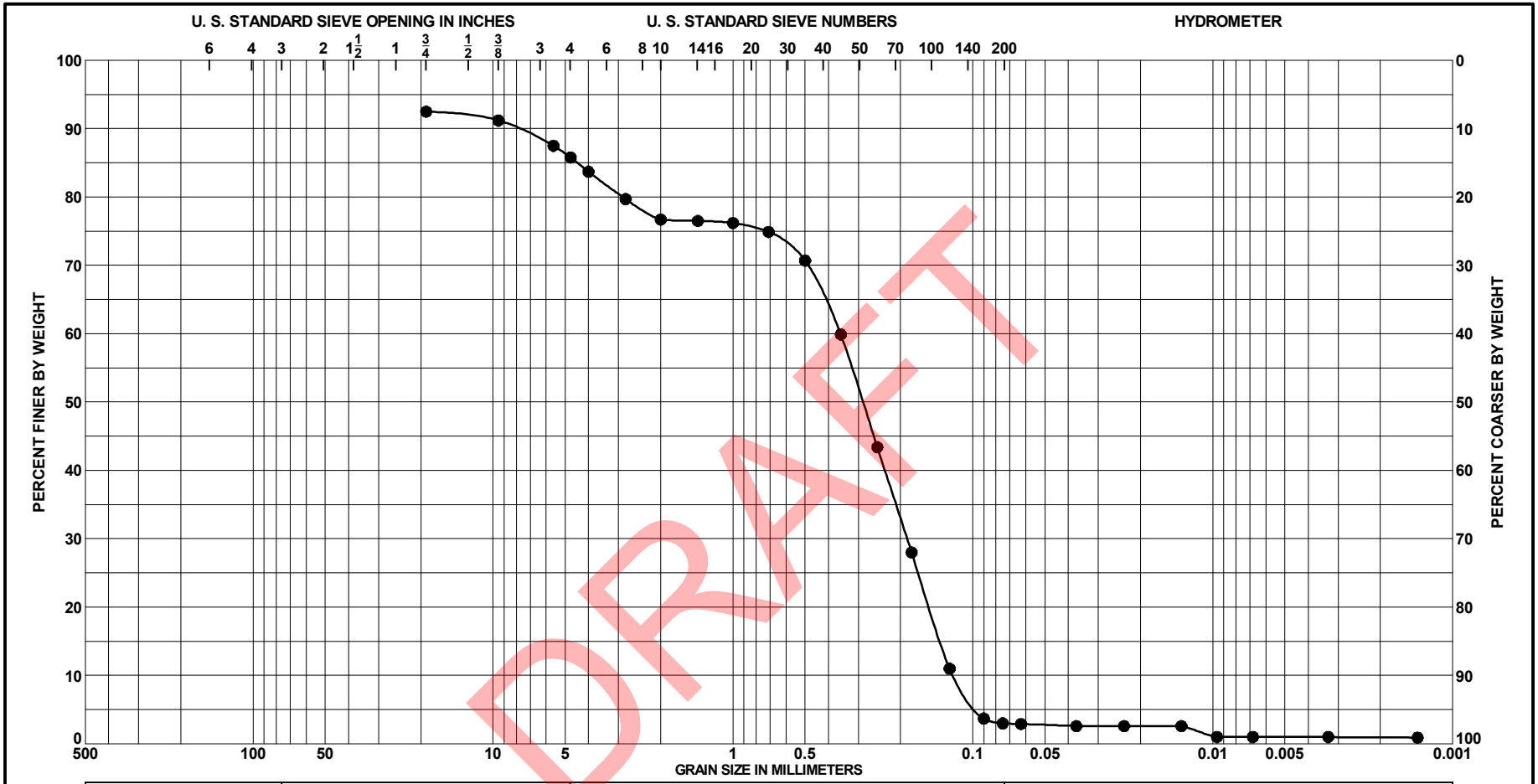
JUN 02

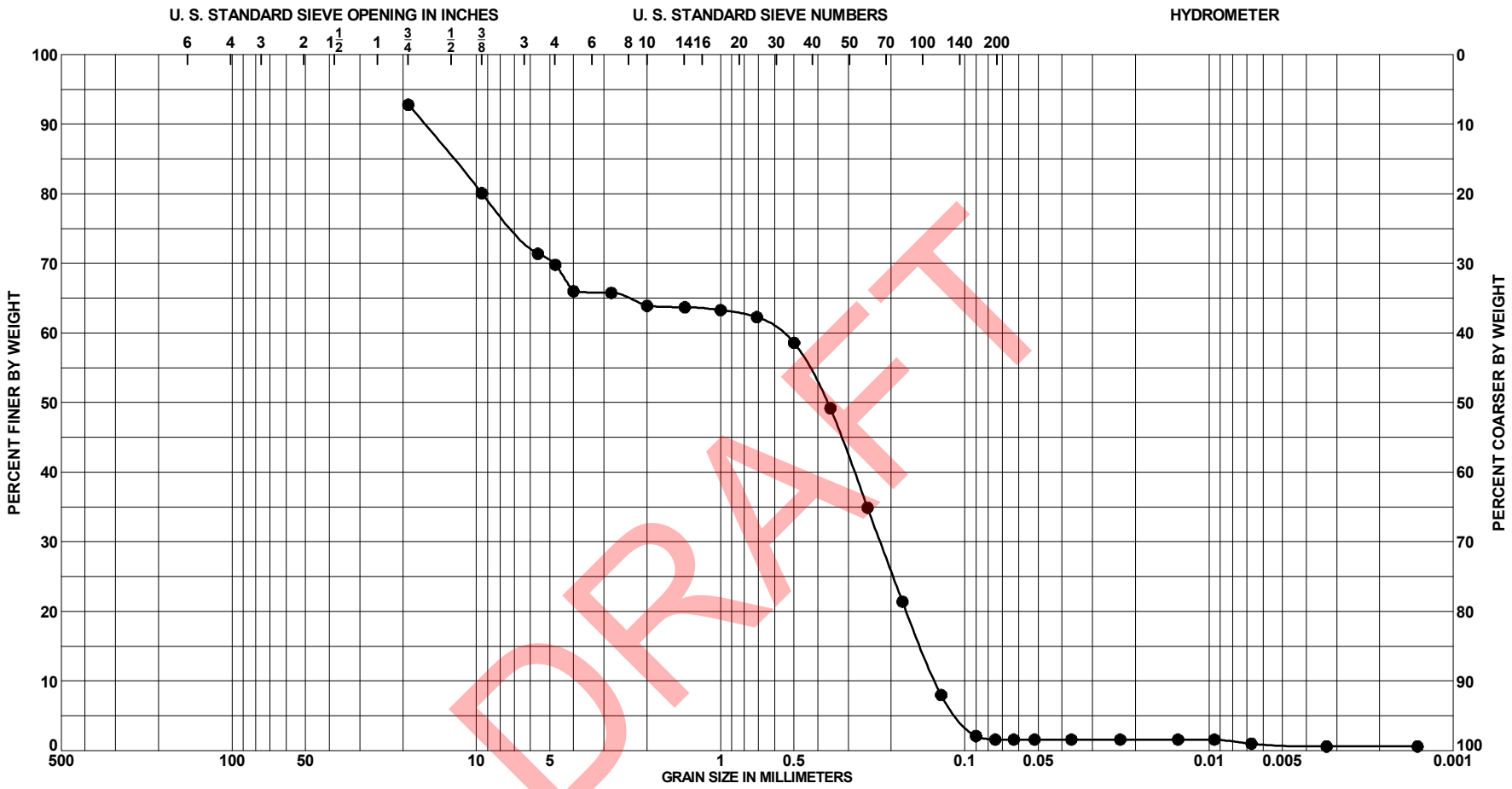


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
● LW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace clay, light brownish gray (SP)	10YR 6/2	0	4	2.65	1		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, little organic matter, trace silt, light brownish gray (SP)	10YR 6/2	0	3	2.74	18		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

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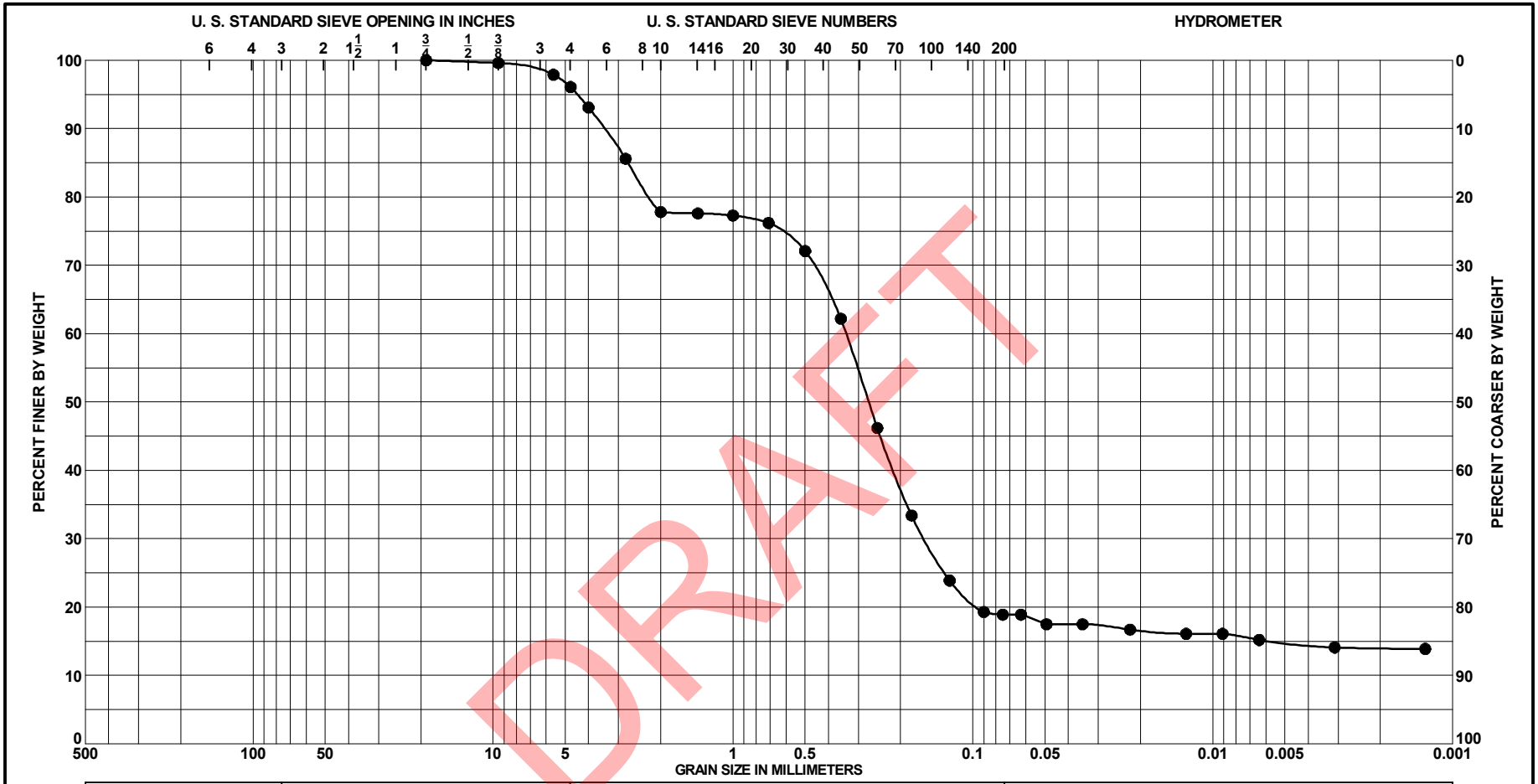
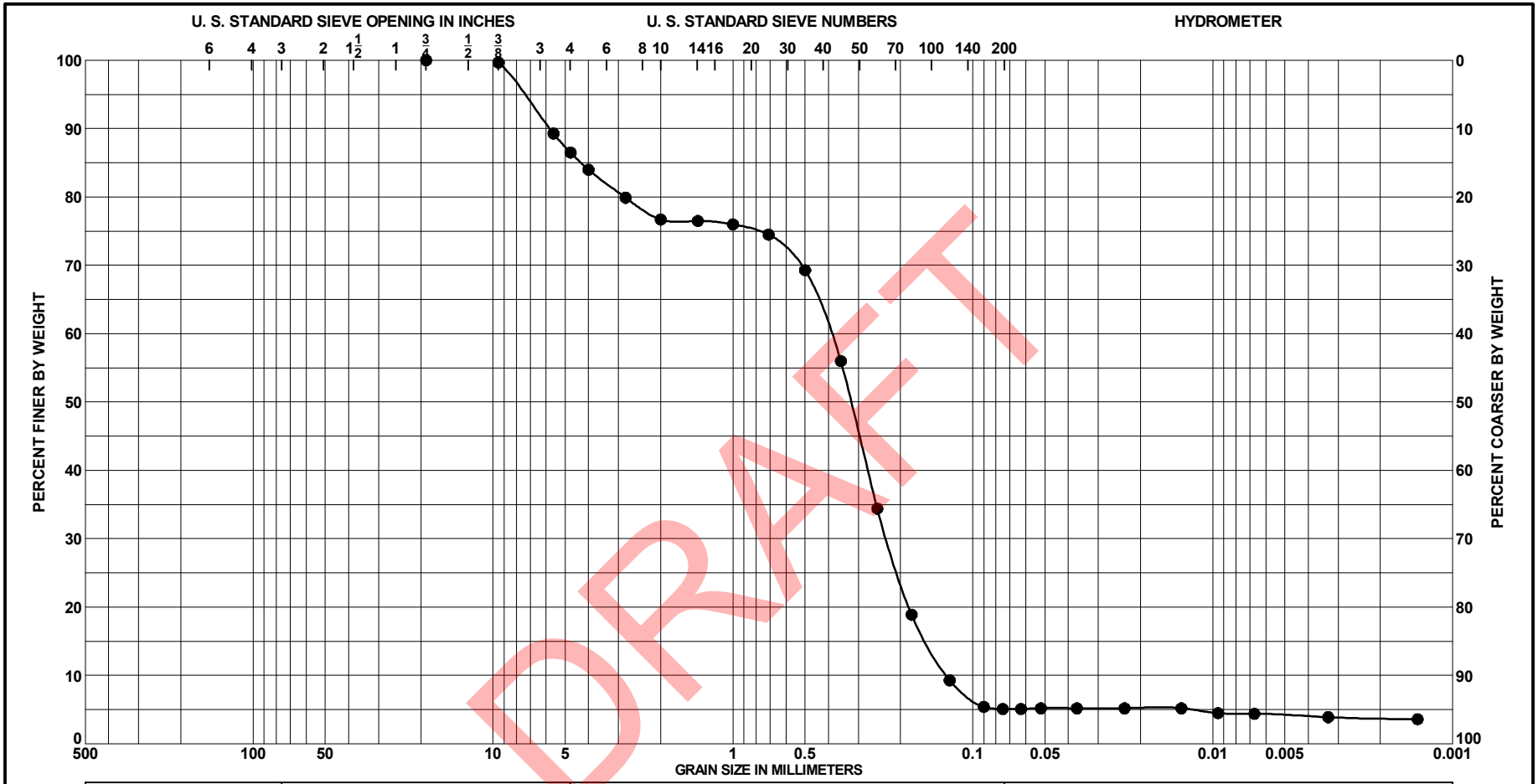


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-C-5/11	5.0 to 11.0 Ft.	SAND, clayey, mostly fine to medium-grained sand-sized quartz, little medium to coarse-grained sand-sized limestone, little clay, pale brown (SC)	10YR 6/3	0	8	2.70	4		26	18	8

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

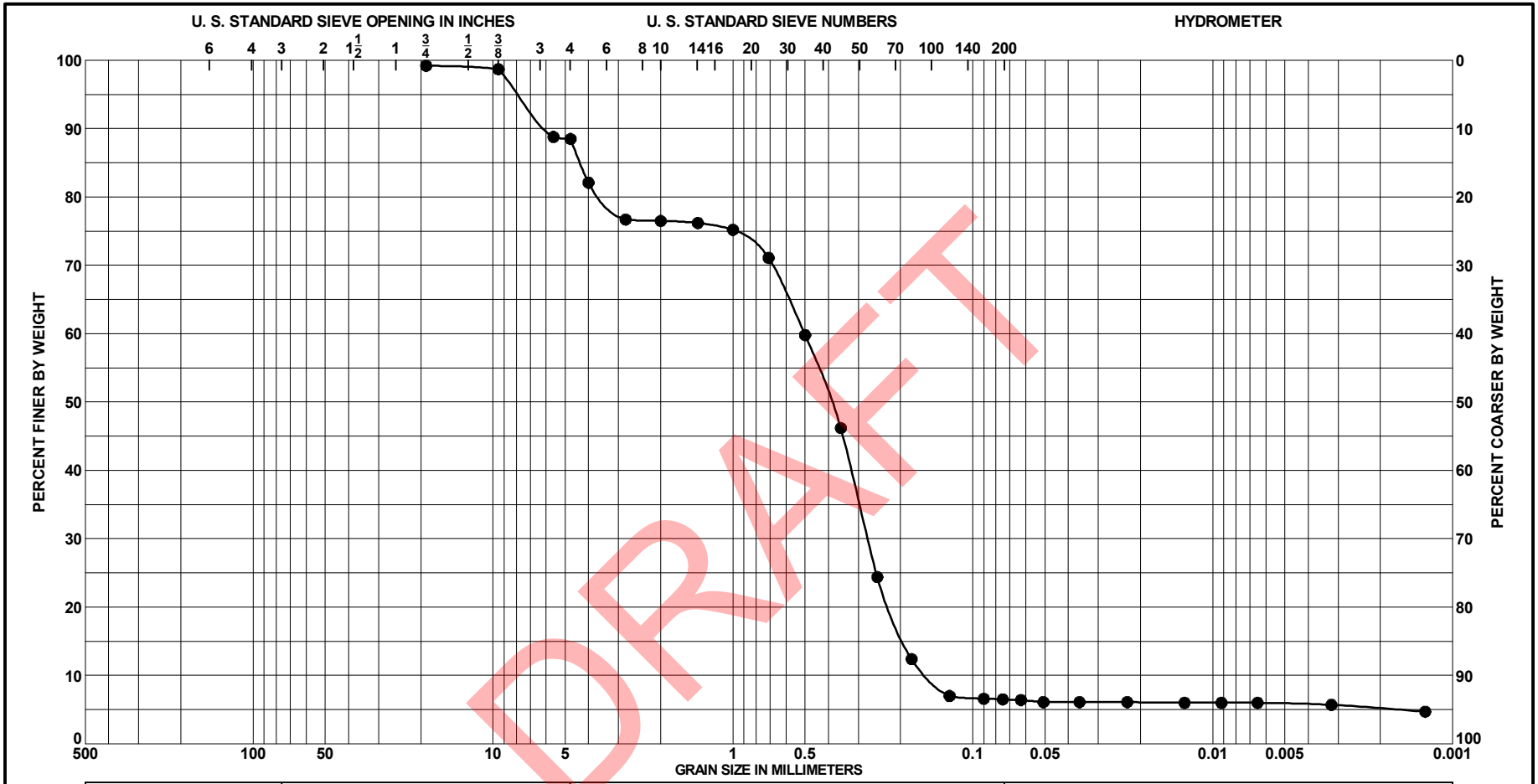


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●LW-C-5/11	5.0 to 11.0 Ft.	SAND, p-g w/silt, mostly fine to	10YR 6/3	5	4	2.69	1		0	0	NP
		med-grained s-sized quartz, little sand									
		to gr-sized limestone, few silt, few fine									
		gr-sized shell, pale brown (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

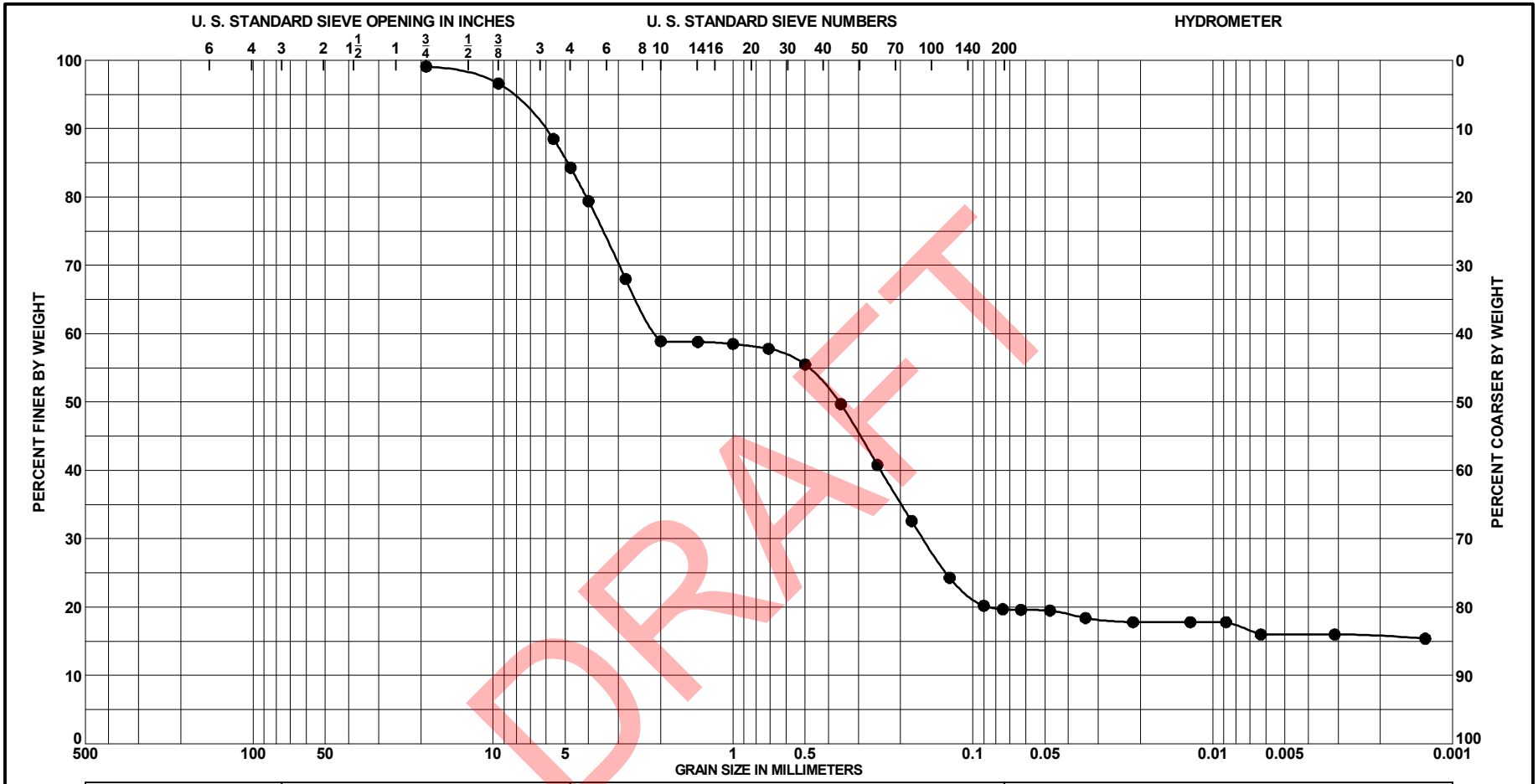


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-C-5/11	5.0 to 11.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 6/3	1	4	2.99	1		0	0	NP
		fine to medium-grained sand-sized									
		quartz, little sand to gravel-sized									
		limestone, few silt, pale brown									
		(SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

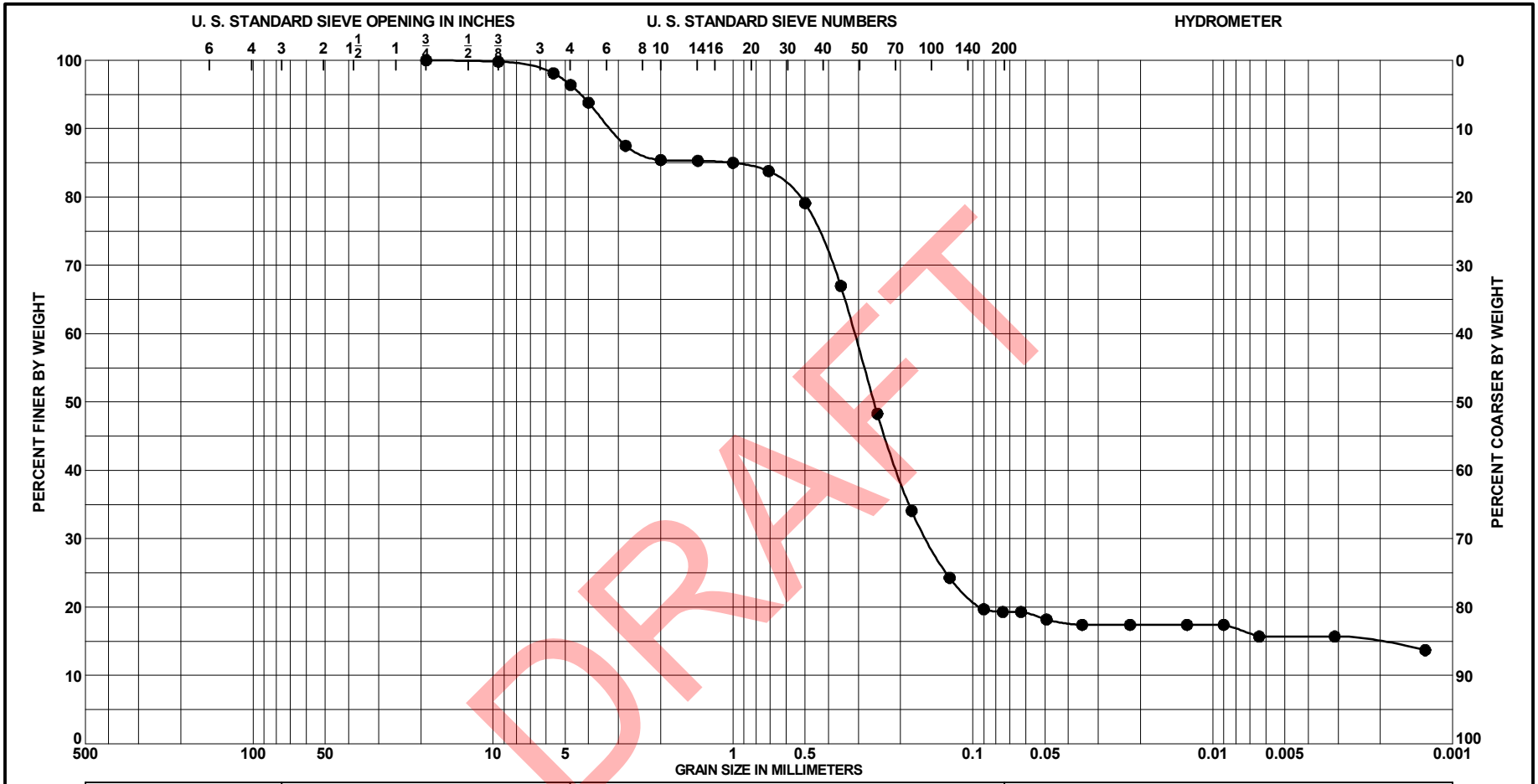


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-5/7	5.0 to 7.0 Ft.	SAND, clayey, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, pale brown (SC)	10YR 6/3	0	5	2.59	2		36	15	21

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-9/11	9.0 to 11.0 Ft.	SAND, silty, mostly fine-grained sand-sized quartz, little medium to coarse-grained sand-sized limestone, little silt, black (SM)	10YR 2/1	0	3	2.70	2		25	18	7

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-516
BORING ELEV.	26.5 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-516 UW-S-2/5								
14%	1	7	0.81	122.0	10.2	121.7	9.9	915
	2	7	0.81	122.0	10.2	122.3	9.9	815
	3	7	0.79	122.0	10.2	121.9	9.7	840
	4	28	0.79	122.0	10.2	122.3	9.7	NT
	5	28	0.76	122.0	10.2	122.3	9.4	NT
	6	28	0.76	122.0	10.2	122.5	9.4	NT
CP14-IRC44-TP-516 UW-C-5/11								
14%	1	7	1.23	118.0	13.3	111.4	15.1	355
	2	7	1.23	118.0	13.3	111.4	15.1	460
	3	7	1.20	118.0	13.3	112.2	14.8	435
	4	28	1.20	118.0	13.3	112.3	14.8	NT
	5	28	1.16	118.0	13.3	112.9	14.2	NT
	6	28	1.16	118.0	13.3	118.7	14.2	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-516 LW-S-2/5								
14%	1	7	0.85	121.5	10.1	120.6	10.5	1095
	2	7	0.85	121.5	10.1	120.9	10.5	1295
	3	7	0.80	121.5	10.1	121.3	9.8	1065
	4	28	0.80	121.5	10.1	121.2	9.8	NT
	5	28	0.80	121.5	10.1	121.2	9.8	NT
	6	28	0.80	121.5	10.1	121.7	9.8	NT
CP14-IRC44-TP-516 LW-C-5/11								
14%	1	7	0.91	121.8	11.7	122.2	11.2	715
	2	7	0.91	121.8	11.7	122.2	11.2	605
	3	7	0.86	121.8	11.7	122.8	10.6	750
	4	28	0.86	121.8	11.7	122.9	10.6	975
	5	28	1.02	121.8	11.7	120.8	12.5	1065
	6	28	1.02	121.8	11.7	120.4	12.5	970

NT: Not tested as of date of report preparation.

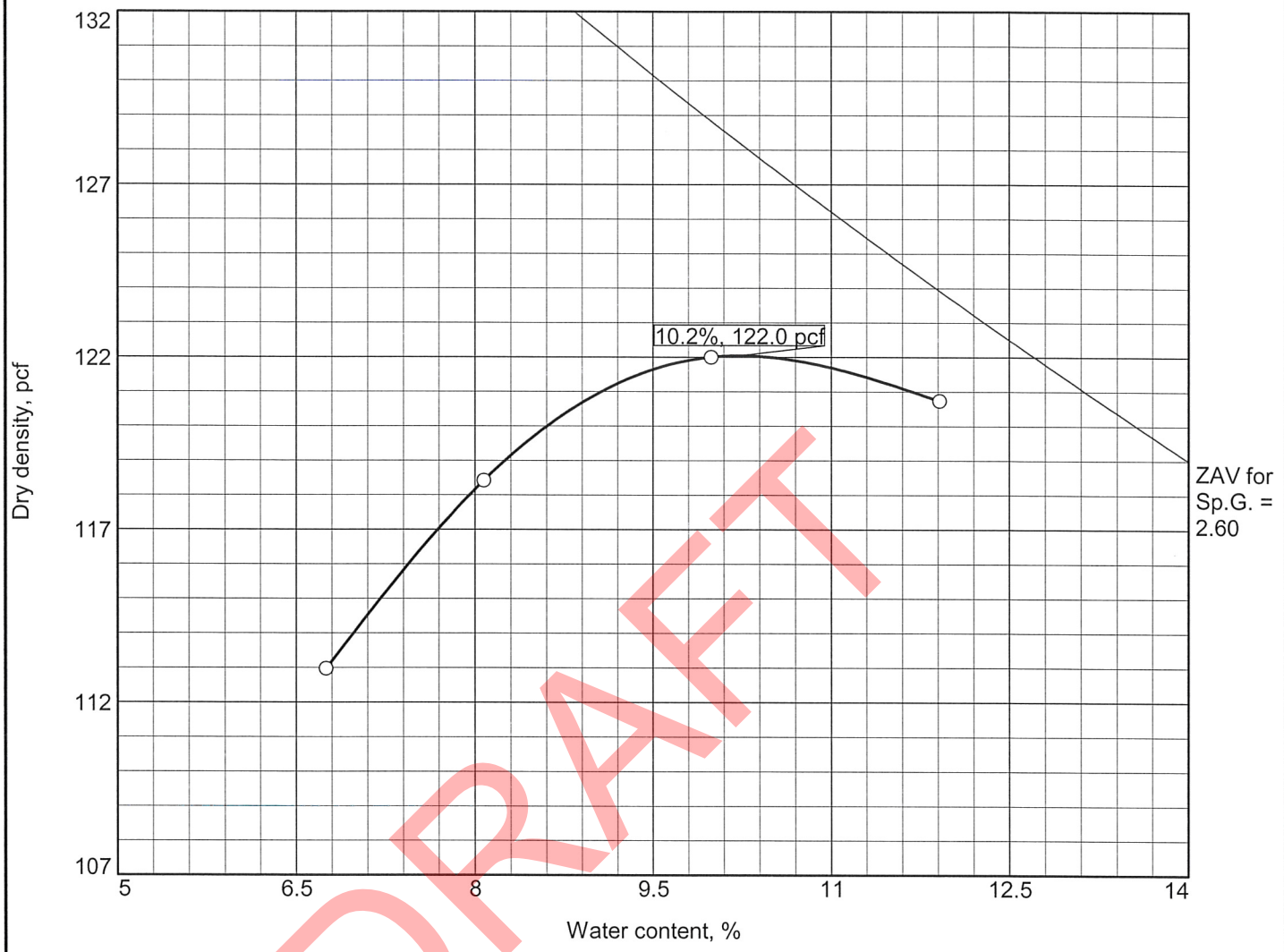
Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (Degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-516 MdW-S-2/5								
14%	1	7	0.75	122.4	10.2	123.4	9.2	1585
	2	7	0.74	122.4	10.2	123.5	9.2	1465
	3	7	0.74	122.4	10.2	123.2	9.2	1665
	4	28	0.74	122.4	10.2	123.8	9.2	NT
	5	28	0.73	122.4	10.2	123.6	9.0	NT
	6	28	0.73	122.4	10.2	124.1	9.0	NT
CP14-IRC44-TP-516 MdW-C-5/11								
14%	1	7	0.70	122.0	10.3	123.7	8.6	1070
	2	7	0.70	122.0	10.3	123.7	8.6	950
	3	7	0.69	122.0	10.3	124.4	8.4	970
	4	28	0.69	122.0	10.3	124.4	8.4	NT
	5	28	0.68	122.0	10.3	123.8	8.4	NT
	6	28	0.68	122.0	10.3	123.8	8.4	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		PSI*			AVG.*
		1	2	3	
TP-516	UW-S-2/5				
TP-516	LW-S-2/5	**1165**	**1045**	**1110**	1107
TP-516	MdW-S-2/5	**940**	**970**	**1065**	992
TP-516	UW-C-5/11				
TP-516	LW-C-5/11				
TP-516	MdW-C-5/11				

* Testing still in progress

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP-SC	A-2-4(0)			24	8	23.4	9.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.0 pcf Optimum moisture = 10.2 %	SAND, poorly-graded with clay, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, few clay

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-516 **Sample Number:** UW-S-2/5

AMEC E&I

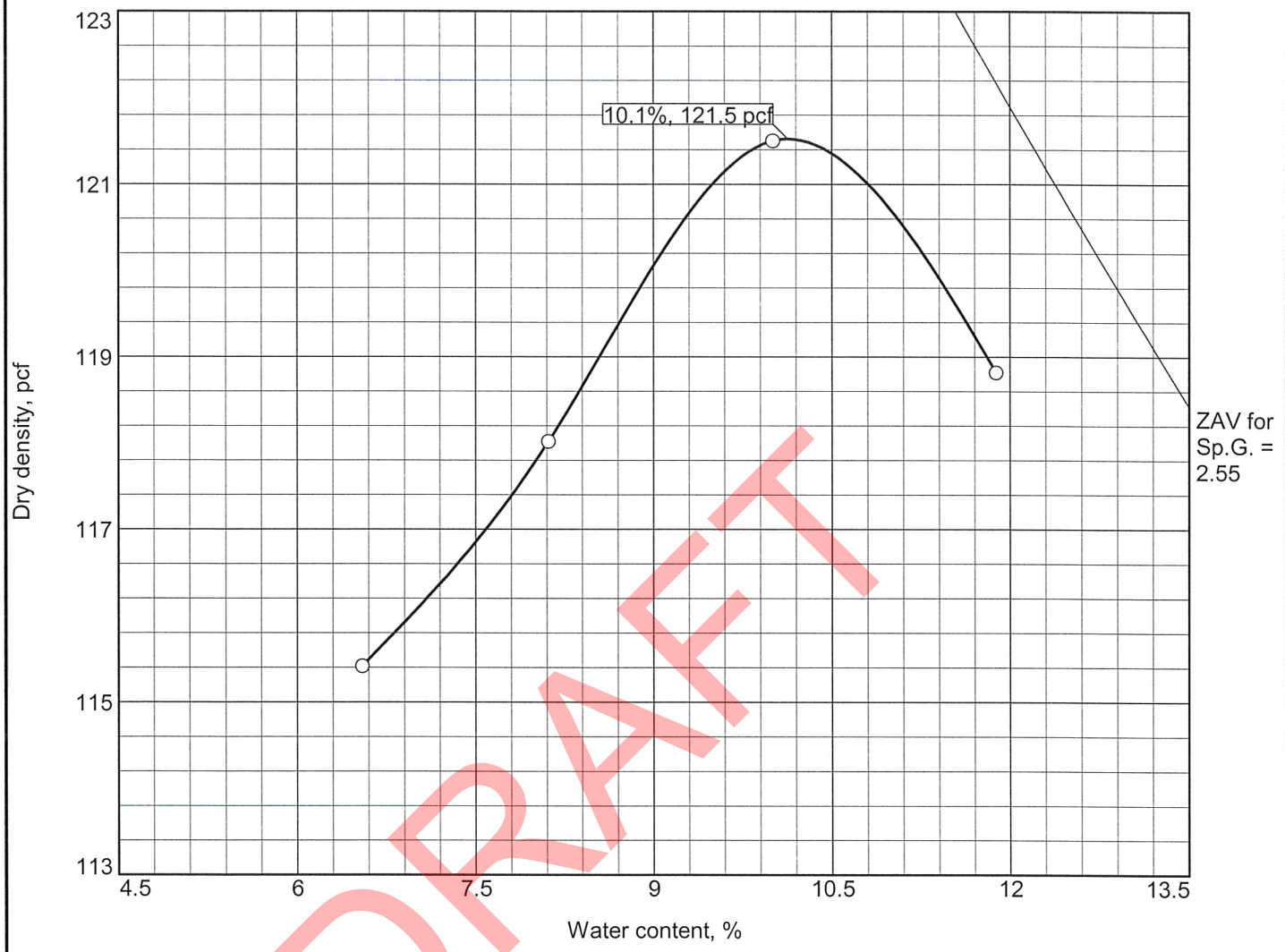
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NP	NP	14.2	3.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 121.5 pcf Optimum moisture = 10.1 %	SAND, poorly-graded, mostly fine to medium-grained sand sized quartz, some sand to gravel-sized limestone, trace clay

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-516 **Sample Number:** LW-S-2/5

AMEC E&I

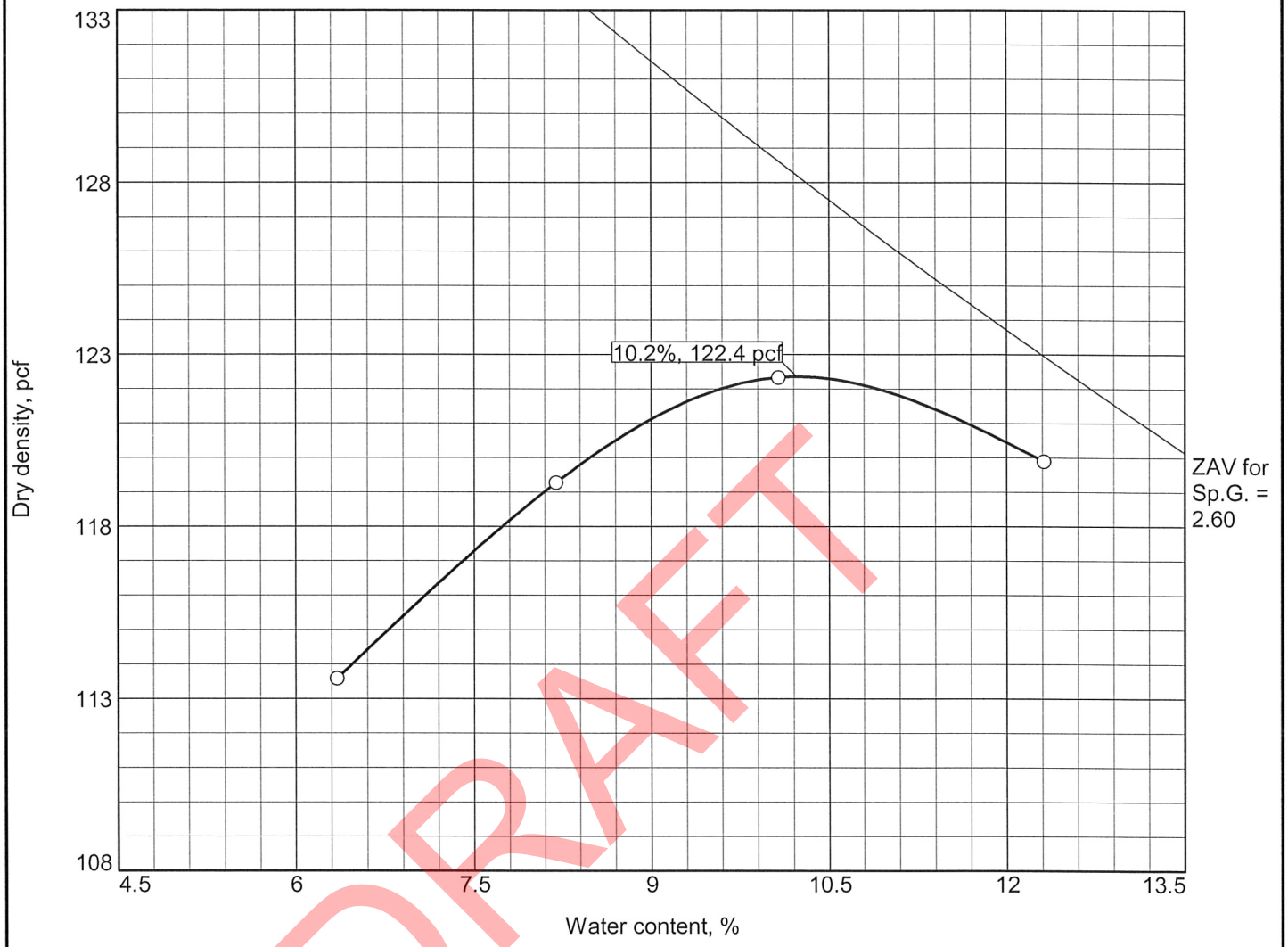
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NP	NP	30.2	1.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.4 pcf Optimum moisture = 10.2 %	SAND, poorly-graded, mostly fine to medium-grained sand sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-516 **Sample Number:** MdW-S-2/5

AMEC E&I

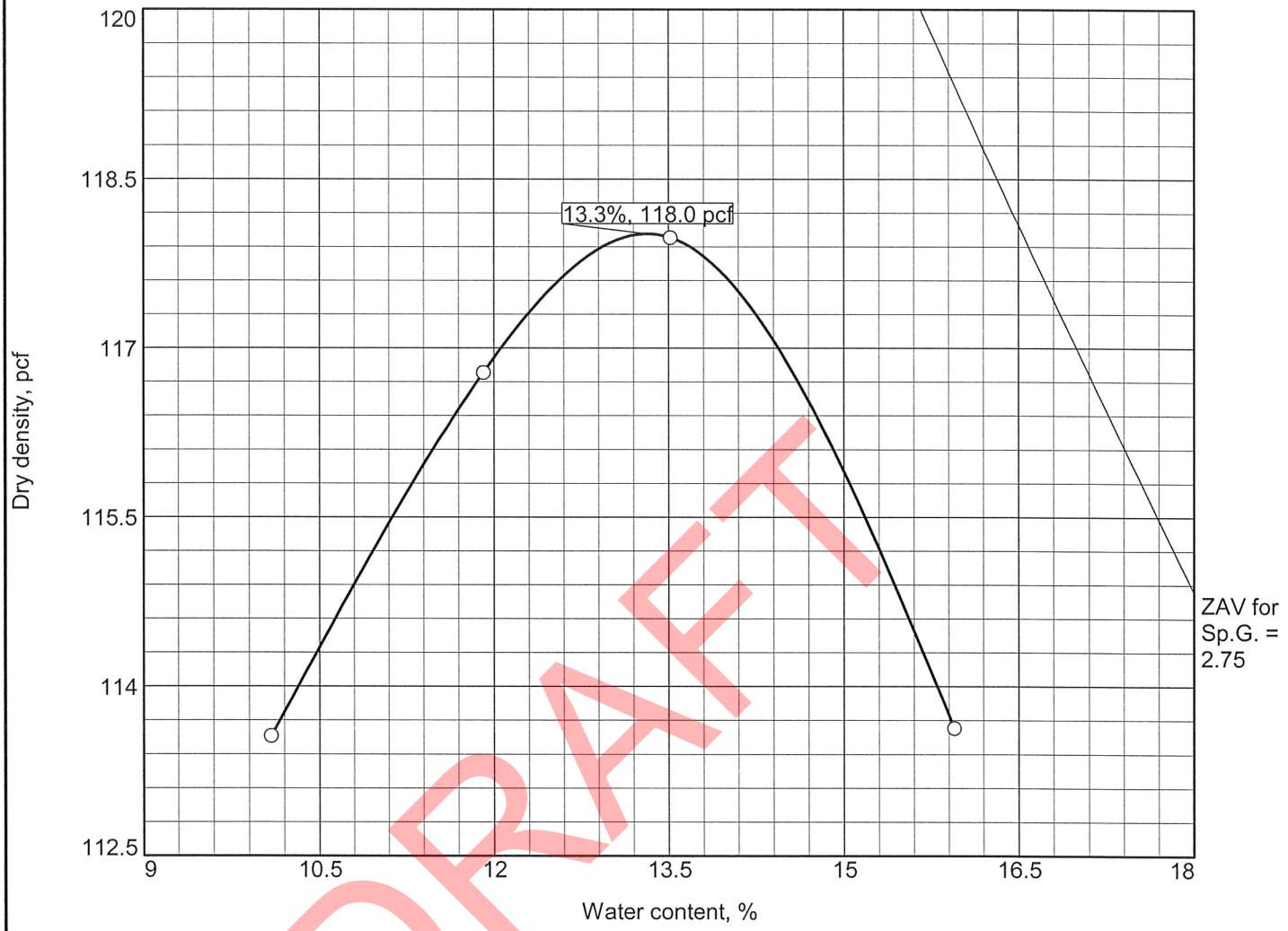
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SC	A-2-4(0)			26	8	3.9	18.9

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf Optimum moisture = 13.3 %	SAND, clayey, mostly fine to medium-grained sand-sized quartz, little medium to coarse-grained sand-sized limestone, little

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-516 **Sample Number:** UW-C-5/11

AMEC E&I

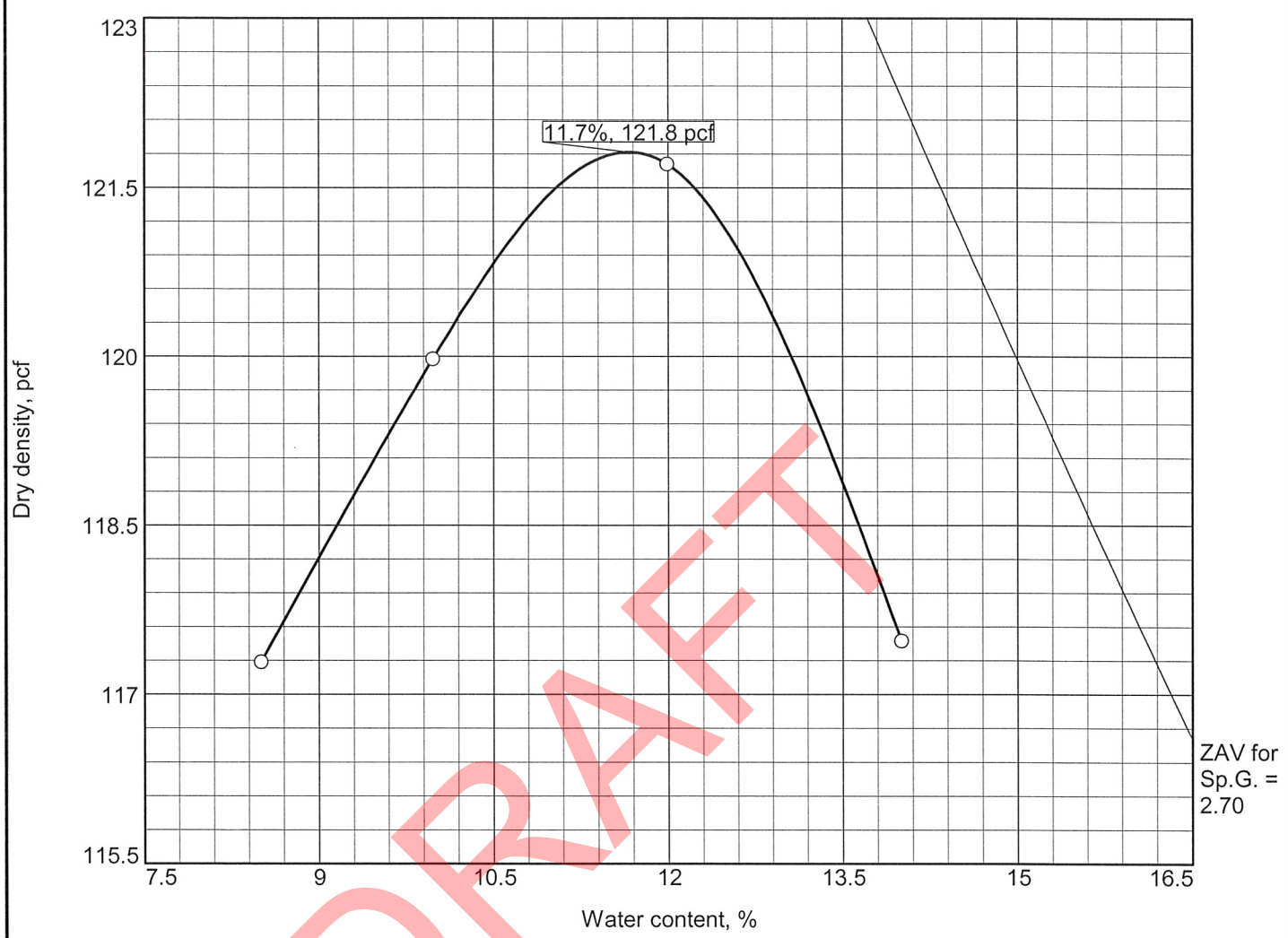
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP-SM	A-3			NV	NP	13.5	5.1

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 121.8 pcf Optimum moisture = 11.7 %	SAND, p-g w/silt, mostly fine to medium-grained s-sized quartz, little sand to gr-sized limestone, few silt, few fine gravel-sized shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-516 **Sample Number:** LW-C-5/11

Remarks:

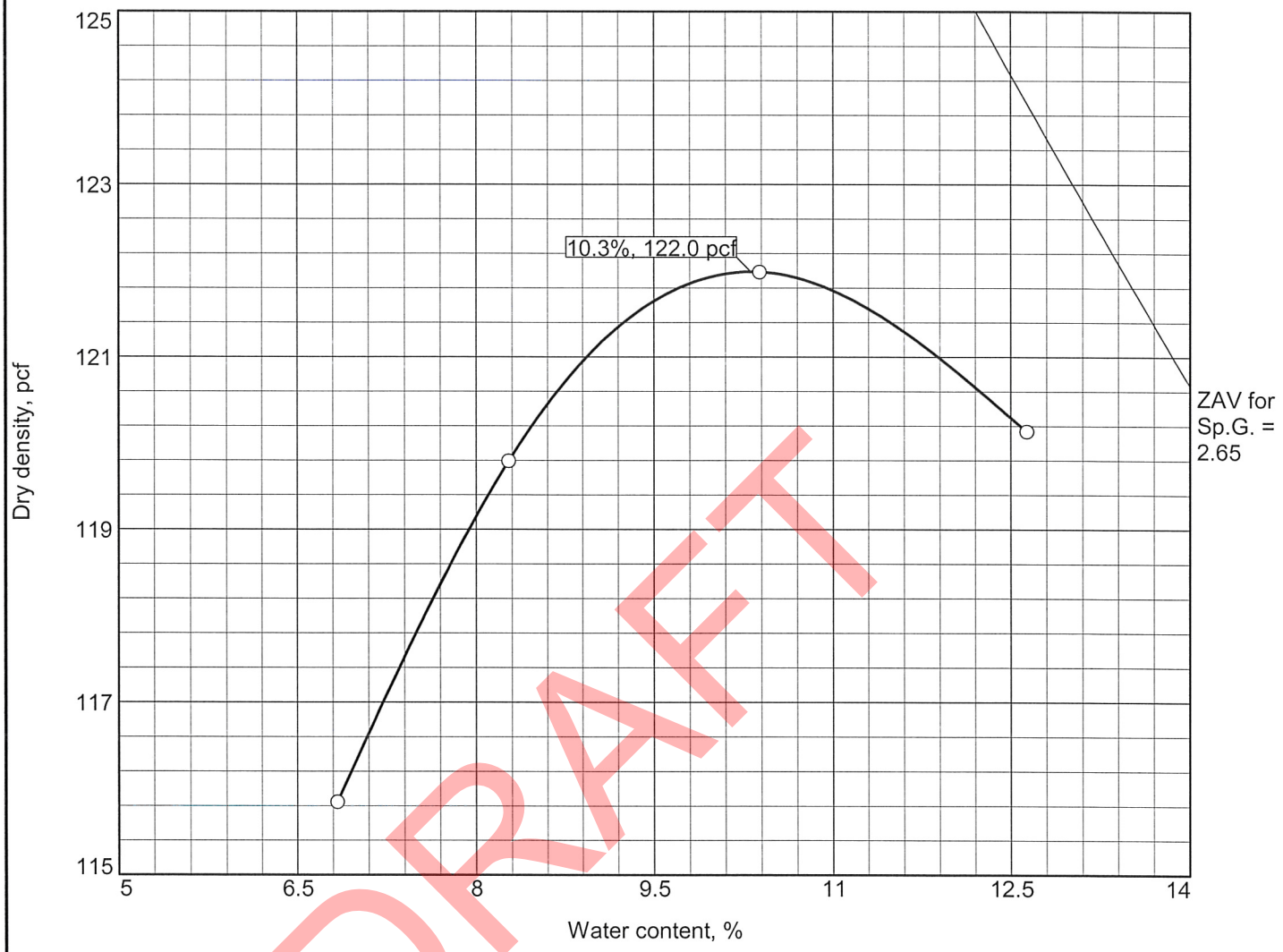
AMEC E&I

Jacksonville, Florida

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP-SM	A-3			NP	NP	11.5	6.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.0 pcf Optimum moisture = 10.3 %	SAND, poorly-graded with silt, mostly fine to medium-grained sand-sized quartz, little sand to gravel-sized limestone, few silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-516 **Sample Number:** MdW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trial No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-516						
2-5	UW-S-2/5	1	14.0	2.4	18	18
		2	14.1	2.4	17	
		3	13.9	2.4	18	
	LW-S-2/5	1	10.4	3.7	36	35
		2	10.4	3.4	33	
		3	10.4	3.6	35	
	MdW-S-2/5	1	11.2	3.5	32	32
		2	11.4	3.7	33	
		3	11.4	3.6	32	
5-11	UW-C-5/11	1	13.8	3.4	25	25
		2	13.7	3.4	25	
		3	13.8	3.4	25	
	LW-C-5/11	1	13.8	2.4	18	16
		2	13.4	2.0	15	
		3	13.6	2.1	16	
	MdW-C-5/11	1	14.3	3.1	22	22
		2	14.2	3.0	22	
		3	14.3	3.0	21	

Test Pit 516 View N

Test Pit 516 View W

Test Pit 516 View S

Test Pit 516 View E

Test Pit 516 View SE – Sampling and Staging Area

Test Pit 516 View NW – Backfilled Condition

Boring Designation CP14-IRC44-TP-517

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 2 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT: C-44 RSTA-Geotechnical Investigation-Phase V Phase V		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP14-IRC44-TP-517	LOCATION COORDINATES: X = 1,000,988 Y = 835,210	11. MANUFACTURER'S DESIGNATION OF DRILL: Komatsu 210 LC	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Phillips & Jordan	CONTRACTOR FILE NO.: 6734-14-9799	12. TOTAL SAMPLES	DISTURBED: 8 / UNDISTURBED (UD): 0
4. NAME OF DRILLER: Chuck Floyd		13. TOTAL NUMBER CORE BOXES: 0	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL:	BEARING:	14. ELEVATION GROUND WATER
		15. DATE BORING	STARTED: 12-10-14 / COMPLETED: 12-10-14
6. THICKNESS OF OVERBURDEN: N/A		16. ELEVATION TOP OF BORING: 26.7 Ft.	
7. DEPTH DRILLED INTO ROCK: N/A		17. TOTAL RECOVERY FOR BORING: N/A	
8. TOTAL DEPTH OF BORING: 11.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
26.7	0.0						26.7		
25.7	1.0		SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, few silt, trace organic matter, 10YR 2/2 very dark brown (SP-SM)				Test Pit		
24.7	2.0		SAND, poorly-graded, mostly fine-grained sand-sized quartz, trace silt, 10YR 4/2 dark grayish brown (SP)				24.7		
21.7	5.0		SAND, well-graded with silt, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, few silt, 10YR 8.5/1 yellowish gray (SW-SM)		MdW-S-2/5 LW-S-2/5 UW-S-2/5		24.7 24.7 21.7		
17.7	9.0		SAND, poorly-graded with silt, mostly fine to medium-grained sand-sized quartz, little sand to gravel-sized limestone, few silt, 10YR 8/2 very pale brown (SP-SM) At El. 19.7 Ft., mostly fine-grained sand-sized quartz, trace shell		UW-R-5/7 MdW-C-5/11 LW-C-5/11 UW-C-5/11		21.7 21.7 21.7 17.7		
15.7	11.0		SAND, well-graded with silt, mostly fine-grained sand-sized quartz, little sand to gravel-sized limestone, few silt, 10YR 8/1 white (SW-SM)		UW-R-9/11		15.7		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE SAMPLE LABORATORY

Abbreviations:

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 2 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
C-44 RSTA-Geotechnical Investigation-Phase V	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 1,000,988 Y = 835,210	26.7 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE

ID	DEPTH	CLASSIFICATION
UW-S-2/5	2.0/5.0	SW-SM
LW-S-2/5	2.0/5.0	SP
MdW-S-2/5	2.0/5.0	SP
UW-C 5/11	/11.0	SP-SM
LW-C 5/11	/11.0	SP
MdW-C 5/11	/11.0	SP
UW-R-5/7	5.0/7.0	SP-SM
UW-R 9/11	/11.0	SW-SM

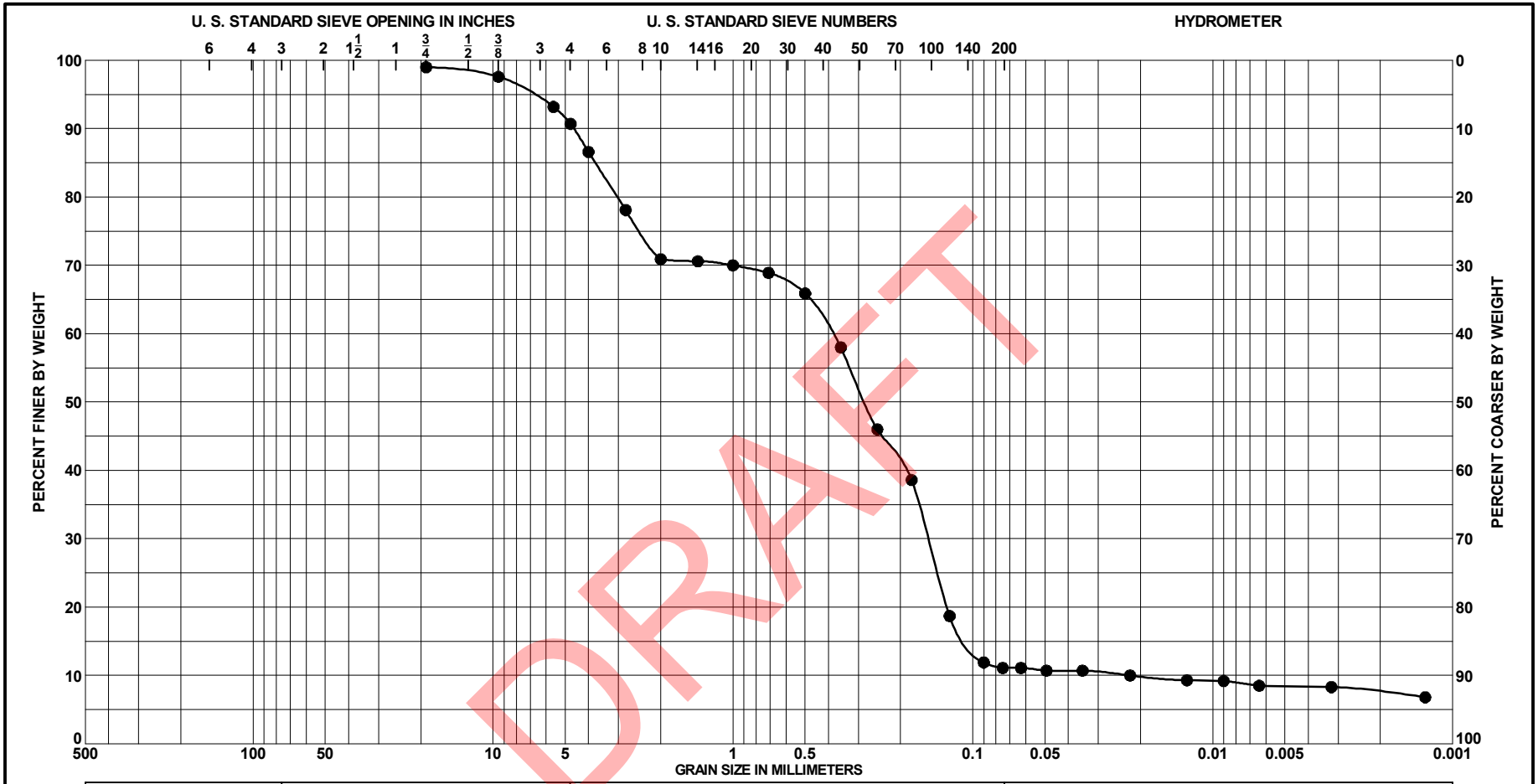
not on atterberg limits.

4. Additional Laboratory Testing

UW-S-2/5Specific Gravity
UW-S-2/5Atterberg
UW-S-2/5Percent Organic
UW-S-2/5Percent Carbonate
UW-S-2/5Percent Visual Shell
LW-S-2/5Specific Gravity
LW-S-2/5Atterberg
LW-S-2/5Percent Organic
LW-S-2/5Percent Carbonate
LW-S-2/5Percent Visual Shell
MdW-S-2/5Specific Gravity
MdW-S-2/5Atterberg
MdW-S-2/5Percent Organic
MdW-S-2/5Percent Carbonate
MdW-S-2/5Percent Visual Shell
UW-C 5/11Specific Gravity
UW-C 5/11Atterberg
UW-C 5/11Percent Organic
UW-C 5/11Percent Carbonate
UW-C 5/11Percent Visual Shell
LW-C 5/11Specific Gravity
LW-C 5/11Atterberg
LW-C 5/11Percent Organic
LW-C 5/11Percent Carbonate
LW-C 5/11Percent Visual Shell
MdW-C 5/11Specific Gravity
MdW-C 5/11Atterberg
MdW-C 5/11Percent Organic
MdW-C 5/11Percent Carbonate
MdW-C 5/11Percent Visual Shell
UW-R-5/7Specific Gravity
UW-R-5/7Atterberg
UW-R-5/7Percent Organic
UW-R-5/7Percent Carbonate
UW-R-5/7Percent Visual Shell
UW-R 9/11Specific Gravity
UW-R 9/11Atterberg
UW-R 9/11Percent Organic
UW-R 9/11Percent Carbonate
UW-R 9/11Percent Visual Shell

15
20
25
30
35

Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-517	UW-S-2/5	2.0	5.0	SW-SM	0	0	0	1.4	2.48	8.3	79.6	11.1	2.6	8.5	7.47	0	8.8
CP14-IRC44-TP-517	LW-S-2/5	2.0	5.0	SP	0	0	0	0.7	2.72	22.2	70.7	3.6	1.7	1.9	9.31	0	8.6
CP14-IRC44-TP-517	MdW-S-2/5	2.0	5.0	SP	0	0	0	0.4	2.61	17.0	80.6	2.4	2.1	0.3	6.06	0	8.5
CP14-IRC44-TP-517	UW-C 5/11	5.0	11.0	SP-SM	0	0	0	1.1	2.67	6.5	84.3	9.2	3.3	5.9	7.23	0.6	8.8
CP14-IRC44-TP-517	LW-C 5/11	5.0	11.0	SP	0	0	0	1.7	2.68	14.2	82.6	3.2	1.5	1.7	5.91	1.4	9.4
CP14-IRC44-TP-517	MdW-C 5/11	5.0	11.0	SP	0	0	0	0.4	2.66	24.9	72.8	2.3	1.3	1	7.74	0.5	8.4
CP14-IRC44-TP-517	UW-R-5/7	5.0	7.0	SP-SM	0	0	0	0.6	2.67	6.0	83.7	10.3	3.5	6.8	10.91	0	8.9
CP14-IRC44-TP-517	UW-R 9/11	9.0	11.0	SW-SM	0	0	0	0.5	2.67	3.1	86.7	10.2	3.6	6.6	8.77	0.3	8.9

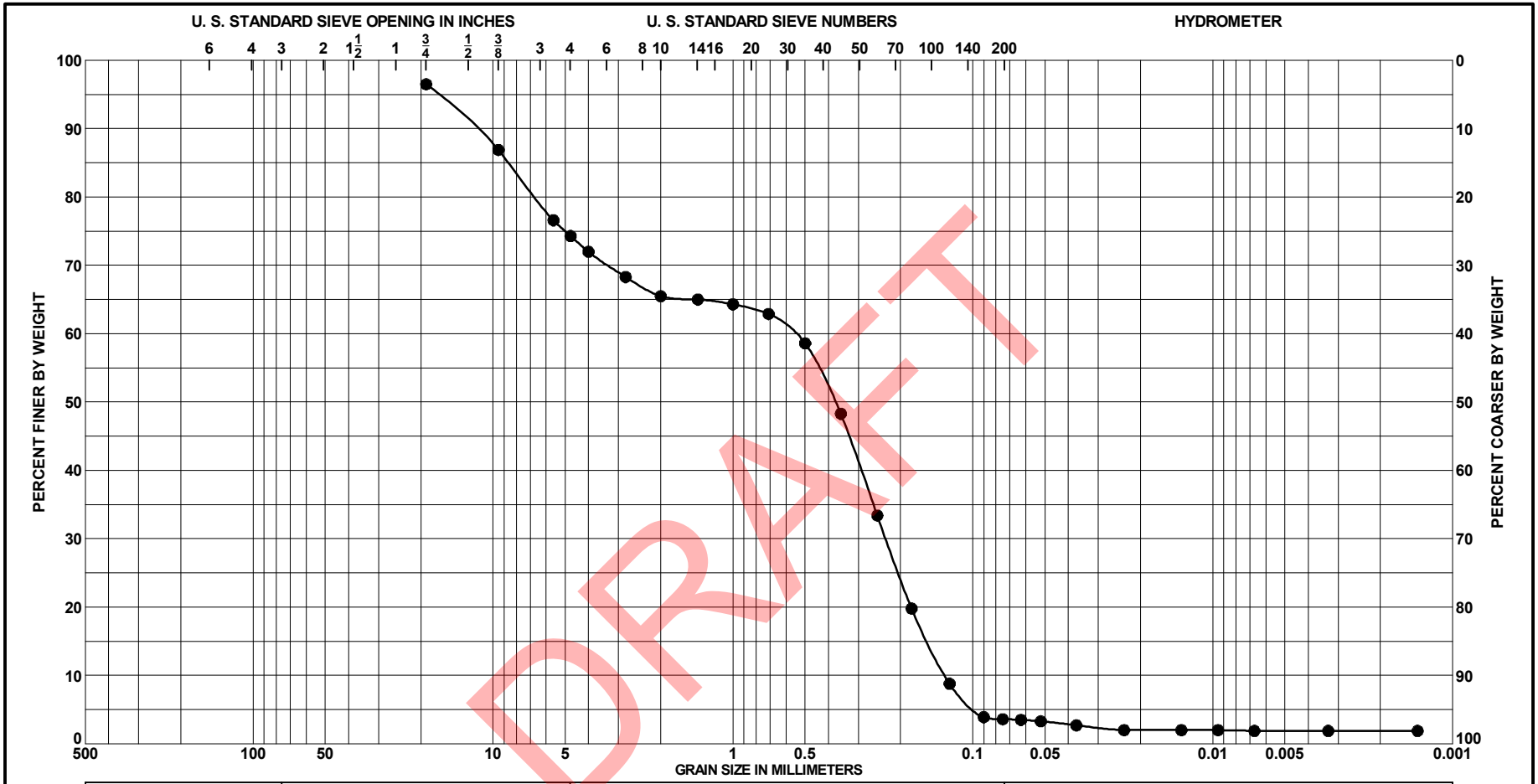


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-S-2/5	2.0 to 5.0 Ft.	SAND, well-graded w/silt, mostly	10YR 8.5/1	0	7	2.48	1		0	0	NP
		fine-grained sand-sized quartz, some									
		sand to gravel-sized limestone, few									
		silt, yellowish gray (SW-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
● LW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt, yellowish gray (SP)	10YR 8.5/1	0	9	2.72	1		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

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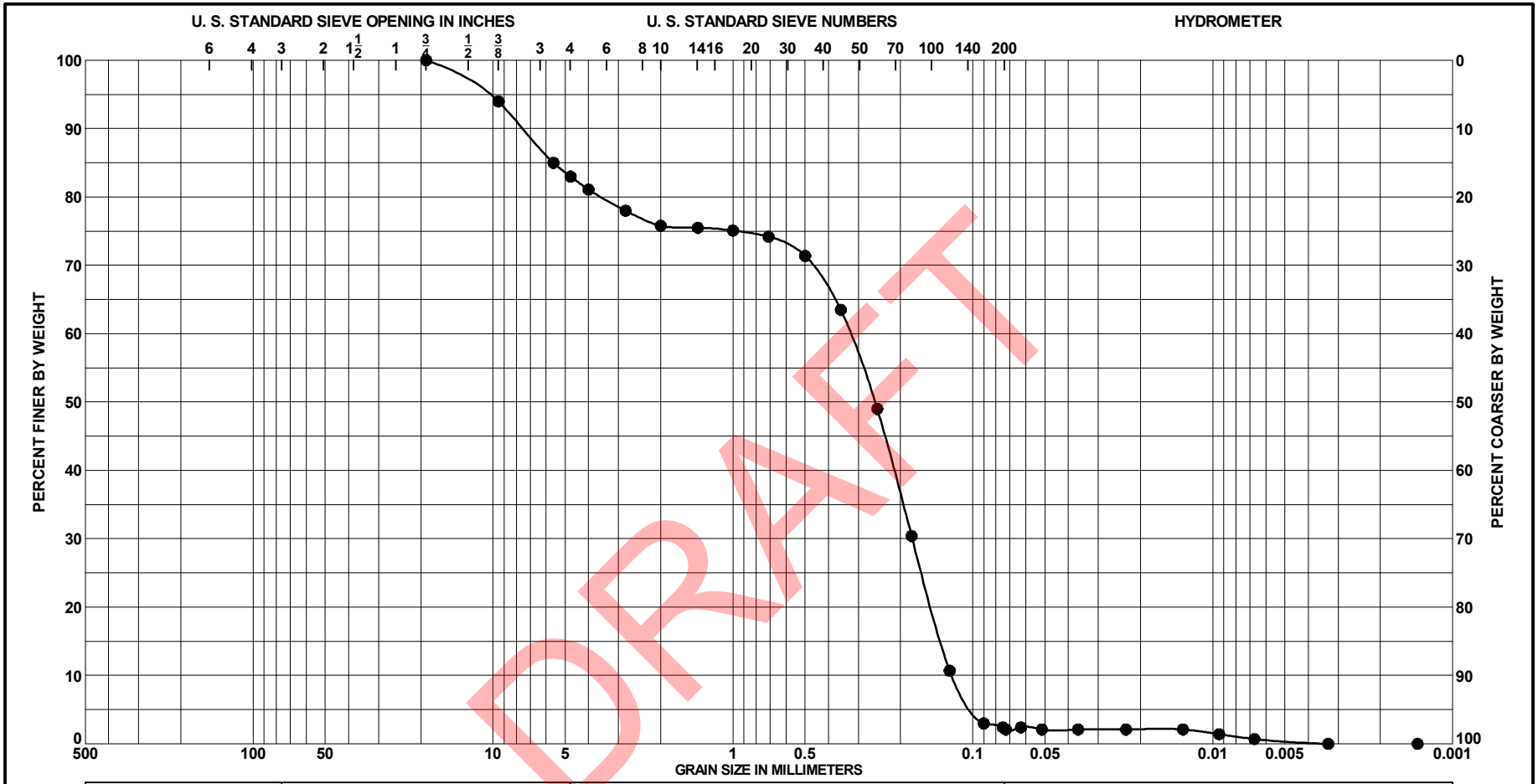
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly	10YR 8.5/1	0	6	2.61	0		0	0	NP
		fine-grained sand-sized quartz, little									
		sand to gravel-sized limestone, trace									
		silt, yellowish gray (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

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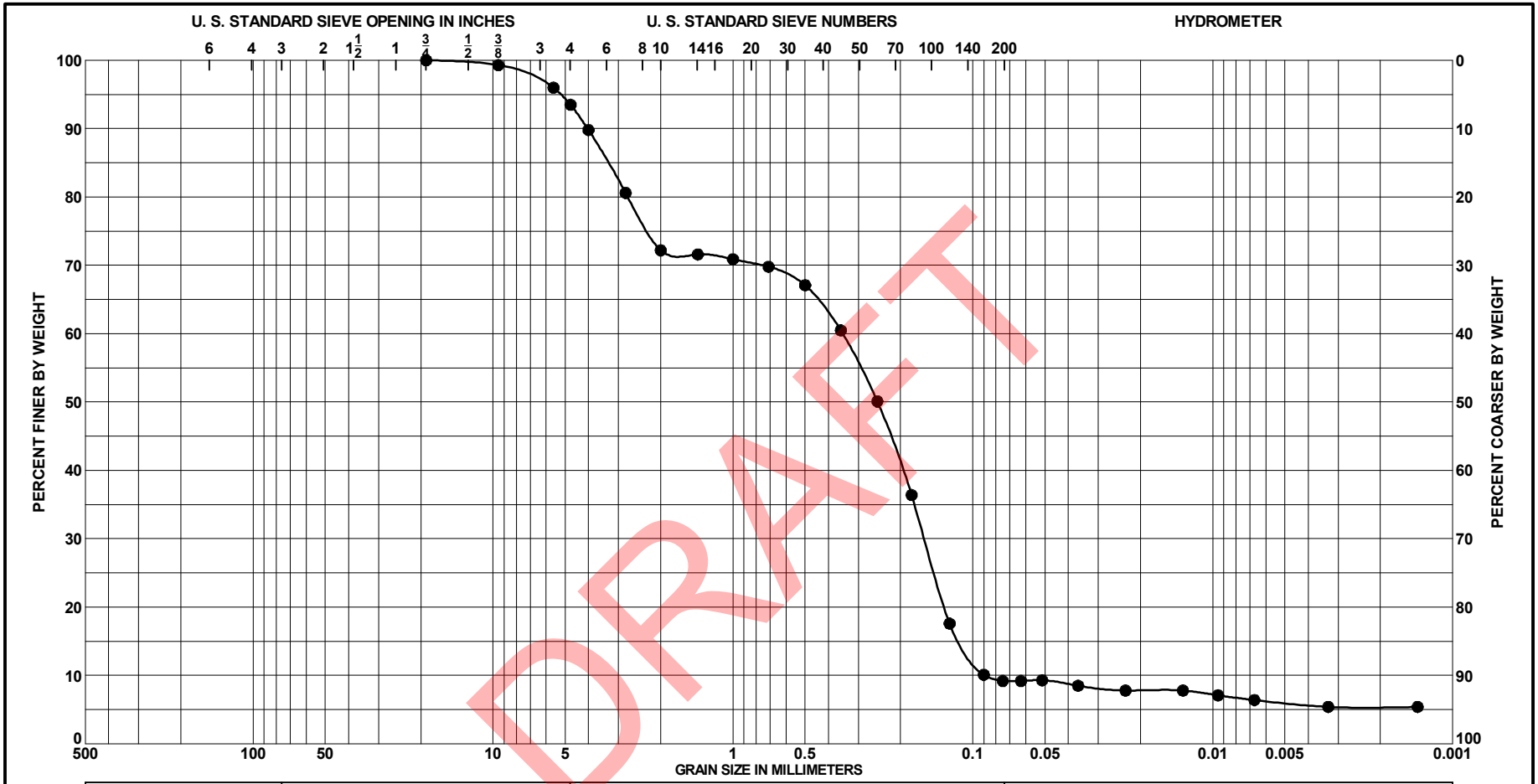
JUN 02

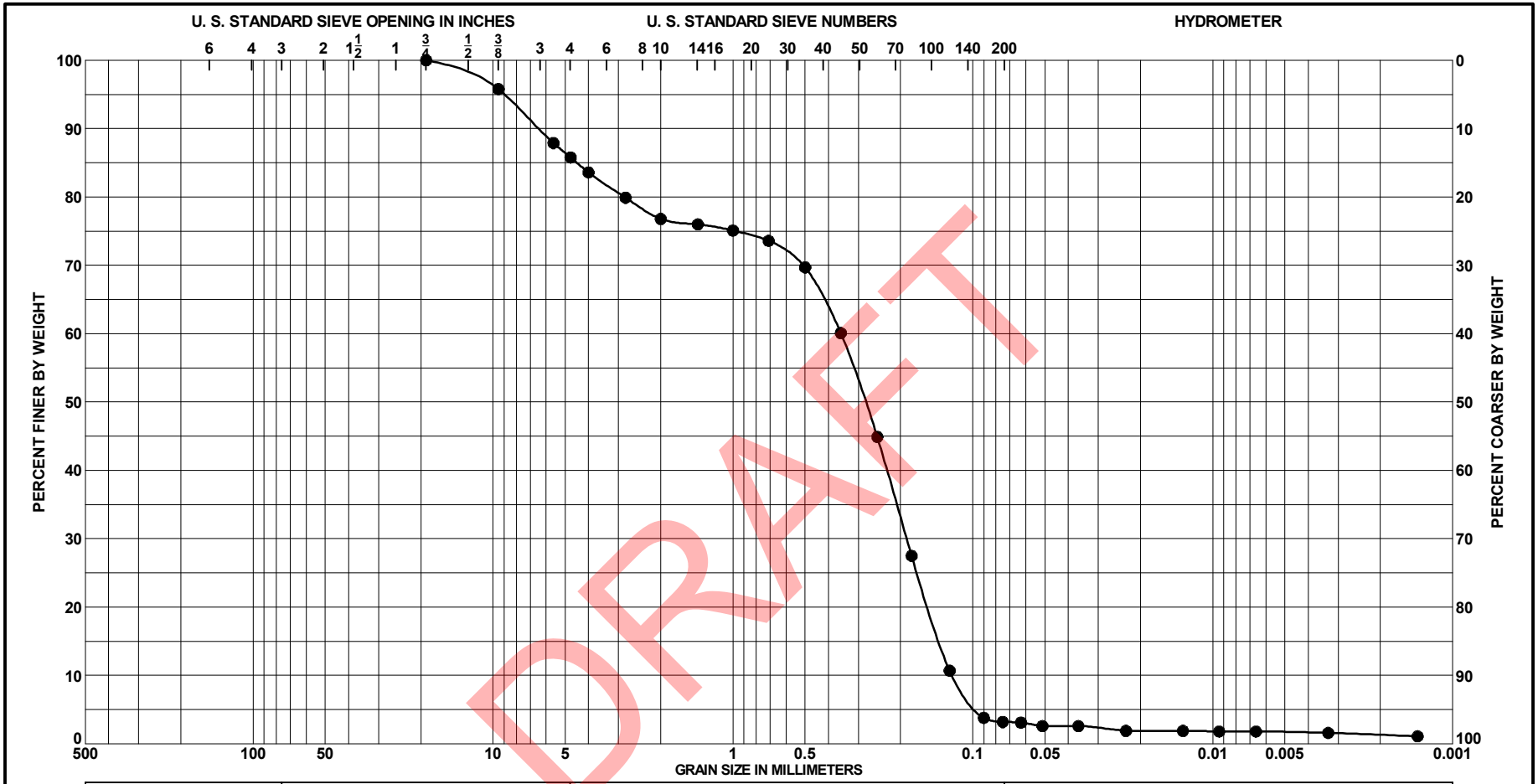


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-C 5/11	to 11.0 Ft.	SAND, pg w/silt, mostly fine-grained	10YR 8/2	1	7	2.67	1		0	0	NP
		sand-sized quartz, little sand to									
		gravel-sized limestone, few silt, trace									
		shell, very pale brown (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

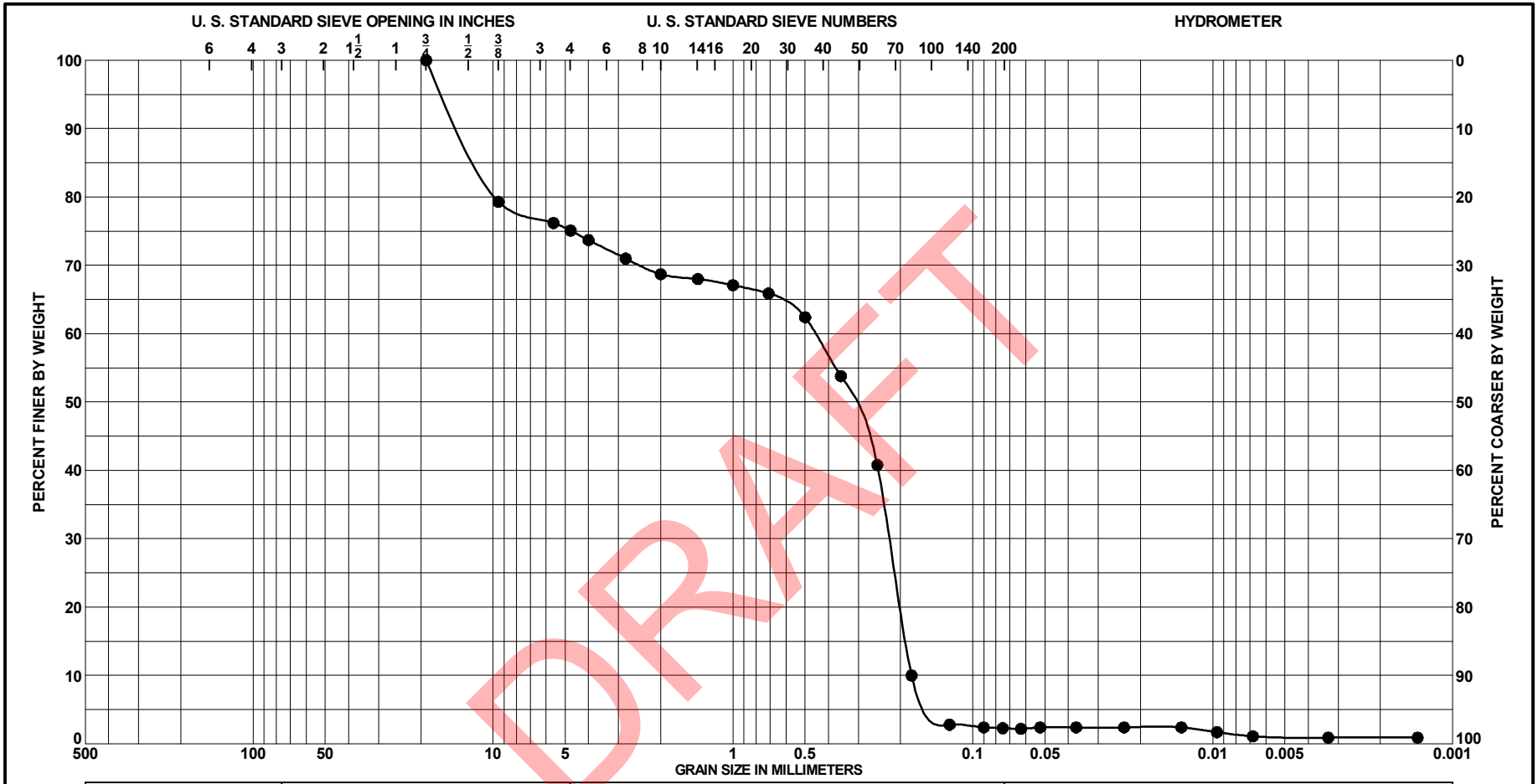


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●LW-C 5/11	to 11.0 Ft.	SAND, poorly-graded, mostly fine to	10YR 8/2	1	6	2.68	2		0	0	NP
		medium-grained sand-sized quartz,									
		little sand to gravel-sized limestone,									
		trace silt, trace shell, very pale brown									
		(SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

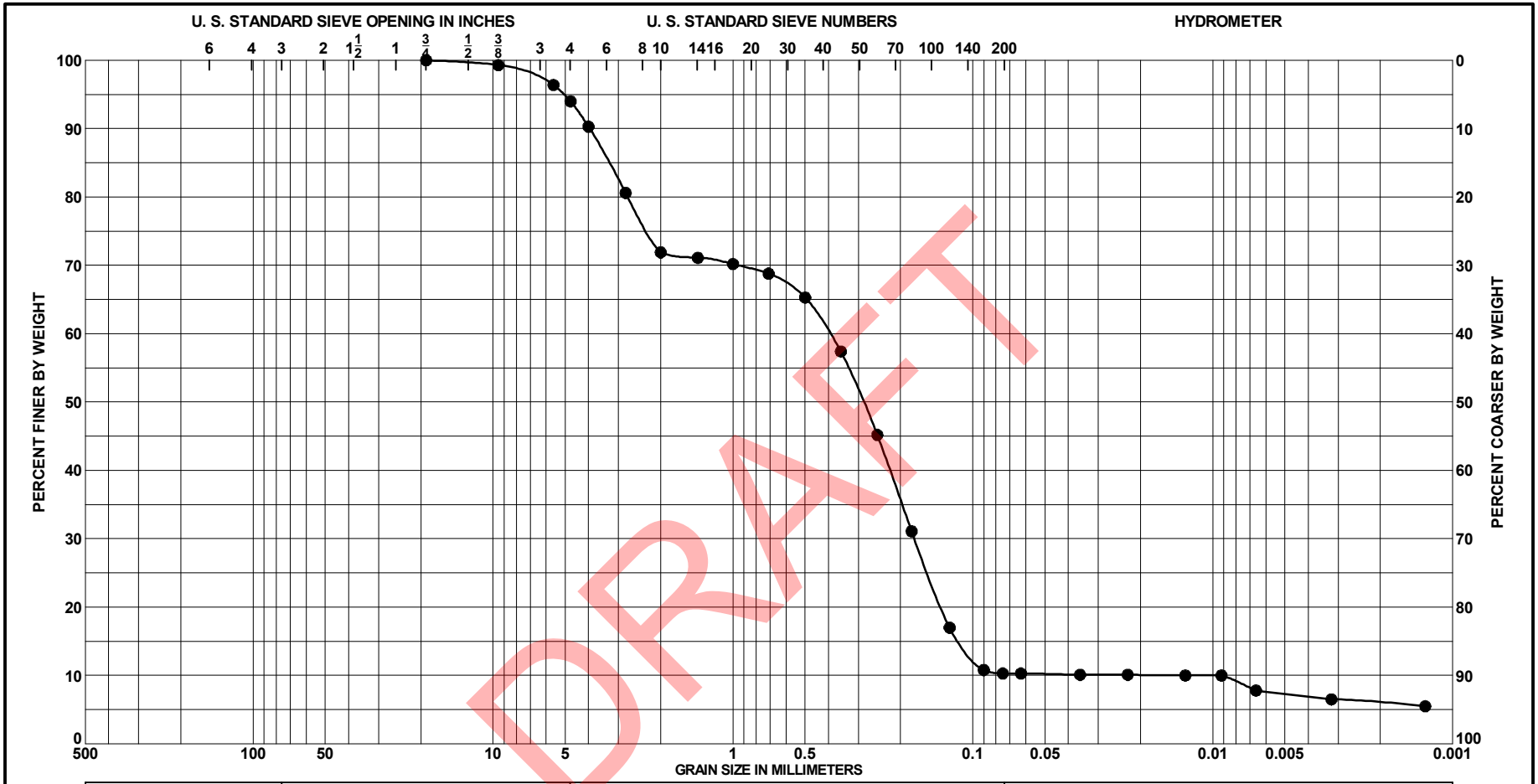


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-C 5/11	to 11.0 Ft.	SAND, poorly-graded, mostly fine to	10YR 8/2	1	8	2.66	0		0	0	NP
		medium-grained sand-sized quartz,									
		some sand to gravel-sized limestone,									
		trace silt, trace shell, very pale brown									
		(SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

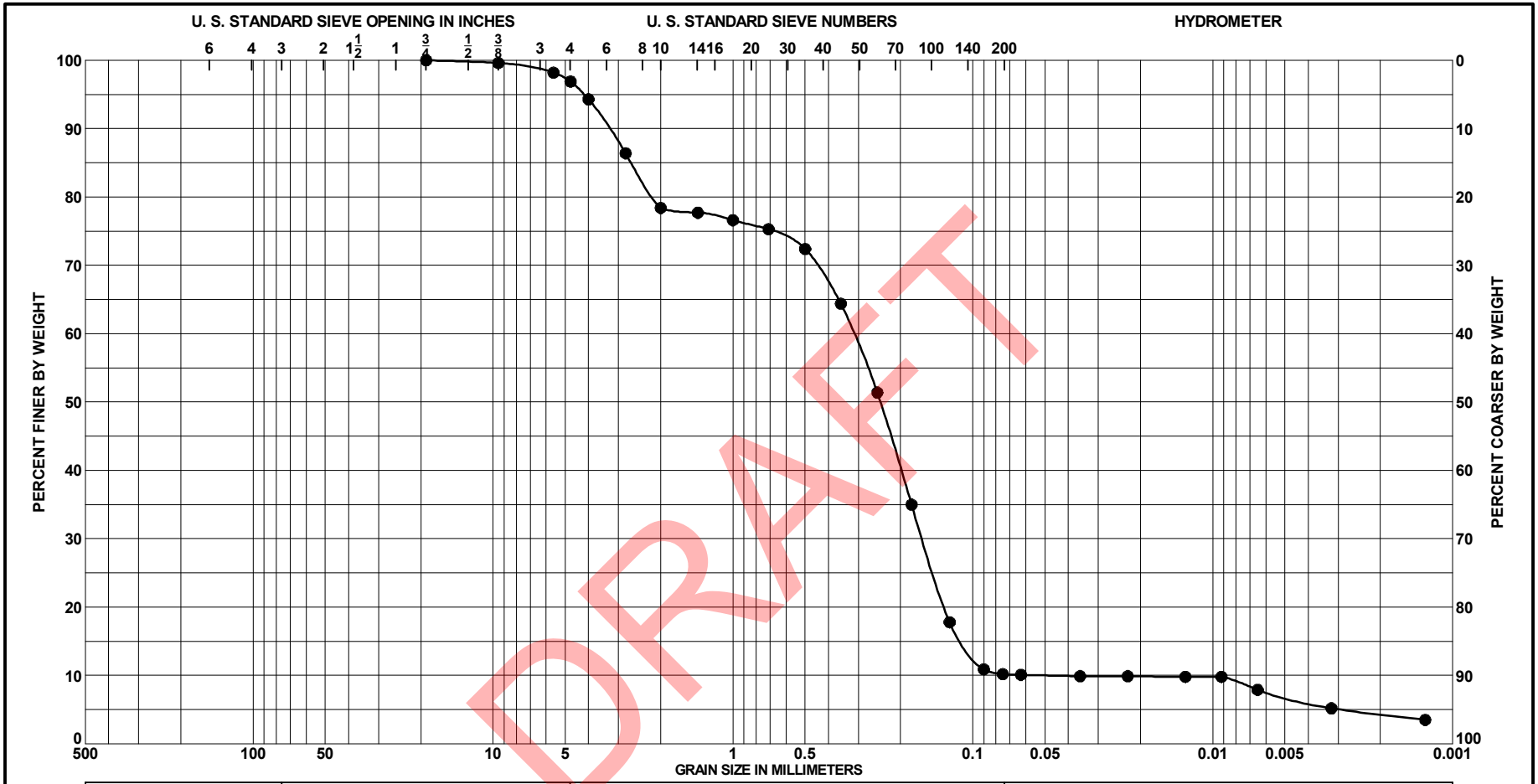


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-5/7	5.0 to 7.0 Ft.	SAND, pg w/silt, mostly fine to	10YR 8/2	0	11	2.67	1		0	0	NP
		med-grained sand-sized quartz, little									
		sand to gravel-sized limestone, few									
		silt, very pale brown (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
UW-R 9/11	to 11.0 Ft.	SAND, well-graded w/silt, mostly	10YR 8/1	0	9	2.67	1		0	0	NP
		fine-grained sand-sized quartz, little									
		sand to gravel-sized limestone, few									
		silt, white (SW-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-517
BORING ELEV.	26.7 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-517 UW-S-2/5								
14%	1	7	0.87	120.2	11.4	121.3	10.7	1025
	2	7	0.87	120.2	11.4	121.3	10.7	850
	3	7	0.83	120.2	11.4	121.8	10.1	1000
	4	28	0.83	120.2	11.4	121.8	10.1	NT
	5	28	0.80	120.2	11.4	122.0	9.9	NT
	6	28	0.80	120.2	11.4	122.1	9.9	NT
CP14-IRC44-TP-517 UW-C-5/11								
14%	1	7	0.87	123.4	11.0	121.3	10.7	1025
	2	7	0.87	123.4	11.0	121.3	10.7	850
	3	7	0.83	123.4	11.0	121.8	10.1	1000
	4	28	0.83	123.4	11.0	121.8	10.1	NT
	5	28	0.80	123.4	11.0	122.0	9.9	NT
	6	28	0.80	123.4	11.0	122.1	9.9	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-517 LW-S-2/5								
14%	1	7	0.75	122.7	10.4	123.8	9.2	1315
	2	7	0.75	122.7	10.4	123.8	9.2	1100
	3	7	0.75	122.7	10.4	123.7	9.3	1240
	4	28	0.75	122.7	10.4	124.3	9.3	NT
	5	28	0.74	122.7	10.4	124.1	9.0	NT
	6	28	0.74	122.7	10.4	124.0	9.0	NT
CP14-IRC44-TP-517 LW-C-5/11								
14%	1	7	0.70	122.6	9.5	123.4	8.6	NT
	2	7	0.70	122.6	9.5	123.9	8.6	NT
	3	7	0.72	122.6	9.5	123.1	8.8	NT
	4	28	0.72	122.6	9.5	123.1	8.8	NT
	5	28	0.71	122.6	9.5	123.1	8.8	NT
	6	28	0.71	122.6	9.5	123.2	8.8	NT

NT: Not tested as of date of report preparation.

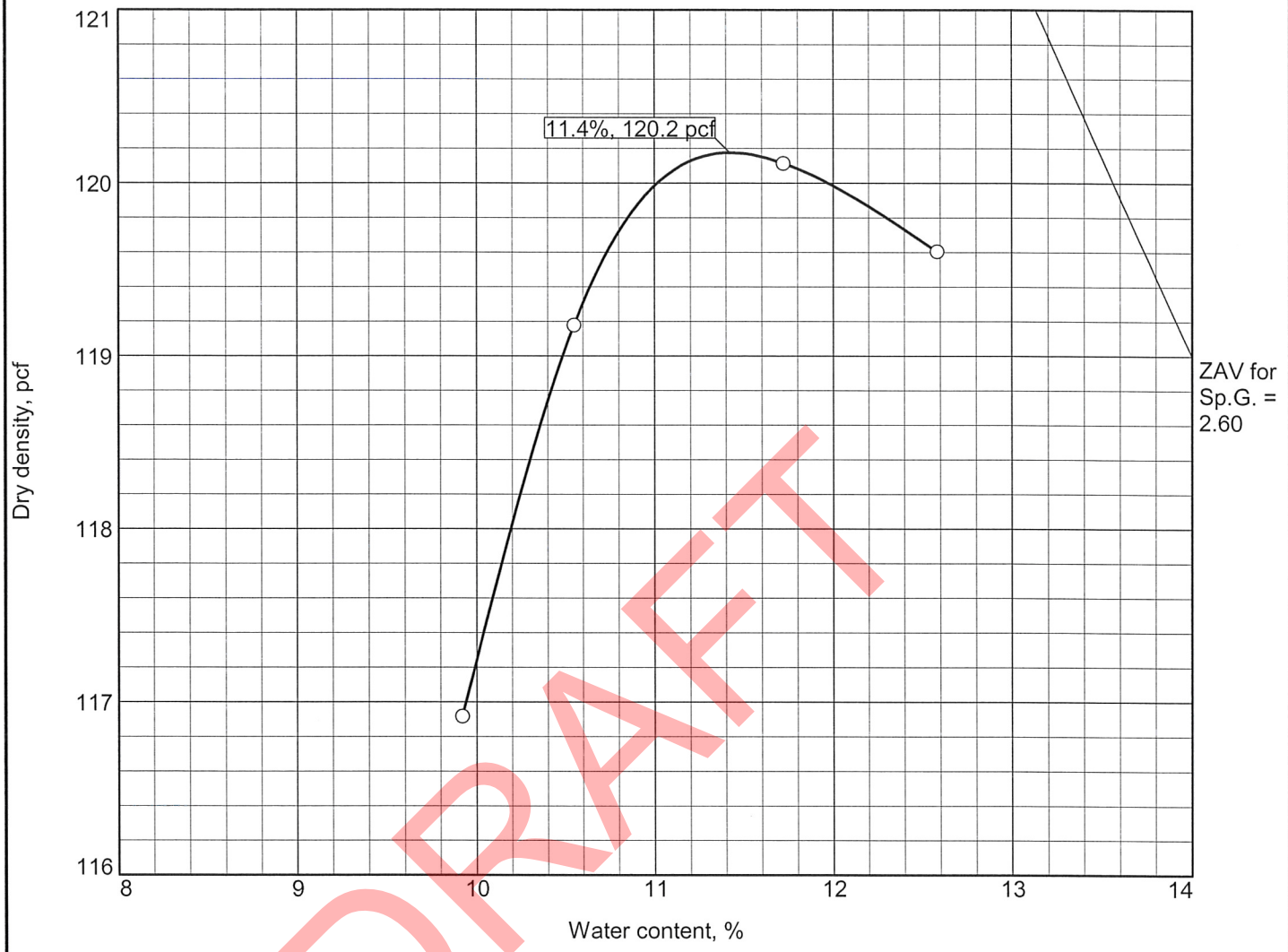
Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-517 MdW-S-2/5								
14%	1	7	0.75	122.2	10.2	122.9	9.3	1265
	2	7	0.75	122.2	10.2	123.3	9.3	1190
	3	7	0.76	122.2	10.2	123.2	9.4	1385
	4	28	0.76	122.2	10.2	123.1	9.4	NT
	5	28	0.76	122.2	10.2	122.9	9.3	NT
	6	28	0.76	122.2	10.2	123.4	9.3	NT
CP14-IRC44-TP-517 MdW-C-5/11								
14%	1	7	0.66	123.3	9.1	123.8	8.1	1365
	2	7	0.66	123.3	9.1	123.8	8.1	1305
	3	7	0.65	123.3	9.1	123.9	8.0	1465
	4	28	0.65	123.3	9.1	124.4	8.0	NT
	5	28	0.68	123.3	9.1	123.4	8.4	NT
	6	28	0.68	123.3	9.1	124.1	8.4	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		**PSI***			**AVG.***
		1	**2**	**3**	
TP-517	UW-S-2/5				
TP-517	LW-S-2/5	**940**	**1250**	**1210**	1133
TP-517	MdW-S-2/5	**975**	**805**	**965**	915
TP-517	UW-C-5/11				
TP-517	LW-C-5/11				
TP-517	MdW-C-5/11				

* Testing still in progress

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SW-SM	A-2-4(0)			NV	NP	9.3	11.1

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.2 pcf Optimum moisture = 11.4 %	SAND, well-graded, mostly fine to medium-grained sand sized quartz, some sand to gravel-sized limestone, few silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-517 **Sample Number:** UW-S-2/5

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT

Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NV	NP	25.7	3.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.7 pcf Optimum moisture = 10.4 %	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-517 **Sample Number:** LW-S-2/5

AMEC E&I

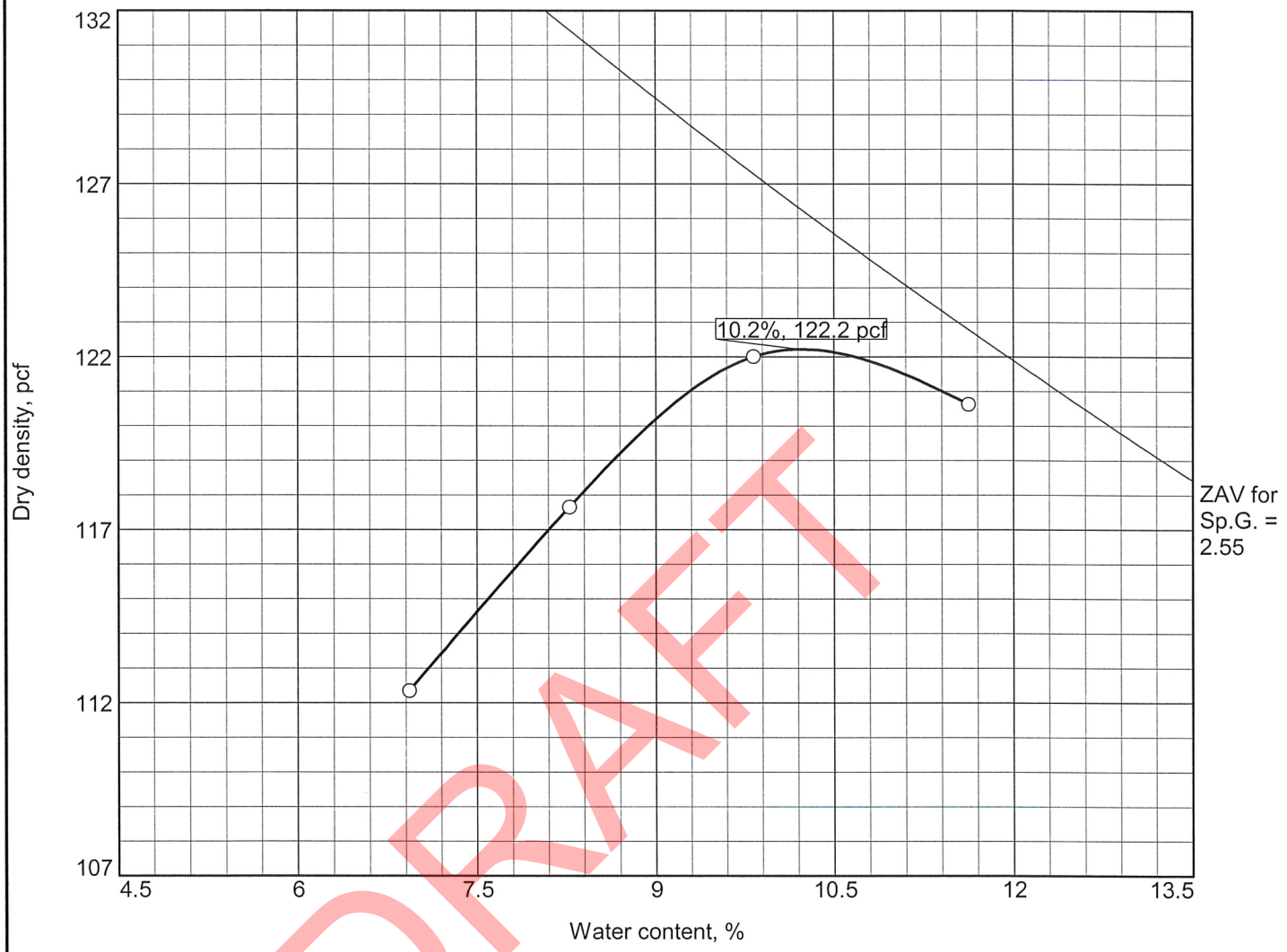
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NP	NP	17.0	2.4

TEST RESULTS

Maximum dry density = 122.2 pcf

Optimum moisture = 10.2 %

MATERIAL DESCRIPTION

SAND, poorly-graded, mostly fine-grained sand-sized quartz, little sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-517 **Sample Number:** MdW-S-2/5

AMEC E&I

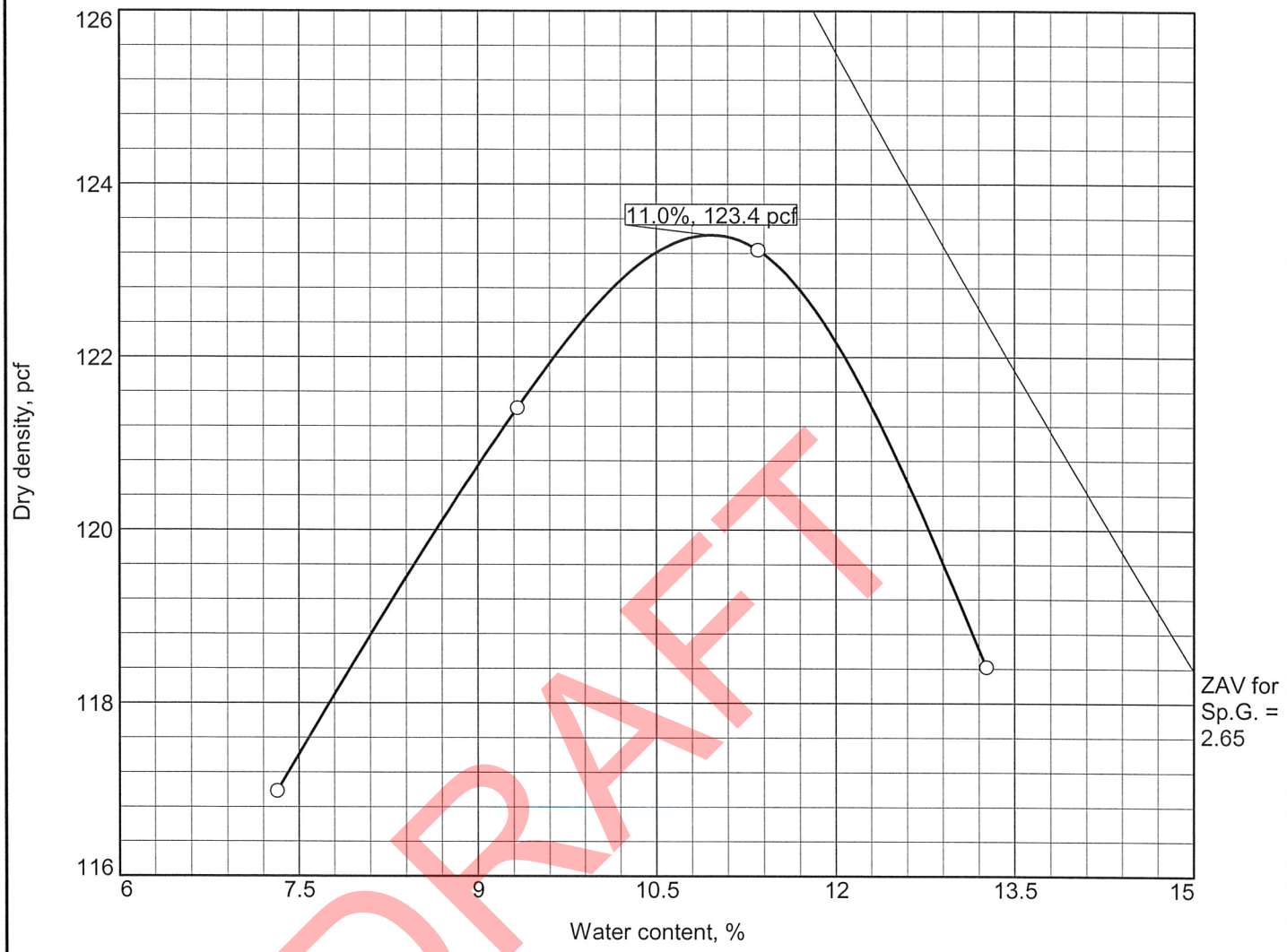
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP-SM	A-3			NP	NP	6.5	9.2

TEST RESULTS

Maximum dry density = 123.4 pcf

Optimum moisture = 11.0 %

MATERIAL DESCRIPTION

SAND, pg w/silt, mostly fine-grained sand-sized quartz, little sand to gravel-sized limestone, few silt, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-517 **Sample Number:** UW-C-5/11

AMEC E&I

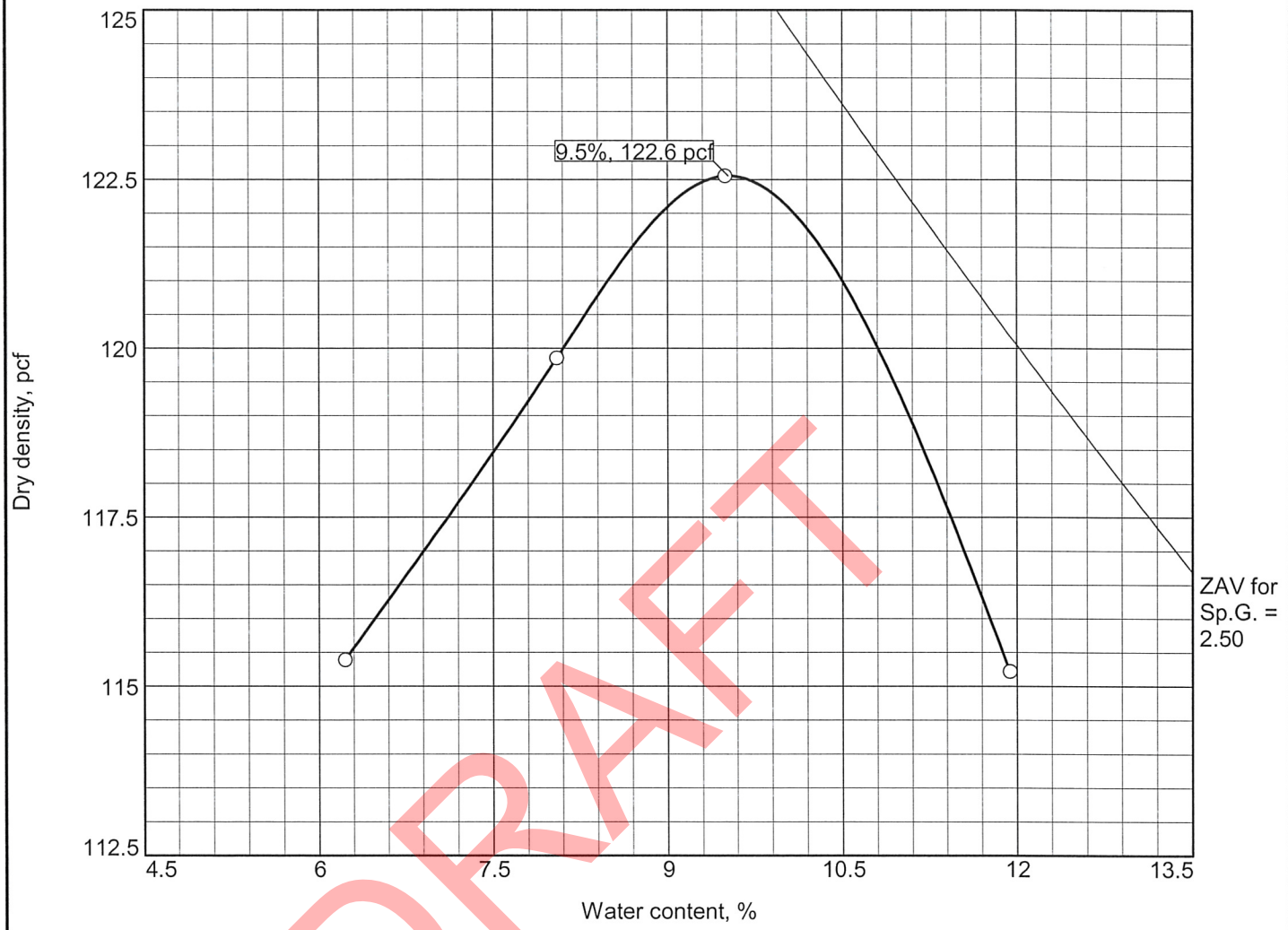
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-3			NP	NP	14.2	3.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.6 pcf Optimum moisture = 9.5 %	SAND, p-g, mostly fine to medium-grained sand-sized quartz, little sand to gravel-sized limestone, trace silt, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-517 **Sample Number:** LW-C-5/11

AMEC E&I

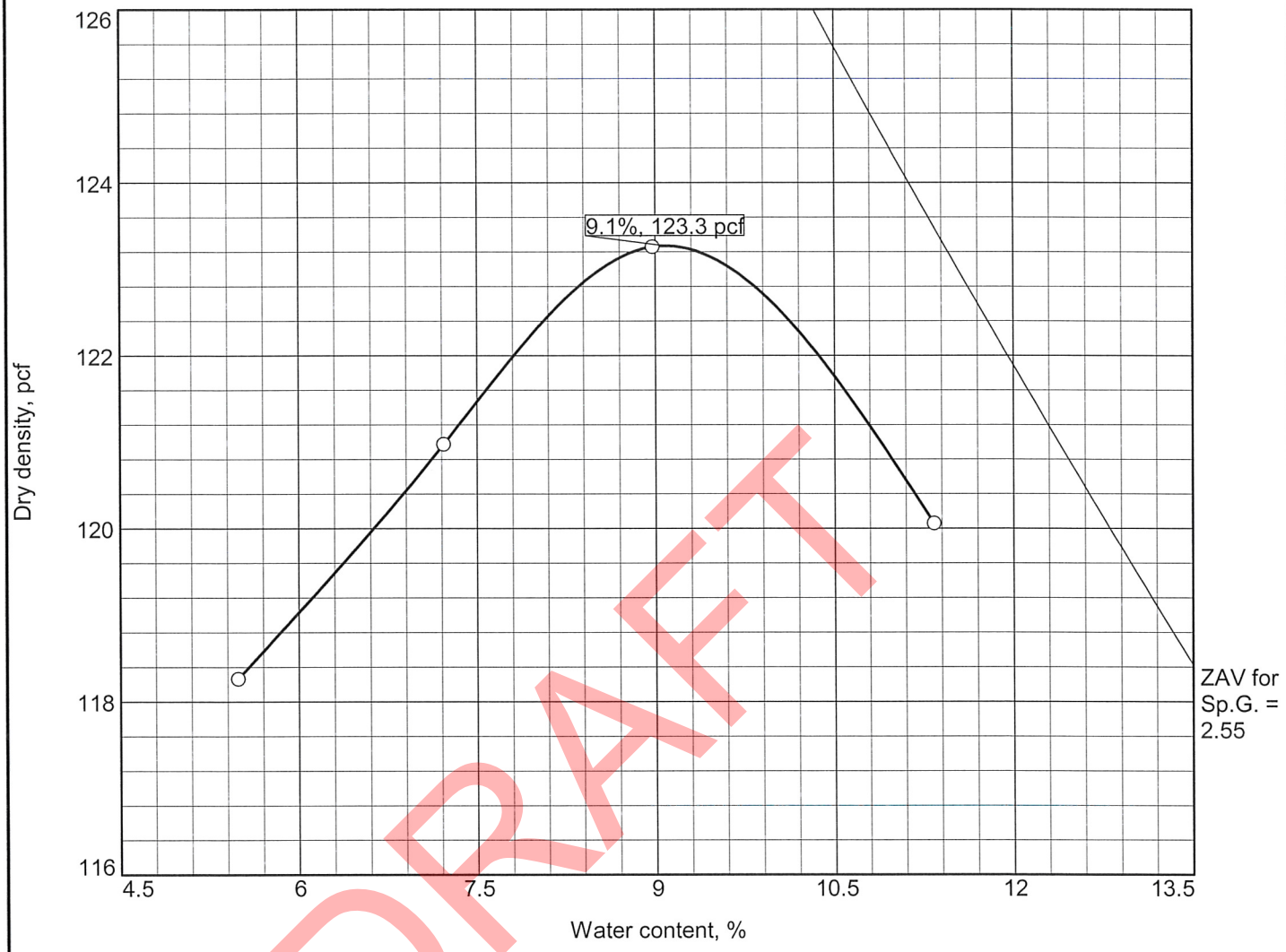
Jacksonville, Florida

Remarks:

Figure

Tested By: W. Martin **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-3			NV	NP	24.9	2.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.3 pcf Optimum moisture = 9.1 %	SAND, poorly-graded with silt, mostly fine to med-grained sand-sized quartz, little sand to gravel-sized limestone, trace silt, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-517 **Sample Number:** MdW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-517 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.83	120.2	11.40	121.5	10.0	NT	NT	--
		0.83	120.2	11.40	121.5	10.0	NT	NT	--
Freezing and Thawing	14	0.84	120.2	11.40	121.6	10.1	NT	NT	--
		0.84	120.2	11.40	121.6	10.1	NT	NT	--
CP14-IRC44-TP -517 UW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	NT	NT	NT	NT	NT	NT	NT	NT
		NT	NT	NT	NT	NT	NT	NT	NT
Freezing and Thawing	14	NT	NT	NT	NT	NT	NT	NT	NT
		NT	NT	NT	NT	NT	NT	NT	NT

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-517 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.78	122.7	10.40	123.3	9.5	130.8	0.0	--
		0.78	122.7	10.40	123.2	9.5	130.1	0.0	--
Freezing and Thawing	14	0.76	122.7	10.40	123.7	9.3	NT	NT	--
		0.76	122.7	10.40	123.7	9.3	NT	NT	--
CP14-IRC44-TP-517 LW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.78	122.6	9.50	121.8	10.0	NT	NT	--
		0.78	122.6	9.50	121.6	10.0	NT	NT	--
Freezing and Thawing	14	0.82	122.6	9.50	122.1	9.6	NT	NT	--
		0.82	122.6	9.50	122.1	9.6	NT	NT	--

*NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-517 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.76	122.2	10.20	123.5	9.4	NT	NT	--
		0.76	122.2	10.20	123.0	9.4	NT	NT	--
Freezing and Thawing	14	0.75	122.2	10.20	123.4	9.3	NT	NT	--
		0.75	122.2	10.20	123.5	9.3	NT	NT	--
CP14-IRC44-TP-517 MdW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.72	123.3	9.10	123.1	8.8	NT	NT	--
		0.72	123.3	9.10	123.1	8.8	NT	NT	--
Freezing and Thawing	14	0.71	123.3	9.10	123.8	8.7	NT	NT	--
		0.71	123.3	9.10	123.8	8.7	NT	NT	--

*NT: Not tested as of date of report preparation.

Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trial No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-517						
2-5	UW-S-2/5	1	14.3	2.2	16	15
		2	14.2	2.1	15	
		3	14.1	2.0	15	
	LW-S-2/5	1	11.3	3.6	32	30
		2	11.1	3.3	30	
		3	11.2	3.2	29	
	MdW-S-2/5	1	10.6	3.8	36	37
		2	10.5	3.9	38	
		3	10.5	3.9	38	
5-11	UW-C-5/11	1	13.6	2.8	21	20
		2	13.2	2.4	19	
		3	13.2	2.6	20	
	LW-C-5/11	1	8.1	3.0	37	36
		2	8.7	3.1	36	
		3	8.7	3.0	35	
	MdW-C-5/11	1	6.2	3.5	57	56
		2	6.3	3.2	51	
		3	6.2	3.6	59	

Drainage Canal Running North/South Located East of Test Pit 517

Test Pit 517 View NW - Excavation

Test Pit 517 View N

Test Pit 517 View W – Depth Measurement

Test Pit 517 View W – Depth Measurement

Test Pit 517 View N

Test Pit 517 View W

Test Pit 517 View S

Test Pit 517 View E

Test Pit 517 View E - Sampling

Test Pit 517 View SE

Test Pit 517 View SE – Sampling and Staging Area

Test Pit 517 View NW - Backfilled Condition

Boring Designation CP14-IRC44-TP-518

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 2 SHEETS
	South Atlantic	Jacksonville District	

1. PROJECT: C-44 RSTA-Geotechnical Investigation-Phase V Phase V		9. SIZE AND TYPE OF BIT: See Remarks	
		10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP14-IRC44-TP-518	LOCATION COORDINATES: X = 1,000,116 Y = 837,236	11. MANUFACTURER'S DESIGNATION OF DRILL: Komatsu 210 LC	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Phillips & Jordan	CONTRACTOR FILE NO.: 6734-14-9799	12. TOTAL SAMPLES	DISTURBED: 8 / UNDISTURBED (UD): 0
4. NAME OF DRILLER: Chuck Floyd		13. TOTAL NUMBER CORE BOXES: 0	
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL:	BEARING:	14. ELEVATION GROUND WATER
		15. DATE BORING	STARTED: 12-11-14 / COMPLETED: 12-11-14
6. THICKNESS OF OVERBURDEN: N/A		16. ELEVATION TOP OF BORING: 26.6 Ft.	
7. DEPTH DRILLED INTO ROCK: N/A		17. TOTAL RECOVERY FOR BORING: N/A	
8. TOTAL DEPTH OF BORING: 11.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR: Brian Hathaway, Geotechnical Engineer	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
26.6	0.0						26.6		
25.6	1.0		SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, few silt, 7.5YR 4/2 brown (SP-SM)				Test Pit		
24.6	2.0		SAND, poorly-graded, mostly fine-grained sand-sized quartz, trace silt, 10YR 6/3 pale brown (SP)				24.6		
21.6	5.0		SAND, poorly-graded with silt, mostly fine to medium-grained sand-sized quartz, few silt, 10YR 7/4 very pale brown (SP-SM)		MdW-S-2/5 LW-S-2/5 UW-S-2/5		24.6 24.6 21.6		
19.6	7.0		SAND, well-graded with silt, mostly sand to gravel-sized limestone, some fine-grained sand-sized quartz, few clay, 10YR 9/2 pale orange yellow (SW-SM)		UW-R-5/7		21.6 21.6 21.6		
15.6	11.0		SAND, clayey, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, trace silt, 10YR 9/2 pale orange yellow (SC) At El. 17.6 Ft., 5GY 6/1 greenish gray At El. 16.6 Ft., 2.5Y 7/3 pale yellow		MdW-C-5/11 LW-C-5/11 UW-C-5/11 UW-R-9/11		17.6 15.6		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE SAMPLE LABORATORY

Abbreviations:

(Continued)

DRILLING LOG (Cont. Sheet)	INSTALLATION	SHEET 2 OF 2 SHEETS
	Jacksonville District	

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
C-44 RSTA-Geotechnical Investigation-Phase V	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 1,000,116 Y = 837,236	26.6 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE

ID	DEPTH	CLASSIFICATION
UW-S-2/5	2.0/5.0	SP-SM
LW-S-2/5	2.0/5.0	SP-SM
MdW-S-2/5	2.0/5.0	SP
UW-C-5/11	5.0/11.0	SC
LW-C-5/11	5.0/11.0	SP-SM
MdW-C-5/11	5.0/11.0	SP
UW-R-5/7	5.0/7.0	SW-SC
UW-R-9/11	9.0/11.0	SC

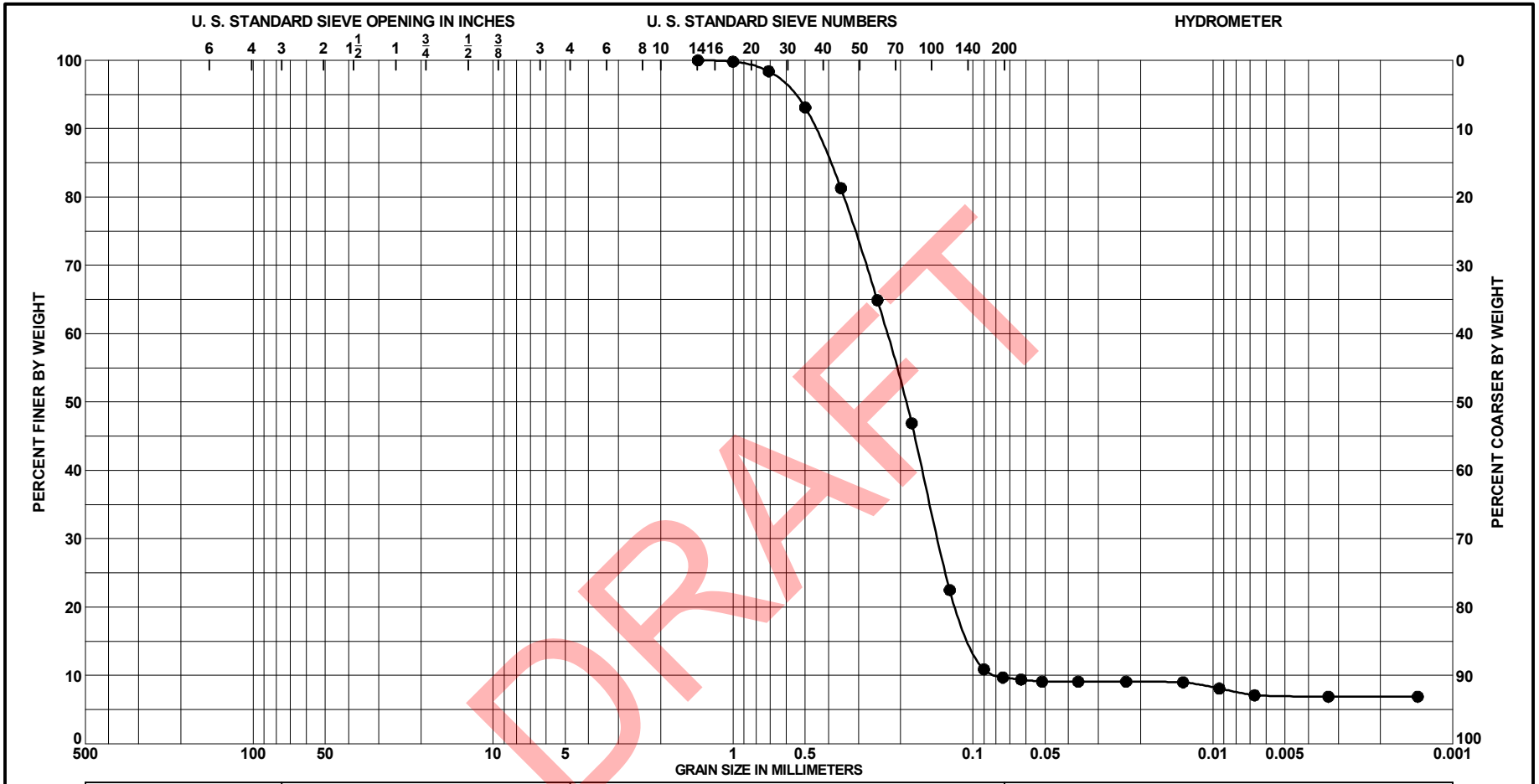
not on atterberg limits.

4. Additional Laboratory Testing

UW-S-2/5Specific Gravity
UW-S-2/5Atterberg
UW-S-2/5Percent Organic
UW-S-2/5Percent Carbonate
UW-S-2/5Percent Visual Shell
LW-S-2/5Specific Gravity
LW-S-2/5Atterberg
LW-S-2/5Percent Organic
LW-S-2/5Percent Carbonate
LW-S-2/5Percent Visual Shell
MdW-S-2/5Specific Gravity
MdW-S-2/5Atterberg
MdW-S-2/5Percent Organic
MdW-S-2/5Percent Carbonate
MdW-S-2/5Percent Visual Shell
UW-C-5/11Specific Gravity
UW-C-5/11Atterberg
UW-C-5/11Percent Organic
UW-C-5/11Percent Carbonate
UW-C-5/11Percent Visual Shell
LW-C-5/11Specific Gravity
LW-C-5/11Atterberg
LW-C-5/11Percent Organic
LW-C-5/11Percent Carbonate
LW-C-5/11Percent Visual Shell
MdW-C-5/11Specific Gravity
MdW-C-5/11Atterberg
MdW-C-5/11Percent Organic
MdW-C-5/11Percent Carbonate
MdW-C-5/11Percent Visual Shell
UW-R-5/7Specific Gravity
UW-R-5/7Atterberg
UW-R-5/7Percent Organic
UW-R-5/7Percent Carbonate
UW-R-5/7Percent Visual Shell
UW-R-9/11Specific Gravity
UW-R-9/11Atterberg
UW-R-9/11Percent Organic
UW-R-9/11Percent Carbonate
UW-R-9/11Percent Visual Shell

15
20
25
30
35

Summary of Classification Testing																	
Test Pit No.	Sample No.	Sample Depth (ft)		USCS	Atterberg Limits			Organic Content (%)	Specific Gravity	Gravel (%)	Sand (%)	Minus 200 (%)	Silt (%)	Clay (%)	Carbonate (%)	Shell (%)	pH
		Top	Bottom		LL	PL	PI										
CP14-IRC44-TP-518	UW-S-2/5	2.0	5.0	SP-SM	0	0	0	1.7	2.66	0	90.3	9.7	2.7	7	1.48	0	8.2
CP14-IRC44-TP-518	LW-S-2/5	2.0	5.0	SP-SM	0	0	0	1.4	2.79	0	92.4	7.6	4.3	3.3	3.68	0	8.9
CP14-IRC44-TP-518	MdW-S-2/5	2.0	5.0	SP	0	0	0	0	2.67	0	96.7	3.3	1.1	2.2	0.45	0	9.1
CP14-IRC44-TP-518	UW-C 5/11	5.0	11.0	SC	22	14	8	2.5	2.72	12.3	70.3	14.8	5.1	9.7	12.15	1	8.6
CP14-IRC44-TP-518	LW-C 5/11	5.0	11.0	SP-SM	0	0	0	0.6	2.64	14.2	78.7	6.2	1.5	4.7	11.9	3	8.9
CP14-IRC44-TP-518	MdW-C 5/11	5.0	11.0	SP	0	0	0	0.2	2.73	22.5	72	2.6	2	0.6	10.5	36.5	9.4
CP14-IRC44-TP-518	UW-R-5/7	5.0	7.0	SW-SC	21	14	7	1.4	2.68	26.6	53.4	10.6	4	6.6	13.5	0	8.7
CP14-IRC44-TP-518	UW-R-9/11	9.0	11.0	SC	28	18	10	1.6	2.61	9.4	73.8	16.4	4.3	12.1	5.93	0.6	8.3



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 7/4	0	1	2.66	2		0	0	NP
		fine to medium-grained sand sized									
		quartz, few silt, very pale brown									
		(SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
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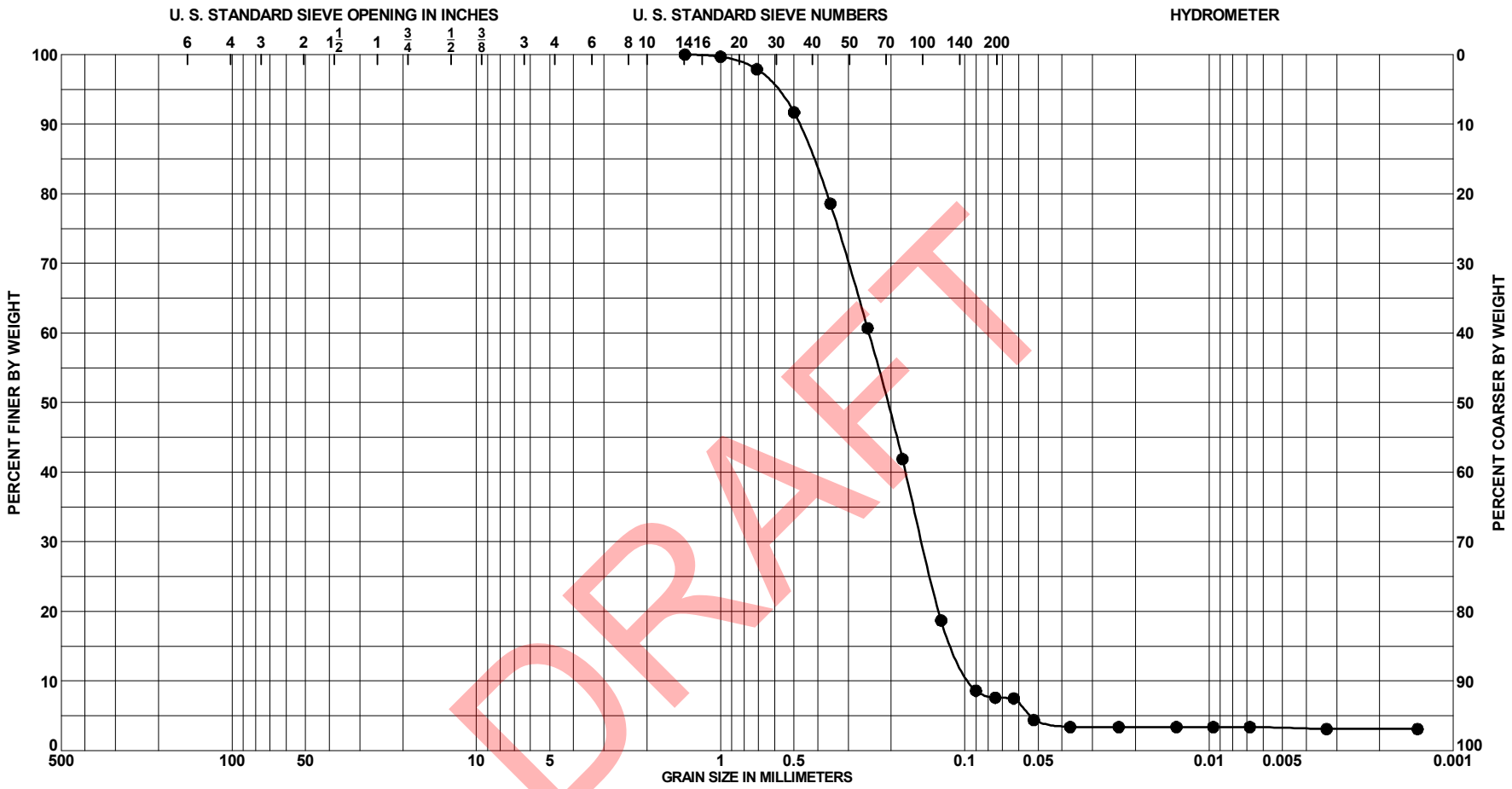
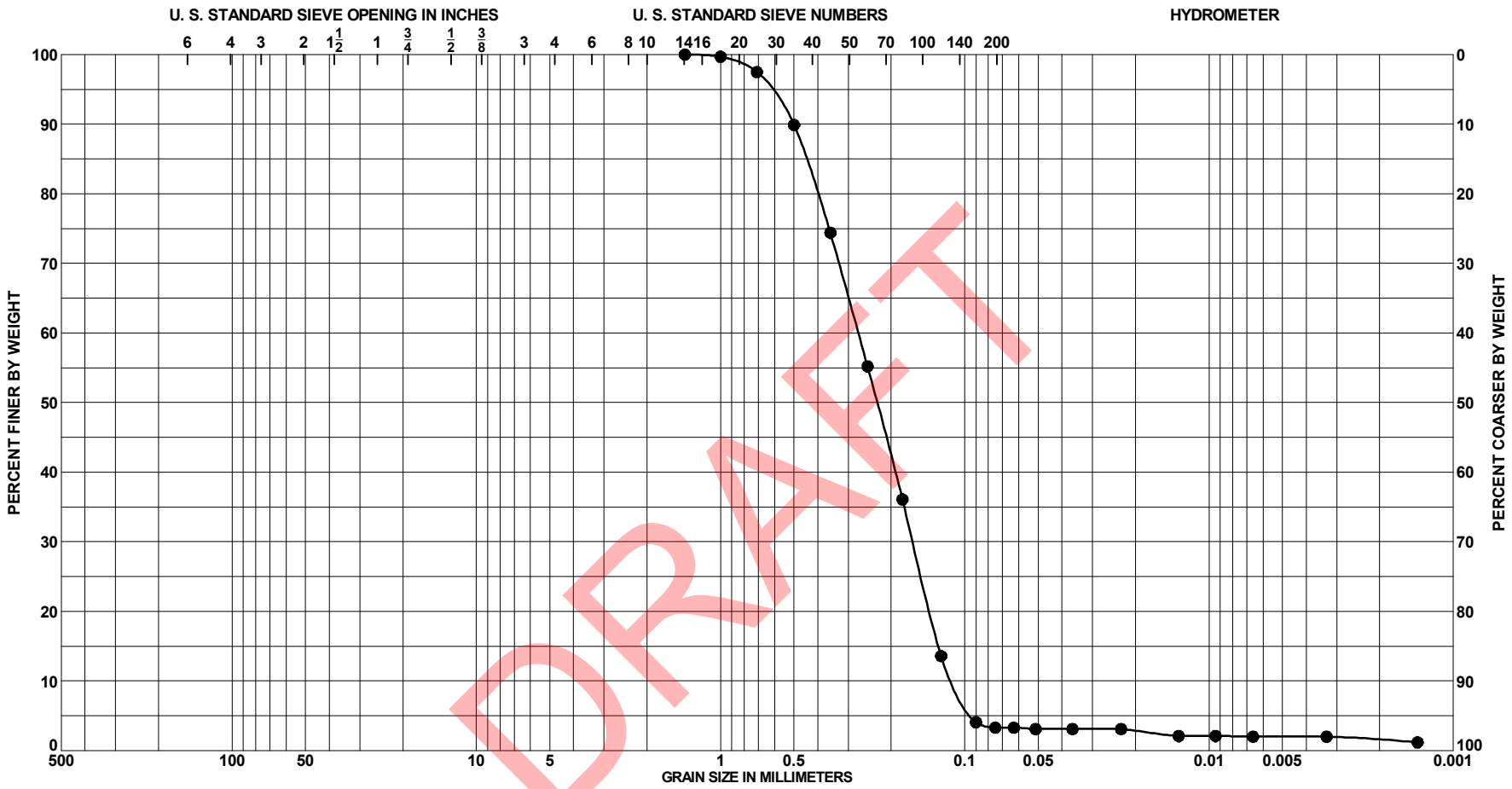


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
● LW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded with silt, mostly fine to medium-grained sand-sized quartz, few silt, very pale brown (SP-SM)	10YR 7/4	0	4	2.79	1		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

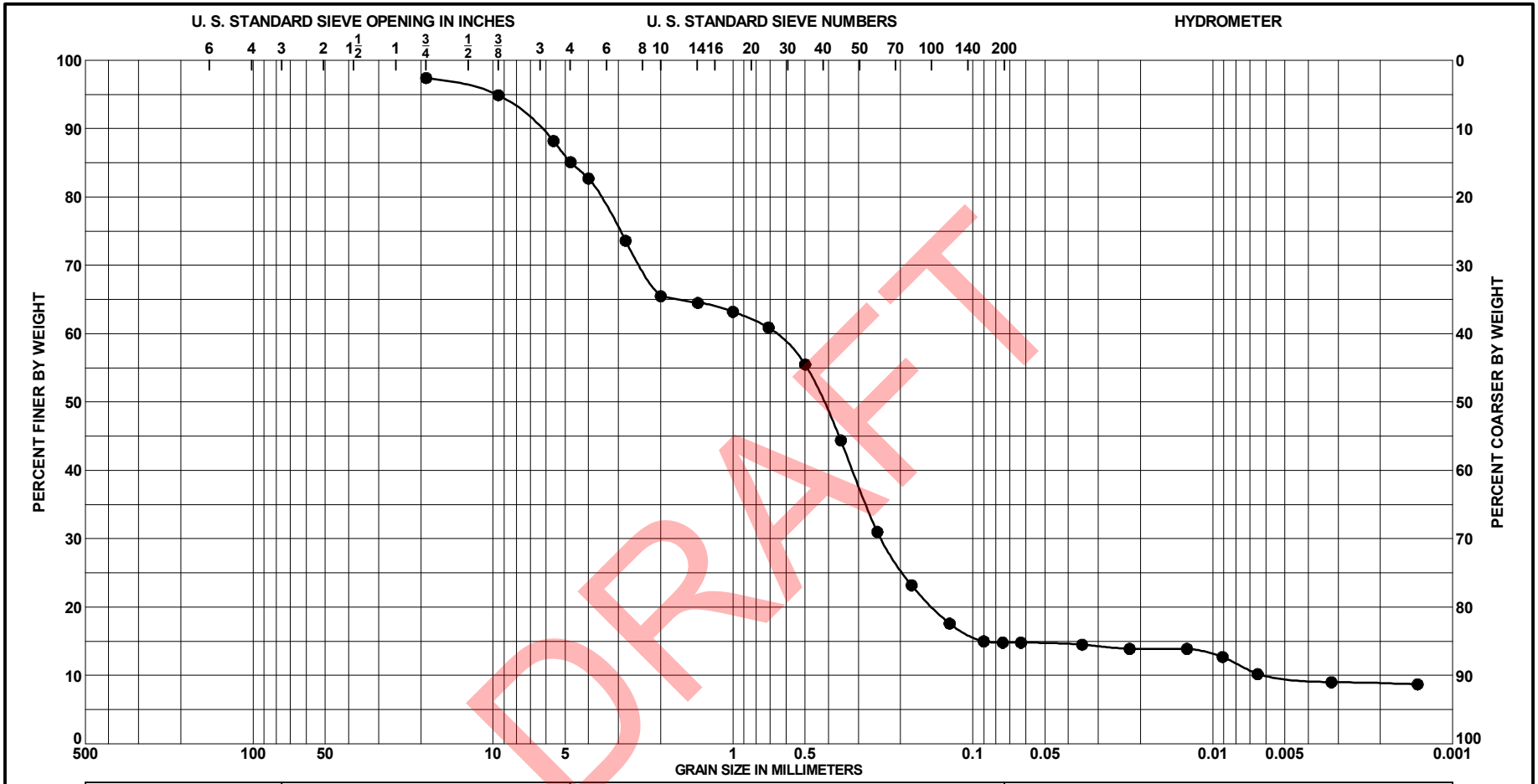


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-S-2/5	2.0 to 5.0 Ft.	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, trace silt, very pale brown (SP)	10YR 7/4	0	0	2.67	0		0	0	NP

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

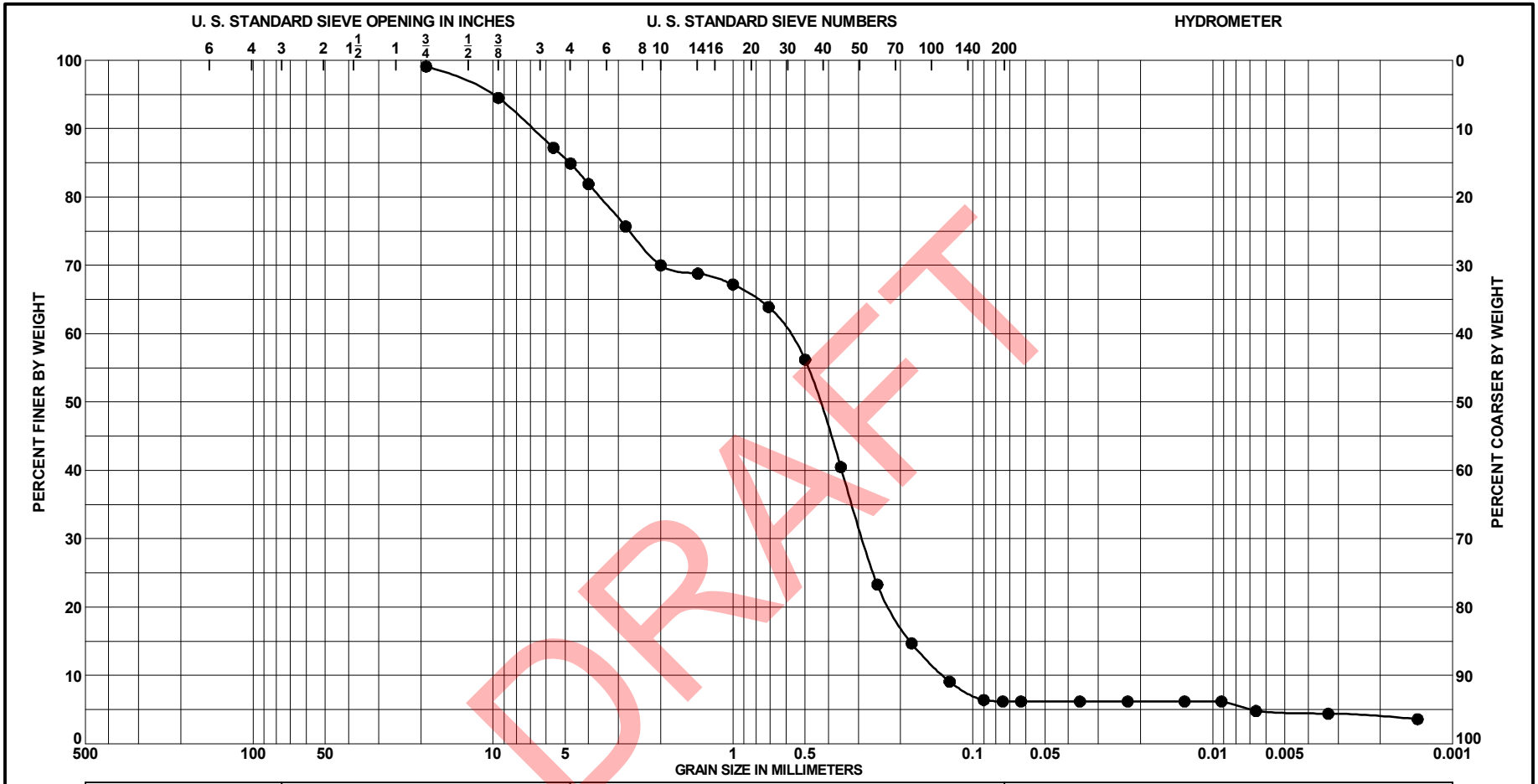


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-C-5/11	5.0 to 11.0 Ft.	SAND, clayey, mostly fine to	10YR 9/2	1	12	2.72	3		22	14	8
		medium-grained sand-sized quartz,									
		some sand to gravel-sized limestone,									
		little clay, trace shell, pale orange									
		yellow (SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

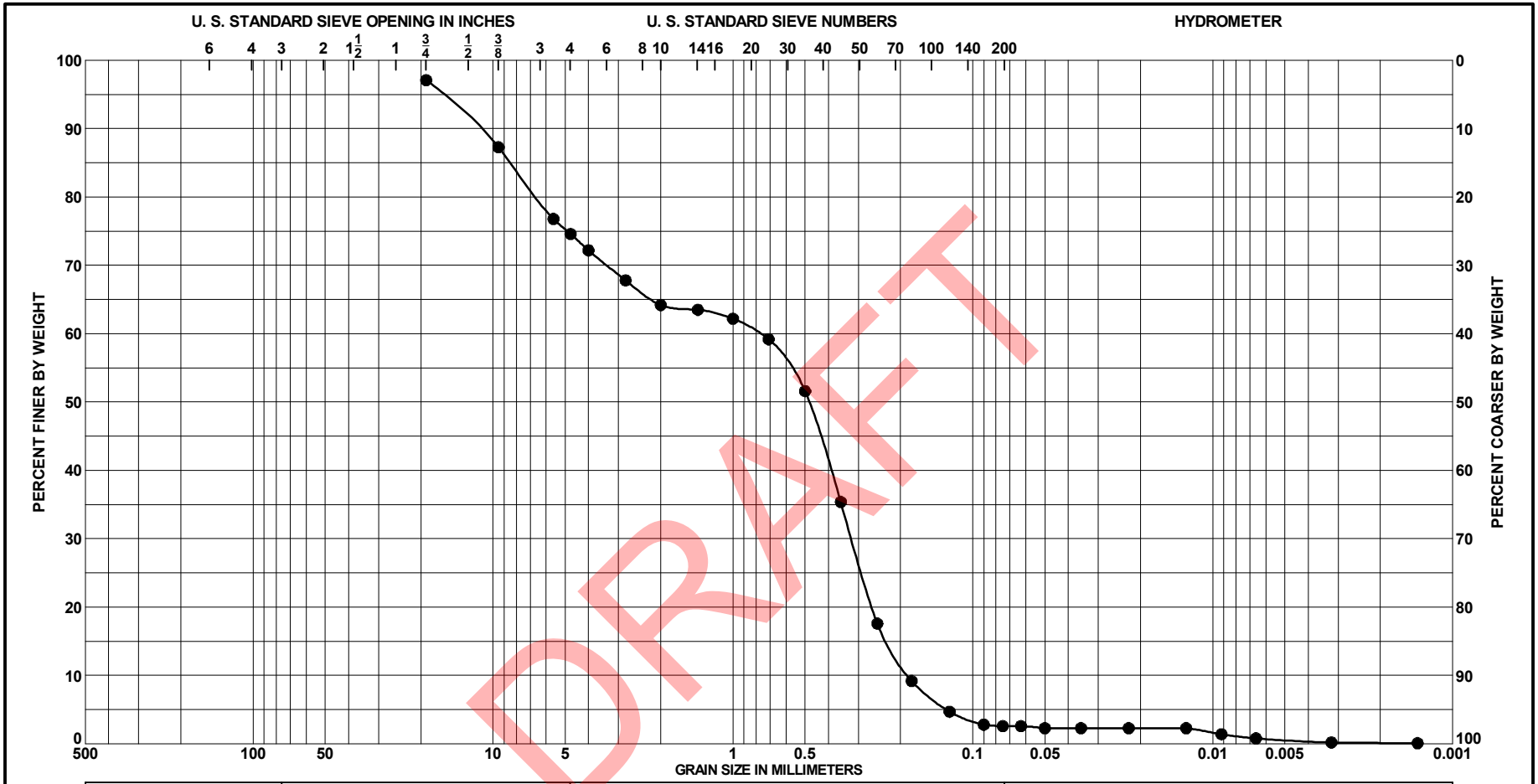


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●LW-C-5/11	5.0 to 11.0 Ft.	SAND, poorly-graded with silt, mostly	10YR 9/2	3	12	2.64	1		0	0	NP
		fine to medium-grained sand-sized									
		quartz, some sand to gravel-sized									
		limestone, few silt, trace shell, pale									
		orange yellow (SP-SM)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

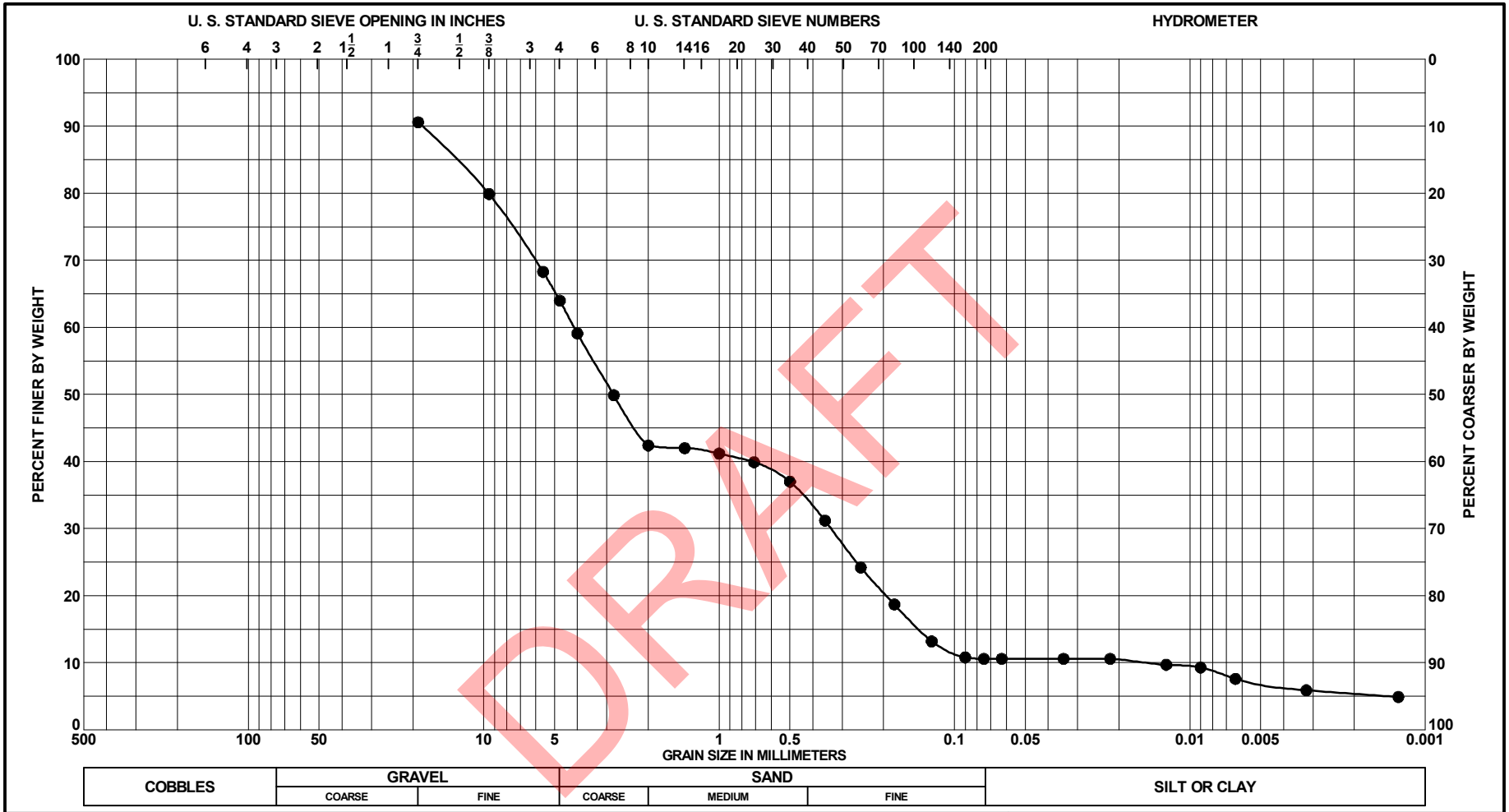


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
MdW-C-5/11	5.0 to 11.0 Ft.	SAND, p-g, mostly fine to	10YR 9/2	37	11	2.73	0		0	0	NP
		med-grained s-sized quartz, some									
		sand to gravel-sized shell, trace									
		limestone, trace silt, pale orange									
		yellow (SP)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

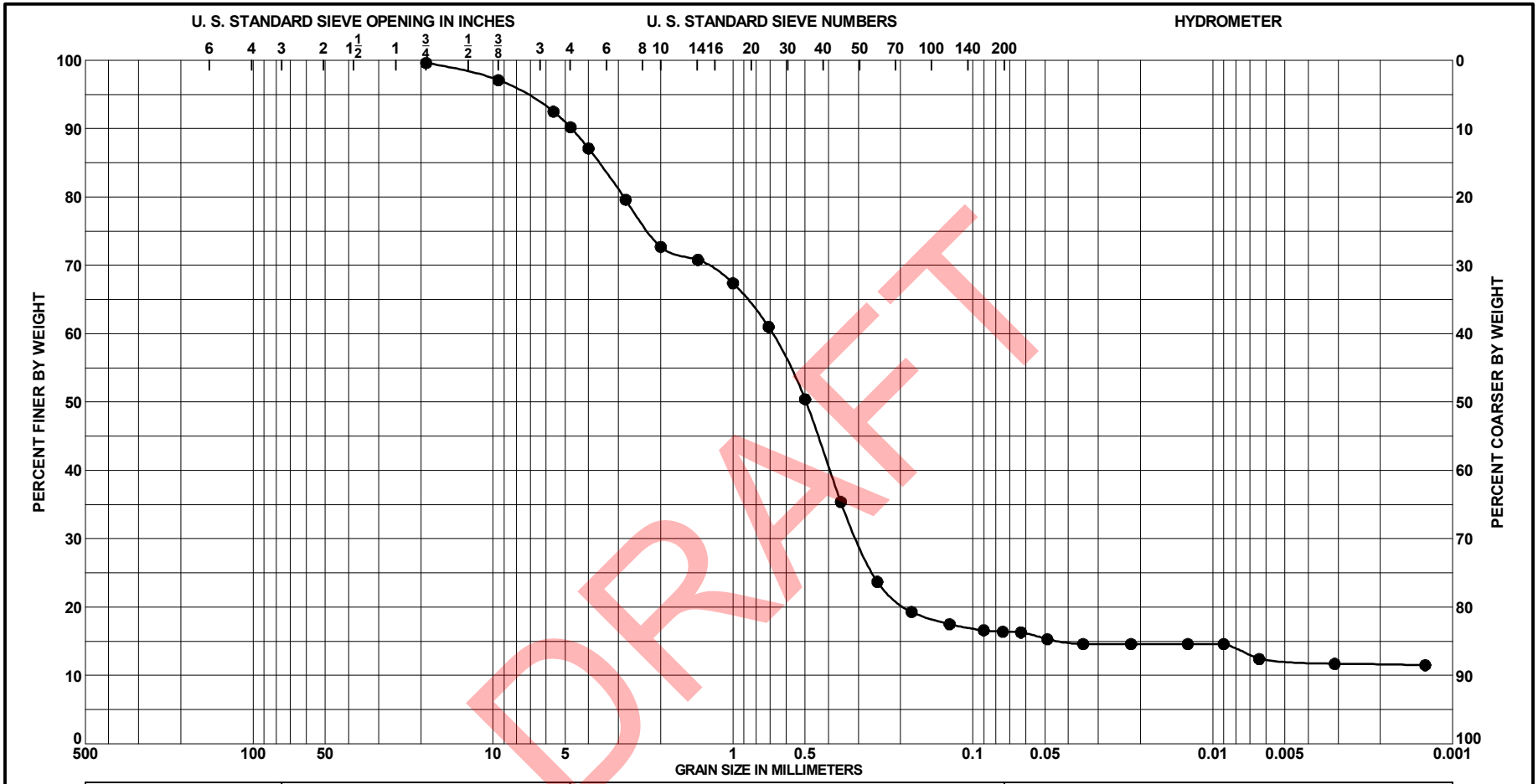


Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-5/7	5.0 to 7.0 Ft.	SAND, well-graded with clay, mostly	10YR 9/2	0	14	2.68	1		21	14	7
		sand to gravel-sized limestone, some									
		fine-grained sand-sized quartz, few									
		clay, pale orange yellow (SW-SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	Visual % Shell (est)	%CO_3	G_s	Org %	w_n	LL	PL	PI
●UW-R-9/11	9.0 to 11.0 Ft.	SAND, clayey, mostly fine to	5GY 6/1	1	6	2.61	2		28	18	10
		med-grained s-sized quartz, some									
		sand to gravel-sized limestone, little									
		clay, trace shell, greenish gray (SC)									

GRADATION CURVES

PROJECT	C-44 RSTA-Geotechnical Investigation-Phase V
	Phase V
BORING NO.	CP14-IRC44-TP-518
BORING ELEV.	26.6 Ft., NAVD88
DATE	1/7/2015

SAJ FORM 2087
JUN 02

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-518 UW-S-2/5								
14%	1	7	0.75	116.5	12.6	120.0	9.2	845
	2	7	0.75	116.5	12.6	119.9	9.2	900
	3	7	0.77	116.5	12.6	119.8	9.5	795
	4	28	0.77	116.5	12.6	119.8	9.5	NT
	5	28	0.77	116.5	12.6	119.8	9.4	NT
	6	28	0.77	116.5	12.6	119.7	9.4	NT
CP14-IRC44-TP-518 UW-C-5/11								
14%	1	7	0.81	121.6	12.2	124.0	9.9	NT
	2	7	0.81	121.6	12.2	124.0	9.9	NT
	3	7	1.00	121.6	12.2	121.5	12.3	NT
	4	28	1.00	121.6	12.2	121.3	12.3	NT
	5	28	0.84	121.6	12.2	123.4	10.3	NT
	6	28	0.84	121.6	12.2	123.5	10.3	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-518 LW-S-2/5								
14%	1	7	0.81	121.0	11.1	122.2	9.9	1050
	2	7	0.81	121.0	11.1	122.6	9.9	935
	3	7	0.82	121.0	11.1	122.2	10.1	1000
	4	28	0.82	121.0	11.1	121.9	10.1	NT
	5	28	0.81	121.0	11.1	122.2	9.9	NT
	6	28	0.81	121.0	11.1	122.0	9.9	NT
CP14-IRC44-TP-518 LW-C-5/11								
14%	1	7	0.77	126.2	10.3	127.0	9.5	NT
	2	7	0.77	126.2	10.3	127.3	9.5	NT
	3	7	1.08	126.2	10.3	122.6	13.3	NT
	4	28	1.08	126.2	10.3	122.6	13.3	NT
	5	28	0.81	126.2	10.3	126.4	9.9	NT
	6	28	0.81	126.2	10.3	126.5	9.9	NT

NT: Not tested as of date of report preparation.

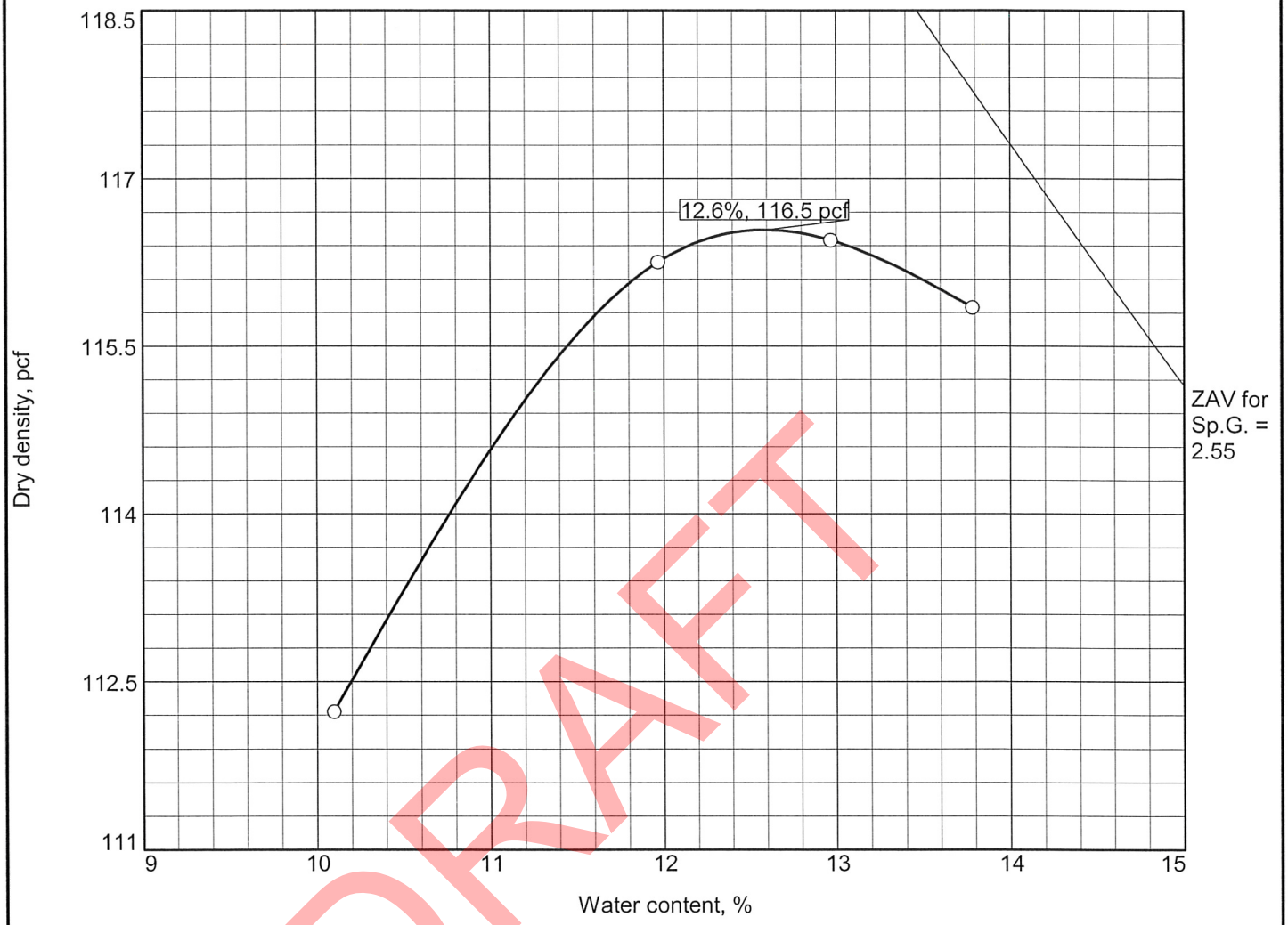
Summary of Soil Cement Testing at 100% Compaction								
Cement Content	**Sample**	**Age**	**Water / Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Test Sample Density (pcf)**	**Test Sample Moisture Content (degrees)**	**Unconfined Compressive Strength (psi)**
CP14-IRC44-TP-518 MdW-S-2/5								
14%	1	7	0.76	118.0	10.7	119.6	9.3	1110
	2	7	0.76	118.0	10.7	119.2	9.3	1150
	3	7	0.81	118.0	10.7	118.6	10.0	1190
	4	28	0.81	118.0	10.7	118.7	10.0	NT
	5	28	0.80	118.0	10.7	119.2	9.9	NT
	6	28	0.80	118.0	10.7	119.2	9.9	NT
CP14-IRC44-TP-518 MdW-C-5/11								
14%	1	7	0.76	123.6	10.4	124.1	9.3	1140
	2	7	0.76	123.6	10.4	124.1	9.3	1215
	3	7	0.78	123.6	10.4	123.8	9.6	1265
	4	28	0.78	123.6	10.4	124.4	9.6	NT
	5	28	0.77	123.6	10.4	124.3	9.5	NT
	6	28	0.77	123.6	10.4	124.6	9.5	NT

NT: Not tested as of date of report preparation.

Summary of Soil Cement Testing at 95% Compaction					
Test Pit No.		**PSI***			**AVG.***
		1	**2**	**3**	
TP-518	UW-S-2/5				
TP-518	LW-S-2/5	**905**	**800**	**935**	880
TP-518	MdW-S-2/5	**1360**	**945**	**1355**	1220
TP-518	UW-C-5/11				
TP-518	LW-C-5/11				
TP-518	MdW-C-5/11				

* Testing still in progress

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP-SM	A-3			NP	NP	0.0	9.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.5 pcf Optimum moisture = 12.6 %	SAND, poorly-graded with silt, mostly fine to medium-grained sand sized quartz, few silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-518 **Sample Number:** UW-S-2/5

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT

Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP-SM	A-3			NP	NP	0.0	7.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 121.0 pcf Optimum moisture = 11.1 %	SAND, poorly-graded with silt, mostly fine to medium-grained sand-sized quartz, few silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-518 **Sample Number:** LW-S-2/5

AMEC E&I

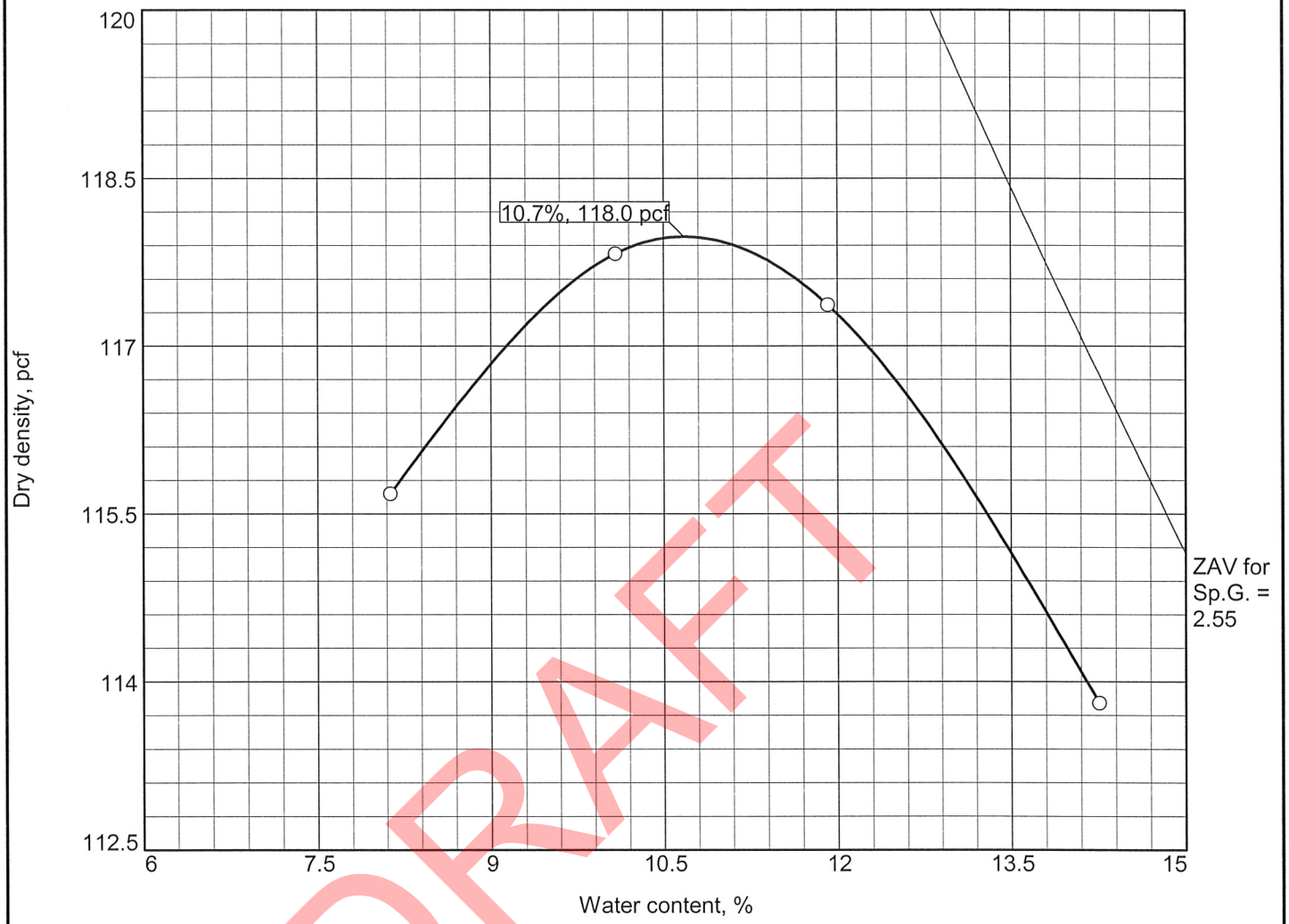
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2.0'- 5.0'	SP	A-3			NP	NP	0.0	3.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf Optimum moisture = 10.7 %	SAND, poorly-graded, mostly fine to medium-grained sand sized quartz, trace silt

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-518 **Sample Number:** MdW-S-2/5

AMEC E&I

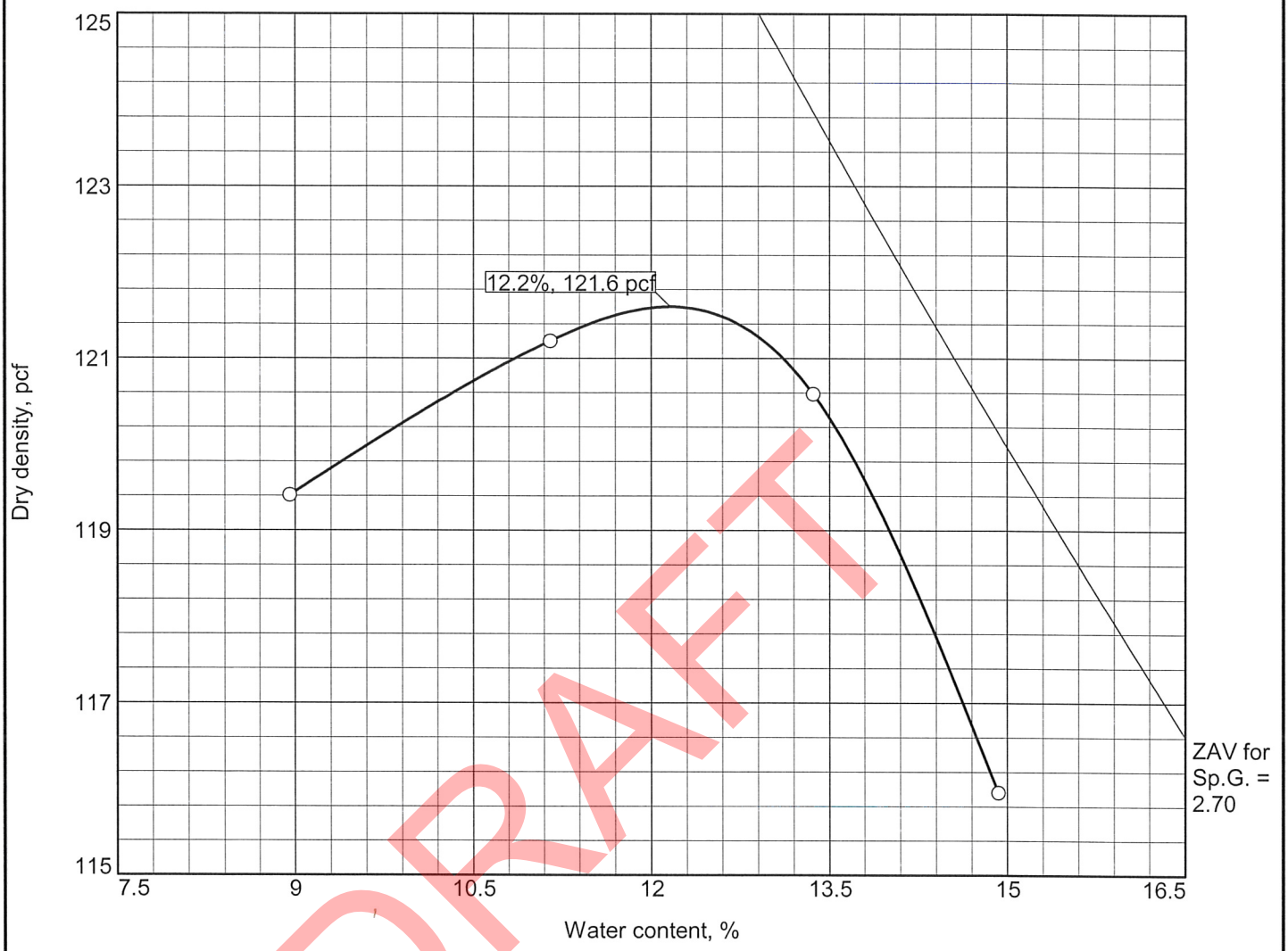
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SC	A-2-4(0)			22	8	14.9	14.8

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 121.6 pcf Optimum moisture = 12.2 %	SAND, clayey, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, little clay, trace shell

Project No. 6734149799 **Client:** USACE

Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-518 **Sample Number:** UW-C-5/11

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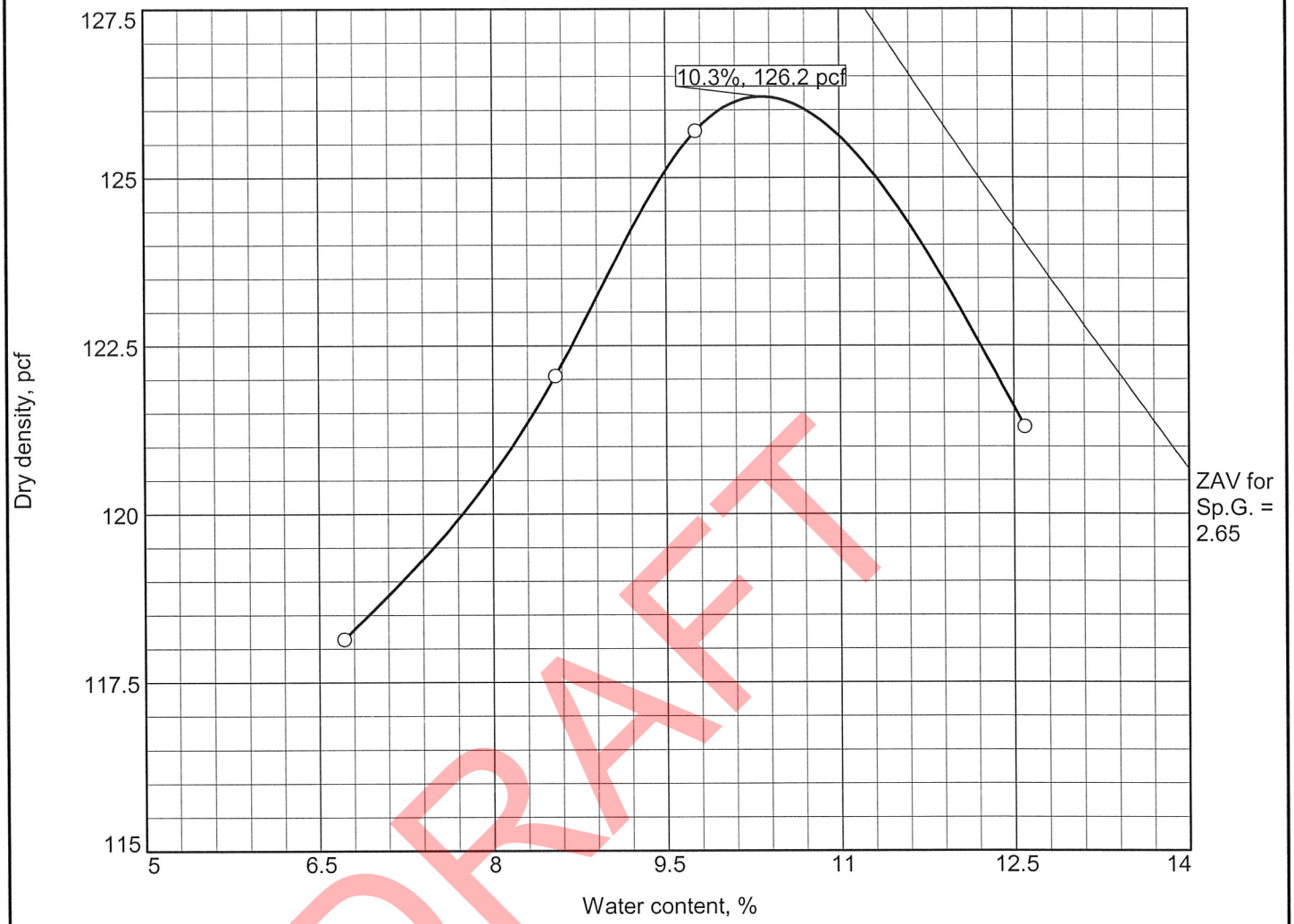
Jacksonville, Florida

Remarks:

Figure

Tested By: J. Tarpley **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP-SM	A-1-b			NV	NP	15.1	6.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 126.2 pcf Optimum moisture = 10.3 %	SAND, poorly graded with silt, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace shell, trace

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-518 **Sample Number:** LW-C-5/11

AMEC E&I

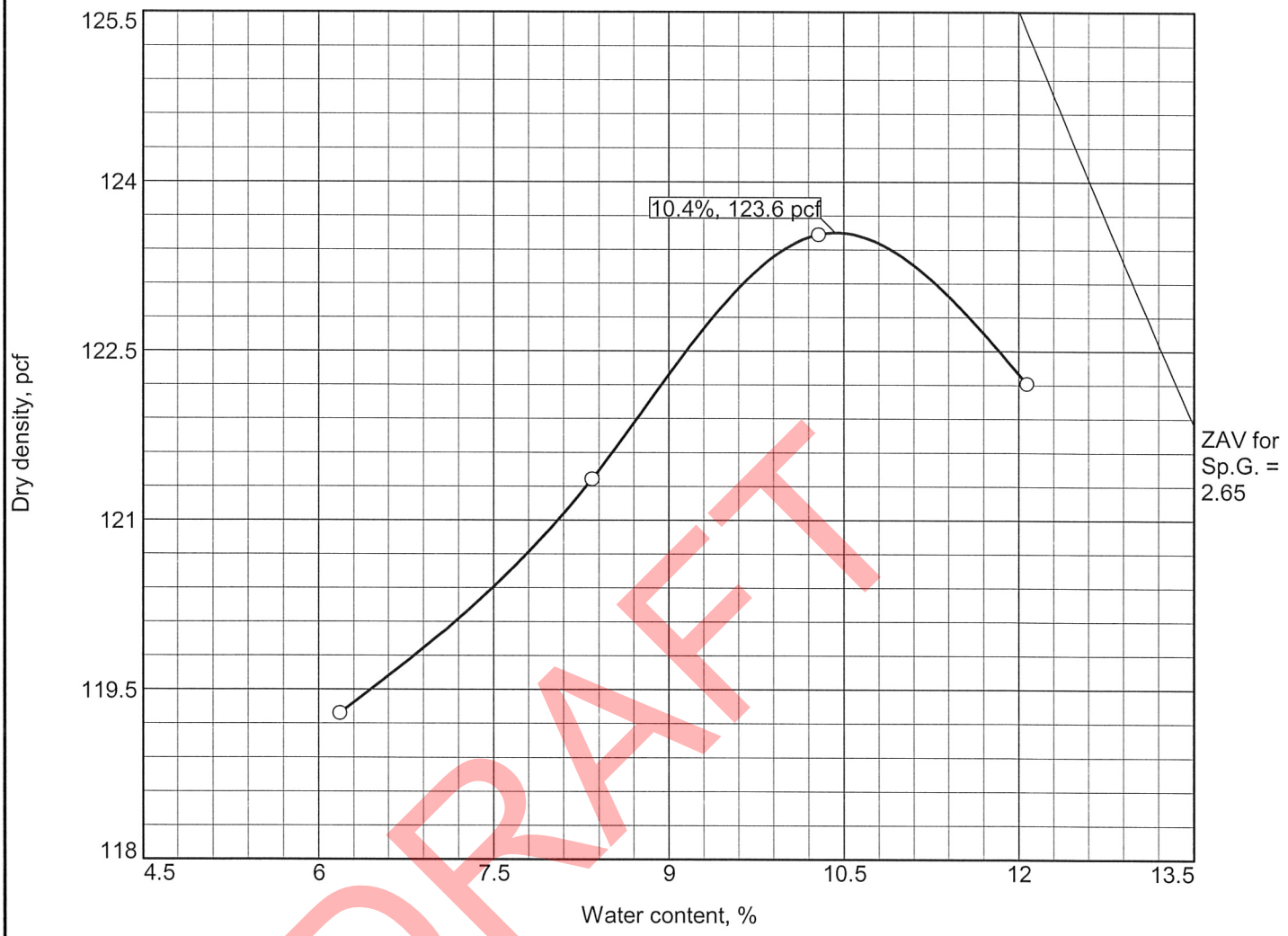
Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

COMPACTION TEST REPORT



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
5.0'- 11.0'	SP	A-1-b			NV	NP	25.4	2.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.6 pcf Optimum moisture = 10.4 %	SAND, poorly-graded, mostly fine to medium-grained sand-sized quartz, some sand to gravel-sized limestone, trace silt

Project No. 6734149799 **Client:** USACE
Project: C-44 RSTA Contract 2 Geotechnical Investigation - Phase V

○ **Location:** CP14-IRC44-TP-518 **Sample Number:** MdW-C-5/11

AMEC E&I

Jacksonville, Florida

Remarks:

Figure

Tested By: A. Coleman **Checked By:** Stephanie Setser, P.E.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-518 UW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.80	116.5	12.60	119.5	9.5	NT	NT	--
		0.80	116.5	12.60	119.8	9.5	NT	NT	--
Freezing and Thawing	14	0.79	116.5	12.60	119.9	9.3	NT	NT	--
		0.79	116.5	12.60	119.4	9.3	NT	NT	--
CP14-IRC44-TP-518 UW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	1.15	121.6	12.20	119.3	13.9	NT	NT	--
		1.18	121.6	12.20	119.3	14.2	NT	NT	--
Freezing and Thawing	14	0.95	121.6	12.20	122.2	11.5	NT	NT	--
		0.95	121.6	12.20	122.3	11.5	NT	NT	--

*NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-518 LW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.86	121.0	11.10	121.2	10.5	130.8	0.0	--
		0.86	121.0	11.10	121.7	10.5	130.1	0.0	--
Freezing and Thawing	14	0.84	121.0	11.10	121.5	10.2	NT	NT	--
		0.84	121.0	11.10	121.9	10.2	NT	NT	--
CP14-IRC44-TP-518 LW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.85	126.2	10.30	126.9	9.6	NT	NT	--
		0.85	126.2	10.30	127.0	9.6	NT	NT	--
Freezing and Thawing	14	0.79	126.2	10.30	125.6	10.3	NT	NT	--
		0.79	126.2	10.30	125.6	10.3	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Wet/Dry and Freeze/Thaw Testing									
CP14-IRC44-TP-518 MdW-S-2/5									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.80	118.0	10.70	119.2	10.0	NT	NT	--
		0.80	118.0	10.70	119.2	10.0	NT	NT	--
Freezing and Thawing	14	0.82	118.0	10.70	118.7	10.2	NT	NT	--
		0.82	118.0	10.70	118.9	10.2	NT	NT	--
CP14-IRC44-TP-518 MdW-C-5/11									
Test Type	**Cement Content (%)**	**Water/ Cement Ratio**	**Max Density (pcf)**	**Optimum Moisture Content (%)**	**Initial Test Sample Density (pcf)**	**Initial Test Sample Moisture Content (%)**	**Final Test Sample Density (pcf)**	**Final Test Sample Moisture Content (%)**	**Final Loss (%)**
Wetting and Drying	14	0.79	123.6	10.40	124.8	9.3	NT	NT	--
		0.79	123.6	10.40	125.1	9.3	NT	NT	--
Freezing and Thawing	14	0.77	123.6	10.40	124.2	9.6	NT	NT	--
		0.77	123.6	10.40	124.5	9.6	NT	NT	--

NT: Not tested as of date of report preparation.

Summary of Sand Cleanliness and Sand Equivalent Testing						
Sample Depth Range (feet)	**Sample No.**	**Trial No.**	**Clay Reading**	**Sand Reading**	**Sand Equivalent (%)**	**Average Sand Equivalent (%)**
CP14-IRC44-TP-518						
2-5	UW-S-2/5	1	14.5	1.7	12	13
		2	14.5	1.8	13	
		3	14.6	1.9	13	
	LW-S-2/5	1	11.2	2.9	26	26
		2	12.0	3.0	25	
		3	11.7	3.1	27	
	MdW-S-2/5	1	13.5	3.7	28	28
		2	13.5	3.6	27	
		3	13.4	3.7	28	
5-11	UW-C-5/11	1	14.8	2.3	16	18
		2	14.1	2.7	20	
		3	14.3	2.6	19	
	LW-C-5/11	1	13.0	3.6	28	27
		2	12.8	3.4	27	
		3	12.7	3.4	27	
	MdW-C-5/11	1	10.4	3.8	37	36
		2	10.4	3.7	36	
		3	10.6	3.7	35	

Test Pit 518 View SW – Site Preparation

Test Pit 518 View S - Excavation

Test Pit 518 View E – Depth Measurement

Test Pit 518 View E – Depth Measurement

Test Pit 518 View S

Test Pit 518 View E

Test Pit 518 View N

Test Pit 518 View W

Test Pit 518 View NW – Sampling and Staging Area

Test Pit 518 View S – Backfilled Condition