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UPPER DES PLAINES RIVER AND TRIBUTARIES, ILLINOIS AND WISCONSIN: INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, DEPARTMENT OF DEFENSE

TRANSMITTING

THE DEPARTMENT'S UPPER DES PLAINES RIVER AND TRIBUTARIES INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT DATED JANUARY 11, 2016

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UPPER DES PLAINES RIVER AND TRIBUTARIES, ILLINOIS AND WISCONSIN

INTERGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

GEOTECHNICAL DESIGN - APPENDIX G

U.S. Army Corps of Engineers, Chicago District
Geotechnical & Survey Section

March 2014

GEOTECHNICAL DESIGN APPENDIX
APPENDIX G

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**Removed from consideration*

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Attachment 1: USDA Soil Survey Maps (All sites)

Attachment 2: **A.** AECOM "Des Plaines II Investigations Subsurface Investigation & Research" Report (Soil Boring Logs/Laboratory Data from Adler Park*, Bull Creek*, Groveland, Oakton-Everett^, & Silver Creek*. Includes site investigations of Aptakisic*, Lake Mary Anne, 5 Dams, 7 Road Raises*, and RxR bridge mod*)

B. AECOM "Des Plaines DPLV09 Investigation" Report (Soil Boring Logs/Laboratory Data from DPLV09)

C. AECOM "Des Plaines II DPLV04 & DPLV05 Investigation" Report (Soil Boring Logs/Laboratory Data from DPLV04 & DPLV05)

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Attachment 4: Design Analysis (Adler Park Levee*, Oakton-Everett Floodwall^ and Levee, Bull Creek Reservoir*, Groveland Floodwall)

**Removed from consideration*

^Portion of DPLV09

GEOTECHNICAL DESIGN APPENDIX
APPENDIX G

INTRODUCTION

1. The study area encompasses the Upper Des Plaines River Basin and tributaries from the headwaters at the border of Racine and Kenosha Counties, Wisconsin to just north of I-55 and the confluence with Salt Creek in Cook County, Illinois. The purpose of this appendix is to evaluate subsurface soil information and provide generalized geotechnical design and related construction considerations for each project feature of the proposed flood risk management and ecosystem restoration project.

2. During the feasibility study formulation, the preliminary plan includes four levee sites, two reservoir sites, one structure modification, one pump station, five dam removal sites, and thirteen restoration sites. Further details of all the sites are included in the Main Report while this appendix focuses on the levee, reservoir, pump station, and dam removal sites. This report mentions sites that were previously considered but for various reasons, have been eliminated from the proposed plan. The sites removed include one levee, four reservoirs, all road raises, and a bridge modification. All sites within this Appendix are located in either Lake or Cook counties, Illinois.

Project Background

3. The Upper Des Plaines River and Tributaries, Illinois and Wisconsin Feasibility Study (Des Plaines II) has been formulated to build on the benefits achieved by the Upper Des Plaines River Flood Damage Reduction Feasibility Study (Des Plaines I). Des Plaines II recommends a plan that further manages flood risk on the main stem in both Illinois and Wisconsin, manages tributary flood risk, and, in addition to flood risk management, restores and enhances degraded ecosystems within the study area.

4. The flood risk management projects are described below:

- Lake Mary Anne Pump Station (FPCI01) – Plate 1 – This site would connect Lake Mary Anne with Dude Ranch Pond by crossing underneath Golf Road between Reding Circle and Oak Lane in Des Plaines, IL. A pump station would pump water from one lake to the other to reduce flooding on the banks. The site is currently covered with landscaped lawn and trees.

- Bull Creek Reservoir (BCRS02) – Plate 2 – *This site was removed from the recommended plan.* This site is west of Lake Street/US 45 and south of Winchester Road in Mundelein, IL. It is currently an undeveloped grassy, marshy area with a few trees. The berm is anticipated to be at elevation 765 NAVD88, use a 10-foot wide crest, and hold up to around 175 acre-feet. The reservoir bottom would be at about 754 NAVD and the spoil would be stored on site. Structural elements would include separate inlet and outlet structures.

- Aptakisic Creek Reservoir (ACRS08) – Plate 3 – *This site was removed from the recommended plan.* This site is at the northeast corner of Aptakisic Road and Buffalo Grove Road in Buffalo Grove, IL. It is currently farmland. The berm is anticipated to be at elevation 688 NAVD88, use a 10-foot wide crest, and hold up to around 400 acre-feet. The reservoir bottom would be at about 676 NAVD and the spoil would be stored on site. Structural elements would include separate inlet and outlet structures on an existing creek, as well as, a pump station.

- Campground Road Reservoir (DPRS15) – Plate 4 – *This site was removed from the recommended plan.* This site is near the east bank of the Des Plaines River in between Algonquin Road and Oakton Street in Des Plaines, Illinois. It is currently parkland covered mostly with trees. The berm is anticipated to be at elevation 635.6 NAVD88, use a 10-foot wide crest, and hold up to around 205 acre-feet. The reservoir bottom would be at about 622.7 NAVD and the spoil would be stored on site, likely to be reused in DPLV09 levee construction. Structural elements would include separate inlet and outlet structures.

- Touhy-Miner (DPLV09) Levee/Floodwall – Plate 5 – This site runs in between River Road and the Des Plaines River south from Touhy Ave to Miner St in Des Plaines, IL for approximately 2 miles. The site runs along the west side of the river, and would levee areas with residential houses, condos, and commercial buildings. There would be a road closure at Algonquin Rd and Oakton St. It ties into high ground to the north at a railroad just south of Miner Street. To the south, it ties into high ground at an I-294 onramp. Portions of the site also would extend through wooded areas. The levee height is anticipated to range from 635.7 to the north and 633.8 NAVD to the south.

- Groveland Avenue (DPLV01) Levee – Plate 6 – This site is located along the west side of Groveland Avenue in Riverside, IL. It extends between Park Place and the BNSF railroad behind residential lots on the east side of the Des Plaines River. The proposed crest elevation of the sheet pile wall is anticipated to be about 618 NAVD. This project also includes raising Park Place road on the north end of the floodwall to the same elevation.

- Adler Park (DPLV15) Levee – Plate 7 – *This site was removed from the recommended plan.* It would have been south of Buckley Road, just west of Idlewood Lane, Birchwood Lane, and Sprucewood Lane in Libertyville, IL. It is generally wooded with limited grass areas. The proposed crest elevation of the clay levee was anticipated to be about 660 NAVD.

- Fullerton-Grand (DPLV04) Levee/Floodwall – Plate 8 – This site is located along the east side of Des Plaines River Road in River Grove, IL. It extends south from a tie-in to a railroad bridge near Franklin Ave to North 5th Ave. At North 5th Ave, the proposed floodwall/levee would cross River Road and run due south to Palmer Street. It ties into high ground going west along Palmer St. This floodwall/levee would include two road closures and one road raise, with a crest height around 628 to 629 NAVD88.

- Belmont-Irving Park (DPLV05) Floodwall/Levee – Plate 9 – This site is located along the east side of Des Plaines River Road in Schiller Park and Franklin Park, IL. It ties into high ground along the south side of Irving Park Road and extends south to tie into high ground at Belmont Ave. Both ends extend several hundred feet west to reach high ground, which would involve crossing River Road for two road closures. This floodwall/levee would include three road closures, with a crest height at about 630 NAVD88.

- First Avenue Bridge (DPBM04) – First Avenue Bridge in River Grove, IL would be raised over the Des Plaines River for about 2,000 feet, raising River Road for about 600 feet, as well.

- BNSF Railroad Bridge (DPBM01) – *This site was removed from the recommended plan.* The BNSF Railroad Bridge is in Riverside, IL and the plan would have added a total of 264 feet of extensions to the piers and excavate the banks to improve flow of the Des Plaines River. This bridge is located near the southern end of the proposed Groveland Avenue Levee.

- Fullerton Woods (DPRS04) Reservoir – This site is located south of the intersection of Des Plaines River Road and N 5th Ave in River Grove, IL. It is currently parkland with the western edge covered with trees and the majority covered with grasses. The berm is anticipated to be about 4 to 10 feet above existing grade, use a 10-foot wide crest, and hold up to around 150 acre-feet. The reservoir bottom would be at about 611 NAVD and the spoil would be stored on site, likely to be reused in DPLV04 and DPLV05 levee construction. Structural elements would include inlet and outlet structures around 500 ft long that would connect to the Des Plaines River by going under Des Plaines River Road.

- Harry Semrow Driving Range (WLRS04) Reservoir - This site is located north of the intersection of Rand Road and Golf Road in Des Plaines, IL. It is currently the Harry Semrow Golf Driving Range at 1150 East Golf Road with the northern and eastern edge covered with trees and the majority covered with grasses. A small pond is on the northwest portion of the site. The berm is anticipated to be about 10 feet above existing grade, use a 20-foot wide crest (for possible use as golf range tees), and hold up to around 200 acre-feet. The reservoir bottom would be at about 630 NAVD or about 20 ft lower than the top of berm. The spoil would be stored on site, likely to be reused in DPLV09 levee construction. Structural elements would include a ditch/pipe extending east for about 2,000 ft to the Des Plaines River with a pump station in the northeast portion of the site as the inlet/outlet structure.

- WHRS01 Reservoir – *This site was removed from the recommended plan.* This site is located northwest of the intersection of Interstate 190 and 294 in Rosemont, IL. The site is currently vacant with a railroad along the west side and Willow-Higgins Creek along the north. The site is generally lightly forested, with increasing tree presence on the west and north sides. There is a large mound of soil in the center of the site. The berm is anticipated to be at elevation 663 NAVD88, use a 10-foot wide crest, and hold up to around 600 acre-feet. The reservoir bottom would be at about 627 NAVD and the spoil would be stored on site or hauled offsite as a borrow source for other projects. Structural elements would include a ditch/pipe extending about 300 feet north to Willow Creek.

5. The following dams on the Des Plaines River are being proposed for removal. Removal of these low-head, run of the river dams will provide ecosystem restoration benefits, restoring riverine function and fish passage.

- Dam #1 – This dam is located east of Hintz Road and Milwaukee Avenue in Wheeling, IL at river mile 73.1.
- Dam #2 – This dam is located northeast of Kensington Road and River Road in Wheeling, IL at river mile 69.3.
- Dempster Avenue Dam – This dam is located south of the Miner Street and UP-NW Railroad bridges and east of River Road in Des Plaines, IL at river mile 64.75.
- Touhy Avenue Dam – This dam is located east of I-294 and about 0.3 miles north of Touhy Avenue Bridge in Park Ridge, IL at river mile 62.3.
- Dam #4 (Devon Ave Dam) – This dam is located east of River Road and about 0.2 miles south of Devon Avenue in Rosemont, IL at river mile 60.5.

REGIONAL GEOLOGY

Physiography

6. The Des Plaines River is located primarily within the Wheaton Morainal Country and secondly within the Chicago Lake and Kankakee Plains of the Central Lowland Province (Figure 1). This area is characterized by a series of broad parallel moronic ridges complicated by a variety of elongated hills, mounds, basins, sags, valleys, natural lakes, and swamps. Post-glacial erosion has been slight and restricted largely to youthful valleys along the Fox, Des Plaines, and Illinois Rivers.

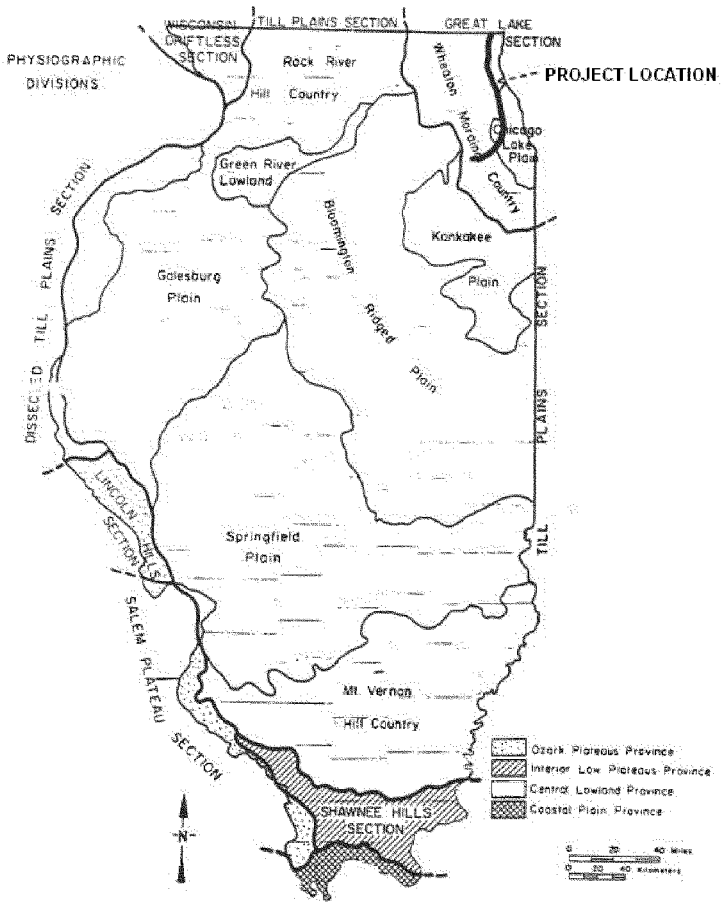


Figure 1. Physiographic Divisions of Illinois (Willman et al., 1975)

7. The Des Plaines River originates in Racine and Kenosha Counties in southeastern Wisconsin. The river enters Illinois in Lake County, flowing southward through Cook County to Riverside, Illinois, where it turns sharply east and then curves to the southwest. At Riverside, the river is joined by a major tributary, Salt Creek. This is where the Des Plaines II study area terminates. The river continues to flow southwest, through Will County where it joins with DuPage and Kankakee Rivers at the headwaters of the Illinois River in Grundy County.

8. Of 83 tributaries joining the Des Plaines River in the study area, 68 are less than a few miles in length and their flow is intermittent. Three larger tributaries joining the Des Plaines River in Wisconsin are Root River, Kilbourn Road Ditch, and Boughton Creek. Major tributaries of the Des Plaines River in Illinois portion of the study area are (listed from north to south) Mill Creek, Bull Creek, Indian Creek, Aptakisic Creek, Buffalo-Wheeling Creek, McDonald Creek, Feehanville Ditch, Weller Creek, Farmer's-Prairie Creek, Willow-Higgins Creek, Crystal Creek, and Silver Creek. Salt Creek, Addison Creek, Flag Creek, and Sawmill Creek flow into the river below the Des Plaines II study area. All of these larger tributaries, except Farmer's-Prairie Creek, enter the river from the west.

Bedrock Geology

9. The surface bedrock of the region consists predominantly of rock of the Silurian System (Figure 2). There is a geologic contact between the Silurian, Ordovician, and Pennsylvanian Systems at the headwaters of the Illinois River. The Upper Des Plaines River is located within a region where the seismic probability is minor. The closest geologic structure to the project area is the Des Plaines Disturbance faults located near the boundary of the northeast corner of DuPage and Cook Counties. This disturbance encircles the Paleozoic Undifferentiated area shown on Figure 2. The Sandwich fault is several miles southwest of the project area. Bedrock in the region is principally dolomite of the Niagran and Alexandrian Series since the Silurian System includes the Niagran Series underlain by the Alexandrain Series.

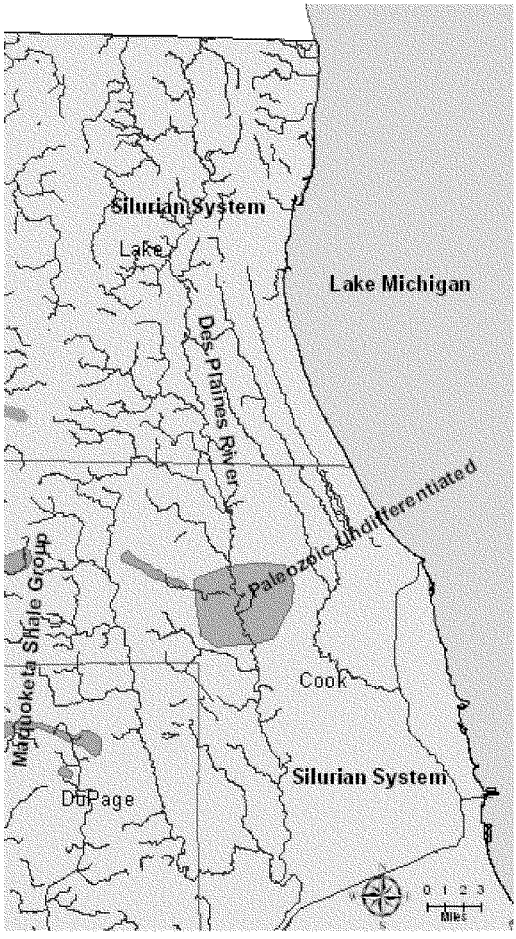


Figure 2. General Bedrock Geology of Project Area

Surficial Geology

10. The entire Chicago region was buried under several hundred feet of glacial ice that spread over the region from the northeast during the Illinoisan and particularly the Woodfordian Substage of the Wisconsian glacial stages of the Pleistocene Epoch. The glaciers were largely part of the Lake Michigan Lobe. The glaciers retreated from the Chicago region about 13,500 years ago leaving a series of moraine deposits and several large lakes in the order of 200 to 250 feet wide. The deposits range in thickness from several feet to about 400 feet, as shown in Figure 3.

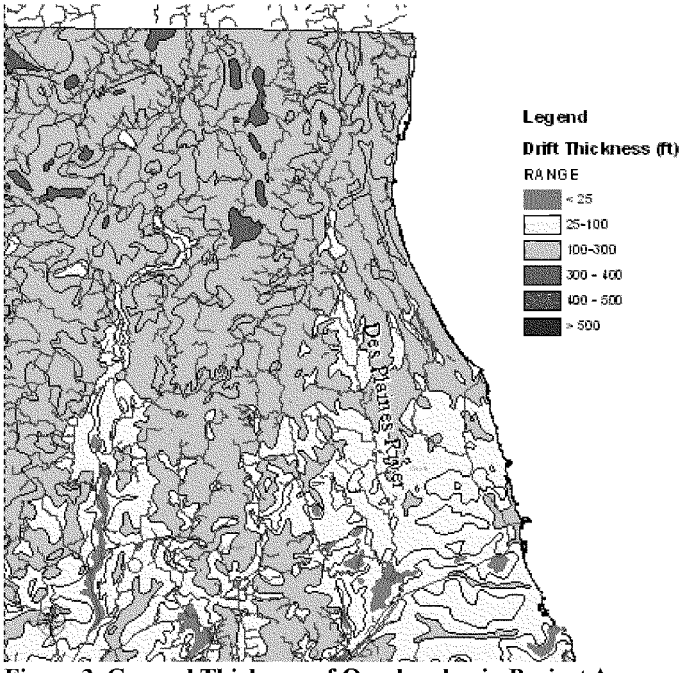


Figure 3. General Thickness of Overburden in Project Area

11. Due to glacial scouring and alluvial deposition, the Chicago area is a lake plain, surrounded by moraines paralleling former shorelines of glacial Lake Chicago. The Des Plaines River is a primary drainage feature in northeastern Illinois. The river valley where the river has historically meandered and changed course can be as wide as one mile in some places. Over the last 200 years, the river has become increasingly channelized due to urbanization, reducing the Des Plaines River's opportunity for meandering.

12. Glacial till, glaciolacuatrine and glaciofluvial deposits are the major materials deposited on top of the Silurian dolomite bedrock in Lake and Cook Counties. The major topographic features in these counties reflecting the influence of glacial deposition (moraines); till plains and sand and gravel outwash plains; a few knob-like hills of sand and gravel (kames); and the Sag, Fox, and Des Plaines River valleys which were drainage-ways for glacial melt-waters. Sand and gravel accumulated as valley trains along these rivers.

13. Till is the most abundant glacial overburden material in Lake and Cook counties. This material consists of unsorted debris deposited by glacial ice and is composed of pebbles, cobbles, and boulders embedded in a matrix of clay, silt and sand. Because of extensive urbanization, there are many areas of Cook County where geologic materials have been affected by human activities. It is recognized that a few feet of miscellaneous fills and/or regraded topsoil and other surficial material underline most of the metropolitan Chicago area.

14. Soils along the Des Plaines River include well sorted sands and gravels in the valleys and glacial outwash in the terraces. Predominant soil types along the Des Plaines River include Zurich, Grays, Wauconda, and Fox silt loams, and Sawmill silty clay loam (Soil Conservation Service, 1970).

15. Within the Des Plaines River Valley, the surficial soils are primarily fluvial deposits consisting of varying amounts of clay, silt, sand, and sometimes gravel. These deposits generally range from 20 to 35 feet thick, but in some areas do extend down to bedrock. The alluvium is underlain by clean medium textured sands and gravels varying in thickness from 25 to 30 feet.

LOCAL GEOLOGY

Bedrock Geology

16. The surface bedrock within the study areas consist predominantly of rock or the Silurian System which is principally dolomite of the Niagran and Alexandrian Series. Based on soil borings and well logs, the depth to bedrock ranges from about 15 to 270 feet with the limestone being the principal rock type; however, there are layered deposits of limestone and shale with the presence of sandstone increasing with depth.

Surficial Geology

17. Surficial geology present within the study area consists of the eastern flank of the Valparaiso (undifferentiated) moraine, the valley between the Tinley and Park Ridge ground moraines and Lake Chicago plain deposits in the northern, middle, and lower reaches, respectively. The surficial deposits at project feature locations consist of alluvium (Sawmill), herbaceous organic material (Houghton Muck), earth fill (Orthents, Urban), and underlying loess and glacial outwash (Pella, Mundelein, Barrington, Kane). All the deposits are of the Pleistocene Series of the Quaternary System of the Wisconsian Stage, and Woodfordian Substage. A soil map of each site can be seen in Attachment 1.

18. Based on the USDA Soil Survey data summarized in Table 1, surface soils at the project areas for levees, reservoirs, and pump station consists of silt loam, silty clay loam, and Houghton Muck (Soil Conservation Service, Version 6, 2011). A portion of several sites did not have data available, as it was described as 'Urban Land.' Road raise and dam removal sites are not shown, as the existing conditions along roads has already been altered and dams are in water.

Table 1. Surface Soils at Reservoir, Levee, and Pump Station Sites

Site (USGS maps located in Attachment 1)	Silty Clay Loam	Silt Loam	Houghton Muck	'Urban Land'
Adler Park Levee (DPLV15)*	54%	46%		
Aptakisic Reservoir (ACRS08)*	40%	60%		
Bull Creek Reservoir (BCRS02)*	25%	22%	53%	
Lake Mary Anne PS (FPCI01)	50%	50%		
Touhy-Miner Levee (DPLV09)	65%	15%		20%
Campground Road Reservoir (DPRS15)*	13%	87%		
Groveland Levee (DPLV01)	100%			
Fullerton-Grand Levee (DPLV04)	8%	25%		67%
Belmont-Irving Park Levee (DPLV05)	24%	16%		60%
Fullerton Woods Reservoir (DPRS04)	34%+	10%		56%
H. S. Driving Range Reservoir (WLRS04)	33%	67%		
WHRS01 Reservoir*	100%+			

**Removed from consideration*
+Described as 'Orthents, clayey'

Subsurface Investigations

19. Subsurface investigations were performed by AECOM during the fall of 2011, spring 2013, and fall 2013 whose reports can be found in Attachment 2. Twenty-nine (29) borings were completed amongst the sites listed below.

- Bull Creek Reservoir (BCRS02) – Four (4) borings with one at 50 ft and three at 30 ft. *This site was removed from consideration after the borings were completed.* Completed analyses are still included in the report.
- DPLV09 Levee – Two (2) borings at 35 ft, each in 2011 and an additional eight (8) borings ranging from 25 to 35 ft in 2013.
- Groveland Avenue Levee (DPLV01) – Two (2) borings at 30 ft, each.
- Adler Park Levee (DPLV15) – Two (2) borings at 25 ft, each. *This site was removed from consideration after the borings were completed.* Completed analyses are still included in the report.
- Silver Creek Reservoir (SCMC01) – Two (2) borings with one at 30 ft and one at 35 ft. *This site was removed from consideration after the borings were completed.* The logs are still in the AECOM report but are not mentioned further in this appendix, as no design work was completed.
- Fullerton-Grand Levee (DPLV04) – Four (4) borings at 35 ft, each.
- Belmont-Irving Park Levee (DPLV05) – Five (5) borings at 35 ft, each.

20. Each site was investigated by AECOM or the Corps using the Illinois State Water Survey – Well Database to find previous water well logs. These logs are included in AECOM's reports in Attachment 2 and/or after the associated Plate maps at the end of this appendix.

21. In addition to collecting soil boring data, the first investigation performed by AECOM gathered information about the road raise, structure modification and dam removal sites and included it in their report located in Attachment 2. Several sites have been removed since the investigation including the BNSF Bridge modification and all the road raises except DPBM04. The dam removal sites are still included and consist of Dam #1 in Wheeling, Dam #2 in Wheeling, Dempster Avenue Dam in Des Plaines, Touhy Avenue Dam in Park Ridge, and Dam #4 (Devon Ave Dam) in Rosemont.

22. A second investigation was completed by AECOM in spring 2013 and this report can also be found in Attachment 2. Eight soil borings were completed along the DPLV09 alignment to depths of 25.8 to 36.5 ft.

23. A third investigation by AECOM was completed in fall 2013 and this report can also be found in Attachment 2. Nine soil borings were completed along the DPLV04 and DPLV05 alignments to depths of about 35 ft below grade.

24. There were several sites which had previous explorations completed at or near proposed Des Plaines II projects. These boring logs and maps can be found in Attachment 3 and as Plate Drawings at the end of this appendix.

Structure Modifications:

- Lake Mary Anne Pump Station (FPCI01) – Plate 1 – New borings for this site were not completed at this time.
    - The IDOT as builts of an existing 96" pipe along the south side of Golf Road include a soil profile completed using borings completed in 1973 by G.H. Otto. These borings encountered layers of both sandy and clayey soils to about elevation 622 NGVD. Below this elevation, clay till was encountered to the termination depth of the borings of about elevation 620 to 605. These are included in the AECOM Report in Attachment 2.
    - Previous borings uncovered through the Illinois State Water Survey include four water well logs near the project. However, the logs did not include any soil or water data online but there could be information filed at the ISGS office.
- BNSF Railroad Bridge (DPBM01) – *This site was removed from the proposed plan.* DP2-11-11 is about 450 feet north of this bridge. See the Groveland Floodwall section for information on this log. The investigation found one nearby water well log from the ISGS. However, this log does not include any soil or water data online but there could be information filed at the ISGS office.

- BNSF provided several drawings of the existing bridge which have cross sections of two soil borings completed in 1900. These cross sections encountered gravel underlain by soft to hard clay. Beneath the clay, gravel and tough clay was encountered with the boring terminating in bedrock. These cross sections do not include elevation data or thicknesses of the layers. These drawings are not included in this Feasibility Report as they are protected from disclosure as provided by the Critical Infrastructure Information Act of 2002. See 6 U.S.C. sec. 133 (a) (2) (A) for more information.

Reservoirs:

- Bull Creek Reservoir (BCRS02) – Plate 2 – *This site was removed from the proposed plan.* Of the four borings completed at this site, DP2-11-06 was completed to 50 feet below grade and DP2-11-07, 08, and 09 were completed to 30 feet. DP2-11-06 was completed near the proposed outflow structure, DP2-11-07 was completed near the inlet structure, and DP2-11-08 and 09 were completed along the perimeter dike. Topsoil was encountered at each boring location, with varying thicknesses of ½ to 2 feet. DP2-11-06 and 07 encountered about 2 feet of clay fill beneath the topsoil. Beneath the fill and/or topsoil, the Houghton Muck layer identified in the soil survey was encountered in DP2-11-07 and 08 as soft organic clay and peat to a depth of 8 to 10 feet. The other two borings (DP2-11-06 and 09) did not encounter this organic material. Beneath the organic material, fill and/or topsoil, stiff to very stiff lean clay was encountered to the termination depths, other than DP2-11-06. DP2-11-06 encountered very dense fine to coarse gravel at about 48 feet below grade. When the borehole extended into this layer, a natural gas pocket was released and dissipated until the next day when the hole was backfilled. Water was not observed in DP2-11-06 or 09, but was encountered about ½ to 3 feet below grade in DP2-11-07 and 08. These logs are included in Attachment 2.
  - Previous borings uncovered through the Illinois State Water Survey include fourteen water well logs near the project. These well logs were completed based on general observations and may not be as accurate as borings completed specifically for classification. Eleven extend to depths of about 10 to 12 feet while three extend 257 to 314 feet below grade. Bedrock was encountered in the deep borings between 218 and 270 feet below grade. The overburden soils encountered mostly clay with a few layers of organic soils and sand. Water was noted in BCR-1 only, at about 80 feet below grade. These logs are included in Attachment 2.
- Aptakisic Creek Reservoir (ACRS08) – Plate 3 – *This site was removed from the proposed plan.* New borings for this site were not completed at this time although it is anticipated to consist of mostly clay materials based on the soil survey.

- Previous borings uncovered through the Illinois State Water Survey include six water well logs near the project. These well logs were completed based on general observations and may not be as accurate as borings completed specifically for classification. They extend to depths of about 86 to 149 feet below grade and encountered mostly clay with a few sand layers. Only ACR-6 noted rock, which was encountered at 130 feet below grade. Water was observed between 42 to 72 feet below grade. These logs are included in Attachment 2.

- DPRS04 (Fullerton Woods) Reservoir – Plate 11 – New borings for this site were not completed at this time. This site was once used as a staging area from the MWRD Deep Tunnel excavation where rock cuttings were stored from the late 1990's to the mid 2000's. These rock cuttings were then sold to local construction companies, although documentation was not provided to determine if all rock was removed. One soil boring was provided by MWRD as shown on Plate 11. This boring was completed in 1975 and encountered silty clay to about 8-½ feet below grade, where the material changes to clayey silt. At about 11 feet below grade, a layer of sand and clay about 4 feet thick was encountered. Clayey silt and silty clay interchange between 15 and 55 ft below grade, where about 1 foot of gravel was present before hitting bedrock at 56 ft below grade. Additionally, DP2-13-17(A) completed for DPLV04 is just west of the DPRS04 site. It encountered about 5 to 9 feet of silty clay fill underlain by native silty clay to 35 ft below grade.
  - Previous borings uncovered through the Illinois State Water Survey include 5 water well logs near the project. These well logs were completed based on general observations and may not be as accurate as borings completed specifically for classification. They extend to depths of about 44 to 1497 feet below grade. These logs do not mention the surface materials, only the depth to rock, which was between 40 and 80 ft below grade. These logs are included in Plate 11.
- WLRS04 (Harry Semrow Driving Range) Reservoir – Plate 10 – New borings for this site were not completed at this time although it is anticipated to consist of mostly clay materials based on the soil types shown on the plate drawing. The soil types onsite include Symerton silt loam, Andres silt loam, and Drummer silty clay loam.
  - Previous borings uncovered through the Illinois State Water Survey include several water well logs near the project. These well logs were completed based on general observations and may not be as accurate as borings completed specifically for classification. They extend to depths of about 105 to 1340 feet below grade, with the four closest to the site shown on Plate 10. Only one of these four recorded the soil types, which is about 1,500 ft east of the site. It encountered clay to about 69 ft below grade before encountering 6 feet of sand and gravel, then bedrock at about 75 feet below grade. The other three well logs encountered bedrock between 100 and 200 ft below grade.

- WHRS01 Reservoir – Plate 12 – *This site was removed from the proposed plan.* New borings for this site were not completed at this time although it is anticipated to consist of mostly clay materials based on the soil survey in Attachment 1. The site is covered entirely of 'Orthents, clayey' either rolling or nearly level. Orthents are described as disturbed soils from manmade reworking such as filling, excavation or other soil movement. The site was reportedly residential but was then bought out by O'Hare Airport and cleared. The site now has a large mound of soil in the center which is of unknown quality.
    - The Illinois State Water Survey included 1 water well log at the potential project site. This well log was completed based on general observations and may not be as accurate. This log extends to a depth of about 113 feet below grade and encountered bedrock at 66 ft. No observations on the soil type were recorded. This log is included in Attachment 2.
- Campground Road Reservoir (DPRS15) – Plate 4 – *This site was removed from the proposed plan.* New borings for this site were not completed at this time although it is anticipated that the site consists of silty and clayey material, based on the soil survey.
    - The soil borings completed for DPLV09 are on the opposite side of the Des Plaines River, about 1,000 ft west of the proposed reservoir site. These encountered mostly clay and some silt.

Levees:

- Touhy-Miner Levee (DPLV09) – Plate 5 – Two borings along the centerline of the levee/floodwall were completed to 35 feet in 2011; DP-11-14 and 15. These were completed in a relatively small section of the proposed levee; in between Oakton Street and Everett Street. An additional eight borings were completed in 2013 which extended the complete length of the proposed levee; from Touhy Ave to Miner St and designated DP2-13-01 thru DP2-13-08. DP2-11-15, DP2-13-01, and DP2-13-05 encountered about 4 to 6 inches of asphalt underlain while the rest encountered about 5 to 18 inches of topsoil. Beneath the surface materials, fill soils were encountered to approximately 2 feet below grade in DP2-13-01 thru DP2-13-04. DP2-13-05 encountered about 9.5 ft and DP2-13-06 and DP2-13-08 encountered about 6 ft. These fill materials consist of reworked site soils. Deleterious materials were generally not found with the exception of glass pieces and the fact that DP2-13-05 required a minor relocation due to an unknown obstruction. The native materials consist of very stiff clay with a few small sand lenses/layers. The bottom of some of the borings consisted of very hard silt. Water was encountered in each boring except DP2-11-14, DP2-11-15, and DP2-13-08. Where water was encountered, it generally is around a similar elevation as the Des Plaines River. These logs are included in the second AECOM report in Attachment 2.

- On the opposite bank of the Des Plaines River near the north end of the proposed DPLV09 Levee/Floodwall, there is an existing levee named Levee 50 (Rand Road Levee). This levee system protects Des Plaines, IL on the east bank with levee, floodwall, and a clay embankment along a railroad berm. It was completed in 2011 with a crest elevation of 636 NAVD88. The previous borings were completed by Christopher B. Burke Engineering, Ltd. in 1998 and STS in 2002. The centerline of Levee 50 is closest to the northernmost portion of the proposed DPLV09 levee at around 300 feet. In general, these borings encountered about 2 to 7 feet of sand beneath the fill soils underlain with tough to very tough clay. These logs are in Attachment 3.
- Soil borings completed for the Des Plaines Tunnel in 1978 are also near the proposed DPLV09 alignment. These borings were completed on both sides of the Des Plaines River, with several within 500 ft of the proposed project. These borings encountered clayey and silty soils, similar to the other subsurface investigations. These logs can also be found in Attachment 3.
- Previous borings uncovered through the Illinois State Water Survey include three water well logs near the project. However, the logs did not include any soil or water data online but there could be information filed at the ISGS office.

- Groveland Avenue Levee (DPLV01) – Plate 6 – Borings DP2-11-10 and 11 were completed along the proposed floodwall alignment with DP2-11-10 near the north end of Groveland Avenue and DP2-11-11 near the south end. Both borings encountered about ¾ feet of topsoil at the surface. Beneath the topsoil, each encountered silty clay fill to about 5 feet below grade underlain by native medium stiff silty clay with a 1-foot thick sand layer in DP2-11-11 at about 8 feet below grade. At about 9-½ to 10 feet below grade, dense silt was encountered in DP2-11-10 while loose silty sand was encountered in DP2-11-11. Beneath the silt in DP2-11-10, hard silty clay at about 13 feet below grade was encountered to about 17.5 feet where auger refusal on inferred bedrock was encountered. Beneath the silty sand in DP2-11-11, dense silt was encountered at about 20 feet with hard silty clay encountered at 25 feet below grade. This extended to the termination depth of the boring at 30.5 feet. Water was observed between 7-½ and 12 feet below grade. These logs are included in Attachment 2.
  - North of Forest Avenue along the same line as the proposed floodwall, the existing berm had been modified in 2004 as a Section 14 USACE project. This project reduced seepage by replacing part of the old berm with compacted clay and removing vegetation. Five borings were completed along this stretch by Professional Service Industries, Inc. (PSI) in May 1988 labeled B-1 thru B-5 which extended between 4.5 and 21.5 feet below grade. B-4 and B-5 encountered clay fill to about 4-½ feet where the borings were terminated. The other borings encountered silty sand at about 8 to 10-½ feet below grade with B-1 and B-3 terminating in this material at about 11-½ feet. B-2 encountered weathered rock at about 15 feet to the termination depth of about 21-½ feet below grade. These logs are in Attachment 3.

- Previous borings uncovered through the Illinois State Water Survey include five water well logs near the project. However, the logs did not include any soil or water data online but there could be information filed at the ISGS office.

- Adler Park Levee (DPLV15) – Plate 7 – *This site was removed from the proposed plan.* Borings DP2-11-01 and 02 were completed along the proposed levee alignment to 25 feet below grade. These borings encountered medium stiff to stiff lean clay with a few intermittent sand seams/layers. Both borings terminated about 25 feet below grade, with DP2-11-01 ending in dense fine to coarse sand and DP2-11-02 ending in very stiff lean clay. Water was encountered between 12 and 18 feet below grade. These logs are included in Attachment 2.

  - The USACE North Libertyville Estates Levee project is less than 1,000 feet west of the proposed Adler Park Levee. North Libertyville was completed in September 1998 and protects a residential area with a levee at elevation 657.5 feet NGVD29 (a 33-year flood, approximately). There are several borings within 750 feet of the proposed Adler Park levee. They were completed by Patrick Drilling, Inc. in late 1990 and are labeled CB-NL-12-90 thru CB-NL-15-90. Each extends about 25 feet below grade and encountered similar conditions along the east edge of the project, encountering lean clay to at least 3 feet below grade underlain by a mix of sand, silt, and clay. Water was observed between about 5 to 10 feet below grade. The logs are located in Attachment 3.

  - Previous borings uncovered through the Illinois State Water Survey include five water well logs near the project. These well logs were completed based on general observations and may not be as accurate as borings completed specifically for classification. They extend to depths of 136 to 200 feet below grade and encountered mostly clay with a few sand layers. Each encountered bedrock, except for DPLV15-3, between 121-½ and 129 feet below grade. Water was observed between 10 to 45 feet below grade.

- Fullerton-Grand Levee (DPLV04) – Plate 8 – Borings DP2-13-14 thru DP2-13-17were completed near the proposed alignment to 35 ft below grade. These borings encountered about 5 to 9 ft of fill consisting of clay, silt, topsoil, and sand. Beneath the fill, each boring consisted of medium stiff to hard silty clay and silt to the termination depth of 35 ft with the exception of DP2-13-14 which encountered 4 ft of silty sand about 23 ft below grade.

  - The southern end of DPLV04 would run near the proposed DPSR04 reservoir so see that section above for additional subsurface information. The ISGS logs in this area only indicated limestone bedrock was about 40 to 80 ft below grade.

- Belmont-Irving Park Levee (DPLV05) – Plate 9 – Borings DP2-13-09 thru DP2-13-13 were completed near the proposed alignment to 35 ft below grade. These borings encountered about 2 to 10 ft of fill consisting of sand, gravel, clay, silt and topsoil. Beneath the fill, the borings consisted of mostly stiff to hard silt and clay, although every boring but DP2-13-09 encountered a layer of sand and/or gravel. The sand/gravel layers are about 3 to 8 ft thick and were encountered a minimum of 7 ft below grade to a maximum of at the termination depth of 35 ft deep.

- ISGS logs were investigated along DPLV04, and there were 3 close to the alignment of the proposed levee. These did not include any soil information; just that bedrock is about 70 feet below grade.

Structure Modification:

- First Avenue Bridge (DPBM04) – The investigation found six nearby water well logs from the ISGS. However, these logs do not include any soil or water data online but there could be information filed at the ISGS office.
  - The IDOT as builts provided in Attachment 2 did not include any soil information for this site.

Dam Removal Sites:

- Dam #1 – There are paved drives on both banks as this dam used to be used as a ford. Additionally, there are parking lots on both banks near Dam #1 which are part of the Forest Preserve District of Cook County. The reinforced concrete dam has a flat broad crest with a smooth straight sloped face and about 4.8 feet tall and 127 feet wide.
- Dam #2 – The west bank is a generally grassy area with a parking lot and gravel river access path about 500 feet north of Dam #2. The east bank is generally dense forest. Both banks are owned by the Forest Preserve District of Cook County. The reinforced concrete dam has a flat broad crest with a smooth step-like face and used to be used as a river ford. It is about 4.3 feet tall and 151 feet wide.
- Dempster Avenue Dam – The west bank at the dam has an approximately 5 foot tall wall up to River Road and the east bank is a recreational path and Campground Road. The reinforced concrete dam has a round broad crest with a smooth steep convex sloped face with a boat portage the east bank. It is about 5.5 feet tall and 106 feet wide. The Dempster Ave Dam is near the existing Levee 50 project.
- Touhy Avenue Dam – Both the east and west bank are owned by the Forest Preserve District of Cook County and are covered with trees. There is a walking path close to the east bank. The reinforced concrete dam has a round broad crest with a smooth convex sloped face with a boat portage on the east bank. It is about 5.5 feet tall and 106 feet wide.
- Dam #4 (aka Devon Ave Dam) – Both the east and west bank are owned by the Forest Preserve District of Cook County and are covered with trees. The reinforced concrete dam has a round broad crest with a smooth convex sloped face with a boat portage on the west bank. It is about 5.5 feet tall and 106 feet wide.

DESIGN ANALYSIS

Purpose

25. The purpose of this analysis is to determine the constructability of the earthen structures based on the limited amount of subsurface investigation completed as part of this feasibility study. Poorly suited soils will be identified, such as organic soils and coarse grained soils where seepage is disadvantageous. Settlement of levees and reservoir berms were analyzed using procedures outlined in EM 1110-1-1904. Slope stability and seepage of levees and reservoir berms was analyzed using SLOPE/W and SEEP/W software, respectively. Analysis for structures such as road raises, floodwalls, pump stations, spillways, etc. will be completed during the design phase.

Lake Mary Anne Pump Station (FPCI01) – Plate 1

26. Analyses could not be done for the Lake Mary Anne Pump Station as soil borings were not completed prior to this feasibility report. Based on the USDA Soil Survey, this site is anticipated to encounter mostly silt and clay soils which would be appropriate for construction of a pump station and underground pipe. A subsurface investigation will be required prior to the design phase to determine more accurate information.

27. The Illinois Department of Transportation provided the as builts for two existing drainage pipes that run parallel with Golf Road. One pipe is a 96 inch storm sewer which runs along the south side of Golf Road and is between elevations of about 620 to 630 NGVD. The other pipe is also a storm sewer that is 18 inch diameter and runs along the center of Golf Road between elevations 640 and 635 NGVD. The proposed pipe connecting the lakes should take care to avoid these pipes.

28. To construct the pipe that connects the two lakes, the most feasible method is to directional drill beneath the existing utilities. The IDOT as builts include a soil profile, which indicate that sandy layers were encountered as deep as elevation 622 NGVD and the water table around 631 NGVD. Therefore, the new pipe should be constructed around elevation 615 to 620 NGVD to avoid the existing pipes and be fully in the clay till. Soil borings should be completed to create a soil profile along the proposed drive line.

Bull Creek Reservoir (BCRS02) – Plate 2, 2a *(removed from consideration)*

29. The main obstacle in designing a reservoir at the Bull Creek site is the presence of 'Houghton Muck' soils consisting of organic clay and peat, as shown on Plates 2 (plan) and 2a (profile). This layer is highly compressible and therefore requires remediation to reduce settlement after construction.

30. Based on the USDA Web Soil Survey, Houghton Muck is present beneath approximately 70% of the berm on the existing plan. While the berm can be shifted to reduce this percentage, there is no way to construct the berm without intersecting this subsurface soil. Additional data could show that some areas have a relatively thin layer of these organic soils compared to the 8 to 10 feet encountered in the two borings on the west side of the site.

31. Other areas that did not encounter the organic clays would be suitable for construction as the materials encountered are stiff to very stiff lean clay, such as the two borings completed on the east side of the site. This material is relatively easy to work with and impermeable. The detailed settlement, stability, and seepage analyses are in Attachment 4.

Settlement

32. The settlement analyses for the two different site characteristics; with organics and without provided two different anticipated settlements. Boring logs DP2-11-07 (western portion) and 09 (eastern portion) were used for the comparison where DP2-11-07 estimates about 7 feet of settlement, while DP2-11-09 estimates less than ¾-foot. Of the seven feet of settlement in DP2-11-07, about 5-½ feet is attributed to the 8-½ foot thick peat and organic clayey silt layers. This is based on rough estimates. A more precise analysis based on new laboratory testing results of the materials should be completed to determine a more accurate number.

33. One option to prevent this high amount of settlement is to remove and replace the peat and clayey silt layers, which are a maximum of 12-½ feet below grade in the borings completed. However, other options should be considered as removal could become difficult and costly. Pre-loading the berm footprint using on-site clay and installing wick drains would consolidate the soft materials prior to the construction of the actual berm. Laboratory data is required to determine the length of time and amount of load necessary to consolidate the materials to an appropriate level. Settlement of structures such as the inlet and outlets should be analyzed during the design phase.

Stability

34. The stability analysis was based on the soil conditions of both with and without organic soils present using DP2-11-07 (west side) and DP2-11-09 (east side) to determine the cross sections. SLOPE/W software was used to determine factors of safety for both the end of construction and long term stability of the berm at both locations. Based on the analyses, in areas where no organic soils are present, either through removal or if none are present in the first place, the reservoir berms can be sloped with a 2.5H: 1V on the inner side and 2H: 1V on the outer side. In areas where peat and clayey silt are present and are not removed, the inner and outer slopes must be flattened to at least 5H: 1V and 3H: 1V, respectively.

35. This analysis is based on the tallest anticipated berm at this stage in the project. Once actual cross sections are developed for the berm, the stability should be analyzed again. Additional strength data for the soils should also be gathered, particularly for the organic soils as they are likely unavoidable when laying out a useful reservoir footprint.

Seepage

36. A seepage analysis completed by SEEP/W also used the cross section presented by DP2-11-07 with a completely full and saturated reservoir with organic soils present. Based on this analysis, the anticipated seepage is in the order of $4.5*10^{-4}$ gallons per minute per foot of berm. This is considered an insignificant amount of seepage.

37. However, the exit gradient produced with the organic layers present creates conditions that may produce piping and sand boils. In order to mitigate this risk, a cutoff trench could be installed through the peat and clayey silt soils. This trench would have to be at least 5 feet wide at the bottom and be sloped to prevent cave-ins. Additional sample collection and laboratory testing should be completed to determine the actual material properties and calculate a more precise seepage analysis.

38. Alternatively, in areas with thick peat layers, sheet pile can be installed through the organic material to reduce seepage and piping. This would eliminate the need excavate the unstable peat material to install a cutoff trench. The sheet pile would need to extend at least 2 feet beyond the peat and organic clayey silt.

Construction

39. The silty clay encountered in the soil borings would be appropriate to construct the reservoir berms while the organic materials present should not be used for berm construction. If the peat layer is left in place, the berms should expect settlement on the order of several feet and pre-loading using wick drains and overbuild should be used. In areas without peat, about ¾-foot should be anticipated for overbuild while areas with peat should be analyzed on a case-by-case basis.

40. Construction activities where peat soils are present should be limited, as they are very compressible and equipment may become stuck. Excavating into the peat layer may also become challenging as this layer is very soft and is almost always encountered below the water table. Water was encountered as little as ½-foot below grade in areas with organic soils while the other borings did not encounter groundwater. Therefore, it is likely that the water encountered is perched in the organic material on top of the silty clay in the form of a marsh/pond. To avoid excavating into the water, it is recommended to use sheet pile instead of a clay cutoff trench beneath the berm and install wick drains to drain the organic layer.

Additional Information

41. In order to properly design this reservoir, additional information is required. Depending on the actual extents of the organic layer, the method of construction can be greatly affected. Additional soil borings should be completed to determine the extents of this layer and where to align the berm to avoid this subsurface layer. Once the extents and depth of this layer is better quantified, a refined alignment for the reservoir can be developed. Compression curves and conductivity values should be developed from laboratory tests to better estimate the anticipated settlement, as well as, the seepage potential.

Aptakisic Creek Reservoir (ACRS08) – Plate 3 *(removed from consideration)*

42. Analyses could not be done for the Aptakisic Creek Reservoir as soil borings were not completed at the time of this Appendix. Based on the USDA Soil Survey and ISGS water well logs, this site is anticipated to encounter mostly clay soils which would be appropriate for reservoir construction with low permeability and stable slopes. The descriptions in the ISGS well logs include some sands and gravels near the profile surface. If these sandy soils are present on the site and within 5 feet or so of the surface, a cutoff trench should be installed. A seepage analysis should be completed to determine the extents of a cutoff trench once the subsurface profile is known. Groundwater was encountered deep below the surface and will likely not be encountered during construction. A subsurface investigation will be required prior to the design phase to determine more accurate information.

Campground Road Reservoir (DPRS15) – Plate 4 *(removed from consideration)*

43. Analyses could not be done for the Campground Road Reservoir as soil borings were not completed at the time of this Appendix. Based on the USDA Soil Survey and on soil borings completed for the DPLV09 levee stretch, this site is anticipated to encounter mostly clay soils which would be appropriate for reservoir construction with low permeability and stable slopes. Groundwater is not anticipated to be encountered during excavation. A subsurface investigation will be required prior to the design phase to determine more accurate information.

WLRS04 (Harry Semrow Driving Range) Reservoir – Plate 10

44. Analyses could not be done for WLRS04 Reservoir as soil borings were not completed. Based on the USDA Soil Survey and on the existing water well log, this site is anticipated to encounter mostly clay soils which would be appropriate for reservoir construction with low permeability and stable slopes. There is an existing pond onsite, so this should be drained prior to earthwork. This pond may indicate that the groundwater is higher in this area and could be a factor during construction. A pump station is also part of this reservoir site and would be in the northeast portion of the site. A subsurface investigation is necessary to determine the foundation needed, but based on projects build in similar areas, spread footings would likely be appropriate. Bedrock was encountered in the ISGS logs at least 75 ft below grade, so it would not affect construction. A subsurface investigation will be required prior to the design phase to determine more accurate information.

DPRS04 (Fullerton Woods) Reservoir – Plate 11

45. Analyses could not be done for the DPRS04 Reservoir as soil borings were not completed. Based on the USDA Soil Survey and the MWRD soil boring log from 1975, this site is anticipated to encounter mostly clay soils which would be appropriate for reservoir construction with low permeability and stable slopes. A layer of 'sand and clay' was encountered between 11 and 15 ft below grade (approx elevation 619 to 623 ft NAVD88). This material could create a seepage path and would not be suitable for reuse as berm material. Bedrock is about 70 ft below grade, so it wouldn't affect reservoir construction. Historical records indicate this site was used for stone storage as the stone was being excavated from the MWRD Deep Tunnel construction. This stone was onsite for 5 to 10 years in the early 2000's. It was originally expected to be hauled offsite as construction material, but records were not available to substantiate this claim. It is possible that portions of the excavated rock are still onsite below grade. This material would not be suitable as part of the berms or reservoir bottom and would have to be removed and replaced with clay fill. Information on the groundwater table was not available; however, the upcoming soil borings to be completed for DPLV04 would give indication for this site. A pump station is also part of this reservoir site and would be in the northeast portion of the site. A subsurface investigation is necessary to determine the foundation needed, but based on projects build in similar areas, spread footings would likely be appropriate. A subsurface investigation will be required prior to the design phase to determine more accurate information.

WHRS01 Reservoir – Plate 12 *(removed from consideration)*

46. Analyses could not be done for the WHRS01 Reservoir as soil borings were not completed. Based on the USDA Soil Survey, this site is anticipated to encounter mostly clay soils which would be appropriate for reservoir construction with low permeability and stable slopes. However, the Soil Survey does indicate this area has been reworked so there could be materials not native to the area present. Additionally, since the site was formerly residential, it is unknown if debris from demolition is still present. The mound onsite may contain debris such as bricks, concrete, wood, etc that would be unsuitable as construction soils. Bedrock is shown via the ISGS logs to be about 66 ft below grade, so it would not affect reservoir construction. A pump station is also part of this reservoir site and would be in the northeast portion of the site. A subsurface investigation is necessary to determine the foundation needed, but based on projects build in similar areas, spread footings would likely be appropriate. A subsurface investigation will be required prior to the design phase to determine more accurate information.

DPLV09 Levee/Floodwall – Plate 5, 5a

47. The soil borings were completed in 2011 and 2013 for the length of DPLV09 from Ashland Avenue to Fargo Avenue. Plan and profile views of the completed borings are shown on Plates 5 and 5a, respectively. The below analysis only examines the area where the 2011 soil borings were taken. The additional borings from 2013 further reinforce the anticipated conditions. DPLV09 will consist of both clay levee and floodwall. The detailed settlement, stability, and seepage analyses for the floodwall and levee portion are in Attachment 4.

Settlement

48. The settlement analysis used the conditions presented in DP2-11-15 and calculated the settlement of levee to be on the order of about ¾ foot or less. The floodwall settlement will be evaluated in the design phase.

Stability

49. The levee stability analysis was completed using SLOPE/W software and modeled using the profile from DP2-11-15. End of construction, long term, and rapid drawdown cases were analyzed which determined the DPLV09 Levee can be constructed with a 2.5H: 1V slope.

50. The floodwall was analyzed with ETL-1110-2-575 for a flood-side gap in cohesive soils, rotational stability failure around the floodwall toe, and consolidation of the land side soils. The sheet pile toe was assumed to extend to the top of the very dense silt, at about 603.5 NAVD. This depth may increase or decrease depending on a structural analysis to be completed during design phase. Based on these parameters, the floodwall appears stable to construct.

Seepage

51. Levee and floodwall seepage analyses were completed using the results from DP2-11-15 for the levee and DP2-11-14 for the floodwall. SEEP/W software was used which determined this site would be minimally susceptible to seepage for levee and floodwall construction. Piping was also analyzed and was determined not to be a mitigating factor using the available soil stratum. The floodwall depth will likely not be controlled by seepage cutoff since the subsurface is clay. Additional soil investigations may encounter sand layers near the surface of the soil stratum which would increase the risk of seepage.

Construction

52. Based on the available data, this site appears to be suitable for levee and floodwall construction as no soft or coarse grained soil strata were encountered within the top 10 feet of the soil strata. The levees should include about ¾-foot of overbuild based on the data available at this time. Clay present at the site would be suitable for levee construction, although since there will be a limited amount of excavation, an offsite source will be required.

53. Near the north end of this proposed levee/floodwall, there is an existing retaining wall that is about 500 feet long. If the existing wall does not provide a sufficient cutoff or would not be able to support additional height, then it will likely have to be torn out and a new wall installed.

54. For the floodwall, piles may be difficult to drive into the extremely dense silt present about 20 to 25 feet below grade. Groundwater is not anticipated near the surface.

Additional Information

55. The soil borings completed did not encounter any soils that would be unsuitable for levee/floodwall construction. The shallowest layer of permeable materials is the silty sand layer in DP2-13-05 about 9.5 to 12 ft below grade. However, this would be cut off by the proposed floodwall in this area. Additional soil borings should be completed so that there are generally 3 soil borings every 1,000 feet. These borings should be collected on the landside, riverside, and centerline. Laboratory tests including hydraulic conductivity and compression tests should be completed to better determine the soil characteristics.

DPLV04 Levee/Floodwall – Plate 8

56. Analyses were not completed for the DPLV04 levee/floodwall; however the subsurface characteristics are similar to DPLV09. Due to a limited amount of area available, DPLV04 will likely be constructed of almost all I-Wall which is acceptable based on the stable materials present. The subsurface sheetpile should cut off any possible seepage through the thick fill materials encountered in the soil borings although there may be difficulty in driving the sheetpile at greater depths due to the stiffness of the soils. Additional soil borings should be completed so that there are generally 3 soil borings every 1,000 feet. These borings should be collected on the landside, riverside, and centerline. Laboratory tests including hydraulic conductivity and compression tests should be completed to better determine the soil characteristics and complete a design analysis.

DPLV05 Levee/Floodwall – Plate 9

57. Analyses were not completed for the DPLV05 levee/floodwall; however the subsurface characteristics are similar to DPLV09. Due to a limited amount of area available, DPLV05 will likely be constructed of almost all I-Wall which is acceptable based on the stable materials present. The subsurface sheetpile should cut off any possible seepage through the thick fill materials encountered in the soil borings although there may be difficulty in driving the sheetpile at greater depths due to the stiffness of the soils. The deeper sand layers may provide seepage paths and should be considered. Additional soil borings should be completed so that there are generally 3 soil borings every 1,000 feet. These borings should be collected on the landside, riverside, and centerline. Laboratory tests including hydraulic conductivity and compression tests should be completed to better determine the soil characteristics and complete a design analysis.

Groveland Avenue Levee (DPLV01) – Plate 6, 6a

58. The Groveland Avenue Levee is anticipated to be constructed with a steel sheet pile floodwall with a concrete façade. This site encountered clay and silty sand underlain by very dense silt, clay and bedrock. Plan and profile views of the AECOM and PSI borings are shown on Plates 6 and 6a. Structural stress analyses will be performed on the floodwalls to determine the required depth of piling during the detailed design phase of this study. The detailed stability and seepage analyses for the floodwall are in Attachment 4.

Stability

59. The floodwall was analyzed with ETL-1110-2-575 for a flood-side gap in cohesive soils, rotational stability failure around the floodwall toe, and consolidation of the land side soils. The sheet pile toe was assumed to extend through the sand layers, at about 601 NAVD in DP2-11-10 and 592 NAVD in DP2-11-11. Additional borings may also modify the minimum required depth. The depth of the sheet piling will likely depend on the depth of the

permeable sandy layers rather than the required depth for structural stability. Based on this analysis using DP2-11-11, the floodwall appears stable to construct.

Seepage

60. Floodwall seepage analysis was completed using the results from DP2-11-11. SEEP/W software was used which determined this site would be minimally susceptible to seepage but piping may occur in areas where sands are present in the subsurface. To reduce the potential for piping, the silty sand layers should be cut off with the sheet piling. This is near elevation 592 NAVD88 in DP2-11-11, which equates to a 26-foot long sheet pile. In DP2-11-10, the sand layer was encountered to about elevation 601 NAVD88, which equates to a 17-foot sheet pile. Additional soil investigations are required to better map the sandy subsurface layers that require cutoff to reduce the risk of seepage and piping.

Construction

61. The floodwall may experience difficulty driving piles into the hard clay and extremely dense silt encountered as shallow as 13 feet below grade or elevation 601. Water was encountered as shallow as 7 feet below grade. However, since floodwall construction does not include much excavation, groundwater in not expected to be encountered during construction.

Additional Information

62. Additional soil investigations should be completed along the alignment of this proposed floodwall. Generally, 3 soil borings every 1,000 feet is suitable to locate most unsuitable soils. These borings should be collected on the landside, riverside, and centerline. Laboratory tests including hydraulic conductivity and compression tests should be completed to better determine the soil characteristics.

Adler Park Levee (DPLV15) – Plate 7 *(removed from consideration)*

63. This site encountered clay with a few sand seams/layers. Plan and profile views of the borings are shown on Plates 7 and 7a. This is consistent with the anticipated conditions as the adjacent North Libertyville Levee soil borings encountered similar strata. Therefore, like the North Libertyville Levee, this levee will likely require an inspection trench to cut off potential shallow seepage paths. The detailed settlement, stability, and seepage analyses are in Attachment 4.

Settlement

64. The settlement analysis used the conditions presented in DP2-11-01 and calculated it to be on the order of ¾-foot or less. Soil borings adjacent to the project site did not encounter any soils that may result in higher anticipated settlements than this estimate.

Stability

65. The North Libertyville Estates Levee was constructed with slopes that are either 2H: 1V away from the Des Plaines River or 2.5H: 1V along the river. The analysis for Adler Park used SLOPE/W software and the profile from DP2-11-01. Conditions at end of construction, long term, and rapid drawdown were analyzed which determined a 2.5H: 1V slope is recommended.

Seepage

66. At the North Libertyville Estates Levee, the clay levee was constructed after a 5-foot deep inspection trench was dug. The project was completed in 1998 but during high water events in the early 2000's, several sand boils developed. Because of this, the North Libertyville project was modified in 2007 to include several relief wells that allow water to gravity flow to the surface while preventing subsurface soils from flowing, as well.

67. Based on the seepage analysis completed using SEEP/W, seepage of water to the protected side is insignificant; however, piping is an issue. To mitigate this, a 2-foot wide cutoff trench could be constructed through the upper sand layer and backfilled with clay. At DP2-11-01, this layer extends to about 3-½ feet below grade while DP2-11-02 did not encounter the sand layer. This layer may be deeper in other places not investigated.

Construction

68. Based on the available data, this site appears to be suitable for levee construction with the only issue of shallow coarse-grained material. The levees should include about ¾-foot of overbuild based on the data available at this time. Clay present at the site would be suitable for levee construction, although since there will be a limited amount of excavation, an offsite source will be required. Groundwater was encountered at least 12 feet below grade in the soil borings, and is not anticipated to be encountered during construction.

69. The site does have an existing stream about 5 feet wide and 1 foot deep, south of the houses along Sprucewood Lane. This stream should still be able to discharge into the Des Plaines River so the flow would have to be altered to go through a pipe with a closure mechanism.

Additional Information

70. Additional soil investigations should be completed along the alignment of this proposed levee and floodwall. Generally, 3 soil borings every 1,000 feet is suitable to locate most unsuitable soils. These borings should be collected on the landside, riverside, and centerline. Laboratory tests including hydraulic conductivity and compression tests should be completed to better determine the soil characteristics.

Bridge Modifications

71. The First Avenue Bridge will be raised by about 5 feet over the Des Plaines River and is about 250 feet long and 4 lanes wide. The as builts provided by IDOT include utilities, cross sections of the road, and information about the bridge piers; which should be examined to determine the existing conditions for design.

BNSF Railroad Bridge Pier Extension *(removed from consideration)*

72. The BNSF Bridge modification will involve modifying the piers in the river as well as excavating portions of the existing banks to improve flow. Once cross sections are developed for the banks, stability analyses should be completed. As for the pier modifications, geotechnical data will likely be necessary to construct the longer piers with concrete supported on either footings or piles. As noted in the Groveland Avenue soil borings, very dense silts and bedrock are relatively shallow in this area and would increase the difficulty in driving piles if encountered. The drawings provided to the Government by BNSF are not included in this Feasibility Report as they are protected from disclosure as provided by the Critical Infrastructure Information Act of 2002. See 6 U.S.C. sec. 133 (a) (2) (A).

Dam Removals

73. Since the dams that are proposed to be removed are all less than 5-½ feet tall, instability issues are not anticipated along the channel. Bank stabilization may be required as most of these dams have significant concrete structures along the banks. Dams #1, #2, Touhy, and #4 are all bordered on both sides by forest preserve, so the demolition will not affect any other structures. However, the Dempster Ave Dam west end terminates into a retaining wall which supports River Road. Further analyses should be completed to determine if removal of this portion of the dam would affect the stability of River Road. Dempster Ave Dam is also adjacent to the proposed DPLV09 so any work should be coordinated with this project.

SUMMARY AND CONCLUSIONS

74. The geotechnical recommendations for various project features developed for this report are based on subsurface information available from the three AECOM investigations performed as part of this feasibility study (Attachment 2). Boring information of other projects within 1,000 feet of the proposed sites, well log data, and soil survey maps were also used for the recommendations presented. This report contains sufficient contingencies in the cost estimate to cover uncertainties in the design until an extensive investigation and analysis is completed during the design phase. Essential geotechnical recommendations developed for various features of the project are summarized below.

Table 2. Summary Table of Design Considerations

Site	Type	Acceptable Slope	Overbuild	Seepage/Piping Prevention
FPCI01	Pump Station	N/A	TBD	N/A
BCRS02*	Reservoir on Clay	2.5:1 inner, 2:1 outer	<3/4 foot	none
	Reservoir on Peat	5:1 inner, 3:1 outer	4-7 feet	clay cutoff or sheet pile
ACRS08*	Reservoir	TBD	TBD	TBD
DPLV09	Levee	2.5:1	<3/4 foot	none
	Floodwall	N/A	TBD	sheet pile
DPRS15*	Reservoir	TBD	TBD	TBD
DPRS04	Reservoir	TBD	TBD	TBD
WLRS04	Reservoir	TBD	TBD	TBD
WHRS01*	Reservoir	TBD	TBD	TBD
DPLV01	Floodwall	N/A	TBD	sheet pile
DPLV15*	Levee	2.5:1	<3/4 foot	clay cutoff
DPLV04	Floodwall	N/A	TBD	sheet pile
	Levee	TBD	TBD	clay cutoff
DPLV05	Floodwall	N/A	TBD	sheet pile
	Levee	TBD	TBD	clay cutoff

**removed from consideration*

Levees and Floodwalls

75. DPLV01, DPLV04, and DPLV05 encountered coarse grained materials that increase the possibility of seepage and piping while DPLV09 did not. The levees in which coarse grained materials could be present should include an inspection trench backfilled with clay while the floodwall should extend to competent fine-grained material. The levee and floodwall sites did not encounter soils that may increase the risk of undue settlement or stability problems. Levee construction should estimate about ¾- foot of overbuild to account for settlement at this time. All levees will be constructed with 10-foot wide crests and the slopes are acceptable at a 2.5H: 1V ratio using competent clay fill placed to meet specified density and compaction requirements. The floodwall structural designs will be completed during the

final design phase of each respective project. Additional subsurface information is needed prior to design, as some of the borings were offset from the centerline of the proposed project due to trees and vegetation.

Reservoirs

76. None of the reservoir sites still being considered have been investigated with soil borings. Based on surrounding characteristics, the sites likely consist of fine-grained non-organic materials. However, there are likely sand layers/lenses below grade that would need to be cut off to prevent seepage. Additional subsurface information is needed prior to design phase.

REFERENCES

Butts, Thomas and Ralph Evans. Illinois State Water Survey – Circular 132. Effects of Channel Dams on Dissolved Oxygen Concentrations in Northeastern Illinois Streams. 1978.

Corps of Engineers. 2003. Slope Stability. Engineering and Design, Engineer Manual 1110-2-1902.

Corps of Engineers. 2000. Design and Construction of Levees. Engineering and Design, Engineer Manual 1110-2-1913.

Corps of Engineers. 1990. Settlement Analysis. Engineering and Design, Engineer and Design 1110-1-1904.

Corps of Engineers. 1986. Seepage Analysis and Control for Dams. Engineering and Design, Engineer Manual 1110-2-1901.

Corps of Engineers, 2011. Evaluation of I-Walls. Engineering and Design, Engineer Technical Letter 1110-2-575.

Corps of Engineers. Riverside, Illinois Section 14 Planning and Design Analysis Report. 2003. Appendix D: Geotech.

Des Plaines River – Rand Park Flood Control Phase II Pump Station and Railroad Embankment Seal. As-Built Set. 2003. State of Illinois Department of Natural Resources Project Number FR-415.

Humphrey, Aaron and Jamie Matus. 2012. Des Plaines II Site Investigations and Subsurface Investigation and Research. Geotechnical Exploration Report. AECOM Project Number 60223274.

Humphrey, Aaron and Paul Tarvin. 2013. Des Plaines DPLV09 Investigation. Geotechnical Exploration Report. AECOM Project Number 60299932.

North Libertyville Estates Levee, Lake County, Illinois, Section 205 Flood Control Project. As-Built Set. 2000. Corps of Engineers Project Number DACW23-97-C-0030.

United States Department of Agriculture, Natural Resource Conservation Service. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

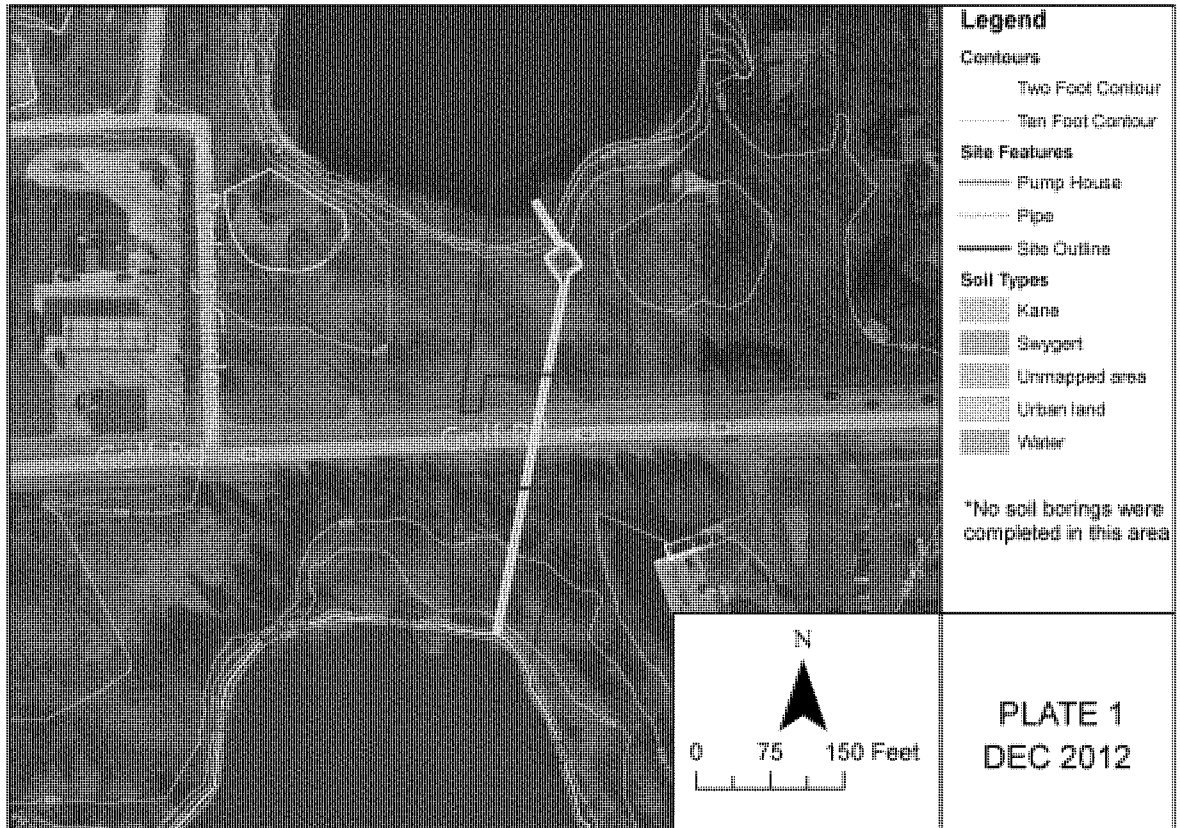
Willman, H.B. 1971. Summary of the Geology of the Chicago Area. Illinois State Geological Survey. Circular 460. 77p.

Willman, H.B. 1973. Rock Stratigraphy of the Silurian System in Northeastern and Northwestern Illinois. Illinois State Geological Survey. Circular 479. 55p.

Willman, H.B., et al. 1975. Handbook of Illinois Stratigraphy. Illinois State Geological Survey. Bulletin 95. 261p.

Lake Mary Anne Pump Station - Soil Map*

U.S. Army Corps of Engineers
Chicago District



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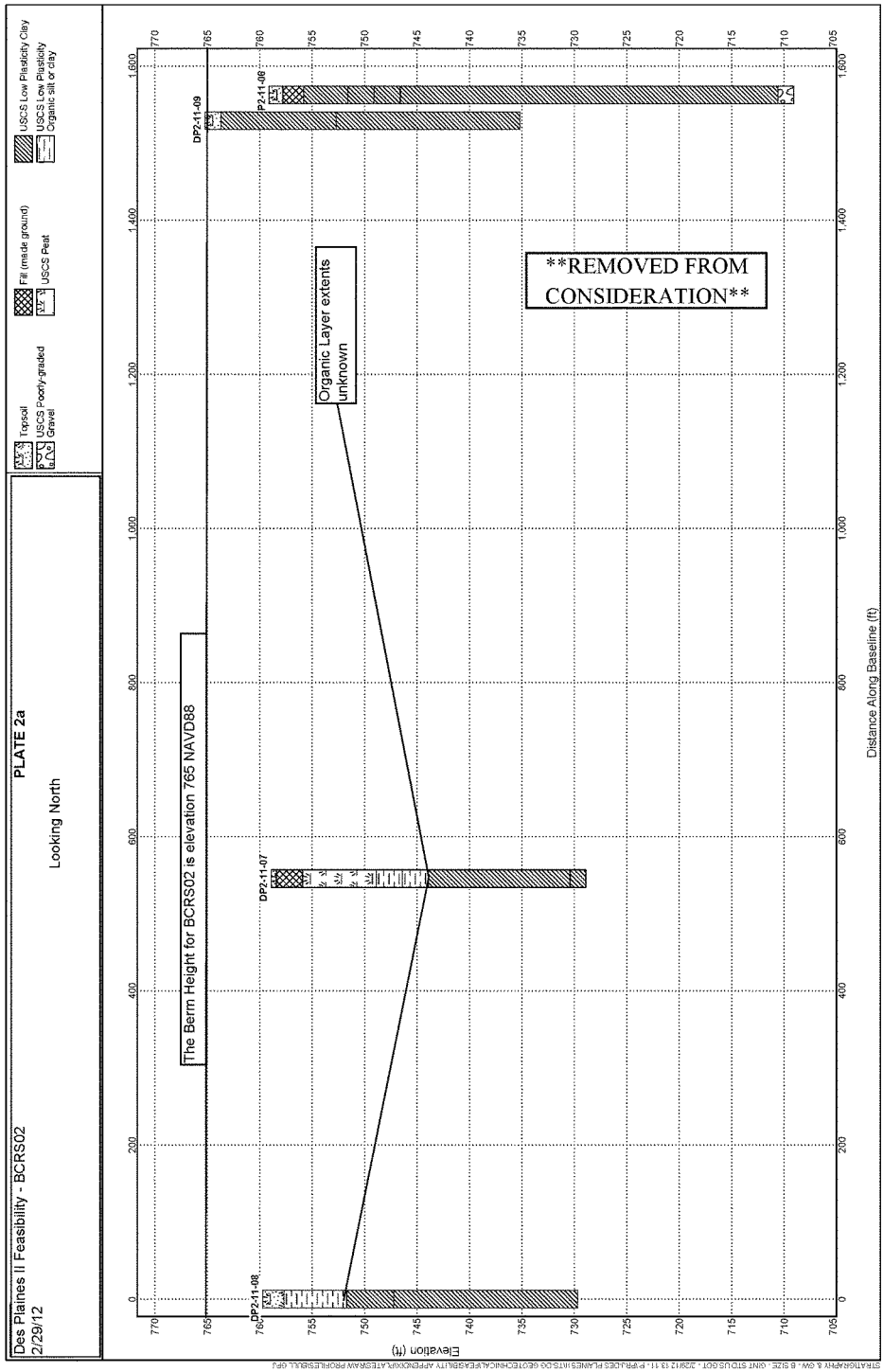
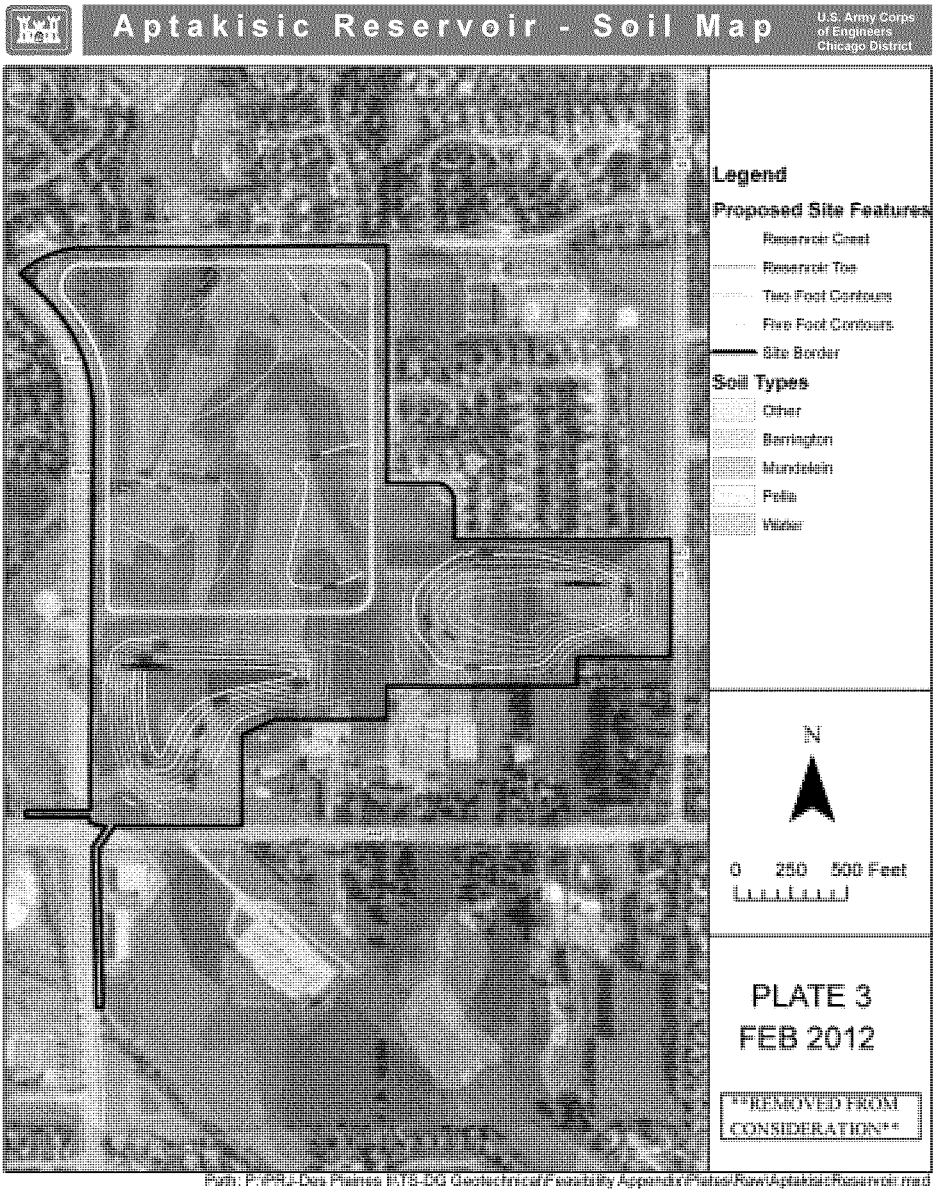
U.S. Army Corps of Engineers Chicago District
Bull Creek Reservoir - Soil Map
Legend
Soil Boring
AECOM/STRATA
ISWS+
Proposed Project
Berm Crest
Berm Toe
Site
Contours
Two Foot Interval
Ten Foot Interval
Soil Type
REMOVED FROM CONSIDERATION
Other
Houghton**
**Houghton is described as soils formed in herbaceous organic materials more than 130 cm (51 in) thick
+ISWS borings were completed by unknown drillers and accuracy of descriptions/depths cannot be verified
N
0 200 400 800 Feet
Plate 2
FEB 2012


Des Plaines II Feasibility - BCRS02
2/29/12
PLATE 2a
Looking North
Topsoil
USCS Poorly-graded Gravel
Fill (made ground)
USCS Peat
USCS Low Plasticity Clay
USCS Low Plasticity Organic silt or clay
The Berm Height for BCRS02 is elevation 765 NAVD88
Organic Layer extents unknown
REMOVED FROM CONSIDERATION
DP2-11-08
DP2-11-07
DP2-11-09
DP2-11-06
Elevation (ft)
Distance Along Baseline (ft)



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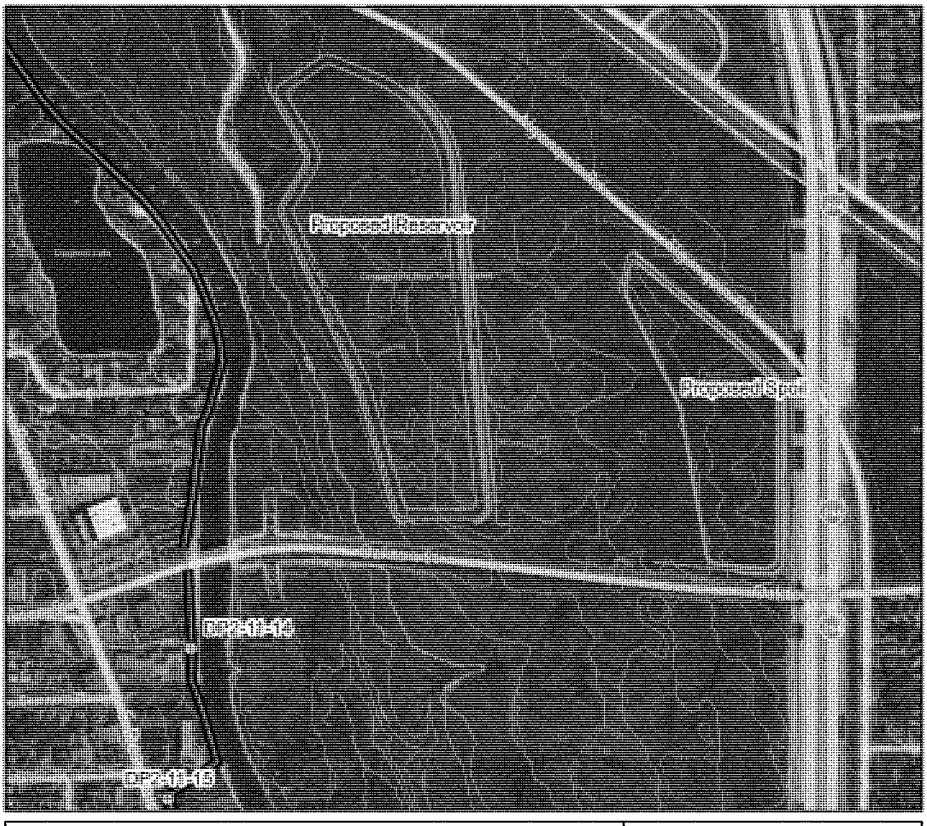
Campground Road Reservoir - Map

U.S. Army Corps of Engineers Chicago District



Legend

- Soil Borings

Proposed Reservoir

- Contours

Contour Lines

- 10 Foot Contour
- 2 Foot Contour

Proposed Levee/Floodwall

- Levee/Floodwall Toe
- Center Line

N

0 250 500 Feet

PLATE 4
FEB 2012

REMOVED FROM CONSIDERATION

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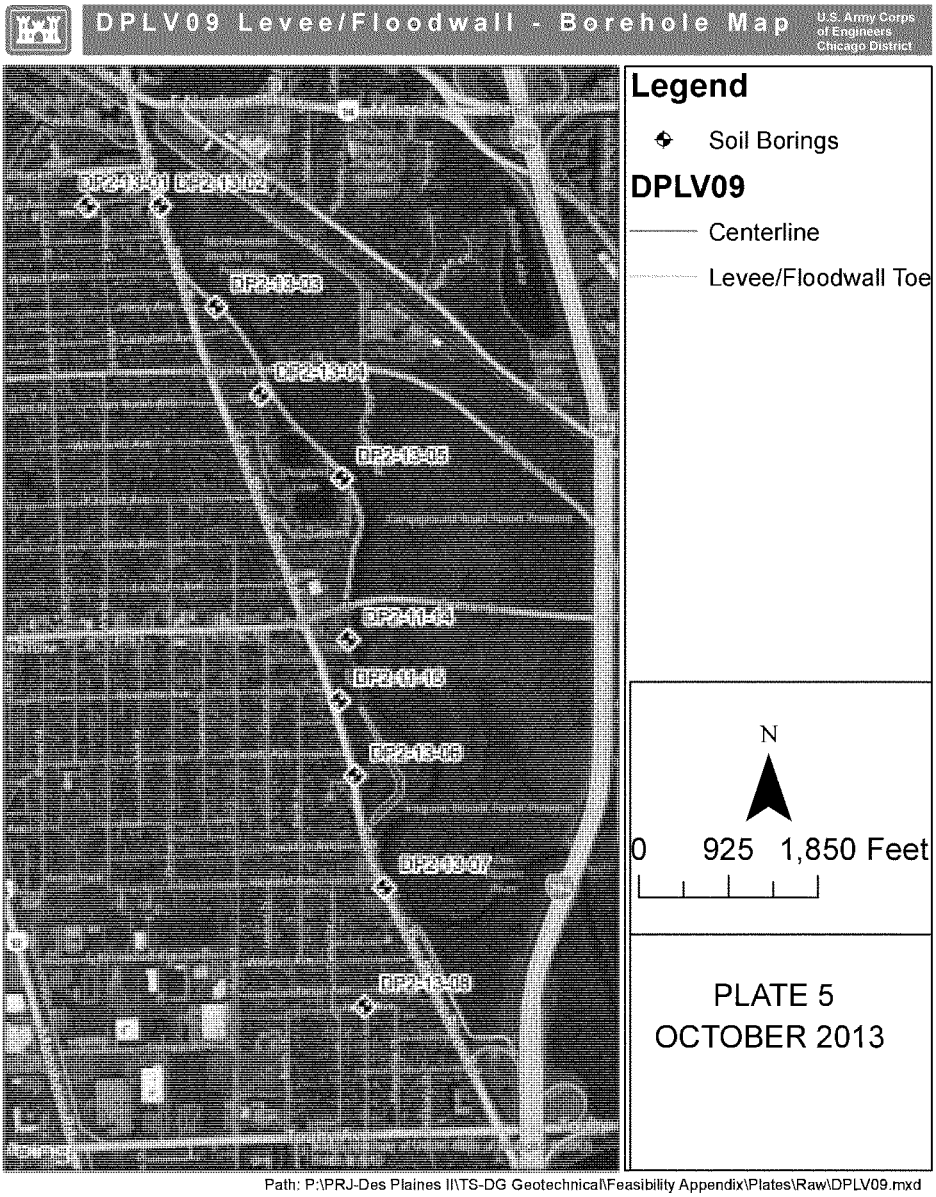

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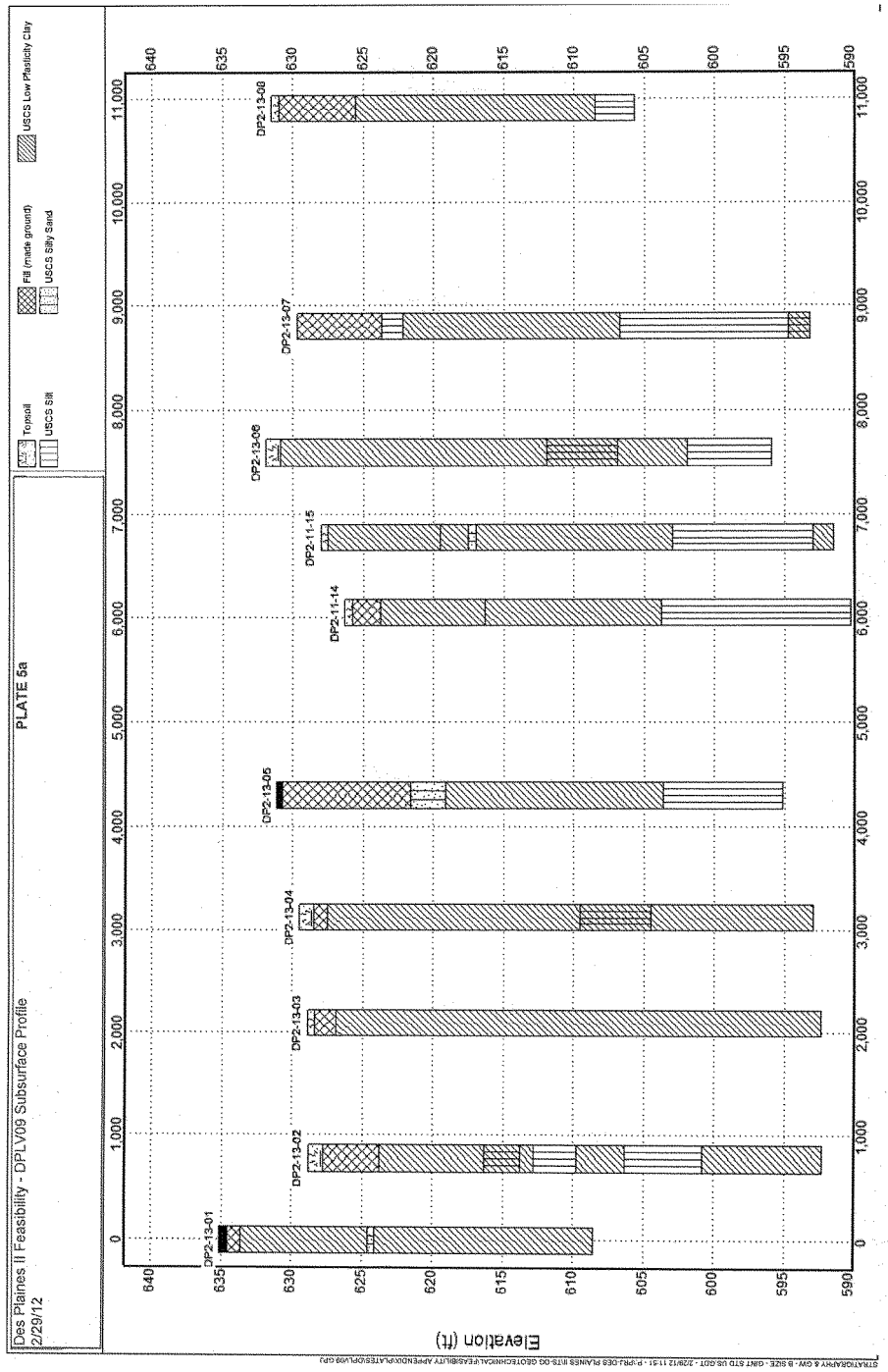
Des Plaines II Feasibility - DPLV09 Subsurface Profile
2/29/12
PLATE 5a
Topsoil
USCS Silt
Fill (made ground)
USCS Silty Sand
USCS Low Plasticity Clay
Elevation (ft)
Distance Along Baseline (ft)
DP2-13-01
DP2-13-02
DP2-13-03
DP2-13-04
DP2-13-05
DP2-11-14
DP2-11-15
DP2-13-06
DP2-13-07
DP2-13-08

Groveland Floodwall - Borehole Map

U.S. Army Corps of Engineers
Chicago District

Legend

Groveland Floodwall Boreholes

- PSI 1988 Borehole
- AECOM 2011 Borehole

Groveland Floodwall

- Proposed Road Raise
- Proposed Floodwall

Contour Lines

- Five Foot
- One Foot

N

0 55 110 220 Feet

PLATE 6
FEB 2012

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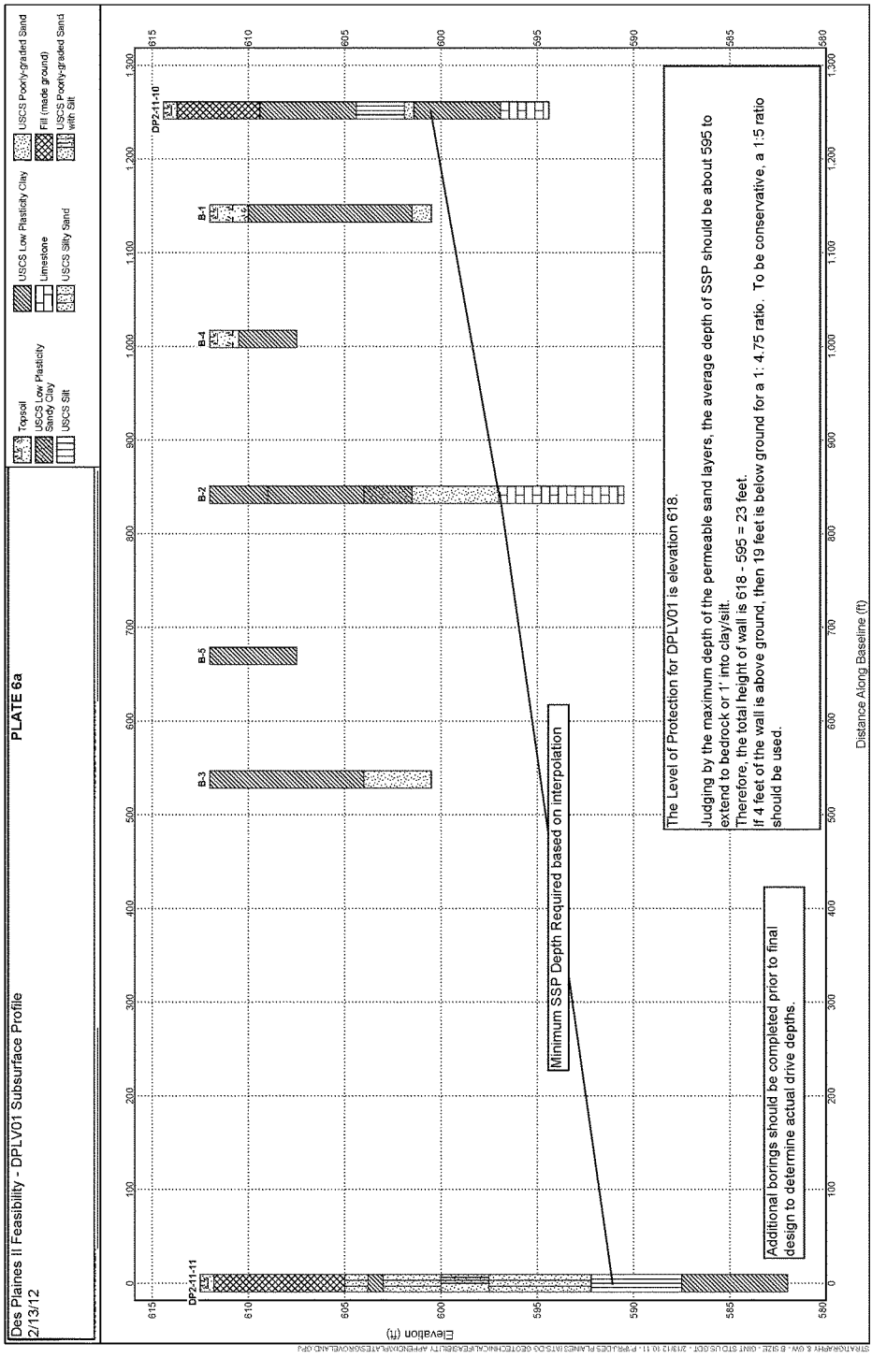
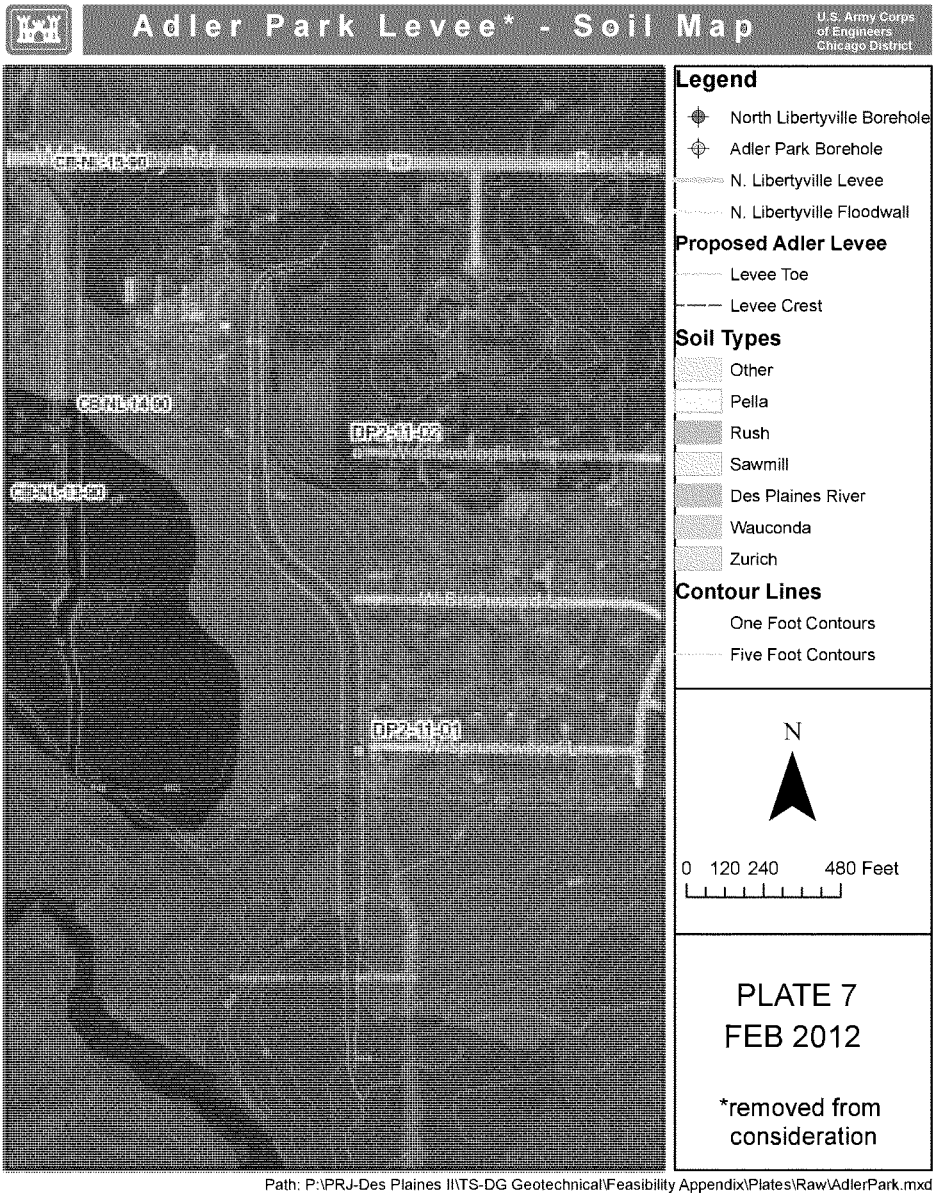

Des Plaines II Feasibility - DPLV01 Subsurface Profile
2/13/12
PLATE 6a
Topsoil
USCS Low Plasticity Sandy Clay
USCS Silt
USCS Low Plasticity Clay
Limestone
USCS Silty Sand
USCS Poorly-graded Sand
Fill (made ground)
USCS Poorly-graded Sand with Silt
DP2-11-11
DP2-11-10
B-1
B-2
B-3
B-4
B-5
Minimum SSP Depth Required based on interpolation
The Level of Protection for DPLV01 is elevation 618.
Judging by the maximum depth of the permeable sand layers, the average depth of SSP should be about 595 to extend to bedrock or 1' into clay/silt.
Therefore, the total height of wall is 618 - 595 = 23 feet.
If 4 feet of the wall is above ground, then 19 feet is below ground for a 1: 4.75 ratio. To be conservative, a 1:5 ratio should be used.
Additional borings should be completed prior to final design to determine actual drive depths.
Elevation (ft)
Distance Along Baseline (ft)



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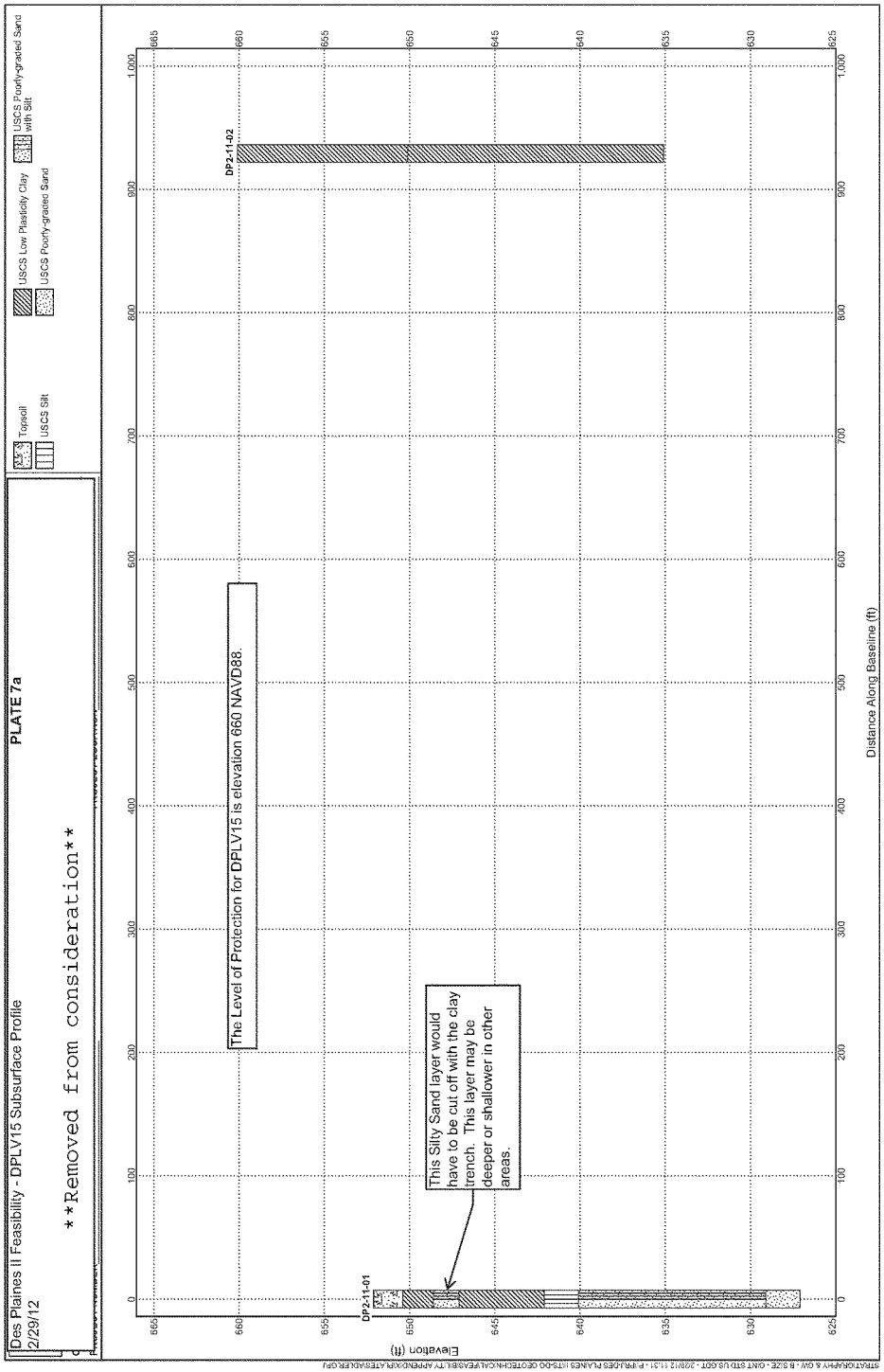
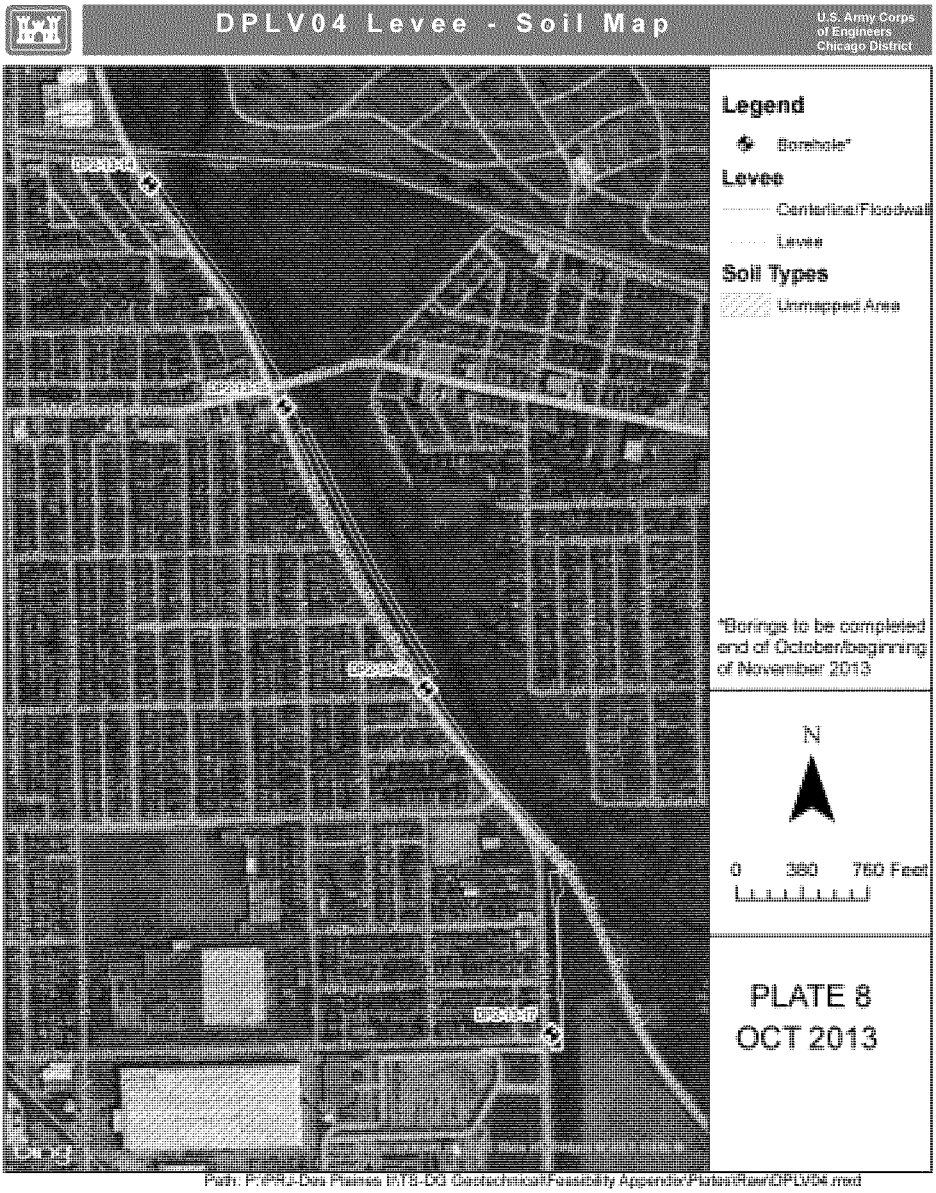

Des Plaines II Feasibility - DPLV15 Subsurface Profile
2/29/12
PLATE 7a
Removed from consideration
Topsoil
USCS Silt
USCS Low Plasticity Clay
USCS Poorly-graded Sand
USCS Poorly-graded Sand with Silt
DP2-11-01
DP2-11-02
The Level of Protection for DPLV15 is elevation 660 NAVD88.
This Silty Sand layer would have to be cut off with the clay trench. This layer may be deeper or shallower in other areas.
Elevation (ft)
Distance Along Baseline (ft)



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DPLV05 Levee - Soil Map
U.S. Army Corps
of Engineers
Chicago District
Legend
Borehole*
DPLV05
Levee
Floodwall
Soil Types
Unmapped Area
ISWS Well Log+
Bedrock Depth Only
With Soil Info
+ISWS borings were completed by unknown drillers and accuracy of descriptions/depths cannot be verified
*Borings to be completed end of October/beginning of November 2013
N
0 490 980 Feet
PLATE 9
OCT 2013

DPLV05-1

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

Stratigraphic Test	Top	Bottom
Silurian	70	
Maquoketa	238	
Galena	474	
St Peter	795	
Total Depth		816

Driller's Log filed
Neutron Log filed
Sonic Log filed
Density Log filed
Caliper Log filed
Temperature Survey filed

Core #C 9656 (70' - 816') Received: November 1, 1971

Image viewing help: New users please read this.

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GET IMAGE	Density Log
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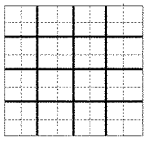
GET IMAGE	Miscellaneous document
GET IMAGE	Miscellaneous document

Permit Date: **Permit #:**

COMPANY Metro Sanitary Dist
FARM Dh-71-81
DATE DRILLED **NO.**
ELEVATION 620TM **COUNTY NO.** 01667
LOCATION NW SW NE
LATITUDE 41.947061 **LONGITUDE** -87.854999
COUNTY Cook **API** 120310166700 **22 - 40N - 12E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

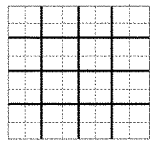
DPLV05-2

Water Well	Top	Bottom
Silurian	72	
Total Depth		255

Sample set # 57646 (70' - 255') Received: September 23, 1971

Permit Date: July 11, 1971 **Permit #:** 13443

COMPANY Knierin Paul
FARM Cook Co Forest Pres
DATE DRILLED July 1, 1971 **NO.**
ELEVATION 606GL **COUNTY NO.** 01312
LOCATION NE SW SE
LATITUDE 41.939931 **LONGITUDE** -87.852182
COUNTY Cook **API** 120310131200 **22 - 40N - 12E**



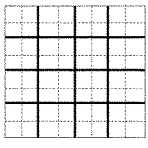
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

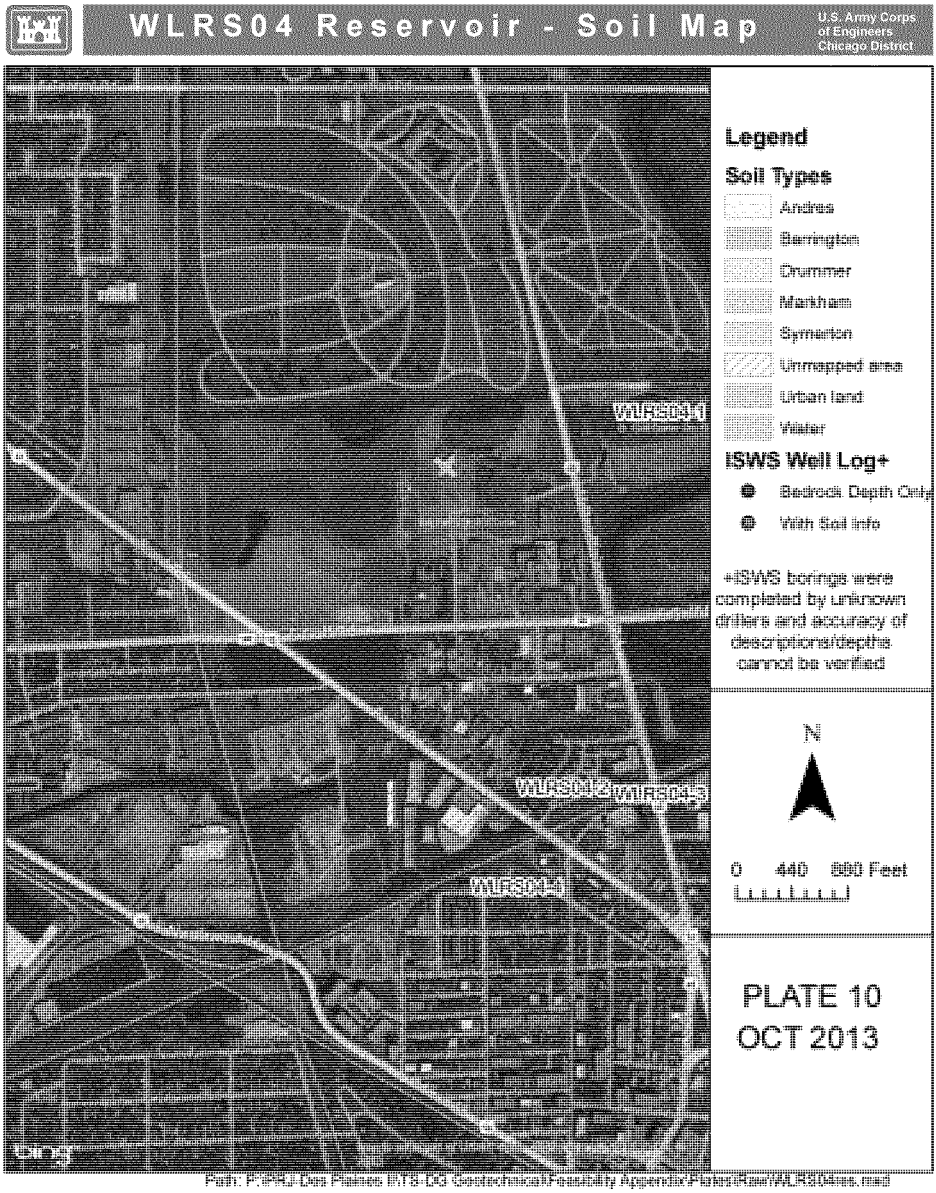
DPLV05-3

Engineering Test	Top	Bottom
Total Depth		284
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED December 1, 1975 **NO.**
ELEVATION 615GL **COUNTY NO.** 26728
LOCATION SW SE SE
LATITUDE 41.938202 **LONGITUDE** -87.849632
COUNTY Cook **API** 120312672800 **22 - 40N - 12E**





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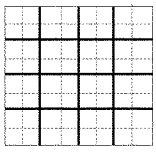
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

WLRS04-4

Water Well	Top	Bottom
Silurian	140	
Total Depth		450
Survey Sample Study filed		
Sample set # 2293 (100' - 350') Received: September 9, 1937		

Permit Date: **Permit #:**

COMPANY Hoetzer Theo
FARM Pesche
DATE DRILLED January 1, 1937 **NO.**
ELEVATION 637GL **COUNTY NO.** 01745
LOCATION 1100'N line, 800'E line of section
LATITUDE 42.050124 **LONGITUDE** -87.887682
COUNTY Cook **API** 120310174500 **17 - 41N - 12E**



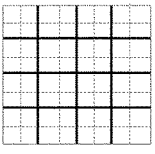
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

WLRS04-3

Water Well	Top	Bottom
Maquoketa	192	
Galena	398	
Total Depth		480
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Fischer James
FARM Rand Rd Property
DATE DRILLED May 1, 1971 **NO.** 1
ELEVATION 639TM **COUNTY NO.** 01335
LOCATION 400'N line, 250'E line of NW SW NE
LATITUDE 42.048273 **LONGITUDE** -87.89291
COUNTY Cook **API** 120310133500 **17 - 41N - 12E**



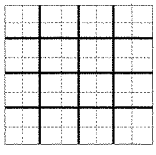
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

WLRS04-2

Water Well	Top	Bottom
Silurian	120	
Total Depth		174

Permit Date: Permit #:

COMPANY Shelton Brothers
FARM Stockton
DATE DRILLED NO.
ELEVATION 640GL COUNTY NO. 00149
LOCATION 1050'N line, 1600'E line of section
LATITUDE 42.050169 LONGITUDE -87.890639
COUNTY Cook API 120310014900 17 - 41N - 12E



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

WLRS04-1

Irrigation Well	Top	Bottom
brown clay	0	14
blue clay	14	69
sand & gravel	69	75
shale	75	607
brown limestone hard	607	666
brown limestone broken	666	716
Total Depth		**716**

Casing: 6" A53 STEEL T/C from 0' to 607'

Grout: BENTONITE from 0 to 607.

Water from limestone at 666' to 716'.
Static level 440' below casing top which is 1' above GL
Pumping level ' when pumping at 75 gpm for hours

Remarks: Driller's Estimated Well Yield 50-75 gpm

Additional location info: Lot: Subdivision: gamma log: dpgolf.aa0

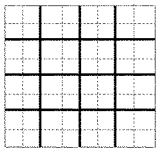
Address of well: 353 N. River Rd.
Des Plaines, IL

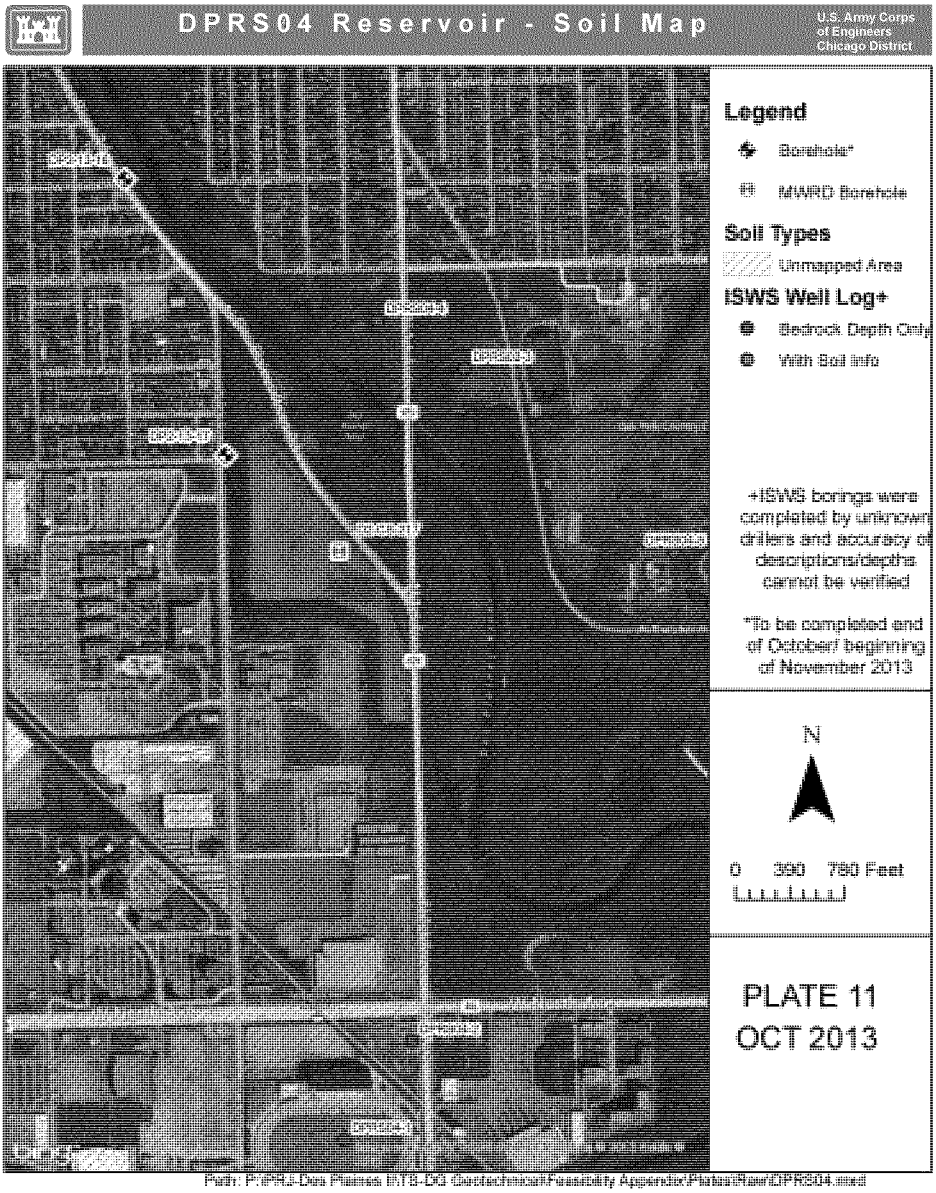
Location source: Global Positioning System verified Verified by: ADW on November 8, 2001.

Image viewing help: New users please read this.
GET IMAGE Natural Gamma Log

Permit Date: September 6, 2001 **Permit #:** 031-001

COMPANY Boysen, Henry Co.
FARM Des Plaines Park District
DATE DRILLED October 29, 2001 **NO.**
ELEVATION 634 **COUNTY NO.** 33655
LOCATION NW NE SE
LATITUDE 42.059013 **LONGITUDE** -87.887988
COUNTY Cook **API** 120313365500 **8 - 41N - 12E**





Path: P:\PRJ-Des Plaines II\TS-DG Geotechnical\Feasibility Appendix\Plates\Raw\DPRS04.mxd

Page 1

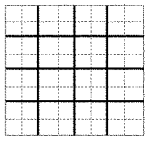
ILLINOIS STATE GEOLOGICAL SURVEY

DPRS04-5

Water Well	Top	Bottom
Silurian	62	
Maquoketa	281	
Galena	520	
St Peter	842	
Ironton	1302	
Eau Claire	1495	
Total Depth		1497
Driller's Log filed		
Sample set # 47149 (0' - 1495') Received: February 25, 1964		

Permit Date: **Permit #:**

COMPANY Layne Western Co., Inc.
FARM Oak Park Country Clu
DATE DRILLED November 1, 1963 **NO.** 3
ELEVATION 629TM **COUNTY NO.** 00380
LOCATION 2025'N line, 700'E line of section
LATITUDE 41.917543 **LONGITUDE** -87.82818
COUNTY Cook **API** 120310038000 **35 - 40N - 12E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPRS04-4

Water Well	Top	Bottom
Silurian	80	
Total Depth		**84**
Driller's Log filed		
Survey Sample Study filed		
Sample set # 1790 (60' - 83.6') Received: April 5, 1936		

Permit Date: **Permit #:**

COMPANY Snelton Brothers

FARM Park Ridge Camp

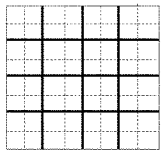
DATE DRILLED January 1, 1935 **NO.** 3

ELEVATION 626GL **COUNTY NO.** 03321

LOCATION 300'N line, 2400'W line of section

LATITUDE 41.922113 **LONGITUDE** -87.836486

COUNTY Cook **API** 120310332100 **35 - 40N - 12E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

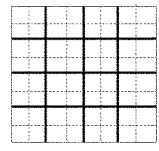
DPRS04-3

Water Well	Top	Bottom
Silurian	68	
Total Depth		134

Driller's Log filed

Permit Date: Permit #:

COMPANY Water Well Engineer
FARM Forest Preserve Dist
DATE DRILLED January 1, 1964 NO.
ELEVATION 625GL COUNTY NO. 03319
LOCATION 500'N line, 2200'E line of section
LATITUDE 41.921619 LONGITUDE -87.833826
COUNTY Cook API 120310331900 35 - 40N - 12E



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPRS04-2

Water Well	Top	Bottom
Silurian	60	
Maquoketa	302	
Total Depth		307

Driller's Log filed

Sample set # 25648 (75' - 310') Received: August 1, 1955

Permit Date: **Permit #:**

COMPANY Layne Western Co., Inc.

FARM Raytheon Mfg Co

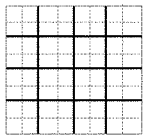
DATE DRILLED July 1, 1955 **NO.** 1

ELEVATION 628GL **COUNTY NO.** 00004

LOCATION 0'S 0'E NW/c NW NE

LATITUDE 41.908334 **LONGITUDE** -87.835248

COUNTY Cook **API** 120310000400 **2 - 39N - 12E**



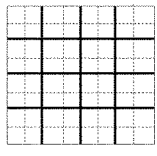
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPRS04-1

Engineering Test	Top	Bottom
Silurian	40	
Maquoketa	245	
Galena	499	
Total Depth		44
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation
FARM Pumphouse
DATE DRILLED December 1, 1960 **NO.** Ps-1
ELEVATION 629TM **COUNTY NO.** 02763
LOCATION NE NW
LATITUDE 41.906435 **LONGITUDE** -87.837648
COUNTY Cook **API** 120310276300 **2 - 39N - 12E**



NOTES AND LEGEND

FORMATION: Based on N.B.Willman, 1971

CASING: Indicates casing left in place.

ROCK CONDITION: w = weathered
x = broken or fragmented
s = susceptible to sloking
s = shale partings susceptible to sloking

JOINTING: J = Stratigraphic position of joint with dip in degrees with reference to horizontal. F = fault position. f = fill material with sh for shale, cl for clay, py for pyrite, Ca for calcite, Fe for iron stain, sl for slickensides. Fill thickness in 10^{-2} feet

BEDDING: Horizontal except as noted.
th = thick-bedded (>2')
t = thin-bedded (2' to 2")
vt = very thin or laminated (<2")

CORE RECOVERY: % core recovered per run.

ROCK QUALITY DESIGNATION (RQD): Indicates ratio of total length of core pieces 4" or longer vs length of total length of drilling run. Mechanical breaks are considered as unbroken core.

WATER PRESSURE TEST: Conducted over the stratigraphic intervals shown. Water loss in gpm (net pressure in psi.)

7/1/75 = Groundwater level and date observed.

UNCONFINED COMPRESSIVE STRENGTH: Ultimate strength in psi.

MODULUS OF ELASTICITY, POISSON'S RATIO:
E_t = Young's modulus (static) 10^6 psi
E_d = Young's modulus (dynamic) 10^6 psi
u_t = Poisson's ratio (static)
u_d = Poisson's ratio (dynamic)

MISCELLANEOUS TESTS:
A = abrasion (percent of wear)
K_v = permeability, vertical (cm/sec.)
K_h = permeability, horizontal (cm/sec.)
wc = moisture content (percent)
n = porosity (percent)
G_s = specific gravity
T = split cylinder strength (psi)
γ = in-place unit weight (pcf)

Elevations and Locations were surveyed and furnished by DENI ASSOCIATES

Title Sheet Prepared By Robert W. Retzler, Clifford A. Kupfer & Associates, Inc.

DESCRIPTION

BOREHOLE NUMBER D2-CS-217
Coordinates: N 2,121,888.88 Angle
E 534,998.98 Bearing
Location RIVER ROAD & IGP AVE
Ground Elevation (CCD) 43.52

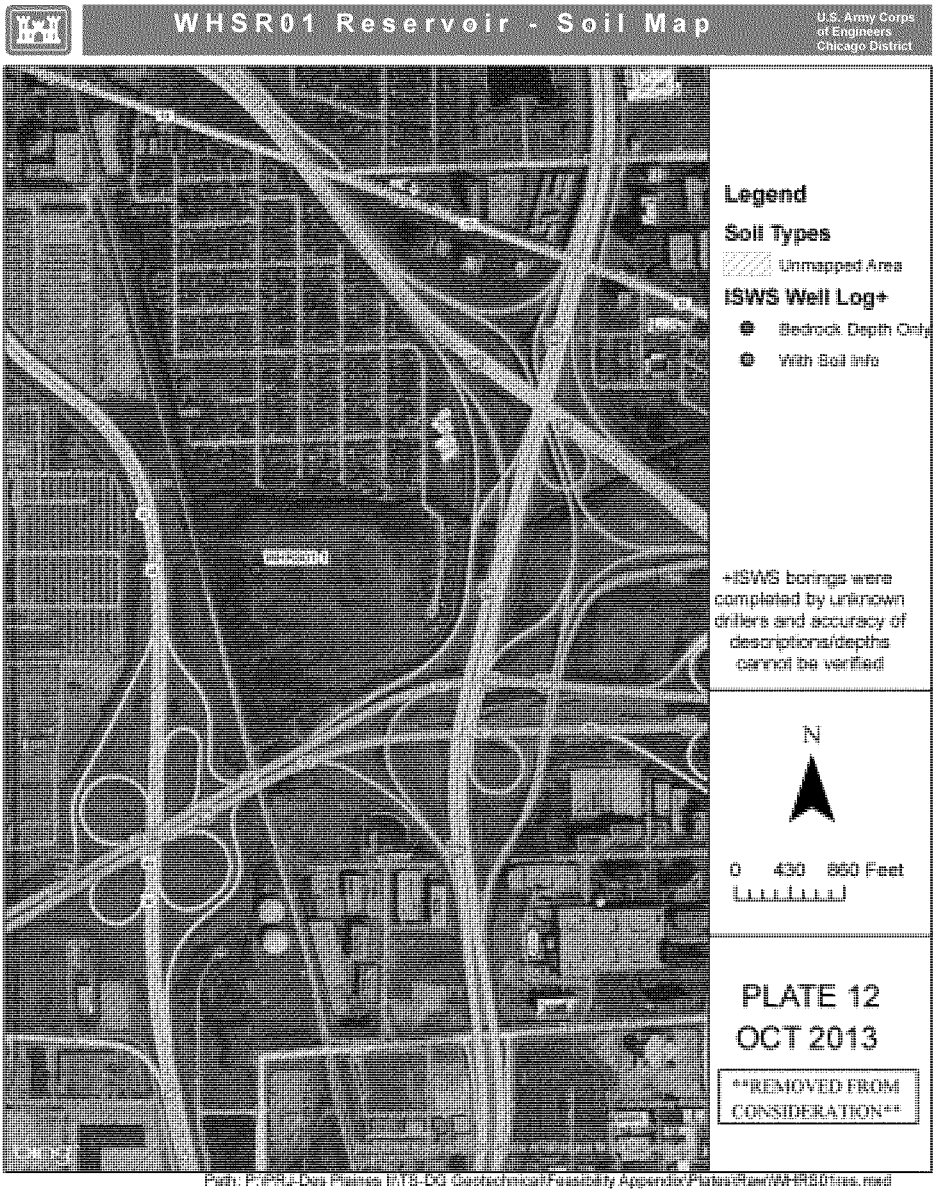
DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	CASING	DESCRIPTION	ROCK CONDITION	JOINTING	BEDDING	CORE RECOVERY	ROCK QUALITY DESIGNATION	WATER LEVEL	PRESSURE TESTS, GPM, (PSI)	PERMEABILITY CM/SEC.	UNCONFINED COMPRESSIVE STRENGTH
0						OVERBURDEN - SEE SHEET 1 OF 2									
36.0'															
60	SILURIAN	NIAGARAN	RACINE			DOLOMITE - PHYSICAL CONDITION: MODERATELY TO INTENSELY FRACTURED, MAXIMUM 0.5', MINIMUM 0.05', MOSTLY 0.4', MODERATELY HARD, MODERATELY STRONG. LITHOLOGY: LIGHT GRAY, FINE TO MEDIUM GRAIN, SCATTERED CHERT NODULES, SCATTERED VUGS, JOINTS CLAY COATED.	x	J90°		60	0				
								J90°		95	50				
										100	60				
								J90°		100	85				
76.0'															
80															
100															
120															
140															
160															
180															
200															
220															
240															
260															
280															
300															
320															
340															
360															
380															
400															
420															
440															
460															
480															
500															

429

CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D2-CS-217
DATE: 11-28-75
SHEET 2 OF 2

SHEET NO. B-4

NOTES AND LEGEND
FORMATION: Based on H.B. Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67
DESCRIPTION
HOLE NUMBER D2-CS-217
Coordinates: N. 1512204.05 Angle:
E. 1335036.90 Bearing:
Location RIVER ROAD & 1st AVE.
Ground Elevation (CCD) 43.62
DEPTH IN FEET
FORMATION
SERIES OR GROUP
SYSTEM
QUATERNARY
RECENT & PLEISTOCENE
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
TOPSOIL- BROWN ORGANIC SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.
4.0'
GRAY-BROWN SILTY CLAY, LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL.
8.5'
GRAY-BROWN CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.
11.0'
GRAY FINE TO COARSE SAND AND SILTY CLAY, LITTLE FINE GRAVEL.
15.0'
GRAY CLAYEY SILT, TRACE MEDIUM TO FINE SAND, TRACE FINE GRAVEL.
20.0'
GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.
30.0'
GRAY CLAYEY SILT, LITTLE COARSE TO FINE SAND, TRACE MEDIUM TO FINE GRAVEL.
55.0'
GRAY FINE TO MEDIUM GRAVEL, TRACE COARSE TO FINE SAND
56.0'
ROCK - SEE SHEET 2 OF 2
BLOWS PER FOOT - N
TYPE OF SAMPLE
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE - %
GRAVEL
SAND
SILT
CLAY
DENSITY - LBS./FT³
MOISTURE CONTENT - %
This Sheet Prepared By Woodward-Clyde-Sherard & Associates, Inc.
CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D2-CS-217
DATE: 12-3-75
SHEET 1 OF 2
SHEET NO. B-3
428


WHSR01 Reservoir - Soil Map
U.S. Army Corps of Engineers Chicago District
Legend
Soil Types
Unmapped Area
ISWS Well Log+
Bedrock Depth Only
With Soil Info
+ISWS borings were completed by unknown drillers and accuracy of descriptions/depths cannot be verified
N
0 430 860 Feet
PLATE 12
OCT 2013
REMOVED FROM CONSIDERATION
Path: P:\PRJ-Des Plaines II\TB-DG Geotechnical\Feasibility Appendix\Plates\Raw\WHRS01res.mxd

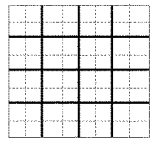
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

WHRS01-1
REMOVED FROM CONSIDERATION

Water Well	Top	Bottom
Silurian	66	
Total Depth		113
Driller's Log filed		

Permit Date: **Permit #:**

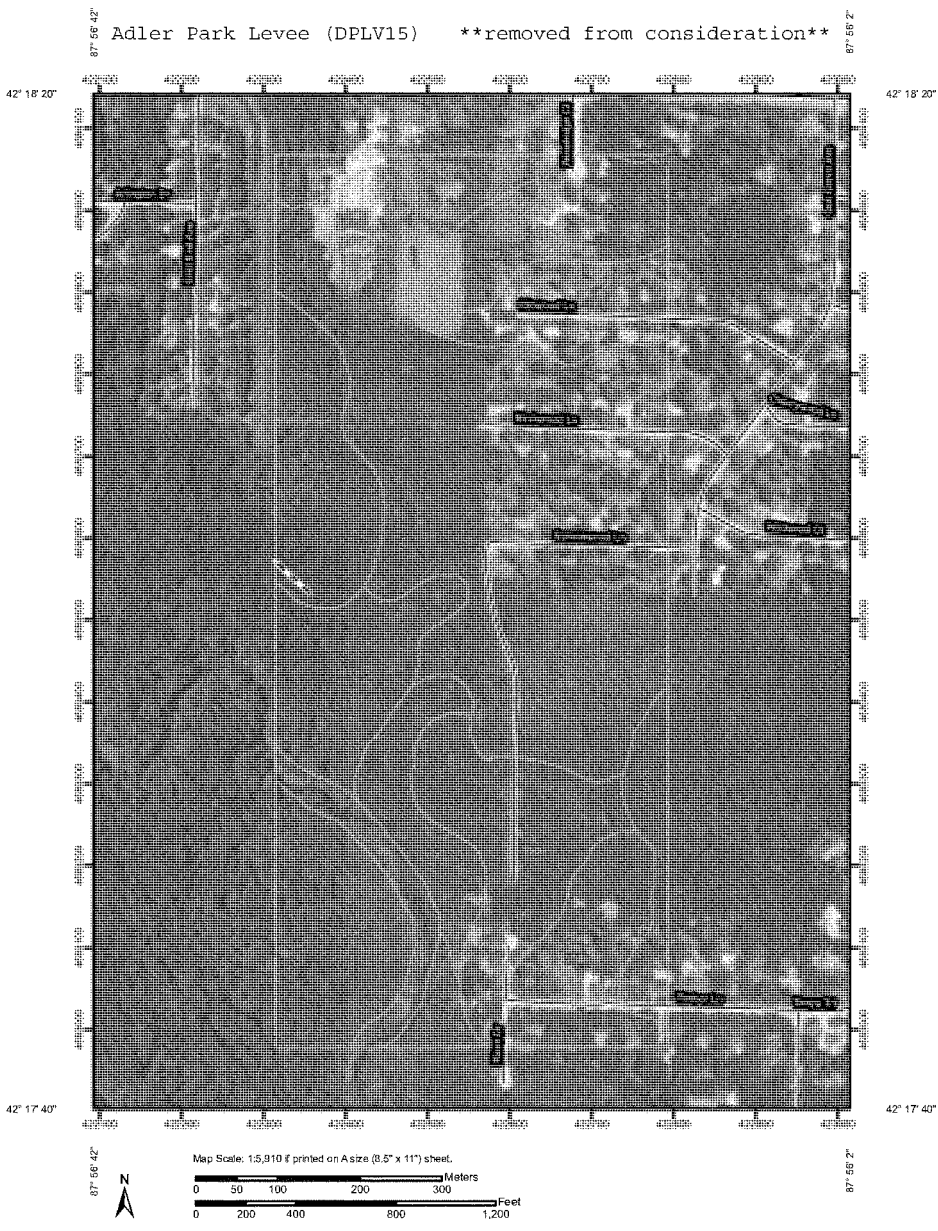
COMPANY Pilgard, Peter & Son
FARM Dorn Francis
DATE DRILLED January 1, 1940 **NO.**
ELEVATION 635GL **COUNTY NO.** 03243
LOCATION
LATITUDE 41.987539 **LONGITUDE** -87.876217
COUNTY Cook **API** 120310324300 **4 - 40N - 12E**



APPENDIX G – GEOTECHNICAL DESIGN

Attachment 1 – USGS Soil Maps

Soil Map—Lake County, Illinois



Adler Park Levee (DPLV15) **removed from consideration**

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:5,910 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County, Illinois
Survey Area Data: Version 5, Feb 12, 2010

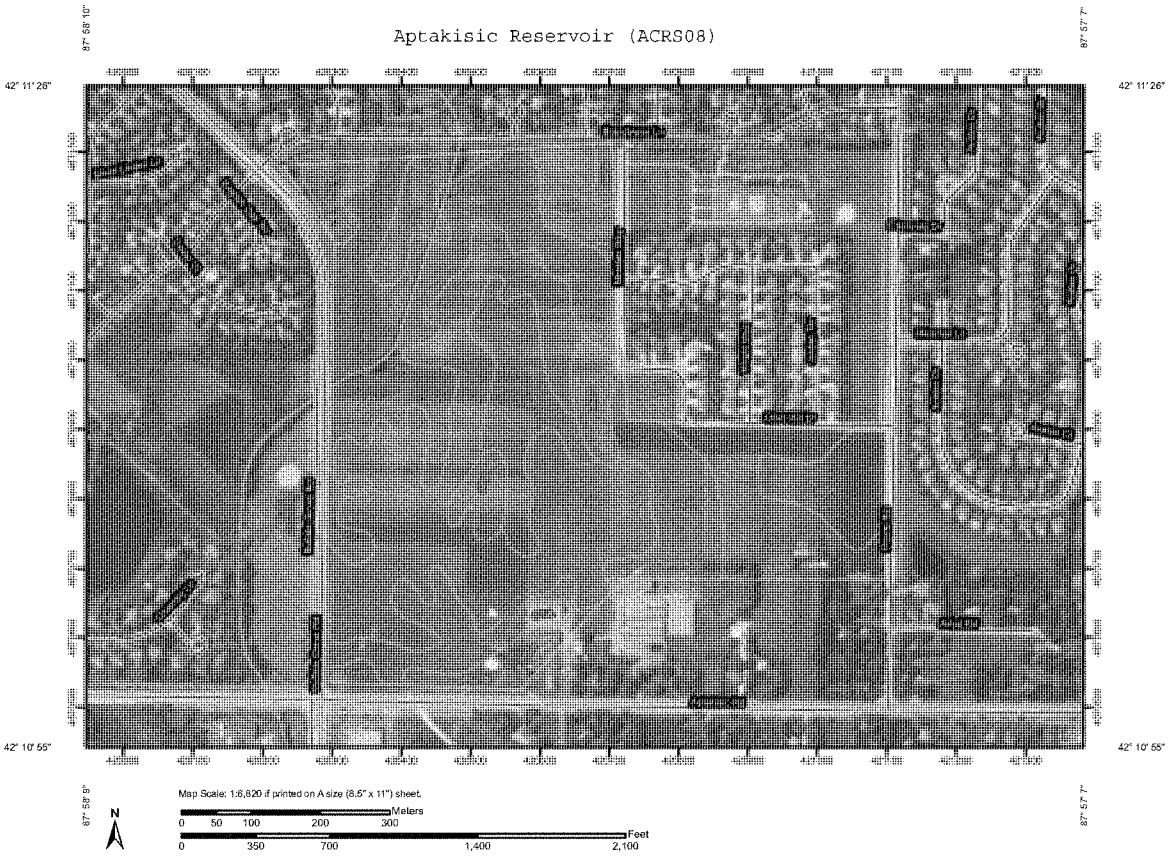
Date(s) aerial images were photographed: 7/31/2007; 7/7/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Adler Park Levee (DPLV15) **removed from consideration**

Map Unit Legend

Lake County, Illinois (IL097)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
153A	Pella silty clay loam, 0 to 2 percent slopes	47.6	36.9%
228B	Nappanee silt loam, 2 to 4 percent slopes	8.0	6.2%
465A	Montgomery silty clay loam, 0 to 2 percent slopes	0.0	0.0%
696B	Zurich silt loam, 2 to 4 percent slopes	14.9	11.5%
696C2	Zurich silt loam, 4 to 6 percent slopes, eroded	5.6	4.3%
791A	Rush silt loam, 0 to 2 percent slopes	9.0	7.0%
981A	Wauconda and Frankfort silt loams, 0 to 2 percent slopes	11.5	8.9%
982A	Aptakisic and Nappanee silt loams, 0 to 2 percent slopes	3.7	2.9%
983B	Zurich and Nappanee silt loams, 2 to 4 percent slopes	4.8	3.7%
1107A	Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	20.4	15.8%
W	Water	3.6	2.8%
Totals for Area of Interest		**129.0**	**100.0%**


Aptakisic Reservoir (ACRS08)
87° 58' 10"
87° 57' 7"
42° 11' 26"
42° 10' 55"
Map Scale: 1:6,820 if printed on A size (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 350 700 1,400 2,100

Aptakisic Reservoir (ACRS08)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,820 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County, Illinois
Survey Area Data: Version 5, Feb 12, 2010

Date(s) aerial images were photographed: 7/31/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Aptakisic Reservoir (ACRS08)

Map Unit Legend

Lake County, Illinois (IL097)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
153A	Pella silty clay loam, 0 to 2 percent slopes	38.3	38.7%
442A	Mundelein silt loam, 0 to 2 percent slopes	44.8	45.3%
443A	Barrington silt loam, 0 to 2 percent slopes	9.7	9.8%
443B	Barrington silt loam, 2 to 4 percent slopes	6.2	6.2%
Totals for Area of Interest		**99.1**	**100.0%**

Soil Map—Lake County, Illinois

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:5,670 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County, Illinois
Survey Area Data: Version 5, Feb 12, 2010

Date(s) aerial images were photographed: 7/31/2007

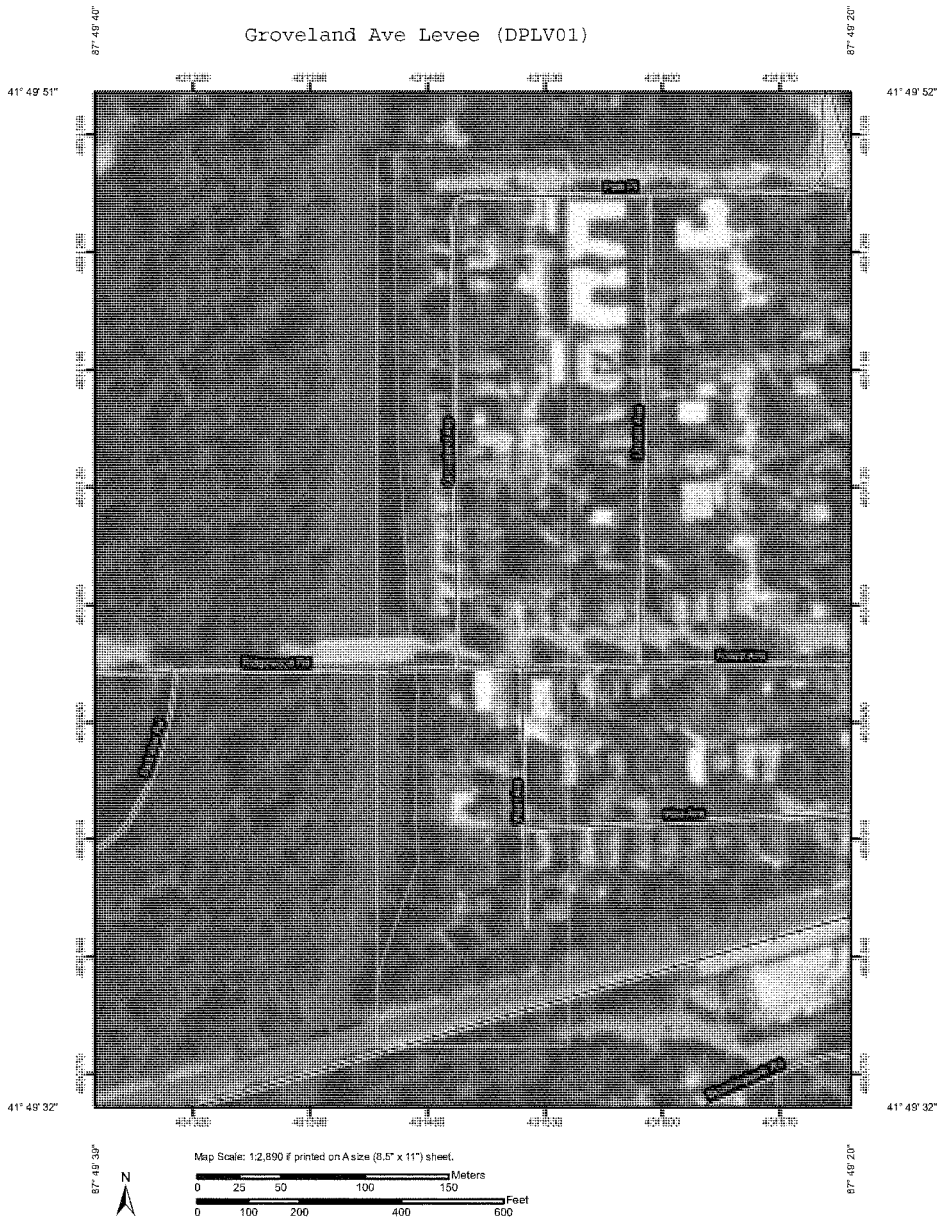
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Bull Creek Reservoir (BCRS02)

Map Unit Legend

Lake County, Illinois (IL097)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
103A	Houghton muck, 0 to 2 percent slopes	13.6	10.8%
146B	Elliott silt loam, 2 to 4 percent slopes	6.5	5.1%
223B	Varna silt loam, 2 to 4 percent slopes	2.0	1.6%
223C2	Varna silt loam, 4 to 6 percent slopes, eroded	2.4	1.9%
232A	Ashkum silty clay loam, 0 to 2 percent slopes	8.1	6.5%
298B	Beecher silt loam, 2 to 4 percent slopes	0.7	0.5%
330A	Peotone silty clay loam, 0 to 2 percent slopes	23.3	18.6%
531B	Markham silt loam, 2 to 4 percent slopes	4.1	3.2%
531D2	Markham silt loam, 6 to 12 percent slopes, eroded	0.2	0.2%
984B	Barrington and Varna silt loams, 2 to 4 percent slopes	0.8	0.7%
989A	Mundelein and Elliott silt loams, 0 to 2 percent slopes	0.1	0.1%
989B	Mundelein and Elliott silt loams, 2 to 4 percent slopes	10.9	8.7%
1103A	Houghton muck, undrained, 0 to 2 percent slopes	52.6	42.0%
Totals for Area of Interest		**125.3**	**100.0%**

Soil Map—Cook County, Illinois



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:2,890 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Groveland Ave Levee (DPLV01)

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2822B	Alfic Udarents, clayey-Urban land-Elliott complex, 2 to 4 percent slopes	13.1	87.4%
W	Water	1.9	12.5%
Totals for Area of Interest		**15.0**	**100.0%**

Soil Map—Cook County, Illinois

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:17,400 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

DPLV09 Levee/Floodwall
80

DPLV09 Levee/Floodwall

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
69A	Milford silty clay loam, 0 to 2 percent slopes	3.4	1.1%
192A	Del Rey silt loam, 0 to 2 percent slopes	3.8	1.2%
290B	Warsaw silt loam, 2 to 4 percent slopes	7.7	2.4%
327B	Fox silt loam, 2 to 4 percent slopes	2.6	0.8%
370B	Saylesville silt loam, 2 to 4 percent slopes	11.1	3.6%
533	Urban land	41.0	13.1%
802B	Orthents, loamy, undulating	6.7	2.1%
805D	Orthents, clayey, rolling	1.1	0.4%
811A	Alfic Udarents, clayey, 0 to 2 percent slopes	0.6	0.2%
811B	Alfic Udarents, clayey, 2 to 6 percent slopes	2.6	0.8%
1107A	Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	30.9	9.9%
2571A	Orthents, loamy-Urban land-Whitaker complex, 0 to 2 percent slopes	1.2	0.4%
2811A	Urban land-Alfic Udarents, clayey, complex, 0 to 2 percent slopes	142.9	45.6%
2822B	Alfic Udarents, clayey-Urban land-Elliott complex, 2 to 4 percent slopes	12.2	3.9%
3107A	Sawmill silty clay loam, 0 to 2 percent slopes, frequently flooded	3.2	1.0%
3451A	Lawson silt loam, 0 to 2 percent slopes, frequently flooded	8.0	2.5%
W	Water	34.4	11.0%
Totals for Area of Interest		**313.3**	**100.0%**

Soil Map—Cook County, Illinois

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:5,500 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

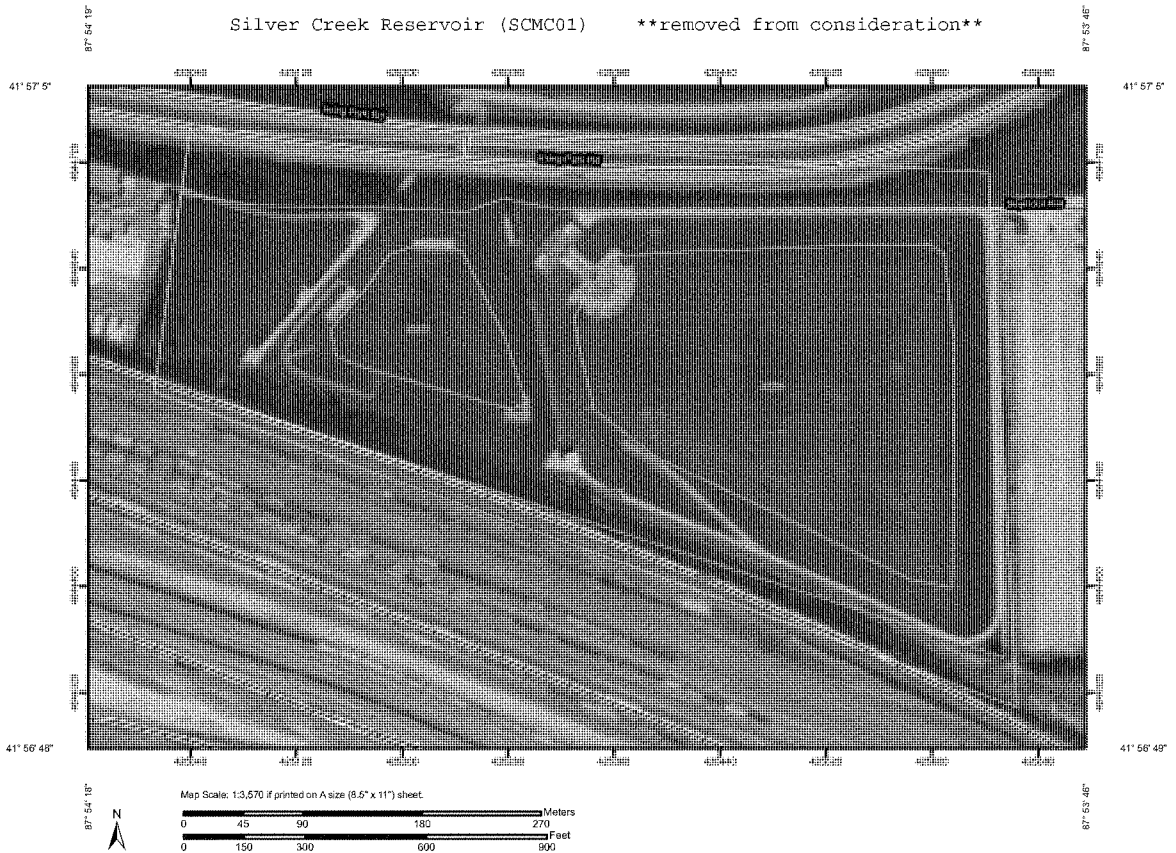
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Campground Road Reservoir (DPRS15)

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
153A	Pella silty clay loam, 0 to 2 percent slopes	8.9	9.6%
327A	Fox silt loam, 0 to 2 percent slopes	31.6	33.9%
327B	Fox silt loam, 2 to 4 percent slopes	35.7	38.3%
571A	Whitaker loam, 0 to 2 percent slopes	13.0	14.0%
805D	Orthents, clayey, rolling	0.5	0.6%
1107A	Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	2.9	3.1%
2811A	Urban land-Alfic Udarents, clayey, complex, 0 to 2 percent slopes	0.4	0.5%
W	Water	0.1	0.1%
Totals for Area of Interest		**93.2**	**100.0%**

Silver Creek Reservoir (SCMC01) **removed from consideration**



Silver Creek Reservoir (SCMC01) **removed from consideration**

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:3,570 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Silver Creek Reservoir (SCMC01) **removed from consideration**

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
522B	Orthents, clayey, refuse substratum, undulating	13.4	28.5%
522F	Orthents, clayey, refuse substratum, steep	20.1	43.0%
533	Urban land	4.1	8.7%
805A	Orthents, clayey, nearly level	6.5	13.9%
805D	Orthents, clayey, rolling	2.8	5.9%
Totals for Area of Interest		**46.8**	**100.0%**

Soil Map—Cook County, Illinois

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:1,270 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Lake Mary Anne Pump Station (FPCI01)

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
91A	Swygert silty clay loam, 0 to 2 percent slopes	0.7	9.0%
343A	Kane silt loam, 0 to 2 percent slopes	2.3	31.3%
802B	Orthents, loamy, undulating	0.1	0.8%
811B	Alfic Udarents, clayey, 2 to 6 percent slopes	3.3	44.0%
W	Water	1.1	14.9%
Totals for Area of Interest		**7.5**	**100.0%**

Soil Map—Cook County, Illinois

DPLV04 Levee/Floodwall

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:8,970 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

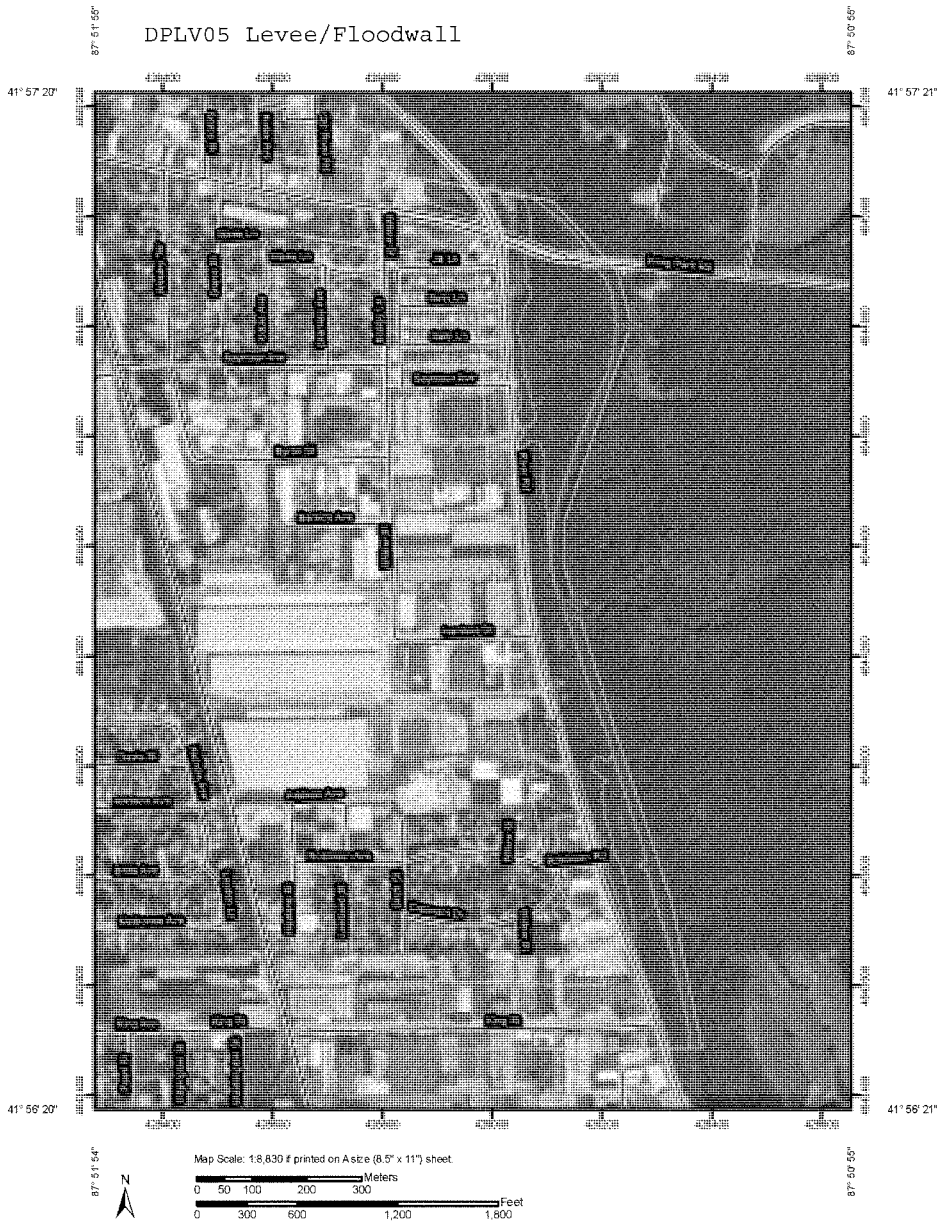
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

DPLV04 Levee/Floodwall

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
293A	Andres silt loam, 0 to 2 percent slopes	4.4	7.1%
294B	Symerton silt loam, 2 to 5 percent slopes	1.4	2.3%
530D	Ozaukee silt loam, 6 to 12 percent slopes	7.4	12.1%
533	Urban land	12.6	20.6%
534A	Urban land-Orthents, clayey, complex, nearly level	23.6	38.5%
696B	Zurich silt loam, 2 to 4 percent slopes	0.2	0.4%
805A	Orthents, clayey, nearly level	1.5	2.4%
805D	Orthents, clayey, rolling	1.4	2.2%
1107A	Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	3.1	5.1%
2811A	Urban land-Alfic Udarents, clayey, complex, 0 to 2 percent slopes	1.1	1.7%
W	Water	4.6	7.5%
Totals for Area of Interest		**61.2**	**100.0%**

Soil Map—Cook County, Illinois



DPLV05 Levee/Floodwall

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:8,830 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Date(s) aerial images were photographed: 7/7/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

DPLV05 Levee/Floodwall

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
290B	Warsaw silt loam, 2 to 4 percent slopes	13.1	13.8%
533	Urban land	45.2	47.6%
534A	Urban land-Orthents, clayey, complex, nearly level	0.2	0.2%
811A	Alfic Udarents, clayey, 0 to 2 percent slopes	1.5	1.6%
1107A	Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	21.4	22.6%
2811A	Urban land-Alfic Udarents, clayey, complex, 0 to 2 percent slopes	5.4	5.7%
W	Water	8.0	8.5%
Totals for Area of Interest		**94.9**	**100.0%**

DPRS04 Reservoir

Soil Map—Cook County, Illinois

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

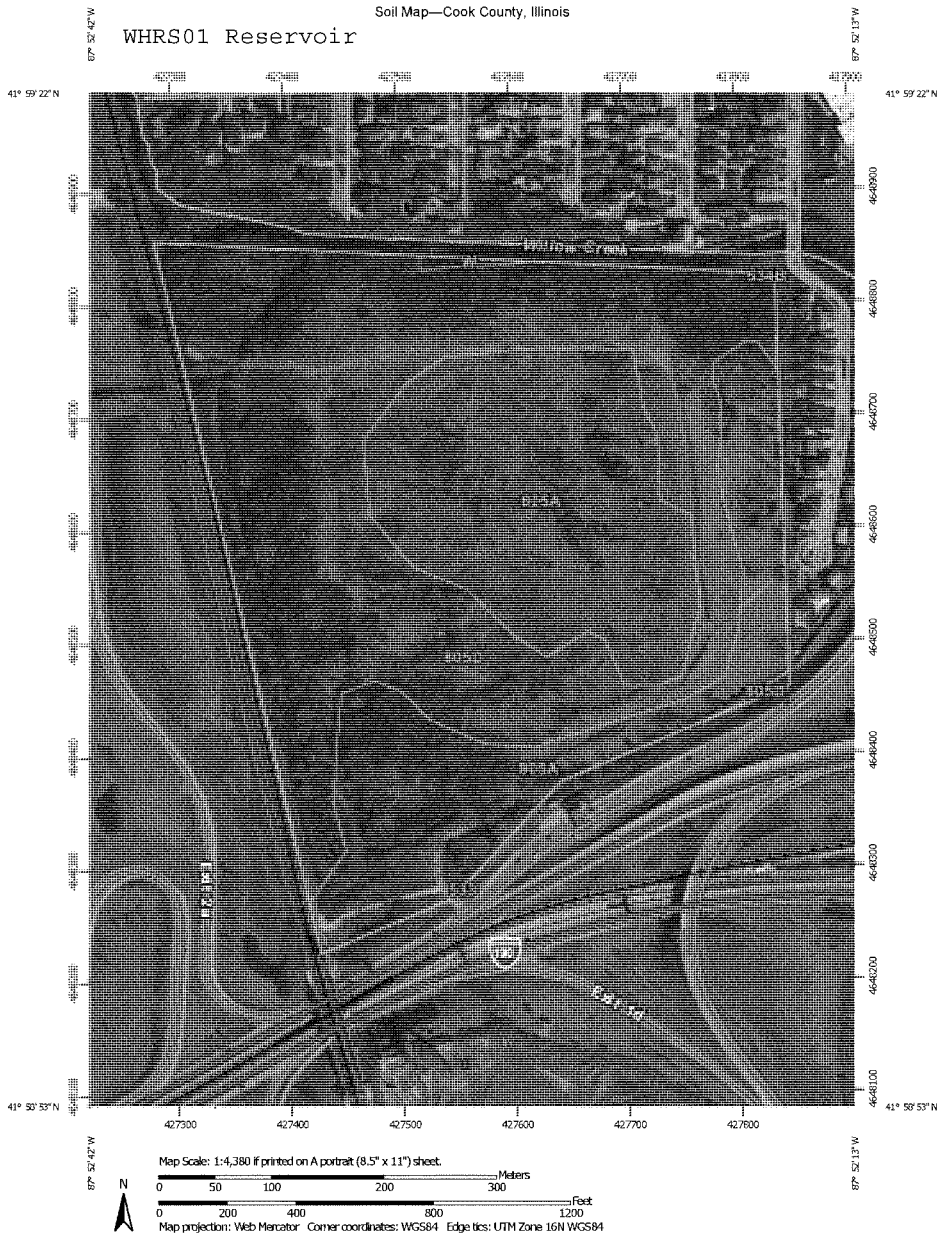
Date(s) aerial images were photographed: Apr 29, 2011—Mar 28, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

DPRS04 Reservoir

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
293A	Andres silt loam, 0 to 2 percent slopes	3.7	8.5%
294B	Symerton silt loam, 2 to 5 percent slopes	0.5	1.1%
533	Urban land	24.4	56.0%
534A	Urban land-Orthents, clayey, complex, nearly level	1.5	3.5%
805A	Orthents, clayey, nearly level	10.0	22.9%
805B	Orthents, clayey, undulating	3.1	7.2%
805D	Orthents, clayey, rolling	0.3	0.7%
Totals for Area of Interest		**43.6**	**100.0%**


Soil Map—Cook County, Illinois
WHRS01 Reservoir
87° 52' 42" W
87° 52' 13" W
41° 59' 22" N
41° 58' 53" N
427300
427400
427500
427600
427700
427800
Map Scale: 1:4,380 if printed on A portrait (8.5" x 11") sheet.
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84
USDA
Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
10/16/2013
Page 1 of 3

WHRS01 Reservoir

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 29, 2011—Mar 28, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

WHRS01 Reservoir

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
533	Urban land	0.0	0.0%
534B	Urban land-Orthents, clayey, complex, gently sloping	0.0	0.0%
805A	Orthents, clayey, nearly level	27.7	45.3%
805D	Orthents, clayey, rolling	33.2	54.3%
W	Water	0.2	0.3%
Totals for Area of Interest		**61.2**	**100.0%**

Soil Map—Cook County, Illinois
WLRS04 Reservoir
87° 54' 4" W
87° 53' 36" W
42° 3' 37" N
42° 3' 10" N
425500
425600
425700
425800
425900
426000
4656800
4656700
4656600
4656500
4656400
4656300
4656200
4656100
Map Scale: 1:4,020 if printed on A portrait (8.5" x 11") sheet.
Meters
0 50 100 200 300
Feet
0 150 300 600 900
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84
USDA
Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
10/16/2013
Page 1 of 3

WLRS04 Reservoir

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 6, Nov 2, 2011

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 29, 2011—Mar 28, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

WLRS04 Reservoir

Map Unit Legend

Cook County, Illinois (IL031)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
152A	Drummer silty clay loam, 0 to 2 percent slopes	18.6	30.9%
293A	Andres silt loam, 0 to 2 percent slopes	18.3	30.5%
294B	Symerton silt loam, 2 to 5 percent slopes	18.5	30.7%
443B	Barrington silt loam, 2 to 4 percent slopes	2.8	4.6%
802B	Orthents, loamy, undulating	0.4	0.7%
805B	Orthents, clayey, undulating	0.3	0.5%
W	Water	1.3	2.2%
Totals for Area of Interest		**60.2**	**100.0%**

APPENDIX G – GEOTECHNICAL DESIGN

Attachment 2- February 2012 AECOM Report

July 2013 AECOM Report

January 2014 AECOM Report

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Final Geotechnical Exploration Report

Des Plaines II Site Investigations
Subsurface Investigation & Research
U.S. Army Corps of Engineers – Chicago District
Delivery Order No. CX 21
Contract No. W911XK-09-D-0015

AECOM Project No. 60223274

Prepared by:
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February 29, 2012

Mr. Dan Ferris, P.E.
U.S. Army Corps of Engineers – Chicago District
111 North Canal Street
Suite 600
Chicago, IL 60606-7206

RE: Des Plaines II Site Investigations
Final Subsurface Investigation & Research Report
AECOM Project Number 60223274

Dear Mr. Ferris,

AECOM has completed the subsurface investigation and site research activities for the Des Plaines II project in Lake and Cook Counties, IL and is pleased to submit this report of our findings. This report is being issued as final following receipt of your comments to the draft report dated December 20, 2011

This report includes a summary of the subsurface exploration, presents the results of laboratory testing performed on obtained soil samples, and provides the results of our site investigation activities. If you have any questions, or would like to further discuss the report or the project, please contact us.

Respectfully,

AECOM Technical Services, Inc.

Aaron M. Humphrey, P.E.
Project Engineer

Jamie Matus, C.P.G.
Vice President

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TABLES

APPENDICES

1.0 Introduction

The proposed Upper Des Plaines River Flood Damage Reduction Feasibility Study (Des Plaines II) project is located along the Des Plaines River in Lake and Cook counties in northern Illinois. The Des Plaines II project involves the development of a plan to manage flood risk on the main stem of the Des Plaines River, manage tributary flood risk, and restores and enhances degraded ecosystems within the study area.

The overall Des Plaines II project may potentially involve:

- construction of three (3) Reservoir sites;
- construction of three (3) levee segments:
- construction of one (1) pump station:
- raising of seven (7) roads along the Des Plaines River;
- restoring ecosystems at ten (10) sites; and,
- removal of five (5) existing dams along the Des Plaines River.

At the request of the United States Army Corps of Engineers (USACE), AECOM performed a subsurface exploration program consisting of advancing soil borings at five(5) sites. The exploration program included collecting samples (including bulk samples of native material) and laboratory testing to characterize the existing foundation and borrow soil properties. In addition, AECOM performed site reconnaissance and document discovery activities for all sites except the ecosystem restoration sites.

Following initiation of the project, AECOM was informed by USACE that the soil borings for one of the reservoir sites (Aptakisic Reservoir) and the one pump station (Lake Mary Anne Pump Station) were removed from the project scope.

This report includes a summary of the AECOM subsurface explorations, laboratory testing, and research activities performed for the project. As requested by the corps of engineers, each of the project sites is discussed in separate appendices attached to this report. The main body of this report outlines the procedures which were followed, but the data for each of the sites is included as a separate Appendix.

2.0 Scope of Work

The AECOM services were completed in general accordance with the Des Plaines II Site Investigation; Scope of Work dated 12 July 2011 (USACE Delivery Order No. CX21; Contract No. W911XK-09-D-0015). The Scope of Work included, but was not limited to, the following tasks:

- preparing a Quality Control Plan, and a Hazard Analysis and Accident Prevention Plan;
- coordinating drilling activities with the USACE Technical POC;
- mobilizing ATV and truck mounted drilling rigs to various sites to complete soil borings;
- obtaining representative split spoon and thin-walled tube soil samples generally at 2.5 foot intervals to 15 feet below the ground surface and at 5 foot intervals thereafter in general accordance with ASTM standards;
- obtaining two (2) representative bulk samples of native materials from each of the reservoir sites;
- observing soil and groundwater conditions while drilling and sampling and prepare field logs documenting drilling methods, Standard Penetration Test (SPT) results, soil condition observations, groundwater measurements and other pertinent geotechnical-related observations;
- surveying as-drilled locations of soil borings;
- performing laboratory testing on representative samples and preparing final geotechnical boring logs using gINT software;
- performing visual reconnaissance and photo documentation of all sites except for the ecosystem restoration sites;
- contacting various entities to obtain available soils information and as-built documentation of features at all sites except for the ecosystem restoration sites;
- preparing a draft geotechnical engineering report summarizing the field explorations, soil conditions, laboratory results, recommended soil properties for use in the geotechnical analyses, and information obtained from site reconnaissance and research activities; and,
- preparing this final geotechnical engineering report to incorporate USACE comments to our draft report.

3.0 Procedures

3.1 Borehole Survey

The USACE provided AECOM with a location maps for the approximate borehole locations on the five) different sites at which borings were performed. AECOM coordinated the final locations with the USACE technical Point of contact (POC), Dan Ferris, P.E. while he was on-site for the commencement of the borings at each of the sites. After completion of the subsurface explorations, an AECOM surveyor performed a high-resolution GPS survey to obtain coordinates and elevations of each of the borings using the Illinois State Plane East (NAD 83) coordinate system and NAVD 88 elevation datum. Based on survey information, the soil boring locations are presented within the data appendices for each of the project sites.

3.2 Soil Explorations

A total of twelve(12) soil borings were advanced at five projects site by Strata Earth Sciences, LLC (Strata) under subcontract to AECOM using a Mobile B-61 truck mounted drill rig and an ATV mounted Dietrich D-50 rotary drill rig. An AECOM field engineer was on site during the subsurface exploration to observe the collected samples and log the boreholes.

The boreholes were generally advanced with solid or hollow stem continuous flight augers. If groundwater or borehole instability was observed, then a 2 7/8-inch diameter rock bit and rotary wash drilling methods were utilized to advance the borings using water and cuttings or bentonite drilling mud. Representative soil samples were obtained in general accordance with ASTM D 1586, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils" using an automatic hydraulic hammer. Relatively undisturbed soil samples were obtained in general conformance with ASTM D 1587, "Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes." Two bulk samples of native materials were collected from auger cuttings between the depths of 0 and 20 feet below the ground surface at the Bull Creek Reservoir site and the Silver Creek Reservoir site. The soil borings were filled with auger cuttings or bentonite chips to the ground surface.

The soil samples were returned to the AECOM laboratory in Vernon Hills, Illinois for testing as described later in this report. The results of these observations are shown on the final boring logs that are included in the attached site appendices. A copy of the AECOM Standard Boring Log, Field, and Laboratory Procedures are included in Appendix A.

An AECOM field engineer was present during the drilling activities to prepare field logs; documenting drilling methods, SPT results, soil conditions, groundwater measurements, collect bulk samples and record other pertinent geotechnical-related observations. Copies of the AECOM field logs were provided on a daily and weekly basis to the USACE and are provided in Appendix B. It is important to note that the information included on the field logs is based on

the initial interpretations of the soil conditions and soil types by the AECOM field representative. These field logs were then used along with additional visual observations and the results of laboratory testing and laboratory classification for completing the final boring logs.

3.3 Laboratory Testing

Laboratory strength and index tests were completed on selected soil samples to characterize the physical properties of the soils encountered in the soil borings. The table below outlines the laboratory tests and corresponding ASTM designation completed by AECOM:

Laboratory Testing Program Summary

Test Name	Designation	Proposed Number of Tests	Number of Tests Completed
Visual Classification	ASTM D 2488	115	131
Moisture Content	ASTM D 2216	115	130
Hand Penetrometer		80	78
Atterberg Limits	ASTM D 4318	10	11
Combined Gradation Analysis	ASTM D 422	10	12
Dry Density	ASTM D 2937 & ASTM D 221	15	12
Unconfined Compression with stress strain curves		15	12
Standard Proctor	ASTM D 698	4	4
Organic Content	ASTM D 1557	4	2

In conjunction with the laboratory testing program, all of the samples were classified in the field with AECOM Soil Classification System. These descriptions and estimated group symbols are in general conformance with the Unified Soil Classification System which serves as the basis for the AECOM Soil Classification System, and are included on the soil boring logs. A brief explanation of the classification of soil samples is included in the Appendix A. The laboratory test results are included within the site specific appendices at the end of this report.

3.4 Site Research and Investigation

As part of the project Scope of Work, AECOM was requested to perform site research and investigation for each of the nineteen (19) sites which were included in the scope of work. This site research and investigation included a trip to each of the sites to take photographs to document the site features and a document discovery exercise. The photographs are included in the attached Appendices.

The document discovery exercise was performed to obtain information such as: nearby existing soil borings, current age of the dams and roads, as-built drawings, and other pertinent information. As requested in the scope of work, AECOM attempted to obtain information from: Illinois Department of Transportation (IDOT), BNSF Railroad, Illinois State Water Survey (ISWS), and the Illinois Department of Natural Resources (IDNR). It was specified in the scope of work that the landowners of each of the sites should also be contacted, but prior to contacting landowners, AECOM was informed by USACE that they would make the information requests to the landowners and provide any information which was received to AECOM for inclusion into this report.

The research activities were commenced by AECOM with web-based research and numerous phone calls to identify appropriate personnel at each organization to whom requests for information were to be submitted. Following the identification and introductory telephone calls by the AECOM project manager, letters were sent to each of the appropriate organizations along with the USACE prepared sketches to identify what information was requested and the locations of each site. A brief summary of the results are included below, and the documentation obtained from each of the sites is provided in Appendices B through T. The attached Table 2 indicates which sources yielded information for each of the sites. The overall research process is discussed below:

- Illinois State Water Survey (ISWS): The inquiries to the Illinois State Water Survey (ISWS) resulted in AECOM being provided with login information to access the ISWS and the Illinois State Geological Survey (ISGS) interactive well locator website. AECOM performed research for documented private wells near each of the nineteen (19) project sites. Due to Department of Homeland Security considerations, public water supply wells were not included in this search. AECOM assembled a figure for each of the sites indicating the location of documented wells at each of the site. For the sites where AECOM performed soil borings, AECOM downloaded the well logs and input pertinent soil data into the gINT logging software as requested by the USACE. This allowed AECOM to generate gINT boring logs and show the locations of the ISWS borings along with the AECOM borings on exploration location plans. It is important to note that AECOM estimated USCS group symbols for soils described on the rudimentary well logs which were obtained from the website. AECOM is not responsible for the accuracy of any information contained on those logs or the estimation of USCS group symbols or other classifications.

- Illinois Department of Transportation (IDOT): The Illinois Department of Transportation research resulted in AECOM receiving approximately 200 sheets of 18"x24" plans consisting of as-builts, soil borings, and other information from the following sites:
  - River Road at Feehanville Ditch – Wheeling, IL (road raise project)
  - River Road at Ashland Road – Des Plaines, IL (road raise project)
  - River Road at Irving Park Rd – Schiller Park, IL (road raise project)
  - First Avenue Bridge – River Grove, IL (road raise project)

- River Road at Deerfield Road – Deerfield, Buffalo Grove, Riverwoods, IL (road raise project)
- Milwaukee Ave at Buffalo Wheeling Creek – Wheeling, IL (road raise project)
- Oakton Everett Levee – Libertyville, IL (levee project)
- Lake Mary Anne Pump Station – Des Plaines, IL (levee project)

The Illinois Department of Transportation indicated that information was not available for the other project locations. The drawings obtained from IDOT are included in the appropriate appendices but are transmitted to USACE on the final AECOM data CD only due to the number of drawing sheets which were obtained.

- Illinois Department of Natural Resources (IDNR): AECOM established contact with Mr. Bill Boyd and Mr. Gary Jereb with the IDNR who indicated the IDNR did not posess any information on the project sites.

- BNSF Railroad: No information has been obtained from BNSF Railroad as of the writing of this report. AECOM has been in contact with representative from BNSF Railroad and have been informed that information is available and will be provided.

4.0 General Qualifications

The information presented in this report is based on data obtained from soil borings and laboratory testing completed. Variations can occur between borings; the nature and extent of which may not become evident until after construction. If variations are encountered, it may be necessary reevaluate the information contained in this report with respect to the design and construction.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices to aid in the evaluation of this property, and to assist in the design of this project. No other warranty, expressed or implied, is made. The scope of this report is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects relevant to soil characteristics. In the event any changes in the design or location of the structures as outlined in this report are planned, we should be informed so the changes can be reviewed, and the conclusions of this report modified as required.

As a check, we recommend that AECOM be authorized to review project plans and specifications to confirm that the recommendations of this report have been interpreted in accordance with our intent. Without this review, AECOM will not be responsible for misinterpretation of our data, our analyses, and/or our recommendations or how these are incorporated into the final design.

Tables

Table 1: Research Results Summary

Appendices

Appendix A -	General Notes Soil Classifications Field and Laboratory Procedures Boring Log Procedures
Appendix B -	Adler Park Levee Data Compilation
Appendix C -	Aptakisic Creek Reservoir Data Compilation
Appendix D -	Bull Creek Reservoir Data Compilation
Appendix E -	Groveland Avenue Levee Data Compilation
Appendix F -	Lake Mary Anne Pump Station Data Compilation
Appendix G-	Oakton-Everett Levee Data Compilation
Appendix H-	Silver Creek Reservoir Data Compilation
Appendix I -	Dam #1 Data Compilation
Appendix J-	Dam #2 Data Compilation
Appendix K-	Dam #4 Data Compilation
Appendix L -	Dempster Avenue Dam Data Compilation
Appendix M-	Touhy Avenue Dam Data Compilation
Appendix N-	River Road at Deerfield Avenue Data Compilation
Appendix 0-	Milwaukee Avenue at Buffalo-Wheeling Creek Data Compilation
Appendix P-	River Road at Feehanville Ditch Data Compilation
Appendix Q-	River Road at Ashland Avenue Data Compilation
Appendix R -	River Road at Irving Park Road Data Compilation
Appendix S-	First Avenue Bridge Data Compilation
Appendix T-	BNSF Bridge Data Compilation

*Appendices N, O, P, Q, R, and T omitted since no longer part of study and to reduce file size.

APPENDIX A

General Notes

Soil Classifications

Field and Laboratory Procedures

Boring Log Procedures

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AECOM General Notes

Drilling and Sampling Symbols:

SS : Split Spoon - 1-3/8" I.D. 2" O.D. (Unless otherwise noted)	HS : Hollow Stem Auger
ST : Shelby Tube-2" O.D. (Unless otherwise noted)	WS : Wash Sample
PA : Power Auger	FT : Fish Tail
DB : Diamond Bit-NX, BX, AX	RB : Rock Bit
AS : Auger Sample	BS : Bulk Sample
JS : Jar Sample	PM : Pressuremeter Test
VS : Vane Shear	GS : Giddings Sampler
OS : Osterberg Sampler	

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

Water Level Measurement Symbols:

WL : Water Level	WCI : Wet Cave In
WS : While Sampling	DCI : Dry Cave In
WD : While Drilling	BCR : Before Casing Removal
AB : After Boring	ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

Gradation Description and Terminology:

Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; they are described as boulders, cobbles, gravel or sand. Fine grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component of Sample	Size Range	Description of Other Components Present in Sample	Percent Dry Weight
Boulders	Over 8 in. (200 mm)	Trace	1-9
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Little	10-19
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)	Some	20-34
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)	And	35-50
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

Consistency of Cohesive Soils:

Unconfined Compressive Strength, Qu, tsf	Consistency
<0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium (firm)
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
>8.00	Very Hard

Relative Density of Granular Soils:

N-Blows per foot	Relative Density
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
>80	Extremely Dense

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AECOM Soil Classification System [1]

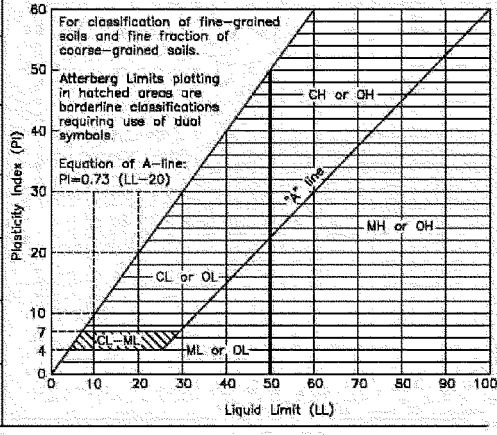
Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravel (More than half of coarse fraction is larger than No. 4 sieve size) — Clean gravel (Little or no fines)	GW	Well-graded, gravel, gravel-sand mixtures, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
		GP	Poorly graded gravel, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
	Gravel with fines (Appreciable amount of fines)	GM	Silty gravel, gravel-sand-silt mixtures	Atterberg limits below "A" line or PI less than 4
		GC	Clayey gravel, gravel-sand-clay mixtures	Atterberg limits above "A" line or PI greater than 7
	Sand (More than half of coarse fraction is smaller than No. 4 sieve size) — Clean sand (Little or no fines)	SW	Well-graded sand, gravelly sand, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
		SP	Poorly graded sand, gravelly sand, little or no fines	Not meeting all gradation requirements for SW
	Sand with fines (Appreciable amount of fines)	SM	Silty sand, sand-silt mixtures	Atterberg limits below "A" line or PI less than 4
		SC	Clayey sand, sand-clay mixtures	Atterberg limits above "A" line or PI greater than 7
Fine-grained soils (More than half of material is smaller than No. 200 sieve size)	Silt and clay (Liquid limit less than 50)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity	
		CL	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay	
		OL	Organic silt and organic silty clay of low plasticity	
	Silt and clay (Liquid limit greater than 50)	MH	Inorganic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silt	
		CH	Inorganic clay of high plasticity, fat clay	
		OH	Organic clay of medium to high plasticity, organic silt	
	Highly organic soils	PT	Peat and other highly organic soil	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 percent . . . . . GW, GP, SW, SP
More than 12 percent . . . . . GM, GC, SM, SC
5 to 12 percent . . . . . Borderline cases requiring dual symbols [2]

Above "A" line with PI between 4 and 7 are *borderline* cases requiring use of dual symbols

Limits plotting in hatched zone with PI between 4 and 7 are *borderline* cases requiring use of dual symbols

Plasticity Chart [2]



1. See AECOM General Notes for component gradation terminology, consistency of cohesive soils and relative density of granular soils.
2. Reference: Unified Soil Classification Systems
3. Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

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AECOM Field and Laboratory Procedures

Subsurface Exploration Procedures

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer or a drop hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the borehole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the boreholes. They are turned and hydraulically advanced by a truck, trailer or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open boreholes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the boreholes. The open stem allows the sampling tool to be used without removing the augers from the borehole. Hollow stem augers thus provide support to the sides of the borehole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the boreholes. In this process, surface casing and/or drilling fluids are used to maintain open boreholes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (or triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

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AECOM Field and Laboratory Procedures

Field Sampling Procedures

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) - (ASTM Standard D-1586-99)

In the split-barrel sampling procedure, a 2-inch O.D. split barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - ASTM Standard D-1587-94

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are identified, sealed and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

AECOM

AECOM Laboratory Procedures

Water Content (Wc)
The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)
In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)
In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γd)
The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples
In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in accordance with the AECOM Soil Classification System which is described on a separate sheet. The soil descriptions on the boring logs are derived from this system as well as the component gradation terminology, consistency of cohesive soils and relative density of granular soils as described on a separate sheet entitled "AECOM General Notes". The estimated group symbols included in parentheses following the soil descriptions on the boring logs are in general conformance with the Unified Soil Classification System (USCS) which serves as the basis of the AECOM Soil Classification System.

AECOM

AECOM Standard Boring Log Procedures

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by experienced geotechnical engineers, and as such, differences between the field logs and the final logs may exist. The engineer preparing the report reviews the field logs, laboratory test data and classifications, and using judgment and experience in interpreting this data, may make further changes. It is common practice in the geotechnical engineering profession not to include field logs and laboratory data sheets in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then discarded unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

APPENDIX B

Adler Park Levee Data Compilation

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APPENDIX B

Adler Park Levee Data Compilation

1. **Type of Project:** Levee
2. **USACE Description:** The Adler Park Levee site (DPLV15) is south of Buckley Road, just west of Idlewood Lane, Birchwood Lane, and Sprucewood Lane in Libertyville, IL. The stretch is almost 3,000 feet long and constructed with clay levee to elevation 660 feet. The site is currently covered with trees.
3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified five nearby water well logs. The information from the website is included in Attachment B.4.1. At the request of USACE, AECOM interpreted the reported findings on the well logs and created a gINT boring log with estimated USCS symbols. The boring logs are included in Attachment B.2 and the boring locations are also shown on Figure B.1.
   - Landowner: The Lake County Forest Preserve is the owner of the property and they reported that they did not have pertinent information for the site.
   - Illinois Department of Transportation (IDOT): The Illinois Department of Transportation reported that they did not have pertinent information available for this site.
   - Illinois Department of Natural Resources (IDNR): The Illinois Department of Natural Resources reported that they did not have pertinent information available for this site.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment B.5.

4. **Subsurface Explorations**

   AECOM performed two soil borings at the project site as discussed below.

   a. **Boring Locations***

Boring**	Coordinates***		Surface Elevation (ft)+	Boring Depth (ft)	Date Drilled	Borehole Status
	Northing (ft)	Easting (ft)				
DP2-11-01	2052410	1090788	652.1	25	10/21/11	Backfilled
DP2-11-02	2053339	1090784	660.9	25	10/21/11	Backfilled

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*: All surveying information based on survey completed by AECOM.
**: All soil borings performed by Strata Earth Services, LLC
***: Based on NAD 83, Illinois State Plane East
+: Based on NAVD 88

b. Subsurface Conditions

The subsurface conditions observed at the site borings are as follows.

Boring DP2-11-01

Beginning from the ground surface, the soil conditions at this boring are as follows:

- *Topsoil*: A 1.7-foot thick layer of black organic topsoil was observed beginning from the ground surface.
- *Silty Clay*: Silty clay with trace amounts of sand and wood pieces (USCS: CL) was observed between 1.7 and 3.5 feet below the ground surface. This material was medium to stiff with calibrated penetrometer values ranging between 0.75 and 1.0 tsf.
- *Sand*: A layer of fine to coarse sand with little silt and trace amounts of fine gravel was observed between 3.5 and 5.0 feet below the ground surface. This material was medium dense with an SPT-N value of 20 blows per foot.
- *Silty Clay*: A silty clay layer was observed between 5.0 and 10.0 feet below the ground surface and consisted of silty clay with trace amounts of fine sand and occasional silt layers (USCS: CL). This material was very stiff with calibrated penetrometer values ranging between 2.0 and 2.75 tsf.
- *Silt*: A relatively thin layer of silt with trace amounts of fine sand (USCS: ML) was observed between 10.0 and 12.0 feet below the ground surface. This material was loose with an SPT-N value of 7 blows per foot.
- *Sand*: Sand soils were found below the silt layer and extended to the boring termination depth of 25 feet. This material generally consisted of fine to coarse sand with lesser amounts of fine gravel and trace to little silt (USCS: SP, SP-SM). The material was generally medium dense to dense with SPT-N values ranging from 10 to 33 blows per foot.

Boring DP2-11-02

This boring consisted of silty clay with trace amounts of fine to coarse sand and fine gravel (USCS: CL) to the termination depth of 25 feet below the ground surface. The soil was very stiff to hard with calibrated penetrometer values ranging from 2.0 to greater than 7.0 tons per square foot (tsf). A transition was observed at a depth of approximately 10 feet where the soil change from brown in color with calibrated penetrometer values typically between 6.0 and 7.0 tsf, to gray soil with calibrated penetrometer values between 2.0 and 4.5 tons tsf.

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c. Groundwater Conditions

The groundwater observations discussed below were made at the project site at the time of drilling. Groundwater level fluctuations may occur with time and seasonal change due to variations in precipitation, evaporation, and surface water runoff.

Groundwater was observed at 12 feet below the ground surface while sampling and after completion of boring DP2-11-01. Groundwater was observed at a depth of 15 feet while sampling and at 19 feet after completion of boring DP2-11-02.

5. Engineering Properties:

It is AECOM's understanding that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. Given the variability in soil conditions observed in both the borings and the laboratory testing, AECOM recommends that the USACE use extreme caution in the selection of soil properties. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following section illustrates the range of soil properties which were obtained from the laboratory testing for the site:

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf) (USCS: "CL" soils)	111.7	122.2	117.0 (from 2 data points)
Unconfined compressive strength (tsf) (USCS: "CL" soils)	1.25	3.68	2.47 (from 2 data points, one from each boring)

ATTACHMENTS

B.1: Boring Location Plan

B.2: Boring Logs

B.3: Lab Testing Results

B.4: Research Data

B.4.1: Illinois State Water Survey Data

B.5: Site Reconnaissance Photographs

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ATTACHMENT

B.1: Boring Location Plan

AECOM
EXPLORATION LOCATION PLAN
ADLER PARK LEVEE
DES PLAINES II FEASIBILITY STUDY
UNITED STATES ARMY CORPS OF ENGINEERS – CHICAGO DISTRICT
Legend
Borings by others

AECOM

ATTACHMENT

B.2: Boring Logs

Hole No. DP2-11-01

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,052,410.0 E 1,090,788.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-01	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/21/2011; COMPLETED 10/21/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +652.1
9. TOTAL DEPTH OF HOLE: 25.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+652.1	0.0		Topsoil (1.7')	59	1 0.0 1.7	1, 2, 2 N = 4
+650.4	1.7		Silty clay, little fine to coarse sand, trace fine gravel with trace wood and sand seams - brown - medium to stiff (CL)	100 50	1A 1.7 2.0 2 2.5 3.5	2/6" N = 4* (w= 19.2%) Qp = 1.0 tsf 2, 3/6" N = 6* (w = 17.5%) Qp = 0.75-1.0 tsf
+648.6	3.5		Fine to coarse sand, little silt, trace fine gravel, with trace limestone pieces - gray - medium dense - moist (SP-SM)	80	2A 3.5 4.0	10/6" N = 20* (w = 8.3%)
+647.1	5.0		Silty clay, trace fine sand and occasional layers of silt - gray - very stiff (CL)	100	3 5.0 6.5	4, 4, 6 N = 10 (w = 20.6%) Qp = 2.5-2.75 tsf
				100	4 7.5 10.0	3" Shelby Tube Qp = 2.5 tsf (w = 20.9%)
+642.1	10.0		Silt, trace clay, trace fine sand - gray - loose - moist to wet (ML)	75	5 10.0 12.0	2, 3, 4, 6 N = 7 (w = 23.0%)
+640.1	12.0		Fine to coarse sand, trace to little silt, trace fine gravel, trace clay - gray - medium dense - wet (SP-SM)	100	6 12.5 14.0	3, 4, 6 N = 10 (w = 19.6%)
				67	7 15.0 16.5	5, 8, 9 N = 17 (w = 17.7%)

Hole No. DP2-11-01

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 652.1 | **Hole No. DP2-11-01**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fine to coarse sand, trace to little silt, trace fine gravel, trace clay - gray - medium dense - wet (SP-SM) *(continued)*	100	8 20.0 21.5	5, 7, 11 N = 18 (w = 13.3%)
+628.6	23.5					
			Fine to coarse sand and fine gravel, trace silt, trace clay - gray - dense - wet (SP)	80	9 23.5 25.0	9, 15, 18 N = 33 (w = 13.1%)
+627.1	25.0		End of boring at 25'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 23.5 feet Boring advanced with split spoon sampler to 25 feet. GW at 12.0' W.S. GW at 12.0' A.B. Borehole backfilled with auger cuttings and bentonite chips.

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-01

Hole No. DP2-11-02

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,053,339.0 E 1,090,784.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-02	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 8 / UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/21/2011 / COMPLETED 10/21/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +660.1
9. TOTAL DEPTH OF HOLE: 25.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+660.1	0.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale pieces, with occasional seams noted - brown - very stiff to hard (CL)	65	1 0.0 2.0	9, 7, 4, 3 N = 11 (w = 18.2%) Qp = 3.0-3.25 tsf
				100	2 2.5 4.0	4, 5, 9 N = 14 (w = 16.3%) Qp = 7.0+ tsf
				100	3 5.0 6.5	7, 11, 18 N = 19 (w = 14.9%) Qp = 7.0+ tsf
				100	4 7.5 9.0	7, 10, 13 N = 23 (w = 16.9%) Qp = 6.0 tsf
+650.1	10.0					
			Silty clay, trace fine to coarse sand, trace fine gravel, with ocassional sand seams noted - gray - very stiff to hard (CL)	100	5 10.0 11.5	8, 11, 14 N = 25 (w = 15.7%) Qp = 3.0 tsf
				100	6 12.5 15.0	3" Shelby Tube Qp = 4.5 tsf (w= 15.1%)
				100	7 15.0 16.5	7, 10, 14 N = 24 (w = 16.5%) Qp = 3.25-3.5 tsf

Hole No. DP2-11-02

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 660.1 | **Hole No. DP2-11-02**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, with ocassional sand seams noted - gray - very stiff to hard (CL) *(continued)*	100	8 20.0 21.5	4, 6, 9 N = 15 (w = 16.4%) Qp = 2.0-2.25 tsf
				100	9 23.5 25.0	5, 10, 14 N = 24 (w = 13.9%) Qp = 2.0 tsf
+635.1	25.0		End of boring at 25'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler Boring advanced with SSA to 23.5 feet Boring advanced with split spoon sampler to 25 feet. GW at 15' W.S. GW at 19' A.B. Borehole backfilled with auger cuttings and bentonite chips.

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Hole No. DPLV15-1

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,054,017.0 E 1,088,457.0
3. DRILLING AGENCY: Boysen, Henry Co.
4. HOLE NO. *(As shown on drawing title and file number)*: DPLV15-1
5. NAME OF DRILLER:
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 168.0
10. SIZE AND TYPE OF BIT:
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*:
12. MANUFACTURER'S DESIGNATION OF DRILL:
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
16. DATE HOLE: STARTED 7/22/1954 COMPLETED:
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	0.0		Sand & gravel dirty leached strong brown wet 7.5YR4/6 (SP)			
	4.0		Gravel and fine-medium sand dirty partly leached dark yellow brown wet 10YR4/6 (GP)			
	14.0		Sand very fine to coarse dirty calc brown to dark brown 10YR4/3 (SM)			
	23.0		Gravel fine clean calc variable (GW)			
	32.0		dm silty clay loam to silt loam gravelly calc grayish brown 10YR5/2 (CL)			
	36.0		dm waterlain silty clay loam to silt loam gravelly calc grayish brown 10YR5/2 (CL)			
	79.0		Silt loam waterlain calc brown to pale brown 10YR5/2.5 (ML)			

Hole No. DPLV15-1

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. DPLV15-1**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	103.0					
			dm silt loam calc brown to pale brown 10YR5/2.5 (ML)			
	115.5					
			dm clay loam gravelly calc brown to dark brown 10YR4.5/3 (CL)			
	121.5					
			Dolomite chips (DOLOMITE)			
	168.0					
			End of boring at 168'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120970236700 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. DPLV15-2

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,054,115.0 E 1,090,470.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Jeffrey Snelten	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): DPLV15-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/2001 COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 200.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		Brown clay (CL)			
	9.0		Blue clay (CL)			
	22.0		Sand and gravel (SM)			
	31.0		Blue clay (CL)			

Hole No. DPLV15-2

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. DPLV15-2**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Blue clay (CL) *(continued)*			
	115.0		Sand and gravel (SM)			
	126.0		Limestone			

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PROJECT: Des Plaines II - ISWS Logs | HOLE NO. DPLV15-2

Hole No. DPLV15-2

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. DPLV15-2**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Limestone *(continued)*			
	200.0		End of boring at 200'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120972875000 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. DPLV15-3

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,054,089.0 E 1,091,156.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Boysen, Henry Co.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): DPLV15-3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED: 10/1/1940 — COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 138.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		old well			
	78.0		clay, blue			

Hole No. DPLV15-3

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE

Hole No. DPLV15-3

PROJECT	INSTALLATION	SHEET
Des Plaines II - ISWS Logs	Chicago District	2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			clay, blue *(continued)*			
	136.0					

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PROJECT Des Plaines II - ISWS Logs

HOLE NO. DPLV15-3

Hole No. DPLV15-4

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,053,458.0 E 1,091,708.0	11. DATUM FOR ELEVATION SHOWN (*TBM or MSL*)
3. DRILLING AGENCY: Boysen, Henry Co.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (*As shown on drawing title and file number*): DPLV15-4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 1/1/1942 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 138.0	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (*Drilling time, water loss, depth weathering, etc., if significant*) g
	0.0		Yellow clay (CL)			
	20.0		Blue clay (CL)			
	82.0		Stoney blue clay (CL)			
	100.0					

Hole No. DPLV15-4

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. DPLV15-4**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Sand & Gravel (GP)			
	125.0		Blue clay (CL)			
	129.0		Gray black rock (BEDROCK)			
	138.0		End of boring at 138'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120970066600 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

ENG FORM 1836-A JUN 67 | PROJECT: Des Plaines II - ISWS Logs | HOLE NO. DPLV15-4

Hole No. DPLV15-5

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Adler Park Levee N 2,051,970.0 E 1,090,504.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Boysen, Henry Co.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): DPLV15-5	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/28/1969 — COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 139.0	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		clay (CL)			

Hole No. DPLV15-5

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. DPLV15-5**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			clay (CL) *(continued)*			
	128.0					
			limestone			
	139.0					
			End of boring at 139'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120970319300 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

ENG FORM 1836-A JUN 67 | PROJECT: Des Plaines II - ISWS Logs | HOLE NO. DPLV15-5

AECOM

FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/21/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/21/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION | ☑ AUTOMATIC

OFFSET | CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS

WL: 12 WS OR WD

WL: ____ BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60723374 BORING NO. DP2-11-01 CLIENT USACE WEATHER 55° clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	1.7	SS	1	2	2	2	1.0'	—			clayey silt topsoil El roots
1A	1.7	2	SS				2	0.3'	0.75		1.7'	Brn Gr sicl medium
	0	2.5	PA									
2	2.5	3.5	SS	2	3			0.8'	0.5			SAND Seams noted
2A	3.5	4	SS			10		0.4'	—		3.5	Silty f-c Sand & f. Gravel wet med dense
	2.5	5	PA									
3	5	6.5	SS	4	4	6		1.5'	3.5		5'	Brn cl gray w/ trace silt seams
	5	7.5	PA								7'	
4	7.5	10	3" ST	D	W	S	H	2.5'	3.5			cly silt gray moist
5	10	12	SS	2	3	4	6	1.5'	0.5			cly silt wet loose gry Sand at tip
	10	12.5	PA									
6	12.5	14	SS	3	4	6		1.5'	—		12'	m-c gray sand wet loose
	12.5	15	PA									
7	15	16.5	SS	5	8	9		1.0'	—			same med dense L-SAT

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 1.7'
FILL THICKNESS C
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING ____
AFTER BORING COMPLETION ____
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS ____
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH ____
HEIGHT OF SOIL RISE IN CASING ____
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

K:\WPDOCS\FORMS\DRILLING FORMS\Field Boring Log.DOC

AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/21/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/21/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS

WL: 12 (WS) OR WD

WL: ____ BCR ____ ACR

WL: 12' (AB) ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60172324 BORING NO. DP1-11-01 CLIENT ASACE WEATHER 60's Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	15	20	PA									
8	20	21.5	SS	5	7	11		1.5	—			Same
	20	23.5	PA									
9	23.5	25	SS	9	15	18		1.2'	—		23.5	c-sand & fine gravel Set Lt Set
						EOB		Backfilled w/ chips				

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 1.7'
FILL THICKNESS 0
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING ____
AFTER BORING COMPLETION ____
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS ____
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH ____
HEIGHT OF SOIL RISE IN CASING ____
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

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AECOM

FIELD BORING LOG

SHEET 1 OF 1

TECHNICIAN Beckett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/21/11 | ☐ DONUT

HELPER FRANKS | BORING COMPLETED 10/21/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED ___ SIZE ___

WATER LEVEL OBSERVATIONS

WL: 15 (WS) OR WD

WL: ___ BCR ___ ACR

WL: 19 AB ___ HR. AB

WL: ___ 24 HR. AB

JOB NO. 60222774 BORING NO. DP2-11-02 CLIENT USACE WEATHER 45° Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	2	SS	9	7	4	3	1.3'	2.75			Brn Silt tr f-c Sd tr f gr v stiff (CL)
	0	2.5	PA									
2	2.5	4	SS	4	5	9		1.5'	4.5+			SAME Brn/gry hard (CL)
	2.5	5	PA									
3	5	6.5	SS	7	11	18		1.5'	4.5+			SAME
	5	7.5	PA									
4	7.5	9	SS	7	10	13		1.5'	4.5+			SAME
	7.5	10	PA									
5	10	11.5	SS	8	11	14		1.5'	3.0		10.7'	gry only
	10	12.5	PA									
6	12.5	15	3"ST	P	U	S	H	2.5'	3.75			SAME
7	15	16.5	SS	7	10	14		1.5'	3.5			SAME SAND seam @ 16.5'
	15	20	PA									
8	20	21.5	SS	4	6	9		1.5'	3.5			SAME
	20	23.5	PA									
9	23.5	25	SS	5	10	14		1.5'	3.0			SAME 6" silt seam @ 24'-24.5' moist

EOB Backfilled w/ cuttings

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0
FILL THICKNESS 0

CAVE-IN LEVEL:

WHILE DRILLING AND SAMPLING ___
AFTER BORING COMPLETION ___

WATER LOSS:

AT ___ TO ___
PERCENT LOSS
AT ___ TO ___
PERCENT LOSS ___

BOULDERS OR OBSTRUCTIONS:

AT ___ TO ___
AT ___ TO ___

ARTESIAN PRESSURE:

DEPTH ___
HEIGHT OF SOIL RISE IN CASING ___
PIEZOMETER PVC OR SS DIAMETER ___ IN.
SCREEN DEPTH ___ FT. TO ___ FT.
RISER PIPE ___ FT. TO ___ FT.

AECOM

ATTACHMENT

B.3: Lab Testing Results

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

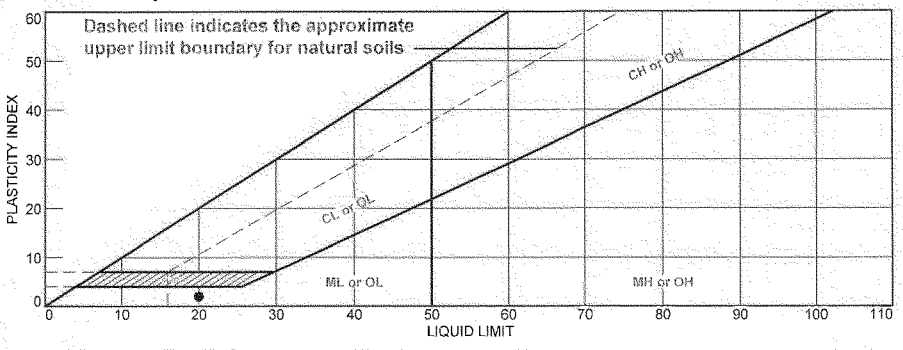
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
DP2-11-01																	
	S-1A	1.7-2.0	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN - WOOD AND SEAMS OF GRAY AND BLACK SILTY CLAY NOTED	CL	19.2	1.0											
	S-2	2.5-3.5	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN - SEAMS OF SAND AND SEAMS OF GRAY SILTY CLAY NOTED	CL	17.5	0.75-1.0											
	S-2A	3.5-4.0	F-C SAND LITTLE SILT TRACE F GRAVEL - GRAY - LIMESTONE PIECES NOTED	SP-SM	8.3												
	S-3	5.0-6.5	SILTY CLAY TRACE F SAND - GRAY - LAYERS OF SILT NOTED	CL	20.6	2.5-2.75											
	S-4	7.5-10.0	SILTY CLAY TRACE F SAND - GRAY	CL	20.9	2.5	1.25 @ 0.76%										
	S-5	10.0-12.0	SILT TRACE CLAY TRACE F SAND - GRAY - SATURATED	ML	23.0							20	18	2			
	S-6	12.5-14.0	F-C SAND TRACE SILT TRACE CLAY TRACE F GRAVEL GRAVEL - GRAY - SATURATED	SP-SM	19.6			2.4	86.6	8.1	2.9						
	S-7	15.0-16.5	F-C SAND LITTLE SILT TRACE F GRAVEL - GRAY - SATURATED	SP-SM	17.7												
	S-8	20.0-21.5	F-C SAND LITTLE SILT TRACE F GRAVEL - GRAY - SATURATED	SP-SM	13.3												
	S-9	23.5-25.0	F-C SAND AND F GRAVEL TRACE SILT TRACE CLAY - GRAY - SATURATED	SP	13.1			40.6	54.3	4.0	1.1						
DP2-11-02																	
	S-1	0.0-2.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN - LAYER OF SANDIER CLAY NOTED	CL	18.2	3.0-3.25											
	S-2	2.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	16.3	7.0+											
	S-3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	14.9	7.0+											
	S-4	7.5-9.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	16.9	6.0											
	S-5	10.0-11.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL	CL	15.7	3.0											

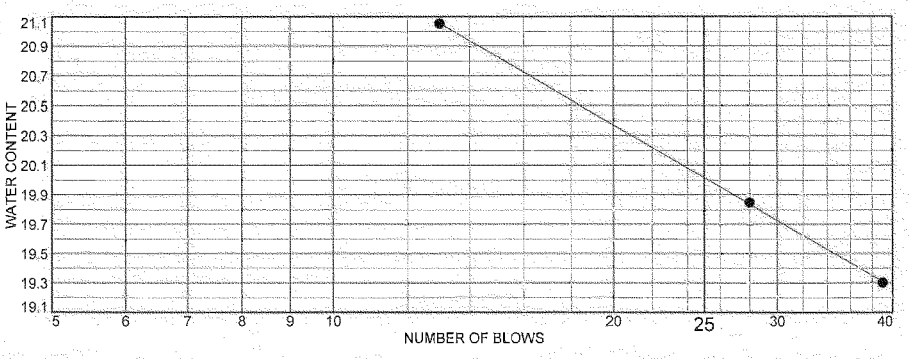
LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
			TRACE SHALE - GRAY - LAYER OF 5.25 TON BROWN CLAY NOTED														
	S-6	12.5-15.0	SILTY CLAY TRACE F-M SAND TRACE F GRAVEL - GRAY SILT SEAMS NOTED	CL	15.1	4.5	3.68 @ 0.76%					25	13	12			
	S-7	15.0-16.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	16.5	3.25-3.5											
	S-8	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAM OF SAND NOTED	CL	16.4	2.0-2.25											
	S-9	23.5-25.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF SILTY SAND NOTED	CL	13.9	2.0											

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILT TRACE CLAY TRACE F SAND - GRAY - SATURATED	20	18	2			ML

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

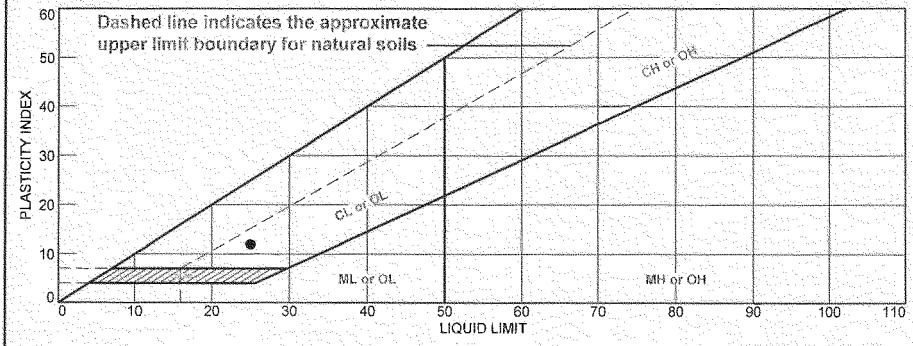
● **Source of Sample:** DP2-11-01 **Depth:** 10.0-12.0 **Sample Number:** S-5

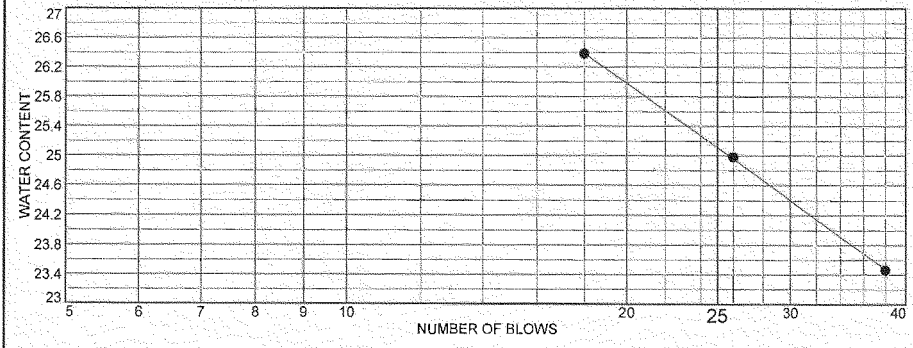
Remarks:
● 0.5

AECOM

Tested By: ER **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-M SAND TRACE F GRAVEL - GRAY SILT SEAMS NOTED	25	13	12			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

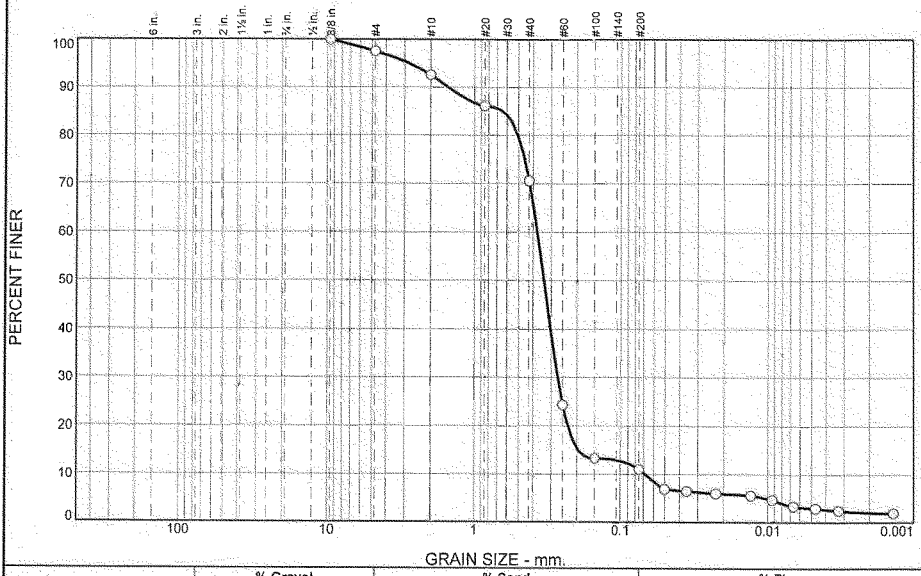
● **Source of Sample:** DP2-11-02 **Depth:** 12.5-15.0 **Sample Number:** S-6

Remarks:
● 4.5

AECOM

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	5.0	22.0	59.6	8.1	2.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	97.6		
#10	92.6		
#20	86.0		
#40	70.6		
#60	24.3		
#100	13.3		
#200	11.0		

* (no specification provided)

Material Description

F-C SAND TRACE SILT TRACE CLAY TRACE F GRAVEL
GRAVEL - GRAY - SATURATED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5123 D_{85}= 0.6423 D_{60}= 0.3735
D_{50}= 0.3362 D_{30}= 0.2706 D_{15}= 0.1962
D_{10}= 0.0683 C_u= 5.46 C_c= 2.87

Classification

USCS= SP-SM AASHTO=

Remarks

Source of Sample: DP2-11-01 **Depth:** 12.5-14.0
Sample Number: S-6 **Date:** 11/9/11

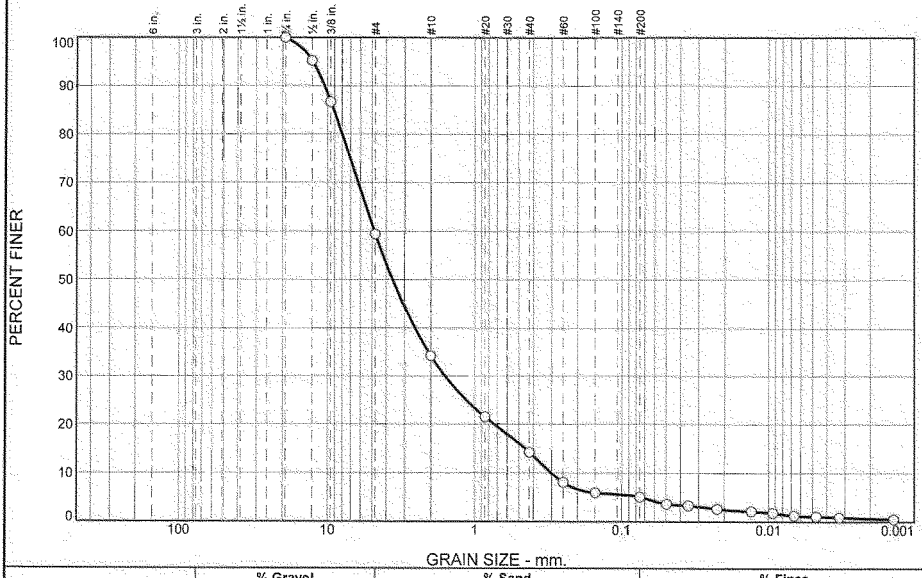
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	40.6	25.2	20.0	9.1	4.0	1.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.50	95.2		
.375	86.6		
#4	59.4		
#10	34.2		
#20	21.5		
#40	14.2		
#60	8.0		
#100	5.9		
#200	5.1		

* (no specification provided)

Material Description

F-C SAND AND F GRAVEL TRACE SILT TRACE CLAY - GRAY - SATURATED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.5040 D_{85}= 9.1021 D_{60}= 4.8289
D_{50}= 3.6274 D_{30}= 1.5999 D_{15}= 0.4539
D_{10}= 0.3026 C_u= 15.96 C_c= 1.75

Classification

USCS= SP AASHTO=

Remarks

Source of Sample: DP2-11-01 **Depth:** 23.5-25.0
Sample Number: S-9 **Date:** 11/9/11

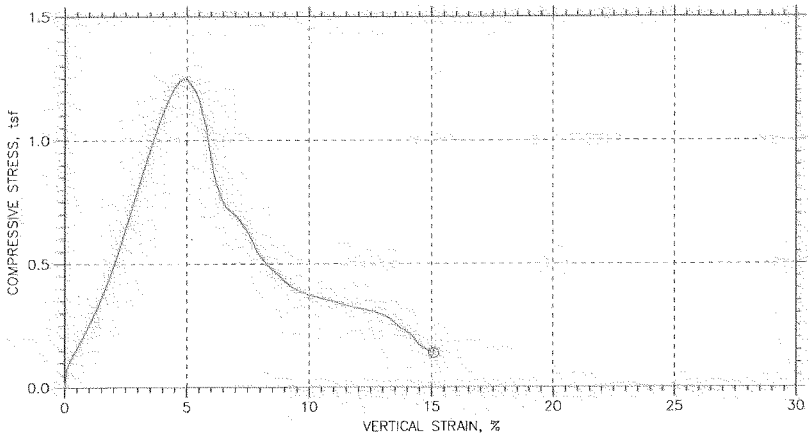
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

UNCONFINED COMPRESSION TEST REPORT



Symbol		⏲			
Test No.		DP21101S4			
Initial	Diameter, in	2.8114			
	Height, in	6.0055			
	Water Content, %	18.94			
	Dry Density, pcf	111.7			
	Saturation, %	99.01			
	Void Ratio	0.52039			
Unconfined Compressive Strength, tsf		1.2499			
Undrained Shear Strength, tsf		0.62494			
Time to Failure, min		9.7501			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		0			
Plastic Limit		0			
Plasticity Index		0			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21101 S-4 Depth: 7.5'-10.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F SAND - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 15:00:18

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21101 S-4
Sample No.: S-4
Test No.: DP21101S4

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 7.5'-10.0'
Elevation: -----

Soil Description: SILTY CLAY TRACE F SAND - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.01 in
Specimen Area: 6.21 inA2
Specimen Volume: 37.28 inA3

Liquid Limit: 0
Plastic Limit: 0
Estimated Specific Gravity: 2.72

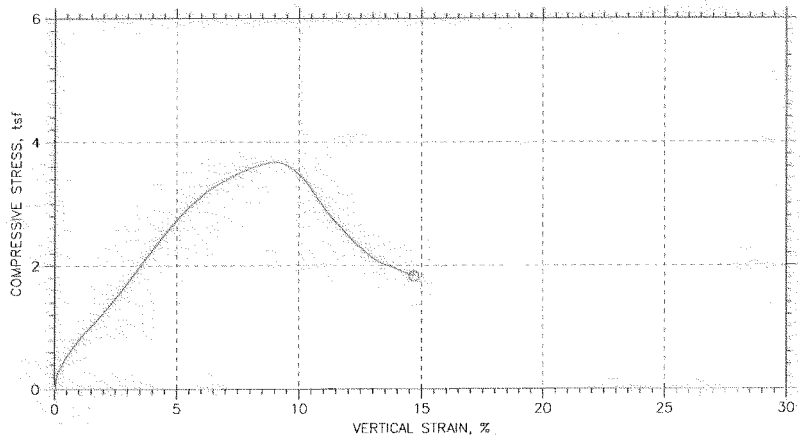
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2078	0	0
2	0.10405	0	0	0.21047	6.2078	0.0024411	0.0012206
3	0.20405	0.00018268	0.0030419	0.99975	6.208	0.011595	0.0057975
4	0.30405	0.0030143	0.050192	5.3144	6.211	0.061607	0.030804
5	0.40405	0.0061199	0.10191	7.1035	6.2142	0.082304	0.041152
6	0.5041	0.0092256	0.15362	8.3137	6.2174	0.096276	0.048138
7	0.60405	0.012331	0.20533	9.3134	6.2206	0.1078	0.053899
8	0.70405	0.015437	0.25704	10.208	6.2238	0.11809	0.059045
9	0.80407	0.018451	0.30724	10.997	6.227	0.12716	0.063578
10	0.90407	0.021557	0.35895	11.839	6.2302	0.13682	0.06841
11	1.0041	0.024845	0.4137	12.681	6.2336	0.14647	0.073234
12	1.1041	0.027859	0.4639	13.47	6.2368	0.15551	0.077753
13	1.2041	0.030965	0.51561	14.26	6.24	0.16453	0.082266
14	1.3041	0.033888	0.56428	15.049	6.2431	0.17355	0.086777
15	1.4041	0.036994	0.61599	15.838	6.2463	0.18256	0.091281
16	1.5041	0.040099	0.66771	16.68	6.2496	0.19217	0.096083
17	1.6041	0.043205	0.71942	17.469	6.2528	0.20115	0.10058
18	1.7041	0.046219	0.76961	18.311	6.256	0.21074	0.10537
19	1.8041	0.049325	0.82133	19.206	6.2592	0.22092	0.11046
20	1.9041	0.052339	0.87152	19.995	6.2624	0.22988	0.11494
21	2.0041	0.055445	0.92323	20.889	6.2657	0.24004	0.12002
22	2.1041	0.05855	0.97494	21.784	6.269	0.25019	0.1251
23	2.2041	0.061747	1.0282	22.678	6.2723	0.26033	0.13016
24	2.3041	0.064853	1.0799	23.573	6.2756	0.27045	0.13523
25	2.4041	0.067867	1.1301	24.52	6.2788	0.28118	0.14059
26	2.5041	0.070882	1.1803	25.415	6.282	0.29129	0.14564
27	2.6041	0.073987	1.232	26.467	6.2853	0.30319	0.15159
28	2.7041	0.077093	1.2837	27.414	6.2886	0.31387	0.15694
29	2.8041	0.080107	1.3339	28.466	6.2918	0.32576	0.16288
30	2.9041	0.083121	1.3841	29.466	6.295	0.33703	0.16851
31	3.0042	0.086227	1.4358	30.519	6.2983	0.34888	0.17444
32	3.1041	0.089333	1.4875	31.624	6.3016	0.36132	0.18066
33	3.2041	0.092347	1.5377	32.676	6.3048	0.37316	0.18658
34	3.3041	0.095453	1.5894	33.728	6.3081	0.38497	0.19249
35	3.4041	0.098376	1.6381	34.938	6.3112	0.39859	0.19929
36	3.5042	0.10148	1.6898	36.096	6.3145	0.41158	0.20579
37	3.6041	0.10459	1.7415	37.201	6.3179	0.42395	0.21198
38	3.7041	0.10769	1.7932	38.359	6.3212	0.43691	0.21846
39	3.8041	0.11071	1.8434	39.622	6.3244	0.45107	0.22553
40	3.9041	0.11381	1.8951	40.884	6.3278	0.4652	0.2326
41	4.0042	0.11683	1.9453	42.095	6.331	0.47873	0.23936
42	4.1041	0.11993	1.997	43.305	6.3343	0.49223	0.24611
43	4.2041	0.12313	2.0503	44.673	6.3378	0.5075	0.25375
44	4.3041	0.12633	2.1035	45.988	6.3412	0.52216	0.26108
45	4.4041	0.12943	2.1552	47.251	6.3446	0.53622	0.26811
46	4.5042	0.13226	2.2024	48.567	6.3476	0.55088	0.27544
47	4.6041	0.13519	2.251	49.987	6.3508	0.56671	0.28336
48	4.7041	0.13829	2.3028	51.408	6.3542	0.58251	0.29126
49	4.8041	0.1414	2.3545	52.723	6.3575	0.5971	0.29855
50	4.9041	0.14441	2.4047	54.144	6.3608	0.61288	0.30644
51	5.0042	0.14743	2.4549	55.565	6.3641	0.62863	0.31432
52	5.1041	0.15053	2.5066	57.091	6.3674	0.64555	0.32278
53	5.2041	0.15355	2.5568	58.459	6.3707	0.66068	0.33034
54	5.3041	0.15656	2.6069	59.827	6.374	0.6758	0.3379
55	5.4042	0.15967	2.6587	61.405	6.3774	0.69326	0.34663
56	5.5042	0.16268	2.7089	62.931	6.3807	0.71012	0.35506
57	5.6042	0.16579	2.7606	64.405	6.3841	0.72636	0.36318
58	5.7042	0.16889	2.8123	65.825	6.3875	0.74199	0.37099
59	5.8042	0.17191	2.8625	67.246	6.3908	0.75761	0.37881
60	5.9042	0.17501	2.9142	68.877	6.3942	0.77557	0.38779
61	6.0042	0.17812	2.9659	70.403	6.3976	0.79233	0.39617
62	6.2542	0.18597	3.0967	74.139	6.4062	0.83325	0.41663
63	6.5042	0.19355	3.2229	77.98	6.4146	0.87528	0.43764
64	6.7501	0.20095	3.3461	81.663	6.4228	0.91546	0.45773
65	7.0001	0.20863	3.4739	85.241	6.4313	0.95431	0.47715
66	7.2501	0.21612	3.5986	88.872	6.4396	0.99367	0.49683
67	7.5001	0.22388	3.7279	92.24	6.4482	1.0299	0.51497
68	7.7501	0.23137	3.8526	95.66	6.4566	1.0667	0.53337
69	8.0001	0.23904	3.9804	98.764	6.4652	1.0999	0.54995
70	8.2501	0.24672	4.1081	101.66	6.4738	1.1306	0.56531
71	8.5001	0.25439	4.2359	104.5	6.4824	1.1607	0.58034
72	8.7501	0.26206	4.3637	106.97	6.4911	1.1866	0.59328
73	9.0001	0.26973	4.4914	109.24	6.4998	1.21	0.60502
74	9.2501	0.27741	4.6192	110.97	6.5085	1.2276	0.61381
75	9.5001	0.28499	4.7454	112.5	6.5171	1.2429	0.62143
76	9.7501	0.29275	4.8747	113.29	6.526	1.2499	0.62494
77	10	0.30042	5.0025	113.23	6.5347	1.2476	0.62381
78	10.25	0.30828	5.1333	111.92	6.5437	1.2314	0.61571
79	10.5	0.31604	5.2626	110.24	6.5527	1.2112	0.60562
80	10.75	0.3239	5.3934	108.6	6.5617	1.1917	0.59584
81	11	0.33176	5.5242	105.6	6.5708	1.1572	0.57858

82	11.25	0.3397	5.6565	100.4	6.58	1.0985	0.54927
83	11.5	0.34756	5.7873	96.66	6.5892	1.0562	0.5281
84	11.75	0.35523	5.9151	89.346	6.5981	0.97496	0.48748
85	12	0.3629	6.0428	82.768	6.6071	0.90196	0.45098
86	12.25	0.37048	6.1691	76.823	6.616	0.83604	0.41802
87	12.5	0.37788	6.2923	73.613	6.6247	0.80006	0.40003
88	12.75	0.38546	6.4185	70.351	6.6336	0.76357	0.38179
89	13	0.39314	6.5463	68.035	6.6427	0.73743	0.36872
90	13.25	0.40081	6.674	66.667	6.6518	0.72162	0.36081
91	13.5	0.40857	6.8033	65.825	6.661	0.71152	0.35576
92	13.75	0.41634	6.9326	64.878	6.6703	0.70031	0.35015
93	14	0.42401	7.0604	63.878	6.6794	0.68857	0.34428
94	14.25	0.43196	7.1927	62.405	6.689	0.67173	0.33587
95	14.5	0.43972	7.322	60.669	6.6983	0.65213	0.32606
96	14.75	0.44758	7.4528	58.827	6.7078	0.63144	0.31572
97	15	0.45534	7.5821	56.67	6.7171	0.60744	0.30372
98	15.25	0.4632	7.7129	54.407	6.7267	0.58236	0.29118
99	15.5	0.47096	7.8421	51.671	6.7361	0.5523	0.27615
100	15.75	0.47872	7.9714	49.987	6.7456	0.53355	0.26677
101	16	0.4864	8.0992	48.461	6.7549	0.51654	0.25827
102	16.25	0.49425	8.23	46.883	6.7646	0.49901	0.2495
103	16.5	0.50202	8.3593	45.936	6.7741	0.48824	0.24412
104	16.75	0.50969	8.487	44.831	6.7836	0.47583	0.23791
105	17	0.51745	8.6163	43.568	6.7932	0.46177	0.23089
106	17.25	0.52504	8.7426	42.726	6.8026	0.45222	0.22611
107	17.5	0.53271	8.8703	41.621	6.8121	0.43991	0.21996
108	17.75	0.54047	8.9996	40.516	6.8218	0.42762	0.21381
109	18	0.54824	9.1289	39.569	6.8315	0.41703	0.20852
110	18.25	0.55591	9.2566	38.622	6.8411	0.40648	0.20324
111	18.5	0.56367	9.3859	37.938	6.8509	0.39871	0.19936
112	18.75	0.57162	9.5183	37.306	6.8609	0.3915	0.19575
113	19	0.57911	9.643	36.833	6.8703	0.386	0.193
114	19.25	0.58687	9.7723	36.412	6.8802	0.38104	0.19052
115	19.5	0.59464	9.9015	36.043	6.8901	0.37665	0.18832
116	19.75	0.60249	10.032	35.57	6.9001	0.37116	0.18558
117	20	0.61017	10.16	35.517	6.9099	0.37008	0.18504
118	20.25	0.61811	10.292	35.096	6.9201	0.36516	0.18258
119	20.5	0.6256	10.417	34.728	6.9297	0.36083	0.18041
120	20.75	0.63328	10.545	34.465	6.9396	0.35758	0.17879
121	21	0.64095	10.673	34.254	6.9495	0.35489	0.17744
122	21.25	0.64871	10.802	34.044	6.9596	0.3522	0.1761
123	21.5	0.65639	10.93	33.728	6.9696	0.34843	0.17422
124	21.75	0.66397	11.056	33.413	6.9795	0.34468	0.17234
125	22	0.67173	11.185	33.097	6.9896	0.34093	0.17046
126	22.25	0.6794	11.313	32.781	6.9997	0.33719	0.1686
127	22.5	0.68708	11.441	32.36	7.0098	0.33238	0.16619
128	22.75	0.69484	11.57	32.044	7.0201	0.32866	0.16433
129	23	0.7027	11.701	31.781	7.0305	0.32548	0.16274
130	23.25	0.71064	11.833	31.518	7.041	0.3223	0.16115
131	23.5	0.7185	11.964	31.36	7.0515	0.32021	0.1601
132	23.75	0.72608	12.09	31.15	7.0616	0.3176	0.1588
133	24	0.73375	12.218	30.992	7.0719	0.31554	0.15777
134	24.25	0.74142	12.346	30.676	7.0822	0.31187	0.15593
135	24.5	0.7491	12.474	30.413	7.0925	0.30874	0.15437
136	24.75	0.75686	12.603	30.203	7.103	0.30615	0.15308
137	25	0.76463	12.732	29.782	7.1135	0.30144	0.15072
138	25.25	0.77248	12.863	29.308	7.1242	0.2962	0.1481
139	25.5	0.78015	12.991	28.993	7.1347	0.29258	0.14629
140	25.75	0.78774	13.117	28.361	7.145	0.28579	0.1429
141	26	0.79541	13.245	27.835	7.1556	0.28008	0.14004
142	26.25	0.80299	13.371	26.73	7.166	0.26857	0.13428
143	26.5	0.81066	13.499	25.625	7.1766	0.25709	0.12854
144	26.75	0.81824	13.625	24.467	7.1871	0.24511	0.12256
145	27	0.82592	13.753	23.52	7.1977	0.23528	0.11764
146	27.25	0.83368	13.882	23.047	7.2085	0.2302	0.1151
147	27.5	0.84135	14.01	22.152	7.2192	0.22093	0.11047
148	27.75	0.84903	14.137	21.31	7.23	0.21222	0.10611
149	28	0.85697	14.27	19.995	7.2411	0.19881	0.099407
150	28.25	0.86501	14.404	17.995	7.2525	0.17865	0.089326
151	28.5	0.87296	14.536	16.838	7.2637	0.1669	0.083451
152	28.75	0.88109	14.671	16.101	7.2752	0.15935	0.079674
153	29	0.88922	14.807	15.312	7.2868	0.1513	0.075648
154	29.25	0.89744	14.944	14.575	7.2985	0.14379	0.071893
155	29.5	0.90538	15.076	14.102	7.3099	0.1389	0.069449

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		○			
Test No.		DP21102S6			
Initial	Diameter, in	2.8382			
	Height, in	6.1154			
	Water Content, %	14.37			
	Dry Density, pcf	122.2			
	Saturation, %	100.37			
	Void Ratio	0.38942			
Unconfined Compressive Strength, tsf		3.6799			
Undrained Shear Strength, tsf		1.84			
Time to Failure, min		18.25			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		25			
Plastic Limit		13			
Plasticity Index		12			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21102 S-6 Depth: 12.5'-15.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-M SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:57:57

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21102 S-6
Sample No.: S-6
Test No.: DP21102S6

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 12.5'-15.0'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-M SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.12 in
Specimen Area: 6.33 inA2
Specimen Volume: 38.69 inA3

Liquid Limit: 25
Plastic Limit: 13
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3266	0	0
2	0.10413	0.0016442	0.026886	10.997	6.3283	0.12512	0.06256
3	0.20415	0.0044758	0.073189	18.995	6.3313	0.21602	0.10801
4	0.30415	0.0073074	0.11949	23.573	6.3342	0.26795	0.13398
5	0.40415	0.010322	0.16878	27.151	6.3373	0.30847	0.15423
6	0.50418	0.013336	0.21807	30.413	6.3405	0.34536	0.17268
7	0.60415	0.01635	0.26736	33.518	6.3436	0.38043	0.19021
8	0.70415	0.019273	0.31516	36.833	6.3466	0.41785	0.20893
9	0.80415	0.022105	0.36146	40.253	6.3496	0.45644	0.22822
10	0.90415	0.02521	0.41225	43.252	6.3528	0.4902	0.2451
11	1.0042	0.028133	0.46005	46.094	6.3559	0.52215	0.26108
12	1.1042	0.031148	0.50934	48.777	6.359	0.55228	0.27614
13	1.2042	0.034162	0.55863	51.355	6.3622	0.58118	0.29059
14	1.3	0.036994	0.60493	53.618	6.3651	0.60651	0.30325
15	1.4	0.040008	0.65422	56.038	6.3683	0.63357	0.31679
16	1.5	0.043022	0.70351	58.511	6.3715	0.6612	0.3306
17	1.6	0.046036	0.7528	61.037	6.3746	0.6894	0.3447
18	1.7	0.049142	0.80359	63.194	6.3779	0.7134	0.3567
19	1.8	0.052248	0.85437	65.352	6.3811	0.73738	0.36869
20	1.9	0.055171	0.90217	67.404	6.3842	0.76017	0.38008
21	2.0001	0.058185	0.95146	69.509	6.3874	0.78351	0.39176
22	2.1	0.061291	1.0022	71.719	6.3907	0.80801	0.40401
23	2.2	0.064214	1.05	73.718	6.3938	0.83014	0.41507
24	2.3	0.067319	1.1008	75.612	6.3971	0.85103	0.42552
25	2.4	0.070425	1.1516	77.507	6.4003	0.8719	0.43595
26	2.5001	0.073439	1.2009	79.511	6.4035	0.89513	0.44757
27	2.6	0.076545	1.2517	81.611	6.4068	0.91714	0.45857
28	2.7	0.079559	1.301	83.452	6.41	0.93737	0.46869
29	2.8	0.082573	1.3503	85.294	6.4132	0.95758	0.47879
30	2.9	0.085679	1.401	87.294	6.4165	0.97952	0.48976
31	3.0001	0.088602	1.4488	89.188	6.4196	1.0003	0.50015
32	3.1	0.091616	1.4981	90.977	6.4229	1.0198	0.50992
33	3.2	0.094722	1.5489	92.976	6.4262	1.0417	0.52086
34	3.3	0.097828	1.5997	95.028	6.4295	1.0642	0.53208
35	3.4	0.10093	1.6505	96.975	6.4328	1.0854	0.5427
36	3.5001	0.10395	1.6998	98.922	6.436	1.1066	0.55332
37	3.6	0.10705	1.7506	100.87	6.4394	1.1278	0.56392
38	3.7001	0.11007	1.7999	102.92	6.4426	1.1502	0.5751
39	3.8001	0.11336	1.8536	105.08	6.4461	1.1737	0.58684
40	3.9001	0.11664	1.9074	107.08	6.4497	1.1954	0.59768
41	4.0001	0.11966	1.9567	109.02	6.4529	1.2165	0.60824
42	4.1001	0.12258	2.0045	111.02	6.456	1.2382	0.61909
43	4.2001	0.1255	2.0523	113.34	6.4592	1.2634	0.63169
44	4.3001	0.12852	2.1016	115.34	6.4624	1.285	0.64251
45	4.4001	0.13172	2.1538	117.5	6.4659	1.3084	0.65418
46	4.5001	0.13473	2.2031	119.55	6.4692	1.3305	0.66527
47	4.6001	0.13784	2.2539	121.97	6.4725	1.3568	0.67839
48	4.7001	0.14094	2.3047	124.07	6.4759	1.3795	0.68974
49	4.8001	0.14396	2.354	126.07	6.4792	1.401	0.7005
50	4.9001	0.14697	2.4033	128.44	6.4824	1.4266	0.71329
51	5.0001	0.15008	2.4541	130.91	6.4858	1.4533	0.72665
52	5.1001	0.15309	2.5034	133.12	6.4891	1.4771	0.73854
53	5.2001	0.15629	2.5556	135.28	6.4926	1.5002	0.75011
54	5.3001	0.1593	2.6049	137.6	6.4958	1.5251	0.76256
55	5.4001	0.16241	2.6557	140.02	6.4992	1.5511	0.77557
56	5.5001	0.16551	2.7065	142.28	6.5026	1.5754	0.78769
57	5.6001	0.16853	2.7558	144.49	6.5059	1.599	0.79952
58	5.7001	0.17172	2.8081	146.91	6.5094	1.625	0.81248
59	5.8001	0.17474	2.8574	149.44	6.5127	1.6521	0.82603
60	5.9001	0.17784	2.9081	151.86	6.5161	1.6779	0.83897
61	6.0001	0.18086	2.9574	154.17	6.5194	1.7027	0.85133
62	6.2501	0.18826	3.0784	160.33	6.5276	1.7684	0.88422
63	6.5001	0.19584	3.2024	166.54	6.5359	1.8346	0.91729
64	6.7501	0.20342	3.3264	172.69	6.5443	1.9	0.94998
65	7.0001	0.211	3.4503	178.95	6.5527	1.9663	0.98316
66	7.2502	0.21858	3.5743	185.37	6.5611	2.0342	1.0171
67	7.5002	0.22607	3.6968	191.53	6.5695	2.0991	1.0496
68	7.7502	0.23347	3.8178	197.63	6.5778	2.1633	1.0816
69	8.0002	0.24114	3.9432	203.74	6.5863	2.2272	1.1136
70	8.2502	0.24863	4.0657	209.95	6.5948	2.2921	1.1461
71	8.5002	0.25603	4.1867	215.58	6.6031	2.3506	1.1753
72	8.7502	0.26389	4.3152	221.73	6.6119	2.4145	1.2073
73	9.0002	0.27147	4.4391	227.42	6.6205	2.4732	1.2366
74	9.2502	0.27914	4.5646	233.15	6.6292	2.5323	1.2661
75	9.5002	0.28672	4.6886	238.78	6.6379	2.59	1.295
76	9.7502	0.2944	4.814	244.73	6.6466	2.651	1.3255
77	10	0.30216	4.941	250.3	6.6555	2.7078	1.3539
78	10.25	0.30983	5.0665	255.83	6.6643	2.764	1.382
79	10.5	0.31751	5.1919	261.14	6.6731	2.8176	1.4088
80	10.75	0.325	5.3144	265.99	6.6817	2.8662	1.4331
81	11	0.33249	5.4369	271.46	6.6904	2.9213	1.4607

82	11.25	0.34007	5.5609	276.14	6.6992	2.9678	1.4839
83	11.5	0.34756	5.6834	280.67	6.7079	3.0126	1.5063
84	11.75	0.35514	5.8073	285.09	6.7167	3.056	1.528
85	12	0.36272	5.9313	289.08	6.7255	3.0948	1.5474
86	12.25	0.37021	6.0538	293.61	6.7343	3.1391	1.5696
87	12.5	0.37788	6.1792	297.66	6.7433	3.1782	1.5891
88	12.75	0.38556	6.3047	301.55	6.7523	3.2155	1.6077
89	13	0.39314	6.4287	305.34	6.7613	3.2516	1.6258
90	13.25	0.40081	6.5542	309.08	6.7704	3.2869	1.6435
91	13.5	0.40867	6.6826	312.03	6.7797	3.3137	1.6569
92	13.75	0.41634	6.8081	315.24	6.7888	3.3433	1.6716
93	14	0.42419	6.9365	318.13	6.7982	3.3693	1.6847
94	14.25	0.43196	7.0635	320.87	6.8075	3.3937	1.6968
95	14.5	0.43972	7.1905	324.13	6.8168	3.4235	1.7117
96	14.75	0.4473	7.3144	327.02	6.8259	3.4494	1.7247
97	15	0.45498	7.4399	330.23	6.8352	3.4786	1.7393
98	15.25	0.46256	7.5639	332.86	6.8443	3.5016	1.7508
99	15.5	0.47005	7.6863	335.49	6.8534	3.5246	1.7623
100	15.75	0.47772	7.8118	337.65	6.8627	3.5424	1.7712
101	16	0.48521	7.9343	340.33	6.8719	3.5659	1.7829
102	16.25	0.49288	8.0598	342.86	6.8812	3.5874	1.7937
103	16.5	0.50046	8.1837	344.75	6.8905	3.6024	1.8012
104	16.75	0.50814	8.3092	346.81	6.9	3.6189	1.8094
105	17	0.51554	8.4302	348.33	6.9091	3.63	1.815
106	17.25	0.52303	8.5527	350.17	6.9183	3.6443	1.8222
107	17.5	0.5307	8.6781	352.17	6.9278	3.6601	1.83
108	17.75	0.53828	8.8021	353.65	6.9373	3.6704	1.8352
109	18	0.54595	8.9276	354.91	6.9468	3.6785	1.8392
110	18.25	0.55363	9.053	355.54	6.9564	3.6799	1.84
111	18.5	0.56166	9.1845	355.07	6.9665	3.6697	1.8349
112	18.75	0.56915	9.307	354.54	6.9759	3.6593	1.8297
113	19	0.57692	9.4339	353.07	6.9857	3.639	1.8195
114	19.25	0.58486	9.5639	350.12	6.9957	3.6035	1.8017
115	19.5	0.59272	9.6923	347.33	7.0056	3.5697	1.7848
116	19.75	0.60039	9.8178	344.65	7.0154	3.5372	1.7686
117	20	0.60825	9.9462	340.39	7.0254	3.4885	1.7442
118	20.25	0.61583	10.07	336.39	7.0351	3.4427	1.7214
119	20.5	0.62359	10.197	331.76	7.045	3.3906	1.6953
120	20.75	0.63127	10.323	326.39	7.0549	3.331	1.6655
121	21	0.63912	10.451	319.92	7.065	3.2603	1.6302
122	21.25	0.6467	10.575	313.08	7.0748	3.1862	1.5931
123	21.5	0.65447	10.702	305.97	7.0849	3.1095	1.5547
124	21.75	0.66223	10.829	299.29	7.0949	3.0372	1.5186
125	22	0.6699	10.954	292.5	7.1049	2.9642	1.4821
126	22.25	0.67767	11.081	285.87	7.1151	2.8929	1.4464
127	22.5	0.68552	11.21	279.93	7.1254	2.8286	1.4143
128	22.75	0.69356	11.341	273.61	7.1359	2.7607	1.3804
129	23	0.70169	11.474	267.67	7.1467	2.6967	1.3483
130	23.25	0.70964	11.604	262.83	7.1572	2.644	1.322
131	23.5	0.71749	11.733	257.57	7.1676	2.5873	1.2937
132	23.75	0.72535	11.861	251.99	7.178	2.5276	1.2638
133	24	0.7333	11.991	246.78	7.1886	2.4717	1.2358
134	24.25	0.74124	12.121	241.62	7.1993	2.4165	1.2082
135	24.5	0.74928	12.252	237.41	7.21	2.3708	1.1854
136	24.75	0.75723	12.382	233.05	7.2207	2.3238	1.1619
137	25	0.76517	12.512	229.47	7.2315	2.2847	1.1423
138	25.25	0.77285	12.638	225.21	7.2418	2.239	1.1195
139	25.5	0.78052	12.763	220.84	7.2523	2.1925	1.0962
140	25.751	0.78819	12.889	217.21	7.2627	2.1533	1.0767
141	26.001	0.79577	13.013	213.58	7.2731	2.1143	1.0572
142	26.251	0.80354	13.14	210.95	7.2837	2.0852	1.0426
143	26.501	0.81112	13.264	208.26	7.2941	2.0558	1.0279
144	26.751	0.81888	13.391	205.63	7.3048	2.0268	1.0134
145	27.001	0.82665	13.518	204.26	7.3155	2.0104	1.0052
146	27.251	0.83441	13.645	203.11	7.3263	1.9961	0.99803
147	27.501	0.84218	13.771	201.63	7.3371	1.9787	0.98933
148	27.751	0.85003	13.9	199.69	7.348	1.9566	0.97832
149	28.001	0.85789	14.028	197.48	7.359	1.9321	0.96605
150	28.251	0.86574	14.157	194.95	7.37	1.9045	0.95227
151	28.501	0.87351	14.284	193.32	7.3809	1.8858	0.94291
152	28.751	0.88127	14.411	191.74	7.3919	1.8676	0.93382
153	29.001	0.88903	14.538	190.43	7.4028	1.8521	0.92604
154	29.251	0.8968	14.665	188.06	7.4138	1.8263	0.91317

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ATTACHMENT

B.4: Research Data

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B.4.1: Illinois State Water Survey Data

AECOM

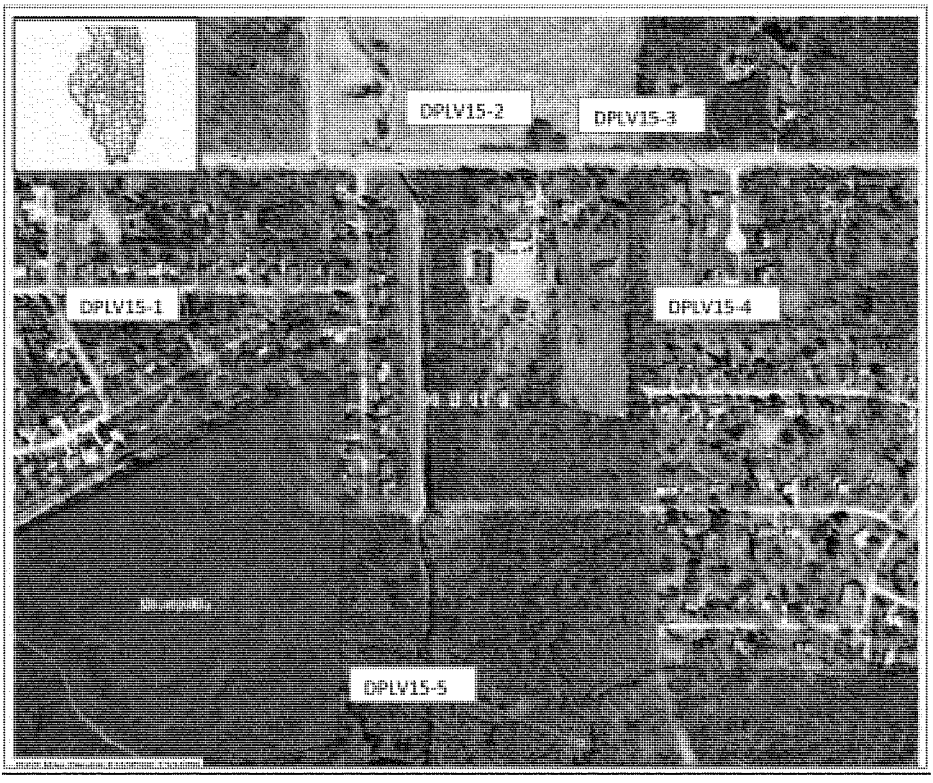
Illinois State Water Survey – Well Database Search Results

SITE NAME: ADLER PARK LEVEE (DPLV15)

COUNTY: Lake **CITY:** Libertyville

TOWNSHIP: 44N **RANGE:** 11E **SECTION:** 10

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DPLV15-1

	Top	Bottom
till	0	122
limestone	122	168
Interpretation by: on 28-FEB-01 too much drilling mud to 79'?		
sand & gravel dirty leached strong brown wet 7.5YR4/6	0	4
gravel and fine - med sand dirty partly leached dark yellow brown wet 10YR4/6	4	14
sand very fine to coarse dirty calc brown to dark brown 10YR4/3	14	23
gravel fine clean calc variable	23	32
dm silty clay loam to silt loam gravelly calc grayish brown 10YR5/2	32	36
dm waterlain silty clay loam to silt loam gravelly calc grayish brown 10YR5/2	36	79
silt loam waterlain calc brown to pale brown 10YR5/2.5	79	103
dm silt loam calc brown to pale brown 10YR5/2.5	103	115.5
dm clay loam gravelly calc brown to dark brown 10YR4.5/3	115.5	121.5
dolomite chips	121.5	
Total Depth		168

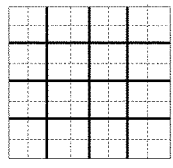
Casing: 12" from 0' to 122'

Static level 14' below casing top which is 0' above GL
Pumping level 89' when pumping at 115 gpm for 0 hours

Driller's Log filed

Permit Date: July 22, 1954 **Permit #:**

COMPANY Boysen, Henry Co.
FARM Bruns, E.J., Subdivision
DATE DRILLED January 1, 1954 **NO.**
ELEVATION 657GL **COUNTY NO.** 02367
LOCATION 2400'S line, 950'E line of section
LATITUDE 42.305133 **LONGITUDE** -87.948116
COUNTY Lake **API** 120970236700 9 - 44N - 11E



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPLV15-2

Private Water Well	Top	Bottom
brown clay	0	9
blue clay	9	22
sand & gravel	22	31
blue clay	31	115
sand & gravel	115	126
limestone	126	200
Total Depth		200

Casing: 5" PVC ASTM D-2241 from 0' to 126'
4.75" ROCK from 126' to 200'

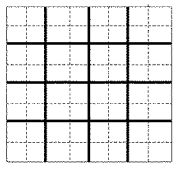
Grout: BENTONITE from 0 to 126.
Water from limestone at 47' to 200'.
Static level 47' below casing top which is 1' above GL
Pumping level 50' when pumping at 10 gpm for 2 hours
Permanent pump installed at 100' on September 5, 2001, with a capacity of 10 gpm

Address of well: same as above

Location source: Digital Orthophoto Quad Verified by: VJA on November 22, 2004.

Permit Date: July 10, 2001 **Permit #:**

COMPANY Snelten, Jeffrey
FARM Landmark Homes/Pea,B. & R.
DATE DRILLED August 20, 2001 **NO.** 1
ELEVATION 0 **COUNTY NO.** 28750
LOCATION NE NW SW
LATITUDE 42.305375 **LONGITUDE** -87.940672
COUNTY **Lake** **API** **120972875000** **10 - 44N - 11E**



 ILLINOIS STATE GEOLOGICAL SURVEY DPLV15-2

Sample set # 31176 (0' - 166') Received: March 29, 1958

Additional location info: Lot: 3 Subdivision:

Address of well: 75' east of Center Ave., 200' south of Hwy. 137

Location source: Digital Orthophoto Quad Verified by: VJA on November 17, 2004.

Boysen, Henry Co. Bruns, E.J., Subdivision

COUNTY Lake **API 120970236700** **9 - 44N - 11E**

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPLV15-3

	Top	Bottom
old well	0	78
clay, blue	78	136
gravel	136	138
Total Depth		138

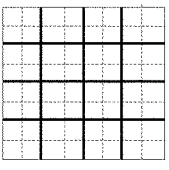
Casing: 4" from 0' to 138'

Static level 12' below casing top which is 0' above GL
Pumping level 12' when pumping at 10 gpm for 8 hours

Driller's Log filed
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY Boysen, Henry Co.
FARM Schrech, Carl
DATE DRILLED October 1, 1940 **NO.**
ELEVATION 0 **COUNTY NO.** 00668
LOCATION 2475'S line, 1650'W line of section
LATITUDE 42.305296 **LONGITUDE** -87.938139
COUNTY **Lake** **API** **120970066800** **10 - 44N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DPLV15-4

	Top	Bottom
yellow clay	0	20
blue clay	20	82
stoney blue clay	82	100
sand & gravel	100	125
blue clay	125	129
gray black rock	129	138
Total Depth		138

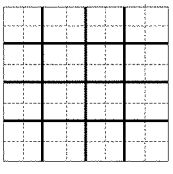
Casing: 4.5" GALVANIZE from 0' to 130'
Size hole below casing: 4.5"

Water from gray black rock at 129' to 138'.
Static level 28' below casing top which is 0' above GL
Pumping level 28' when pumping at 10 gpm for 4 hours

Driller's Log filed
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY Boysen, Henry Co.
FARM Ahrens, Harry
DATE DRILLED January 1, 1942 **NO.** 1
ELEVATION 0 **COUNTY NO.** 00666
LOCATION 1850'S line, 2200'W line of section
LATITUDE 42.303556 **LONGITUDE** -87.936108
COUNTY Lake **API** 120970066600 **10 - 44N - 11E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DPLV15-5

Private Water Well	Top	Bottom
clay	0	128
limestone	128	139
Total Depth		139

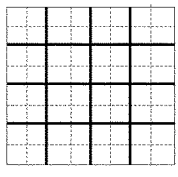
Casing: 5" GALVANIZED from 0' to 133'
Size hole below casing: 5"

Water from rock at 0' to 0'.
Static level 65' below casing top which is 1' above GL
Pumping level 65' when pumping at 15 gpm for 0 hours

Driller's Log filed
Location source: Location from permit

Permit Date: September 23, 1969 **Permit #:**

COMPANY Henry Boysen Co.,Lichter,John
FARM Lenzini, Harry
DATE DRILLED October 28, 1969 **NO.**
ELEVATION 0 **COUNTY NO.** 03193
LOCATION 300'N line, 1000'W line of SW SW SW
LATITUDE 42.299489 **LONGITUDE** -87.940582
COUNTY Lake **API** 120970319300 **10 - 44N - 11E**



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ATTACHMENT

B.5: Site Reconnaissance Photographs

Adler Park Levee

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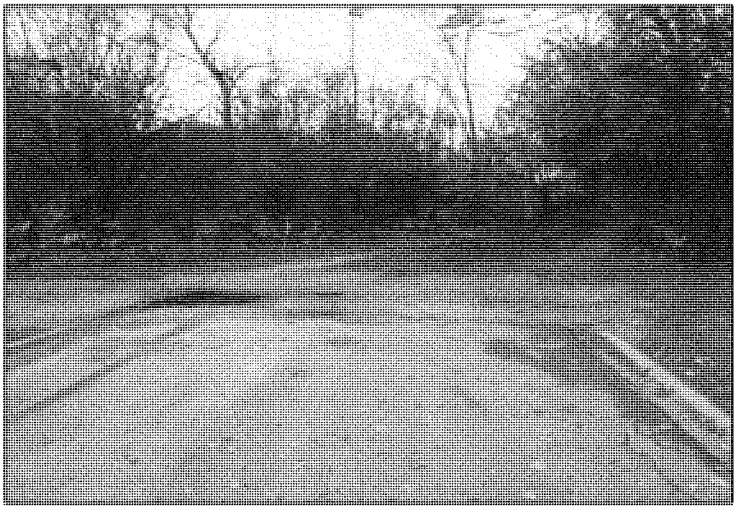
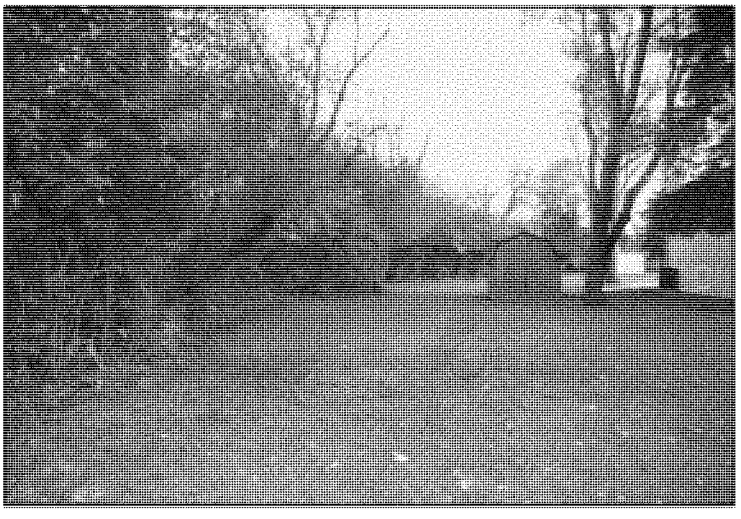


Photograph #1

Location of DP2-11-02 at Dead End of Idlewood Lane



Photograph #2

Looking North from DP2-11-02

Photograph #3

Looking West from DP2-11-02

Photograph #4

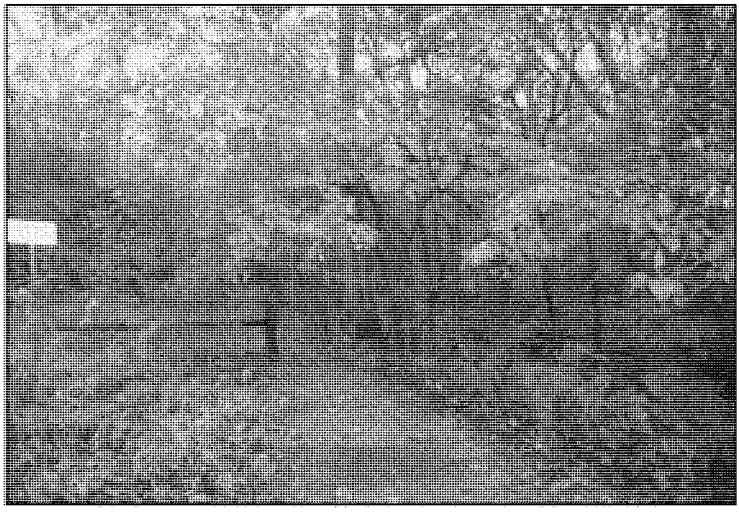
Looking South from DP2-11-02

Photograph #5

Dead End at Birchwood Lane (between DP2-11-01 and DP2-11-02)

Photograph #6

Looking North from Dead End on Birchwood Lane

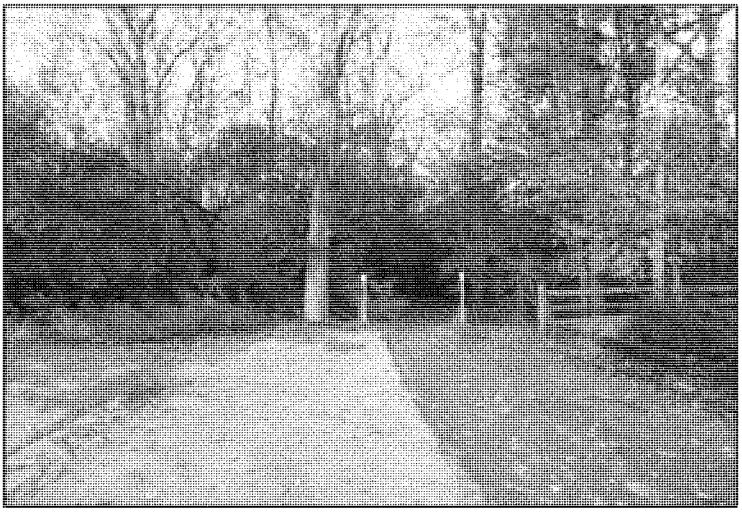


Photograph #7

Looking West from Dead End on Birchwood Lane

Photograph #8

Looking South from Dead End on Birchwood Lane

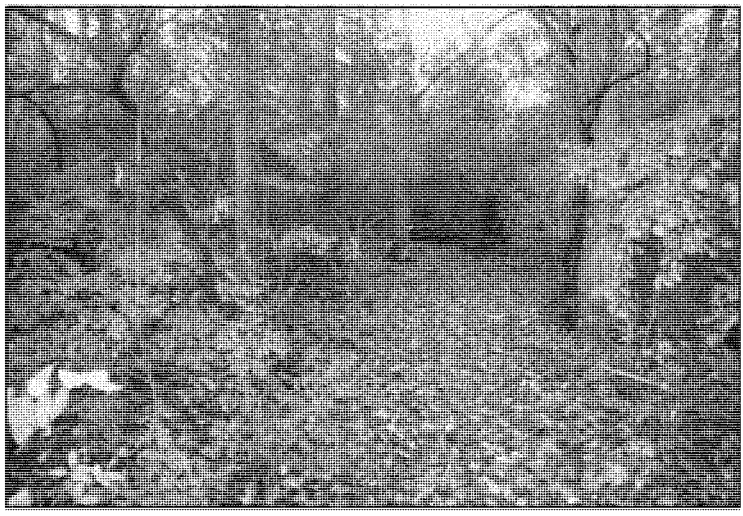


Photograph #9

Location of DP2-11-01 at Dead End of Sprucewood Lane

Photograph #10

Looking North from DP2-11-01



Photograph #11

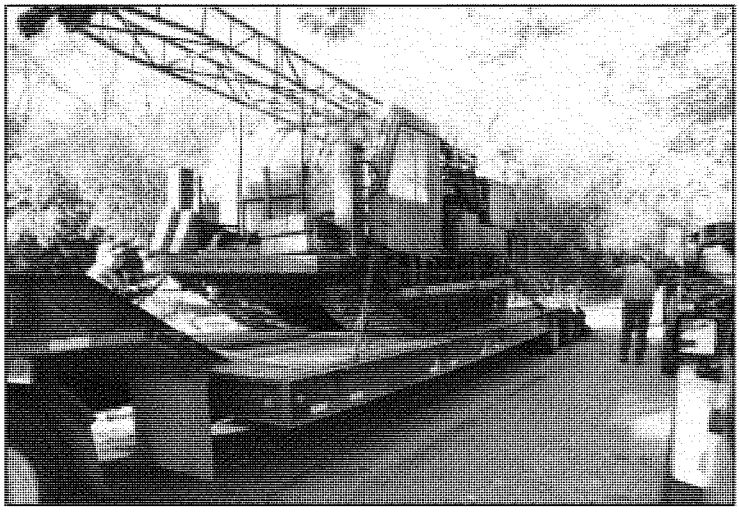
Looking West from DP2-11-01

Photograph #12

Looking South from DP2-11-01

Photograph #13

Looking South from DP2-11-01



Photograph #14

Diedrich D-50 ATV-mounted Drill used to Advance DP2-11-01 and DP2-11-02

APPENDIX C

Aptakisic Creek Reservoir Data Compilation

AECOM

APPENDIX C

Aptakisic Creek Reservoir Data Compilation

1. **Type of Project:** Reservoir
2. **USACE Description:** The Aptakisic Creek Reservoir site (ACRS08) is on the northeast corner of Aptakisic Road and Buffalo Grove Road in Buffalo Grove, IL. The lot is currently farmland with Aptakisic Creek through the northwest corner.
3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified six nearby water well logs. The information from the website is included in Attachment C.1.1.
   - Landowner: No landowner provided information was available for the project site.
   - Illinois Department of Transportation (IDOT): No information was available on the project site from the Illinois Department of Transportation.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment C.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

C.1: Research Data

C.1.1: Illinois State Water Survey Data

C.2: Site Reconnaissance Photographs

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ATTACHMENT

C.1: Research Data

AECOM

C.1.1: Illinois State Water Survey Data

AECOM

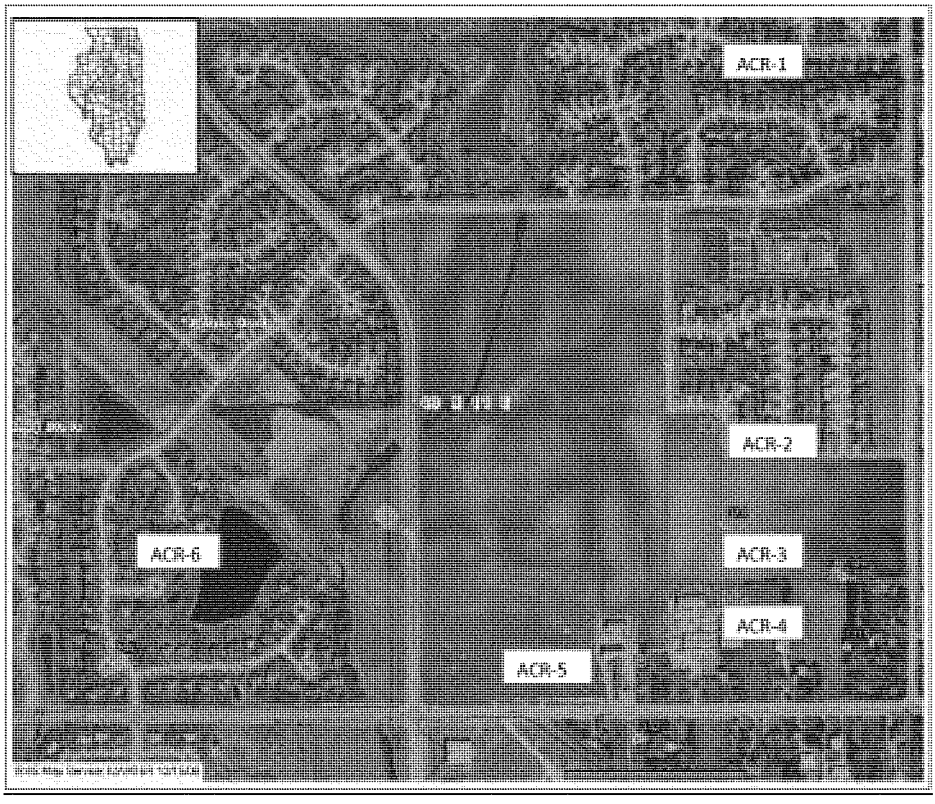
Illinois State Water Survey – Well Database Search Results

SITE NAME: APTAKISIC CREEK RESERVOIR.(ACRS08)

COUNTY: Lake **CITY:** Buffalo Grove

TOWNSHIP: 43N **RANGE:** 11E **SECTION:** 21

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

ACR-1

Private Water Well	Top	Bottom
clay & some gvl mxd	0	80
wh sand, gvl & water	80	86
Total Depth		86

Casing: 5" GALV. SCH 40 15#/FT from 0' to 86'
Size hole below casing: 5"

Water from open-gravel at 82' to 86'.
Static level 57' below casing top which is 1' above GL
Pumping level 80' when pumping at 7 gpm for 4 hours

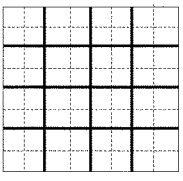
Permanent pump installed at 83' on November 30, 1976, with a capacity of 10 gpm

Driller's Log filed
Additional location info: Lot: #21 Subdivision:

Location source: Location from permit

Permit Date: November 17, 1976 **Permit #:** 54835

COMPANY Rosset, Richard D.
FARM Glander, Albert D.
DATE DRILLED November 30, 1976 **NO.** 1
ELEVATION 0 **COUNTY NO.** 27105
LOCATION SE SE NW
LATITUDE 42.190808 **LONGITUDE** -87.956575
COUNTY Lake **API** 120972710500 **21 - 43N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

ACR-2

Private Water Well	Top	Bottom
clay	0	18
sand w/some water	18	20
clay	20	108
sand & gvl w/water	108	114
Total Depth		114

Casing: 5" GALV.SCH 40 15#/FT from 0' to 114'
Size hole below casing: 5"

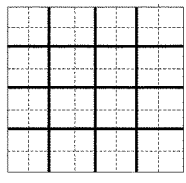
Water from open-gravel at 110' to 114'.
Static level 49' below casing top which is 1' above GL
Pumping level 49' when pumping at 20 gpm for 24 hours

Permanent pump installed at 112' on May 31, 1977, with a capacity of 12 gpm

Driller's Log filed
Location source: Location from permit

Permit Date: December 14, 1976 **Permit #:** 55673

COMPANY Rosset, Richard D.
FARM Bennish, Lyle
DATE DRILLED April 30, 1977 **NO.** 1
ELEVATION 0 **COUNTY NO.** 27104
LOCATION NW SE SW
LATITUDE 42.185357 **LONGITUDE** -87.959159
COUNTY Lake **API** 120972710400 **21 - 43N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

ACR-3

Private Water Well	Top	Bottom
black dirt	0	4
brown clay	4	23
sand, gravel, & water	23	29
gray clay	29	81
gravel & clay hardpan	81	113
sand & gravel	113	133
fine sand & water	133	138
medium sand & water	138	145
coarse sand, gravel & water	145	149
Total Depth		149

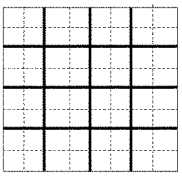
Casing: 5" ASTM A53B from -1' to 149'
Grout: BENTONITE from 5 to 149.
Water from sand & gravel at 148' to 149'.
Static level 72' below casing top which is 1' above GL
Pumping level 76' when pumping at 20 gpm for 6 hours
Permanent pump installed at 128' on March 7, 2005, with a capacity of 12 gpm

Address of well: 22140 N. Prairie Rd.
Prairie View, IL

Location source: Digital Orthophoto Quad Verified by: VJA on June 6, 2005.

Permit Date: January 27, 2005 **Permit #:**

COMPANY Rosset, Richard D.
FARM Hoffmann, Willard
DATE DRILLED March 1, 2005 **NO.** 1
ELEVATION 0 **COUNTY NO.** 49824
LOCATION NE SE SW
LATITUDE 42.184567 **LONGITUDE** -87.956806
COUNTY Lake **API** 120974982400 **21 - 43N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

ACR-4

Private Water Well	Top	Bottom
drift	0	115
Total Depth		115
Casing: 5" GALV 15#/' from 0' to 115'		
Water from gravel at 113' to 115'.		
Static level 42' below casing top which is 1' above GL		
Pumping level 45' when pumping at 10 gpm for 2 hours		
Permanent pump installed at 85' on , with a capacity of	gpm	
Driller's Log filed		
Location source: Location from permit		

Permit Date: April 9, 1974 **Permit #:** 28782

COMPANY Rosset, Richard D.

FARM Szostkawski, Edward

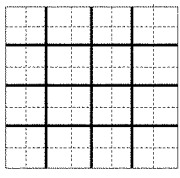
DATE DRILLED April 10, 1974 **NO.**

ELEVATION **COUNTY NO.** 24323

LOCATION SE SE SW

LATITUDE 42.183546 **LONGITUDE** -87.956744

COUNTY **Lake** **API** **120972432300** **21 - 43N - 11E**



ACR-5

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

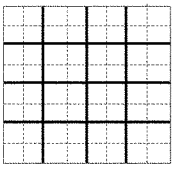
Water Well	Top	Bottom
sand, yellow	0	3
water sand, but not sufficient water	3	25
clay	25	60
small bed of gravel & sand	60	120
water began to clear	120	125
total depth, water	125	132
Total Depth		132

Static level 8' below casing top which is ' above GL

Driller's Log filed
Location source: Location from the driller Verified by: VJA on July 9, 2008.

Permit Date: **Permit #:**

COMPANY Kiene, Fred & Sons
FARM Geest, Emil
DATE DRILLED January 1, 1939 **NO.**
ELEVATION **COUNTY NO.** 00444
LOCATION NW NW
LATITUDE 42.182264 **LONGITUDE** -87.960948
COUNTY Lake **API** 120970044400 **28 - 43N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

ACR-6

Water Well for Commercial Operation	Top	Bottom
black dirt	0	2
clay & gravel	2	40
blue clay	40	80
sand & water	80	90
clay & gravel	90	110
dry gvl & brkn rock	110	130
rock & water	130	145
Total Depth		145

Casing: 5" GALV. SCH 40 15#/FT from 0' to 130'
Size hole below casing: 5"

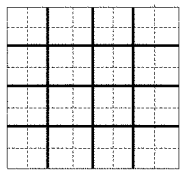
Water from rock at 130' to 145'.
Static level 53' below casing top which is 1' above GL
Pumping level 60' when pumping at 25 gpm for 24 hours

Permanent pump installed at 115' on , with a capacity of 18 gpm

Driller's Log filed
Location source: Location from permit

Permit Date: August 21, 1980 **Permit #:** 95681

COMPANY Rosset, Richard D.
FARM Sims, Don
DATE DRILLED October 31, 1980 **NO.** 1
ELEVATION 0 **COUNTY NO.** 27101
LOCATION SE SW SE
LATITUDE 42.183541 **LONGITUDE** -87.971412
COUNTY Lake **API** 120972710100 **20 - 43N - 11E**



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ATTACHMENT

C.2: Site Reconnaissance Photographs

Photograph #1

Looking West from Prairie Road

Photograph #2

Looking Northwest from Prairie Road

Photograph #3

Looking Southeast from Meridian Way

Photograph #4

Looking South from Meridian Way

Photograph #5

Looking Southwest from Meridian Way

Photograph #6

Looking West from Meridian Way

Photograph #7

Looking Northwest from Meridian Way

Photograph #8

Looking North along Meridian Way

Photograph #9

Looking West from Meridian Way at Brandywyn Lane

Photograph #10

Looking South from Brandywyn Lane

Photograph #11

Looking South from Brandywyn Lane at Buffalo Grove Road

Photograph #12

Looking East from Buffalo Grove Road

Photograph #13

Looking East from Buffalo Grove Road near Aptakisic Road

Photograph #14

Looking Northeast from Buffalo Grove Road at Aptakisic Road

APPENDIX D

Bull Creek Reservoir Data Compilation

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APPENDIX D

Bull Creek Reservoir Data Compilation

1. **Type of Project:** Reservoir
2. **USACE Description:** The Bull Creek Reservoir site (BCRS02) is west of Lake Street/US 45 and the railroad tracks, south of Winchester Road in Mundelein, IL. The lot is currently undeveloped grassland with a few trees.
3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified fourteen nearby water well logs. The information from the website is included in Attachment D.4.1. At the request of USACE, AECOM interpreted the reported findings on the well logs and created gINT boring logs with estimated USCS symbols. The boring logs are included in Attachment D.2 and the boring locations are also shown on the figure in Attachment D.1.
   - Landowner: No landowner provided information was available for the site.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment D.5.

4. **Subsurface Explorations**

   AECOM performed four soil borings at the project site as discussed below.

   a. **Boring Locations***

Boring**	Coordinates***		Surface Elevation (ft)+	Boring Depth (ft)	Date Drilled	Borehole Status
	Northing (ft)	Easting (ft)				
DP2-11-06	2050175	1072759	759.1	50	10/26/11	Backfilled
DP2-11-07	2049859	1071617	758.9	30	10/27/11	Backfilled
DP2-11-08	2049555	1070967	759.7	30	10/27/11	Backfilled
DP2-11-09	2049068	1072419	765.2	30	10/26/11	Backfilled

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*: All surveying information based on survey completed by AECOM.
**: All soil borings performed by Strata Earth Services, LLC
***: Based on NAD 83, Illinois State Plane East
+: Based on NAVD 88

b. Subsurface Conditions

The subsurface conditions observed at the site borings are as follows:

- *Topsoil:* Approximately 6 inches to 2 feet of organic topsoil was observed at all of the boring locations.
- *Fill:* Non-engineered fill soil was found between 1.3 and 3.3 feet beneath the ground surface in boring DP2-11-06. The fill consisted of silty clay with trace fine to coarse sand, trace fine gravel, roots, and a layer of black silty clay.
- *Organic Soils:* Organic soils were encountered below the topsoil in boring DP2-11-08 extending to a depth of 8 feet, and below the fill soils in boring DP2-11-07 to a depth of 15 feet. The soils consisted of peat (USCS: PT) with an organic content of 81.7%, very loose organic clayey silt (USCS: OL), and very soft organic silty clay (USCS: OL) in boring DP2-11-07. SPT-N values were typically near zero blows per foot and calibrated penetrometer values of 0.25 tsf. In boring DP2-11-08, the organic soils consisted of an organic silty clay with trace amounts of fine to coarse sand, fine gravel, and roots (USCS: OL) with SPT-N values of 4 bpf or less. Due to the fabric of the soil, calibrated penetrometer values were not able to be obtained.
- *Silty clay:* The dominant soil stratum at the site underlying the organic soils or the topsoil was a silty clay stratum with trace fine to coarse sand and trace gravel (USCS: CL). This stratum was generally stiff to very stiff with most calibrated penetrometer values ranging between 1.5 and 3.0 tsf. All of the borings, except DP2-11-06 terminated within this stratum.
- *Gravel:* A layer of fine to coarse gravel with little fine to coarse sand and trace silt (USCS: GP) was encountered from 48.5 feet to the boring termination depth of 50 feet in boring DP2-11-06. This stratum was extremely dense with an SPT-N value of 101 blows per foot.

c. Groundwater Conditions

The groundwater observations discussed below were made at the project site at the time of drilling. Groundwater level fluctuations may occur with time and seasonal change due to variations in precipitation, evaporation, and surface water runoff.

Groundwater was not encountered in borings DP2-11-09 or DP2-11-06. In borings DP2-11-07 and DP2-11-08, which contained near surface organic soils, groundwater was encountered at 3 feet below the ground surface while sampling.

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5. Engineering Properties:

It is AECOM's understanding that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. Given the variability in soil conditions observed in both the borings and the laboratory testing, AECOM recommends that the USACE use extreme caution in the selection of soil properties. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following section illustrates the range of soil properties which were obtained from the laboratory testing for the site:

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf)			
CL soils	110.9	117.6	114.2 (from 2 data points)
OL soils	-	-	46.1 (from 1 data point)
Unconfined compressive strength (tsf)			
CL soils	2.59	4.14	3.37 (from 2 data points)
OL soils	-	-	0.28 (from 1 data point)
Maximum dry density (pcf) from soils from 0 to 20 feet deep			
Standard Proctor	105.6	107.2	106.4 (from 2 data points)

ATTACHMENTS

D.1: Boring Location Plan

D.2: Boring Logs

D.3: Lab Testing Results

D.4: Research Data

D.4.1: Illinois State Water Survey Data

D.5: Site Reconnaissance Photographs

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ATTACHMENT

D.1: Boring Location Plan

AECOM
EXPLORATION LOCATION PLAN
BULL CREEK RESERVOIR
DES PLAINES II FEASIBILITY STUDY
UNITED STATES ARMY CORPS OF ENGINEERS – CHICAGO DISTRICT
Legend
AECOM Borings
Boring by others

AECOM

ATTACHMENT

D.2: Boring Logs

Hole No. DP2-11-06

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,050,175.0 E 1,072,759.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-06	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 14; UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/26/2011; COMPLETED 10/26/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +759.1
9. TOTAL DEPTH OF HOLE: 50.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+759.1	0.0		Topsoil (1.3')	69	1 0.0 1.3	3, 5/6" N = 10* Qp = 2.0 tsf
+757.8	1.3		FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace roots, layer of black silty clay noted - gray - very stiff (FILL: CL)	100	1A 1.3 1.5	7/6" N = 14* (w = 15.7%) Qp =3.5 tsf
+755.8	3.3		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, sand seam noted - brown - very stiff (CL)	47	2 2.5 4.0	4, 3, 6 N = 9 (w = 20.7%) Qp = 2.5-2.75 tsf
+751.6	7.5			80	3 5.0 6.5	3, 5, 6 N = 11 (w = 11.4%) Qp = 2.0 tsf
+749.1	10.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, with seams of brown silty clay - gray - very stiff (CL)	73	4 7.5 9.0	4, 6, 8 N = 14 (w = 20.3%) Qp = 3.5-3.75 tsf
+746.6	12.5		Silty clay, trace fine to coarse sand, trace fine gravel - gray - stiff to very stiff (CL)	73	5 10.0 11.5	5, 5, 6 N = 11 (w = 21.5%) Qp = 1.75-2.0 tsf
			Silty clay, trace fine to coarse sand, trace fine to coarse gravel, trace shale - gray - stiff (CL)	60	6 12.5 15.0	3" Shelby Tube Qp = 1.25 tsf (w = 24.9%)
				60	7 15.0 16.5	3, 5, 7 N = 12 (w = 14.9%) Qp = 1.75 tsf
+739.1	20.0					

Hole No. DP2-11-06

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 759.1 | **Hole No. DP2-11-06**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, with occasional silt seams - gray - very stiff (CL)	87	8 20.0 21.5	4, 7, 10 N = 17 (w = 20.8%) Qp = 2.75 tsf
			Large gravel/cobbles noted while drilling from 24.5' to 25'.	100	9 25.0 26.5	5, 5, 7 N = 12 (w = 19.1%) Qp = 2.0-2.25 tsf
				87	10 30.0 31.5	6, 8, 14 N = 22 (w = 16.9%) Qp = 2.5-2.75 tsf
				100	11 35.0 36.5	11, 18, 32 N = 50 (w = 14.1%) Qp = 3.5-3.75 tsf
				100	12 40.0 41.5	8, 11, 16 N = 27 (w = 21.3%) Qp = 2.75 tsf
				100	13 45.0	11, 12, 17 N = 29 (w = 21.0%)

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-06

Hole No. DP2-11-06

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 759.1 | **Hole No. DP2-11-06**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, with occasional silt seams - gray - very stiff (CL) *(continued)*		46.5	Qp = 2.25-2.5 tsf
+710.6	48.5					
			Fine to coarse gravel, little fine to coarse sand, trace silt - gray - extremely dense - moist (GP)	100	14 48.5 50.0	27, 41, 60 N = 101 (w = 2.3%)
+709.1	50.0					SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content
			End of boring at 50'. NOTE: A gas pocket was encountered at 48.5-50.0' with a strong sulfur odor noted and pressure estimated at 50 psi. Borehole was allowed to stay open to let gas pressure dissipate. Boring abandoned with hydrated bentonite chips.			Boring advanced with HSA to 48.5 feet Boring advanced with split spoon sampler to 50 feet. Borehole Dry Borehole backfilled with auger cuttings and bentonite chips.

ENG FORM JUN 67 **1836-A** | PROJECT Des Plaines II | HOLE NO. DP2-11-06

Hole No. DP2-11-07

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA/HSA
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,049,859.0 E 1,071,617.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-07	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 / UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/27/2011 / COMPLETED 10/27/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +758.9
9. TOTAL DEPTH OF HOLE: 30.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+758.4	0.5		Topsoil (6")	100	1 0.0 0.5	WOH/6" N = 0* (w = 32.6%) Qp < 0.5 tsf
			FILL: Silty clay, trace fine to coarse sand, trace fine gravel with seams of black silty clay and topsoil - brown and gray - medium to stiff (FILL: CL)	73	1A 0.5 2.0	2, 2, 5 N = 4 (w = 22.6%) Qp = 0.5-1.0 tsf
+755.9	3.0			100	2 2.5 3.0	2/6" N = 4* (w = 22.3%) Qp = 1.75 tsf
			Peat - black - loose to very loose - moist to wet (PT) (LOI = 81.7%)	20	2A 3.0 4.0	3, 3 N = 6
				35	3 5.0 7.0	1, 1, 1, 1 N = 2 (w = 332.3%)
				60	4 7.5 9.5	WOH/24" N = 0 (w = 529.2%)
+748.9	10.0					
			Organic clayey silt, trace fine sand - gray - very loose - wet (OL)	55	5 10.0 12.0	WOH/24" N = 0 (w = 390.6%)
+746.4	12.5					
			Organic silty clay, trace fine to medium sand - black and gray - very soft (OL)	84	6 12.5 15.0	3" Shelby Tube Qp = 0.25 tsf (w = 92.2%)
+743.9	15.0					
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - stiff to very stiff (CL)	47	7 15.0 16.5	3, 4, 5 N = 9 (w = 20.6%) Qp = 1.25-1.5 tsf

Hole No. DP2-11-07

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 758.9 | **Hole No. DP2-11-07**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - stiff to very stiff (CL) *(continued)*	93	8 20.0 21.5	3, 4, 5 N = 9 (w = 19.1%) Qp = 1.75-2.0 tsf
				93	9 25.0 26.5	7, 9, 13 N = 22 (w = 19.0%) Qp = 2.5 tsf
+730.4	28.5					
			Silty clay, trace fine to coarse sand, trace fine to coarse gravel, trace shale - gray - hard (CL)	100	10 28.5 30.0	7, 12, 18 N = 30 (w = 18.5%) Qp = 4.25-4.5 tsf
+728.9	30.0					
			End of boring at 30'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 10 feet Boring advanced with HSA to 28.5 feet Boring advanced with split spoon sampler to 30 feet. GW at 3' W.D. Water rose to depth of 0.5' after encounter. Borehole backfilled with auger cuttings and bentonite chips.

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-07

Hole No. DP2-11-08

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA/HSA
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,049,555.0 E 1,070,967.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-08	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10 / UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/27/2011 / COMPLETED 10/27/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +759.7
9. TOTAL DEPTH OF HOLE: 30.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) (g)
+759.7	0.0		Topsoil (2")	45	1 0.0 2.0	WOH, 2, 2, 2 N = 4 (w = 84.%)
+757.7	2.0		Organic silty clay, trace fine to coarse sand, trace fine gravel, trace roots - black (OL-OH) (LOI = 22.8%)	33	2 2.5 4.0	2, 2, 2 N = 4 (w = 84.5%) Too disturbed for Qp measurement
				5	3 5.0 7.0	1, 1, 1, 1 N = 2 (w = 136.9%) Too disturbed for Qp measurement
+751.7	8.0		Silty clay, trace fine to coarse sand, trace fine gravel - gray - medium to stiff (CL)	80	4 7.5	2/6" N = 4* (w = 146.9%)
				90	8.0 4A 8.0 9.0	Too disturbed for Qp measurement 1, 3 N = 4 (w = 21.0%) Qp = 0.5 tsf
				68	5 10.0 12.5	3" Shelby Tube Qp = 1.75 tsf (w = 19.5%)
+747.2	12.5		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - stiff to very stiff (CL)	80	6 12.5 14.0	4, 8, 16 N = 24 (w = 18.5%) Qp = 2.75-3.0 tsf
				93	7 15.0 16.5	6, 9, 17 N = 26 (w = 18.7%) Qp = 3.0-3.25 tsf

Hole No. DP2-11-08

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 759.7 | **Hole No. DP2-11-08**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - stiff to very stiff (CL) *(continued)*	93	8 20.0 21.5	6, 8, 11 N = 19 (w = 20.6%) Qp = 1.75-2.0 tsf
				100	9 25.0 26.5	7, 11, 16 N = 27 (w = 20.4%) Qp = 1.75-2.0 tsf
				100	10 28.5 30.0	12, 14, 16 N = 30 (w = 15.4%) Qp = 2.0 tsf
+729.7	30.0		End of boring at 30'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 2.5 feet Boring advanced with HSA to 28.5 feet Boring advanced with split spoon sampler to 30 feet. GW at 3' W.S. Water encountered again at 15' W.S. Borehole backfilled with auger cuttings and bentonite chips. Bulk sample obtained from 15'-20'.

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-08

Hole No. DP2-11-09

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,049,068.0 E 1,072,419.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-09	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9 / UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/26/2011 / COMPLETED 10/26/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +765.2
9. TOTAL DEPTH OF HOLE: 30.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+765.2	0.0		Topsoil (1.5')	40	1 0.0 1.5	2, 3, 3 N = 6
+763.7	1.5		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown with seams of gray silty clay - hard (CL)			
				73	2 2.5 4.0	7, 8, 11 N = 19 (w = 17.4%) Qp = 6.5-6.75 tsf
				80	3 5.0 6.5	6, 10, 13 N = 23 (w = 15.2%) Qp = 6.5-6.75 tsf
				100	4 7.5 9.0	7, 10, 13 N = 23 (w = 16.6%) Qp = 5.75-6.0 tsf
				56	5 10.0 12.5	3" Shelby Tube Qp = 4.5 tsf (w = 17.9%)
+752.7	12.5		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff to stiff (CL)	100	6 12.5 14.0	5, 8, 10 N = 18 (w = 16.2%) Qp = 2.75-3.0 tsf
				100	7 15.0 16.5	4, 7, 8 N = 15 (w = 16.7%) Qp = 2.5 tsf

Hole No. DP2-11-09

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 765.2 | **Hole No. DP2-11-09**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff to stiff (CL) *(continued)*	100	8 20.0 21.5	6, 6, 8 N = 14 (w = 18.6%) Qp = 1.5 tsf
				87	9 25.0 26.5	11, 14, 15 N = 29 (w = 17.5%) Qp = 3.5 tsf
				100	10 28.5 30.0	11, 13, 17 N = 30 (w = 16.8%) Qp = 3.5 tsf
+735.2	30.0		End of boring at 30'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 28.5 feet Boring advanced with split spoon sampler to 30 feet. Borehole Dry Borehole backfilled with auger cuttings and bentonite chips. Bulk sample taken from 0 to 10 feet deep.

Hole No. BCR-1

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,051,251.0 E 1,072,358.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: George E Gaffke	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): BCR-1	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 9/9/1993 COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 257.0	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		Clay Fill			
	5.0		Black peat (PT)			
	24.0		Blue clay (CL)			
	35.0		Sand and gravel (GP)			
	38.0		Blue clay with gravel (CL)			
	90.0		Blue clay (CL)			

Hole No. BCR-1

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. BCR-1

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Blue clay (CL) *(continued)*			
	208.0					
			Gravel with white clay (GC)			
	218.0					
			Limestone			

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PROJECT: Des Plaines II - ISWS Logs | HOLE NO. BCR-1

Hole No. BCR-1

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. BCR-1**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Limestone *(continued)*			
	257.0		End of boring at 257'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120973799700 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-2A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,051,254.0 E 1,073,030.0	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)*: BCR-2A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	0.0		FILL: Dark gray and brown silty clay A-6 (FILL: CL)			
	1.0		Very stiff gray and brown to brown clay loam A-6 (CL-ML)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974899900 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-2B

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,051,254.0 E 1,073,030.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): BCR-2B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED: 8/20/1997 — COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		FILL: intermixed dark brown, brown and gray, and brown silty clay loam or clay loam A-6 (FILL: CL)			
	2.5		Stiff to very stiff brown, brown-gray and gray clay loam A-6 (CL)			
	4.5		Medium stiff brown and gray clay loam A-6 (CL)			
	6.5		Stiff brown silty loam A-4 (ML)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974900300 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-3A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,051,259.0 E 1,073,712.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): BCR-3A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		FILL: Brown clay loam A-6 (FILL: CL)			
	4.5		Dark brown to black organic silty clay loam A-7-6 (OL)			
	5.0		Stiff to very stiff brown to gray clay loam A-6 (CL)			
	6.5		Medium stiff gray brown silty loam A-4 (ML)			
	9.5		Stiff to very stiff brown to grayish brown clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974900100 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-3B

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,051,259.0 E 1,073,712.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): BCR-3B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		FILL: Intermixed brown clay loam A-6 and dark brown organic silty clay loam A-7-6 (FILL: OL-CL)			
	1.5		Stiff to very stiff brown to grayish brown clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974900200 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-4A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,050,596.0 E 1,073,716.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): BCR-4A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		FILL: Intermixed brown and gray clay loam A-6 and dark brown organic silty clay loam A-7-6 (FILL: CL-OL)			
	3.5		Very stiff to hard brown to gray clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974899800 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-4B

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,050,596.0 E 1,073,716.0	11. DATUM FOR ELEVATION SHOWN (*TBM or MSL*)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (*As shown on drawing title and file number*): BCR-4B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED: 8/20/1997 — COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (*Drilling time, water loss, depth weathering, etc., if significant*) g
	0.0		Dark brown to black organic silty clay loam A-7-6 (OL)			
	2.5		Stiff to very stiff brown to grayish brown clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974900000 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-5A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,049,932.0 E 1,073,721.0	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)*: BCR-5A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	0.0		FILL: Dark brown and black organic silty clay laom A-7-6 (FILL: OL)			
	1.5		FILL: Brown sand A-1-a (SM)			
	3.0		Black organic silty clay loam A-7-6 (OL)			
	5.0		Stiff to very stiff grayish borwn to brown clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974899600 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-5B

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,049,932.0 E 1,073,721.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): BCR-5B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED: 8/20/1997 — COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		50mm root zone material dark brown organic silty clay loam A-7-6 (TOPSOIL)			
	1.2		Very stiff to hard brown clay loam A-6 (CL)			
	3.6		Dense brown sand A-1-b (SM)			
	6.3		Very hard brown to gray clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974899700 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-6A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,049,268.0 E 1,073,724.0	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)*: BCR-6A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	0.0		Stiff to very stiff brown clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974899300 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-6B

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,079,268.0 E 1,073,724.0	11. DATUM FOR ELEVATION SHOWN (*TBM or MSL*)
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (*As shown on drawing title and file number*): BCR-6B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 10.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (*Drilling time, water loss, depth weathering, etc., if significant*) g
	0.0		FILL: Dark brown and black organic silty clay loam A-7-6 (FILL: OL)			
	1.3		Stiff to very stiff gray borwn to brown clay loam A-6 (CL)			
	3.5		Brown sandy loam A-2-4 (SM)			
	5.5		Stiff to very stiff grayish brown to brown clay loam A-6 (CL)			
	10.0		End of boring at 10'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974899500 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-7

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,048,599.0 E 1,073,051.0	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY: Mirza Engineering, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)*: BCR-7	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 8/20/1997 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 12.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	0.0		330 Bituminous concrete, fill: brown and gray sand A-1a (FILL: SP)			
	2.0		Intermixed dark gray and brown clay loam A-6 (FILL: CL)			
	4.3		Black organic silty clay loam A-7-6 (OL)			
	9.0		Medium stiff brown clay loam A-6 (CL)			
	11.5		Stiff to very stiff brown silty clay A-6 (CL)			
	12.0		End of boring at 12'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120974898700 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of			

Hole No. BCR-7

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. BCR-7**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. BCR-8A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,048,932.0 E 1,070,704.0	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY: Kiene Fred & Son	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)*: BCR-8A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 1/1/1941 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 283.0	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	2.0		Black soil (TOPSOIL)			
			Clay, yellow (CL)			
	24.0					
	27.0		Sand (SM)			
			Clay, blue (CL)			

Hole No. BCR-8A

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. BCR-8A**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Clay, blue (CL) *(continued)*			
	110.0		Gravel and sand (GP)			
	175.0		Hardpan (ML)			

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PROJECT: Des Plaines II - ISWS Logs | HOLE NO. BCR-8A

Hole No. BCR-8A

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. BCR-8A**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
	240.0		Hardpan (ML) *(continued)*			
	262.0		white, dirty gravel with clay mixture (GC)			
	283.0		rock (BEDROCK)			
			End of boring at 283'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120970058800 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

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PROJECT: Des Plaines II - ISWS Logs | HOLE NO. BCR-8A

Hole No. BCR-8B

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Bull Creek Reservoir N 2,048,932.0 E 1,070,704.0	11. DATUM FOR ELEVATION SHOWN (*TBM or MSL*)
3. DRILLING AGENCY: Kiene Fred & Son	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (*As shown on drawing title and file number*): BCR-8B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED: 1/1/1940 — COMPLETED:
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 314.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (*Drilling time, water loss, depth weathering, etc., if significant*) g
	2.0		Black soil (TOPSOIL)			
			Clay, yellow (CL)			
	20.0					
	22.0		bed of sand (SM)			
			Clay, blue (CL)			

Hole No. BCR-8B

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. BCR-8B**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Clay, blue (CL) *(continued)*			
	108.0		White gravel and dirty sand mixture (GC)			
	175.0		Hardpan (ML)			

Hole No. BCR-8B

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. BCR-8B**

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Hardpan (ML) *(continued)*			
	245.0		White gravel and sand mixed (GP)			
	270.0		Rock, water (BEDROCK)			
	314.0		End of boring at 314'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120970058900 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

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PROJECT: Des Plaines II - ISWS Logs | HOLE NO. BCR-8B

AECOM

FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER BAKER | BORING STARTED 10/26/11 | ☐ DONUT

HELPER FRANKS | BORING COMPLETED 10/27/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS

WL: DRY WS OR WD

WL: ____ BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP1-11-06 CLIENT USACE WEATHER 50° overcast

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	1.3	SS	3	5			0.9	2.0		1'	TOPSOIL
1A	1.3	1.5	SS			7		0.2	3.5			si cl little f sand qr v stiff (CL) (fill)
	0	2.5	HAS									
2	2.5	4	SS	4	3	6		0.7	2.75		3.3'	Brn qr si cl v stiff (CL)
	2.5	5	HAS									All: 2.5-3.3 Topsoil & sand layer
3	5	6.5	SS	3	5	6		1.2'	3.25			same (CL) sand seam @ 5.3'
	5	7.5	HAS									
4	7.5	9	SS	4	6	8		1.1'	3.75		8'	gray orng (CL)
	7.5	10	HAS									
5	10	11.5	SS	5	5	6		1.1'	2.5			SAME (CL)
	10	12.5	HAS									
6	12.5	15	3" ST	P	U	S	H	1.5'	3.0			Same (CL) sand seam @ 15'
7	15	16.5	SS	3	5	7		0.9	1.25			SAME (CL) STIFF sand seam @ 15'
	15	20	HAS									to ground noted

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 1.3
FILL THICKNESS 3.3
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING
AFTER BORING COMPLETION
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH
HEIGHT OF SOIL RISE IN CASING
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett
DRILLER Baker
HELPER Franks
RIG MFG/MODEL D-50-ATV

SURFACE ELEV. _____
BORING STARTED 10/26/11
BORING COMPLETED 10/27/11
STATION _____
OFFSET _____

140 LB. HAMMER TYPE:
☐ DONUT
☐ SAFETY
☒ AUTOMATIC

CASING USED _____ SIZE _____

WATER LEVEL OBSERVATIONS
WL: DRY WS OR WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR. AB
WL: _____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP2-11-06 CLIENT USACE WEATHER 50° overcast

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION 24.5 - 25' Large gravel Driller observation Encountered gas pocket at 48.5-50' sample sulfer odor noted (so pen)
8	20	21.5	SS	4	7	10		1.3'	3			Same (CL) v. stiff
	20	25	HAS									
9	25	26.5	SS	5	5	7		1.5'	1.75			Same (CL) stiff
	25	30	HAS									
10	30	31.5	SS	6	8	14		1.3'	3.25			Same (CL) Salt seam & grv noted
	30	35	HAS									
11	35	36.5	SS	11	18	32		1.5'	4.5			Same (CL) HARD
	35	40	HAS									
12	40	41.5	SS	8	11	16		1.5'	3.0			Same (CL) v. stf
	40	45	HAS									
13	45	46.5	SS	11	12	17		1.5'	3.5			Same (CL)
	45	48.5	HAS								48'	
14	48.5	50	SS	27	41	60		1.5'	—			fc sz & grv gr dry gas bearing zone

ABBREVIATIONS
FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TDPSOIL THICKNESS 1.3'
FILL THICKNESS 3.3'
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

* Borehole allowed to stay open to let gas pressure dissipate
on 10/27 hole was backfilled w/ hydrated bentonite chips

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AECOM

FIELD BORING LOG

water rose 6" depth after excavation

SHEET 1 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/27/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/27/11 | ☐ SAFETY

RIG MFG/MODEL D50-ATV | STATION | ☒ AUTOMATIC

33 | OFFSET | CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS

WL: 4 WS OR (WD)

WL: ____ BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60272574 BORING NO. DB2-1-07 CLIENT USACE WEATHER 50° OVERCAST

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	0.5	SS	W				0.5'	0.5		0.5'	clayey topsoil
1A	0.5	2	SS		2	2	5	1.1'	0.75			br - si cl med (CL) possible fill
	0	2.5	PA									
2	2.5	3	SS	2				0.5'	1.25		3'	same
2A	3	4	SS		3	3		0.2'	—			organic silt
	2.5	5	PA									
3	5	7	SS	1	1	1	1	0.7	—			Peat
	5	7.5	PA									
4	7.5	9.5	SS	W	W	W	W	1.2'	—			Peat same
	7.5	10	PA									
5	10	12	SS	W	W	W	W	1.1'	0.25		10'	clayey silt v soft (CL-ML)
	0	12.5	HAS									
6	12.5	15	3" ST	P	U	S	H	2.1'	1.5		12.5'	si clay stiff gray (CL)
7	15	16.5	SS	3	4	5		0.7	0.75			same (MED)

ABBREVIATIONS

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HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.5
FILL THICKNESS 2' from 3'

CAVE-IN LEVEL:

WHILE DRILLING AND SAMPLING ____
AFTER BORING COMPLETION ____

WATER LOSS:

AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS

BOULDERS OR OBSTRUCTIONS:

AT ____ TO ____
AT ____ TO ____

ARTESIAN PRESSURE:

DEPTH ____
HEIGHT OF SOIL RISE IN CASING ____
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

AECOM

FIELD BORING LOG

TECHNICIAN Bickett | SURFACE ELEV. _____ | 140 LB. HAMMER TYPE:

DRILLER BAKER | BORING STARTED 10/27/11 | ☐ DONUT

HELPER FRANKS | BORING COMPLETED 10/27/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION _____ | ☒ AUTOMATIC

OFFSET _____ | CASING USED _____ SIZE _____

SHEET 2 OF _____

WATER LEVEL OBSERVATIONS

WL: 4 WS OR WD
water rose to 0.5' after 5 min

WL: _____ BCR _____ ACR

WL: _____ AB _____ HR. AB

WL: _____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP2-11-07 CLIENT USACE WEATHER 55° Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	15	20	HAS									
8	20	21.5	SS	3	4	5		1.4'	1.5			Same (CL) stiff
	20	25	HAS								23'	
9	25	26.5	SS	7	9	13		1.4'	3.5			Same (CL) V. Stiff
	25	28.5	HAS									
10	28.5	30	SS	7	12	18		1.5	3.5-4.5+			Same (CL) v. stiff – hard
				EOB				Backfilled w/ chips & cuttings				

ABBREVIATIONS

FT – FISH TAIL
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DB – DIAMOND BIT
PA – POWER AUGER
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HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.5'

FILL THICKNESS 0' poss. 3'

CAVE-IN LEVEL:

WHILE DRILLING AND SAMPLING _____

AFTER BORING COMPLETION _____

WATER LOSS:

AT _____ TO _____

PERCENT LOSS

AT _____ TO _____

PERCENT LOSS _____

BOULDERS OR OBSTRUCTIONS:

AT _____ TO _____

AT _____ TO _____

ARTESIAN PRESSURE:

DEPTH _____

HEIGHT OF SOIL RISE IN CASING _____

PIEZOMETER PVC OR SS DIAMETER _____ IN.

SCREEN DEPTH _____ FT. TO _____ FT.

RISER PIPE _____ FT. TO _____ FT.

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AECOM

W 2.7.8
7.2.2

FIELD BORING LOG

TECHNICIAN Bickett
DRILLER Baker
HELPER Franks
RIG MFG/MODEL D-50 ATV

SURFACE ELEV. _____
BORING STARTED 10/27/11
BORING COMPLETED 10/27/11
STATION _____
OFFSET Relocated hole to end of Cambridge

140 LB. HAMMER TYPE:
☐ DONUT
☐ SAFETY
☒ AUTOMATIC

CASING USED _____ SIZE _____

SHEET 1 OF 2

WATER LEVEL OBSERVATIONS

WL: 3' WS OR WD
15' water again WS
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR. AB
WL: _____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP2-11-08 CLIENT USACE WEATHER 55° clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	2	SS	W	2	2	2	0.9	—		2'	Bulk Sample from 15-20' Similar gr si clay as observed at other areas of site called DP2-11-08 Bulk 2
	0	2.5	PA									
2	2.5	4	SS	2	2	2		0.5				organic clayey silt
	2.5	5	HAS									
3	5	7	SS	1	1	1	1	0.1'	—			min. recovery organic cly/si
	5	7.5	HAS									
4	7.5	8	SS	2				0.4				same
4A	8	9	SS		1	3		0.9	0.5		8'	si clay gray (CL) med. trace organics
	7.5	10	HAS									
5	10	12.5	3" ST	P	U	S	H	1.7'	3.0		10'	si clay gr (CL) v. stf
	10	12.5	HAS									
6	12.5	14	SS	4	8	16		1.2'	3.5			same (CL)
	12.5	15	HAS									
7	15	16.5	SS	6	9	17		1.4'	3.5			same (CL)

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TOPSOIL THICKNESS 2'
FILL THICKNESS _____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

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AECOM

FIELD BORING LOG

TECHNICIAN Bickett
DRILLER Baker
HELPER Franks
RIG MFG/MODEL D-50 ATV

SURFACE ELEV. _____
BORING STARTED 10/27/11
BORING COMPLETED 10/27/11
STATION _____
OFFSET _____

140 LB. HAMMER TYPE:
☐ DONUT
☐ SAFETY
☒ AUTOMATIC
CASING USED _____ SIZE _____

SHEET 2 OF 2

WATER LEVEL OBSERVATIONS
WL: 3 WS OR WD
15' (WS)
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR. AB
WL: _____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP2-11-08 CLIENT USACE WEATHER 55° Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	15	20	HAS									
8	20	21.5	SS	6	8	11		1.4'	275			Same (CL)
	20	25	HAS									
9	25	26.5	SS	7	11	16		1.5'	275			Same (CL)
	25	28.5	HAS									
10	28.5	30	SS	12	14	16		1.5'	225			Same (CL) Sand Seams noted to 9"
						EOB		Back filled w/ chips & cuttings				

ABBREVIATIONS
FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST: 2'
TOPSOIL THICKNESS _____
FILL THICKNESS _____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

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AECOM

FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/26/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/26/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS

WL: Dry WS OR WD

WL: ____ BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60222374 BORING NO. DP2-11-09 CLIENT USACE WEATHER 45° overcast

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
												Auger cuttings collected for bulk sample
												0-10' Collect sample DP2-11-09 Bulk 1
1	0	1.5	SS	2	3	3		0.6'	–		1.5'	Topsoil Cly Sily
	0	2.5	PA									
2	2.5	4	SS	7	8	11		1.1'	4.5+			Si cl cly br fr f sand lgr hard (CL)
	2.5	5	PA									
3	5	6.5	SS	6	10	13		1.2'	4.5+			Same (CL)
	5	7.5	PA									
4	7.5	9	SS	7	10	13		1.5'	4.5+			Same (CL)
	7.5	10	PA									
5	10	12.5	3" ST	P	4	5	H	1.6'	4.5+		12'	BRN & gray to gr si cl hard
6	12.5	14	SS	5	8	10		1.5'	3.0			Same gr (CL) v stiff
	12.5	15	PA									
7	15	16.5	SS	4	7	8		1.5'	3.0			Same (CL)
	15	20	PA									
8	20	21.5	SS	6	6	8		1.5	1.75			Same (CL) stiff

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 1.5'
FILL THICKNESS
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING
AFTER BORING COMPLETION
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH
HEIGHT OF SOIL RISE IN CASING
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

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FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett
DRILLER Baker
HELPER Franks
RIG MFG/MODEL D50 ATV

SURFACE ELEV. _____
BORING STARTED 10/26/11
BORING COMPLETED 10/26/11
STATION _____
OFFSET _____

140 LB. HAMMER TYPE:
☐ DONUT
☐ SAFETY
☒ AUTOMATIC

CASING USED _____ SIZE _____

WATER LEVEL OBSERVATIONS
WL: Dry WS OR WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR. AB
WL: _____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP2-11-09 CLIENT USACE WEATHER 50° overcast

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	20	25	PA									
9	25	26.5	SS	11	14	15		1.3'	3.25			Lg grv piece noted Same (CL)
	25	28.5	PA									
10	28.5	30	SS	11	13	17		1.5'	2.75			Same (CL) seam of sand noted
					E	O	B	Backfilled w/ chips & cuttings				

ABBREVIATIONS
FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TOPSOIL THICKNESS 1.5'
FILL THICKNESS 0
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

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ATTACHMENT

D.3: Lab Testing Results

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
DP2-11-06	S-1A	1.3-1.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY - ROOTS, LIMESTONE AND LAYER OF BLACK SILTY CLAY NOTED	CL	15.7	3.5											
	S-2	2.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	20.7	2.5-2.75											
	S-3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAM OF SAND AND LAYERS OF GRAY SILTY CLAY NOTED	CL	11.4	2.0											
	S-4	7.5-9.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - POCKETS OF BROWN SILTY CLAY NOTED	CL	20.3	3.5-3.75											
	S-5	10.0-11.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	CL	21.5	1.75-2.0						38	18	20			
	S-6	12.5-15.0	SILTY CLAY TRACE F SAND - GRAY	CL	24.9	1.25											
	S-7	15.0-16.5	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL TRACE SHALE - GRAY	CL	14.9	1.75											
	S-8	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	20.8	2.75											
	S-9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	19.1	2.0-2.25											
	S-10	30.0-31.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAM OF SILT NOTED	CL	16.9	2.5-2.75											

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
	S-11	35.0-36.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	14.1	3.5-3.75											
	S-12	40.0-41.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	21.3	2.75											
	S-13	45.0-46.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	21.0	2.25-2.5											
	S-14	48.5-50.0	F-C GRAVEL LITTLE F-C SAND TRACE SILT - GRAY - LIMESTONE NOTED	GP	2.3												
DP2-11-07																	
	S-1	0.0-0.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY - ROOTS, SEAMS OF BLACK SILTY CLAY AND LAYERS OF TOPSOIL NOTED.	CL	32.6												
	S-1A	.5-2.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN - SEAMS OF GRAY SILTY CLAY AND LAYER OF BLACK SILTY CLAY NOTED	CL	22.6	0.5-1.0											
	S-2	2.5-3.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN GRAY	CL	22.3	1.75											
	S-3	5.0-7.0	PEAT - BLACK	-	332.3												
	S-4	7.5-9.5	PEAT - BLACK	-	529.2										81.67		
	S-5	10.0-12.0	ORGANIC CLAYEY SILT TRACE F SAND - GRAY	OL	390.6												
	S-6	12.5-15.0	ORGANIC SILTY CLAY TRACE F-M SAND - BLACK AND GRAY	OL	92.2	0.25	0.28 @ 0.76%										
	S-7	15.0-16.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	20.6	1.25-1.5											
	S-8	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	19.1	1.75-2.0											
	S-9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	CL	19.0	2.5						37	17	20			
	S-10	28.5-30.0	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL TRACE SHALE - GRAY	CL	18.5	4.25-4.5											
DP2-11-08																	
	S-1	0.0-2.0	CLAYEY TOPSOIL LITTLE SILT TRACE F-C SAND TRACE F GRAVEL - BLACK - LAYER OF GRAY CLAYEY TOPSOIL NOTED	OL	75.0	1.0											
	S-2	2.5-4.0	ORGANIC SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BLACK - ROOTS	OL	84.5												

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

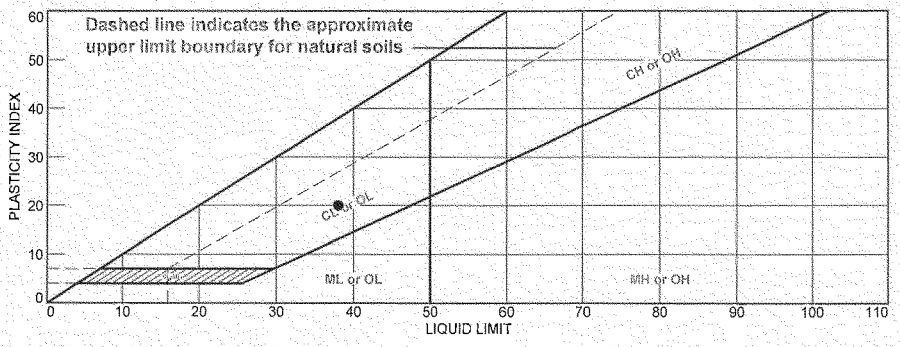
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
			NOTED														
	S-3	5.0-7.0	ORGANIC SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BLACK - ROOTS NOTED	OL	136.9							92	59	33	22.83		
	S-4	7.5-8.0	ORGANIC SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BLACK - ROOTS NOTED	OL	146.9												
	S-4A	8.0-9.0	SILTY CLAY TRACE F-C SAND - GRAY	CL	21.0	0.5											
	S-5	10.0-12.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	CL	19.5	1.75	2.59 @ 0.76%										
	S-6	12.5-14.0	SILTY CLAY TRACE F-C SANE TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.5	2.75-3.0											
	S-7	15.0-16.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.7	3.0-3.25											
	BULK 2	15.0-20.0	SILTY CLAY TRACE F-C SAND - GRAY	CL	34.8			0.2	9.7	38.8	51.3					105.6	17.3
	S-8	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	20.6	1.75-2.0											
	S-9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	20.4	1.75-2.0											
	S-10	28.5-30.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF 3.5 TON CLAY NOTED	CL	15.4	2.0											
DP2-11-09																	
	BULK 1	0.0-10.0	SILTY CLAY TRACE F-M SAND - GRAY TOPSOIL NOTED	CL				0.0	9.0	40.6	50.4					107.2	17.5
	S-2	2.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	17.4	6.5-6.75											
	S-3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	15.2	6.5-6.75											
	S-4	7.5-9.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	16.6	5.75-6.0											
	S-5	10.0-12.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN	CL	17.9	4.5	4.14 @ 0.76%										
	S-6	12.5-14.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL	CL	16.2	2.75-3.0											

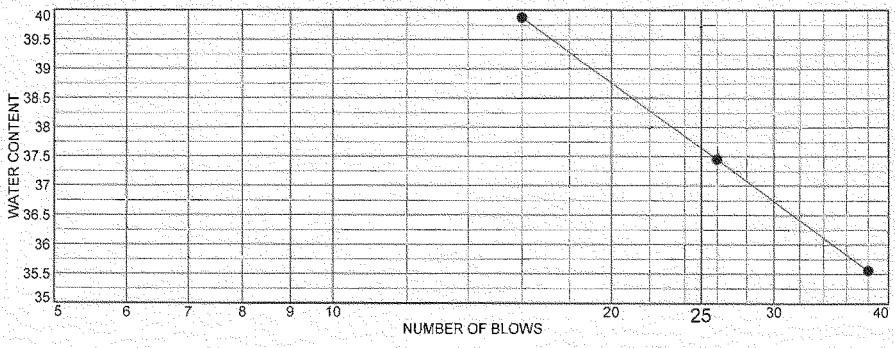
LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
			TRACE SHALE - GRAY														
	S-7	15.0-16.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	16.7	2.5											
	S-8	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.6	1.5											
	S-9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.5	3.5											
	S-10	28.5-30.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAM OF SAND NOTED	CL	16.8	3.5											

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	38	18	20			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

● **Source of Sample:** DP2-11-06 **Depth:** 10.0-11.5 **Sample Number:** S-5

Remarks:

● 1.75-2.0

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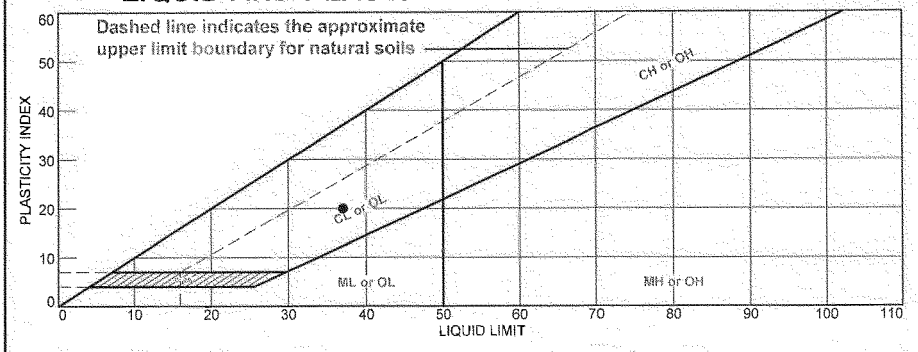
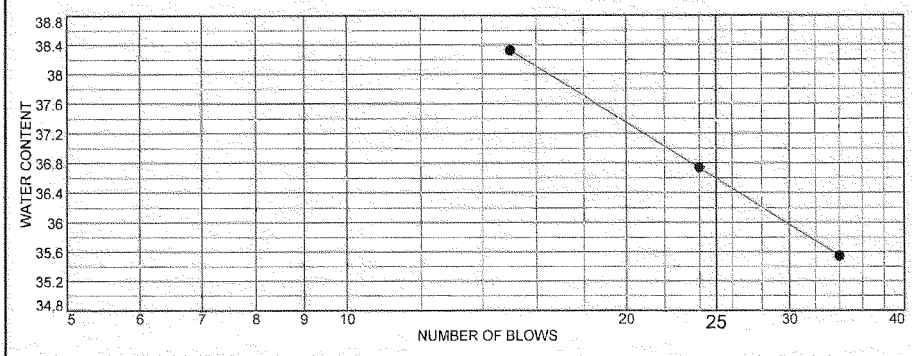
Tested By: ER **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	37	17	20			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

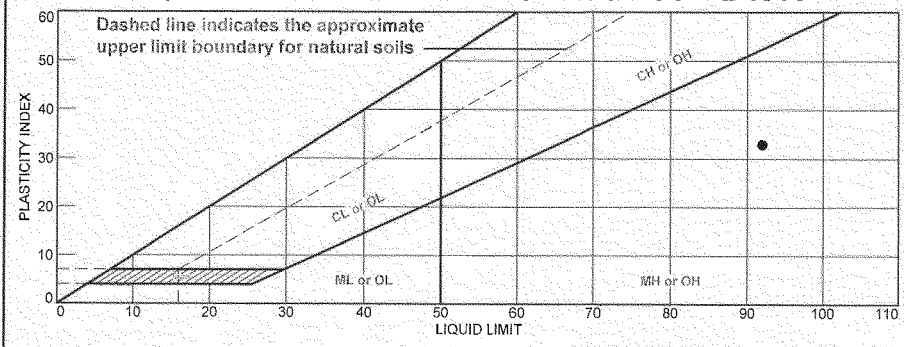
● **Source of Sample:** DP2-11-07 **Depth:** 25.0-26.5 **Sample Number:** S-9

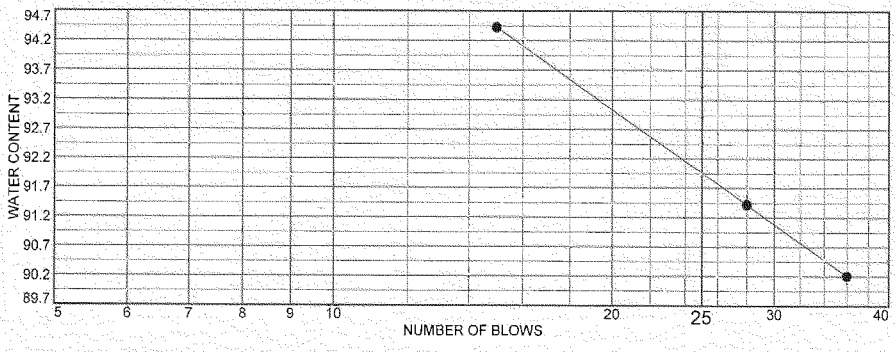
Remarks:

AECOM

Tested By: ER **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
•	ORGANIC SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BLACK - ROOTS NOTED	92	59	33			OL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

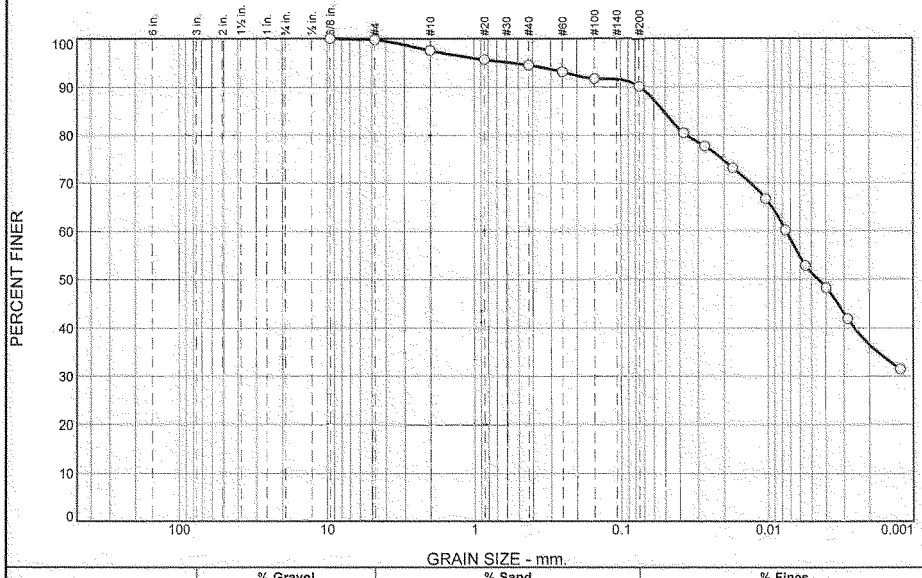
• **Source of Sample:** DP2-11-08 **Depth:** 5.0-7.0 **Sample Number:** S-3

Remarks:

AECOM

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	2.2	3.1	4.4	38.8	51.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.8		
#10	97.6		
#20	95.7		
#40	94.5		
#60	93.2		
#100	91.7		
#200	90.1		

* (no specification provided)

Material Description

SILTY CLAY TRACE F-C SAND - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0745 D_{85}= 0.0517 D_{60}= 0.0075
D_{50}= 0.0045 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Source of Sample: DP2-11-08 **Depth:** 15.0-20.0
Sample Number: BULK 2 **Date:** 11/9/11

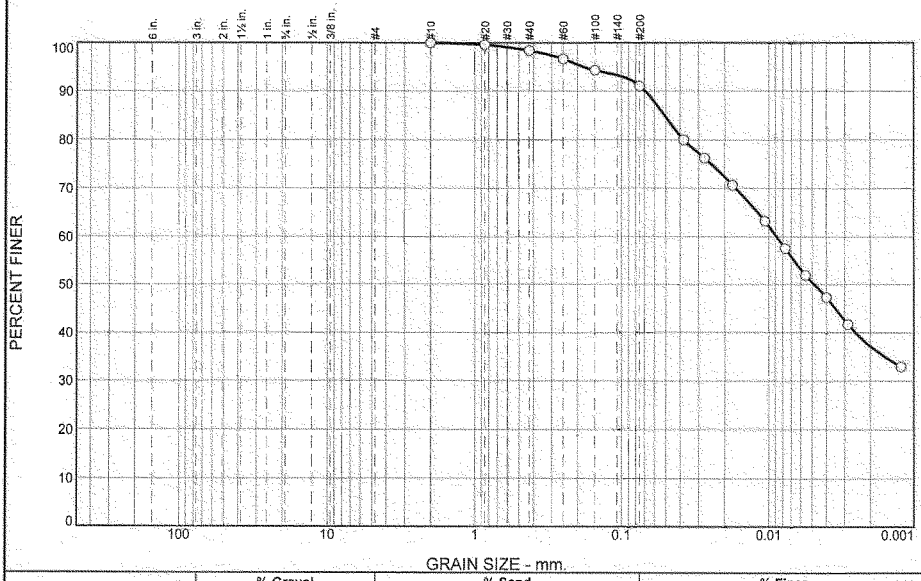
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.6	7.4	40.6	50.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.6		
#40	98.4		
#60	96.7		
#100	94.2		
#200	91.0		

* (no specification provided)

Material Description

SILTY CLAY TRACE F-M SAND - GRAY TOPSOIL NOTED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0694 D_{85}= 0.0512 D_{60}= 0.0088
D_{50}= 0.0049 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Source of Sample: DP2-11-09 **Depth:** 0.0-10.0
Sample Number: BULK 1 **Date:** 11/9/11

AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

AECOM

ORGANIC CONTENT TEST
ASTM D-2974
Method C

Laboratory Services Group *750 Corporate Woods Parkway, Vernon Hills, Illinois 60061* *Phone: (847) 279-2500 Fax:(847) 279-2550*

AECOM Project No.: 60223274
Project Name: DES PLAINES II
Date Tested: 11/2/2011

Sample Information

Boring / Source:	DP2-11-07	DP2-11-08
Sample No.:	4	3
Depth (ft.):	7.5'-9.5'	5.0'-7.0'

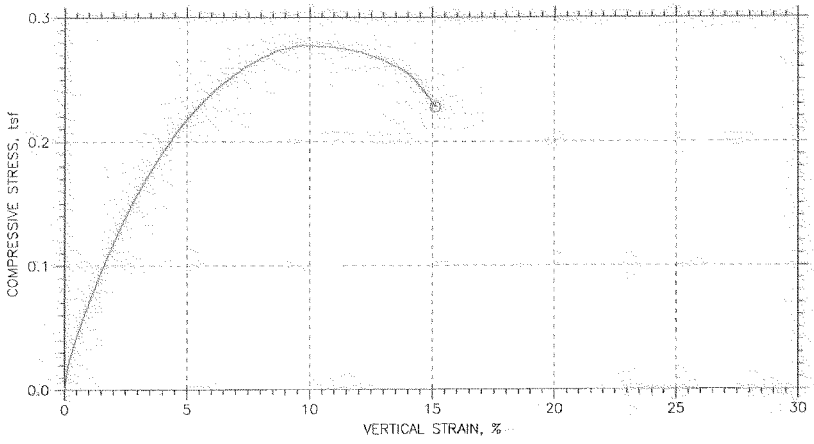
Organic Content Test Data

Tare No.:	G	H
Tare Wt. (gm): T	20.12	16.93
Wet Wt. + Tare (gm): A+T	47.24	47.44
Dry Wt. + Tare (gm): B+T	24.43	29.81
Moisture Content (%):	**529.23**	**136.88**
Wt. of Ash + Tare (gm): D+T	20.91	26.87
Percent Ash: (D-T/B-T)x100 = E	18.33	77.17
Organic Content (%):	**81.67**	**22.83**

** Note: Test performed by heating the sample to 440 degrees Centigrade until constant weight of ash is attained.

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21107S6			
Initial	Diameter, in	2.848			
	Height, in	6.0205			
	Water Content, %	92.16			
	Dry Density, pcf	46.14			
	Saturation, %	96.70			
	Void Ratio	2.3826			
Unconfined Compressive Strength, tsf		0.27809			
Undrained Shear Strength, tsf		0.13905			
Time to Failure, min		19			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.50			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21107 S-6 Depth: 12.5'-15.0'
Sample Type: 3" ST
Description: ORGANIC SILTY CLAY TRACE F-M SAND - BLACK AND GRAY OL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:51:53

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21107 S-6
Sample No.: S-6
Test No.: DP21107S6

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 12.5'-15.0'
Elevation: -----

AECOM

Soil Description: ORGANIC SILTY CLAY TRACE F-M SAND - BLACK AND GRAY OL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.02 in
Specimen Area: 6.37 inA2
Specimen Volume: 38.35 inA3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.50

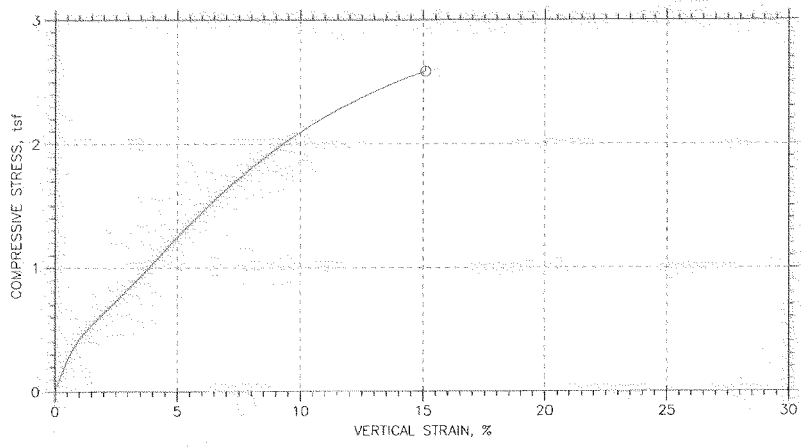
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3706	0	0
2	0.10412	0.0020095	0.033378	0.78927	6.3727	0.0089173	0.0044587
3	0.20412	0.0050238	0.083446	1.3681	6.3759	0.015449	0.0077245
4	0.30413	0.0081295	0.13503	1.789	6.3792	0.020192	0.010096
5	0.40413	0.011144	0.1851	2.1047	6.3824	0.023743	0.011872
6	0.50415	0.014341	0.2382	2.4204	6.3858	0.02729	0.013645
7	0.60413	0.017538	0.2913	2.6835	6.3892	0.030241	0.01512
8	0.70413	0.020552	0.34137	2.9992	6.3924	0.033781	0.016891
9	0.80413	0.023749	0.39447	3.3149	6.3958	0.037318	0.018659
10	0.90413	0.026763	0.44454	3.578	6.399	0.040258	0.02013
11	1.0042	0.029869	0.49612	3.8411	6.4024	0.043197	0.021598
12	1.1041	0.033157	0.55074	4.1042	6.4059	0.04613	0.023065
13	1.2042	0.036263	0.60233	4.3673	6.4092	0.049062	0.024531
14	1.3042	0.039277	0.65239	4.683	6.4124	0.052582	0.026291
15	1.4042	0.042383	0.70398	4.8935	6.4158	0.054917	0.027458
16	1.5042	0.045397	0.75405	5.1566	6.419	0.05784	0.02892
17	1.6042	0.048411	0.80411	5.4723	6.4222	0.06135	0.030675
18	1.7042	0.051517	0.8557	5.6828	6.4256	0.063677	0.031838
19	1.8042	0.054623	0.90728	5.8932	6.4289	0.066001	0.033
20	1.9042	0.057728	0.95887	6.1563	6.4323	0.068911	0.034456
21	2.0042	0.060925	1.012	6.3668	6.4357	0.071229	0.035615
22	2.1042	0.063848	1.0605	6.6299	6.4389	0.074136	0.037068
23	2.2042	0.066954	1.1121	6.8404	6.4422	0.07645	0.038225
24	2.3	0.069968	1.1622	7.0508	6.4455	0.078762	0.039381
25	2.4	0.073074	1.2138	7.2613	6.4489	0.081071	0.040535
26	2.5	0.076179	1.2653	7.4718	6.4522	0.083377	0.041689
27	2.6	0.079194	1.3154	7.7349	6.4555	0.086269	0.043135
28	2.7	0.082208	1.3655	7.9453	6.4588	0.088572	0.044286
29	2.8	0.085496	1.4201	8.2611	6.4624	0.09204	0.04602
30	2.9	0.088511	1.4702	8.4715	6.4656	0.094337	0.047169
31	3	0.091616	1.5217	8.682	6.469	0.09663	0.048315
32	3.1	0.094813	1.5748	8.8925	6.4725	0.098919	0.04946
33	3.2	0.097919	1.6264	9.1029	6.4759	0.10121	0.050604
34	3.3	0.10093	1.6765	9.3134	6.4792	0.1035	0.051748
35	3.4	0.10395	1.7266	9.5765	6.4825	0.10636	0.053182
36	3.5001	0.10705	1.7782	9.8396	6.4859	0.10923	0.054615
37	3.6	0.11016	1.8297	9.9975	6.4893	0.11092	0.055462
38	3.7	0.11326	1.8813	10.261	6.4927	0.11378	0.056891
39	3.8	0.11637	1.9329	10.418	6.4962	0.11547	0.057736
40	3.9	0.11948	1.9845	10.629	6.4996	0.11774	0.058872
41	4.0001	0.12258	2.0361	10.839	6.503	0.12001	0.060006
42	4.1	0.12578	2.0892	11.05	6.5065	0.12228	0.061138
43	4.2	0.12879	2.1392	11.208	6.5098	0.12396	0.061979
44	4.3	0.13181	2.1893	11.418	6.5132	0.12622	0.063111
45	4.4	0.13491	2.2409	11.629	6.5166	0.12848	0.06424
46	4.5001	0.13802	2.2925	11.839	6.5201	0.13074	0.065369
47	4.6001	0.14122	2.3456	12.05	6.5236	0.13299	0.066495
48	4.7001	0.14414	2.3941	12.26	6.5268	0.13524	0.067622
49	4.8001	0.14724	2.4457	12.418	6.5303	0.13691	0.068457
50	4.9001	0.15044	2.4988	12.628	6.5339	0.13916	0.069579
51	5.0001	0.15345	2.5489	12.786	6.5372	0.14083	0.070413
52	5.1001	0.15647	2.599	12.997	6.5406	0.14307	0.071535
53	5.2001	0.15957	2.6505	13.207	6.544	0.14531	0.072655
54	5.3001	0.16268	2.7021	13.418	6.5475	0.14755	0.073774
55	5.4001	0.16579	2.7537	13.575	6.551	0.1492	0.074602
56	5.5001	0.1688	2.8038	13.786	6.5544	0.15144	0.07572
57	5.6001	0.17191	2.8554	13.944	6.5578	0.15309	0.076546
58	5.7001	0.17501	2.9069	14.154	6.5613	0.15532	0.07766
59	5.8001	0.17803	2.957	14.312	6.5647	0.15697	0.078486
60	5.9001	0.18113	3.0086	14.47	6.5682	0.15862	0.079309
61	6.0001	0.18415	3.0587	14.628	6.5716	0.16027	0.080133
62	6.2501	0.19182	3.1861	15.049	6.5802	0.16466	0.082331
63	6.5001	0.19949	3.3136	15.522	6.5889	0.16962	0.08481
64	6.7501	0.20716	3.441	15.943	6.5976	0.17399	0.086995
65	7.0001	0.21484	3.5684	16.312	6.6063	0.17777	0.088887
66	7.2501	0.2226	3.6974	16.733	6.6152	0.18212	0.091059
67	7.5001	0.23018	3.8233	17.101	6.6238	0.18588	0.092942
68	7.7501	0.23795	3.9523	17.469	6.6327	0.18963	0.094817
69	8.0001	0.24571	4.0813	17.89	6.6416	0.19394	0.096971
70	8.2502	0.25338	4.2087	18.206	6.6505	0.1971	0.098551
71	8.5002	0.26106	4.3361	18.574	6.6593	0.20082	0.10041
72	8.7502	0.26882	4.4651	18.943	6.6683	0.20453	0.10226
73	9.0002	0.27658	4.5941	19.311	6.6773	0.20822	0.10411
74	9.2502	0.28435	4.723	19.627	6.6864	0.21134	0.10567
75	9.5002	0.29211	4.852	19.942	6.6954	0.21445	0.10723
76	9.7502	0.29979	4.9794	20.258	6.7044	0.21755	0.10878
77	10	0.30746	5.1069	20.521	6.7134	0.22008	0.11004
78	10.25	0.31513	5.2343	20.837	6.7225	0.22317	0.11158
79	10.5	0.3228	5.3618	21.1	6.7315	0.22568	0.11284
80	10.75	0.33048	5.4892	21.416	6.7406	0.22875	0.11438
81	11	0.33824	5.6182	21.679	6.7498	0.23125	0.11562

82	11.25	0.34591	5.7456	21.994	6.7589	0.2343	0.11715
83	11.5	0.35377	5.8761	22.205	6.7683	0.23621	0.11811
84	11.75	0.36135	6.002	22.468	6.7774	0.23869	0.11935
85	12	0.36921	6.1325	22.731	6.7868	0.24115	0.12058
86	12.25	0.3767	6.2569	22.994	6.7958	0.24362	0.12181
87	12.5	0.38446	6.3859	23.205	6.8052	0.24551	0.12275
88	12.75	0.39213	6.5133	23.415	6.8144	0.2474	0.1237
89	13	0.3998	6.6408	23.626	6.8237	0.24928	0.12464
90	13.25	0.40748	6.7682	23.836	6.8331	0.25116	0.12558
91	13.5	0.41506	6.8941	24.099	6.8423	0.25359	0.12679
92	13.75	0.4231	7.0276	24.257	6.8521	0.25488	0.12744
93	14	0.4305	7.1505	24.467	6.8612	0.25676	0.12838
94	14.25	0.43826	7.2795	24.731	6.8707	0.25916	0.12958
95	14.5	0.44602	7.4085	24.888	6.8803	0.26045	0.13022
96	14.75	0.45379	7.5374	25.099	6.8899	0.26228	0.13114
97	15	0.46146	7.6649	25.257	6.8994	0.26357	0.13179
98	15.25	0.46923	7.7938	25.415	6.9091	0.26485	0.13242
99	15.5	0.4769	7.9213	25.572	6.9186	0.26612	0.13306
100	15.75	0.48457	8.0487	25.783	6.9282	0.26794	0.13397
101	16	0.49233	8.1777	25.888	6.938	0.26866	0.13433
102	16.25	0.50028	8.3097	26.046	6.9479	0.26991	0.13495
103	16.5	0.50805	8.4386	26.256	6.9577	0.27171	0.13585
104	16.75	0.51581	8.5676	26.414	6.9675	0.27296	0.13648
105	17	0.52357	8.6966	26.52	6.9774	0.27366	0.13683
106	17.25	0.53134	8.8255	26.625	6.9872	0.27435	0.13718
107	17.5	0.53892	8.9514	26.73	6.9969	0.27506	0.13753
108	17.75	0.54677	9.0819	26.783	7.007	0.27521	0.1376
109	18	0.55472	9.2139	26.835	7.0171	0.27535	0.13767
110	18.25	0.56276	9.3474	27.046	7.0275	0.2771	0.13855
111	18.5	0.57034	9.4734	27.046	7.0373	0.27671	0.13836
112	18.75	0.57801	9.6008	27.151	7.0472	0.2774	0.1387
113	19	0.58541	9.7237	27.256	7.0568	0.27809	0.13905
114	19.25	0.59299	9.8496	27.204	7.0666	0.27717	0.13859
115	19.5	0.60067	9.9771	27.256	7.0766	0.27731	0.13866
116	19.75	0.60834	10.105	27.309	7.0867	0.27746	0.13873
117	20	0.61601	10.232	27.309	7.0967	0.27706	0.13853
118	20.25	0.62387	10.362	27.309	7.1071	0.27666	0.13833
119	20.5	0.63145	10.488	27.361	7.117	0.2768	0.1384
120	20.75	0.63912	10.616	27.414	7.1272	0.27694	0.13847
121	21	0.64698	10.746	27.467	7.1376	0.27707	0.13853
122	21.25	0.65456	10.872	27.414	7.1477	0.27615	0.13807
123	21.5	0.66241	11.003	27.414	7.1582	0.27574	0.13787
124	21.75	0.67	11.129	27.414	7.1683	0.27535	0.13768
125	22	0.67776	11.258	27.467	7.1787	0.27548	0.13774
126	22.25	0.68552	11.387	27.467	7.1892	0.27508	0.13754
127	22.5	0.6932	11.514	27.414	7.1995	0.27416	0.13708
128	22.75	0.70087	11.641	27.414	7.2099	0.27376	0.13688
129	23	0.70854	11.769	27.361	7.2203	0.27284	0.13642
130	23.25	0.71621	11.896	27.414	7.2308	0.27297	0.13649
131	23.5	0.72389	12.024	27.414	7.2413	0.27258	0.13629
132	23.75	0.73156	12.151	27.361	7.2518	0.27166	0.13583
133	24	0.73914	12.277	27.309	7.2622	0.27075	0.13538
134	24.25	0.74681	12.405	27.256	7.2727	0.26984	0.13492
135	24.5	0.75458	12.534	27.204	7.2835	0.26892	0.13446
136	24.75	0.76225	12.661	27.151	7.2941	0.26801	0.134
137	25	0.77011	12.791	27.098	7.305	0.26709	0.13354
138	25.25	0.77769	12.917	27.046	7.3156	0.26619	0.13309
139	25.5	0.78545	13.046	26.993	7.3264	0.26527	0.13264
140	25.75	0.79312	13.174	26.888	7.3372	0.26385	0.13193
141	26	0.80107	13.306	26.73	7.3483	0.2619	0.13095
142	26.251	0.80884	13.435	26.677	7.3593	0.261	0.1305
143	26.501	0.8166	13.564	26.625	7.3703	0.2601	0.13005
144	26.751	0.82436	13.693	26.52	7.3813	0.25868	0.12934
145	27.001	0.83222	13.823	26.414	7.3925	0.25727	0.12863
146	27.251	0.83989	13.951	26.256	7.4034	0.25535	0.12768
147	27.501	0.84756	14.078	26.099	7.4144	0.25344	0.12672
148	27.751	0.85533	14.207	25.888	7.4255	0.25102	0.12551
149	28.001	0.863	14.334	25.625	7.4366	0.2481	0.12405
150	28.251	0.87086	14.465	25.309	7.4479	0.24467	0.12233
151	28.501	0.87862	14.594	25.046	7.4592	0.24176	0.12088
152	28.751	0.88639	14.723	24.731	7.4705	0.23835	0.11918
153	29.001	0.89415	14.852	24.467	7.4818	0.23546	0.11773
154	29.251	0.90191	14.981	24.099	7.4931	0.23156	0.11578
155	29.501	0.90968	15.11	23.731	7.5045	0.22768	0.11384

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		○			
Test No.		DP21102S5			
Initial	Diameter, in	2.7929			
	Height, in	5.9976			
	Water Content, %	19.54			
	Dry Density, pcf	110.9			
	Saturation, %	99.99			
	Void Ratio	0.5314			
Unconfined Compressive Strength, tsf		2.5864			
Undrained Shear Strength, tsf		1.2932			
Time to Failure, min		29.5			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		0			
Plastic Limit		0			
Plasticity Index		0			
Failure Sketch					

Project: DES PLAINES II

Location: DES PLAINES, IL

Project No.: 60223274

Boring No.: DP21108 S-5 Depth: 10.0'-12.5'

Sample Type: 3" ST

Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL

Remarks: TEST PERFORMED AS PER ASTM D 2166

Thu, 17-NOV-2011 14:49:18

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21108 S-5
Sample No.: S-5
Test No.: DP21102S5

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 10.0'-12.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.00 in
Specimen Area: 6.13 inA2
Specimen Volume: 36.74 inA3

Liquid Limit: 0
Plastic Limit: 0
Estimated Specific Gravity: 2.72

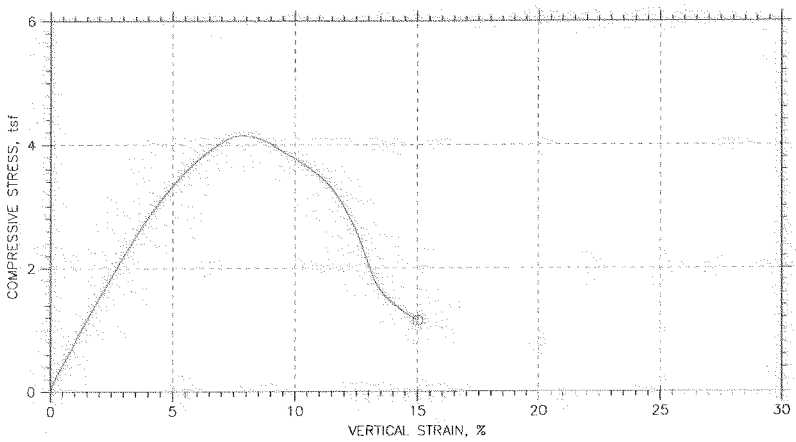
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.1264	0	0
2	0.104	0.0017355	0.028936	2.6835	6.1282	0.031529	0.015764
3	0.204	0.0047498	0.079194	5.1566	6.1312	0.060554	0.030277
4	0.304	0.0078554	0.13098	7.1561	6.1344	0.083991	0.041996
5	0.404	0.01087	0.18123	9.1556	6.1375	0.10741	0.053703
6	0.50403	0.013884	0.23149	11.05	6.1406	0.12956	0.064781
7	0.604	0.016807	0.28023	12.997	6.1436	0.15231	0.076157
8	0.704	0.019821	0.33048	15.154	6.1467	0.17751	0.088754
9	0.804	0.022927	0.38227	17.206	6.1499	0.20144	0.10072
10	0.90402	0.02585	0.431	19.627	6.1529	0.22967	0.11483
11	1.004	0.028955	0.48278	21.837	6.1561	0.25539	0.1277
12	1.104	0.032061	0.53456	23.678	6.1593	0.27679	0.13839
13	1.204	0.035075	0.58482	25.415	6.1624	0.29694	0.14847
14	1.304	0.03809	0.63508	27.204	6.1655	0.31768	0.15884
15	1.404	0.041104	0.68534	28.677	6.1687	0.33471	0.16736
16	1.5041	0.04421	0.73712	30.098	6.1719	0.35111	0.17556
17	1.604	0.047407	0.79042	31.466	6.1752	0.36688	0.18344
18	1.704	0.050421	0.84068	32.729	6.1783	0.38141	0.1907
19	1.804	0.053435	0.89094	34.044	6.1815	0.39653	0.19827
20	1.904	0.056541	0.94272	35.359	6.1847	0.41164	0.20582
21	2.0041	0.059646	0.9945	36.464	6.1879	0.42428	0.21214
22	2.104	0.062752	1.0463	37.569	6.1912	0.43691	0.21846
23	2.204	0.065766	1.0965	38.78	6.1943	0.45076	0.22538
24	2.304	0.068872	1.1483	39.779	6.1976	0.46214	0.23107
25	2.404	0.071978	1.2001	40.832	6.2008	0.47411	0.23706
26	2.5041	0.074992	1.2504	41.831	6.204	0.48547	0.24274
27	2.6041	0.078006	1.3006	42.884	6.2071	0.49743	0.24872
28	2.7041	0.080929	1.3494	43.831	6.2102	0.50817	0.25408
29	2.8041	0.084126	1.4027	44.831	6.2135	0.51948	0.25974
30	2.9041	0.087232	1.4544	45.725	6.2168	0.52957	0.26478
31	3.0041	0.090246	1.5047	46.672	6.22	0.54026	0.27013
32	3.1041	0.093352	1.5565	47.567	6.2233	0.55033	0.27516
33	3.2041	0.096457	1.6083	48.514	6.2265	0.56099	0.28049
34	3.3041	0.099472	1.6585	49.408	6.2297	0.57104	0.28552
35	3.4041	0.10249	1.7088	50.303	6.2329	0.58108	0.29054
36	3.5041	0.1055	1.759	51.145	6.2361	0.5905	0.29525
37	3.6041	0.10851	1.8093	52.092	6.2393	0.60113	0.30057
38	3.7041	0.11162	1.8611	53.039	6.2426	0.61174	0.30587
39	3.8041	0.11473	1.9129	53.828	6.2459	0.62051	0.31026
40	3.9041	0.11783	1.9646	54.776	6.2492	0.6311	0.31555
41	4.0041	0.12085	2.0149	55.617	6.2524	0.64047	0.32023
42	4.1041	0.12386	2.0651	56.407	6.2556	0.64923	0.32461
43	4.2041	0.12697	2.1169	57.354	6.2589	0.65978	0.32989
44	4.3041	0.12998	2.1672	58.248	6.2621	0.66972	0.33486
45	4.4041	0.13309	2.219	59.09	6.2654	0.67904	0.33952
46	4.5041	0.13619	2.2707	59.985	6.2687	0.68896	0.34448
47	4.6041	0.13921	2.321	60.827	6.272	0.69827	0.34913
48	4.7041	0.14231	2.3728	61.669	6.2753	0.70756	0.35378
49	4.8041	0.14533	2.423	62.563	6.2785	0.71745	0.35873
50	4.9041	0.14843	2.4748	63.563	6.2819	0.72853	0.36426
51	5.0041	0.15154	2.5266	64.457	6.2852	0.73839	0.3692
52	5.1041	0.15464	2.5784	65.299	6.2885	0.74764	0.37382
53	5.2041	0.15766	2.6286	66.194	6.2918	0.75749	0.37874
54	5.3041	0.16076	2.6804	67.141	6.2951	0.76792	0.38396
55	5.4041	0.16378	2.7307	68.035	6.2984	0.77775	0.38887
56	5.5041	0.16688	2.7825	68.982	6.3017	0.78815	0.39408
57	5.6041	0.1699	2.8327	69.877	6.305	0.79796	0.39898
58	5.7041	0.173	2.8845	70.824	6.3084	0.80835	0.40417
59	5.8041	0.17602	2.9348	71.824	6.3116	0.81933	0.40967
60	5.9041	0.17912	2.9865	72.771	6.315	0.82969	0.41485
61	6.0041	0.18214	3.0368	73.613	6.3183	0.83886	0.41943
62	6.2542	0.1899	3.1663	75.928	6.3267	0.86409	0.43204
63	6.5042	0.19757	3.2942	78.454	6.3351	0.89165	0.44582
64	6.7542	0.20534	3.4236	80.874	6.3436	0.91793	0.45896
65	7.0042	0.2131	3.5531	83.347	6.3521	0.94473	0.47236
66	7.2542	0.22077	3.681	85.82	6.3605	0.97147	0.48574
67	7.5042	0.22854	3.8105	88.293	6.3691	0.99812	0.49906
68	7.7542	0.23621	3.9384	90.872	6.3776	1.0259	0.51295
69	8.0042	0.24388	4.0663	93.345	6.3861	1.0524	0.52621
70	8.2542	0.25165	4.1958	95.818	6.3947	1.0788	0.53942
71	8.5042	0.25941	4.3252	98.554	6.4034	1.1082	0.55408
72	8.7542	0.26718	4.4547	101.08	6.412	1.135	0.56751
73	9	0.27476	4.5811	103.61	6.4205	1.1618	0.58092
74	9.25	0.28243	4.709	106.24	6.4291	1.1897	0.59487
75	9.5	0.29019	4.8385	108.76	6.4379	1.2164	0.60818
76	9.7501	0.29796	4.9679	111.29	6.4467	1.2429	0.62146
77	10	0.30563	5.0959	113.92	6.4553	1.2706	0.6353
78	10.25	0.31349	5.2268	116.44	6.4643	1.297	0.64849
79	10.5	0.32125	5.3563	119.02	6.4731	1.3239	0.66194
80	10.75	0.3292	5.4888	121.34	6.4822	1.3477	0.67387
81	11	0.33696	5.6182	123.92	6.4911	1.3745	0.68725

82	11.25	0.34482	5.7492	126.34	6.5001	1.3994	0.6997
83	11.5	0.35258	5.8787	128.76	6.509	1.4242	0.71212
84	11.75	0.36025	6.0066	131.28	6.5179	1.4502	0.72511
85	12	0.36793	6.1345	133.76	6.5268	1.4755	0.73776
86	12.25	0.37542	6.2594	136.28	6.5355	1.5014	0.75069
87	12.5	0.38318	6.3889	138.65	6.5445	1.5254	0.76268
88	12.75	0.39085	6.5168	141.02	6.5535	1.5493	0.77464
89	13	0.39862	6.6462	143.38	6.5626	1.5731	0.78656
90	13.25	0.40602	6.7696	145.59	6.5712	1.5953	0.79763
91	13.5	0.41378	6.8991	147.91	6.5804	1.6184	0.80919
92	13.75	0.42154	7.0285	150.28	6.5895	1.642	0.821
93	14	0.42913	7.1549	152.59	6.5985	1.665	0.83251
94	14.25	0.43671	7.2813	154.8	6.6075	1.6868	0.84342
95	14.5	0.44447	7.4108	157.01	6.6167	1.7085	0.85427
96	14.75	0.45214	7.5387	159.01	6.6259	1.7279	0.86395
97	15	0.45973	7.6651	161.33	6.635	1.7507	0.87533
98	15.25	0.46749	7.7946	163.8	6.6443	1.775	0.8875
99	15.5	0.47525	7.924	166.17	6.6536	1.7981	0.89907
100	15.75	0.48284	8.0504	168.33	6.6628	1.819	0.90949
101	16	0.49051	8.1784	170.27	6.6721	1.8375	0.91873
102	16.25	0.49809	8.3048	172.22	6.6813	1.8559	0.92795
103	16.5	0.50576	8.4327	174.32	6.6906	1.876	0.93798
104	16.75	0.51334	8.5591	176.38	6.6998	1.8954	0.94772
105	17	0.52102	8.687	178.48	6.7092	1.9154	0.95768
106	17.25	0.52869	8.815	180.38	6.7186	1.933	0.96649
107	17.5	0.53673	8.949	182.43	6.7285	1.9521	0.97605
108	17.75	0.54413	9.0723	184.43	6.7377	1.9708	0.98541
109	18	0.55171	9.1987	186.27	6.747	1.9877	0.99387
110	18.25	0.55929	9.3251	188.27	6.7564	2.0063	1.0031
111	18.5	0.56696	9.4531	190	6.766	2.0219	1.011
112	18.75	0.57454	9.5795	191.9	6.7754	2.0392	1.0196
113	19	0.58231	9.7089	193.85	6.7852	2.057	1.0285
114	19.25	0.58998	9.8369	195.79	6.7948	2.0747	1.0373
115	19.5	0.59774	9.9663	197.48	6.8046	2.0895	1.0448
116	19.75	0.60542	10.094	199.32	6.8142	2.106	1.053
117	20	0.61309	10.222	201.21	6.8239	2.123	1.0615
118	20.25	0.62076	10.35	203.11	6.8337	2.1399	1.07
119	20.5	0.62843	10.478	204.84	6.8435	2.1552	1.0776
120	20.75	0.6362	10.607	206.53	6.8534	2.1697	1.0849
121	21	0.64378	10.734	208.16	6.8631	2.1838	1.0919
122	21.25	0.65145	10.862	210	6.8729	2.1999	1.1
123	21.5	0.65913	10.99	211.79	6.8828	2.2155	1.1077
124	21.75	0.66671	11.116	213.37	6.8926	2.2288	1.1144
125	22	0.67429	11.243	215.1	6.9024	2.2438	1.1219
126	22.25	0.68196	11.37	216.68	6.9124	2.257	1.1285
127	22.5	0.68954	11.497	218.58	6.9222	2.2735	1.1367
128	22.75	0.69722	11.625	220.05	6.9323	2.2855	1.1427
129	23	0.70489	11.753	221.63	6.9423	2.2985	1.1493
130	23.25	0.71265	11.882	223.15	6.9525	2.311	1.1555
131	23.5	0.72032	12.01	224.63	6.9626	2.3229	1.1614
132	23.75	0.72809	12.14	226.42	6.9729	2.3379	1.169
133	24	0.73604	12.272	227.99	6.9834	2.3507	1.1753
134	24.25	0.74371	12.4	229.68	6.9936	2.3646	1.1823
135	24.5	0.75147	12.529	231.31	7.004	2.3778	1.1889
136	24.75	0.75924	12.659	232.68	7.0143	2.3884	1.1942
137	25	0.76682	12.785	234.26	7.0245	2.4011	1.2005
138	25.25	0.77458	12.915	235.78	7.0349	2.4131	1.2066
139	25.5	0.78225	13.043	237.2	7.0453	2.4241	1.2121
140	25.75	0.78984	13.169	238.68	7.0555	2.4356	1.2178
141	26	0.79751	13.297	239.99	7.066	2.4454	1.2227
142	26.25	0.80518	13.425	241.57	7.0764	2.4579	1.2289
143	26.5	0.81267	13.55	243.15	7.0866	2.4704	1.2352
144	26.75	0.82016	13.675	244.46	7.0969	2.4802	1.2401
145	27	0.82774	13.801	245.94	7.1073	2.4915	1.2457
146	27.25	0.83542	13.929	247.31	7.1178	2.5016	1.2508
147	27.5	0.84309	14.057	248.62	7.1284	2.5112	1.2556
148	27.75	0.85085	14.186	250.04	7.1392	2.5217	1.2609
149	28	0.85843	14.313	251.41	7.1497	2.5318	1.2659
150	28.25	0.86629	14.444	252.94	7.1607	2.5432	1.2716
151	28.5	0.87405	14.573	254.15	7.1715	2.5516	1.2758
152	28.75	0.88182	14.703	255.46	7.1824	2.5609	1.2804
153	29	0.88958	14.832	256.78	7.1933	2.5702	1.2851
154	29.25	0.89735	14.962	258.09	7.2043	2.5794	1.2897
155	29.5	0.90529	15.094	259.2	7.2155	2.5864	1.2932

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21109S5			
Initial	Diameter, in	2.8299			
	Height, in	5.8827			
	Water Content, %	16.25			
	Dry Density, pcf	117.6			
	Saturation, %	99.52			
	Void Ratio	0.4441			
Unconfined Compressive Strength, tsf		4.1445			
Undrained Shear Strength, tsf		2.0723			
Time to Failure, min		15.5			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21109 S-5 Depth: 10.0'-12.5'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:47:42

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21109 S-5
Sample No.: S-5
Test No.: DP21109S5

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 10.0'-12.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.88 in
Specimen Area: 6.29 in^2
Specimen Volume: 37.00 in^3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

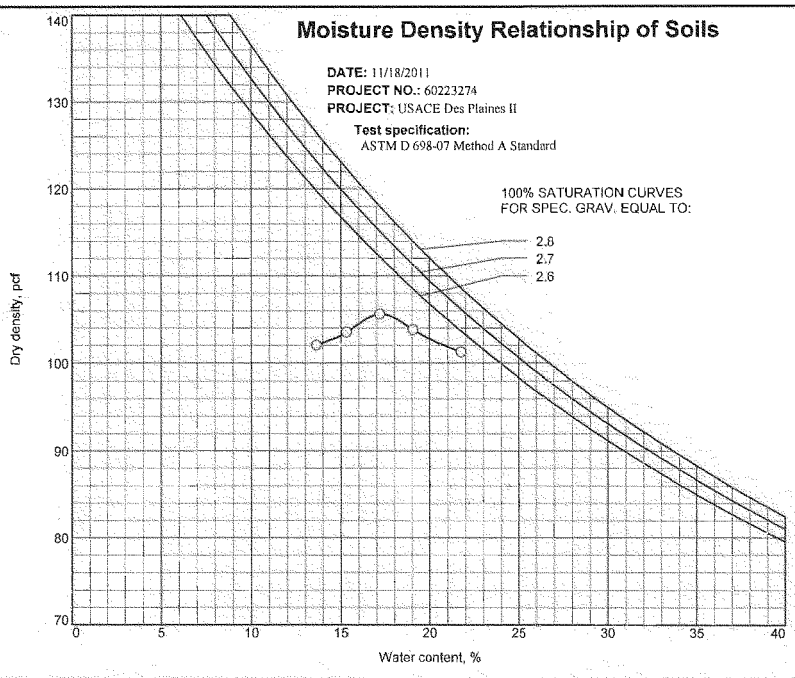
	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2898	0	0
2	0.40397	0.0018268	0.031055	5.9985	6.2918	0.068644	0.034322
3	0.504	0.0047498	0.080742	10.892	6.2949	0.12458	0.06229
4	0.60398	0.0077641	0.13198	14.47	6.2981	0.16542	0.08271
5	0.70398	0.010687	0.18167	17.89	6.3013	0.20442	0.10221
6	0.80398	0.013793	0.23446	21.258	6.3046	0.24277	0.12138
7	0.90398	0.016716	0.28415	24.573	6.3077	0.28049	0.14024
8	1.004	0.019639	0.33384	27.888	6.3109	0.31817	0.15908
9	1.104	0.022653	0.38508	31.308	6.3141	0.357	0.1785
10	1.204	0.025576	0.43477	34.518	6.3173	0.39341	0.1967
11	1.304	0.028499	0.48445	37.78	6.3204	0.43037	0.21519
12	1.404	0.031513	0.53569	41.147	6.3237	0.46849	0.23425
13	1.504	0.034527	0.58693	44.357	6.327	0.50478	0.25239
14	1.604	0.037542	0.63817	47.725	6.3302	0.54282	0.27141
15	1.704	0.040465	0.68786	50.882	6.3334	0.57844	0.28922
16	1.804	0.04357	0.74065	53.986	6.3368	0.61341	0.3067
17	1.904	0.046493	0.79034	57.196	6.3399	0.64955	0.32478
18	2.004	0.049599	0.84313	60.458	6.3433	0.68623	0.34312
19	2.104	0.052613	0.89437	63.931	6.3466	0.72528	0.36264
20	2.204	0.055627	0.94561	67.193	6.3499	0.76189	0.38095
21	2.304	0.058642	0.99685	70.719	6.3532	0.80145	0.40073
22	2.404	0.061656	1.0481	74.297	6.3564	0.84157	0.42078
23	2.5041	0.06467	1.0993	77.717	6.3597	0.87985	0.43993
24	2.604	0.067685	1.1506	81.137	6.363	0.9181	0.45905
25	2.704	0.07079	1.2034	84.663	6.3664	0.95748	0.47874
26	2.804	0.073805	1.2546	88.135	6.3697	0.99623	0.49812
27	2.904	0.076819	1.3058	91.556	6.373	1.0344	0.51718
28	3.0041	0.079833	1.3571	94.976	6.3764	1.0724	0.53622
29	3.104	0.082847	1.4083	98.238	6.3797	1.1087	0.55435
30	3.204	0.085862	1.4596	101.66	6.383	1.1467	0.57335
31	3.304	0.088967	1.5124	104.76	6.3864	1.1811	0.59054
32	3.404	0.091982	1.5636	108.13	6.3897	1.2184	0.60921
33	3.5041	0.095087	1.6164	111.29	6.3932	1.2533	0.62666
34	3.604	0.09801	1.6661	114.55	6.3964	1.2894	0.64471
35	3.704	0.10102	1.7173	117.76	6.3997	1.3249	0.66243
36	3.804	0.10404	1.7686	121.13	6.4031	1.362	0.68101
37	3.904	0.10714	1.8214	124.18	6.4065	1.3956	0.6978
38	4.0041	0.11016	1.8726	127.44	6.4099	1.4315	0.71575
39	4.104	0.11317	1.9238	130.6	6.4132	1.4662	0.7331
40	4.204	0.11619	1.9751	133.81	6.4166	1.5015	0.75073
41	4.3041	0.1192	2.0263	136.86	6.4199	1.5349	0.76745
42	4.4041	0.12231	2.0791	140.07	6.4234	1.57	0.7852
43	4.5041	0.12532	2.1303	143.12	6.4267	1.6034	0.80171
44	4.6041	0.12834	2.1816	146.23	6.4301	1.6373	0.81867
45	4.7041	0.13135	2.2328	149.28	6.4335	1.6706	0.83532
46	4.8041	0.13436	2.2841	152.49	6.4368	1.7057	0.85283
47	4.9041	0.13738	2.3353	155.64	6.4402	1.7401	0.87003
48	5.0041	0.1403	2.385	158.7	6.4435	1.7733	0.88664
49	5.1041	0.14322	2.4347	161.91	6.4468	1.8082	0.90411
50	5.2041	0.14615	2.4844	164.96	6.4501	1.8414	0.92069
51	5.3041	0.14898	2.5325	168.27	6.4533	1.8774	0.93872
52	5.4041	0.15181	2.5806	171.27	6.4564	1.91	0.95498
53	5.5041	0.15473	2.6303	174.48	6.4597	1.9448	0.97238
54	5.6041	0.15757	2.6785	177.48	6.4629	1.9772	0.98861
55	5.7041	0.16058	2.7297	180.8	6.4663	2.0131	1.0065
56	5.8041	0.1635	2.7794	183.74	6.4696	2.0449	1.0224
57	5.9041	0.16633	2.8275	187.01	6.4728	2.0801	1.0401
58	6.0041	0.16935	2.8788	190.06	6.4763	2.113	1.0565
59	6.2541	0.17666	3.003	197.48	6.4846	2.1926	1.0963
60	6.5041	0.18396	3.1272	205.26	6.4929	2.2762	1.1381
61	6.7541	0.19136	3.253	212.89	6.5013	2.3577	1.1789
62	7.0041	0.19885	3.3803	220.68	6.5099	2.4408	1.2204
63	7.2541	0.20643	3.5092	228.57	6.5186	2.5247	1.2623
64	7.5041	0.21392	3.6365	236.26	6.5272	2.6061	1.303
65	7.7541	0.22169	3.7685	243.78	6.5361	2.6854	1.3427
66	8.0041	0.22936	3.8989	251.04	6.545	2.7616	1.3808
67	8.2542	0.23712	4.0309	258.14	6.554	2.8359	1.4179
68	8.5042	0.2448	4.1613	265.04	6.5629	2.9077	1.4538
69	8.7542	0.25247	4.2918	271.88	6.5719	2.9786	1.4893
70	9.0042	0.26014	4.4222	278.67	6.5808	3.0488	1.5244
71	9.2542	0.26772	4.5511	285.4	6.5897	3.1183	1.5592
72	9.5042	0.27531	4.6799	291.72	6.5986	3.183	1.5915
73	9.7542	0.28289	4.8088	297.66	6.6076	3.2435	1.6217
74	10.004	0.29038	4.9361	303.92	6.6164	3.3073	1.6536
75	10.254	0.29787	5.0635	310.03	6.6253	3.3692	1.6846
76	10.504	0.30545	5.1923	315.39	6.6343	3.4229	1.7114
77	10.754	0.31312	5.3228	321.13	6.6434	3.4803	1.7402
78	11	0.32043	5.447	326.39	6.6522	3.5327	1.7664
79	11.25	0.32801	5.5759	331.6	6.6612	3.5842	1.7921
80	11.5	0.33577	5.7078	336.7	6.6706	3.6343	1.8171
81	11.75	0.34345	5.8383	341.91	6.6798	3.6854	1.8427

82	12	0.35112	5.9687	346.75	6.6891	3.7324	1.8662
83	12.25	0.35897	6.1022	351.28	6.6986	3.7757	1.8879
84	12.5	0.36665	6.2327	355.65	6.7079	3.8174	1.9087
85	12.75	0.37432	6.3631	360.07	6.7173	3.8594	1.9297
86	13	0.38208	6.4951	364.33	6.7267	3.8996	1.9498
87	13.25	0.38985	6.6271	368.33	6.7362	3.9369	1.9684
88	13.5	0.39761	6.759	372.17	6.7458	3.9723	1.9861
89	13.75	0.40519	6.8879	375.85	6.7551	4.0061	2.003
90	14	0.41287	7.0184	379.27	6.7646	4.0388	2.0184
91	14.25	0.42045	7.1472	382.74	6.774	4.0682	2.0341
92	14.5	0.42803	7.2761	385.8	6.7834	4.0949	2.0475
93	14.75	0.43552	7.4034	388.32	6.7927	4.1161	2.058
94	15	0.44319	7.5339	390.48	6.8023	4.1331	2.0665
95	15.25	0.45087	7.6643	391.95	6.8119	4.1428	2.0714
96	15.5	0.45881	7.7994	392.69	6.8219	4.1445	2.0723
97	15.75	0.46621	7.9251	393.01	6.8312	4.1422	2.0711
98	16	0.47388	8.0556	393.48	6.8409	4.1413	2.0707
99	16.25	0.48146	8.1845	393.74	6.8505	4.1383	2.0691
100	16.5	0.48905	8.3133	392.74	6.8601	4.122	2.061
101	16.75	0.4969	8.4469	391.22	6.8701	4.1	2.05
102	17	0.50476	8.5804	390.27	6.8802	4.0841	2.0421
103	17.25	0.5127	8.7155	388.37	6.8904	4.0583	2.0291
104	17.5	0.52056	8.849	386.85	6.9004	4.0364	2.0182
105	17.75	0.52841	8.9826	385.11	6.9106	4.0124	2.0062
106	18	0.53627	9.1161	382.48	6.9207	3.9792	1.9896
107	18.25	0.54413	9.2496	379.9	6.9309	3.9465	1.9733
108	18.5	0.5518	9.3801	377.8	6.9409	3.919	1.9595
109	18.75	0.55965	9.5136	375.01	6.9511	3.8844	1.9422
110	19	0.56724	9.6425	372.59	6.961	3.8538	1.9269
111	19.25	0.575	9.7745	370.33	6.9712	3.8248	1.9124
112	19.5	0.58249	9.9018	368.01	6.9811	3.7955	1.8978
113	19.75	0.59016	10.032	365.49	6.9912	3.764	1.882
114	20	0.59774	10.161	362.7	7.0012	3.7299	1.865
115	20.25	0.60533	10.29	359.91	7.0113	3.696	1.848
116	20.5	0.613	10.42	356.8	7.0215	3.6588	1.8294
117	20.75	0.62067	10.551	353.8	7.0317	3.6227	1.8114
118	21	0.62843	10.683	350.65	7.0421	3.5851	1.7925
119	21.25	0.63611	10.813	347.65	7.0524	3.5492	1.7746
120	21.5	0.64387	10.945	344.23	7.0629	3.5091	1.7546
121	21.75	0.65164	11.077	340.33	7.0734	3.4643	1.7321
122	22	0.65958	11.212	335.97	7.0841	3.4146	1.7073
123	22.25	0.66744	11.346	330.92	7.0948	3.3582	1.6791
124	22.5	0.67529	11.479	324.5	7.1055	3.2881	1.6441
125	22.75	0.68306	11.611	318.02	7.1161	3.2177	1.6089
126	23	0.69082	11.743	310.76	7.1267	3.1396	1.5698
127	23.25	0.69868	11.877	303.61	7.1375	3.0626	1.5313
128	23.5	0.70644	12.009	294.87	7.1482	2.9701	1.485
129	23.75	0.7143	12.142	284.93	7.1591	2.8655	1.4328
130	24	0.72224	12.277	274.77	7.1701	2.7592	1.3796
131	24.25	0.73028	12.414	264.25	7.1813	2.6494	1.3247
132	24.5	0.73841	12.552	252.2	7.1927	2.5246	1.2623
133	24.75	0.74654	12.69	237.73	7.2041	2.376	1.188
134	25	0.75513	12.836	222.52	7.2161	2.2203	1.1101
135	25.25	0.76326	12.975	207.21	7.2276	2.0642	1.0321
136	25.5	0.77139	13.113	192.06	7.2391	1.9102	0.9551
137	25.75	0.77942	13.249	179.32	7.2505	1.7807	0.89037
138	26	0.78764	13.389	169.85	7.2622	1.684	0.84199
139	26.25	0.79586	13.529	162.77	7.2739	1.6063	0.80313
140	26.5	0.80409	13.669	155.96	7.2857	1.5413	0.77063
141	26.75	0.81222	13.807	150.33	7.2974	1.4832	0.74162
142	27	0.82053	13.948	145.7	7.3093	1.4352	0.7176
143	27.25	0.82857	14.085	141.33	7.321	1.39	0.69499
144	27.5	0.8366	14.221	137.75	7.3326	1.3526	0.67631
145	27.75	0.84409	14.349	133.7	7.3435	1.3109	0.65545
146	28	0.85213	14.485	129.76	7.3553	1.2702	0.63509
147	28.25	0.85962	14.613	126.7	7.3662	1.2385	0.61923
148	28.5	0.86711	14.74	123.92	7.3772	1.2094	0.60469
149	28.75	0.8746	14.867	121.34	7.3883	1.1825	0.59123
150	29	0.88227	14.998	117.97	7.3996	1.1479	0.57394

AECOM

Moisture Density Relationship of Soils

DATE: 11/18/2011
PROJECT NO.: 60223274
PROJECT: USACE Des Plaines II
Test specification:
ASTM D 698-07 Method A Standard



	Sample No.	Elev. or Depth	Material Description	Specific Gravity	LL	PL	Oversize	% < #200
O	BULK 2	15.0-20.0	SILTY CLAY TRACE F-C SAND - GRAY	2.72			%>#4=0.2	90.1

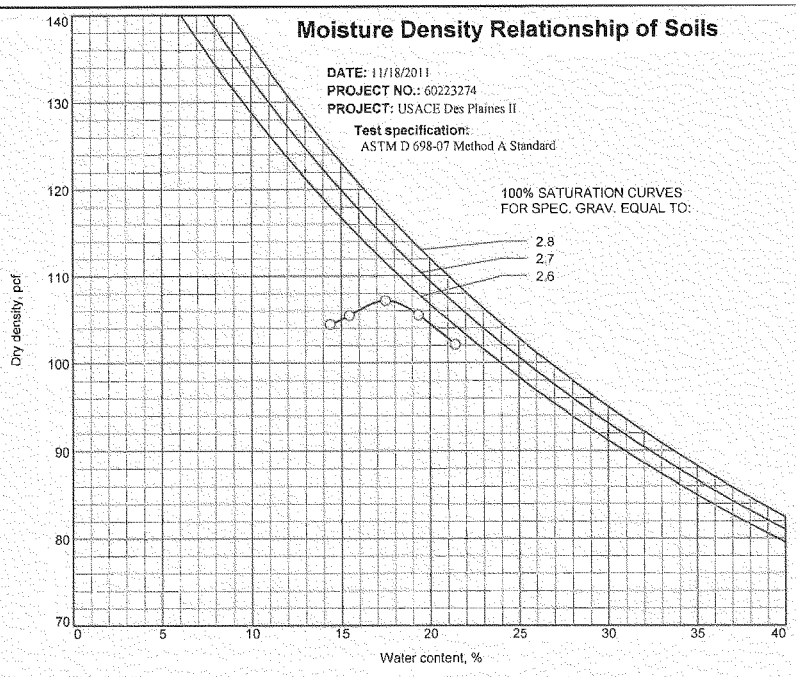
Sample No.	BULK 2			
Natural water content, percent	34.8			
Optimum water content, percent	17.3			
Max dry density, pcf	105.6			

Remarks:	Project: USACE Des Plaines II	Project No.: 60223274
	Location:	
	Source: DP2-11-08	
	AECOM	

Tested By: BCM **Checked By:** WPQ

Moisture Density Relationship of Soils

DATE: 11/18/2011
PROJECT NO.: 60223274
PROJECT: USACE Des Plaines II
Test specification:
ASTM D 698-07 Method A Standard



	Sample No.	Elev. or Depth	Material Description	Specific Gravity	LL	PL	Oversize	% < #200
O	BULK 1	0.0-10.0	SILTY CLAY TRACE F-M SAND - GRAY TOPSOIL NOTED				%>#4=0.0	91.0

Sample No.	BULK 1			
Natural water content, percent				
Optimum water content, percent	17.5			
Max dry density, pcf	107.2			

Remarks:	Project: USACE Des Plaines II	Project No.: 60223274
	Location:	
	Source: DP2-11-09	
	AECOM	

Tested By: JF **Checked By:** WPQ

AECOM

ATTACHMENT

D.4: Research Data

AECOM

D.4.1: Illinois State Water Survey Data

AECOM

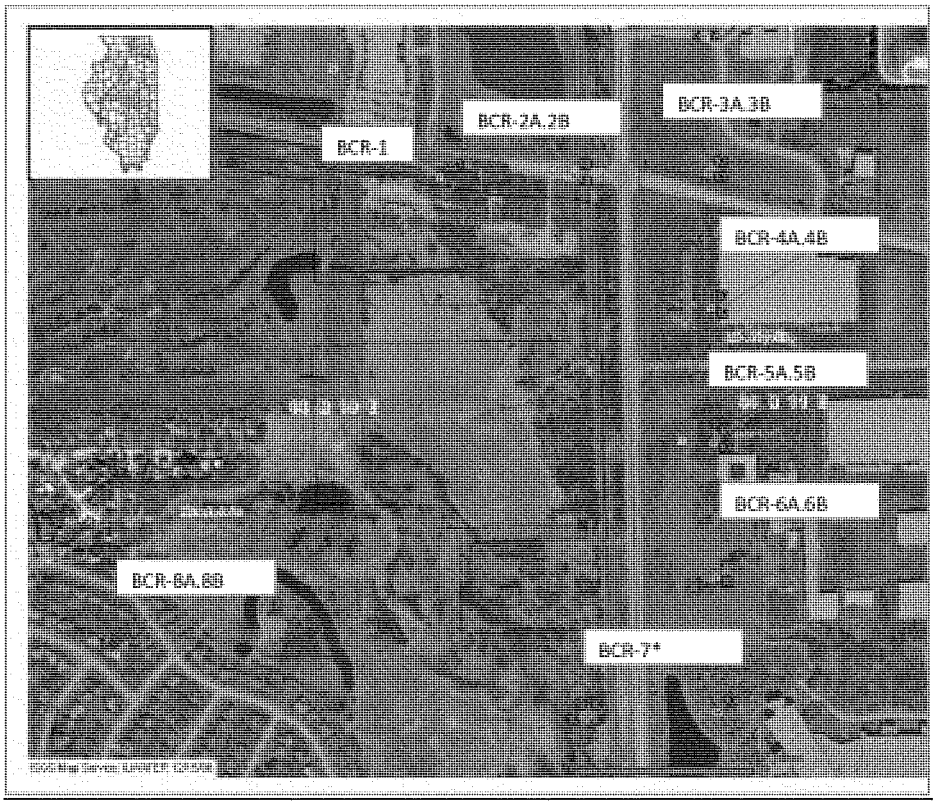
Illinois State Water Survey – Well Database Search Results

SITE NAME: BULL CREEK RESERVOIR (BCR)

COUNTY: Lake **CITY:** Mundelein

TOWNSHIP: 44N **RANGE:** 10E **SECTION:** 13

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

*: More than two well/boring logs available for cluster of wells/boring logs. Deepest log is provided on attached sheets.

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ILLINOIS STATE GEOLOGICAL SURVEY

BCR-1

Irrigation Well	Top	Bottom
clay fill	0	5
black peat	5	24
blue clay	24	35
sand & gravel	35	38
blue clay, gravel	38	90
blue clay	90	208
gravel with white clay	208	218
limestone	218	257
Total Depth		257

Casing: 6" PVC from -1' to 197'
6" BLACK STEEL from 197' to 218'

Grout: BENTONITE from 0 to 218.
Size hole below casing: 6"

Water from limestone at 218' to 257'.
Static level 80' below casing top which is 0' above GL
Permanent pump installed at 168' on November 22, 1993, with a capacity of 50 gpm

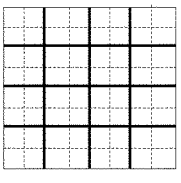
Additional location info: Lot: Subdivision:

Address of well: 19200 W. Winchester Rd.
Mundelein, IL

Location source: Location from permit

Permit Date: July 8, 1993 **Permit #:**

COMPANY Gaffke, George E.
FARM Wirkus Nurseries Inc.
DATE DRILLED September 9, 1993 **NO.**
ELEVATION 0 **COUNTY NO.** 37997
LOCATION NW NE NE
LATITUDE 42.297727 **LONGITUDE** -88.007668
COUNTY Lake **API** 120973799700 **13 - 44N - 10E**



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ILLINOIS STATE GEOLOGICAL SURVEY

BCR-2A

Engineering Test	Top	Bottom
fill: dark gr & brown silty clay A-6	0	1
very stiff gr & brown to brown clay loam A-6	1	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.

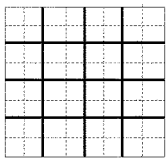
FARM FAP 344-US Rt. 45

DATE DRILLED August 20, 1997 **NO.** B-33

ELEVATION 761GL **COUNTY NO.** 48999

LOCATION NE NE NE

LATITUDE 42.297727 **LONGITUDE** -88.005182



COUNTY Lake **API** 120974899900 **13 - 44N - 10E**

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** BCR-2B

Engineering Test	Top	Bottom
fill: intermixed dark brown, brown & gr, and brown silty clay loam or clay loam A-6	0	2.5
stiff to very stiff brown, brown-gr, and gr clay loam A-6	2.5	4.5
medium stiff brown & gr clay loam A-6	4.5	6.5
stiff brown silty loam A-4	6.5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.

FARM FAP 344-US Rt. 45

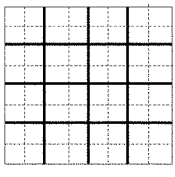
DATE DRILLED August 20, 1997 NO. B-36

ELEVATION 756GL COUNTY NO. 49003

LOCATION NE NE NE

LATITUDE 42.297727 LONGITUDE -88.005182

COUNTY Lake **API 120974900300** **13 - 44N - 10E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

BCR-3A

Engineering Test	Top	Bottom
fill: brown clay loam A-6	0	4.5
dark brown to black organic silty clay loam A-7-6	4.5	5
stiff to very stiff brown to gr-brown clay loam A-6	5	6.5
medium stiff gr-brown silty loam A-4	6.5	9.5
stiff to very stiff brown to gr-brown clay loam A-6	9.5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.

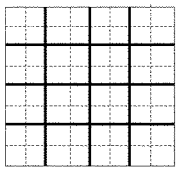
FARM FAP 344-US Rt. 45

DATE DRILLED August 20, 1997 **NO.** B-34

ELEVATION 761GL **COUNTY NO.** 49001

LOCATION NW NW NW

LATITUDE 42.297735 **LONGITUDE** -88.002662



COUNTY **Lake** **API** **120974900100** **18 - 44N - 11E**

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

BCR-3B

Engineering Test	Top	Bottom
fill: intermixed brown clay loam A-6 & dark brown organic silty clay loam A-7-6	0	1.5
stiff to very stiff brown to gr-brown clay loam A-6	1.5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.

FARM FAP 344-US Rt. 45

DATE DRILLED August 20, 1997 **NO.** B-35

ELEVATION 758GL **COUNTY NO.** 49002

LOCATION NW NW NW

LATITUDE 42.297735 **LONGITUDE** -88.002662

COUNTY Lake **API** 120974900200 **18 - 44N - 11E**

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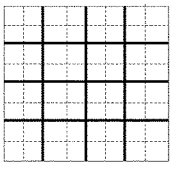
ILLINOIS STATE GEOLOGICAL SURVEY

BCR-4A

Engineering Test	Top	Bottom
fill: intermixed brown & gr clay loam A-6 & dark brown organic silty clay loam A-7-6	0	3.5
very stiff to hard brown to gr clay loam A-6	3.5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.
FARM FAP 344-US Rt. 45
DATE DRILLED August 20, 1997 **NO.** B-31
ELEVATION 766GL **COUNTY NO.** 48998
LOCATION SW NW NW
LATITUDE 42.295914 **LONGITUDE** -88.002657
COUNTY Lake **API** 120974899800 **18 - 44N - 11E**



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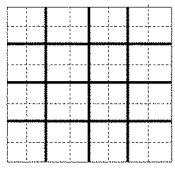
ILLINOIS STATE GEOLOGICAL SURVEY

BCR-4B

Engineering Test	Top	Bottom
dark brown to black organic silty clay loam A-7-6	0	2.5
stiff to very stiff brown to gr-brown clay loam A-6	2.5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.
FARM FAP 344-US Rt. 45
DATE DRILLED August 20, 1997 **NO.** B-32
ELEVATION 761GL **COUNTY NO.** 49000
LOCATION SW NW NW
LATITUDE 42.295914 **LONGITUDE** -88.002657
COUNTY **Lake** **API** **120974900000** **18 - 44N - 11E**



Page 1

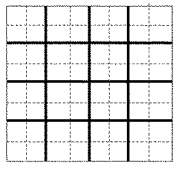
ILLINOIS STATE GEOLOGICAL SURVEY

BCR-5A

Engineering Test	Top	Bottom
fill: dark brown & black organic siltyclay loam A-7-6	0	1.5
fill: brown sand A-1-a	1.5	3
black organic silty clay loam A-7-6	3	5
stiff to very stiff gr-brown to brown clay loam A-6	5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.
FARM FAP 344-US Rt. 45
DATE DRILLED August 20, 1997 **NO.** B-29
ELEVATION 773GL **COUNTY NO.** 48996
LOCATION NW SW NW
LATITUDE 42.294092 **LONGITUDE** -88.00265
COUNTY Lake **API** 120974899600 **18 - 44N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

BCR-5B

Engineering Test	Top	Bottom
50mm root zone material, dark brown organic silty clay loam A-7-6	0	1.2
very stiff to hard brown clay loam A-6	1.2	3.6
dense brown sand A-1-b	3.6	6.3
gravel noted @ 2.1m, very hard brown to gr clay loam A-6	6.3	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.

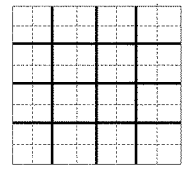
FARM FAP 344-US Rt. 45

DATE DRILLED August 20, 1997 **NO.** B-30

ELEVATION 769GL **COUNTY NO.** 48997

LOCATION NW SW NW

LATITUDE 42.294092 **LONGITUDE** -88.00265



COUNTY Lake **API** 120974899700 **18 - 44N - 11E**

Page 1

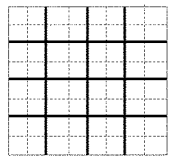
ILLINOIS STATE GEOLOGICAL SURVEY

BCR-6A

Engineering Test	Top	Bottom
stiff to very stiff brown clay loam A-6	0	10
Total Depth		10

Permit Date: Permit #:

COMPANY Mirza Engineering, Inc.
FARM FAP 344-US Rt. 45
DATE DRILLED August 20, 1997 NO. B-26
ELEVATION 774GL COUNTY NO. 48993
LOCATION SW SW NW
LATITUDE 42.292271 LONGITUDE -88.002645
COUNTY Lake API 120974899300 18 - 44N - 11E



Page 1

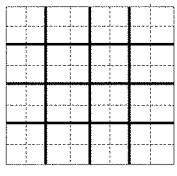
ILLINOIS STATE GEOLOGICAL SURVEY

BCR-6B

Engineering Test	Top	Bottom
fill: dark brown & black organic silty clay loam A-7-6	0	1.3
stiff to very stiff gr-brown to brown clay loam A-6	1.3	3.5
brown sandy loam A-2-4	3.5	5.5
stiff to very stiff gr-brown to brown clay loam A-6	5.5	10
Total Depth		10

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.
FARM FAP 344-US Rt. 45
DATE DRILLED August 20, 1997 **NO.** B-27
ELEVATION 774GL **COUNTY NO.** 48995
LOCATION SW SW NW
LATITUDE 42.292271 **LONGITUDE** -88.002645
COUNTY Lake **API** 120974899500 **18 - 44N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

BCR-7

Engineering Test	Top	Bottom
330 Bituminous concrete, fill: brown & gr sand A-1-a	0	2
fill: intermixed dark gr & brown clay loam A-6	2	4.25
black organic silty clay loam A-7-6	4.25	9
medium stiff brown clay loam A-6	9	11.5
stiff to very stiff brown silty clay A-6	11.5	12
Total Depth		12

Permit Date: **Permit #:**

COMPANY Mirza Engineering, Inc.

FARM FAP 344-US Rt. 45

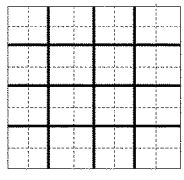
DATE DRILLED August 20, 1997 **NO.** B-23

ELEVATION 771GL **COUNTY NO.** 48987

LOCATION NE NE SE

LATITUDE 42.290442 **LONGITUDE** -88.005142

COUNTY **Lake** **API** **120974898700** **13 - 44N - 10E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** BCR-8A

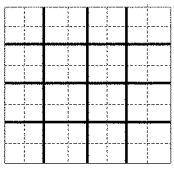
	Top	Bottom
black soil	0	2
clay, yellow	2	24
sand	24	27
clay, blue	27	110
gravel & sand	110	175
hardpan	175	240
white, dirty gravel with clay mixture	240	262
rock	262	283
Total Depth		283

Driller's Log filed
Address of well: Mundelein, IL

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY Kiene Fred & Son
FARM Taylor, Claud
DATE DRILLED January 1, 1941 **NO.**
ELEVATION 0 **COUNTY NO.** 00588
LOCATION
LATITUDE 42.29138 **LONGITUDE** -88.013812
COUNTY Lake **API** 120970058800 **13 - 44N - 10E**



ILLINOIS STATE GEOLOGICAL SURVEY

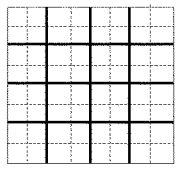
BCR-8B

	Top	Bottom
black soil	0	2
clay, yellow	2	20
bed of sand	20	22
clay, blue	22	108
white gravel & dirty sand mixture	108	175
hardpan	175	245
white gravel & sand mixed	245	270
rock, water	270	314
Total Depth		314

Driller's Log filed
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY Kiene Fred & Son
FARM Williams, Fredrick
DATE DRILLED January 1, 1940 **NO.**
ELEVATION 0 **COUNTY NO.** 00589
LOCATION
LATITUDE 42.29138 **LONGITUDE** -88.013812
COUNTY Lake **API** 120970058900 **13 - 44N - 10E**



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ATTACHMENT

D.5: Site Reconnaissance Photographs

Bull Creek Reservoir

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Photograph #1

General Site Conditions Near DP2-11-06

Photograph #2

Boring DP2-11-06

Client: US Army Corps of Engineers
Contract No: W911XK-09-D-0015
Project: Des Plaines II Site Investigations

AECOM Project No: 60223274

Photograph #3

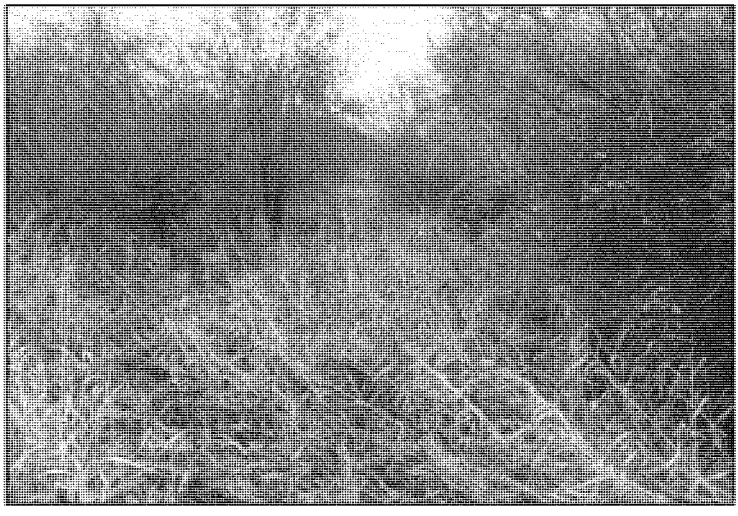
Backfilling DP2-11-06 After Encoutnering Gas Pocket at 50 ft Depth

Photograph #4

General Site Conditions Between DP2-11-06 and DP2-11-09

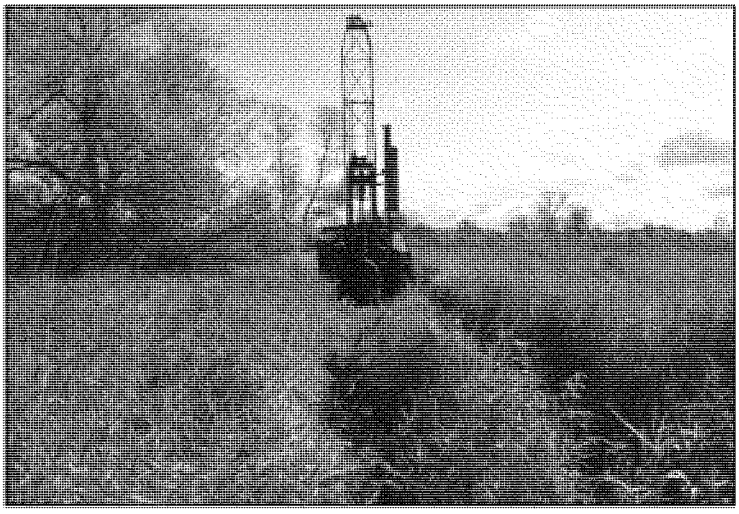
Photograph #5

General Site Conditions Between DP2-11-06 and DP2-11-09



Photograph #6

General Site Conditions Between DP2-11-06 and DP2-11-09

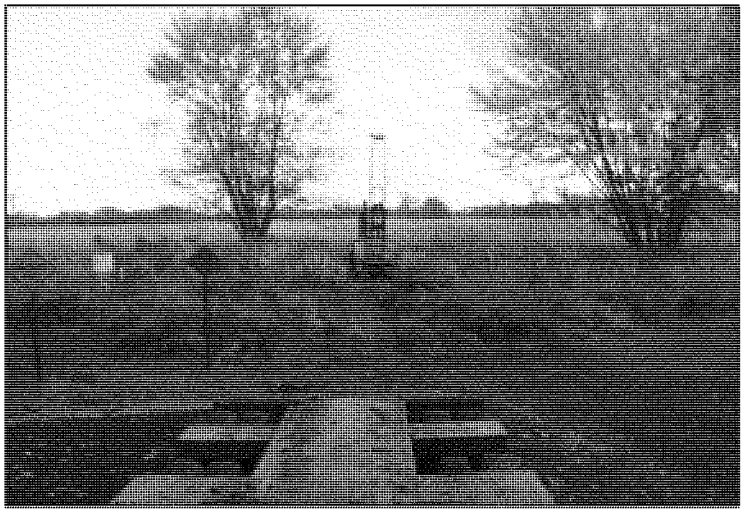


Photograph #7

Boring DP2-11-07

Photograph #8

Looking at DP2-11-07 from Havard Avenue



Photograph #9

Looking at DP2-11-08 from Cambridge Road

Photograph #10

General Site Photo from Cambridge Road

APPENDIX E

Groveland Avenue Levee Data Compilation

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APPENDIX E

Groveland Avenue Levee Data Compilation

1. **Type of Project:** Reservoir
2. **USACE Description:** The Groveland Avenue Levee site (DPLV01) extends between Groveland Avenue and the Des Plaines River to the BNSF Railroad in Riverside, IL. This would be constructed with approximately 1,500 feet of SSP with a top elevation of 618 feet. In addition, the street Park Place would be raised along a 700-foot stretch which affects Groveland Ave for 550 feet and Lincoln Ave for 200 feet.
3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified five nearby water well logs. The information from the website is included in Attachment E.4.1.
   - Landowner: No landowner provided information was available for this site. According to the USACE, the Groveland Levee is the same location as the "Section 14, Riverside USACE project." The basic premise of that project was that an old soil berm had seepage related issues so the riverside slope was cleared of vegetation and a two-foot thick clay blanket was installed.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment E.5.

4. **Subsurface Explorations**

   AECOM performed two soil borings at the project site as discussed below.

   a. **Boring Locations***

Boring**	Coordinates***		Surface Elevation (ft)+	Boring Depth (ft)	Date Drilled	Borehole Status
	Northing (ft)	Easting (ft)				
DP2-11-10	1881284	1122679	614.4	20	10/25/11	Backfilled
DP2-11-11	1880033	1122724	612.5	30.5	10/25/11	Backfilled

*: All surveying information based on survey completed by AECOM.

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**: All soil borings performed by Strata Earth Services, LLC
***: Based on NAD 83, Illinois State Plane East
†: Based on NAVD 88

b. Subsurface Conditions

Overall, the borings performed for the Groveland Avenue Levee evaluation were dissimilar and are discussed separately below.

Boring DP2-11-10

Beginning from the ground surface, the soil conditions at this boring are as follows:

- *Topsoil*: A 0.7-foot thick layer of black organic topsoil was observed beginning from the ground surface.
- *Fill*: Non-engineered fill was observed between 0.7 feet to 5 feet below the ground surface. The fill consisted of silty clay with trace fine to coarse sand and a topsoil seam at the 5 foot depth. The fill was hard with calibrated penetrometer values of 5.25 to 5.5 tsf.
- *Silty Clay*: Silty clay with trace amounts of fine sand (USCS:CL) was observed between 5 and 17.5 feet below the ground surface with the exception of a 3-foot thick layer of silt and sand (USCS: ML, SP-SM) between 10 and 13 feet below the ground surface. The layer was generally hard with calibrated penetrometer values of 5.25 to 5.5 tsf, except a portion of the clay from 7.5 to 10 feet was of medium consistency with a calibrated penetrometer value of 0.5 tsf.
- *Bedrock:* A layer of bedrock was inferred from 17.5 feet to the boring termination depth of 20 feet based on split-spoon sampler refusal and the behavior of the rock bit during drilling.

Boring DP2-11-11

Beginning from the ground surface, the soil conditions at this boring are as follows:

- *Topsoil*: A 0.7-foot thick layer of black organic topsoil was observed beginning from the ground surface.
- *Fill*: Non-engineered fill was observed between 0.7 feet to 7.5 feet below the ground surface. The fill consisted of silty clay with trace fine to coarse sand, coal pieces, and cinders. The fill was hard with calibrated penetrometer values of 5.25 to 5.5 tsf.
- *Silt/Sand*: Sandy and silty soils (USCS: SM, SP-SM, ML) with trace amounts of fine gravel (USCS:CL) were observed between 7.5 and 25 feet below the ground surface with the exception of a 0.8-foot thick layer of silty clay (USCS: CL) between 8.7 and 9.5 feet below the ground surface. This layer ranged from very loose to very dense with SPT-N values ranging from 1 bpf to 58 bpf, with density generally increasing with depth.
- *Silty Clay:* A layer of silty clay with trace amounts of sand and fine gravel (USCS: CL) was observed between 25 feet and the boring termination depth of 30.5 feet. This stratum was hard with SPT-N values of 73 to greater than 100 blows per foot.

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c. **Groundwater Conditions**

The groundwater observations discussed below were made at the project site at the time of drilling. Groundwater level fluctuations may occur with time and seasonal change due to variations in precipitation, evaporation, and surface water runoff.

Groundwater was observed at 12 feet below the ground surface while sampling boring DP2-11-10. Groundwater was observed at a depth of 7.5 feet while sampling and 11 feet after completion of boring DP2-11-11.

5. Engineering Properties:

It is AECOM's understanding that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. Given the variability in soil conditions observed in both the borings and the laboratory testing, AECOM recommends that the USACE use extreme caution in the selection of soil properties. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following sections illustrate the range of soil properties which were obtained from the laboratory testing for the site:

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf) (USCS: "CL" soils)	-	-	94.5 (from 1 data point)
Unconfined compressive strength (tsf) (USCS: "CL" soils)	-	-	0.87 (from 1 data point)

ATTACHMENTS

E.1: Boring Location Plan

E.2: Boring Logs

E.3: Lab Testing Results

E.4: Research Data

E.4.1: Illinois State Water Survey Data

E.5: Site Reconnaissance Photographs

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ATTACHMENT

E.1: Boring Location Plan

AECOM
EXPLORATION LOCATION PLAN
GROVELAND AND ME LEVEE
DES PLAINES II FEASIBILITY STUDY
UNITED STATES ARMY CORPS OF ENGINEERS - CHICAGO DISTRICT
Legend
Borings

AECOM

ATTACHMENT

E.2: Boring Logs

Hole No. DP2-11-10

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA/ 2-7/8" RB
2. LOCATION (Coordinates or Station): Groveland Ave Levee N 1,881,284.0 E 1,122,679.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: B-61 TRUCK
4. HOLE NO. (As shown on drawing title and file number): DP2-11-10	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9; UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
	16. DATE HOLE: STARTED 10/25/2011 COMPLETED 10/25/2011
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE: +614.4
8. DEPTH DRILLED INTO ROCK: 2.5	18. TOTAL CORE RECOVERY FOR BORING: %
9. TOTAL DEPTH OF HOLE: 20.0	19. ENGINEER: J. Bickett

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) (g)
+614.4	0.0		Topsoil (0.7')	47	1	4, 6, 7
+613.7	0.7		FILL: Silty clay, trace fine to coarse sand, topsoil seam at 5', with seams of gray silty clay - brown - hard (FILL: CL)		0.0 1.5	N = 13 Qp = 2.5 tsf
				47	2 2.5 4.0	5, 5, 5 N = 10 (w = 18.7%) Qp = 5.25-5.5 tsf
+609.4	5.0		Silty clay, trace fine sand - brown - hard (CL)	60	3 5.0 6.5	6, 5, 5 N = 10 (w = 17.6%) Qp = 5.25-5.5 tsf
+606.9	7.5		Silty clay, trace fine sand - brown - medium (CL)	73	4 7.5 9.0	2, 1, 2 N = 3 (w = 33.7%) Qp = 0.5 tsf
+604.4	10.0		Silt and fine to medium sand, little clay - brown - moist to wet (ML)	100	5 10.0 12.5	3" Shelby Tube (w = 18.3%)
+601.9	12.5		Fine to coarse sand, little silt, trace fine gravel - brown - very dense - wet (SP-SM)	100	6 12.5 13.0	37/6" N = 74* (w = 20.5%)
+601.4	13.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with trace amounts of organic material and silt layers - gray to dark gray - hard (CL)	100	6A 13.0 14.0	29, 32 N = 61 (w = 35.7%) Too disturbed for Qp measurement
				94	7 15.0 15.8	42, 50/3" N = 100+* (w = 13.5%) Qp = 4.5+ tsf
+596.9	17.5		Bedrock (inferred from auger refusal, split spoon sampler refusal, and resistance of roller bit)		8 17.5 17.5	50/0" N = 100+*
+594.4	20.0					

Hole No. DP2-11-10

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 614.4 | **Hole No. DP2-11-10**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			End of boring at 20'.		9 20.0 20.0	50/0" N = 100+* SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 17.5 feet 4-1/4" casing set to 17.5 feet. Boring advanced with roller bit to 20 feet. GW at 12.0' W.S. Borehole backfilled with auger cuttings and bentonite chips.

Hole No. DP2-11-11

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT	Des Plaines II
2. LOCATION (Coordinates or Station)	Groveland Ave Levee N 1,880,033.0 E 1,122,724.0
3. DRILLING AGENCY	STRATA
4. HOLE NO. *(As shown on drawing title and file number)*	DP2-11-11
5. NAME OF DRILLER	Mark Baker
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	30.5
10. SIZE AND TYPE OF BIT	SSA
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*	Illinois State Plane East NAD83(horiz) NAVD88 (vert)
12. MANUFACTURER'S DESIGNATION OF DRILL	B-61 TRUCK
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 9 / UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER	SEE REMARKS AT END OF LOG
16. DATE HOLE	STARTED 10/25/2011 / COMPLETED 10/25/2011
17. ELEVATION TOP OF HOLE	+612.5
18. TOTAL CORE RECOVERY FOR BORING	%
19. ENGINEER	J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
+612.5	0.0		Topsoil (0.7')	60	1	5, 6, 8
+611.8	0.7		FILL: Silty clay, little fine to coarse sand, trace fine gravel, with layers of silt and cinders/coal - gray (FILL: CL)		0.0 1.5	N = 14 Qp = 2.25 tsf
				60	2 2.5 4.0	2, 2, 2 N = 4 (w = 18.0%) Too disturbed for Qp measurement
+607.5	5.0		FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace coal - dark brown - medium (FILL: CL)	100	3 5.0 6.5	3" Shelby Tube Qp = 0.75 tsf (w = 29.5%)
+605.0	7.5		Silty fine to coarse sand - gray - loose - wet (SM)	42	4 7.5 8.7	1, 1, 4 N = 5 (w = 24.8%)
+603.8	8.7		Silty clay, trace fine to coarse sand, trace fine gravel - gray - stiff (CL)	67	4A 8.7 9.0	4/6" N = 8* (w = 18.5%) Qp = 1.0-1.25 tsf
+603.0	9.5		Fine to medium sand, little clay, trace silt - gray (SM)	80	5 10.0 12.5	3" Shelby Tube (w = 24.8%)
+600.0	12.5		Fine to coarse sand, little silt, trace fine gravel - gray - very loose - wet (SP-SM)	65	6 12.5 14.5	WOH, WOH, 1, 1 N = 1 (w = 29.2%)
+597.5	15.0		Silty fine to coarse sand, trace fine gravel - gray - dense - wet (SM)	100	7 15.0 16.5	2, 8, 22 N = 30 (w = 22.4%)

Hole No. DP2-11-11

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 612.5 | **Hole No. DP2-11-11**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+592.2	20.3		Silt, little fine to coarse sand, little fine to coarse gravel, trace clay - gray - very dense - wet (ML)	67	8 20.0 21.5	7, 23, 35 N = 58 (w = 9.8%)
+587.5	25.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occasional silt seams - gray - hard (CL)	73	9 25.0 26.5	16, 28, 45 N = 73 (w = 15.2%) Too disturbed for Qp measurement
+582.0	30.5		End of boring at 30.5'.	100	10 30.0 30.5	52/6" N = 100+* (w = 14.7%) Too disturbed for Qp measurement SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 30 feet Boring advanced with split spoon sampler to 30.5 feet. GW at 7.5' W.S. GW at 11' A.B. Borehole backfilled with auger cuttings and bentonite chips.

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FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Bickett
DRILLER Baker
HELPER Franks
RIG MFG/MODEL B-61 truck

SURFACE ELEV. ____
BORING STARTED 10/25/11
BORING COMPLETED 10/25/11
STATION ____
OFFSET ____

140 LB. HAMMER TYPE:
- [ ] DONUT
- [ ] SAFETY
- [x] AUTOMATIC

CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS
WL: 12 WS OR WD
WL: ____ BCR ____ ACR
WL: ____ AB ____ HR. AB
WL: ____ 24 HR. AB

JOB NO. 60223274 BORING NO. IP2-11-10 CLIENT USACE WEATHER 60 clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	1.5	SS	4	6	7		0.7'	2.5		0.7'	Topsoil clayey
	0	2.5	PA									
2	2.5	4	SS	5	5	5		0.7	4.5+			si cly br + gr fill hard
	2.5	5	PA									burned topsoil noted @ 5'
3	5	6.5	SS	6	5	5		0.9	4.5+		5'	si cly br hard
	5	7.5	PA									
4	7.5	9	SS	2	1	2		1.1'	0.75		7.5	si cl br med
	7.5	10	PA									
5	10	12.5	3" ST	P	U	S	H	2.5'	—		12'	wet f.m. sand tr si brn
6	12.5	13	SS	37				0.5'	—			f.m. v. dense sat sand brn
6A	13	14	SS		29	32		1.0'	—		13'	f. sand cly silt gr & bl v. dense
	12.5	15	PA									
7	15	15.8	SS	42	50/3	—		9"	4.5+			gr silt tr f-c sand + gr moist-wet
	15	17.5	PA			auger refusal						extremely dense

ABBREVIATIONS
FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TOPSOIL THICKNESS 0.7'
FILL THICKNESS 5'
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING ____
AFTER BORING COMPLETION ____
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS ____
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH ____
HEIGHT OF SOIL RISE IN CASING ____
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

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AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett | SURFACE ELEV. _____ | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/25/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/25/11 | ☐ SAFETY

RIG MFG/MODEL B-61 truck | STATION _____ | ☒ AUTOMATIC

OFFSET _____ | CASING USED _____ SIZE _____

WATER LEVEL OBSERVATIONS

WL: 12' WS OR WD

WL: _____ BCR _____ ACR

WL: _____ AB _____ HR. AB

WL: _____ 24 HR. AB

JOB NO. 60023274 BORING NO. DP7-11-10 CLIENT ISSCC WEATHER 60° clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
B	17.5	17.5	SS	50/0"				0	—			Refusal
	17.5	20	RB									Drillers obser. solid rock
9	20	20	SS	50/0"								Refusal
					EOB			Backfilled w/chips & cuttings				

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.7
FILL THICKNESS 5'
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

AECOM

FIELD BORING LOG

*Boring located at West end of Driveway &

Under 45th Road asphalt ~9 bike path - south side road mtg path w/ Hawk Avenue

SHEET 1 OF 2

TECHNICIAN Bickett | SURFACE ELEV. _____ | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/25/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/25/11 | ☐ SAFETY

RIG MFG/MODEL B-61 truck | STATION _____ | ☒ AUTOMATIC

OFFSET offset to end of drive due to access | CASING USED _____ SIZE _____

WATER LEVEL OBSERVATIONS

WL: 7.5 (WS) OR WD

WL: _____ BCR _____ ACR

WL: 11' AB _____ HR. AB

WL: _____ 24 HR. AB

JOB NO. 60227574 | BORING NO. DP2-11-11 | CLIENT USACE | WEATHER 65° clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	1.5	SS	5	6	8		0.9	2.25		0.7	clay TOPSOIL
	0	2.5	PA									
2	2.5	4	SS	2	2	2		0.9	—			fill sandy coal f gry silt
	2.5	5	PA									
3	5	7.5	3"ST	P	U	S	H	1.5'	1.5		5'	si cl br stiff
	5	7.5	PA									
4	7.5	8.7	SS	1	1	4		0.5			7.5'	si f-m sand sft loose brn
4A	8.7	9	SS			4		0.2	0.75		8.7	si cl bluish gray
	7.5	10	PA								9.5	
5	10	12.5	3"ST	P	U	S	H	2'	—			f-c si sand tr f gr sft brn
6	12.5	14.5	SS	W	W	1	1	1.3'	—			Same v loose brn
	12.5	15	PA									
7	15	16.5	SS	2	8	22		1.5'	—			Same dense tr f gr brn & gray
	15	20	PA									

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.7'
FILL THICKNESS 5
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

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AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett | SURFACE ELEV. _____ | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/25/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/25/11 | ☐ SAFETY

RIG MFG/MODEL B-61 | STATION _____ | ☒ AUTOMATIC

OFFSET _____ | CASING USED _____ SIZE _____

WATER LEVEL OBSERVATIONS

WL: 7.5 WS OR WD

WL: _____ BCR _____ ACR

WL: 11' 6 AB _____ HR. AB

WL: _____ 24 HR. AB

JOB NO. 60223244 | BORING NO. DB-11-11 | CLIENT NISCE | WEATHER _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
B	20	21.5	SS	7	23	35		1.0'	—		20.3'	Sandy, grey Silt wet v.dense tr f.c gravel
	20	25	PA									
9	25	26.5	SS	16	28	45		1.1'	—			Sand w/clay seams
	25	30	PA									
10	30	30.5	SS	52				0.5'	—			Sand
					EOB			Back filled w/chips & cuttings				

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.7
FILL THICKNESS 5'

CAVE-IN LEVEL:

WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____

WATER LOSS:

AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____

BOULDERS OR OBSTRUCTIONS:

AT _____ TO _____
AT _____ TO _____

ARTESIAN PRESSURE:

DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

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AECOM

ATTACHMENT

E.3: Lab Testing Results

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

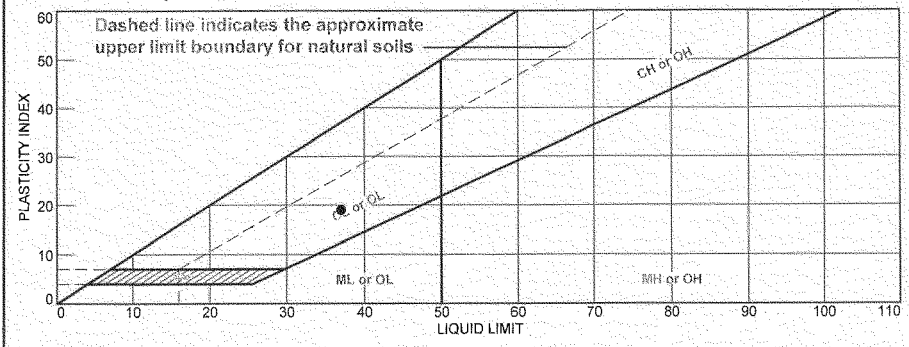
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
DP2-11-10																	
	S-2	2.5-4.0	SILTY CLAY TRACE F-C SAND - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	18.7	5.25-5.5											
	S-3	5.0-6.5	SILTY CLAY TRACE F SAND - BROWN	CL	17.6	5.25-5.5											
	S-4	7.5-9.0	SILTY CLAY TRACE F SAND - BROWN	CL	33.7	0.5						37	18	19			
	S-5	10.0-12.5	SILT AND F-M SAND LITTLE CLAY - BROWN	ML	18.3			0.0	41.2	43.6	15.2						
	S-6	12.5-13.0	F-C SAND LITTLE SILT TRACE F GRAVEL - BROWN - WET	SP-SM	20.5												
	S-6A	13.0-14.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - DARK GRAY - ORGANIC MATERIAL AND LAYER OF SILT AND SAND NOTED	CL	35.7												
	S-7	15.0-15.8	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF SILT NOTED	CL	13.5												
DP2-11-11																	
	S-2	2.5-4.0	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - GRAY - LAYER OF SILT AND LAYER OF SANDIER MATERIAL NOTED	CL	18.0												
	S-3	5.0-7.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - DARK BROWN COAL NOTED FILL	CL	29.6	0.75	0.87 @ 0.76%					44	24	20			
	S-4	7.5-8.7	SILTY F-C SAND - GRAY - SATURATED	SM	24.8												
	S-4A	8.7-9.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY - SEAM OF BROWN SILTY CLAY NOTED	CL	18.5	1.0-1.25											
	S-5	10.0-12.5	F-M SAND LITTLE CLAY TRACE SILT - GRAY	SM	24.8			0.2	79.4	9.8	10.6						
	S-6	12.5-	F-C SAND LITTLE SILT	SP-SM	29.2												

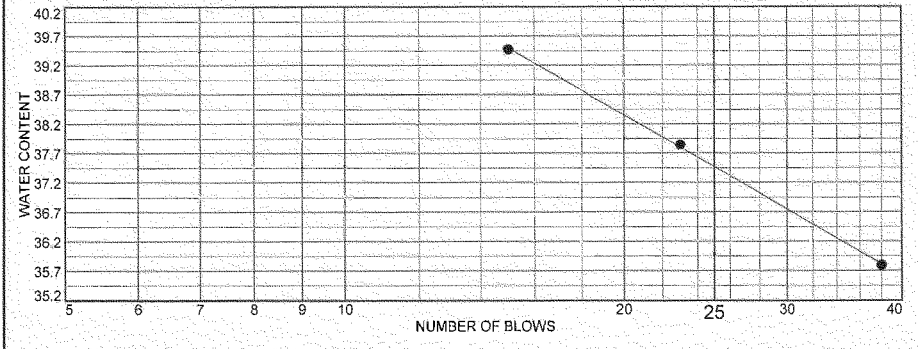
LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
		14.5	TRACE F GRAVEL - GRAY - SATURATED														
	S-7	15.0-16.5	SILTY F-C SAND TRACE F GRAVEL - GRAY - SATURATED	SM	22.4												
	S-8	20.0-21.5	SILT LITTLE F-C SAND LITTLE F-C GRAVEL TRACE CLAY - GRAY	ML	9.8												
	S-9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAMS OF SAND NOTED	CL	15.2												
	S-10	30.0-30.5	SILTY CLAY TRACE F SAND - GRAY - SEAMS OF SILT AND POCKET OF LIGHT GRAY SILTY CLAY NOTED	CL	14.7												

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F SAND - BROWN	37	18	19			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

● **Source of Sample:** DP2-11-10 **Depth:** 7.5-9.0 **Sample Number:** S-4

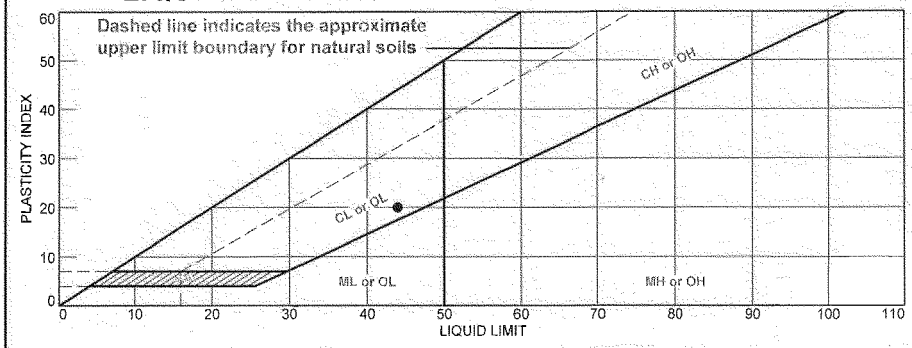
Remarks:

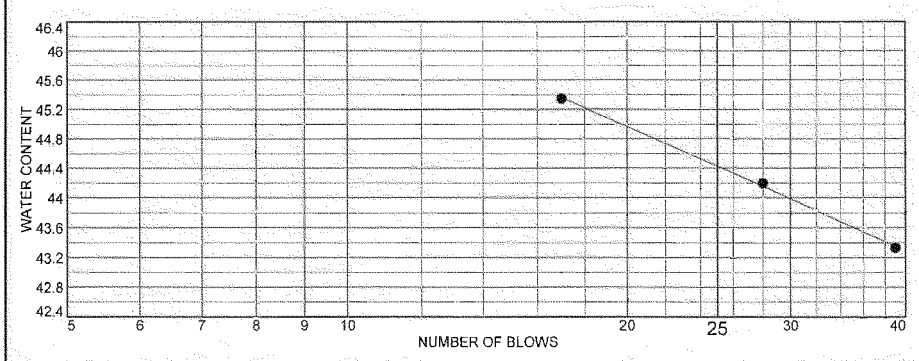
● 0.5

AECOM

Tested By: ER **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - DARK BROWN COAL NOTED FILL	44	24	20			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

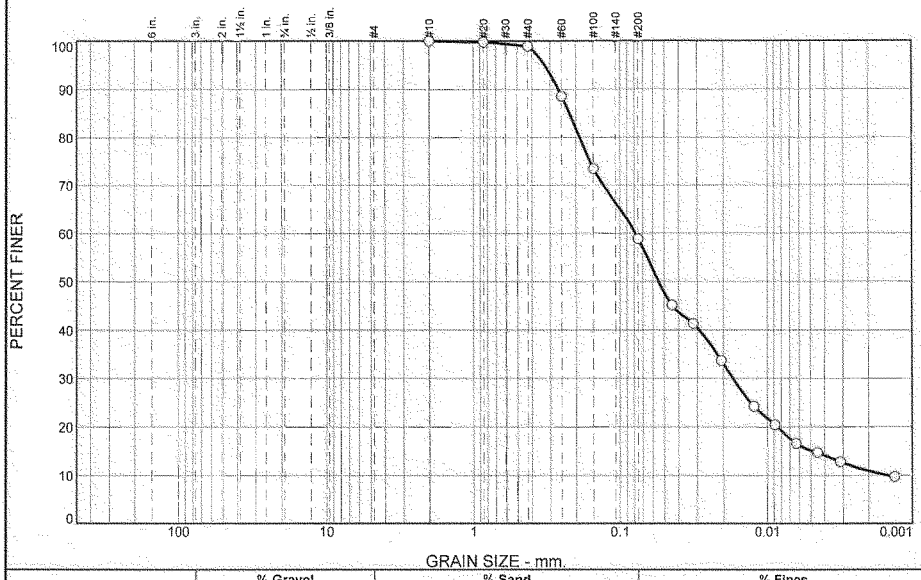
● **Source of Sample:** DP2-11-11 **Depth:** 5.0-7.5 **Sample Number:** S-3

Remarks:
● 0.75

AECOM

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.1	40.1	43.6	15.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	98.9		
#60	88.5		
#100	73.4		
#200	58.8		

* (no specification provided)

Material Description

SILT AND F-M SAND LITTLE CLAY - BROWN

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2637 D_{85}= 0.2217 D_{60}= 0.0787
D_{50}= 0.0549 D_{30}= 0.0172 D_{15}= 0.0048
D_{10}= 0.0015 C_u= 53.54 C_c= 2.57

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: DP2-11-10 **Depth:** 10.0-12.5
Sample Number: S-5 **Date:** 11/9/11

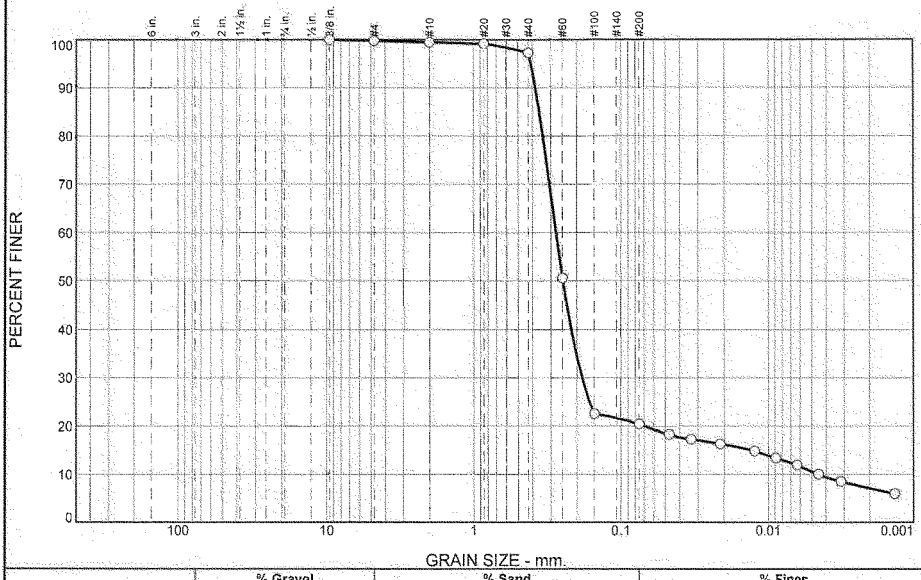
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.3	2.2	76.9	9.8	10.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.8		
#10	99.5		
#20	99.2		
#40	97.3		
#60	50.6		
#100	22.5		
#200	20.4		

* (no specification provided)

Material Description

F-M SAND LITTLE CLAY TRACE SILT - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3813 D_{85}= 0.3590 D_{60}= 0.2769
D_{50}= 0.2484 D_{30}= 0.1843 D_{15}= 0.0127
D_{10}= 0.0045 C_u= 61.38 C_c= 27.20

Classification

USCS= SM AASHTO=

Remarks

Source of Sample: DP2-11-11 **Depth:** 10.0-12.5
Sample Number: S-5 **Date:** 11/9/11

AECOM

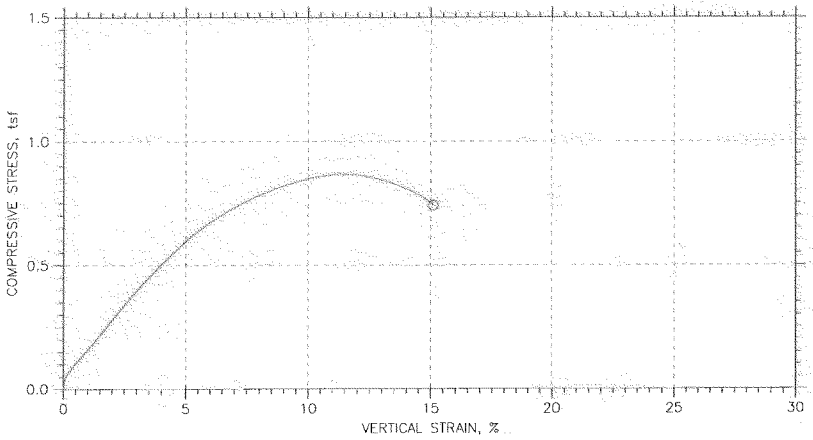
Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21111S3			
Initial	Diameter, in	2.8398			
	Height, in	6.0213			
	Water Content, %	29.44			
	Dry Density, pcf	94.5			
	Saturation, %	100.49			
	Void Ratio	0.79681			
Unconfined Compressive Strength, tsf		0.86841			
Undrained Shear Strength, tsf		0.4342			
Time to Failure, min		22.25			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		44			
Plastic Limit		24			
Plasticity Index		20			
Failure Sketch					

Project: DES PLAINES II

Location: DES PLAINES, IL

Project No.: 60223274

Boring No.: DP21111 S-3 **Depth: 5.0'-7.5'**

Sample Type: 3" ST

Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - DARK BROWN COAL NOTED, FILL

Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:41:44

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21111 S-3
Sample No.: S-3
Test No.: DP21111S3

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 5.0'-7.5'
Elevation: -----

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - DARK BROWN COAL NOTED, FILL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.02 in
Specimen Area: 6.33 inA2
Specimen Volume: 38.14 inA3

Liquid Limit: 44
Plastic Limit: 24
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3337	0	0
2	0.10402	0.0019182	0.031857	2.8414	6.3357	0.03229	0.016145
3	0.20403	0.0049325	0.081918	4.1042	6.3388	0.046618	0.023309
4	0.30403	0.0080381	0.1335	4.8935	6.3421	0.055554	0.027777
5	0.40403	0.011052	0.18356	5.6301	6.3453	0.063885	0.031943
6	0.50407	0.014158	0.23513	6.2616	6.3486	0.071013	0.035507
7	0.60403	0.017264	0.28671	6.8404	6.3519	0.077537	0.038769
8	0.70403	0.020278	0.33677	7.4718	6.3551	0.084652	0.042326
9	0.80403	0.023384	0.38835	8.0506	6.3583	0.091162	0.045581
10	0.90403	0.026398	0.43841	8.6294	6.3615	0.097667	0.048834
11	1.0041	0.029595	0.49151	9.1556	6.3649	0.10357	0.051784
12	1.1041	0.032701	0.54308	9.6817	6.3682	0.10946	0.054731
13	1.2041	0.035806	0.59466	10.208	6.3715	0.11535	0.057676
14	1.3041	0.039003	0.64776	10.734	6.3749	0.12123	0.060617
15	1.4041	0.042109	0.69933	11.26	6.3783	0.12711	0.063555
16	1.5041	0.045306	0.75243	11.786	6.3817	0.13298	0.066489
17	1.6041	0.048503	0.80552	12.365	6.3851	0.13943	0.069717
18	1.7041	0.051608	0.8571	12.839	6.3884	0.1447	0.07235
19	1.8041	0.054805	0.9102	13.312	6.3918	0.14996	0.074978
20	1.9041	0.05782	0.96026	13.839	6.3951	0.1558	0.077902
21	2.0041	0.060925	1.0118	14.312	6.3984	0.16105	0.080526
22	2.1041	0.064031	1.0634	14.944	6.4017	0.16807	0.084035
23	2.2041	0.067045	1.1135	15.417	6.405	0.17331	0.086654
24	2.3041	0.070151	1.1651	15.891	6.4083	0.17854	0.089269
25	2.4041	0.073256	1.2166	16.469	6.4117	0.18494	0.092472
26	2.5041	0.076362	1.2682	17.101	6.415	0.19194	0.095968
27	2.6041	0.079559	1.3213	17.627	6.4185	0.19773	0.098867
28	2.7041	0.082573	1.3714	18.101	6.4217	0.20294	0.10147
29	2.8041	0.085588	1.4214	18.679	6.425	0.20933	0.10466
30	2.9041	0.088785	1.4745	19.258	6.4284	0.2157	0.10785
31	3.0041	0.091799	1.5246	19.837	6.4317	0.22207	0.11103
32	3.1041	0.094905	1.5762	20.363	6.4351	0.22784	0.11392
33	3.2041	0.097919	1.6262	20.942	6.4384	0.23419	0.1171
34	3.3041	0.10093	1.6763	21.521	6.4416	0.24054	0.12027
35	3.4041	0.10413	1.7294	22.1	6.4451	0.24688	0.12344
36	3.5041	0.10724	1.781	22.526	6.4485	0.25263	0.12631
37	3.6041	0.11025	1.831	23.205	6.4518	0.25896	0.12948
38	3.7041	0.11345	1.8841	23.731	6.4553	0.26469	0.13234
39	3.8041	0.11646	1.9342	24.362	6.4586	0.27159	0.13579
40	3.9041	0.11948	1.9842	24.888	6.4619	0.27731	0.13866
41	4.0041	0.12249	2.0343	25.415	6.4652	0.28303	0.14152
42	4.1041	0.1255	2.0844	25.993	6.4685	0.28933	0.14466
43	4.2041	0.12861	2.1359	26.572	6.4719	0.29562	0.14781
44	4.3041	0.13172	2.1875	27.098	6.4753	0.30131	0.15066
45	4.4041	0.13473	2.2376	27.677	6.4786	0.30759	0.15379
46	4.5041	0.13784	2.2891	28.309	6.482	0.31444	0.15722
47	4.6041	0.14094	2.3407	28.887	6.4855	0.3207	0.16035
48	4.7041	0.14405	2.3923	29.414	6.4889	0.32637	0.16318
49	4.8041	0.14706	2.4424	29.94	6.4922	0.33204	0.16602
50	4.9041	0.15008	2.4924	30.519	6.4956	0.33828	0.16914
51	5.0042	0.15318	2.544	31.097	6.499	0.34452	0.17226
52	5.1041	0.15629	2.5956	31.624	6.5024	0.35016	0.17508
53	5.2041	0.15939	2.6472	32.15	6.5059	0.3558	0.1779
54	5.3041	0.16241	2.6972	32.729	6.5092	0.36202	0.18101
55	5.4041	0.16551	2.7488	33.307	6.5127	0.36822	0.18411
56	5.5042	0.16862	2.8004	33.834	6.5161	0.37384	0.18692
57	5.6041	0.17172	2.852	34.412	6.5196	0.38004	0.19002
58	5.7041	0.17483	2.9035	34.991	6.5231	0.38622	0.19311
59	5.8041	0.17803	2.9566	35.57	6.5266	0.3924	0.1962
60	5.9041	0.18113	3.0082	36.096	6.5301	0.39799	0.199
61	6.0042	0.18424	3.0598	36.622	6.5336	0.40358	0.20179
62	6.2542	0.192	3.1887	37.99	6.5423	0.4181	0.20905
63	6.5042	0.19977	3.3177	39.306	6.551	0.432	0.216
64	6.7542	0.20753	3.4466	40.726	6.5597	0.44702	0.22351
65	7.0042	0.21529	3.5756	41.989	6.5685	0.46026	0.23013
66	7.2542	0.22297	3.703	43.2	6.5772	0.4729	0.23645
67	7.5042	0.23064	3.8304	44.462	6.5859	0.48608	0.24304
68	7.75	0.23813	3.9548	45.725	6.5945	0.49924	0.24962
69	8	0.2458	4.0822	46.883	6.6032	0.5112	0.2556
70	8.25	0.25338	4.2081	48.093	6.6119	0.52371	0.26185
71	8.5001	0.26096	4.3341	49.251	6.6206	0.53561	0.2678
72	8.7501	0.26845	4.4584	50.461	6.6292	0.54806	0.27403
73	9.0001	0.27594	4.5828	51.566	6.6379	0.55933	0.27966
74	9.2501	0.28343	4.7072	52.671	6.6465	0.57057	0.28528
75	9.5001	0.29102	4.8331	53.881	6.6553	0.58291	0.29145
76	9.7501	0.29869	4.9606	54.986	6.6642	0.59407	0.29703
77	10	0.30627	5.0865	56.038	6.6731	0.60463	0.30232
78	10.25	0.31394	5.2139	57.143	6.682	0.61573	0.30786
79	10.5	0.32171	5.3429	58.143	6.6912	0.62565	0.31282
80	10.75	0.32938	5.4703	59.09	6.7002	0.63498	0.31749
81	11	0.33705	5.5977	60.037	6.7092	0.64429	0.32215

82	11.25	0.34482	5.7267	60.984	6.7184	0.65356	0.32678
83	11.5	0.35258	5.8556	61.932	6.7276	0.6628	0.3314
84	11.75	0.36035	5.9845	62.879	6.7368	0.67202	0.33601
85	12	0.36811	6.1135	63.668	6.7461	0.67952	0.33976
86	12.25	0.37587	6.2424	64.563	6.7554	0.68812	0.34406
87	12.5	0.38355	6.3699	65.404	6.7645	0.69615	0.34807
88	12.75	0.39122	6.4973	66.141	6.7738	0.70303	0.35151
89	13	0.39889	6.6247	67.036	6.783	0.71157	0.35578
90	13.25	0.40638	6.7491	67.825	6.7921	0.71899	0.35949
91	13.5	0.41396	6.875	68.614	6.8012	0.72637	0.36319
92	13.75	0.42154	7.0009	69.298	6.8104	0.73262	0.36631
93	14	0.42922	7.1284	70.087	6.8198	0.73995	0.36997
94	14.25	0.43689	7.2558	70.824	6.8292	0.7467	0.37335
95	14.5	0.44465	7.3847	71.561	6.8387	0.75342	0.37671
96	14.75	0.45224	7.5106	72.245	6.848	0.75959	0.37979
97	15	0.46009	7.6411	72.981	6.8577	0.76625	0.38312
98	15.25	0.46795	7.7716	73.718	6.8674	0.77289	0.38644
99	15.5	0.47571	7.9005	74.297	6.877	0.77787	0.38893
100	15.75	0.48357	8.031	74.928	6.8867	0.78337	0.39168
101	16	0.49142	8.1614	75.507	6.8965	0.7883	0.39415
102	16.25	0.49928	8.2919	76.086	6.9063	0.79321	0.39661
103	16.5	0.50695	8.4193	76.823	6.9159	0.79978	0.39989
104	16.75	0.5148	8.5498	77.349	6.9258	0.80411	0.40206
105	17	0.52266	8.6802	78.033	6.9357	0.81007	0.40503
106	17.25	0.53024	8.8062	78.454	6.9453	0.81331	0.40666
107	17.5	0.53782	8.9321	79.033	6.9549	0.81818	0.40909
108	17.75	0.5454	9.058	79.559	6.9645	0.82249	0.41124
109	18	0.55308	9.1854	80.032	6.9743	0.82623	0.41311
110	18.25	0.56057	9.3098	80.453	6.9838	0.82943	0.41472
111	18.5	0.56833	9.4387	80.979	6.9938	0.83367	0.41684
112	18.75	0.576	9.5662	81.453	7.0036	0.83737	0.41868
113	19	0.58395	9.6982	81.874	7.0139	0.84047	0.42023
114	19.25	0.59144	9.8225	82.295	7.0235	0.84362	0.42181
115	19.5	0.59921	9.9515	82.821	7.0336	0.8478	0.4239
116	19.75	0.60679	10.077	83.242	7.0435	0.85092	0.42546
117	20	0.61446	10.205	83.61	7.0534	0.85348	0.42674
118	20.25	0.62231	10.335	83.926	7.0637	0.85545	0.42773
119	20.5	0.63008	10.464	84.294	7.0739	0.85797	0.42899
120	20.75	0.63803	10.596	84.557	7.0843	0.85938	0.42969
121	21	0.64588	10.727	84.926	7.0947	0.86187	0.43093
122	21.25	0.65355	10.854	85.189	7.1048	0.8633	0.43165
123	21.5	0.66132	10.983	85.505	7.1151	0.86525	0.43262
124	21.75	0.66908	11.112	85.662	7.1254	0.86559	0.43279
125	22	0.67675	11.239	86.031	7.1357	0.86806	0.43403
126	22.25	0.68443	11.367	86.189	7.1459	0.86841	0.4342
127	22.5	0.69201	11.493	85.873	7.1561	0.864	0.432
128	22.75	0.69959	11.619	86.346	7.1663	0.86753	0.43376
129	23	0.70717	11.745	86.399	7.1765	0.86682	0.43341
130	23.25	0.71475	11.87	86.346	7.1868	0.86506	0.43253
131	23.5	0.72233	11.996	86.399	7.197	0.86435	0.43217
132	23.75	0.72992	12.122	86.189	7.2074	0.86101	0.4305
133	24	0.73759	12.25	86.241	7.2178	0.86028	0.43014
134	24.25	0.74535	12.379	86.083	7.2284	0.85745	0.42872
135	24.5	0.75312	12.508	85.978	7.2391	0.85514	0.42757
136	24.75	0.76088	12.637	85.768	7.2498	0.85179	0.42589
137	25	0.76874	12.767	85.662	7.2606	0.84947	0.42474
138	25.25	0.77659	12.897	85.452	7.2715	0.84612	0.42306
139	25.5	0.78445	13.028	85.189	7.2824	0.84225	0.42112
140	25.75	0.79221	13.157	84.821	7.2932	0.83736	0.41868
141	26	0.80007	13.287	84.715	7.3042	0.83507	0.41753
142	26.25	0.80774	13.415	84.4	7.3149	0.83073	0.41537
143	26.5	0.8155	13.544	83.979	7.3258	0.82536	0.41268
144	26.75	0.82318	13.671	83.663	7.3367	0.82105	0.41052
145	27	0.83094	13.8	83.242	7.3476	0.81569	0.40785
146	27.25	0.83852	13.926	82.821	7.3584	0.81038	0.40519
147	27.5	0.84619	14.053	82.4	7.3693	0.80507	0.40254
148	27.75	0.85387	14.181	82.084	7.3802	0.8008	0.4004
149	28	0.86154	14.308	81.4	7.3912	0.79295	0.39647
150	28.25	0.8693	14.437	80.822	7.4023	0.78612	0.39306
151	28.5	0.87698	14.565	80.295	7.4134	0.77984	0.38992
152	28.75	0.88483	14.695	79.453	7.4247	0.77049	0.38524
153	29	0.89269	14.826	78.559	7.4361	0.76065	0.38032
154	29.25	0.90073	14.959	77.875	7.4478	0.75284	0.37642
155	29.5	0.90849	15.088	76.823	7.4591	0.74154	0.37077

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ATTACHMENT

E.4: Research Data

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E.4.1: Illinois State Water Survey Data

AECOM

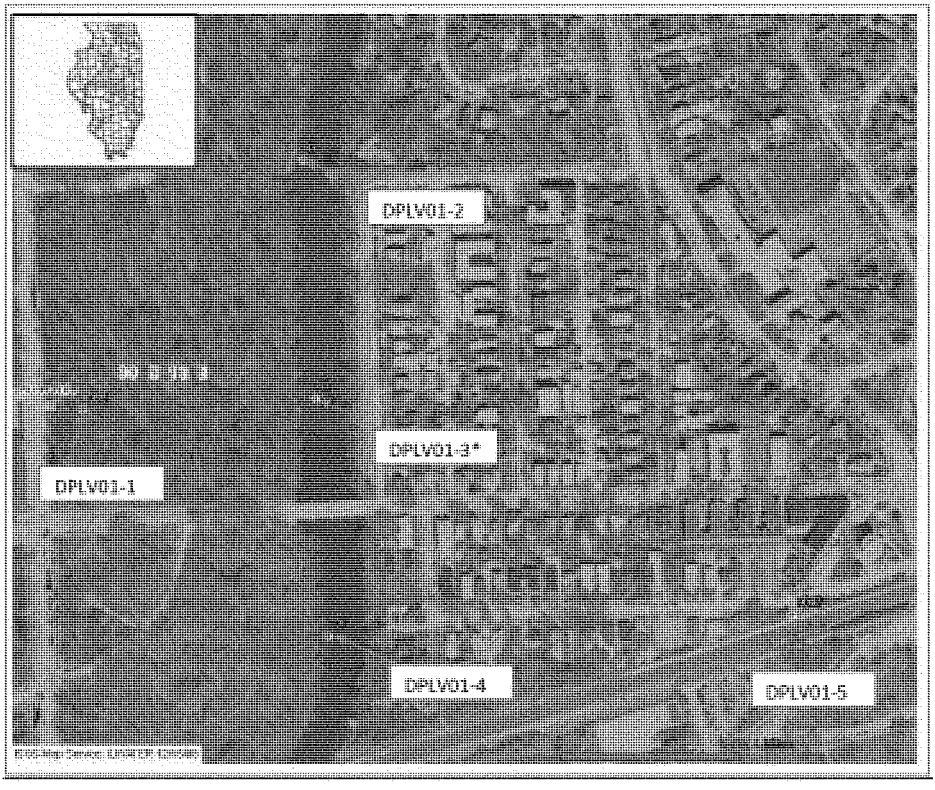
Illinois State Water Survey – Well Database Search Results

SITE NAME: GROVELAND AVENUE LEVEE (DPLV01)

COUNTY: Cook **CITY:** Riverside

TOWNSHIP: 39N **RANGE:** 12E **SECTION:** 35

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

*: More than two well/boring logs available for cluster of wells/boring logs. Deepest log is provided on attached sheets.

Page 1

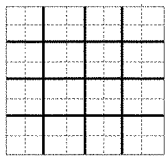
ILLINOIS STATE GEOLOGICAL SURVEY

DPLV01-1

Engineering Test	Top	Bottom
Total Depth		386
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED December 1, 1975 **NO.**
ELEVATION 615GL **COUNTY NO.** 26714
LOCATION SE SW NE
LATITUDE 41.828941 **LONGITUDE** -87.828356
COUNTY Cook **API** 120312671400 **35 - 39N - 12E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DPLV01-2

Noncommunity - Public Water Well	Top	Bottom
Total Depth		

Permit Date: Permit #:

COMPANY

FARM Zoo Woods

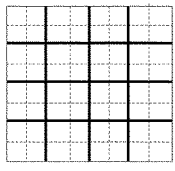
DATE DRILLED NO. 4197

ELEVATION 0 COUNTY NO. 33743

LOCATION NW SE NE

LATITUDE 41.830831 LONGITUDE -87.826017

COUNTY Cook API 120313374300 35 - 39N - 12E



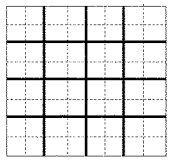
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPLV01-3

Engineering Test	Top	Bottom
Total Depth		27
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Chicago Sanitary Dist.
FARM Test Boring
DATE DRILLED NO. 5C
ELEVATION 0 COUNTY NO. 02821
LOCATION SW SE NE
LATITUDE 41.828991 LONGITUDE -87.825926
COUNTY Cook API 120310282100 35 - 39N - 12E



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DPLV01-4

Engineering Test	Top	Bottom
Total Depth		31
Driller's Log filed		

Permit Date: Permit #:

COMPANY Chicago Sanitary Dist.

FARM Test Pit

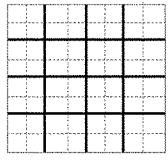
DATE DRILLED NO. 5

ELEVATION 607GL COUNTY NO. 02819

LOCATION NW NE SE

LATITUDE 41.827154 LONGITUDE -87.825835

COUNTY Cook API 120310281900 35 - 39N - 12E



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

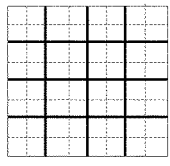
DPLV01-5

Water Well	Top	Bottom
Total Depth		2047

Driller's Log filed
Survey Sample Study filed
Sample set # 276 (200' - 1980') Received: January 9, 1922

Permit Date: **Permit #:**

COMPANY Miller, J. P. Art. Well
FARM Riverside City
DATE DRILLED April 1, 1924 **NO.** 3
ELEVATION 619TM **COUNTY NO.** 02831
LOCATION NW NW SW
LATITUDE 41.827252 **LONGITUDE** -87.820978
COUNTY Cook **API** 120310283100 **36 - 39N - 12E**



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ATTACHMENT

E.5: Site Reconnaissance Photographs

Groveland Avenue Levee

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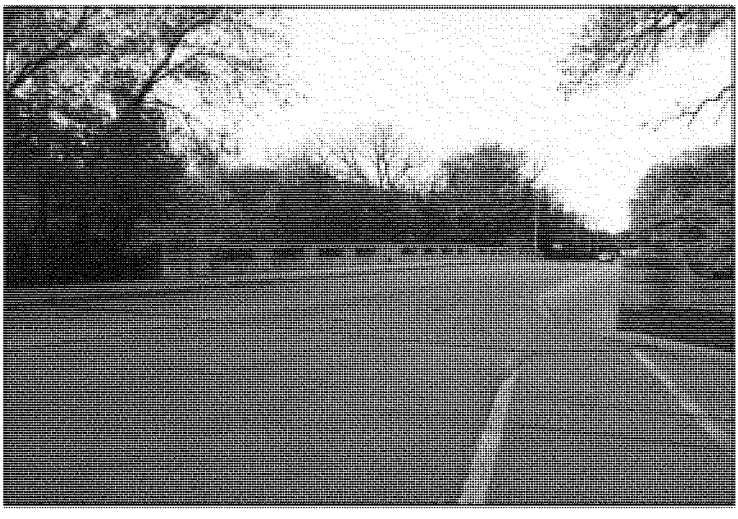
Photograph #1

Looking North Along Groveland Avenue from Forest Avenue



Photograph #2

Forest Avenue Bridge Over Des Plaines River

Client: US Army Corps of Engineers
Contract No: W911XK-09-D-0015
Project: Des Plaines II Site Investigations

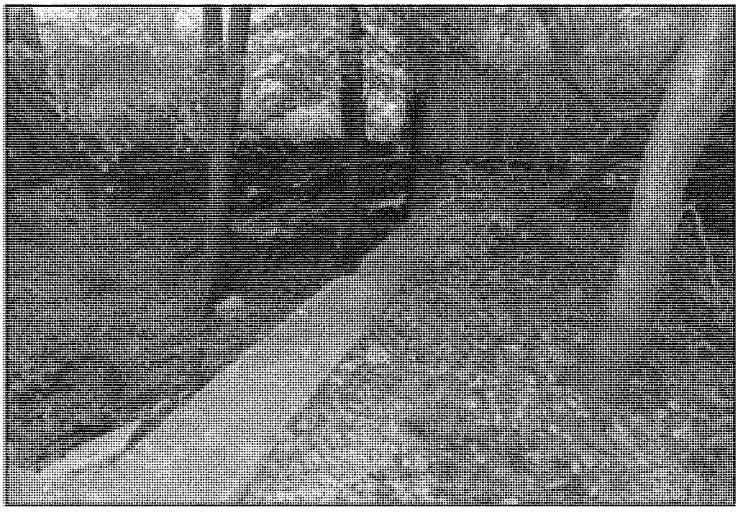
AECOM Project No: 60223274

Photograph #3

Looking South Along Groveland Avenue from Park Place

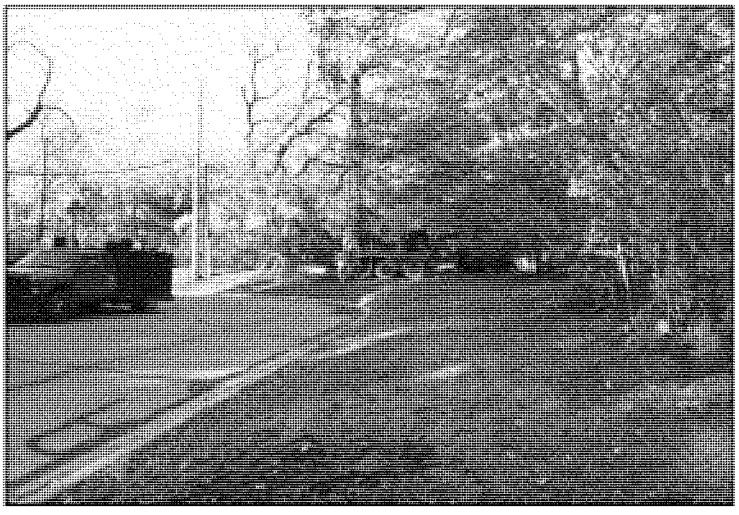
Photograph #4

Structures Adjacent to DP2-11-10 on the River Bank



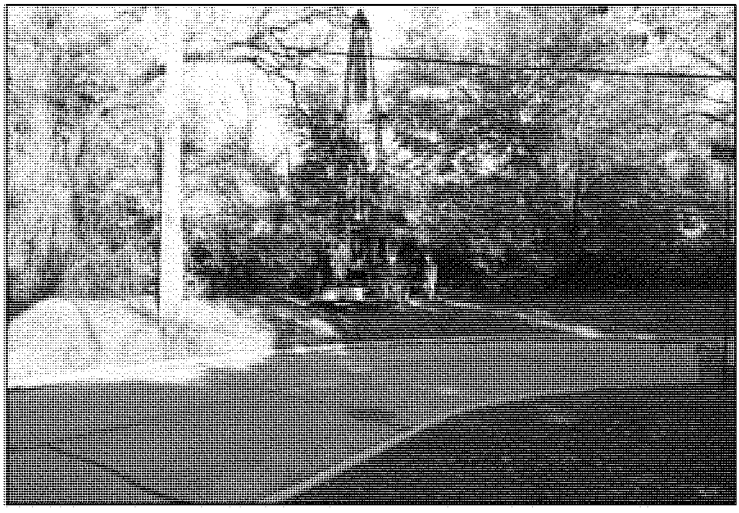
Photograph #5

Structures Adjacent to DP2-11-10 on the River Bank



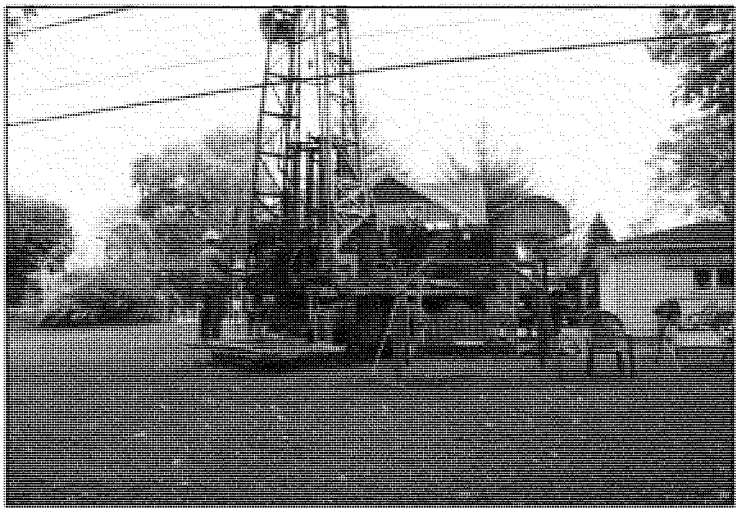
Photograph #6

As-drilled Location of DP2-11-10



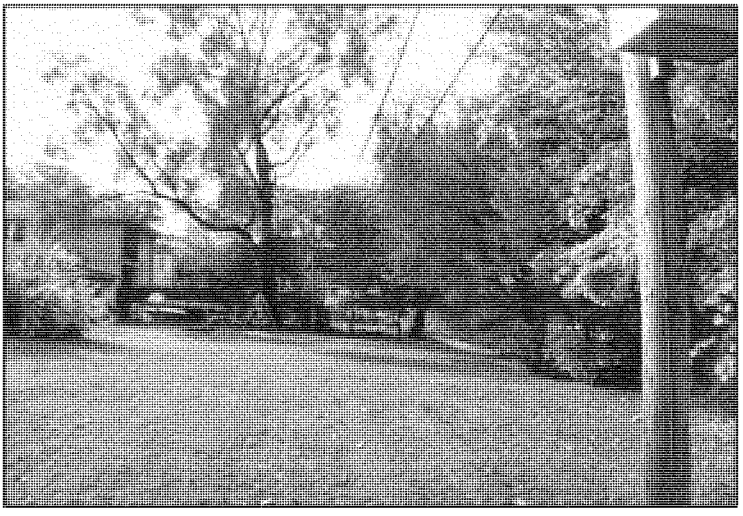
Photograph #7

As-drilled Location of DP2-11-10



Photograph #8

As-drilled Location of DP2-11-11



Photograph #9

Access Restrictions at DP2-11-11 Location

Photograph #10

Site Clean-up at DP2-11-11

APPENDIX F

Lake Mary Anne Pump Station Data Compilation

AECOM

APPENDIX F

Lake Mary Anne Pump Station Data Compilation

1. **Type of Project:** Pump Station
2. **USACE Description:** The Lake Mary Anne Pump Station (FPCI01) connects Lake Mary Anne with Dude Ranch Pond by crossing Golf Road between Reding Circle and Oak Lane in Des Plaines, IL. The site is covered with landscaped grass and some trees.
3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified four nearby water well logs. The information from the website is included in Attachment F.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): Twenty-two sheets of as-built drawings for the project area and vicinity were obtained from IDOT. This information is provided in Attachment F.1.2, and due to its size, is only included on the data CD of this report.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment F.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

F.1: Research Data

F.1.1: Illinois State Water Survey Data

F.1.2: Illinois Department of Transportation

F.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

F.1: Research Data

AECOM

F.1.1: Illinois State Water Survey Data

AECOM

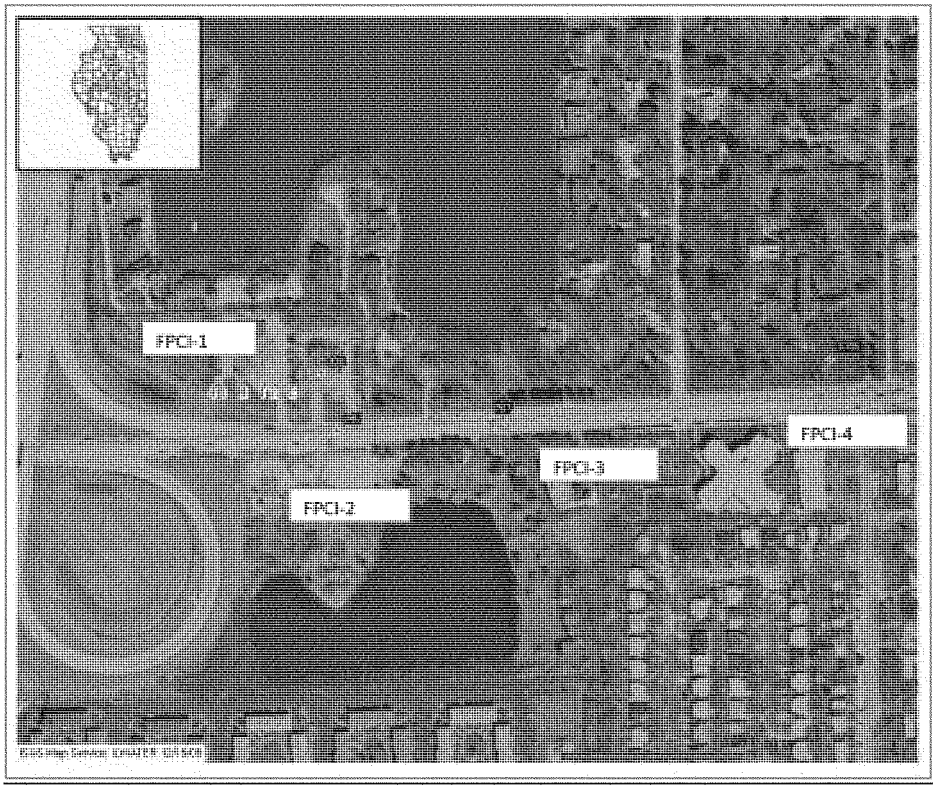
Illinois State Water Survey – Well Database Search Results

SITE NAME: LAKE MARY ANNE PUMP STATION (FPCI01)

COUNTY: Cook **CITY:** Des Plaines

TOWNSHIP: 41N **RANGE:** 12E **SECTION:** 10,15

AREA PLAN WITH WELL LOCATIONS:



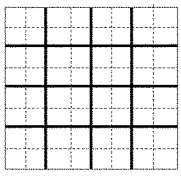
NOTE: Refer to attached sheets for logs available for each location.

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** FPCI-1

Water Well	Top	Bottom
Total Depth		300
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Liberg, Patrick A.
FARM Scown Wm J
DATE DRILLED October 1, 1970 **NO.**
ELEVATION 638GL **COUNTY NO.** 01163
LOCATION 150'S line, 140'E line of section
LATITUDE 42.054156 **LONGITUDE** -87.865306
COUNTY Cook **API** 120310116300 **9 - 41N - 12E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

FPCI-2

Water Well	Top	Bottom
Total Depth		240
Driller's Log filed		

Permit Date: Permit #:

COMPANY Marsalek, Wm.

FARM Reding John

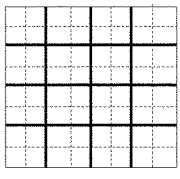
DATE DRILLED January 1, 1959 NO.

ELEVATION 636GL COUNTY NO. 00270

LOCATION 0'N line, 100'E line of section

LATITUDE 42.053746 LONGITUDE -87.865161

COUNTY Cook API 120310027000 16 - 41N - 12E



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

FPCI-3

Water Well	Top	Bottom
Total Depth		767
Driller's Log filed		

Permit Date: Permit #:

COMPANY Marsalek, Wm.

FARM Redings Fish Ranch

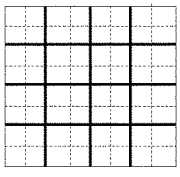
DATE DRILLED January 1, 1959 NO.

ELEVATION 636GL COUNTY NO. 00271

LOCATION 0'N line, 300'W line of section

LATITUDE 42.053795 LONGITUDE -87.863684

COUNTY Cook API 120310027100 15 - 41N - 12E



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

FPCI-4

Water Well	Top	Bottom
Total Depth		1035
Driller's Log filed		

Permit Date: Permit #:

COMPANY Miller, J. P. Art. Well

FARM Leonard J P

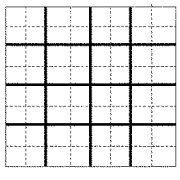
DATE DRILLED November 1, 1939 NO.

ELEVATION 640TM COUNTY NO. 03453

LOCATION 100'S line, 1200'W line of section

LATITUDE 42.054192 LONGITUDE -87.86035

COUNTY Cook API 120310345300 10 - 41N - 12E



AECOM

F.1.2: Illinois Department of Transportation

(NOTE: DATA PROVIDED ON CD-ROM ONLY)

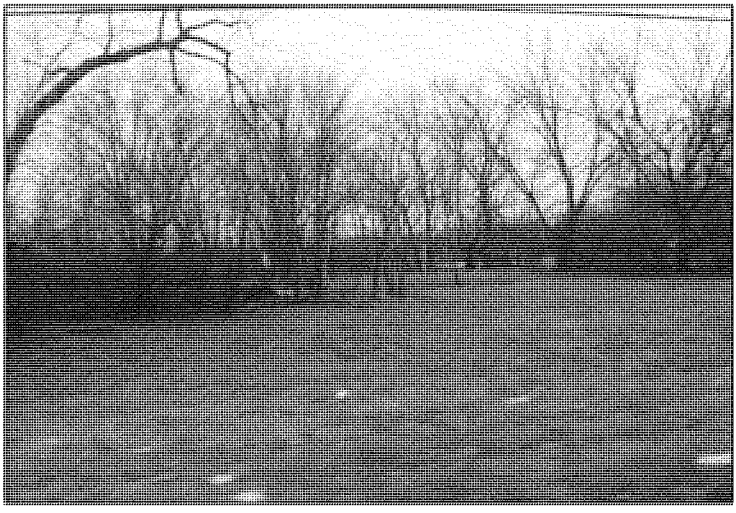
AECOM

ATTACHMENT

F.2: Site Reconnaissance Photographs

Lake Mary Anne Pump Station

AECOM

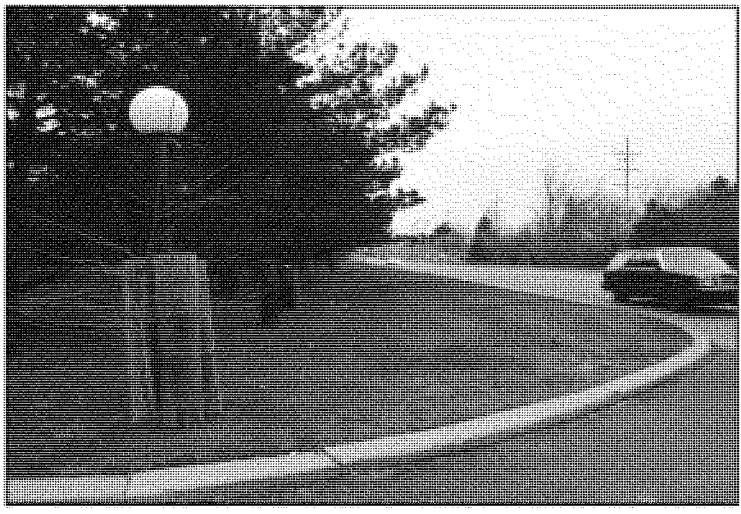


Photograph #1

Looking North from Golf Road at Southern Point of Lake Mary Anne

Photograph #2

Looking North from Golf Road at Eastern Limit of Lake Mary Anne



Photograph #3

Looking West Along Golf Road at Eastern Limit of Lake Mary Anne

Photograph #4

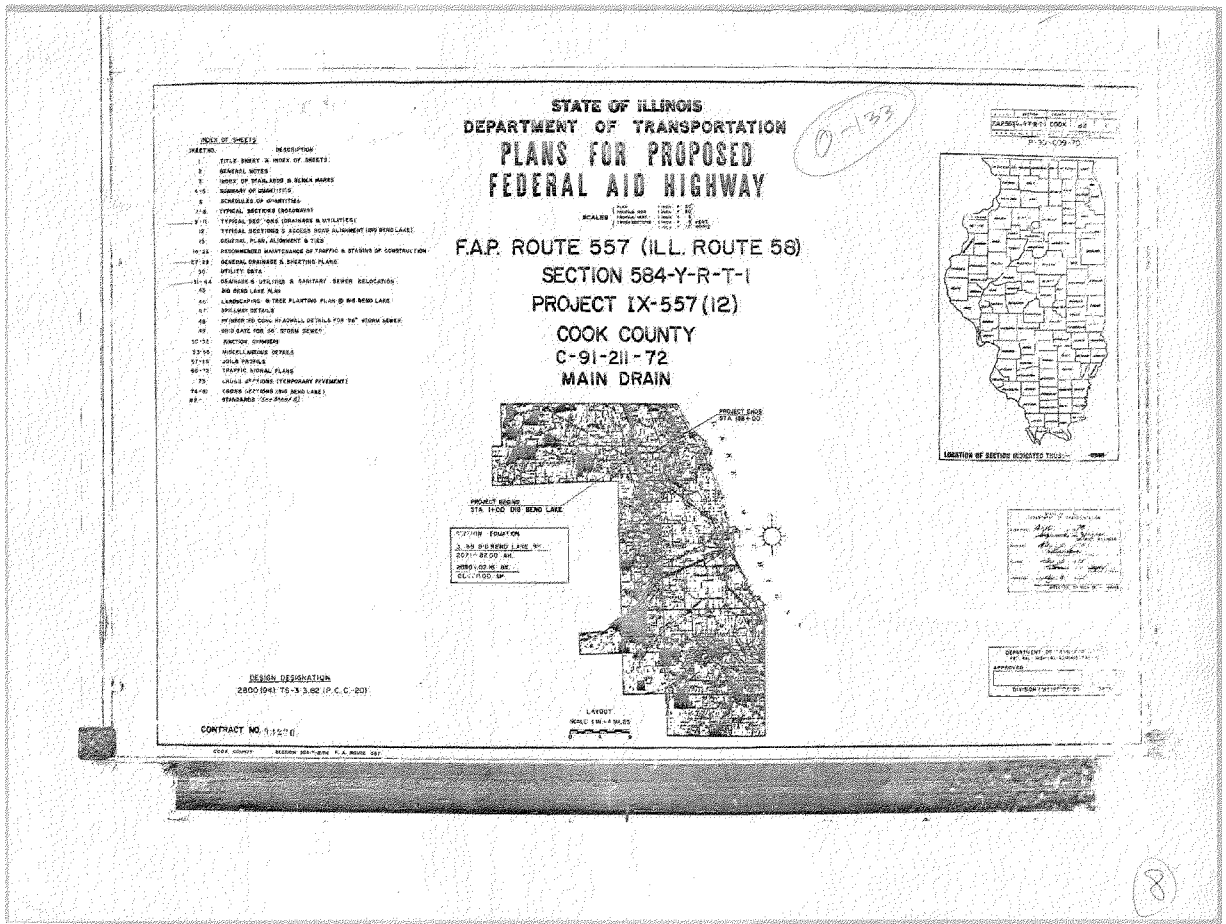
Looking North at Retention Basin South of Golf Road from Apartment Complex on the South

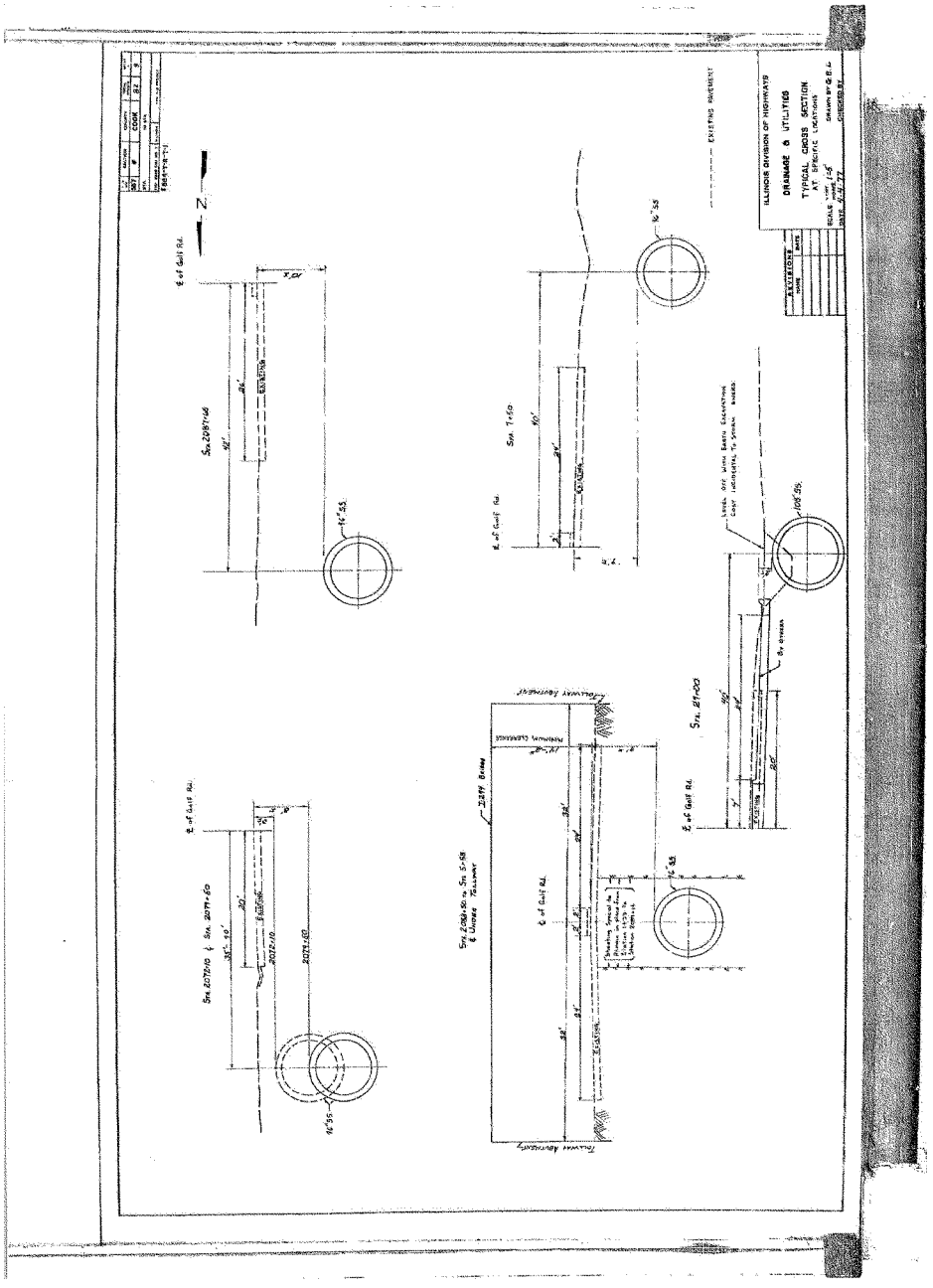
Photograph #5

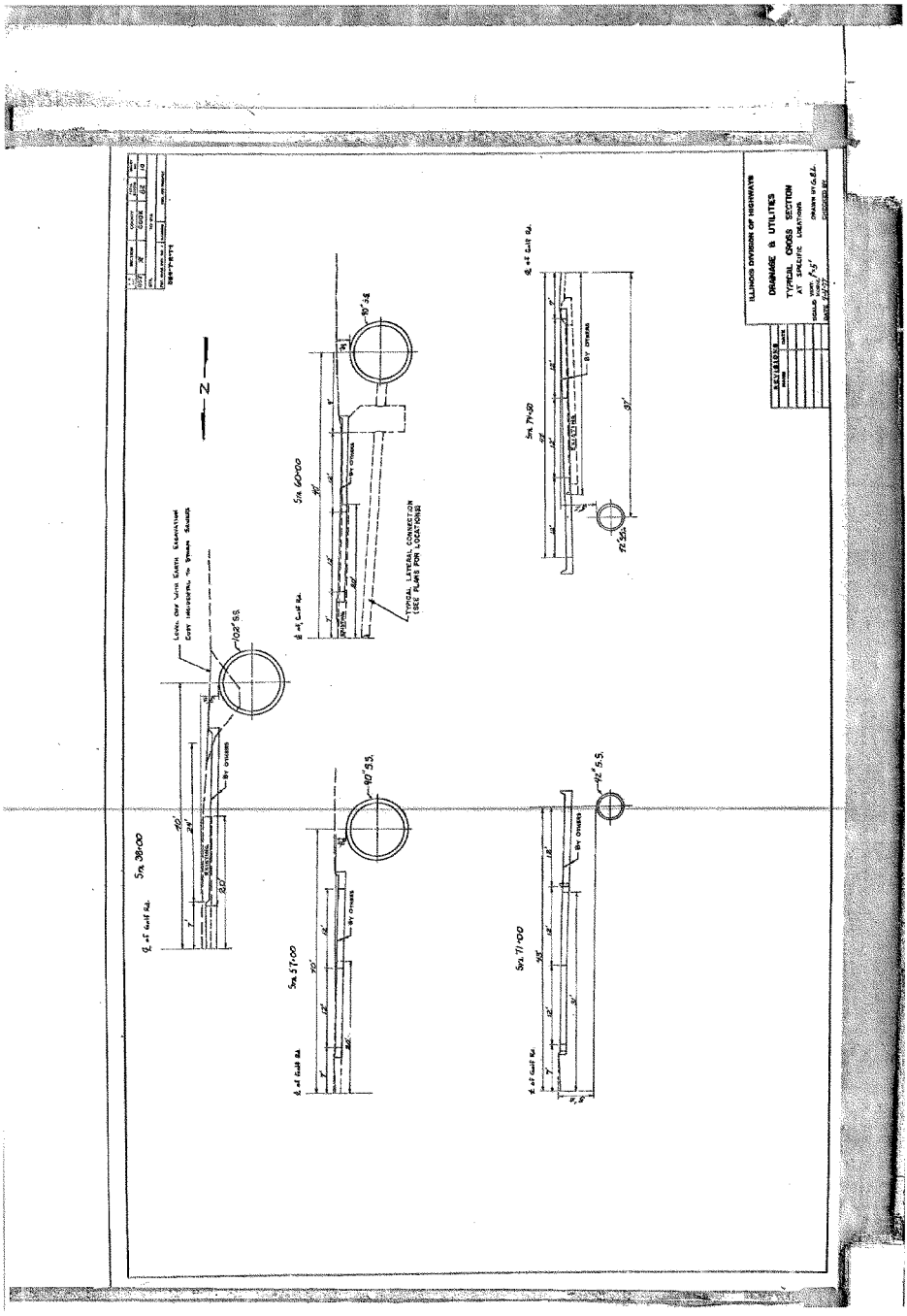
Looking Northeast at Retention Basin South of Golf Road from Apartment Complex on the South

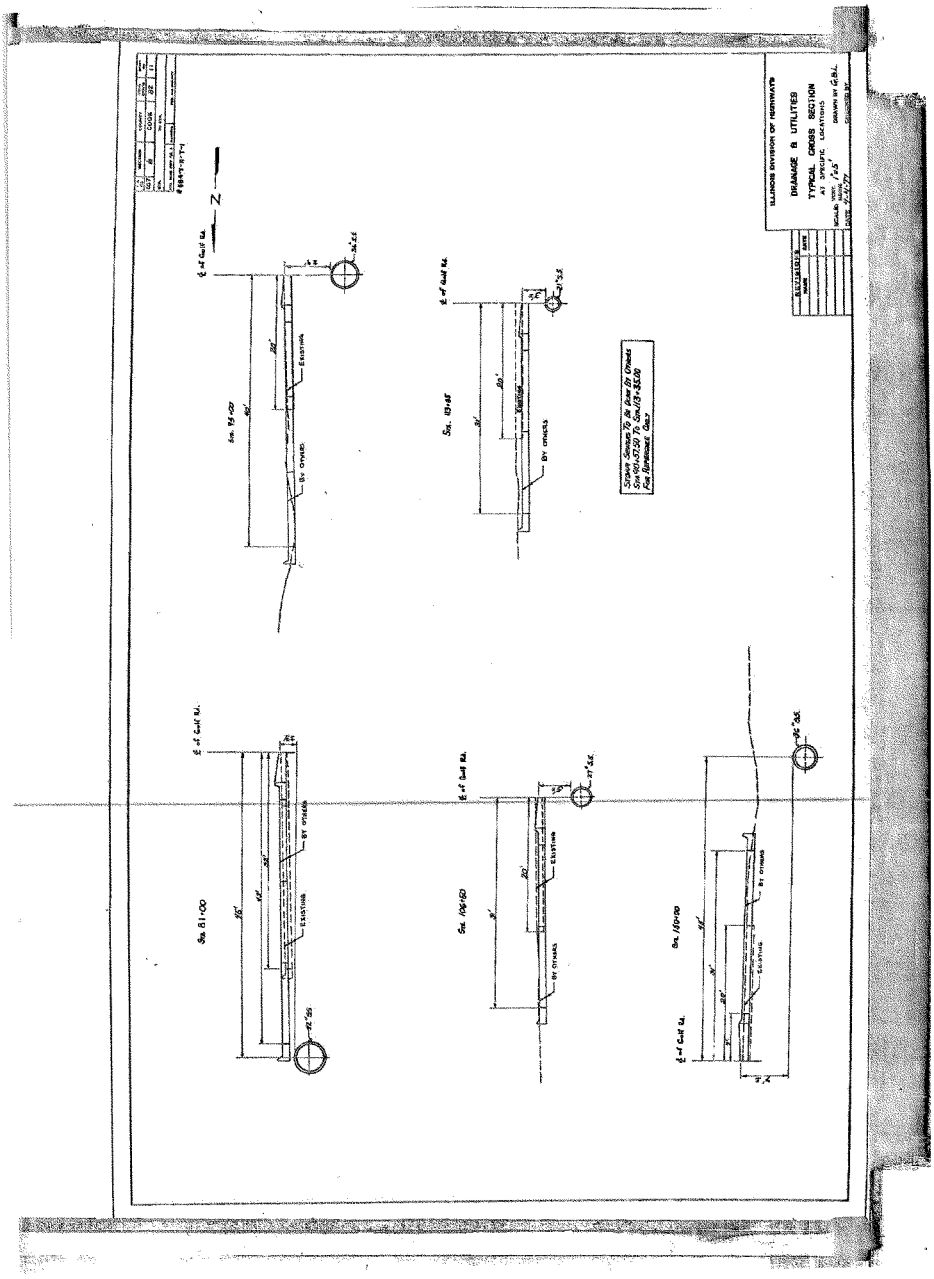
Photograph #6

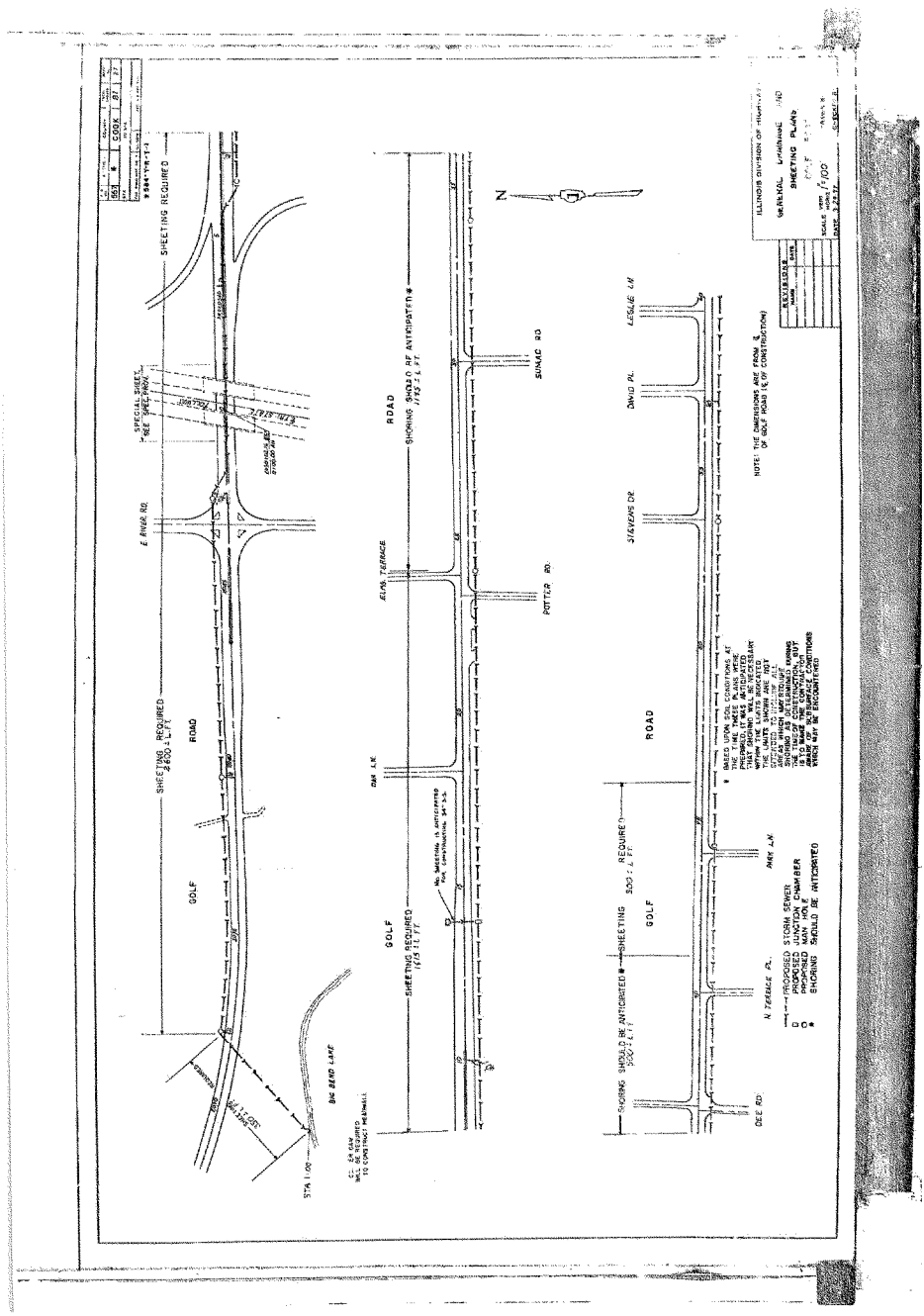
Looking Northeast at Retention Basin South of Golf Road from Apartment Complex on the South

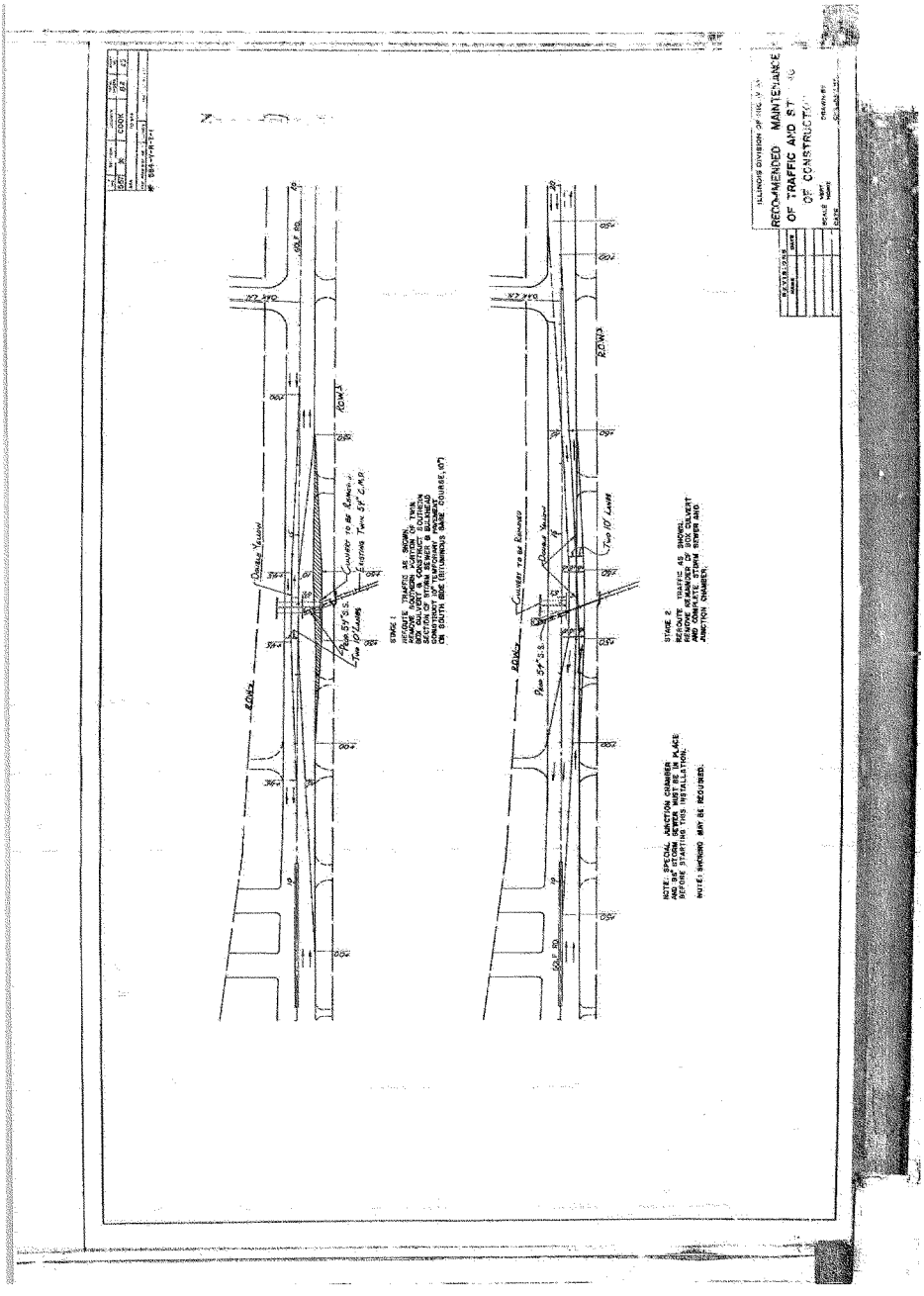

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
FEDERAL AID HIGHWAY
F.A.P. ROUTE 557 (ILL. ROUTE 58)
SECTION 584-Y-R-T-1
PROJECT IX-557 (12)
COOK COUNTY
C-91-211-72
MAIN DRAIN
INDEX OF SHEETS
SHEET NO. DESCRIPTION
1 TITLE SHEET & INDEX OF SHEETS
2 GENERAL NOTES
3 INDEX OF STANDARDS & BENCH MARKS
4-5 SUMMARY OF QUANTITIES
6 SCHEDULES OF QUANTITIES
7-8 TYPICAL SECTIONS (HIGHWAYS)
9-11 TYPICAL SECTIONS (DRAINAGE & UTILITIES)
12 TYPICAL SECTIONS & ACCESS ROAD ALIGNMENT (BIG BEND LAKE)
15 GENERAL PLAN, ALIGNMENT & TIES
16-25 RECOMMENDED MAINTENANCE OF TRAFFIC & STAGING OF CONSTRUCTION
27-29 GENERAL DRAINAGE & SPECTING PLANS
30 UTILITY DATA
31-44 DRAINAGE & UTILITIES & SANITARY SEWER RELOCATION
45 BIG BEND LAKE PLAN
46 LANDSCAPING & TREE PLANTING PLAN @ BIG BEND LAKE
47 SPILLWAY DETAILS
48 PROPERTIES CONC HEADWALL DETAILS FOR 78" STORM SEWER
49 BIG BAKE FOR 36" STORM SEWER
50-52 JUNCTION CHAMBERS
53-55 MISCELLANEOUS DETAILS
57-65 JOINT PROFILE
66-72 TRAFFIC SIGNAL PLANS
73 CROSS SECTIONS (TEMPORARY PAVEMENT)
74-80 CROSS SECTIONS (BIG BEND LAKE)
82- STANDARDS (See Sheet 4)
SCALES
PROJECT ENDS STA. 188+00
PROJECT BEGINS STA. 1+00 BIG BEND LAKE
SECTION EQUATION
LAYOUT
SCALE 1 IN = 4 MILES
LOCATION OF SECTION INDICATED THUS:
DESIGN DESIGNATION
2800 (94) TS-3 3.62 (P.C.C.-20)
CONTRACT NO. 91220
COOK COUNTY SECTION 584-Y-R-T-1 F.A. ROUTE 557
0-133
8

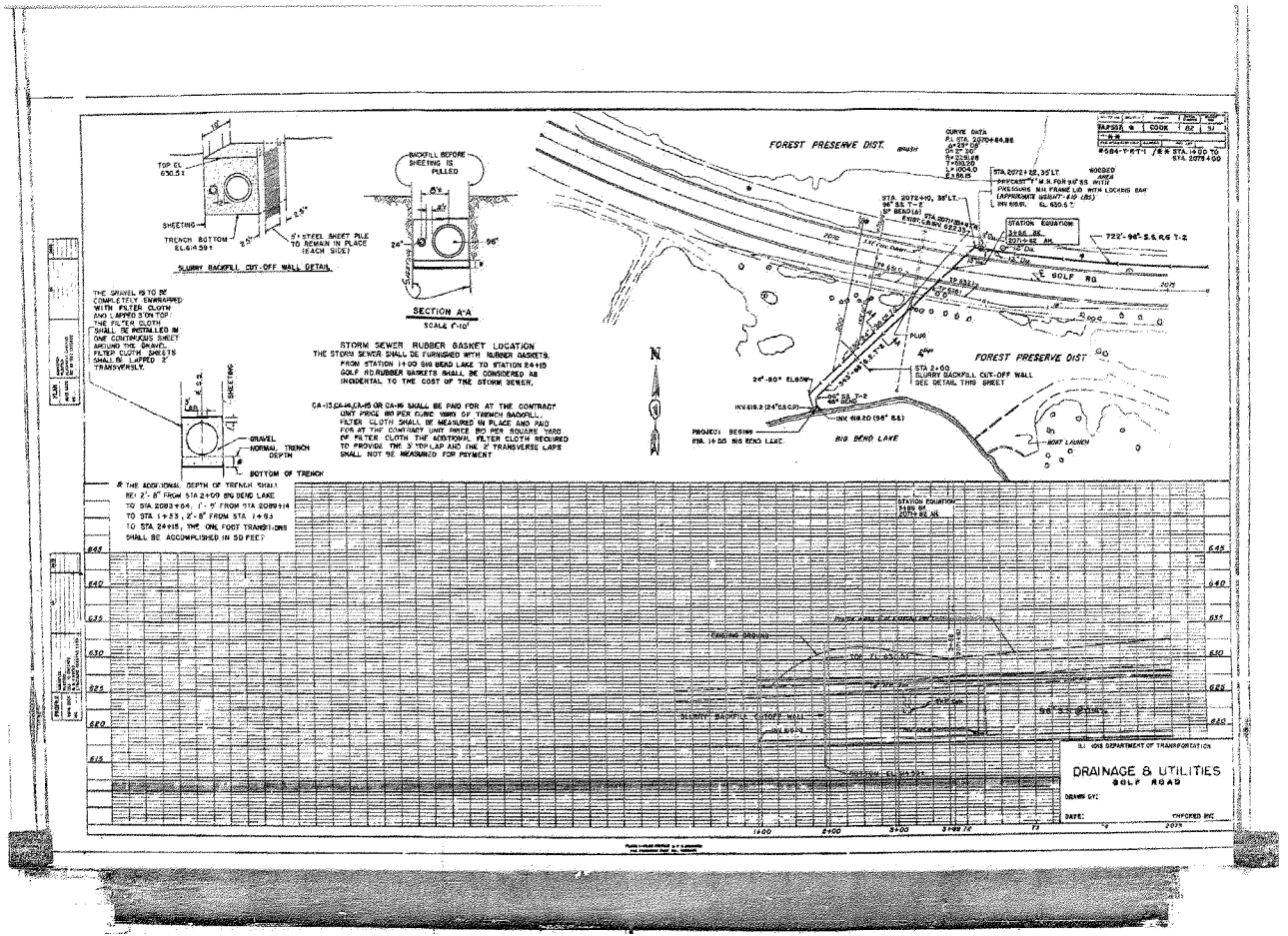

ILLINOIS DIVISION OF HIGHWAYS
DRAINAGE & UTILITIES
TYPICAL CROSS SECTION
AT SPECIFIC LOCATIONS
EXISTING PAVEMENT
℄ of Guit Rd.
Sta. 2087+60
Sta. 2072+10 & Sta. 2071+60
Sta. 2080+60 to Sta. 2081+58
Sta. 2077+60
Sta. 2084+00
Sta. 7+50
Sta. 21+00
Proposed Pavement
Proposed Shoulder
Existing Pavement
Existing Shoulder
Limit of Mine Basin Excavation
Coal Industrial Tp Spoils Basin
Remove Existing Pavement
Remove Existing Shoulder
Remove Existing Culvert
Remove Existing Inlet
Remove Existing Manhole
Remove Existing Headwall
Remove Existing Endwall
Remove Existing Apron
Remove Existing Ditch
Remove Existing Curb
Remove Existing Gutter
Remove Existing Sidewalk
Remove Existing Driveway
Remove Existing Fence
Remove Existing Guardrail
Remove Existing Signs
Remove Existing Poles
Remove Existing Trees
Remove Existing Shrubs
Remove Existing Bushes
Remove Existing Grass
Remove Existing Soil
Remove Existing Rock
Remove Existing Water
Remove Existing Gas
Remove Existing Electric
Remove Existing Telephone
Remove Existing Cable
Remove Existing Fiber Optic
Remove Existing Sewer
Remove Existing Water Main
Remove Existing Gas Main
Remove Existing Electric Line
Remove Existing Telephone Line
Remove Existing Cable Line
Remove Existing Fiber Optic Line
Remove Existing Sewer Line
Remove Existing Water Main Line
Remove Existing Gas Main Line
Remove Existing Electric Line
Remove Existing Telephone Line
Remove Existing Cable Line
Remove Existing Fiber Optic Line
Remove Existing Sewer Line
Remove Existing Water Main Line
Remove Existing Gas Main Line


ILLINOIS DIVISION OF HIGHWAYS
DRAINAGE & UTILITIES
TYPICAL CROSS SECTION
AT SPECIFIC LOCATIONS
SCALE 1"=5'
DRAWN BY G.E.L.
CHECKED BY
DATE 1-4-77
REVISIONS
N
Sta. 38+00
Sta. 57+00
Sta. 60+00
Sta. 71+00
Sta. 74+50
102" S.S.
90" S.S.
42" S.S.
LEVEL OFF WITH EARTH EXCAVATION
COST INCIDENTAL TO DRAIN SAWAGE
TYPICAL LATERAL CONNECTION
(SEE PLANS FOR LOCATIONS)
BY OTHERS
EXISTING
℄ of Gulf Rd.

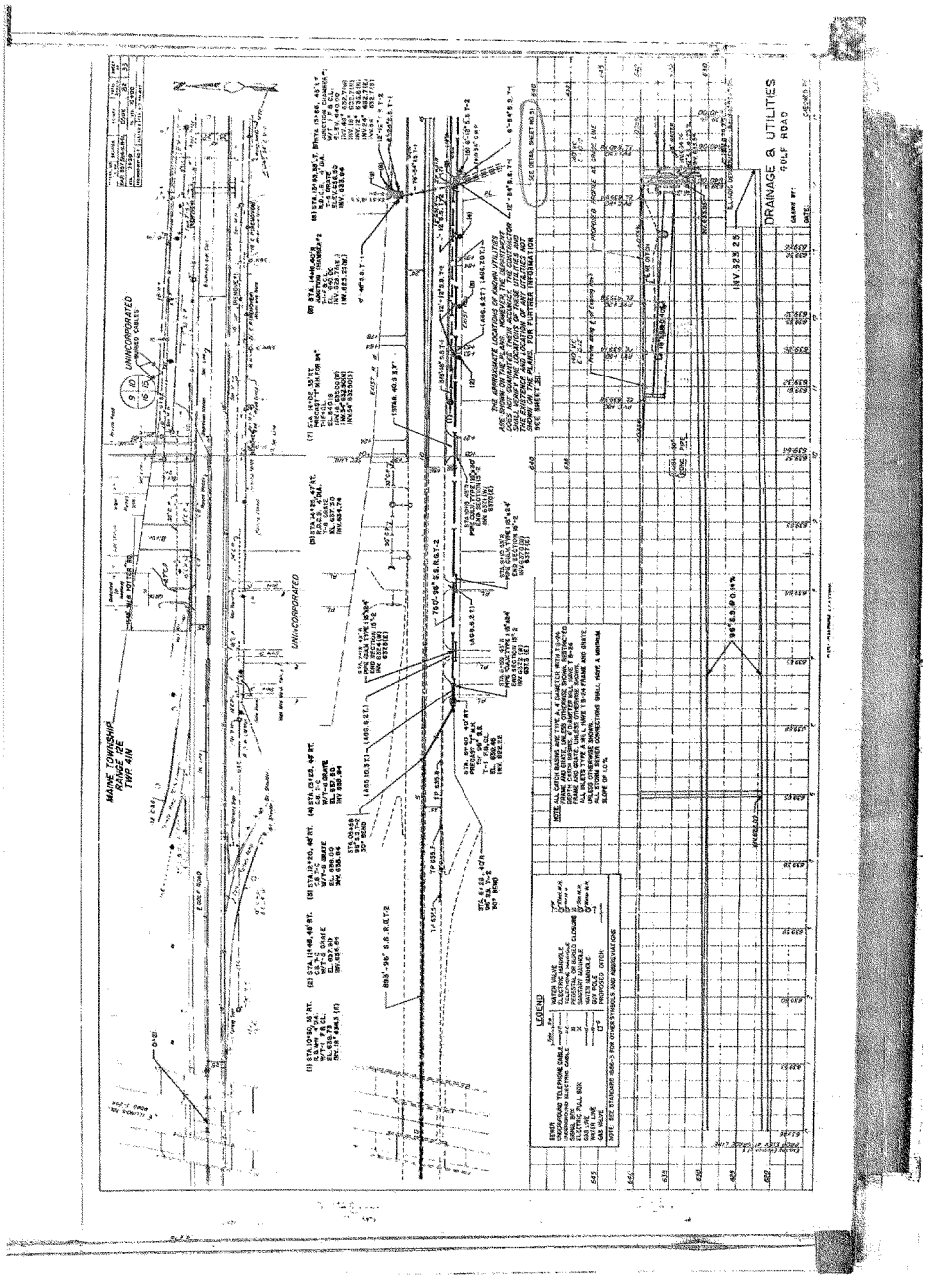

ILLINOIS DIVISION OF HIGHWAYS
DRAINAGE & UTILITIES
TYPICAL CROSS SECTION
AT SPECIFIC LOCATIONS
SCALE: NONE
DRAWN BY G.B.L.
DATE 7-1-77
CHECKED BY
Sta. 81+00
Sta. 106+50
Sta. 113+65
Sta. 135+00
Sta. 150+00
EXISTING
BY OTHERS
Stage Sewer To Be Done By Others
Sta 101+57.50 To Sta 113+35.00
For Reference Only
N

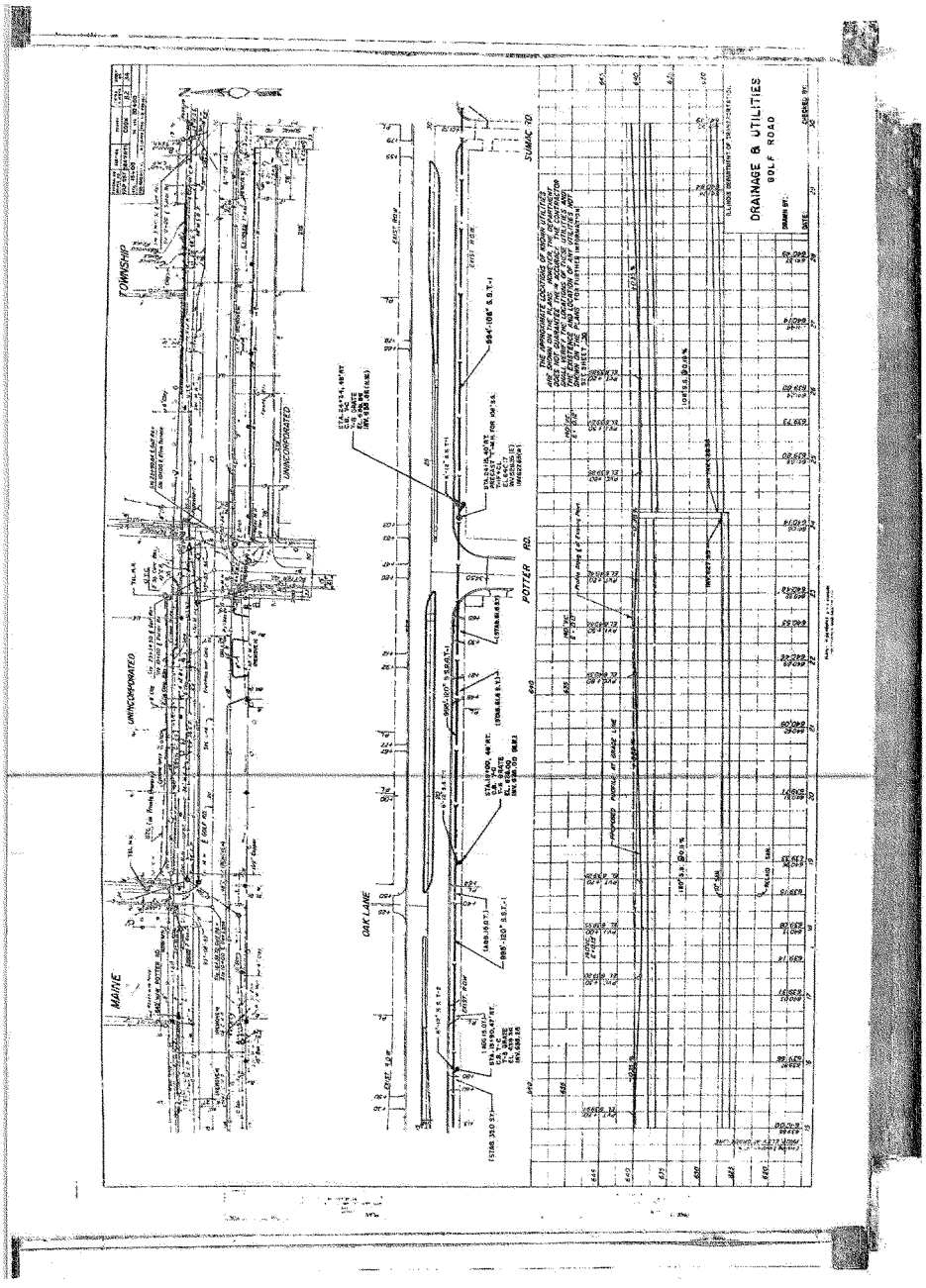

SHEETING REQUIRED
SPECIAL SHEET SEE SPECIAL SHEET
E. RIVER RD.
SHEETING REQUIRED 2600 ± L.F.
ROAD
GOLF
BIG BEND LANE
STA 1.00
SHORING SHOULD BE ANTICIPATED
ELM TERRACE
POTTER RD.
SUMAC RD
DAN L.N.
SHEETING REQUIRED 1175 ± L.F.
N. TERRACE PL.
PARK L.N.
DEE RD.
STEVENS DR.
DAVID PL.
LEGLIE L.N.
NOTE: THE DIMENSIONS ARE FROM ℄ OF GOLF ROAD (℄ OF CONSTRUCTION)
PROPOSED STORM SEWER
PROPOSED JUNCTION CHAMBER
PROPOSED MAN HOLE
SHORING SHOULD BE ANTICIPATED
ILLINOIS DIVISION OF HIGHWAYS
GENERAL DRAINAGE
SHEETING PLANS
REVISIONS
COOK
N

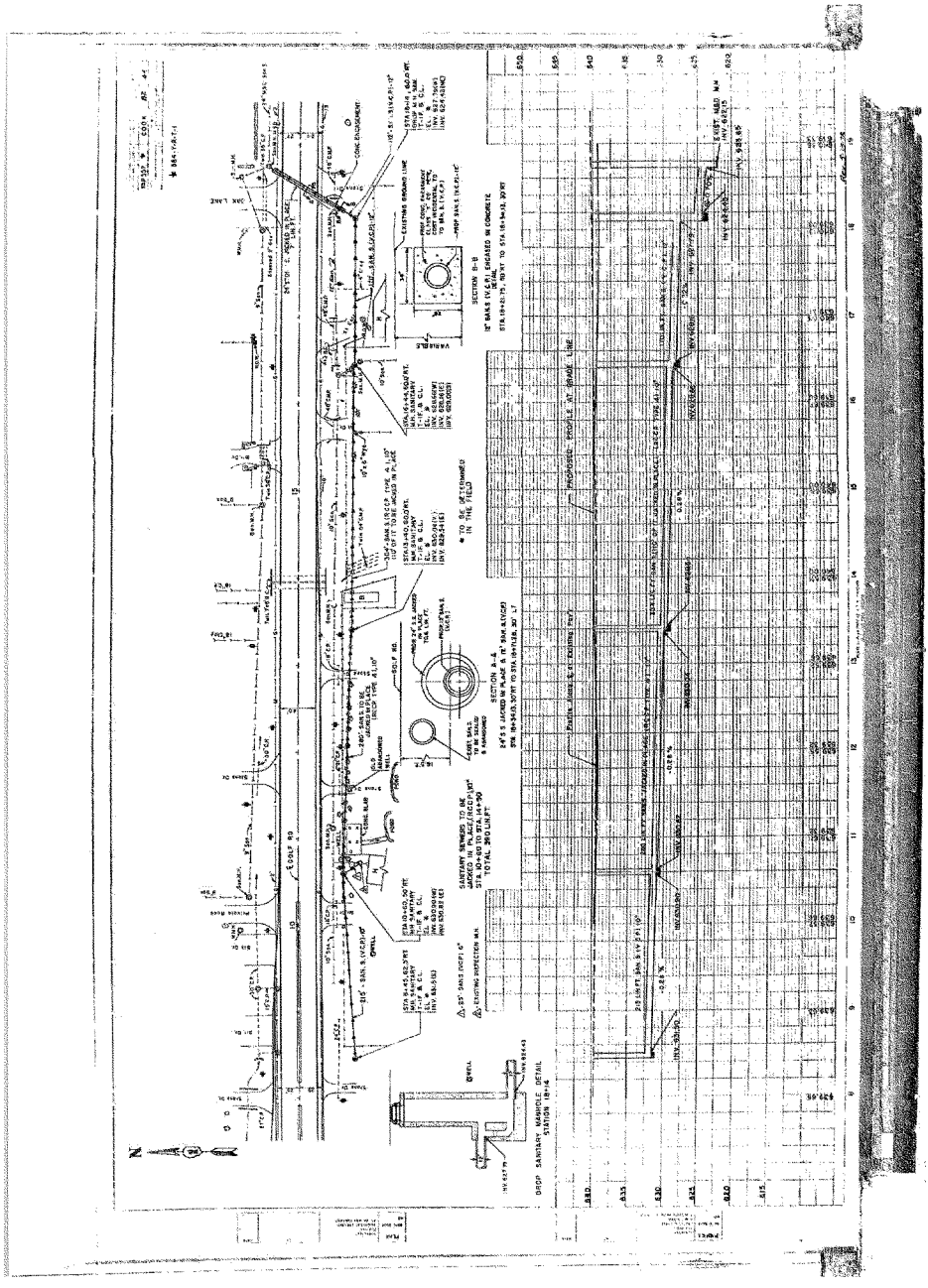

ILLINOIS DIVISION OF HIGHWAYS
REDO-AMENDED MAINTENANCE
OF TRAFFIC AND STAGING
OF CONSTRUCTION
STAGE 1
REROUTE TRAFFIC AS SHOWN.
REMOVE ROUTHERN PORTION OF TWIN
BOX CULVERT & CONSTRUCT SOUTHERN
SECTION OF STORM SEWER & BULKHEAD
CONSTRUCT 30" TEMPORARY PAVEMENT
ON SOUTH SIDE (BITUMINOUS BASE COURSE, 10")
STAGE 2
REROUTE TRAFFIC AS SHOWN.
REMOVE REMAINDER OF BOX CULVERT
AND COMPLETE STORM SEWER AND
JUNCTION CHAMBER.
NOTE: SPECIAL JUNCTION CHAMBER
AND 36" STORM SEWER MUST BE IN PLACE
BEFORE STARTING THIS INSTALLATION.
NOTE: SHORING MAY BE REQUIRED.
Double Yellow
Culvert to be Removed
Existing Twin 54" C.M.P.
Pour 54" S.S.
Two 10' Lanes
R.O.W.
COLF. RD.



SLURRY BACKFILL CUT-OFF WALL DETAIL
TOP EL 630.5±
SHEETING
TRENCH BOTTOM EL 614.59±
5'± STEEL SHEET PILE TO REMAIN IN PLACE (EACH SIDE)
BACKFILL BEFORE SHEETING IS PULLED
SECTION A-A
SCALE 1"=10'
THE GRAVEL IS TO BE COMPLETELY ENWRAPPED WITH FILTER CLOTH AND LAPPED 3' ON TOP. THE FILTER CLOTH SHALL BE INSTALLED IN ONE CONTINUOUS SHEET AROUND THE GRAVEL. FILTER CLOTH SHEETS SHALL BE LAPPED 2' TRANSVERSLY.
GRAVEL
NORMAL TRENCH DEPTH
BOTTOM OF TRENCH
STORM SEWER RUBBER GASKET LOCATION
THE STORM SEWER SHALL BE FURNISHED WITH RUBBER GASKETS. FROM STATION 1+00 BIG BEND LAKE TO STATION 24+15 GOLF RD. RUBBER GASKETS SHALL BE CONSIDERED AS INCIDENTAL TO THE COST OF THE STORM SEWER.
CA-13, CA-14, CA-15 OR CA-16 SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE 80 PER CUBIC YARD OF TRENCH BACKFILL. FILTER CLOTH SHALL BE MEASURED IN PLACE AND PAID FOR AT THE CONTRACT UNIT PRICE 80 PER SQUARE YARD OF FILTER CLOTH. THE ADDITIONAL FILTER CLOTH REQUIRED TO PROVIDE THE 3' TOP LAP AND THE 2' TRANSVERSE LAPS SHALL NOT BE MEASURED FOR PAYMENT
* THE ADDITIONAL DEPTH OF TRENCH SHALL BE: 2'-8" FROM STA 2+00 BIG BEND LAKE TO STA 2083+64, 1'-5" FROM STA 2089+14 TO STA 1+33, 2'-8" FROM STA 1+93 TO STA 24+15, THE ONE FOOT TRANSITIONS SHALL BE ACCOMPLISHED IN 50 FEET
FOREST PRESERVE DIST.
CURVE DATA
STATION EQUATION
GOLF RD
FOREST PRESERVE DIST
STA 2+00 SLURRY BACKFILL CUT-OFF WALL SEE DETAIL THIS SHEET
BIG BEND LAKE
PROJECT BEGINS STA. 1+00 BIG BEND LAKE
BOAT LAUNCH
EXISTING GROUND
SLURRY BACKFILL CUTOFF WALL
ILLINOIS DEPARTMENT OF TRANSPORTATION
DRAINAGE & UTILITIES
GOLF ROAD
DRAWN BY:
DATE:
CHECKED BY:


MAINE TOWNSHIP
RANGE 22E
TWP. 41N
UNINCORPORATED
UNINCORPORATED
LEGEND
DRAINAGE & UTILITIES
GOLF ROAD

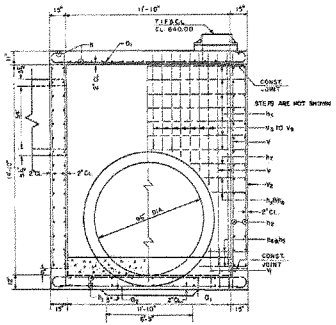

DRAINAGE & UTILITIES
GOLF ROAD
TOWNSHIP
UNINCORPORATED
MAINE
OAK LANE
POTTER RD.
SUMAC RD.
ILLINOIS DEPARTMENT OF TRANSPORTATION



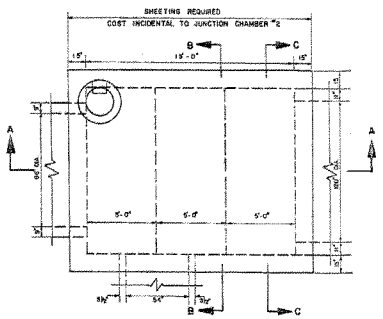
SECTION	COUNTY	DIST. NO.	SHEET NO.
587	COOK	8	51

TO SHEET

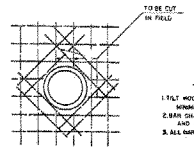
* 584-7-18-7-1



SECTION B-B



PLAN

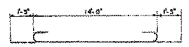


X BARS DETAIL

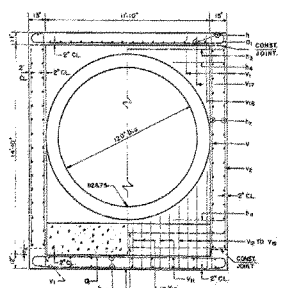
B. X_1-BARS, FOR LOWER HALF OF 120" ⌀ S.S., BOTH FACES
A. X_1-BARS, FOR UPPER HALF OF 120" ⌀ S.S., BOTH FACES
16. X_2-BARS, FOR 96" ⌀ S.S., BOTH FACES
14. X_3-BARS, FOR 54" ⌀ S.S., BOTH FACES
8. X_4-BARS, FOR T.F.B.C.L.

GENERAL NOTES

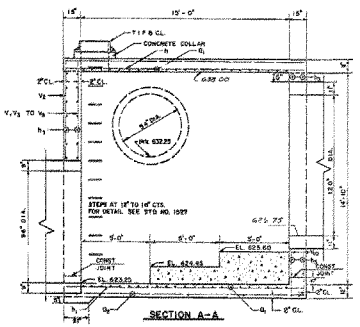
1. TILT HOOK OF "a_1" BARS, TO OBTAIN 2" MINIMUM CLEARANCE AT TOP OF HOOK
2. BAR CHAIRS SHALL BE ORDERED AT FULL LENGTH AND CUT TO FIT
3. ALL BARS SHALL BE LAPPED 24 DIAMETERS



a_1 BAR



SECTION C-C



SECTION A-A

BILL OF MATERIAL

BAR	C-C	NO.	SIZE	LENGTH	BAR	C-C	NO.	SIZE	LENGTH
a_1	8"	52	#9	16'-6"	V	3"	56	#7	5'-1"
a_2	2'-4"	5	#4	12'-10"	V_1	8"	60	#7	2'-5"
					V_2	2'-3"	24	#8	14'-2"
h	5"	19	#7	17'-2"	V_3	8"	2	#7	6'-9"
h_1	18"	18	#5	17'-2"	V_4	8"	2	#7	6'-10"
h_2	12"	40	#5	17'-2"	V_5	8"	2	#7	7'-0"
h_3	12"	50	#5	16'-0"	V_6	8"	2	#7	7'-4"
h_4	12"	8	#5	3'-9"	V_7	8"	2	#7	7'-5"
h_5	12"	8	#5	3'-0"	V_8	8"	2	#7	6'-5"
h_6	12"	8	#5	2'-6"	V_9	8"	2	#7	6'-4"
h_7	12"	4	#6	4'-0"	V_{10}	8"	6	#7	3'-3"
					V_{11}	8"	4	#7	2'-5"
					V_{12}	8"	2	#7	4'-6"
X_1		2	#9	9'-6"	V_{13}	8"	2	#7	5'-0"
X_2		24	#9	8'-6"	V_{14}	8"	2	#7	5'-0"
X_3		16	#5	7'-6"	V_{15}	8"	2	#7	4'-0"
X_4		8	#9	21'-6"	V_{16}	8"	2	#7	6'-0"
					V_{17}	8"	2	#7	5'-0"
					CLASS X CONCRETE			CU. YDS.	56.5
					REINFORCEMENT BARS			LBS.	9345.0

REVISIONS	
NAME	DATE

ILLINOIS DIVISION OF HIGHWAYS

JUNCTION CHAMBER #2

STATION 14+10, 40' RT

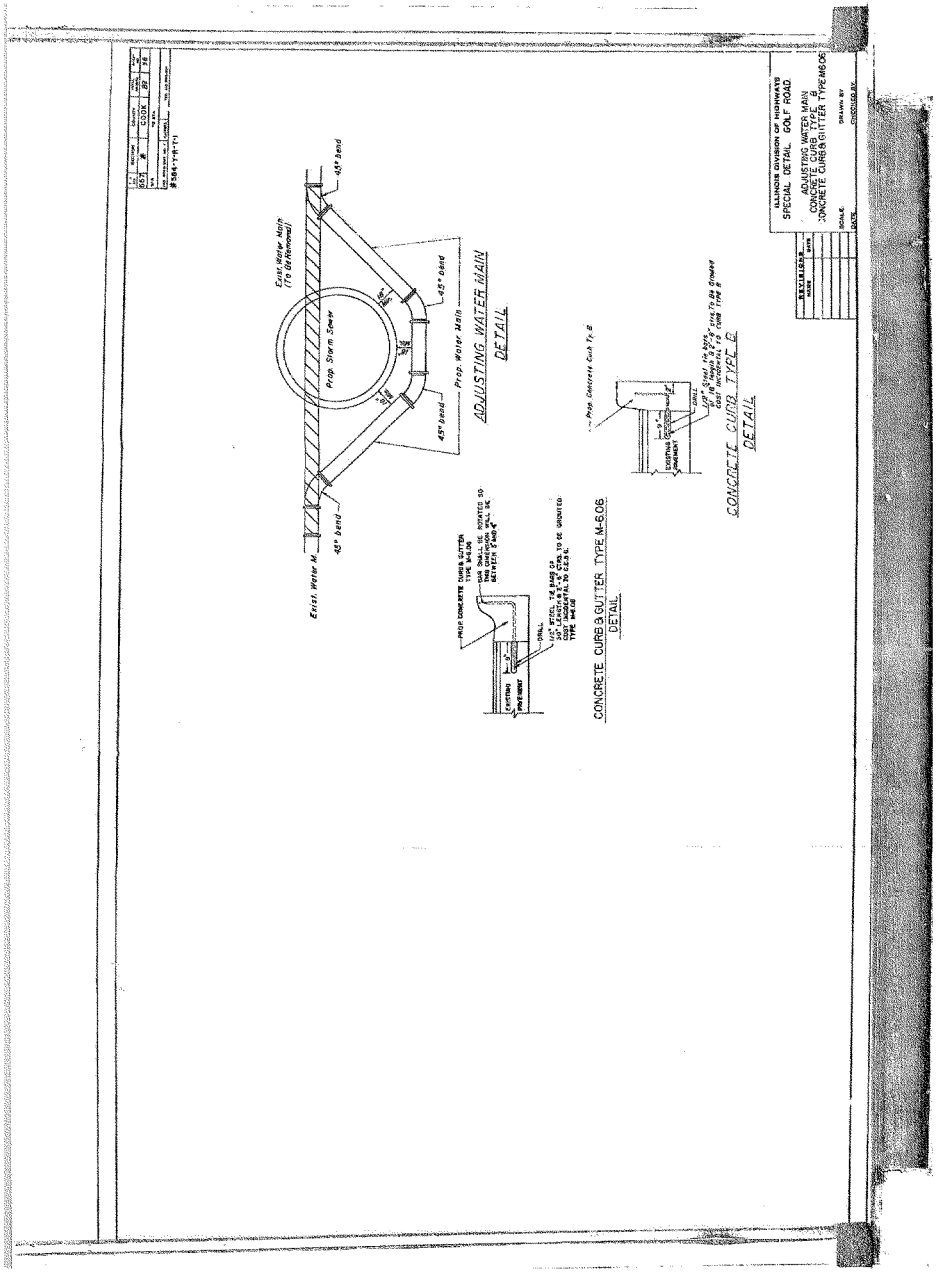
GOLF ROAD

SCALE 1/4" = 1'-0"

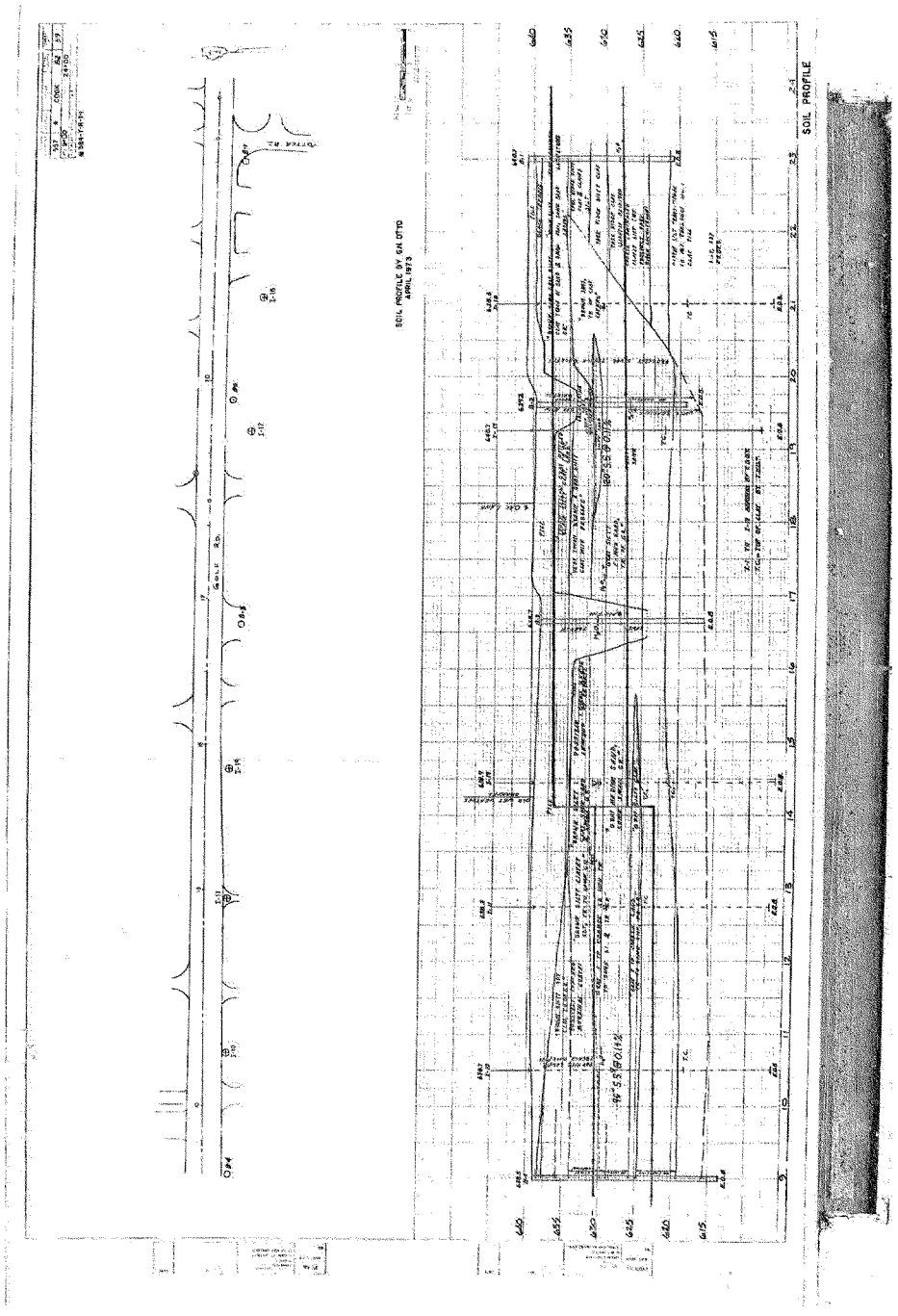
DATE

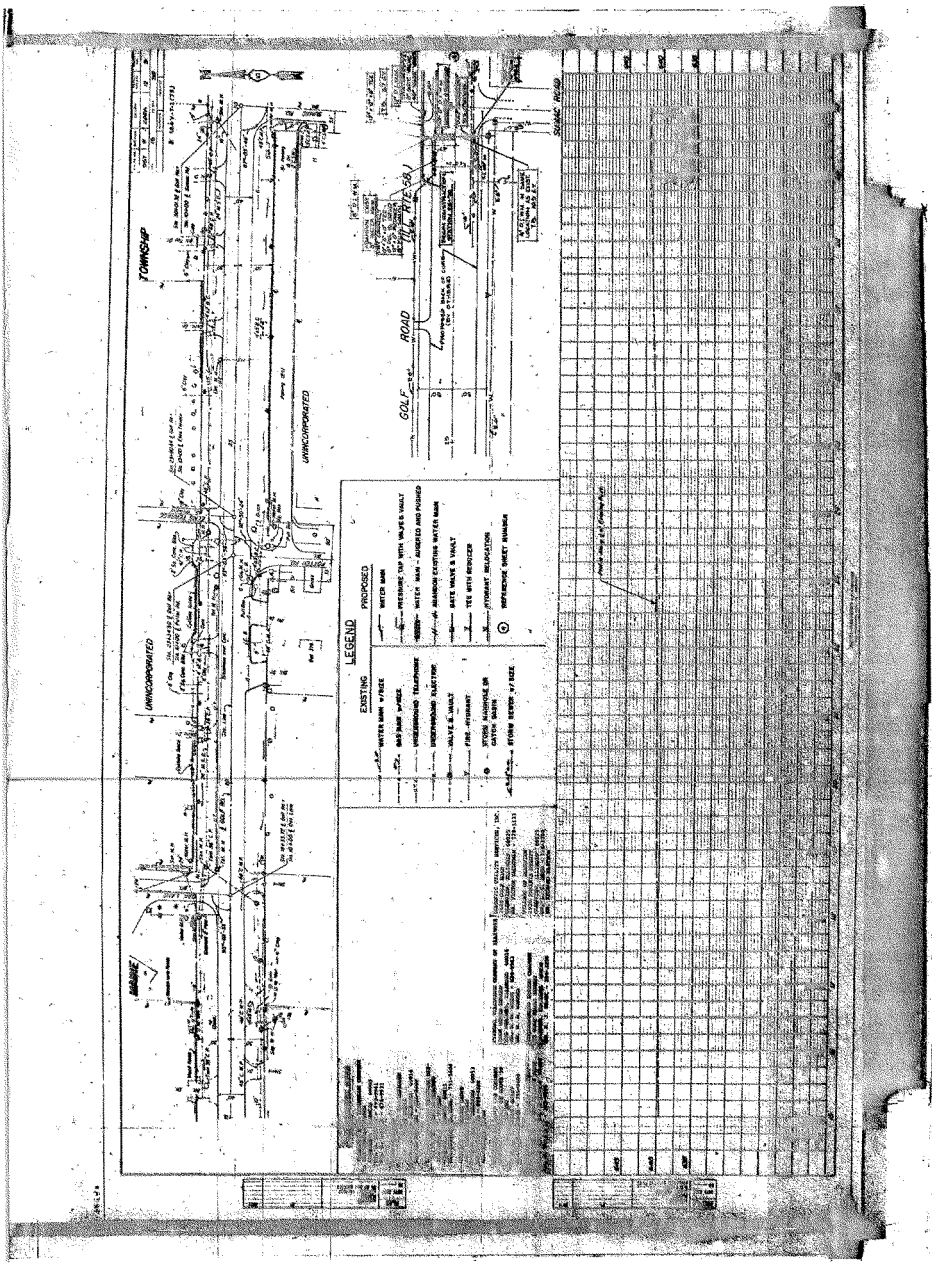
DRAWN B. M. B.

CHECKED BY C. W.


ILLINOIS DIVISION OF HIGHWAYS
SPECIAL DETAIL GOLF ROAD
ADJUSTING WATER MAIN
CONCRETE CURB & GUTTER TYPE M-6.06
Existing Water Main (To Be Removed)
Prop. Storm Sewer
Prop. Water Main
45° Bend
ADJUSTING WATER MAIN DETAIL
CONCRETE CURB & GUTTER TYPE M-6.06 DETAIL
CONCRETE CURB TYPE C DETAIL

SOIL PROFILE BY G.H. OTTO
APRIL 1973
SOIL PROFILE
GOLF ROAD
TOLLWAY RAMP


SOIL PROFILE BY GAI OTTO
APRIL 1973
SOIL PROFILE


TOWNSHIP
UNINCORPORATED
UNINCORPORATED
GOLF ROAD
SUMAC ROAD
LEGEND
EXISTING
PROPOSED
WATER MAIN
PRESSURE TAP WITH VALVE & VAULT
WATER MAIN - AUGERED AND PUSHED
MAHNOON EXISTING WATER MAIN
GATE VALVE & VAULT
TEE WITH REDUCER
HYDRANT RELOCATION
REFERENCE SHEET NUMBER
VALVE & VAULT
FIRE HYDRANT
STORM MANHOLE OR CATCH BASIN
STORM SEWER W/ SIZE

State

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PLANS FOR PROPOSED FEDERAL AID HIGHWAY

SCALES: PLAN, PROFILE, HORIZ., PROFILE, VERT., CROSS-SECTIONS

F.A.P. ROUTE 557 (ILL. ROUTE 58)

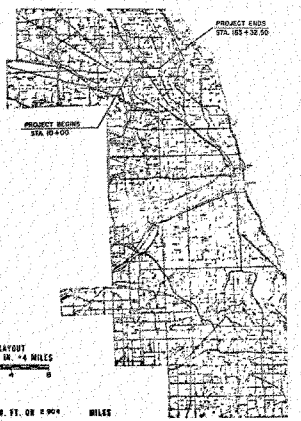
SECTION 584-Y-R
PROJECT IX-557 (16)
COOK COUNTY
C-91-210-72

0-141

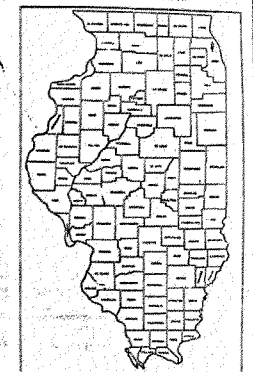
INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX OF SHEETS
2	GENERAL NOTES & INDEX OF STANDARDS
3-5	TYPICAL CROSS SECTIONS
6-8	SUMMARY OF QUANTITIES
9	SCHEDULES OF QUANTITIES
10	GENERAL PLAN, ALIGNMENT & TIES
11-15	R.O.W. STRIP MAP
16-29	RECOMMENDED MAINTENANCE OF TRAFFIC & STAGING OF CONSTRUCTION
30	UTILITY DATA
31-47	DRAINAGE AND UTILITIES
48-65	PLAN AND PROFILE
66-75	INTERSECTION DETAILS
76-78	LANDSCAPING AND TRAFFIC STRIPING
79-85	MISCELLANEOUS DETAILS
86-93	TEMPORARY TRAFFIC SIGNALS
94-109	TRAFFIC SIGNAL INSTALLATION
110-130	CROSS SECTIONS
131-135	CASE U-1, CASE U-2, AND CASE U-3 TRAFFIC CONTROL DEVICE

FOR LIST OF STANDARDS, SEE SHEET 2



LAYOUT
SCALE 1 IN. = 4 MILES
0 4 8



LOCATION OF SECTION INDICATED THUS: —

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SUBMITTED MAY 19 '78

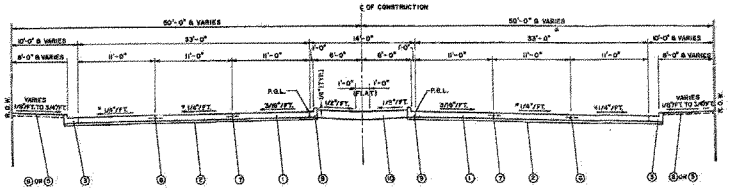
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED Jay W. Miller
DIVISION ADMINISTRATOR 6/6/78

DESIGN DESIGNATION
2800(94) TS-3-3.82 (P.C.C.-20)

CONTRACT NO. 82314

PROJECT NET LENGTH= 16332.50 LIN. FT. OR 2.904 MILES

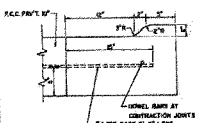
COOK COUNTY SECTION 584-Y-R F.A. ROUTE 557



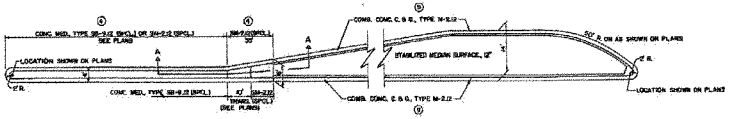
GOLF ROAD

STA. 87+65 L TO STA. 101+30
STA. 88+30 R TO STA. 101+30

STA. 101+30 TO STA. 104+45
PAVEMENT VARIES FROM 33'-0" TO 2 +/-0"



COMB. CONC. C & G., TYPE M-2.12



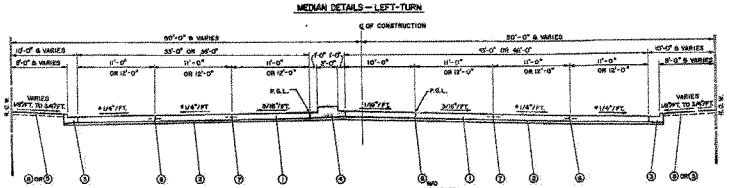
LEGEND

1. 9" C. CONCRETE PAVEMENT, 10'
2. STABILIZED SUBGRADE, 4"
3. COMB. CONC. C. & G., TYPE B-6.24 AND B-9.24 (MODIFIED)
4. CONCRETE MEDIAN, TYPE SB-9.12 (SPECIAL) OR TYPE SM-2.12 (SPECIAL), SEE PLANS
5. 5" CONCRETE SIDEWALK, SEE PLANS
6. KEYED LONGITUDINAL CONST. JOINT
7. SAWED OR POLYETHELENE SHEET LONGITUDINAL JOINT
8. 4" TOP SOIL, 1500, SEE PLANS
9. COMB. CONC. C & G., TYPE M-2.12
10. STABILIZED MEDIAN SURFACE, 12"

* CROSS SLOPE VARIES WITHIN VERTICAL CURVES AT SUMMITS AND SAGS. THE HEIGHT OF CURB OF MOUNTABLE CURB AND GUTTER WILL VARY SUCH THAT THE PROFILE OF THE TOP OF CURB SHALL PARALLEL THE PROFILE GRADE LINE WITHIN THE LIMITS OF THE VARIABLE CROSS SLOPE. SEE PROFILE FOR THESE LIMITS.

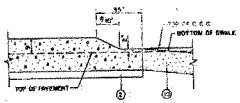
GOLF ROAD

MEDIAN DETAILS — LEFT-TURN



GOLF ROAD

WITH LEFT-TURN LANE



SECTION A-A

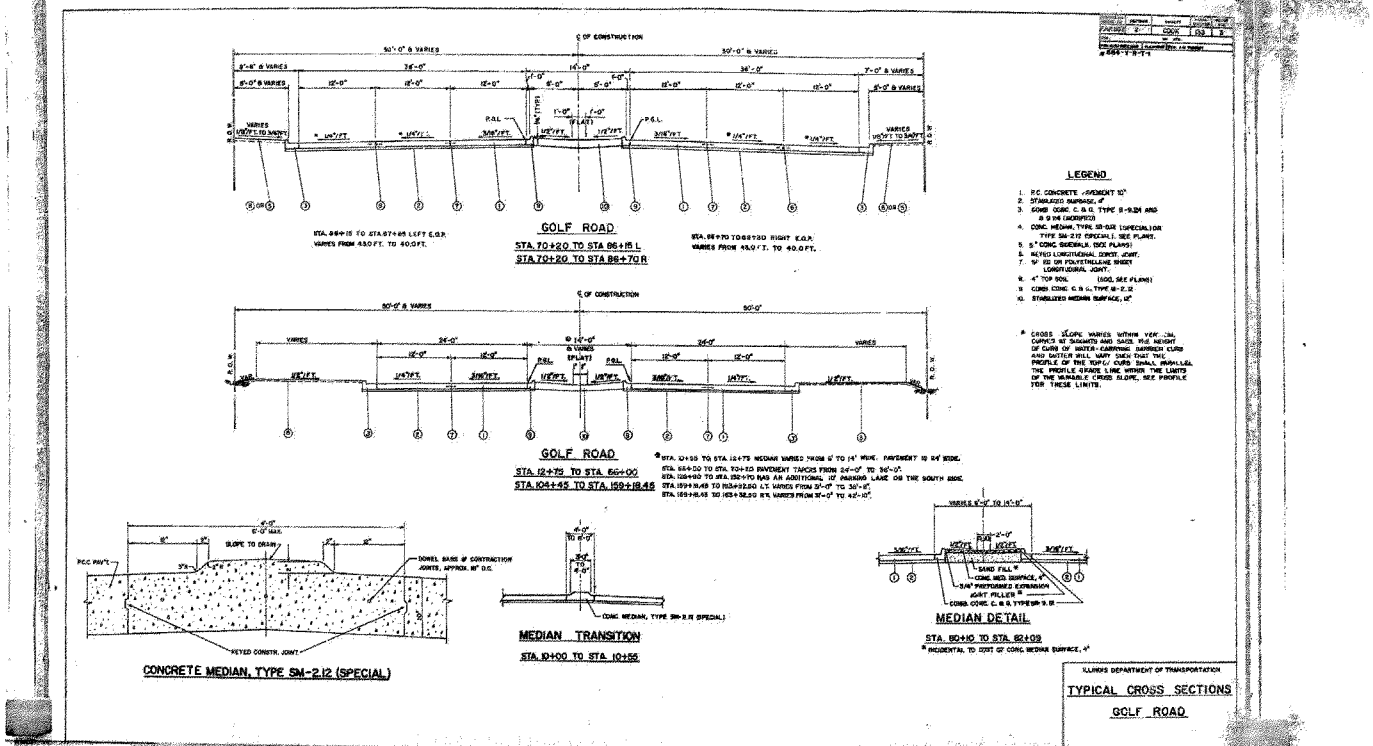
DETAIL OF TYPICAL MEDIAN TRANSITION

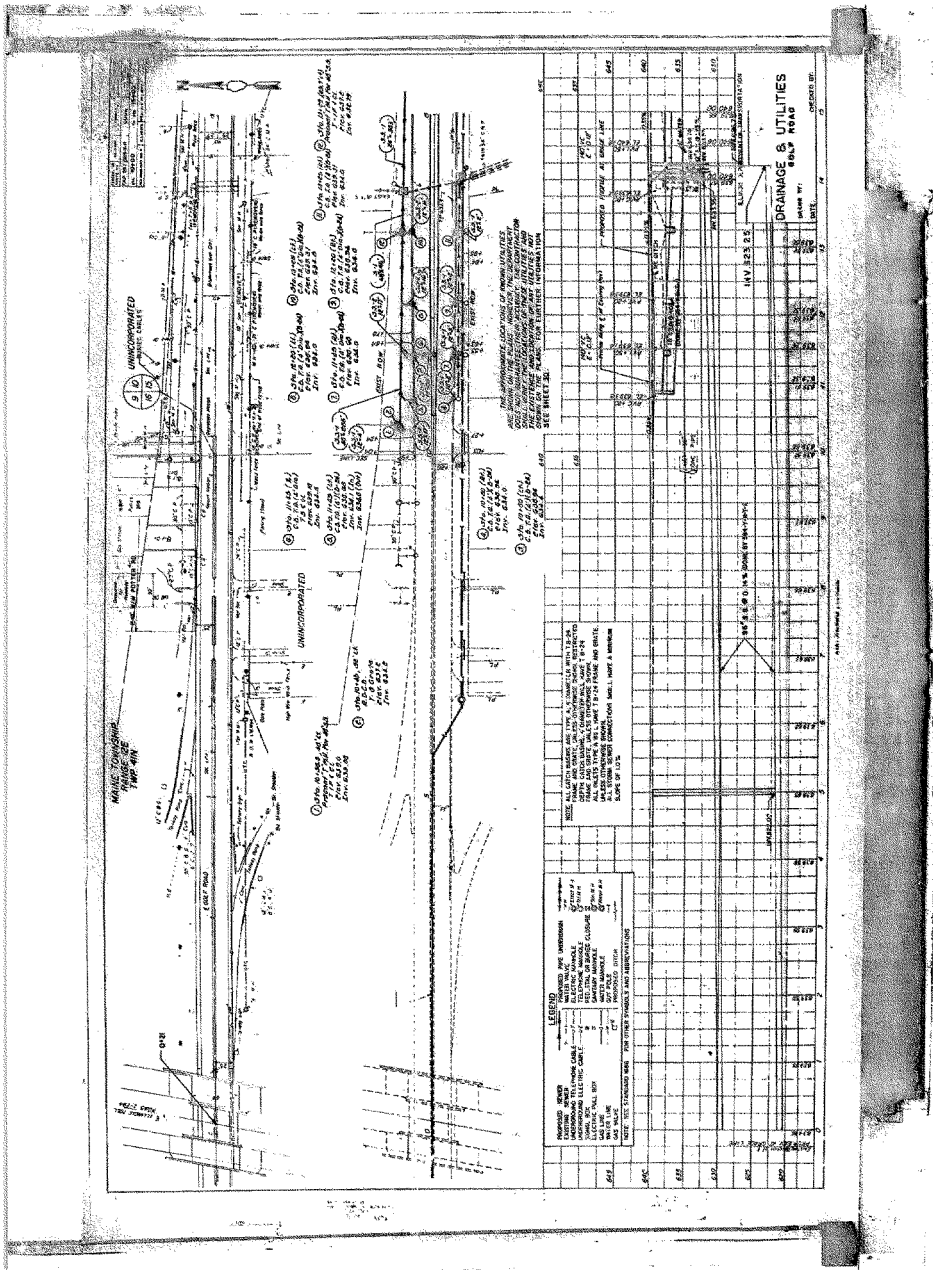
* MEDIAN TRANSITION SHALL BE MEASURED AS CONC. MEDIAN TYPE SB-9.12 (SPECIAL)

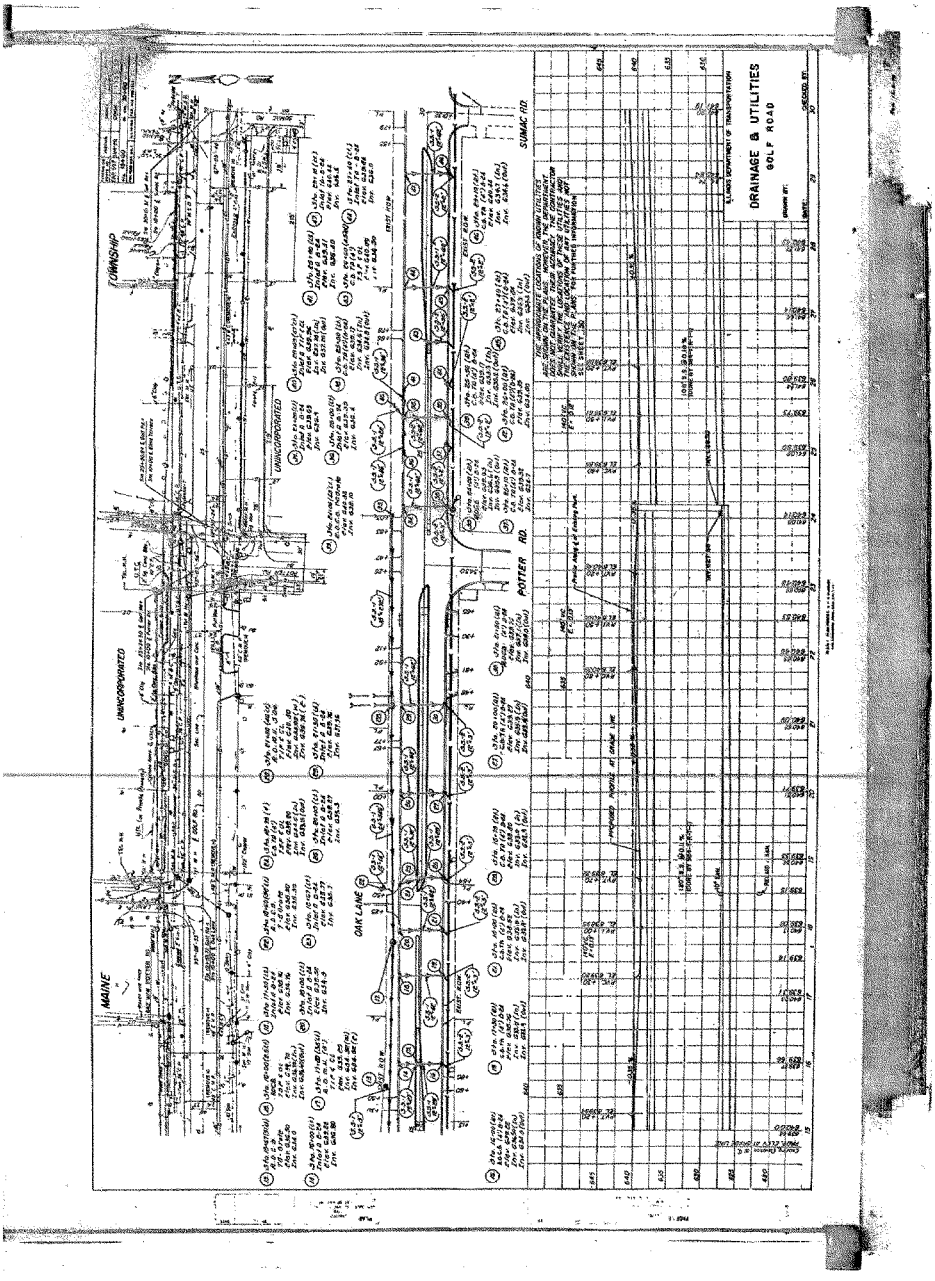
ILLINOIS DEPARTMENT OF TRANSPORTATION

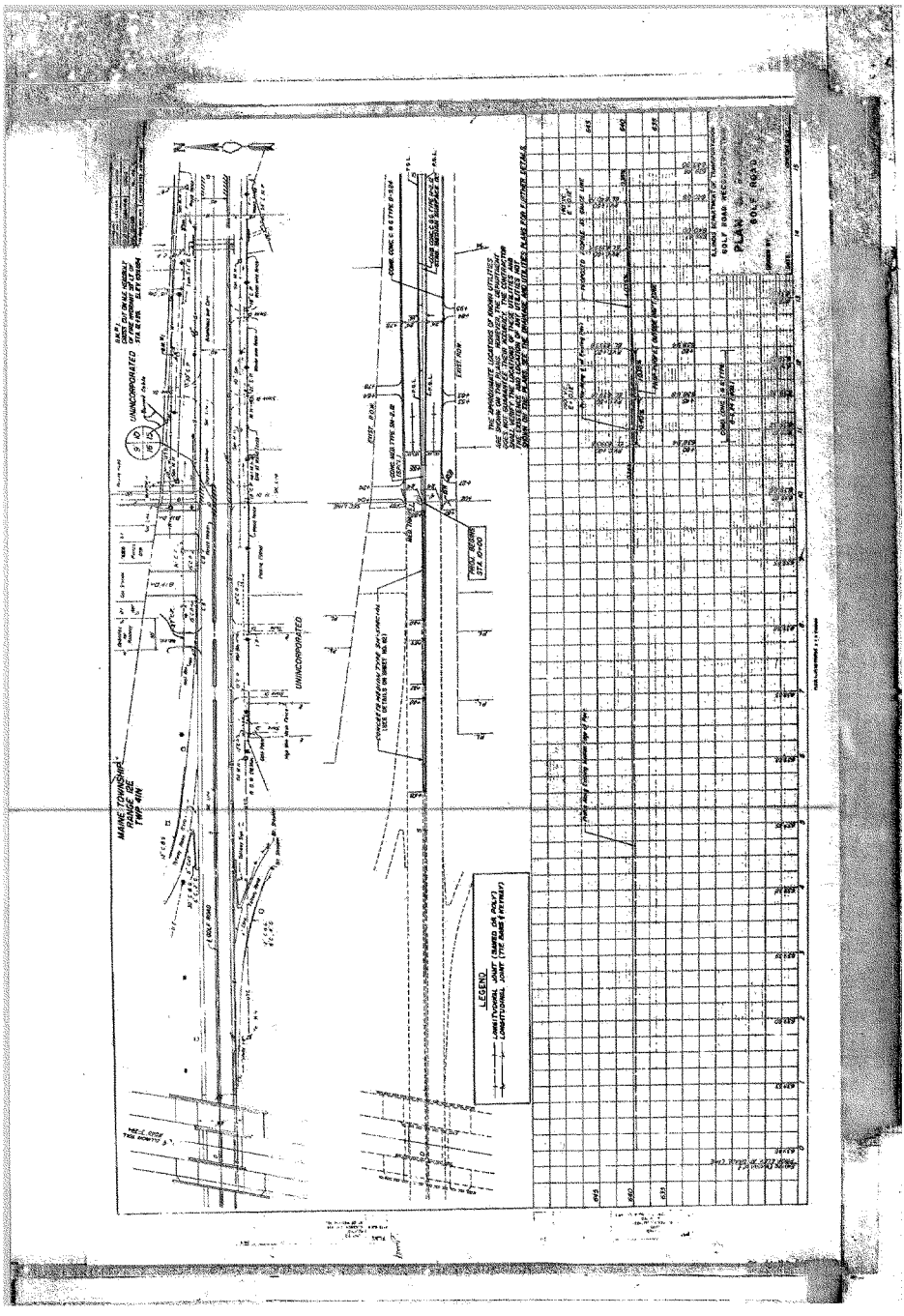
TYPICAL CROSS SECTIONS

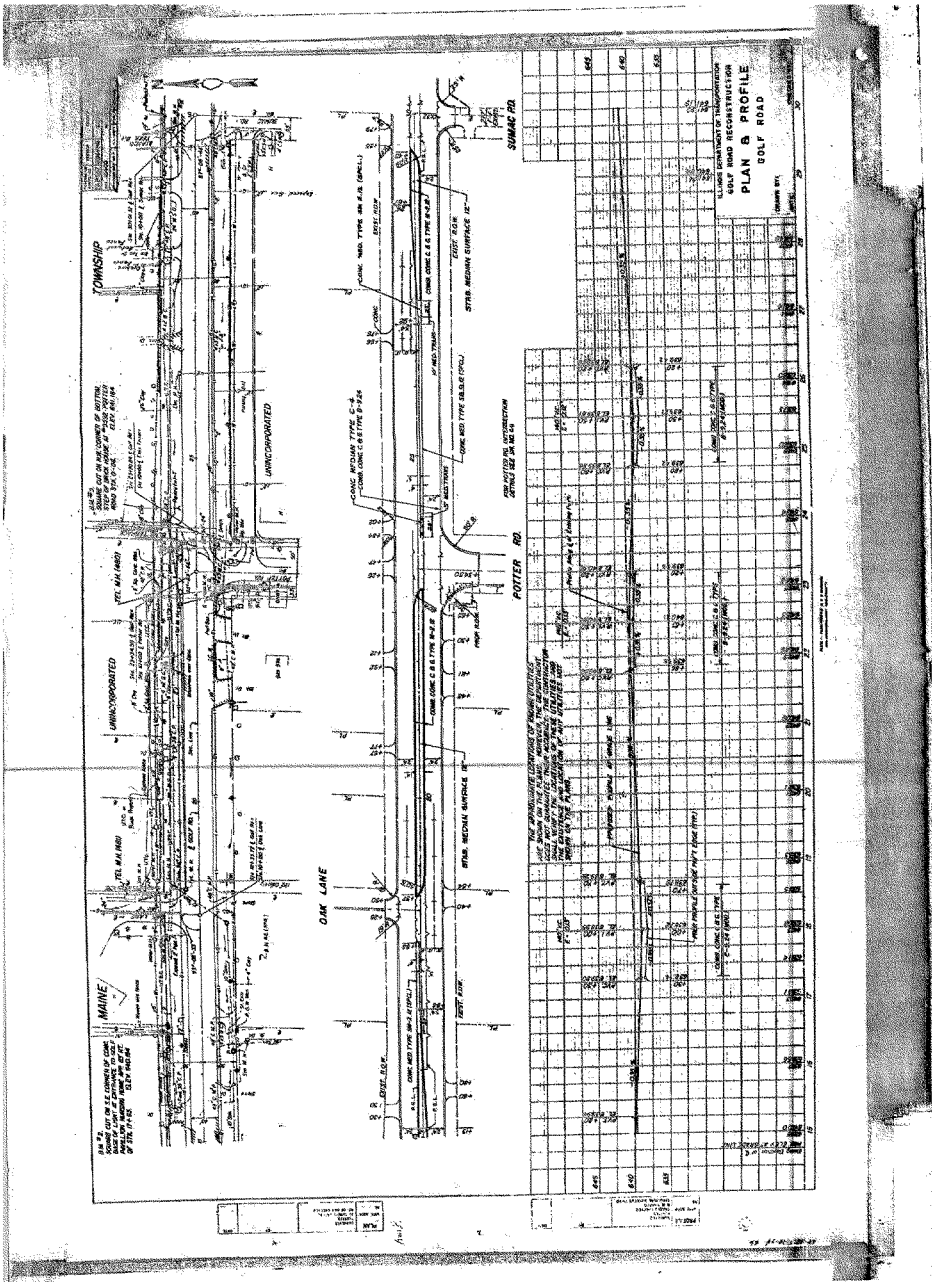
GOLF ROAD


GOLF ROAD
STA. 70+20 TO STA 86+15 L
STA 70+20 TO STA 86+70 R
GOLF ROAD
STA. 12+75 TO STA. 66+00
STA. 104+45 TO STA. 159+18.45
CONCRETE MEDIAN, TYPE SM-2.12 (SPECIAL)
MEDIAN TRANSITION
STA. 10+00 TO STA. 10+55
MEDIAN DETAIL
STA. 80+10 TO STA. 82+09
LEGEND
ILLINOIS DEPARTMENT OF TRANSPORTATION
TYPICAL CROSS SECTIONS
GOLF ROAD


DRAINAGE & UTILITIES
MAINE TOWNSHIP
UNINCORPORATED
LEGEND


MAINE
UNINCORPORATED
TOWNSHIP
OAK LANE
POTTER RD.
SUMAC RD
DRAINAGE & UTILITIES
GOLF ROAD
ILLINOIS DEPARTMENT OF TRANSPORTATION


MAINE TOWNSHIP
RANGE 12E
TWP 4IN
UNINCORPORATED
UNINCORPORATED
LEGEND
LONGITUDINAL JOINT (BARED OR POLY)
LONGITUDINAL JOINT (TIE BARS & KEYWAY)
PROJ. BEGINS
STA. 10+00
EXIST. ROW
PLAN
GOLF ROAD


ILLINOIS DEPARTMENT OF TRANSPORTATION
GOLF ROAD RECONSTRUCTION
PLAN & PROFILE
GOLF ROAD
TOWNSHIP
UNINCORPORATED
UNINCORPORATED
MAINE
OAK LANE
POTTER RD.
SUMAC RD.
STAB. MEDIAN SURFACE 12"
EXIST. ROW

APPENDIX G

Oakton-Everett Levee Data Compilation

AECOM

APPENDIX G

Oakton Everett Levee Data Compilation

1. **Type of Project:** Levee
2. **USACE Description:** The Oakton-Everett Levee site (DPLV07) is between the Des Plaines River and River Road, between Oakton Street and Everett Avenue in Des Plaines, IL. From Oakton Street to about Riverside Ave, the structure would be about 1,100 feet of floodwall; while from Riverside Ave to Everett Ave it would be about 600 feet of levee. The elevation of the SSP and levee would be 635 feet and the layout is generally wooded riverbank with some commercial lots.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified three nearby water well logs. The information from the website is included in Attachment G.4.1.
   - Landowner: The landowner for the adjacent building at 1645 South River Road is Gus Bahramis. His contact information is as follows:

     Gus Bahramis
     1645 South River Road, Unit 17
     Des Plaines, Illinois
     847-635-1500.
     (gbahramis@gjbahramis.com)

     According to the USACE, Mr. Bahramis had given consideration to constructing a floodwall around his property. It is unclear what engineering analyses were performed or how far in the development process the design and/or construction had proceeded, but a figure had been created to show the proposed floodwall. This figure is included as Attachment G.4.3. The designer of the floodwall was reported to be Mike Mondus (mmondus@spacecoinc.com) of SPACECO Inc. who can be reached at 847-696-4060.
   - Illinois Department of Transportation (IDOT): Twenty-two sheets of soil boring logs and as-built drawings for the project area and vicinity were obtained from IDOT. This information is provided in Attachment G.4.2, and due to its size, is only included on the data CD of this report.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.

AECOM

- Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment G.5.

4. Subsurface Explorations

AECOM performed two soil borings at the project site as discussed below.

a. Boring Locations*

Boring**	Coordinates***		Surface Elevation (ft)+	Boring Depth (ft)	Date Drilled	Borehole Status
	Northing (ft)	Easting (ft)				
DP2-11-14	1951680	1108717	626.3	36	10/21/11	Backfilled
DP2-11-15	1951050	1108622	628.0	36.5	10/24/11	Backfilled

*: All surveying information based on survey completed by AECOM.
**: All soil borings performed by Strata Earth Services, LLC
***: Based on NAD 83, Illinois State Plane Central
+: Based on NAVD 88.

b. Subsurface Conditions

The generalized subsurface profile at the Oakton-Everett Levee site is as follows:

- *Pavement:* Approximately 3.75 inches of bituminous asphalt pavement underlain by coarse aggregate to a depth of 1.5 feet was found in boring DP2-11-14.
- *Topsoil:* Approximately 6 inches of organic topsoil was found in borings DP2-11-15.
- *Fill:* Non-engineered fill soil was found between 1.5 and 2.5 feet deep in boring DP2-11-14. This soil consisted of an organic silty clay with little fine to coarse sand, and trace amounts of fine gravel, concrete, limestone, brick, and cinders.
- *Silty clay:* The dominant stratum in these borings is a silty clay with trace fine to coarse sand, and trace gravel (USCS: CL) extending to a depth of 22.5 feet in boring DP2-11-14 and 25 feet in boring DP2-11-15. The soils ranged from stiff to hard with calibrated penetrometer values ranging from 1.5 tsf to 6 tsf, with an average value of approximately 3.5 to 4.0 tsf. A six-inch layer of silty fine sand (USCS: SM) was identified between 10.5 and 11.0 feet in boring DP2-11-15.
- *Silt:* The silty clay was underlain by silt with trace to little clay and trace fine sand (USCS: ML). This stratum was extremely dense with SPT-N values of greater than 100 bpf observed for all of the samples in this stratum. Boring DP2-11-14 was terminated within this layer.
- *Silty clay:* Boring DP2-11-15 was terminated in a silty clay layer with trace fine to coarse sand (USCS: CL) between a depth of 35 feet and the boring termination depth of 36.5 feet. This soil was of a hard consistency with a calibrated penetrometer value of 7.0 tsf recorded.

AECOM

c. **Groundwater Conditions**

The groundwater observations discussed below were made at the project site at the time of drilling. Groundwater level fluctuations may occur with time and seasonal change due to variations in precipitation, evaporation, and surface water runoff.

Groundwater was not encountered in boring DP2-11-15 and was not encountered before the commencement of rotary wash drilling at 9 feet below the ground surface in boring DP2-11-14.

5. Engineering Properties:

It is AECOM's understanding that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. Given the variability in soil conditions observed in both the borings and the laboratory testing, AECOM recommends that the USACE use extreme caution in the selection of soil properties. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following sections illustrate the range of soil properties which were obtained from the laboratory testing for the site:

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf) (USCS: "CL" soils)	110.2	120.8	116 (from 4 data points)
Unconfined compressive strength (tsf) (USCS: "CL" soils)	2.83	8.23	5.56 (from 4 data points)

ATTACHMENTS

G.1: Boring Location Plan

G.2: Boring Logs

G.3: Lab Testing Results

G.4: Research Data

G.4.1: Illinois State Water Survey Data

G.4.2: Illinois Department of Transportation

G.4.3: Proposed Floodwall Figure

G.5: Site Reconnaissance Photographs

AECOM

ATTACHMENT

G.1: Boring Location Plan

AECOM
EXPLORATION LOCATION PLAN
OAKTON-EVERETT LEVEE
DES PLAINES II FEASIBILITY STUDY
UNITED STATES ARMY CORPS OF ENGINEERS – CHICAGO DISTRICT
River
Legend
Borings

AECOM

ATTACHMENT

G.2: Boring Logs

Hole No. DP2-11-14

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA/ 2-7/8" RB
2. LOCATION (Coordinates or Station): Oakton-Everett Levee N 1,951,680.0 E 1,108,717.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: B-61 TRUCK
4. HOLE NO. (As shown on drawing title and file number): DP2-11-14	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10 / UNDISTURBED 2
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/21/2011 / COMPLETED 10/21/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +626.3
9. TOTAL DEPTH OF HOLE: 36.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+626.0	0.3		Bituminous Asphalt Pavement (3.75")			
			Coarse Aggregate			
+624.8	1.5			40	1 1.0 2.5	6, 6, 6 N = 12 (w = 25.6%) Qp = 2.5 tsf
+623.8	2.5		FILL: Organic silty clay, little fine to coarse sand, trace fine gravel, with concrete, limestone, brick and cinders noted - grayish black - very stiff (FILL: CL)	60	1A 2.5 3.0	7/6" N = 14* (w = 19.5%) Qp = 2.75-3.0 tsf
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale , with seams of black silty clay - brown - very stiff to hard (CL)	60	2 3.0 4.5	3, 4, 6 N = 10 (w = 27.5%) Qp = 2.25 tsf
				100	3 5.0 6.5	4, 6, 9 N = 15 (w = 19.4%) Qp = 5.25 tsf
				93	4 7.5 9.0	6, 9, 12 N = 21 (w = 19.5%) Qp = 5.25-5.5 tsf
+616.3	10.0					
			Silty clay, little fine to coarse sand, trace fine gravel, trace shale - brown and gray - very stiff to hard (CL)	100	5 10.0 12.5	3" Shelby Tube Qp = 3.75 tsf (w = 17.1%)
				73	6 12.5 14.0	4, 4, 7 N = 11 (w = 17.1%) Qp = 2.5-2.75 tsf
				80	7 15.0 17.5	3" Shelby Tube Qp = 4.25 tsf (w = 17.1%)

Hole No. DP2-11-14

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 626.3 | **Hole No. DP2-11-14**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, little fine to coarse sand, trace fine gravel, trace shale - brown and gray - very stiff to hard (CL) *(continued)*	67	8 20.0 21.5	6, 8, 15 N = 23 (w = 17.4%) Qp = 4.0 tsf
+603.8	22.5					
			Silt, trace to little clay, trace fine sand - gray - extremely dense (ML)	100	9 25.0 26.0	38, 50/6" N = 100+* (w = 14.9%)
				100	10 30.0 31.0	36, 54/6" N = 100+* (w = 15.2%)
+590.3	36.0			100	11 35.0 36.0	41, 56/6" N = 100+* (w = 14.6%)
			End of boring at 36'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with SSA to 10 feet 4-1/4" casing set to 12.5 feet. Boring advanced with roller bit to 35 feet. Boring advanced with split spoon sampler to 36 feet. Borehole dry to 9 feet. Borehole backfilled with auger cuttings and bentonite chips. Asphalt patching material placed at surface.

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-14

Hole No. DP2-11-15

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Oakton-Everett Levee N 1,951,050.0 E 1,108,622.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-15	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 / UNDISTURBED 2
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 10/24/2011 / COMPLETED 10/24/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +628.0
9. TOTAL DEPTH OF HOLE: 36.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) (g)
+627.5	0.5		Topsoil (0.5')	100	1 0.0 0.5	3/6" N = 6* Qp = 1.0 tsf
			Silty clay, trace fine to coarse sand, trace fine gravel, with occassional gray silty clay seams - brown - stiff to very stiff (CL)	70	1A 0.5 1.5	4, 4 N = 8 (w = 22.8%) Qp = 2.5 tsf
				87	2 2.5 4.0	4, 5, 7 N = 12 (w = 24.0%) Qp = 1.5-1.75 tsf
				67	3 5.0 6.5	3, 5, 8 N = 13 (w = 20.1%) Qp = 1.75-2.0 tsf
+619.5	8.5			75	4 7.5 9.5	3" Shelby Tube Qp = 6.0 tsf (w = 17.1%)
+617.5	10.5		Silty clay, trace fine to coarse sand, trace fine gravle, trace shale - gray - hard (CL)	80	5 10.0 10.5	4/6" N = 8* (w = 16.9%) Qp = 5.25-5.5 tsf
+617.0	11.0		Silty fine to coarse sand, trace fine to coarse gravel - gray - medium dense - moist (SM)	80		
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff to hard (CL)	60	5A 10.5 11.0	10/6" N = 20* (w = 10.2%)
				67	5B 11.0 11.5 6 12.5 14.0	9/6" N = 18* (w = 21.9%) Qp = 3.25 tsf 4, 8, 13 N = 21 (w = 16.8%) Qp = 5.5-5.75 tsf
				87	7 15.0 16.5	4, 5, 10 N = 15 (w = 16.4%) Qp = 3.0 tsf

Hole No. DP2-11-15

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 628.0 | **Hole No. DP2-11-15**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff to hard (CL) *(continued)*	75	8 20.0 22.0	3" Shelby Tube Qp = 4.25 tsf (w = 15.1%)
+603.0	25.0					
			Silt, trace clay, trace fine sand - gray - extremely dense - moist (ML)	100	9 25.0 26.0	54, 82/6" N = 100+ (w = 13.3%)
				100	10 30.0 31.0	48, 102/6" N = 100+ (w = 13.7%)
+593.0	35.0					
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, with silt seam noted - gray - hard (CL)	100	11 35.0 36.5	40, 44, 50 N = 94 (w = 9.8%) Qp = 7.0 tsf
+591.5	36.5					
			End of boring at 36.5'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with HSA to 35 feet Boring advanced with split spoon sampler to 36.5 feet. Borehole dry. Borehole backfilled with auger cuttings and bentonite chips.

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-15

AECOM

FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Rickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Boker | BORING STARTED 10/21/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/21/11 | ☐ SAFETY

RIG MFG/MODEL B-61 | STATION | ☒ AUTOMATIC

OFFSET 13.5' West from STAKE | CASING USED 10' | SIZE 4"

WATER LEVEL OBSERVATIONS

WL: Dry to 9' WS OR WD

WL: _____ BCR _____ ACR

WL: _____ AB _____ HR. AB

WL: _____ 24 HR. AB

JOB NO. 60263274 | BORING NO. DP2-11-14 | CLIENT NSAFE | WEATHER 60° Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	0	1	PA								3¾"	TO 3¾" Asphalt to 1' CA-6
1	1	2.5	SS	6	6	6		0.6	2.5		1.5'	Silt, clayey, black, organic
1A	2.5	3	SS				7	0.3	2.5			Silty clay, brown, v. stiff
	1	3	PA									
2	3	4.5	SS	3	4	6		0.9	2.75			Same little sand noted
	3	5	PA									
3	5	6.5	SS	4	6	9		1.5	4.5+			Same, hard (CL) silt seams noted
	5	7.5	PA									
4	7.5	9	SS	6	9	12		1.4	4			Same (CL)
		SET 10' OF 4" CASING										
	0	12.5	RTB									*Missed 10' sample
6	12.5	14.0	SS	4	4	7		1.1'	2.75		10'	gray, Silty clay, v. stiff
	12.5	15	RTB									
7	15	17.5	3"ST	P	U	S	H	2'	3.5			Same

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.5
FILL THICKNESS _____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 10/21/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 10/21/11 | ☐ SAFETY

RIG MFG/MODEL B-61 | STATION | ☒ AUTOMATIC

OFFSET | CASING USED ____ SIZE ____

WATER LEVEL OBSERVATIONS

WL: Dry to 9' WS OR WD

WL: ____ BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60225274 BORING NO. DP2-11-14 CLIENT NYSEG WEATHER 60° Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	15	20	RB									
8	20	21.5	SS	6	8	15		1.0'	3.75			Same
	20	25	RB									
9	25	26	SS	38	50	—		1.0'	—		22.5	wet extr dense gray silt
	25	30	RB									
10	30	31	SS	36	54	—		1.0'	—			Same
	30	35	RB									
11	35	36	SS	41	56	—		1.0'	—			Same
				EOB				Backfill w/ cuttings, Patch				
		*	Move	5'	South	to	Sample	@	10'	depth		
	0	10	PA									
	10	12.5	3"ST	P	W	S	H	0		EOB		No recovery move 2' (N) of hole repeat
	0	10	PA									
6	10	12.5	3"ST	P	W	S	H	2.5'	3.5			Brown to Gray Sid v. stiff

EOB

Backfill w/ cuttings & PATCHED

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
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SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 0.5
FILL THICKNESS
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING
AFTER BORING COMPLETION
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH
HEIGHT OF SOIL RISE IN CASING
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

AECOM

FIELD BORING LOG

TECHNICIAN Bickett
DRILLER Scott MARK
HELPER Mark
RIG MFG/MODEL D-50 ATV

SURFACE ELEV. _____
BORING STARTED 10/24/11
BORING COMPLETED 10/24/11
STATION _____
OFFSET _____

140 LB. HAMMER TYPE:
- [ ] DONUT
- [ ] SAFETY
- [x] AUTOMATIC

CASING USED _____ SIZE _____

SHEET 1 OF _____

WATER LEVEL OBSERVATIONS

WL: DRY WS OR WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR. AB
WL: _____ 24 HR. AB

JOB NO. 100223674 BORING NO. DP2-11-15 CLIENT USACE WEATHER So. Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
1	0	0.5	SS	3	4	4		0.5	1.0		0.5	clayey topsoil tr gru
1A	0.5	1.5	SS		4	4		0.7	3.0			si cl br & gr v stf tr sa
	0	2.5	HAS									
2	2.5	4	SS	4	5	7		1.3'	3.0			very si cl/cly si gr mot br
	2.5	5	HAS									v stf
3	5	6.5	SS	3	5	8		1.0	2.5			si cl br & gr v st tr
	5	7.5	HAS									sa & gru
4	7.5	9.5	3" ST	P	U	S	H	1.5'	4.5+		8.5'	si cl gr hard
	7.5	10	HAS									
5	10	10.5	SS	4				0.4	4.5+			same
5A	10.5	11	SS		10			0.4			10.5	si f m sand moist med dense
5B	11	11.5	SS			9		0.3	4.0		11.0	cly si/si cl gry (CL)
	10	12.5	HAS									
6	12.5	14	SS	4	8	13		1.0	4.5			same si cl gry hard si

Seams noted

ABBREVIATIONS

FT – FISH TAIL
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DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TOPSOIL THICKNESS 0.5'
FILL THICKNESS _____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

K:\WPDOCS\FORMS\DRILLING FORMS\Field Boring Log.DOC

AECOM

FIELD BORING LOG

TECHNICIAN Birkett
DRILLER Scott
HELPER Mark
RIG MFG/MODEL D-50 ATV

SURFACE ELEV. _____
BORING STARTED 10/24/11
BORING COMPLETED 10/24/11
STATION _____
OFFSET _____

140 LB. HAMMER TYPE:
☐ DONUT
☐ SAFETY
☑ AUTOMATIC
CASING USED _____ SIZE _____

SHEET 2 OF 2

WATER LEVEL OBSERVATIONS
WL: DRY WS OR WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR. AB
WL: _____ 24 HR. AB

JOB NO. 60225274 BORING NO. DP2-11-15 CLIENT USACE WEATHER 50° Clear

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION!
	12.5	15	HAS									
7	15	16.5	SS	4	5	10		1.3'	3.25			Same v. stf.
	15	20	HAS									
8	20	22	3" ST	P	U	S	H	1.5'	4.5+		20'	gry si exdense moist (ML)
	20	25	HAS									
9	25	26	SS	54	82	—		1.0'	—			Same dry (ML)
	25	30	HAS									
10	30	31	SS	48	102	—		1.0'	—			Same
	30	35	HAS									
11	35	36.5	SS	40	44	50		1.5'	—			Same to gr & f sand

ABBREVIATIONS
FT – FISH TAIL
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PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TOPSOIL THICKNESS 0.5'
FILL THICKNESS _____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

K:\WPDOCS\FORMS\DRILLING FORMS\Field Boring Log.DOC

AECOM

ATTACHMENT

G.3: Lab Testing Results

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

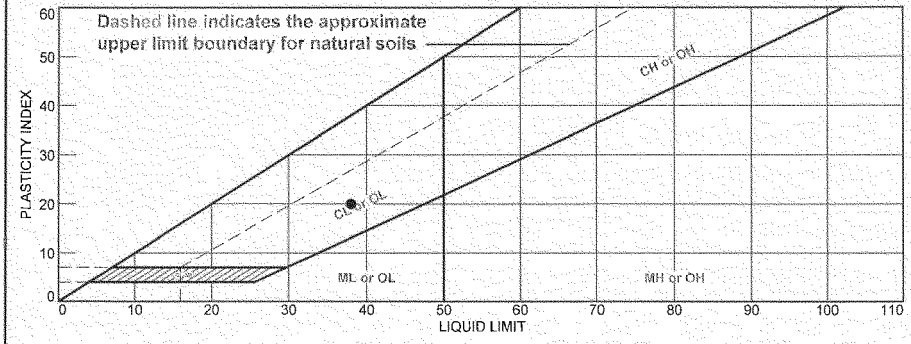
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
DP2-11-14																	
	S-1	1.0-2.5	POSSIBLE ORGANIC SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - GRAYISH BLACK - CONCRETE, LIMESTONE, BRICK AND CINDERS NOTED	OL	25.6												
	S-1A	2.5-3.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - POCKET OF BLACK SILTY CLAY NOTED	CL	19.5	2.75-3.0											
	S-2	3.0-4.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	27.5	2.25											
	S-3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF SILT NOTED	CL	19.4	5.25											
	S-4	7.5-9.0	SILTY CLAY TRACE F-C SAND TRACE F SAND TRACE SHALE - BROWN	CL	19.5	5.25-5.5						38	18	20			
	S-5	10.0-12.5	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN & GRAY	CL	17.1	3.75	2.83 @ 0.76%										
	S-6	12.5-14.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.1	2.5-2.75											
	S-7	15.0-17.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	CL	17.1	4.25	4.75 @ 0.76%										
	S-8	20.0-21.5	SILTY SLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.4	4.0											
	S-9	25.0-26.0	SILT LITTLE CLAY TRACE F SAND - GRAY	ML	14.9			0.0	1.9	84.3	13.8						

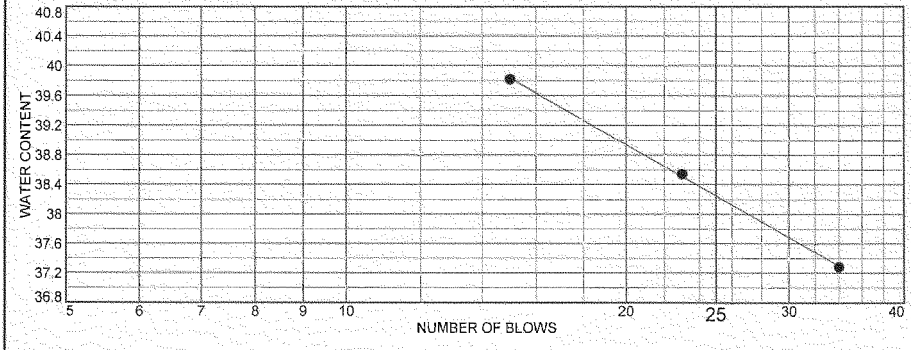
LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Organic Ct. %	Std. Max Den pcf	Opt WC %
	S-10	30.0-31.0	SILT TRACE CLAY TRACE F SAND - GRAY	ML	15.2												
	S-11	35.0-36.0	SILT TRACE CLAY TRACE F SAND - GRAY	ML	14.6												
DP2-11-15																	
	S-1A	0.5-1.5	SILTY CLAY TRACE F-C SAND - BROWN - LAYER OF DARK GRAY ORGANIC CLAY NOTED	CL	22.8	2.5											
	S-2	2.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	24.0	1.5-1.75											
	S-3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY CLAY NOTED	CL	20.1	1.75-2.0						33	18	15			
	S-4	7.5-9.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY SILT SEAMS NOTED	CL	17.1	6.0	8.23 @ 0.76%										
	S-5	10.0-10.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAMS OF BROWN SILTY CLAY NOTED	CL	16.9	5.25-5.5											
	S-5A	10.5-11.0	SILTY F-C SAND TRACE F-C GRAVEL - GRAY - MOIST	SM	10.2												
	S-5B	11.0-11.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF SILT AND SAND NOTED	CL	21.9	3.25											
	S-6	12.5-14.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	16.8	5.5-5.75											
	S-7	15.0-16.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	16.4	3.0											
	S-8	20.0-22.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	15.1	4.25	6.44 @ 0.76%										
	S-9	25.0-26.0	SILT TRACE CLAY TRACE F SAND - GRAY	ML	13.3												
	S-10	30.0-31.0	SILT TRACE CLAY TRACE F SAND - GRAY	ML	13.7			0.0	1.8	89.5	8.7						
	S-11	35.0-36.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF SILT NOTED	CL	9.8	7.0+											

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F SAND TRACE SHALE - BROWN	38	18	20			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

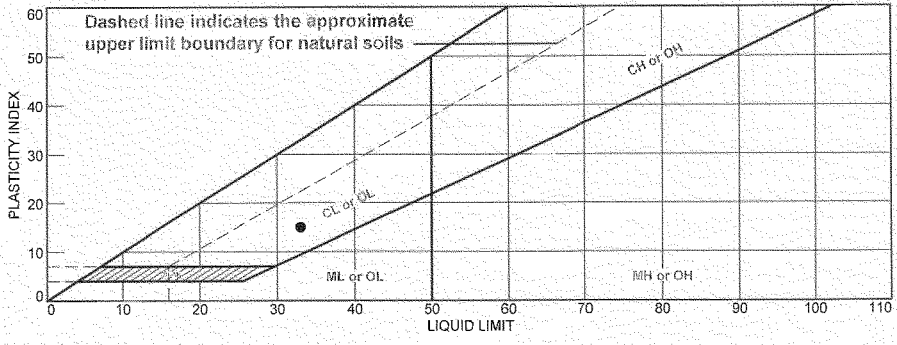
● **Source of Sample:** DP2-11-14 **Depth:** 7.5-9.0 **Sample Number:** S-4

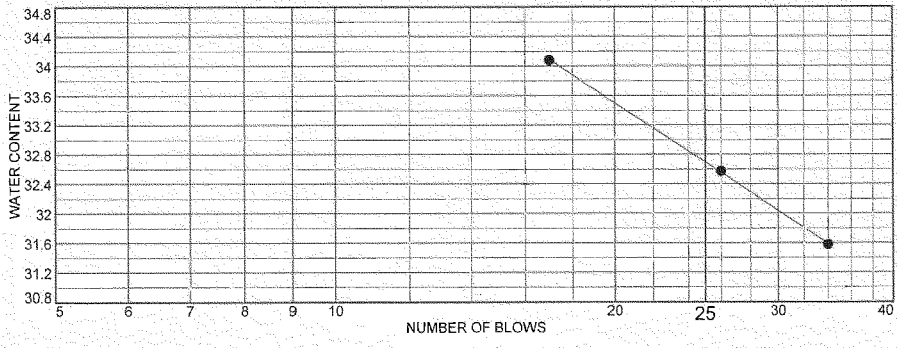
Remarks:
● 5.25-5.5

AECOM

Tested By: ER **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY SILTY	33	18	15			CL

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

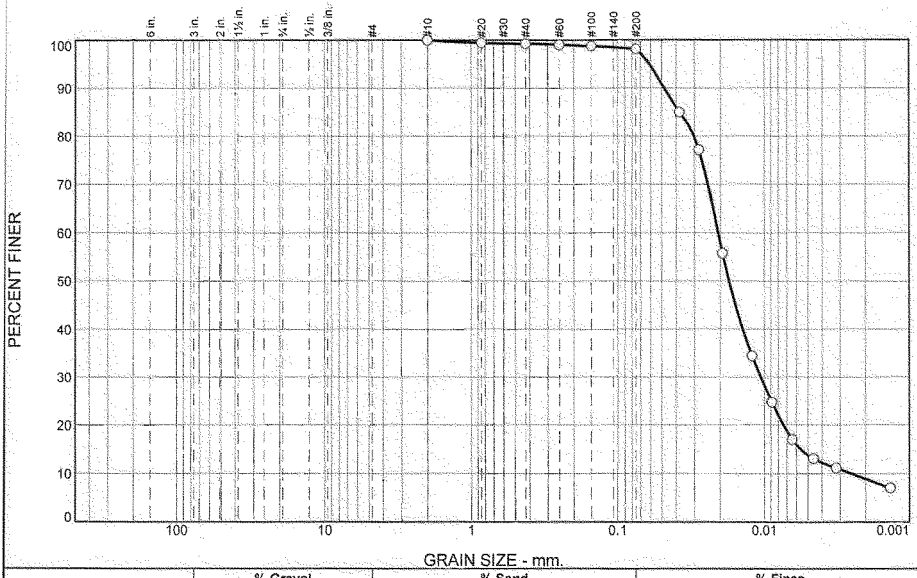
● **Source of Sample:** DP2-11-15 **Depth:** 5.0-6.5 **Sample Number:** S-3

Remarks:
● 1.75-2.0

AECOM

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	1.2	84.3	13.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.4		
#40	99.3		
#60	99.0		
#100	98.8		
#200	98.1		

* (no specification provided)

Material Description

SILT LITTLE CLAY TRACE F SAND - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0483 D_{85}= 0.0382 D_{60}= 0.0208
D_{50}= 0.0175 D_{30}= 0.0106 D_{15}= 0.0056
D_{10}= 0.0025 C_u= 8.30 C_c= 2.16

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: DP2-11-14 **Depth:** 25.0-26.0
Sample Number: S-9 **Date:** 11/9/11

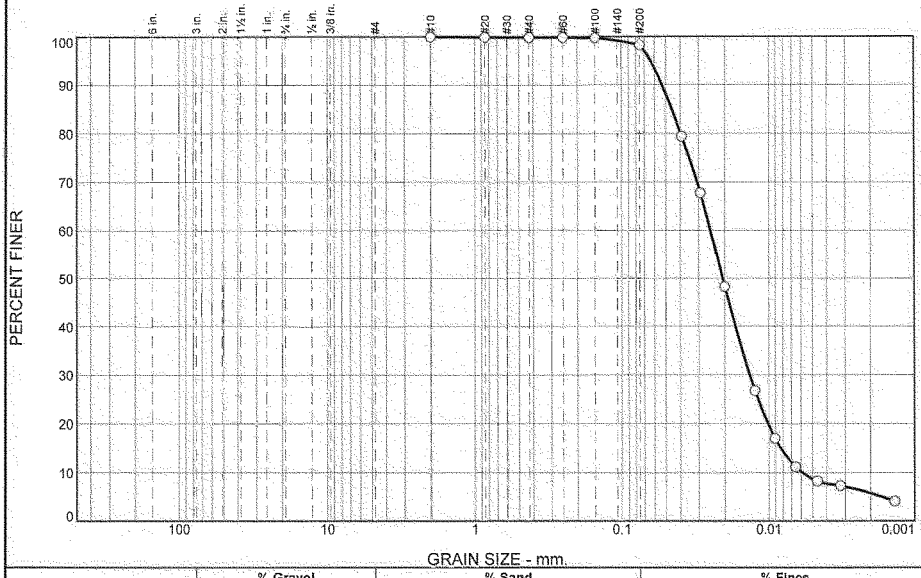
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	1.7	89.5	8.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.9		
#60	99.9		
#100	99.8		
#200	98.2		

* (no specification provided)

Material Description

SILT TRACE CLAY TRACE F SAND - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0531 D_{85}= 0.0457 D_{60}= 0.0250
D_{50}= 0.0207 D_{30}= 0.0135 D_{15}= 0.0083
D_{10}= 0.0059 C_u= 4.25 C_c= 1.24

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: DP2-11-15 **Depth:** 30.0-31.0
Sample Number: S-10 **Date:** 11/9/11

AECOM

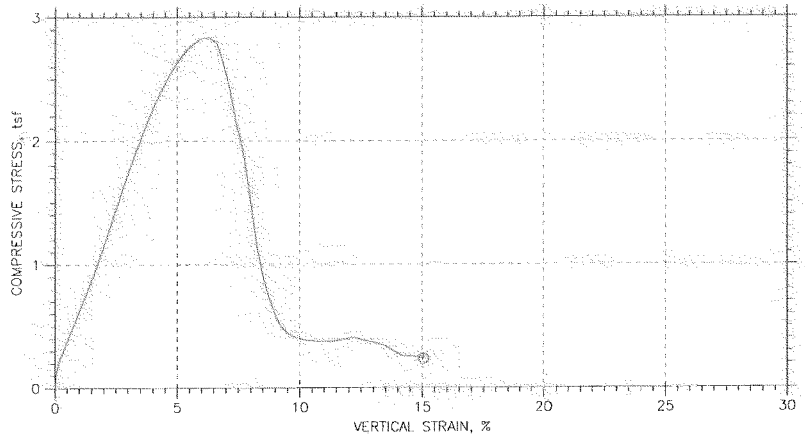
Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274

Tested By: ER **Checked By:** WPQ

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		○			
Test No.		DP2114S5			
Initial	Diameter, in	2.8409			
	Height, in	5.861			
	Water Content, %	17.13			
	Dry Density, pcf	110.2			
	Saturation, %	86.20			
	Void Ratio	0.54056			
Unconfined Compressive Strength, tsf		2.8305			
Undrained Shear Strength, tsf		1.4152			
Time to Failure, min		12			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP2114 S-5 Depth: 10.0'-12.5'
Sample Type: 3" ST
Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN AND GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:23:35

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21114 S-5
Sample No.: S-5
Test No.: DP21114S5

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 10.0'-12.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN AND GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.86 in
Specimen Area: 6.34 inA2
Specimen Volume: 37.15 inA3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

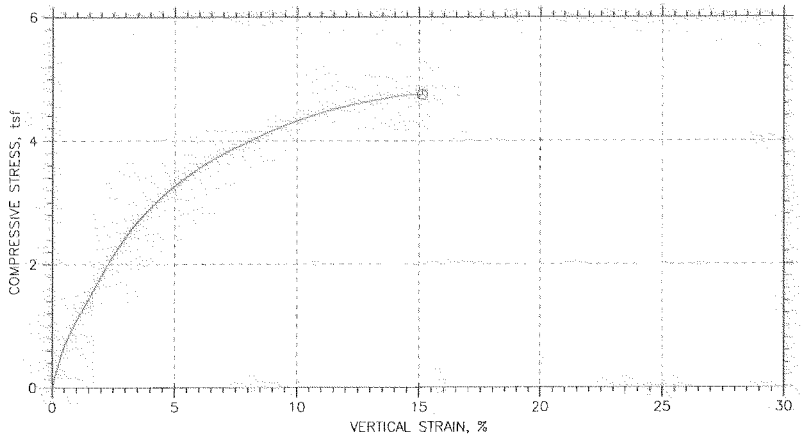
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3389	0	0
2	0.10417	0.0019182	0.032728	9.1029	6.341	0.10336	0.051681
3	0.20417	0.0046585	0.079482	13.996	6.344	0.15885	0.079425
4	0.3	0.0074901	0.12779	17.154	6.347	0.19459	0.097294
5	0.4	0.010504	0.17922	20.1	6.3503	0.2279	0.11395
6	0.50003	0.013519	0.23065	22.731	6.3536	0.25759	0.1288
7	0.6	0.016533	0.28208	23.573	6.3569	0.267	0.1335
8	0.7	0.019547	0.33351	26.467	6.3601	0.29962	0.14981
9	0.8	0.022653	0.3865	28.887	6.3635	0.32685	0.16342
10	0.90002	0.025759	0.43949	31.308	6.3669	0.35404	0.17702
11	1.0001	0.028681	0.48936	33.57	6.3701	0.37944	0.18972
12	1.1	0.031604	0.53923	35.886	6.3733	0.40541	0.2027
13	1.2	0.03471	0.59222	37.99	6.3767	0.42895	0.21448
14	1.3	0.037724	0.64365	40.253	6.38	0.45427	0.22713
15	1.4	0.04083	0.69664	42.305	6.3834	0.47717	0.23858
16	1.5001	0.043844	0.74807	44.568	6.3867	0.50243	0.25121
17	1.6	0.046859	0.79949	46.83	6.39	0.52766	0.26383
18	1.7	0.049964	0.85248	49.093	6.3934	0.55286	0.27643
19	1.8	0.05307	0.90547	51.461	6.3968	0.57922	0.28961
20	1.9	0.056084	0.9569	53.723	6.4002	0.60437	0.30219
21	2.0001	0.05919	1.0099	56.091	6.4036	0.63067	0.31533
22	2.1	0.062204	1.0613	58.511	6.4069	0.65754	0.32877
23	2.2	0.06531	1.1143	60.879	6.4104	0.68379	0.34189
24	2.3	0.068415	1.1673	63.3	6.4138	0.71059	0.3553
25	2.4	0.07143	1.2187	65.615	6.4171	0.7362	0.3681
26	2.5001	0.074535	1.2717	67.983	6.4206	0.76235	0.38118
27	2.6001	0.07755	1.3231	70.403	6.4239	0.78909	0.39454
28	2.7001	0.080655	1.3761	72.718	6.4274	0.8146	0.4073
29	2.8001	0.083761	1.4291	75.139	6.4308	0.84126	0.42063
30	2.9001	0.086684	1.479	77.507	6.4341	0.86733	0.43367
31	3.0001	0.089789	1.532	80.032	6.4375	0.89511	0.44756
32	3.1001	0.092804	1.5834	82.453	6.4409	0.9217	0.46085
33	3.2001	0.095818	1.6348	85.031	6.4443	0.95003	0.47501
34	3.3001	0.098924	1.6878	87.451	6.4477	0.97654	0.48827
35	3.4001	0.10194	1.7393	90.082	6.4511	1.0054	0.5027
36	3.5001	0.10486	1.7891	92.713	6.4544	1.0342	0.51712
37	3.6001	0.10788	1.8406	95.449	6.4578	1.0642	0.5321
38	3.7001	0.1108	1.8904	98.028	6.4611	1.0924	0.54619
39	3.8001	0.114	1.945	100.76	6.4647	1.1223	0.56113
40	3.9001	0.11692	1.9948	103.45	6.4679	1.1516	0.57578
41	4.0001	0.11993	2.0463	106.08	6.4713	1.1802	0.59011
42	4.1001	0.12295	2.0977	108.76	6.4747	1.2094	0.60472
43	4.2001	0.12596	2.1491	111.45	6.4781	1.2386	0.61932
44	4.3001	0.12898	2.2006	114.18	6.4816	1.2684	0.63419
45	4.4001	0.13208	2.2535	117.08	6.4851	1.2998	0.64991
46	4.5001	0.135	2.3034	119.76	6.4884	1.3289	0.66447
47	4.6001	0.13802	2.3548	122.71	6.4918	1.3609	0.68046
48	4.7001	0.14103	2.4063	125.44	6.4952	1.3905	0.69527
49	4.8001	0.14405	2.4577	128.28	6.4986	1.4213	0.71064
50	4.9001	0.14706	2.5091	131.12	6.5021	1.452	0.726
51	5.0001	0.14998	2.559	133.97	6.5054	1.4827	0.74135
52	5.1001	0.15309	2.612	136.86	6.5089	1.5139	0.75695
53	5.2001	0.1561	2.6634	139.75	6.5124	1.5451	0.77255
54	5.3001	0.15903	2.7133	142.6	6.5157	1.5757	0.78785
55	5.4001	0.16204	2.7647	145.38	6.5192	1.6057	0.80284
56	5.5001	0.16506	2.8162	148.23	6.5226	1.6362	0.8181
57	5.6001	0.16816	2.8691	151.01	6.5262	1.6661	0.83303
58	5.7001	0.17118	2.9206	153.91	6.5296	1.6971	0.84855
59	5.8001	0.17419	2.972	156.59	6.5331	1.7258	0.86289
60	5.9001	0.1772	3.0234	159.49	6.5366	1.7567	0.87837
61	6.0001	0.18031	3.0764	162.12	6.5401	1.7847	0.89237
62	6.2502	0.18798	3.2073	169.11	6.549	1.8593	0.92963
63	6.5002	0.19566	3.3382	175.96	6.5578	1.9319	0.96593
64	6.7502	0.20333	3.4692	182.59	6.5667	2.0019	1.001
65	7.0002	0.211	3.6001	189	6.5757	2.0695	1.0348
66	7.2502	0.21867	3.731	195.21	6.5846	2.1346	1.0673
67	7.5002	0.22625	3.8603	201.26	6.5935	2.1978	1.0989
68	7.7502	0.23384	3.9897	207.11	6.6023	2.2585	1.1293
69	8.0002	0.2416	4.1222	212.63	6.6115	2.3156	1.1578
70	8.2502	0.24918	4.2515	218.16	6.6204	2.3725	1.1863
71	8.5002	0.25676	4.3809	223.21	6.6293	2.4242	1.2121
72	8.7502	0.26434	4.5102	227.99	6.6383	2.4729	1.2364
73	9.0002	0.27193	4.6396	232.68	6.6473	2.5202	1.2601
74	9.2502	0.27942	4.7674	237.15	6.6563	2.5652	1.2826
75	9.5002	0.28681	4.8936	241.25	6.6651	2.6062	1.3031
76	9.7502	0.2944	5.0229	245.1	6.6742	2.6441	1.322
77	10	0.30189	5.1507	248.67	6.6832	2.679	1.3395
78	10.25	0.30956	5.2817	251.88	6.6924	2.7099	1.3549
79	10.5	0.31714	5.411	255.25	6.7015	2.7424	1.3712
80	10.75	0.325	5.545	257.83	6.7111	2.7661	1.3831
81	11	0.33239	5.6713	259.99	6.72	2.7856	1.3928

82	11.25	0.34016	5.8037	262.14	6.7295	2.8047	1.4024
83	11.5	0.34811	5.9393	263.99	6.7392	2.8204	1.4102
84	11.75	0.35578	6.0702	265.2	6.7486	2.8294	1.4147
85	12	0.36345	6.2011	265.67	6.758	2.8305	1.4152
86	12.25	0.37131	6.3352	265.83	6.7677	2.8281	1.414
87	12.5	0.37898	6.4661	264.88	6.7771	2.8141	1.407
88	12.75	0.38656	6.5954	263.2	6.7865	2.7923	1.3962
89	13	0.39432	6.7279	257.72	6.7962	2.7304	1.3652
90	13.25	0.40227	6.8635	249.25	6.8061	2.6368	1.3184
91	13.5	0.40994	6.9944	240.99	6.8156	2.5458	1.2729
92	13.75	0.4178	7.1284	230.63	6.8255	2.4328	1.2164
93	14	0.42575	7.264	217.84	6.8355	2.2946	1.1473
94	14.25	0.43369	7.3996	204.68	6.8455	2.1529	1.0764
95	14.5	0.44146	7.5321	193.9	6.8553	2.0365	1.0182
96	14.75	0.4494	7.6677	183.16	6.8653	1.9209	0.96046
97	15	0.45753	7.8064	167.33	6.8757	1.7522	0.87609
98	15.25	0.46612	7.9529	147.44	6.8866	1.5415	0.77073
99	15.5	0.47416	8.09	129.34	6.8969	1.3502	0.6751
100	15.75	0.48247	8.2318	111.39	6.9075	1.1611	0.58055
101	16	0.49087	8.3752	97.133	6.9183	1.0109	0.50544
102	16.25	0.49973	8.5264	83.979	6.9298	0.87253	0.43627
103	16.5	0.50859	8.6776	73.718	6.9413	0.76466	0.38233
104	16.75	0.51672	8.8163	65.773	6.9518	0.68121	0.3406
105	17	0.52476	8.9534	58.669	6.9623	0.60672	0.30336
106	17.25	0.53262	9.0874	52.566	6.9725	0.5428	0.2714
107	17.5	0.54038	9.2199	48.04	6.9827	0.49535	0.24768
108	17.75	0.54814	9.3524	45.146	6.9929	0.46483	0.23242
109	18	0.55573	9.4817	42.936	7.0029	0.44145	0.22072
110	18.25	0.5634	9.6126	41.411	7.0131	0.42514	0.21257
111	18.5	0.57089	9.7404	40.148	7.023	0.4116	0.2058
112	18.75	0.57856	9.8713	39.306	7.0332	0.40238	0.20119
113	19	0.58623	10.002	38.674	7.0434	0.39534	0.19767
114	19.25	0.59382	10.132	38.148	7.0536	0.3894	0.1947
115	19.5	0.60149	10.263	37.99	7.0639	0.38723	0.19361
116	19.75	0.60907	10.392	37.78	7.074	0.38453	0.19226
117	20	0.61683	10.524	37.78	7.0845	0.38396	0.19198
118	20.25	0.6246	10.657	37.412	7.095	0.37965	0.18983
119	20.5	0.63245	10.791	37.043	7.1057	0.37535	0.18767
120	20.75	0.64031	10.925	37.254	7.1164	0.37691	0.18846
121	21	0.64816	11.059	37.412	7.1271	0.37794	0.18897
122	21.25	0.65593	11.191	37.254	7.1377	0.37579	0.18789
123	21.5	0.66388	11.327	37.517	7.1486	0.37786	0.18893
124	21.75	0.67164	11.459	38.096	7.1593	0.38312	0.19156
125	22	0.67931	11.59	38.674	7.1699	0.38836	0.19418
126	22.25	0.68708	11.723	39.201	7.1807	0.39306	0.19653
127	22.5	0.69466	11.852	39.464	7.1912	0.39512	0.19756
128	22.75	0.70251	11.986	39.885	7.2022	0.39872	0.19936
129	23	0.71019	12.117	40.042	7.2129	0.39971	0.19985
130	23.25	0.71777	12.246	40.2	7.2236	0.40069	0.20035
131	23.5	0.72544	12.377	39.832	7.2343	0.39643	0.19821
132	23.75	0.7332	12.51	39.201	7.2453	0.38955	0.19478
133	24	0.74088	12.641	38.622	7.2562	0.38323	0.19161
134	24.251	0.74864	12.773	38.096	7.2672	0.37743	0.18872
135	24.501	0.75631	12.904	37.78	7.2781	0.37374	0.18687
136	24.751	0.76417	13.038	37.096	7.2893	0.36641	0.18321
137	25.001	0.77202	13.172	36.254	7.3006	0.35755	0.17877
138	25.251	0.77997	13.308	35.57	7.312	0.35025	0.17513
139	25.501	0.78792	13.443	34.675	7.3234	0.34091	0.17045
140	25.751	0.79577	13.577	33.413	7.3348	0.32799	0.16399
141	26.001	0.80372	13.713	31.729	7.3463	0.31097	0.15548
142	26.251	0.81167	13.849	29.887	7.3579	0.29246	0.14623
143	26.501	0.81952	13.983	28.466	7.3693	0.27812	0.13906
144	26.751	0.82738	14.117	27.098	7.3808	0.26434	0.13217
145	27.001	0.83523	14.251	26.414	7.3924	0.25727	0.12863
146	27.251	0.84318	14.386	26.204	7.4041	0.25482	0.12741
147	27.501	0.85058	14.512	26.256	7.415	0.25495	0.12748
148	27.751	0.85862	14.65	26.204	7.4269	0.25403	0.12702
149	28.001	0.86611	14.777	25.572	7.4381	0.24754	0.12377
150	28.251	0.87378	14.908	25.204	7.4495	0.2436	0.1218
151	28.497	0.88136	15.038	24.573	7.4609	0.23714	0.11857

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		DP21114S7			
Initial	Diameter, in	2.8413			
	Height, in	5.8768			
	Water Content, %	16.01			
	Dry Density, pcf	118.3			
	Saturation, %	100.14			
	Void Ratio	0.43497			
Unconfined Compressive Strength, tsf		4.7472			
Undrained Shear Strength, tsf		2.3736			
Time to Failure, min		29.251			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		--			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21114 S-7 Depth: 15.0'-17.5'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV 2011 14:20:19

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21114 S-7
Sample No.: S-7
Test No.: DP21114S7

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 15.0'-17.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.88 in
Specimen Area: 6.34 in^2
Specimen Volume: 37.26 in^3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

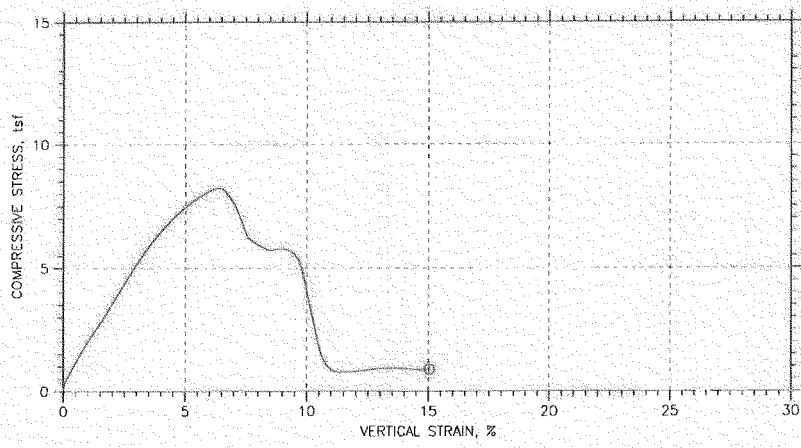
	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3407	0	0
2	0.1041	0.0019182	0.03264	7.5244	6.3428	0.085414	0.042707
3	0.2041	0.0048411	0.082378	13.47	6.3459	0.15283	0.076416
4	0.3041	0.0077641	0.13211	19.258	6.3491	0.21839	0.1092
5	0.4041	0.010596	0.1803	25.046	6.3521	0.28389	0.14195
6	0.50413	0.01361	0.23159	31.045	6.3554	0.3517	0.17585
7	0.6041	0.016716	0.28444	37.254	6.3588	0.42182	0.21091
8	0.7041	0.019639	0.33417	43.252	6.3619	0.4895	0.24475
9	0.8041	0.022653	0.38546	49.198	6.3652	0.5565	0.27825
10	0.9041	0.025667	0.43676	54.407	6.3685	0.61511	0.30755
11	1.0042	0.02859	0.48649	59.459	6.3717	0.67188	0.33594
12	1.1041	0.031604	0.53779	64.142	6.375	0.72443	0.36221
13	1.2041	0.034619	0.58908	68.404	6.3783	0.77216	0.38608
14	1.3041	0.037633	0.64037	72.56	6.3815	0.81867	0.40933
15	1.4041	0.040739	0.69321	76.507	6.3849	0.86273	0.43137
16	1.5042	0.043753	0.74451	80.506	6.3882	0.90736	0.45368
17	1.6041	0.046767	0.7958	84.084	6.3915	0.9472	0.4736
18	1.7041	0.049873	0.84864	87.609	6.395	0.98638	0.49319
19	1.8041	0.052887	0.89994	91.029	6.3983	1.0244	0.51218
20	1.9041	0.055993	0.95278	94.555	6.4017	1.0635	0.53173
21	2.0042	0.059007	1.0041	97.765	6.405	1.099	0.5495
22	2.1041	0.062021	1.0554	100.92	6.4083	1.1339	0.56695
23	2.2041	0.065036	1.1067	104.29	6.4116	1.1711	0.58556
24	2.3041	0.067959	1.1564	107.66	6.4149	1.2083	0.60417
25	2.4041	0.070973	1.2077	110.87	6.4182	1.2437	0.62186
26	2.5042	0.073987	1.259	114.08	6.4215	1.2791	0.63953
27	2.6041	0.077002	1.3103	117.29	6.4249	1.3144	0.65718
28	2.7042	0.079924	1.36	120.81	6.4281	1.3532	0.67659
29	2.8042	0.082939	1.4113	124.02	6.4314	1.3884	0.69421
30	2.9042	0.085953	1.4626	127.28	6.4348	1.4242	0.7121
31	3.0042	0.088876	1.5123	130.55	6.438	1.46	0.72998
32	3.1042	0.09189	1.5636	133.97	6.4414	1.4974	0.74872
33	3.2042	0.094905	1.6149	137.28	6.4448	1.5337	0.76684
34	3.3042	0.097828	1.6646	140.54	6.448	1.5693	0.78467
35	3.4042	0.10084	1.7159	143.81	6.4514	1.6049	0.80246
36	3.5042	0.10376	1.7657	147.28	6.4546	1.6429	0.82143
37	3.6042	0.1066	1.8139	150.7	6.4578	1.6802	0.84009
38	3.7042	0.10961	1.8652	153.86	6.4612	1.7145	0.85724
39	3.8	0.11244	1.9133	156.96	6.4644	1.7482	0.87411
40	3.9	0.11546	1.9646	160.38	6.4677	1.7854	0.89269
41	4	0.11847	2.0159	163.8	6.4711	1.8225	0.91125
42	4.1	0.12149	2.0672	167.01	6.4745	1.8572	0.92862
43	4.2	0.1245	2.1185	170.22	6.4779	1.8919	0.94597
44	4.3	0.12742	2.1682	173.43	6.4812	1.9266	0.96332
45	4.4	0.13053	2.2211	176.9	6.4847	1.9642	0.98208
46	4.5001	0.13354	2.2724	179.95	6.4881	1.997	0.9985
47	4.6	0.13647	2.3221	183.11	6.4914	2.031	1.0155
48	4.7	0.13948	2.3734	186.16	6.4948	2.0638	1.0319
49	4.8	0.14259	2.4263	189.48	6.4983	2.0994	1.0497
50	4.9	0.1456	2.4775	192.42	6.5018	2.1309	1.0654
51	5.0001	0.14861	2.5288	195.37	6.5052	2.1624	1.0812
52	5.1	0.15163	2.5801	198.42	6.5086	2.195	1.0975
53	5.2	0.15473	2.633	201.53	6.5121	2.2281	1.1141
54	5.3	0.15775	2.6843	204.37	6.5156	2.2584	1.1292
55	5.4	0.16076	2.7356	207.26	6.519	2.2891	1.1446
56	5.5001	0.16378	2.7868	210.05	6.5225	2.3187	1.1594
57	5.6	0.16688	2.8397	212.89	6.526	2.3488	1.1744
58	5.7	0.16999	2.8925	215.84	6.5296	2.38	1.19
59	5.8	0.173	2.9438	218.37	6.533	2.4066	1.2033
60	5.9	0.17602	2.9951	221.1	6.5365	2.4355	1.2177
61	6.0001	0.17912	3.048	223.84	6.54	2.4643	1.2321
62	6.2501	0.18679	3.1785	230.36	6.5488	2.5327	1.2663
63	6.5001	0.19438	3.3075	236.78	6.5576	2.5998	1.2999
64	6.7501	0.20205	3.4381	242.83	6.5664	2.6626	1.3313
65	7.0001	0.20954	3.5655	248.57	6.5751	2.7219	1.361
66	7.2501	0.21703	3.693	254.2	6.5838	2.7799	1.3899
67	7.5001	0.22452	3.8205	259.67	6.5925	2.836	1.418
68	7.7501	0.23192	3.9463	264.25	6.6012	2.8822	1.4411
69	8.0001	0.2395	4.0754	269.62	6.6101	2.9368	1.4684
70	8.2501	0.24708	4.2044	274.72	6.619	2.9884	1.4942
71	8.5001	0.25466	4.3334	279.61	6.6279	3.0375	1.5187
72	8.7501	0.26215	4.4608	284.45	6.6367	3.086	1.543
73	9.0002	0.26992	4.5929	289.29	6.6459	3.1341	1.5671
74	9.2502	0.2775	4.7219	293.77	6.6549	3.1783	1.5891
75	9.5002	0.28499	4.8494	298.24	6.6638	3.2224	1.6112
76	9.7502	0.29266	4.98	302.5	6.673	3.2639	1.632
77	10	0.30042	5.1121	306.55	6.6823	3.303	1.6515
78	10.25	0.3081	5.2426	310.71	6.6915	3.3432	1.6716
79	10.5	0.31577	5.3732	314.76	6.7007	3.3822	1.6911
80	10.75	0.32372	5.5084	318.66	6.7103	3.4191	1.7095
81	11	0.33112	5.6343	322.5	6.7193	3.4557	1.7279

82	11.25	0.33861	5.7618	326.29	6.7284	3.4916	1.7458
83	11.5	0.34646	5.8954	330.13	6.7379	3.5277	1.7638
84	11.75	0.35404	6.0244	333.92	6.7472	3.5633	1.7816
85	12	0.36144	6.1503	337.28	6.7562	3.5944	1.7972
86	12.25	0.36902	6.2793	340.86	6.7655	3.6275	1.8138
87	12.5	0.37642	6.4052	344.02	6.7746	3.6562	1.8281
88	12.75	0.384	6.5342	347.33	6.784	3.6863	1.8432
89	13	0.3914	6.6601	350.65	6.7931	3.7165	1.8583
90	13.25	0.39898	6.7892	353.8	6.8025	3.7448	1.8724
91	13.5	0.40656	6.9182	356.86	6.8119	3.7719	1.8859
92	13.75	0.41415	7.0472	360.12	6.8214	3.8011	1.9005
93	14	0.42173	7.1762	363.22	6.8309	3.8285	1.9143
94	14.25	0.42922	7.3036	366.33	6.8403	3.8559	1.928
95	14.5	0.43671	7.4311	369.22	6.8497	3.8811	1.9405
96	14.75	0.44429	7.5601	371.85	6.8592	3.9033	1.9516
97	15	0.45187	7.6891	374.69	6.8688	3.9276	1.9638
98	15.25	0.45954	7.8196	377.38	6.8786	3.9501	1.9751
99	15.5	0.46731	7.9518	380.27	6.8884	3.9747	1.9874
100	15.75	0.47461	8.0761	383.06	6.8977	3.9985	1.9992
101	16	0.4821	8.2036	385.85	6.9073	4.022	2.011
102	16.25	0.48941	8.3279	388.53	6.9167	4.0445	2.0222
103	16.5	0.49681	8.4538	391.32	6.9262	4.0679	2.034
104	16.75	0.50421	8.5797	394.27	6.9357	4.0929	2.0464
105	17	0.51179	8.7087	397.27	6.9455	4.1182	2.0591
106	17.25	0.51928	8.8362	399.74	6.9553	4.1381	2.069
107	17.5	0.52686	8.9652	402.63	6.9651	4.1621	2.0811
108	17.75	0.53426	9.0911	404.95	6.9748	4.1803	2.0901
109	18	0.54166	9.217	407.69	6.9844	4.2027	2.1013
110	18.25	0.54924	9.346	410.26	6.9944	4.2233	2.1116
111	18.5	0.55682	9.475	412.79	7.0043	4.2432	2.1216
112	18.75	0.5645	9.6055	415.21	7.0145	4.2619	2.131
113	19	0.57208	9.7345	417.84	7.0245	4.2828	2.1414
114	19.25	0.57984	9.8667	420.47	7.0348	4.3035	2.1517
115	19.5	0.5876	9.9988	423.05	7.0451	4.3235	2.1618
116	19.75	0.59537	10.131	425.52	7.0555	4.3424	2.1712
117	20	0.60313	10.263	427.63	7.0658	4.3575	2.1787
118	20.25	0.61099	10.397	430.05	7.0764	4.3756	2.1878
119	20.5	0.61875	10.529	432.21	7.0868	4.3911	2.1955
120	20.75	0.62643	10.659	434.42	7.0972	4.4071	2.2035
121	21	0.63428	10.793	436.57	7.1078	4.4223	2.2112
122	21.25	0.64186	10.922	438.73	7.1181	4.4378	2.2189
123	21.5	0.64944	11.051	440.94	7.1284	4.4537	2.2268
124	21.75	0.65702	11.18	443.1	7.1388	4.469	2.2345
125	22	0.66451	11.307	445.36	7.1491	4.4853	2.2427
126	22.25	0.67219	11.438	447.57	7.1596	4.501	2.2505
127	22.5	0.67968	11.565	449.52	7.1699	4.514	2.257
128	22.75	0.68726	11.694	451.46	7.1804	4.527	2.2635
129	23	0.69466	11.82	453.36	7.1906	4.5395	2.2697
130	23.25	0.70233	11.951	455.15	7.2013	4.5506	2.2753
131	23.5	0.71	12.082	457.25	7.212	4.5649	2.2825
132	23.75	0.71768	12.212	459.36	7.2227	4.5791	2.2896
133	24	0.72544	12.344	460.99	7.2336	4.5885	2.2942
134	24.25	0.7333	12.478	462.78	7.2447	4.5992	2.2996
135	24.5	0.74106	12.61	464.88	7.2556	4.6132	2.3066
136	24.75	0.74892	12.744	466.78	7.2667	4.6249	2.3124
137	25	0.75677	12.877	468.51	7.2779	4.635	2.3175
138	25.25	0.76463	13.011	470.09	7.2891	4.6435	2.3217
139	25.5	0.77248	13.145	471.83	7.3003	4.6535	2.3267
140	25.75	0.78034	13.278	473.2	7.3115	4.6598	2.3299
141	26	0.7881	13.41	474.93	7.3227	4.6697	2.3349
142	26.25	0.79577	13.541	476.62	7.3337	4.6792	2.3396
143	26.5	0.80345	13.672	478.46	7.3448	4.6902	2.3451
144	26.751	0.81094	13.799	480.09	7.3557	4.6993	2.3496
145	27.001	0.81852	13.928	481.56	7.3667	4.7066	2.3533
146	27.251	0.8261	14.057	483.09	7.3778	4.7145	2.3572
147	27.501	0.83377	14.188	484.82	7.389	4.7242	2.3621
148	27.751	0.84163	14.321	486.4	7.4005	4.7322	2.3661
149	28.001	0.84921	14.45	487.35	7.4117	4.7343	2.3672
150	28.251	0.85716	14.585	488.51	7.4234	4.738	2.369
151	28.501	0.86483	14.716	489.56	7.4348	4.741	2.3705
152	28.751	0.8725	14.847	490.56	7.4462	4.7434	2.3717
153	29.001	0.88036	14.98	491.45	7.4579	4.7446	2.3723
154	29.251	0.8883	15.115	492.51	7.4698	4.7472	2.3736

AECOM

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21115S4			
Initial	Diameter, in	2.852			
	Height, in	6.0661			
	Water Content, %	17.06			
	Dry Density, pcf	114.7			
	Saturation, %	96.69			
	Void Ratio	0.47984			
Unconfined Compressive Strength, tsf		8.2257			
Undrained Shear Strength, tsf		4.1129			
Time to Failure, min		13.25			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		0			
Plastic Limit		0			
Plasticity Index		0			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21115 S-4 Depth: 7.5 '- 9.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN CL SILT SEAMS NOTED, ROOT SYSTEM WITHIN SAMPLE
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:16:32

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21115 S-4
Sample No.: S-4
Test No.: DP21115S4

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 7.5'-9.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN CL SILT SEAMS NOTED, ROOT SYSTEM WITHIN SAMPLE
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.07 in
Specimen Area: 6.39 inA2
Specimen Volume: 38.75 inA3

Liquid Limit: 0
Plastic Limit: 0
Estimated Specific Gravity: 2.72

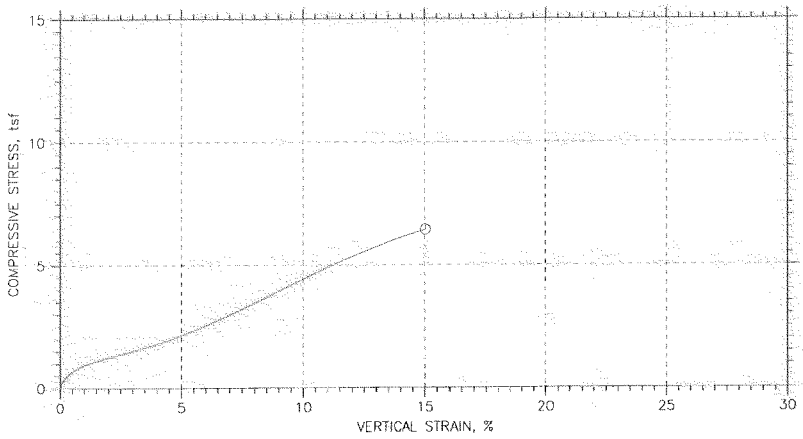
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3882	0	0
2	0.10412	0.0013701	0.022587	21.994	6.3897	0.24784	0.12392
3	0.20412	0.0039277	0.064748	34.307	6.3924	0.38642	0.19321
4	0.30412	0.006668	0.10992	42.41	6.3952	0.47747	0.23874
5	0.40412	0.0095909	0.15811	50.408	6.3983	0.56724	0.28362
6	0.50415	0.012514	0.20629	58.196	6.4014	0.65456	0.32728
7	0.60413	0.015437	0.25448	65.931	6.4045	0.7412	0.3706
8	0.70413	0.018451	0.30417	73.771	6.4077	0.82892	0.41446
9	0.80413	0.021374	0.35235	81.821	6.4108	0.91894	0.45947
10	0.90413	0.024297	0.40054	89.661	6.4139	1.0065	0.50325
11	1.0042	0.027311	0.45023	97.659	6.4171	1.0957	0.54787
12	1.1041	0.030326	0.49992	105.34	6.4203	1.1813	0.59067
13	1.2041	0.033431	0.55111	113.02	6.4236	1.2668	0.63342
14	1.3041	0.036446	0.6008	120.29	6.4268	1.3476	0.67378
15	1.4042	0.039186	0.64598	127.55	6.4297	1.4283	0.71413
16	1.5042	0.041835	0.68964	135.07	6.4326	1.5119	0.75593
17	1.6042	0.044758	0.73783	142.7	6.4357	1.5965	0.79824
18	1.7042	0.047681	0.78601	149.8	6.4388	1.6751	0.83757
19	1.8042	0.050421	0.83119	157.12	6.4418	1.7561	0.87806
20	1.9042	0.053253	0.87786	164.17	6.4448	1.8341	0.91703
21	2.0042	0.056084	0.92454	171.17	6.4478	1.9113	0.95567
22	2.1042	0.058916	0.97122	178.01	6.4509	1.9858	0.9934
23	2.2042	0.061747	1.0179	184.53	6.4539	2.0586	1.0293
24	2.3042	0.06467	1.0661	191.21	6.457	2.1322	1.0661
25	2.4042	0.067411	1.1113	197.84	6.46	2.2051	1.1025
26	2.5042	0.070334	1.1594	204.47	6.4631	2.2779	1.1389
27	2.6	0.073165	1.2061	210.53	6.4662	2.3442	1.1721
28	2.7	0.075905	1.2513	216.94	6.4692	2.4145	1.2073
29	2.8	0.078828	1.2995	223.36	6.4723	2.4848	1.2424
30	2.9	0.081751	1.3477	229.99	6.4755	2.5573	1.2786
31	3	0.084674	1.3959	236.52	6.4786	2.6285	1.3143
32	3.1	0.087597	1.444	242.89	6.4818	2.698	1.349
33	3.2	0.090429	1.4907	249.62	6.4849	2.7715	1.3857
34	3.3	0.093443	1.5404	256.36	6.4882	2.8448	1.4224
35	3.4	0.096275	1.5871	262.88	6.4912	2.9158	1.4579
36	3.5001	0.099106	1.6338	269.67	6.4943	2.9897	1.4949
37	3.6	0.10185	1.6789	276.61	6.4973	3.0653	1.5327
38	3.7	0.10477	1.7271	283.72	6.5005	3.1425	1.5712
39	3.8	0.10751	1.7723	290.56	6.5035	3.2168	1.6084
40	3.9	0.11034	1.819	297.24	6.5066	3.2892	1.6446
41	4.0001	0.11326	1.8672	304.34	6.5098	3.3661	1.6831
42	4.1	0.11619	1.9153	311.39	6.513	3.4424	1.7212
43	4.2	0.11902	1.962	318.34	6.5161	3.5175	1.7588
44	4.3	0.12185	2.0087	325.18	6.5192	3.5914	1.7957
45	4.4	0.12468	2.0554	332.23	6.5223	3.6675	1.8338
46	4.5001	0.12761	2.1036	339.33	6.5255	3.7441	1.8721
47	4.6	0.13044	2.1502	346.65	6.5286	3.823	1.9115
48	4.7	0.13336	2.1984	353.54	6.5318	3.8971	1.9485
49	4.8	0.13619	2.2451	360.65	6.5349	3.9735	1.9867
50	4.9001	0.13893	2.2903	367.75	6.5379	4.0499	2.0249
51	5.0001	0.14185	2.3385	375.22	6.5412	4.1301	2.0651
52	5.1001	0.14478	2.3866	382.32	6.5444	4.2062	2.1031
53	5.2001	0.14761	2.4333	389.32	6.5475	4.2812	2.1406
54	5.3001	0.15053	2.4815	396.58	6.5508	4.3589	2.1794
55	5.4001	0.15345	2.5297	404	6.554	4.4382	2.2191
56	5.5001	0.1562	2.5749	411.05	6.557	4.5136	2.2568
57	5.6001	0.15903	2.6215	418.16	6.5602	4.5894	2.2947
58	5.7001	0.16195	2.6697	425.31	6.5634	4.6656	2.3328
59	5.8001	0.16478	2.7164	432.73	6.5666	4.7447	2.3724
60	5.9001	0.16761	2.7631	439.84	6.5697	4.8203	2.4102
61	6.0001	0.17054	2.8113	446.68	6.573	4.8928	2.4464
62	6.2501	0.17775	2.9302	464.36	6.5811	5.0803	2.5401
63	6.5001	0.18506	3.0507	481.67	6.5892	5.2631	2.6316
64	6.7501	0.19228	3.1696	498.72	6.5973	5.4427	2.7214
65	7.0001	0.19958	3.2901	515.29	6.6055	5.6166	2.8083
66	7.2501	0.20698	3.4121	531.55	6.6139	5.7865	2.8933
67	7.5001	0.2142	3.531	547.28	6.622	5.9505	2.9752
68	7.7501	0.2215	3.6515	562.65	6.6303	6.1099	3.0549
69	8.0001	0.22872	3.7705	576.96	6.6385	6.2576	3.1288
70	8.2502	0.23621	3.8939	591.27	6.647	6.4046	3.2023
71	8.5002	0.24361	4.0159	604.74	6.6555	6.5422	3.2711
72	8.7502	0.25101	4.1379	617.63	6.664	6.6731	3.3366
73	9.0002	0.25841	4.2598	630.26	6.6724	6.8009	3.4005
74	9.2502	0.26581	4.3818	642.68	6.681	6.9261	3.463
75	9.5002	0.27339	4.5068	654.68	6.6897	7.0462	3.5231
76	9.7502	0.28097	4.6318	666.2	6.6985	7.1608	3.5804
77	10	0.28855	4.7567	677.3	6.7073	7.2706	3.6353
78	10.25	0.29622	4.8832	688.04	6.7162	7.376	3.688
79	10.5	0.3038	5.0082	698.3	6.725	7.4762	3.7381
80	10.75	0.31139	5.1332	708.35	6.7339	7.5738	3.7869
81	11	0.31897	5.2582	717.87	6.7428	7.6655	3.8328

82	11.25	0.32664	5.3846	727.03	6.7518	7.7529	3.8765
83	11.5	0.33422	5.5096	735.66	6.7607	7.8346	3.9173
84	11.75	0.3418	5.6346	743.97	6.7697	7.9126	3.9563
85	12	0.34938	5.7596	751.76	6.7786	7.9849	3.9924
86	12.25	0.35697	5.8846	758.86	6.7876	8.0496	4.0248
87	12.5	0.36446	6.008	765.7	6.7966	8.1115	4.0558
88	12.75	0.37195	6.1315	771.91	6.8055	8.1666	4.0833
89	13	0.37962	6.258	776.96	6.8147	8.2089	4.1045
90	13.25	0.3872	6.383	779.59	6.8238	8.2257	4.1129
91	13.5	0.39478	6.5079	778.12	6.8329	8.1932	4.0966
92	13.75	0.40264	6.6374	768.17	6.8424	8.0832	4.0416
93	14	0.41067	6.7699	751.97	6.8521	7.9015	3.9507
94	14.25	0.41862	6.901	738.23	6.8617	7.7463	3.8731
95	14.5	0.42684	7.0365	720.29	6.8717	7.547	3.7735
96	14.75	0.43497	7.1705	690.14	6.8817	7.2207	3.6103
97	15	0.4431	7.3045	660.57	6.8916	6.9013	3.4506
98	15.25	0.45141	7.4415	625.74	6.9018	6.5277	3.2639
99	15.5	0.45945	7.574	598.22	6.9117	6.2317	3.1158
100	15.75	0.46749	7.7065	589.64	6.9216	6.1335	3.0668
101	16	0.47553	7.839	580.43	6.9316	6.0291	3.0145
102	16.25	0.48366	7.9731	573.85	6.9417	5.9521	2.976
103	16.5	0.49133	8.0995	569.07	6.9512	5.8943	2.9472
104	16.75	0.49937	8.2321	562.49	6.9613	5.8178	2.9089
105	17	0.5075	8.3661	557.07	6.9714	5.7533	2.8767
106	17.25	0.51517	8.4926	555.86	6.9811	5.7329	2.8664
107	17.5	0.52284	8.619	557.54	6.9907	5.7423	2.8712
108	17.75	0.53052	8.7455	559.96	7.0004	5.7593	2.8796
109	18	0.5381	8.8705	562.54	7.01	5.7779	2.8889
110	18.25	0.54559	8.994	563.17	7.0195	5.7765	2.8883
111	18.5	0.55335	9.122	562.75	7.0294	5.7641	2.882
112	18.75	0.56121	9.2515	559.28	7.0395	5.7203	2.8602
113	19	0.56897	9.3795	553.86	7.0494	5.6569	2.8285
114	19.25	0.57692	9.5105	543.6	7.0596	5.5441	2.772
115	19.5	0.58505	9.6445	525.87	7.0703	5.3553	2.6776
116	19.75	0.59345	9.783	491.51	7.0809	4.9977	2.4989
117	20	0.60258	9.9336	426.15	7.0928	4.326	2.163
118	20.25	0.61245	10.096	348.96	7.1056	3.536	1.768
119	20.5	0.62231	10.259	283.4	7.1185	2.8665	1.4332
120	20.75	0.63191	10.417	207	7.131	2.09	1.045
121	21	0.64131	10.572	149.01	7.1434	1.502	0.75098
122	21.25	0.6499	10.714	117.55	7.1547	1.1829	0.59146
123	21.5	0.65821	10.851	99.08	7.1657	0.99554	0.49777
124	21.75	0.66652	10.988	85.557	7.1768	0.85834	0.42917
125	22	0.67447	11.119	78.401	7.1873	0.78539	0.3927
126	22.25	0.68214	11.245	76.823	7.1976	0.76848	0.38424
127	22.5	0.68945	11.366	76.665	7.2074	0.76586	0.38293
128	22.75	0.69658	11.483	77.612	7.2169	0.7743	0.38715
129	23	0.70379	11.602	77.244	7.2266	0.76959	0.38479
130	23.25	0.71128	11.725	77.349	7.2368	0.76956	0.38478
131	23.5	0.71868	11.847	78.085	7.2468	0.77581	0.38791
132	23.75	0.72617	11.971	79.453	7.2569	0.7883	0.39415
133	24	0.73357	12.093	80.716	7.267	0.79972	0.39986
134	24.25	0.74115	12.218	82.137	7.2773	0.81264	0.40632
135	24.5	0.74882	12.344	84.189	7.2878	0.83174	0.41587
136	24.75	0.75641	12.469	86.294	7.2983	0.85132	0.42566
137	25	0.76417	12.597	88.293	7.3089	0.86977	0.43489
138	25.25	0.77184	12.724	90.062	7.3195	0.88611	0.44306
139	25.5	0.77942	12.849	91.714	7.33	0.90087	0.45043
140	25.75	0.78728	12.978	92.871	7.3409	0.91088	0.45544
141	26	0.79495	13.105	93.766	7.3516	0.91832	0.45916
142	26.251	0.80262	13.231	93.923	7.3623	0.91852	0.45926
143	26.501	0.81039	13.359	94.187	7.3732	0.91974	0.45987
144	26.751	0.81797	13.484	94.976	7.3839	0.92611	0.46305
145	27.001	0.82573	13.612	94.976	7.3948	0.92474	0.46237
146	27.251	0.83332	13.737	94.45	7.4055	0.91828	0.45914
147	27.501	0.84117	13.867	94.081	7.4167	0.91333	0.45667
148	27.751	0.84884	13.993	93.923	7.4276	0.91046	0.45523
149	28.001	0.85661	14.121	93.134	7.4386	0.90146	0.45073
150	28.251	0.86446	14.251	92.24	7.4499	0.89146	0.44573
151	28.501	0.87223	14.379	90.714	7.461	0.8754	0.4377
152	28.751	0.88017	14.51	90.03	7.4724	0.86747	0.43374
153	29.001	0.88812	14.641	88.977	7.4839	0.85602	0.42801
154	29.251	0.89588	14.769	89.24	7.4951	0.85726	0.42863
155	29.501	0.90374	14.898	89.556	7.5065	0.85899	0.42949
156	29.751	0.91141	15.025	91.819	7.5177	0.87938	0.43969

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		○			
Test No.		DP21152S8			
Initial	Diameter, in	2.7232			
	Height, in	5.9213			
	Water Content, %	15.08			
	Dry Density, pcf	120.8			
	Saturation, %	101.17			
	Void Ratio	0.40535			
Unconfined Compressive Strength, tsf		6.4393			
Undrained Shear Strength, tsf		3.2197			
Time to Failure, min		29.251			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		0			
Plastic Limit		0			
Plasticity Index		0			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21115 S-8 Depth: 20.0'-22.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:12:36

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21115 S-8
Sample No.: S-8
Test No.: DP21152S8

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 20.0'-22.0'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.92 in
Specimen Area: 5.82 inA2
Specimen Volume: 34.49 inA3

Liquid Limit: 0
Plastic Limit: 0
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	5.8245	0	0
2	0.10005	0.0013701	0.023139	12.576	5.8258	0.15542	0.07771
3	0.20005	0.0042017	0.07096	20.574	5.8286	0.25414	0.12707
4	0.30005	0.0071247	0.12032	26.046	5.8315	0.32158	0.16079
5	0.40005	0.010048	0.16969	30.94	5.8344	0.38181	0.19091
6	0.50008	0.013062	0.22059	35.412	5.8374	0.43678	0.21839
7	0.60007	0.016076	0.2715	39.622	5.8403	0.48846	0.24423
8	0.70007	0.019091	0.32241	43.673	5.8433	0.53813	0.26906
9	0.80007	0.022013	0.37177	47.304	5.8462	0.58258	0.29129
10	0.90007	0.025028	0.42268	50.882	5.8492	0.62632	0.31316
11	1.0001	0.028133	0.47513	54.039	5.8523	0.66483	0.33242
12	1.1001	0.031148	0.52603	56.986	5.8553	0.70073	0.35036
13	1.2001	0.034162	0.57694	59.88	5.8583	0.73594	0.36797
14	1.3001	0.037176	0.62784	62.721	5.8613	0.77046	0.38523
15	1.4001	0.040099	0.67721	65.194	5.8642	0.80044	0.40022
16	1.5001	0.043114	0.72811	67.457	5.8672	0.8278	0.4139
17	1.6001	0.046128	0.77902	69.456	5.8702	0.8519	0.42595
18	1.7001	0.049233	0.83147	71.666	5.8733	0.87854	0.43927
19	1.8001	0.052248	0.88238	73.718	5.8763	0.90323	0.45162
20	1.9001	0.055262	0.93328	75.402	5.8794	0.92339	0.46169
21	2.0001	0.058368	0.98573	77.033	5.8825	0.94286	0.47143
22	2.1001	0.061382	1.0366	78.717	5.8855	0.96298	0.48149
23	2.2001	0.064305	1.086	80.401	5.8884	0.98309	0.49154
24	2.3001	0.067411	1.1384	81.716	5.8916	0.99864	0.49932
25	2.4001	0.070425	1.1894	83.242	5.8946	1.0168	0.50838
26	2.5001	0.073439	1.2403	84.557	5.8976	1.0323	0.51615
27	2.6001	0.076545	1.2927	86.083	5.9008	1.0504	0.52519
28	2.7001	0.079559	1.3436	87.451	5.9038	1.0665	0.53326
29	2.8001	0.082573	1.3945	88.714	5.9069	1.0814	0.54068
30	2.9001	0.085588	1.4454	89.977	5.9099	1.0962	0.54809
31	3.0001	0.088693	1.4979	91.345	5.9131	1.1123	0.55613
32	3.1001	0.091799	1.5503	92.45	5.9162	1.1251	0.56256
33	3.2001	0.094813	1.6012	93.766	5.9193	1.1405	0.57027
34	3.3001	0.097828	1.6521	94.923	5.9223	1.154	0.57701
35	3.4001	0.10084	1.703	96.344	5.9254	1.1707	0.58534
36	3.5002	0.10395	1.7555	97.554	5.9286	1.1848	0.59238
37	3.6001	0.10705	1.8079	98.501	5.9317	1.1956	0.59781
38	3.7001	0.11007	1.8589	99.764	5.9348	1.2103	0.60516
39	3.8001	0.11317	1.9113	101.03	5.938	1.225	0.61249
40	3.9001	0.11628	1.9637	102.29	5.9412	1.2396	0.61982
41	4.0002	0.11929	2.0147	103.39	5.9442	1.2524	0.62619
42	4.1001	0.1224	2.0671	104.6	5.9474	1.2664	0.63318
43	4.2001	0.12541	2.118	105.76	5.9505	1.2797	0.63985
44	4.3001	0.12852	2.1705	107.08	5.9537	1.2949	0.64746
45	4.4001	0.13162	2.2229	108.18	5.9569	1.3076	0.65379
46	4.5002	0.13464	2.2738	109.29	5.96	1.3203	0.66013
47	4.6001	0.13765	2.3247	110.5	5.9631	1.3342	0.66709
48	4.7001	0.14076	2.3772	111.87	5.9663	1.35	0.67499
49	4.8001	0.14377	2.4281	112.97	5.9694	1.3626	0.6813
50	4.9001	0.14697	2.4821	114.13	5.9727	1.3758	0.6879
51	5.0002	0.14998	2.533	115.29	5.9759	1.389	0.69451
52	5.1002	0.153	2.5839	116.6	5.979	1.4041	0.70207
53	5.2002	0.1561	2.6363	117.71	5.9822	1.4167	0.70834
54	5.3002	0.15912	2.6872	118.92	5.9853	1.4305	0.71525
55	5.4002	0.16213	2.7381	120.13	5.9885	1.4443	0.72215
56	5.5002	0.16533	2.7921	121.55	5.9918	1.4606	0.73029
57	5.6002	0.16834	2.843	122.6	5.9949	1.4724	0.73622
58	5.7002	0.17136	2.8939	123.81	5.9981	1.4862	0.7431
59	5.8002	0.17446	2.9464	125.02	6.0013	1.4999	0.74996
60	5.9002	0.17748	2.9973	126.39	6.0045	1.5155	0.75777
61	6.0002	0.18049	3.0482	127.55	6.0076	1.5286	0.76431
62	6.2502	0.18807	3.1762	130.7	6.0156	1.5644	0.78219
63	6.5002	0.19556	3.3027	133.81	6.0234	1.5995	0.79973
64	6.7502	0.20305	3.4292	137.12	6.0313	1.6369	0.81847
65	7.0002	0.21064	3.5573	140.44	6.0393	1.6743	0.83714
66	7.2502	0.21822	3.6853	143.7	6.0474	1.7109	0.85545
67	7.5002	0.2258	3.8133	147.12	6.0554	1.7493	0.87465
68	7.7502	0.23338	3.9414	150.65	6.0635	1.7888	0.89441
69	8.0002	0.24096	4.0694	154.22	6.0716	1.8289	0.91444
70	8.2502	0.24854	4.1975	157.8	6.0797	1.8688	0.9344
71	8.5003	0.25612	4.3255	161.59	6.0878	1.9111	0.95556
72	8.7503	0.2638	4.4551	165.43	6.0961	1.9539	0.97695
73	9.0003	0.27147	4.5847	169.22	6.1044	1.9959	0.99796
74	9.2503	0.27914	4.7142	173.06	6.1127	2.0385	1.0192
75	9.5003	0.28681	4.8438	177.11	6.121	2.0833	1.0417
76	9.7503	0.2944	4.9718	181.11	6.1292	2.1275	1.0638
77	10	0.30216	5.103	185.37	6.1377	2.1746	1.0873
78	10.25	0.30965	5.2295	189.79	6.1459	2.2235	1.1117
79	10.5	0.31714	5.356	194.27	6.1541	2.2728	1.1364
80	10.75	0.32472	5.484	198.84	6.1624	2.3232	1.1616
81	11	0.33221	5.6105	203.32	6.1707	2.3723	1.1862

82	11.25	0.3397	5.737	208	6.179	2.4237	1.2118
83	11.5	0.3471	5.8619	212.68	6.1872	2.475	1.2375
84	11.75	0.35486	5.9931	217.63	6.1958	2.529	1.2645
85	12	0.36217	6.1165	222.63	6.204	2.5837	1.2919
86	12.25	0.36966	6.243	227.57	6.2123	2.6375	1.3188
87	12.5	0.37733	6.3725	232.78	6.2209	2.6942	1.3471
88	12.75	0.38492	6.5006	237.94	6.2294	2.7501	1.3751
89	13	0.3925	6.6286	243.2	6.238	2.8071	1.4035
90	13.25	0.40017	6.7582	248.67	6.2467	2.8663	1.4331
91	13.5	0.40766	6.8847	253.94	6.2551	2.9229	1.4615
92	13.75	0.41524	7.0127	259.51	6.2638	2.983	1.4915
93	14	0.42291	7.1423	264.93	6.2725	3.0411	1.5205
94	14.25	0.43068	7.2734	270.51	6.2814	3.1007	1.5504
95	14.5	0.43826	7.4015	276.25	6.29	3.1621	1.581
96	14.75	0.44584	7.5295	281.88	6.2988	3.2221	1.611
97	15	0.45351	7.6591	287.82	6.3076	3.2854	1.6427
98	15.25	0.4611	7.7871	293.71	6.3164	3.348	1.674
99	15.5	0.46859	7.9136	299.66	6.325	3.4111	1.7056
100	15.75	0.47617	8.0417	305.76	6.3338	3.4758	1.7379
101	16	0.48375	8.1697	311.76	6.3427	3.539	1.7695
102	16.25	0.49133	8.2977	317.66	6.3515	3.6009	1.8005
103	16.5	0.49919	8.4304	323.5	6.3607	3.6618	1.8309
104	16.75	0.50658	8.5553	329.55	6.3694	3.7252	1.8626
105	17	0.51417	8.6834	335.7	6.3783	3.7895	1.8947
106	17.25	0.52166	8.8099	341.7	6.3872	3.8519	1.9259
107	17.5	0.52915	8.9364	347.91	6.3961	3.9164	1.9582
108	17.75	0.53682	9.0659	354.12	6.4052	3.9806	1.9903
109	18	0.54449	9.1955	360.28	6.4143	4.0441	2.022
110	18.25	0.55226	9.3266	366.49	6.4236	4.1078	2.0539
111	18.5	0.55993	9.4562	372.64	6.4328	4.1709	2.0854
112	18.75	0.5676	9.5858	378.69	6.442	4.2325	2.1163
113	19	0.57536	9.7169	384.8	6.4514	4.2945	2.1472
114	19.25	0.58304	9.8465	390.48	6.4606	4.3517	2.1758
115	19.5	0.59062	9.9745	396.79	6.4698	4.4158	2.2079
116	19.75	0.59829	10.104	402.79	6.4792	4.4761	2.238
117	20	0.60578	10.231	408.84	6.4883	4.5369	2.2685
118	20.25	0.61345	10.36	415	6.4977	4.5986	2.2993
119	20.5	0.62085	10.485	421.21	6.5067	4.6609	2.3304
120	20.75	0.62834	10.612	427.37	6.5159	4.7223	2.3612
121	21	0.63574	10.737	433.63	6.5251	4.7848	2.3924
122	21.25	0.64332	10.865	439.41	6.5344	4.8417	2.4209
123	21.5	0.65072	10.99	445.2	6.5436	4.8986	2.4493
124	21.751	0.6583	11.118	451.15	6.553	4.9569	2.4784
125	22.001	0.66579	11.244	456.83	6.5624	5.0122	2.5061
126	22.251	0.67337	11.372	462.83	6.5719	5.0707	2.5353
127	22.501	0.68105	11.502	468.57	6.5815	5.126	2.563
128	22.751	0.68872	11.631	474.67	6.5911	5.1852	2.5926
129	23.001	0.69648	11.762	480.67	6.6009	5.2429	2.6215
130	23.251	0.70416	11.892	486.4	6.6106	5.2977	2.6488
131	23.501	0.71192	12.023	492.3	6.6205	5.3539	2.6769
132	23.751	0.71969	12.154	498.14	6.6304	5.4093	2.7047
133	24.001	0.72727	12.282	503.35	6.64	5.4579	2.729
134	24.251	0.73512	12.415	509.13	6.6501	5.5123	2.7562
135	24.501	0.7428	12.545	514.55	6.66	5.5628	2.7814
136	24.751	0.75047	12.674	519.97	6.6698	5.613	2.8065
137	25.001	0.75805	12.802	525.66	6.6796	5.6661	2.833
138	25.251	0.76563	12.93	530.92	6.6895	5.7144	2.8572
139	25.501	0.77321	13.058	536.23	6.6993	5.7631	2.8815
140	25.751	0.78061	13.183	541.81	6.7089	5.8147	2.9073
141	26.001	0.78819	13.311	547.33	6.7189	5.8653	2.9326
142	26.251	0.79568	13.438	553.07	6.7287	5.9181	2.9591
143	26.501	0.80335	13.567	558.44	6.7388	5.9666	2.9833
144	26.751	0.81094	13.695	563.33	6.7488	6.01	3.005
145	27.001	0.8187	13.826	568.54	6.759	6.0563	3.0282
146	27.251	0.82628	13.954	573.49	6.7691	6.0999	3.05
147	27.501	0.83405	14.086	578.33	6.7794	6.1421	3.071
148	27.751	0.84172	14.215	583.43	6.7897	6.1869	3.0935
149	28.001	0.84948	14.346	588.38	6.8	6.2298	3.1149
150	28.251	0.85725	14.477	593.59	6.8105	6.2754	3.1377
151	28.501	0.8651	14.61	598.58	6.8211	6.3184	3.1592
152	28.751	0.87305	14.744	603.48	6.8318	6.36	3.18
153	29.001	0.88072	14.874	608.32	6.8422	6.4013	3.2007
154	29.251	0.88867	15.008	612.9	6.853	6.4393	3.2197

UNCONFINED COMPRESSION TEST REPORT

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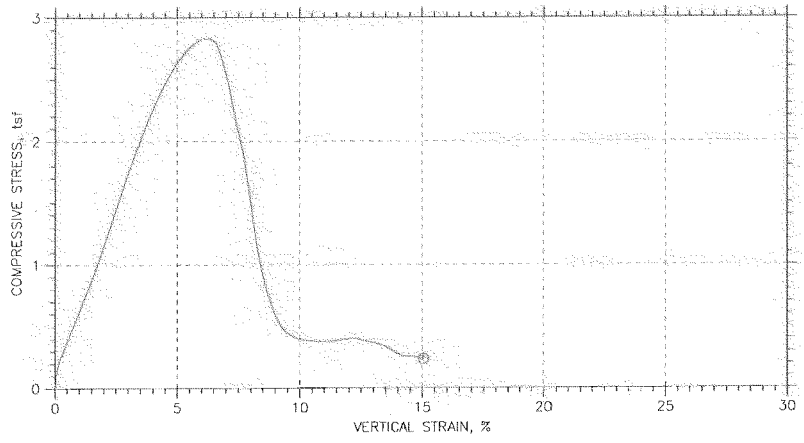


Symbol		○			
Test No.		DP21114S5			
Initial	Diameter, in	2.8409			
	Height, in	5.861			
	Water Content, %	17.13			
	Dry Density, pcf	110.2			
	Saturation, %	86.20			
	Void Ratio	0.54056			
Unconfined Compressive Strength, tsf		2.8305			
Undrained Shear Strength, tsf		1.4152			
Time to Failure, min		12			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21114 S-5 Depth: 10.0'-12.5'
Sample Type: 3" ST
Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN AND GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:23:35

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21114 S-5
Sample No.: S-5
Test No.: DP21114S5

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 10.0'-12.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN AND GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.86 in
Specimen Area: 6.34 in^2
Specimen Volume: 37.15 in^3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

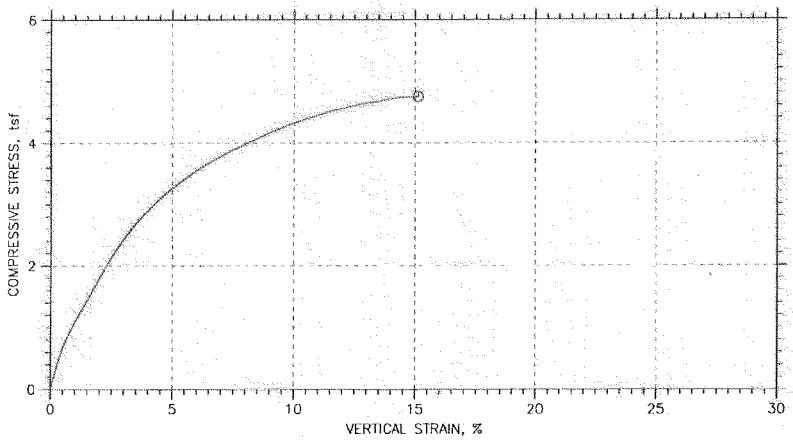
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3389	0	0
2	0.10417	0.0019182	0.032728	9.1029	6.341	0.10336	0.051681
3	0.20417	0.0046585	0.079482	13.996	6.344	0.15885	0.079425
4	0.3	0.0074901	0.12779	17.154	6.347	0.19459	0.097294
5	0.4	0.010504	0.17922	20.1	6.3503	0.2279	0.11395
6	0.50003	0.013519	0.23065	22.731	6.3536	0.25759	0.1288
7	0.6	0.016533	0.28208	23.573	6.3569	0.267	0.1335
8	0.7	0.019547	0.33351	26.467	6.3601	0.29962	0.14981
9	0.8	0.022653	0.3865	28.887	6.3635	0.32685	0.16342
10	0.90002	0.025759	0.43949	31.308	6.3669	0.35404	0.17702
11	1.0001	0.028681	0.48936	33.57	6.3701	0.37944	0.18972
12	1.1	0.031604	0.53923	35.886	6.3733	0.40541	0.2027
13	1.2	0.03471	0.59222	37.99	6.3767	0.42895	0.21448
14	1.3	0.037724	0.64365	40.253	6.38	0.45427	0.22713
15	1.4	0.04083	0.69664	42.305	6.3834	0.47717	0.23858
16	1.5001	0.043844	0.74807	44.568	6.3867	0.50243	0.25121
17	1.6	0.046859	0.79949	46.83	6.39	0.52766	0.26383
18	1.7	0.049964	0.85248	49.093	6.3934	0.55286	0.27643
19	1.8	0.05307	0.90547	51.461	6.3968	0.57922	0.28961
20	1.9	0.056084	0.9569	53.723	6.4002	0.60437	0.30219
21	2.0001	0.05919	1.0099	56.091	6.4036	0.63067	0.31533
22	2.1	0.062204	1.0613	58.511	6.4069	0.65754	0.32877
23	2.2	0.06531	1.1143	60.879	6.4104	0.68379	0.34189
24	2.3	0.068415	1.1673	63.3	6.4138	0.71059	0.3553
25	2.4	0.07143	1.2187	65.615	6.4171	0.7362	0.3681
26	2.5001	0.074535	1.2717	67.983	6.4206	0.76235	0.38118
27	2.6001	0.07755	1.3231	70.403	6.4239	0.78909	0.39454
28	2.7001	0.080655	1.3761	72.718	6.4274	0.8146	0.4073
29	2.8001	0.083761	1.4291	75.139	6.4308	0.84126	0.42063
30	2.9001	0.086684	1.479	77.507	6.4341	0.86733	0.43367
31	3.0001	0.089789	1.532	80.032	6.4375	0.89511	0.44756
32	3.1001	0.092804	1.5834	82.453	6.4409	0.9217	0.46085
33	3.2001	0.095818	1.6348	85.031	6.4443	0.95003	0.47501
34	3.3001	0.098924	1.6878	87.451	6.4477	0.97654	0.48827
35	3.4001	0.10194	1.7393	90.082	6.4511	1.0054	0.5027
36	3.5001	0.10486	1.7891	92.713	6.4544	1.0342	0.51712
37	3.6001	0.10788	1.8406	95.449	6.4578	1.0642	0.5321
38	3.7001	0.1108	1.8904	98.028	6.4611	1.0924	0.54619
39	3.8001	0.114	1.945	100.76	6.4647	1.1223	0.56113
40	3.9001	0.11692	1.9948	103.45	6.4679	1.1516	0.57578
41	4.0001	0.11993	2.0463	106.08	6.4713	1.1802	0.59011
42	4.1001	0.12295	2.0977	108.76	6.4747	1.2094	0.60472
43	4.2001	0.12596	2.1491	111.45	6.4781	1.2386	0.61932
44	4.3001	0.12898	2.2006	114.18	6.4816	1.2684	0.63419
45	4.4001	0.13208	2.2535	117.08	6.4851	1.2998	0.64991
46	4.5001	0.135	2.3034	119.76	6.4884	1.3289	0.66447
47	4.6001	0.13802	2.3548	122.71	6.4918	1.3609	0.68046
48	4.7001	0.14103	2.4063	125.44	6.4952	1.3905	0.69527
49	4.8001	0.14405	2.4577	128.28	6.4986	1.4213	0.71064
50	4.9001	0.14706	2.5091	131.12	6.5021	1.452	0.726
51	5.0001	0.14998	2.559	133.97	6.5054	1.4827	0.74135
52	5.1001	0.15309	2.612	136.86	6.5089	1.5139	0.75695
53	5.2001	0.1561	2.6634	139.75	6.5124	1.5451	0.77255
54	5.3001	0.15903	2.7133	142.6	6.5157	1.5757	0.78785
55	5.4001	0.16204	2.7647	145.38	6.5192	1.6057	0.80284
56	5.5001	0.16506	2.8162	148.23	6.5226	1.6362	0.8181
57	5.6001	0.16816	2.8691	151.01	6.5262	1.6661	0.83303
58	5.7001	0.17118	2.9206	153.91	6.5296	1.6971	0.84855
59	5.8001	0.17419	2.972	156.59	6.5331	1.7258	0.86289
60	5.9001	0.1772	3.0234	159.49	6.5366	1.7567	0.87837
61	6.0001	0.18031	3.0764	162.12	6.5401	1.7847	0.89237
62	6.2502	0.18798	3.2073	169.11	6.549	1.8593	0.92963
63	6.5002	0.19566	3.3382	175.96	6.5578	1.9319	0.96593
64	6.7502	0.20333	3.4692	182.59	6.5667	2.0019	1.001
65	7.0002	0.211	3.6001	189	6.5757	2.0695	1.0348
66	7.2502	0.21867	3.731	195.21	6.5846	2.1346	1.0673
67	7.5002	0.22625	3.8603	201.26	6.5935	2.1978	1.0989
68	7.7502	0.23384	3.9897	207.11	6.6023	2.2585	1.1293
69	8.0002	0.2416	4.1222	212.63	6.6115	2.3156	1.1578
70	8.2502	0.24918	4.2515	218.16	6.6204	2.3725	1.1863
71	8.5002	0.25676	4.3809	223.21	6.6293	2.4242	1.2121
72	8.7502	0.26434	4.5102	227.99	6.6383	2.4729	1.2364
73	9.0002	0.27193	4.6396	232.68	6.6473	2.5202	1.2601
74	9.2502	0.27942	4.7674	237.15	6.6563	2.5652	1.2826
75	9.5002	0.28681	4.8936	241.25	6.6651	2.6062	1.3031
76	9.7502	0.2944	5.0229	245.1	6.6742	2.6441	1.322
77	10	0.30189	5.1507	248.67	6.6832	2.679	1.3395
78	10.25	0.30956	5.2817	251.88	6.6924	2.7099	1.3549
79	10.5	0.31714	5.411	255.25	6.7015	2.7424	1.3712
80	10.75	0.325	5.545	257.83	6.7111	2.7661	1.3831
81	11	0.33239	5.6713	259.99	6.72	2.7856	1.3928

82	11.25	0.34016	5.8037	262.14	6.7295	2.8047	1.4024
83	11.5	0.34811	5.9393	263.99	6.7392	2.8204	1.4102
84	11.75	0.35578	6.0702	265.2	6.7486	2.8294	1.4147
85	12	0.36345	6.2011	265.67	6.758	2.8305	1.4152
86	12.25	0.37131	6.3352	265.83	6.7677	2.8281	1.414
87	12.5	0.37898	6.4661	264.88	6.7771	2.8141	1.407
88	12.75	0.38656	6.5954	263.2	6.7865	2.7923	1.3962
89	13	0.39432	6.7279	257.72	6.7962	2.7304	1.3652
90	13.25	0.40227	6.8635	249.25	6.8061	2.6368	1.3184
91	13.5	0.40994	6.9944	240.99	6.8156	2.5458	1.2729
92	13.75	0.4178	7.1284	230.63	6.8255	2.4328	1.2164
93	14	0.42575	7.264	217.84	6.8355	2.2946	1.1473
94	14.25	0.43369	7.3996	204.68	6.8455	2.1529	1.0764
95	14.5	0.44146	7.5321	193.9	6.8553	2.0365	1.0182
96	14.75	0.4494	7.6677	183.16	6.8653	1.9209	0.96046
97	15	0.45753	7.8064	167.33	6.8757	1.7522	0.87609
98	15.25	0.46612	7.9529	147.44	6.8866	1.5415	0.77073
99	15.5	0.47416	8.09	129.34	6.8969	1.3502	0.6751
100	15.75	0.48247	8.2318	111.39	6.9075	1.1611	0.58055
101	16	0.49087	8.3752	97.133	6.9183	1.0109	0.50544
102	16.25	0.49973	8.5264	83.979	6.9298	0.87253	0.43627
103	16.5	0.50859	8.6776	73.718	6.9413	0.76466	0.38233
104	16.75	0.51672	8.8163	65.773	6.9518	0.68121	0.3406
105	17	0.52476	8.9534	58.669	6.9623	0.60672	0.30336
106	17.25	0.53262	9.0874	52.566	6.9725	0.5428	0.2714
107	17.5	0.54038	9.2199	48.04	6.9827	0.49535	0.24768
108	17.75	0.54814	9.3524	45.146	6.9929	0.46483	0.23242
109	18	0.55573	9.4817	42.936	7.0029	0.44145	0.22072
110	18.25	0.5634	9.6126	41.411	7.0131	0.42514	0.21257
111	18.5	0.57089	9.7404	40.148	7.023	0.4116	0.2058
112	18.75	0.57856	9.8713	39.306	7.0332	0.40238	0.20119
113	19	0.58623	10.002	38.674	7.0434	0.39534	0.19767
114	19.25	0.59382	10.132	38.148	7.0536	0.3894	0.1947
115	19.5	0.60149	10.263	37.99	7.0639	0.38723	0.19361
116	19.75	0.60907	10.392	37.78	7.074	0.38453	0.19226
117	20	0.61683	10.524	37.78	7.0845	0.38396	0.19198
118	20.25	0.6246	10.657	37.412	7.095	0.37965	0.18983
119	20.5	0.63245	10.791	37.043	7.1057	0.37535	0.18767
120	20.75	0.64031	10.925	37.254	7.1164	0.37691	0.18846
121	21	0.64816	11.059	37.412	7.1271	0.37794	0.18897
122	21.25	0.65593	11.191	37.254	7.1377	0.37579	0.18789
123	21.5	0.66388	11.327	37.517	7.1486	0.37786	0.18893
124	21.75	0.67164	11.459	38.096	7.1593	0.38312	0.19156
125	22	0.67931	11.59	38.674	7.1699	0.38836	0.19418
126	22.25	0.68708	11.723	39.201	7.1807	0.39306	0.19653
127	22.5	0.69466	11.852	39.464	7.1912	0.39512	0.19756
128	22.75	0.70251	11.986	39.885	7.2022	0.39872	0.19936
129	23	0.71019	12.117	40.042	7.2129	0.39971	0.19985
130	23.25	0.71777	12.246	40.2	7.2236	0.40069	0.20035
131	23.5	0.72544	12.377	39.832	7.2343	0.39643	0.19821
132	23.75	0.7332	12.51	39.201	7.2453	0.38955	0.19478
133	24	0.74088	12.641	38.622	7.2562	0.38323	0.19161
134	24.251	0.74864	12.773	38.096	7.2672	0.37743	0.18872
135	24.501	0.75631	12.904	37.78	7.2781	0.37374	0.18687
136	24.751	0.76417	13.038	37.096	7.2893	0.36641	0.18321
137	25.001	0.77202	13.172	36.254	7.3006	0.35755	0.17877
138	25.251	0.77997	13.308	35.57	7.312	0.35025	0.17513
139	25.501	0.78792	13.443	34.675	7.3234	0.34091	0.17045
140	25.751	0.79577	13.577	33.413	7.3348	0.32799	0.16399
141	26.001	0.80372	13.713	31.729	7.3463	0.31097	0.15548
142	26.251	0.81167	13.849	29.887	7.3579	0.29246	0.14623
143	26.501	0.81952	13.983	28.466	7.3693	0.27812	0.13906
144	26.751	0.82738	14.117	27.098	7.3808	0.26434	0.13217
145	27.001	0.83523	14.251	26.414	7.3924	0.25727	0.12863
146	27.251	0.84318	14.386	26.204	7.4041	0.25482	0.12741
147	27.501	0.85058	14.512	26.256	7.415	0.25495	0.12748
148	27.751	0.85862	14.65	26.204	7.4269	0.25403	0.12702
149	28.001	0.86611	14.777	25.572	7.4381	0.24754	0.12377
150	28.251	0.87378	14.908	25.204	7.4495	0.2436	0.1218
151	28.497	0.88136	15.038	24.573	7.4609	0.23714	0.11857

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		DP21114S7			
Initial	Diameter, in	2.8413			
	Height, in	5.8768			
	Water Content, %	16.01			
	Dry Density, pcf	118.3			
	Saturation, %	100.14			
	Void Ratio	0.43497			
Unconfined Compressive Strength, tsf		4.7472			
Undrained Shear Strength, tsf		2.3736			
Time to Failure, min		29.251			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		--			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21114 S-7 Depth: 15.0'-17.5'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV 2011 14:20:19

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21114 S-7
Sample No.: S-7
Test No.: DP21114S7

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 15.0'-17.5'
Elevation: ~~~~~

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.88 in
Specimen Area: 6.34 inA2
Specimen Volume: 37.26 inA3

Liquid Limit: ~~~
Plastic Limit: ~~~
Estimated Specific Gravity: 2.72

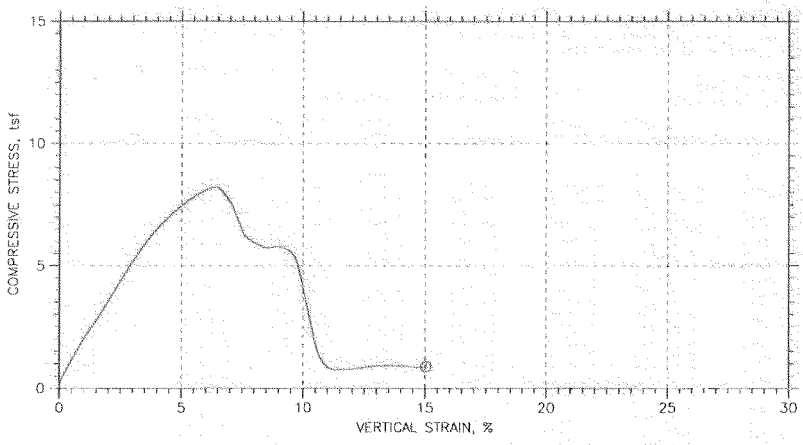
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3407	0	0
2	0.1041	0.0019182	0.03264	7.5244	6.3428	0.085414	0.042707
3	0.2041	0.0048411	0.082378	13.47	6.3459	0.15283	0.076416
4	0.3041	0.0077641	0.13211	19.258	6.3491	0.21839	0.1092
5	0.4041	0.010596	0.1803	25.046	6.3521	0.28389	0.14195
6	0.50413	0.01361	0.23159	31.045	6.3554	0.3517	0.17585
7	0.6041	0.016716	0.28444	37.254	6.3588	0.42182	0.21091
8	0.7041	0.019639	0.33417	43.252	6.3619	0.4895	0.24475
9	0.8041	0.022653	0.38546	49.198	6.3652	0.5565	0.27825
10	0.9041	0.025667	0.43676	54.407	6.3685	0.61511	0.30755
11	1.0042	0.02859	0.48649	59.459	6.3717	0.67188	0.33594
12	1.1041	0.031604	0.53779	64.142	6.375	0.72443	0.36221
13	1.2041	0.034619	0.58908	68.404	6.3783	0.77216	0.38608
14	1.3041	0.037633	0.64037	72.56	6.3815	0.81867	0.40933
15	1.4041	0.040739	0.69321	76.507	6.3849	0.86273	0.43137
16	1.5042	0.043753	0.74451	80.506	6.3882	0.90736	0.45368
17	1.6041	0.046767	0.7958	84.084	6.3915	0.9472	0.4736
18	1.7041	0.049873	0.84864	87.609	6.395	0.98638	0.49319
19	1.8041	0.052887	0.89994	91.029	6.3983	1.0244	0.51218
20	1.9041	0.055993	0.95278	94.555	6.4017	1.0635	0.53173
21	2.0042	0.059007	1.0041	97.765	6.405	1.099	0.5495
22	2.1041	0.062021	1.0554	100.92	6.4083	1.1339	0.56695
23	2.2041	0.065036	1.1067	104.29	6.4116	1.1711	0.58556
24	2.3041	0.067959	1.1564	107.66	6.4149	1.2083	0.60417
25	2.4041	0.070973	1.2077	110.87	6.4182	1.2437	0.62186
26	2.5042	0.073987	1.259	114.08	6.4215	1.2791	0.63953
27	2.6041	0.077002	1.3103	117.29	6.4249	1.3144	0.65718
28	2.7042	0.079924	1.36	120.81	6.4281	1.3532	0.67659
29	2.8042	0.082939	1.4113	124.02	6.4314	1.3884	0.69421
30	2.9042	0.085953	1.4626	127.28	6.4348	1.4242	0.7121
31	3.0042	0.088876	1.5123	130.55	6.438	1.46	0.72998
32	3.1042	0.09189	1.5636	133.97	6.4414	1.4974	0.74872
33	3.2042	0.094905	1.6149	137.28	6.4448	1.5337	0.76684
34	3.3042	0.097828	1.6646	140.54	6.448	1.5693	0.78467
35	3.4042	0.10084	1.7159	143.81	6.4514	1.6049	0.80246
36	3.5042	0.10376	1.7657	147.28	6.4546	1.6429	0.82143
37	3.6042	0.1066	1.8139	150.7	6.4578	1.6802	0.84009
38	3.7042	0.10961	1.8652	153.86	6.4612	1.7145	0.85724
39	3.8	0.11244	1.9133	156.96	6.4644	1.7482	0.87411
40	3.9	0.11546	1.9646	160.38	6.4677	1.7854	0.89269
41	4	0.11847	2.0159	163.8	6.4711	1.8225	0.91125
42	4.1	0.12149	2.0672	167.01	6.4745	1.8572	0.92862
43	4.2	0.1245	2.1185	170.22	6.4779	1.8919	0.94597
44	4.3	0.12742	2.1682	173.43	6.4812	1.9266	0.96332
45	4.4	0.13053	2.2211	176.9	6.4847	1.9642	0.98208
46	4.5001	0.13354	2.2724	179.95	6.4881	1.997	0.9985
47	4.6	0.13647	2.3221	183.11	6.4914	2.031	1.0155
48	4.7	0.13948	2.3734	186.16	6.4948	2.0638	1.0319
49	4.8	0.14259	2.4263	189.48	6.4983	2.0994	1.0497
50	4.9	0.1456	2.4775	192.42	6.5018	2.1309	1.0654
51	5.0001	0.14861	2.5288	195.37	6.5052	2.1624	1.0812
52	5.1	0.15163	2.5801	198.42	6.5086	2.195	1.0975
53	5.2	0.15473	2.633	201.53	6.5121	2.2281	1.1141
54	5.3	0.15775	2.6843	204.37	6.5156	2.2584	1.1292
55	5.4	0.16076	2.7356	207.26	6.519	2.2891	1.1446
56	5.5001	0.16378	2.7868	210.05	6.5225	2.3187	1.1594
57	5.6	0.16688	2.8397	212.89	6.526	2.3488	1.1744
58	5.7	0.16999	2.8925	215.84	6.5296	2.38	1.19
59	5.8	0.173	2.9438	218.37	6.533	2.4066	1.2033
60	5.9	0.17602	2.9951	221.1	6.5365	2.4355	1.2177
61	6.0001	0.17912	3.048	223.84	6.54	2.4643	1.2321
62	6.2501	0.18679	3.1785	230.36	6.5488	2.5327	1.2663
63	6.5001	0.19438	3.3075	236.78	6.5576	2.5998	1.2999
64	6.7501	0.20205	3.4381	242.83	6.5664	2.6626	1.3313
65	7.0001	0.20954	3.5655	248.57	6.5751	2.7219	1.361
66	7.2501	0.21703	3.693	254.2	6.5838	2.7799	1.3899
67	7.5001	0.22452	3.8205	259.67	6.5925	2.836	1.418
68	7.7501	0.23192	3.9463	264.25	6.6012	2.8822	1.4411
69	8.0001	0.2395	4.0754	269.62	6.6101	2.9368	1.4684
70	8.2501	0.24708	4.2044	274.72	6.619	2.9884	1.4942
71	8.5001	0.25466	4.3334	279.61	6.6279	3.0375	1.5187
72	8.7501	0.26215	4.4608	284.45	6.6367	3.086	1.543
73	9.0002	0.26992	4.5929	289.29	6.6459	3.1341	1.5671
74	9.2502	0.2775	4.7219	293.77	6.6549	3.1783	1.5891
75	9.5002	0.28499	4.8494	298.24	6.6638	3.2224	1.6112
76	9.7502	0.29266	4.98	302.5	6.673	3.2639	1.632
77	10	0.30042	5.1121	306.55	6.6823	3.303	1.6515
78	10.25	0.3081	5.2426	310.71	6.6915	3.3432	1.6716
79	10.5	0.31577	5.3732	314.76	6.7007	3.3822	1.6911
80	10.75	0.32372	5.5084	318.66	6.7103	3.4191	1.7095
81	11	0.33112	5.6343	322.5	6.7193	3.4557	1.7279

82	11.25	0.33861	5.7618	326.29	6.7284	3.4916	1.7458
83	11.5	0.34646	5.8954	330.13	6.7379	3.5277	1.7638
84	11.75	0.35404	6.0244	333.92	6.7472	3.5633	1.7816
85	12	0.36144	6.1503	337.28	6.7562	3.5944	1.7972
86	12.25	0.36902	6.2793	340.86	6.7655	3.6275	1.8138
87	12.5	0.37642	6.4052	344.02	6.7746	3.6562	1.8281
88	12.75	0.384	6.5342	347.33	6.784	3.6863	1.8432
89	13	0.3914	6.6601	350.65	6.7931	3.7165	1.8583
90	13.25	0.39898	6.7892	353.8	6.8025	3.7448	1.8724
91	13.5	0.40656	6.9182	356.86	6.8119	3.7719	1.8859
92	13.75	0.41415	7.0472	360.12	6.8214	3.8011	1.9005
93	14	0.42173	7.1762	363.22	6.8309	3.8285	1.9143
94	14.25	0.42922	7.3036	366.33	6.8403	3.8559	1.928
95	14.5	0.43671	7.4311	369.22	6.8497	3.8811	1.9405
96	14.75	0.44429	7.5601	371.85	6.8592	3.9033	1.9516
97	15	0.45187	7.6891	374.69	6.8688	3.9276	1.9638
98	15.25	0.45954	7.8196	377.38	6.8786	3.9501	1.9751
99	15.5	0.46731	7.9518	380.27	6.8884	3.9747	1.9874
100	15.75	0.47461	8.0761	383.05	6.8977	3.9985	1.9992
101	16	0.4821	8.2036	385.85	6.9073	4.022	2.011
102	16.25	0.48941	8.3279	388.53	6.9167	4.0445	2.0222
103	16.5	0.49681	8.4538	391.32	6.9262	4.0679	2.034
104	16.75	0.50421	8.5797	394.27	6.9357	4.0929	2.0464
105	17	0.51179	8.7087	397.27	6.9455	4.1182	2.0591
106	17.25	0.51928	8.8362	399.74	6.9553	4.1381	2.069
107	17.5	0.52686	8.9652	402.63	6.9651	4.1621	2.0811
108	17.75	0.53426	9.0911	404.95	6.9748	4.1803	2.0901
109	18	0.54166	9.217	407.69	6.9844	4.2027	2.1013
110	18.25	0.54924	9.346	410.26	6.9944	4.2233	2.1116
111	18.5	0.55682	9.475	412.79	7.0043	4.2432	2.1216
112	18.75	0.5645	9.6055	415.21	7.0145	4.2619	2.131
113	19	0.57208	9.7345	417.84	7.0245	4.2828	2.1414
114	19.25	0.57984	9.8667	420.47	7.0348	4.3035	2.1517
115	19.5	0.5876	9.9988	423.05	7.0451	4.3235	2.1618
116	19.75	0.59537	10.131	425.52	7.0555	4.3424	2.1712
117	20	0.60313	10.263	427.63	7.0658	4.3575	2.1787
118	20.25	0.61099	10.397	430.05	7.0764	4.3756	2.1878
119	20.5	0.61875	10.529	432.21	7.0868	4.3911	2.1955
120	20.75	0.62643	10.659	434.42	7.0972	4.4071	2.2035
121	21	0.63428	10.793	436.57	7.1078	4.4223	2.2112
122	21.25	0.64186	10.922	438.73	7.1181	4.4378	2.2189
123	21.5	0.64944	11.051	440.94	7.1284	4.4537	2.2268
124	21.75	0.65702	11.18	443.1	7.1388	4.469	2.2345
125	22	0.66451	11.307	445.36	7.1491	4.4853	2.2427
126	22.25	0.67219	11.438	447.57	7.1596	4.501	2.2505
127	22.5	0.67968	11.565	449.52	7.1699	4.514	2.257
128	22.75	0.68726	11.694	451.46	7.1804	4.527	2.2635
129	23	0.69466	11.82	453.36	7.1906	4.5395	2.2697
130	23.25	0.70233	11.951	455.15	7.2013	4.5506	2.2753
131	23.5	0.71	12.082	457.25	7.212	4.5649	2.2825
132	23.75	0.71768	12.212	459.36	7.2227	4.5791	2.2896
133	24	0.72544	12.344	460.99	7.2336	4.5885	2.2942
134	24.25	0.7333	12.478	462.78	7.2447	4.5992	2.2996
135	24.5	0.74106	12.61	464.86	7.2556	4.6132	2.3066
136	24.75	0.74892	12.744	466.78	7.2667	4.6249	2.3124
137	25	0.75677	12.877	468.51	7.2779	4.635	2.3175
138	25.25	0.76463	13.011	470.09	7.2891	4.6435	2.3217
139	25.5	0.77248	13.145	471.83	7.3003	4.6535	2.3267
140	25.75	0.78034	13.278	473.2	7.3115	4.6598	2.3299
141	26	0.7881	13.41	474.93	7.3227	4.6697	2.3349
142	26.25	0.79577	13.541	476.62	7.3337	4.6792	2.3396
143	26.5	0.80345	13.672	478.46	7.3448	4.6902	2.3451
144	26.751	0.81094	13.799	480.09	7.3557	4.6993	2.3496
145	27.001	0.81852	13.928	481.56	7.3667	4.7066	2.3533
146	27.251	0.8261	14.057	483.09	7.3778	4.7145	2.3572
147	27.501	0.83377	14.188	484.82	7.389	4.7242	2.3621
148	27.751	0.84163	14.321	486.4	7.4005	4.7322	2.3661
149	28.001	0.84921	14.45	487.35	7.4117	4.7343	2.3672
150	28.251	0.85716	14.585	488.51	7.4234	4.738	2.369
151	28.501	0.86483	14.716	489.56	7.4348	4.741	2.3705
152	28.751	0.8725	14.847	490.56	7.4462	4.7434	2.3717
153	29.001	0.88036	14.98	491.45	7.4579	4.7446	2.3723
154	29.251	0.8883	15.115	492.51	7.4698	4.7472	2.3736

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		DP21115S4			
Initial	Diameter, in	2.852			
	Height, in	6.0661			
	Water Content, %	17.06			
	Dry Density, pcf	114.7			
	Saturation, %	96.69			
	Void Ratio	0.47984			
Unconfined Compressive Strength, tsf		8.2257			
Undrained Shear Strength, tsf		4.1129			
Time to Failure, min		13.25			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		0			
Plastic Limit		0			
Plasticity Index		0			
Failure Sketch					

Project: DES PLAINES II
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP21115 S-4 Depth: 7.5 '- 9.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN CL SILT SEAMS NOTED, ROOT SYSTEM WITHIN SAMPLE
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:16:32

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21115 S-4
Sample No.: S-4
Test No.: DP21115S4

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 7.5'-9.5'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN CL SILT SEAMS NOTED, ROOT SYSTEM WITHIN SAMPLE
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.07 in
Specimen Area: 6.39 inA2
Specimen Volume: 38.75 inA3

Liquid Limit: 0
Plastic Limit: 0
Estimated Specific Gravity: 2.72

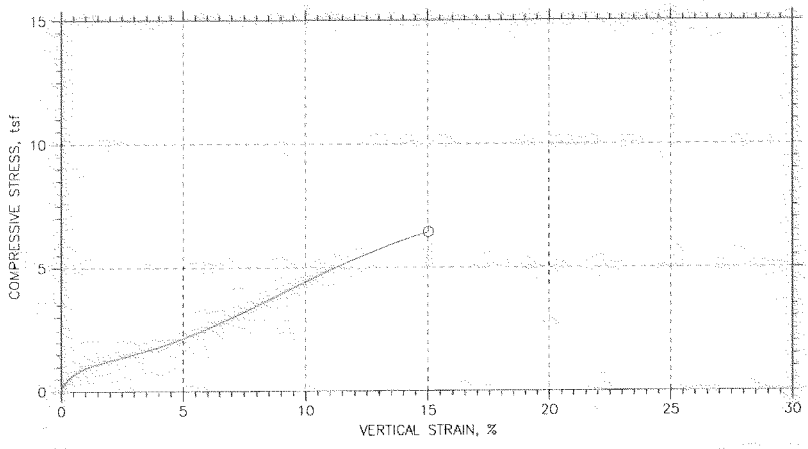
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3882	0	0
2	0.10412	0.0013701	0.022587	21.994	6.3897	0.24784	0.12392
3	0.20412	0.0039277	0.064748	34.307	6.3924	0.38642	0.19321
4	0.30412	0.006668	0.10992	42.41	6.3952	0.47747	0.23874
5	0.40412	0.0095909	0.15811	50.408	6.3983	0.56724	0.28362
6	0.50415	0.012514	0.20629	58.196	6.4014	0.65456	0.32728
7	0.60413	0.015437	0.25448	65.931	6.4045	0.7412	0.3706
8	0.70413	0.018451	0.30417	73.771	6.4077	0.82892	0.41446
9	0.80413	0.021374	0.35235	81.821	6.4108	0.91894	0.45947
10	0.90413	0.024297	0.40054	89.661	6.4139	1.0065	0.50325
11	1.0042	0.027311	0.45023	97.659	6.4171	1.0957	0.54787
12	1.1041	0.030326	0.49992	105.34	6.4203	1.1813	0.59067
13	1.2041	0.033431	0.55111	113.02	6.4236	1.2668	0.63342
14	1.3041	0.036446	0.6008	120.29	6.4268	1.3476	0.67378
15	1.4042	0.039186	0.64598	127.55	6.4297	1.4283	0.71413
16	1.5042	0.041835	0.68964	135.07	6.4326	1.5119	0.75593
17	1.6042	0.044758	0.73783	142.7	6.4357	1.5965	0.79824
18	1.7042	0.047681	0.78601	149.8	6.4388	1.6751	0.83757
19	1.8042	0.050421	0.83119	157.12	6.4418	1.7561	0.87806
20	1.9042	0.053253	0.87786	164.17	6.4448	1.8341	0.91703
21	2.0042	0.056084	0.92454	171.17	6.4478	1.9113	0.95567
22	2.1042	0.058916	0.97122	178.01	6.4509	1.9858	0.9934
23	2.2042	0.061747	1.0179	184.53	6.4539	2.0586	1.0293
24	2.3042	0.06467	1.0661	191.21	6.457	2.1322	1.0661
25	2.4042	0.067411	1.1113	197.84	6.46	2.2051	1.1025
26	2.5042	0.070334	1.1594	204.47	6.4631	2.2779	1.1389
27	2.6	0.073165	1.2061	210.53	6.4662	2.3442	1.1721
28	2.7	0.075905	1.2513	216.94	6.4692	2.4145	1.2073
29	2.8	0.078828	1.2995	223.36	6.4723	2.4848	1.2424
30	2.9	0.081751	1.3477	229.99	6.4755	2.5573	1.2786
31	3	0.084674	1.3959	236.52	6.4786	2.6285	1.3143
32	3.1	0.087597	1.444	242.89	6.4818	2.698	1.349
33	3.2	0.090429	1.4907	249.62	6.4849	2.7715	1.3857
34	3.3	0.093443	1.5404	256.36	6.4882	2.8448	1.4224
35	3.4	0.096275	1.5871	262.88	6.4912	2.9158	1.4579
36	3.5001	0.099106	1.6338	269.67	6.4943	2.9897	1.4949
37	3.6	0.10185	1.6789	276.61	6.4973	3.0653	1.5327
38	3.7	0.10477	1.7271	283.72	6.5005	3.1425	1.5712
39	3.8	0.10751	1.7723	290.56	6.5035	3.2168	1.6084
40	3.9	0.11034	1.819	297.24	6.5066	3.2892	1.6446
41	4.0001	0.11326	1.8672	304.34	6.5098	3.3661	1.6831
42	4.1	0.11619	1.9153	311.39	6.513	3.4424	1.7212
43	4.2	0.11902	1.962	318.34	6.5161	3.5175	1.7588
44	4.3	0.12185	2.0087	325.18	6.5192	3.5914	1.7957
45	4.4	0.12468	2.0554	332.23	6.5223	3.6675	1.8338
46	4.5001	0.12761	2.1036	339.33	6.5255	3.7441	1.8721
47	4.6	0.13044	2.1502	346.65	6.5286	3.823	1.9115
48	4.7	0.13336	2.1984	353.54	6.5318	3.8971	1.9485
49	4.8	0.13619	2.2451	360.65	6.5349	3.9735	1.9867
50	4.9001	0.13893	2.2903	367.75	6.5379	4.0499	2.0249
51	5.0001	0.14185	2.3385	375.22	6.5412	4.1301	2.0651
52	5.1001	0.14478	2.3866	382.32	6.5444	4.2062	2.1031
53	5.2001	0.14761	2.4333	389.32	6.5475	4.2812	2.1406
54	5.3001	0.15053	2.4815	396.58	6.5508	4.3589	2.1794
55	5.4001	0.15345	2.5297	404	6.554	4.4382	2.2191
56	5.5001	0.1562	2.5749	411.05	6.557	4.5136	2.2568
57	5.6001	0.15903	2.6215	418.16	6.5602	4.5894	2.2947
58	5.7001	0.16195	2.6697	425.31	6.5634	4.6656	2.3328
59	5.8001	0.16478	2.7164	432.73	6.5666	4.7447	2.3724
60	5.9001	0.16761	2.7631	439.84	6.5697	4.8203	2.4102
61	6.0001	0.17054	2.8113	446.68	6.573	4.8928	2.4464
62	6.2501	0.17775	2.9302	464.36	6.5811	5.0803	2.5401
63	6.5001	0.18506	3.0507	481.67	6.5892	5.2631	2.6316
64	6.7501	0.19228	3.1696	498.72	6.5973	5.4427	2.7214
65	7.0001	0.19958	3.2901	515.29	6.6055	5.6166	2.8083
66	7.2501	0.20698	3.4121	531.55	6.6139	5.7865	2.8933
67	7.5001	0.2142	3.531	547.28	6.622	5.9505	2.9752
68	7.7501	0.2215	3.6515	562.65	6.6303	6.1099	3.0549
69	8.0001	0.22872	3.7705	576.96	6.6385	6.2576	3.1288
70	8.2502	0.23621	3.8939	591.27	6.647	6.4046	3.2023
71	8.5002	0.24361	4.0159	604.74	6.6555	6.5422	3.2711
72	8.7502	0.25101	4.1379	617.63	6.664	6.6731	3.3366
73	9.0002	0.25841	4.2598	630.26	6.6724	6.8009	3.4005
74	9.2502	0.26581	4.3818	642.68	6.681	6.9261	3.463
75	9.5002	0.27339	4.5068	654.68	6.6897	7.0462	3.5231
76	9.7502	0.28097	4.6318	666.2	6.6985	7.1608	3.5804
77	10	0.28855	4.7567	677.3	6.7073	7.2706	3.6353
78	10.25	0.29622	4.8832	688.04	6.7162	7.376	3.688
79	10.5	0.3038	5.0082	698.3	6.725	7.4762	3.7381
80	10.75	0.31139	5.1332	708.35	6.7339	7.5738	3.7869
81	11	0.31897	5.2582	717.87	6.7428	7.6655	3.8328

82	11.25	0.32664	5.3846	727.03	6.7518	7.7529	3.8765
83	11.5	0.33422	5.5096	735.66	6.7607	7.8346	3.9173
84	11.75	0.3418	5.6346	743.97	6.7697	7.9126	3.9563
85	12	0.34938	5.7596	751.76	6.7786	7.9849	3.9924
86	12.25	0.35697	5.8846	758.86	6.7876	8.0496	4.0248
87	12.5	0.36446	6.008	765.7	6.7966	8.1115	4.0558
88	12.75	0.37195	6.1315	771.91	6.8055	8.1666	4.0833
89	13	0.37962	6.258	776.96	6.8147	8.2089	4.1045
90	13.25	0.3872	6.383	779.59	6.8238	8.2257	4.1129
91	13.5	0.39478	6.5079	778.12	6.8329	8.1992	4.0996
92	13.75	0.40264	6.6374	768.17	6.8424	8.0832	4.0416
93	14	0.41067	6.7699	751.97	6.8521	7.9015	3.9507
94	14.25	0.41862	6.901	738.23	6.8617	7.7463	3.8731
95	14.5	0.42684	7.0365	720.29	6.8717	7.547	3.7735
96	14.75	0.43497	7.1705	690.14	6.8817	7.2207	3.6103
97	15	0.4431	7.3045	660.57	6.8916	6.9013	3.4506
98	15.25	0.45141	7.4415	625.74	6.9018	6.5277	3.2639
99	15.5	0.45945	7.574	598.22	6.9117	6.2317	3.1158
100	15.75	0.46749	7.7065	589.64	6.9216	6.1335	3.0668
101	16	0.47553	7.839	580.43	6.9316	6.0291	3.0145
102	16.25	0.48366	7.9731	573.85	6.9417	5.9521	2.976
103	16.5	0.49133	8.0995	569.07	6.9512	5.8943	2.9472
104	16.75	0.49937	8.2321	562.49	6.9613	5.8178	2.9089
105	17	0.5075	8.3661	557.07	6.9714	5.7533	2.8767
106	17.25	0.51517	8.4926	555.86	6.9811	5.7329	2.8664
107	17.5	0.52284	8.619	557.54	6.9907	5.7423	2.8712
108	17.75	0.53052	8.7455	559.96	7.0004	5.7593	2.8796
109	18	0.5381	8.8705	562.54	7.01	5.7779	2.8889
110	18.25	0.54559	8.994	563.17	7.0195	5.7765	2.8883
111	18.5	0.55335	9.122	562.75	7.0294	5.7641	2.882
112	18.75	0.56121	9.2515	559.28	7.0395	5.7203	2.8602
113	19	0.56897	9.3795	553.86	7.0494	5.6569	2.8285
114	19.25	0.57692	9.5105	543.6	7.0596	5.5441	2.772
115	19.5	0.58505	9.6445	525.87	7.0701	5.3553	2.6776
116	19.75	0.59345	9.783	491.51	7.0809	4.9977	2.4989
117	20	0.60258	9.9336	426.15	7.0928	4.326	2.163
118	20.25	0.61245	10.096	348.96	7.1056	3.536	1.768
119	20.5	0.62231	10.259	283.4	7.1185	2.8665	1.4332
120	20.75	0.63191	10.417	207	7.131	2.09	1.045
121	21	0.64131	10.572	149.01	7.1434	1.502	0.75098
122	21.25	0.6499	10.714	117.55	7.1547	1.1829	0.59146
123	21.5	0.65821	10.851	99.08	7.1657	0.99554	0.49777
124	21.75	0.66652	10.988	85.557	7.1768	0.85834	0.42917
125	22	0.67447	11.119	78.401	7.1873	0.78539	0.3927
126	22.25	0.68214	11.245	76.823	7.1976	0.76848	0.38424
127	22.5	0.68945	11.366	76.665	7.2074	0.76586	0.38293
128	22.75	0.69658	11.483	77.612	7.2169	0.7743	0.38715
129	23	0.70379	11.602	77.244	7.2266	0.76959	0.38479
130	23.25	0.71128	11.725	77.349	7.2368	0.76956	0.38478
131	23.5	0.71868	11.847	78.085	7.2468	0.77581	0.38791
132	23.75	0.72617	11.971	79.453	7.2569	0.7883	0.39415
133	24	0.73357	12.093	80.716	7.267	0.79972	0.39986
134	24.25	0.74115	12.218	82.137	7.2773	0.81264	0.40632
135	24.5	0.74882	12.344	84.189	7.2878	0.83174	0.41587
136	24.75	0.75641	12.469	86.294	7.2983	0.85132	0.42566
137	25	0.76417	12.597	88.293	7.3089	0.86977	0.43489
138	25.25	0.77184	12.724	90.082	7.3195	0.88611	0.44306
139	25.5	0.77942	12.849	91.714	7.33	0.90087	0.45043
140	25.75	0.78728	12.978	92.871	7.3409	0.91088	0.45544
141	26	0.79495	13.105	93.766	7.3516	0.91832	0.45916
142	26.251	0.80262	13.231	93.923	7.3623	0.91852	0.45926
143	26.501	0.81039	13.359	94.187	7.3732	0.91974	0.45987
144	26.751	0.81797	13.484	94.976	7.3839	0.92611	0.46305
145	27.001	0.82573	13.612	94.976	7.3948	0.92474	0.46237
146	27.251	0.83332	13.737	94.45	7.4055	0.91828	0.45914
147	27.501	0.84117	13.867	94.081	7.4167	0.91333	0.45667
148	27.751	0.84884	13.993	93.923	7.4276	0.91046	0.45523
149	28.001	0.85661	14.121	93.134	7.4386	0.90146	0.45073
150	28.251	0.86446	14.251	92.24	7.4499	0.89146	0.44573
151	28.501	0.87223	14.379	90.714	7.461	0.8754	0.4377
152	28.751	0.88017	14.51	90.03	7.4724	0.86747	0.43374
153	29.001	0.88812	14.641	88.977	7.4839	0.85602	0.42801
154	29.251	0.89588	14.769	89.24	7.4951	0.85726	0.42863
155	29.501	0.90374	14.898	89.556	7.5065	0.85899	0.42949
156	29.751	0.91141	15.025	91.819	7.5177	0.87938	0.43969

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21152S8			
Initial	Diameter, in	2.7232			
	Height, in	5.9213			
	Water Content, %	15.08			
	Dry Density, pcf	120.8			
	Saturation, %	101.17			
	Void Ratio	0.40535			
Unconfined Compressive Strength, tsf		6.4393			
Undrained Shear Strength, tsf		3.2197			
Time to Failure, min		29.251			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.72			
Liquid Limit		0			
Plastic Limit		0			
Plasticity Index		0			
Failure Sketch					

Project: DES PLAINES II

Location: DES PLAINES, IL

Project No.: 60223274

Boring No.: DP21115 S-8 Depth: 20.0'-22.0'

Sample Type: 3" ST

Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY CL

Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 17-NOV-2011 14:12:36

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II
Boring No.: DP21115 S-8
Sample No.: S-8
Test No.: DP21152S8

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 11/8/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 20.0'-22.0'
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.92 in
Specimen Area: 5.82 inA2
Specimen Volume: 34.49 inA3

Liquid Limit: 0
Plastic Limit: 0
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	5.8245	0	0
2	0.10005	0.0013701	0.023139	12.576	5.8258	0.15542	0.07771
3	0.20005	0.0042017	0.07096	20.574	5.8286	0.25414	0.12707
4	0.30005	0.0071247	0.12032	26.046	5.8315	0.32158	0.16079
5	0.40005	0.010048	0.16969	30.94	5.8344	0.38181	0.19091
6	0.50008	0.013062	0.22059	35.412	5.8374	0.43678	0.21839
7	0.60007	0.016076	0.2715	39.622	5.8403	0.48846	0.24423
8	0.70007	0.019091	0.32241	43.673	5.8433	0.53813	0.26906
9	0.80007	0.022013	0.37177	47.304	5.8462	0.58258	0.29129
10	0.90007	0.025028	0.42268	50.882	5.8492	0.62632	0.31316
11	1.0001	0.028133	0.47513	54.039	5.8523	0.66483	0.33242
12	1.1001	0.031148	0.52603	56.986	5.8553	0.70073	0.35036
13	1.2001	0.034162	0.57694	59.88	5.8583	0.73594	0.36797
14	1.3001	0.037176	0.62784	62.721	5.8613	0.77046	0.38523
15	1.4001	0.040099	0.67721	65.194	5.8642	0.80044	0.40022
16	1.5001	0.043114	0.72811	67.457	5.8672	0.8278	0.4139
17	1.6001	0.046128	0.77902	69.456	5.8702	0.8519	0.42595
18	1.7001	0.049233	0.83147	71.666	5.8733	0.87854	0.43927
19	1.8001	0.052248	0.88238	73.718	5.8763	0.90323	0.45162
20	1.9001	0.055262	0.93328	75.402	5.8794	0.92339	0.46169
21	2.0001	0.058368	0.98573	77.033	5.8825	0.94286	0.47143
22	2.1001	0.061382	1.0366	78.717	5.8855	0.96298	0.48149
23	2.2001	0.064305	1.086	80.401	5.8884	0.98309	0.49154
24	2.3001	0.067411	1.1384	81.716	5.8916	0.99864	0.49932
25	2.4001	0.070425	1.1894	83.242	5.8946	1.0168	0.50838
26	2.5001	0.073439	1.2403	84.557	5.8976	1.0323	0.51615
27	2.6001	0.076545	1.2927	86.083	5.9008	1.0504	0.52519
28	2.7001	0.079559	1.3436	87.451	5.9038	1.0665	0.53326
29	2.8001	0.082573	1.3945	88.714	5.9069	1.0814	0.54068
30	2.9001	0.085588	1.4454	89.977	5.9099	1.0962	0.54809
31	3.0001	0.088693	1.4979	91.345	5.9131	1.1123	0.55613
32	3.1001	0.091799	1.5503	92.45	5.9162	1.1251	0.56256
33	3.2001	0.094813	1.6012	93.766	5.9193	1.1405	0.57027
34	3.3001	0.097828	1.6521	94.923	5.9223	1.154	0.57701
35	3.4001	0.10084	1.703	96.344	5.9254	1.1707	0.58534
36	3.5002	0.10395	1.7555	97.554	5.9286	1.1848	0.59238
37	3.6001	0.10705	1.8079	98.501	5.9317	1.1956	0.59781
38	3.7001	0.11007	1.8589	99.764	5.9348	1.2103	0.60516
39	3.8001	0.11317	1.9113	101.03	5.938	1.225	0.61249
40	3.9001	0.11628	1.9637	102.29	5.9412	1.2396	0.61982
41	4.0002	0.11929	2.0147	103.39	5.9442	1.2524	0.62619
42	4.1001	0.1224	2.0671	104.6	5.9474	1.2664	0.63318
43	4.2001	0.12541	2.118	105.76	5.9505	1.2797	0.63985
44	4.3001	0.12852	2.1705	107.08	5.9537	1.2949	0.64746
45	4.4001	0.13162	2.2229	108.18	5.9569	1.3076	0.65379
46	4.5002	0.13464	2.2738	109.29	5.96	1.3203	0.66013
47	4.6001	0.13765	2.3247	110.5	5.9631	1.3342	0.66709
48	4.7001	0.14076	2.3772	111.87	5.9663	1.35	0.67499
49	4.8001	0.14377	2.4281	112.97	5.9694	1.3626	0.6813
50	4.9001	0.14697	2.4821	114.13	5.9727	1.3758	0.6879
51	5.0002	0.14998	2.533	115.29	5.9759	1.389	0.69451
52	5.1002	0.153	2.5839	116.6	5.979	1.4041	0.70207
53	5.2002	0.1561	2.6363	117.71	5.9822	1.4167	0.70834
54	5.3002	0.15912	2.6872	118.92	5.9853	1.4305	0.71525
55	5.4002	0.16213	2.7381	120.13	5.9885	1.4443	0.72215
56	5.5002	0.16533	2.7921	121.55	5.9918	1.4606	0.73029
57	5.6002	0.16834	2.843	122.6	5.9949	1.4724	0.73622
58	5.7002	0.17136	2.8939	123.81	5.9981	1.4862	0.7431
59	5.8002	0.17446	2.9464	125.02	6.0013	1.4999	0.74996
60	5.9002	0.17748	2.9973	126.39	6.0045	1.5155	0.75777
61	6.0002	0.18049	3.0482	127.55	6.0076	1.5286	0.76431
62	6.2502	0.18807	3.1762	130.7	6.0156	1.5644	0.78219
63	6.5002	0.19556	3.3027	133.81	6.0234	1.5995	0.79973
64	6.7502	0.20305	3.4292	137.12	6.0313	1.6369	0.81847
65	7.0002	0.21064	3.5573	140.44	6.0393	1.6743	0.83714
66	7.2502	0.21822	3.6853	143.7	6.0474	1.7109	0.85545
67	7.5002	0.2258	3.8133	147.12	6.0554	1.7493	0.87465
68	7.7502	0.23338	3.9414	150.65	6.0635	1.7888	0.89441
69	8.0002	0.24096	4.0694	154.22	6.0716	1.8289	0.91444
70	8.2502	0.24854	4.1975	157.8	6.0797	1.8688	0.9344
71	8.5003	0.25612	4.3255	161.59	6.0878	1.9111	0.95556
72	8.7503	0.2638	4.4551	165.43	6.0961	1.9539	0.97695
73	9.0003	0.27147	4.5847	169.22	6.1044	1.9959	0.99796
74	9.2503	0.27914	4.7142	173.06	6.1127	2.0385	1.0192
75	9.5003	0.28681	4.8438	177.11	6.121	2.0833	1.0417
76	9.7503	0.2944	4.9718	181.11	6.1292	2.1275	1.0638
77	10	0.30216	5.103	185.37	6.1377	2.1746	1.0873
78	10.25	0.30965	5.2295	189.79	6.1459	2.2235	1.1117
79	10.5	0.31714	5.356	194.27	6.1541	2.2728	1.1364
80	10.75	0.32472	5.484	198.84	6.1624	2.3232	1.1616
81	11	0.33221	5.6105	203.32	6.1707	2.3723	1.1862

82	11.25	0.3397	5.737	208	6.179	2.4237	1.2118
83	11.5	0.3471	5.8619	212.68	6.1872	2.475	1.2375
84	11.75	0.35486	5.9931	217.63	6.1958	2.529	1.2645
85	12	0.36217	6.1165	222.63	6.204	2.5837	1.2919
86	12.25	0.36966	6.243	227.57	6.2123	2.6375	1.3188
87	12.5	0.37733	6.3725	232.78	6.2209	2.6942	1.3471
88	12.75	0.38492	6.5006	237.94	6.2294	2.7501	1.3751
89	13	0.3925	6.6286	243.2	6.238	2.8071	1.4035
90	13.25	0.40017	6.7582	248.67	6.2467	2.8663	1.4331
91	13.5	0.40766	6.8847	253.94	6.2551	2.9229	1.4615
92	13.75	0.41524	7.0127	259.51	6.2638	2.983	1.4915
93	14	0.42291	7.1423	264.93	6.2725	3.0411	1.5205
94	14.25	0.43068	7.2734	270.51	6.2814	3.1007	1.5504
95	14.5	0.43826	7.4015	276.25	6.29	3.1621	1.581
96	14.75	0.44584	7.5295	281.88	6.2988	3.2221	1.611
97	15	0.45351	7.6591	287.82	6.3076	3.2854	1.6427
98	15.25	0.4611	7.7871	293.71	6.3164	3.348	1.674
99	15.5	0.46859	7.9136	299.66	6.325	3.4111	1.7056
100	15.75	0.47617	8.0417	305.76	6.3338	3.4758	1.7379
101	16	0.48375	8.1697	311.76	6.3427	3.539	1.7695
102	16.25	0.49133	8.2977	317.66	6.3515	3.6009	1.8005
103	16.5	0.49919	8.4304	323.5	6.3607	3.6618	1.8309
104	16.75	0.50658	8.5553	329.55	6.3694	3.7252	1.8626
105	17	0.51417	8.6834	335.7	6.3783	3.7895	1.8947
106	17.25	0.52166	8.8099	341.7	6.3872	3.8519	1.9259
107	17.5	0.52915	8.9364	347.91	6.3961	3.9164	1.9582
108	17.75	0.53682	9.0659	354.12	6.4052	3.9806	1.9903
109	18	0.54449	9.1955	360.28	6.4143	4.0441	2.022
110	18.25	0.55226	9.3266	366.49	6.4236	4.1078	2.0539
111	18.5	0.55993	9.4562	372.64	6.4328	4.1709	2.0854
112	18.75	0.5676	9.5858	378.69	6.442	4.2325	2.1163
113	19	0.57536	9.7169	384.8	6.4514	4.2945	2.1472
114	19.25	0.58304	9.8465	390.48	6.4606	4.3517	2.1758
115	19.5	0.59062	9.9745	396.79	6.4698	4.4158	2.2079
116	19.75	0.59829	10.104	402.79	6.4792	4.4761	2.238
117	20	0.60578	10.231	408.84	6.4883	4.5369	2.2685
118	20.25	0.61345	10.36	415	6.4977	4.5986	2.2993
119	20.5	0.62085	10.485	421.21	6.5067	4.6609	2.3304
120	20.75	0.62834	10.612	427.37	6.5159	4.7223	2.3612
121	21	0.63574	10.737	433.63	6.5251	4.7848	2.3924
122	21.25	0.64332	10.865	439.41	6.5344	4.8417	2.4209
123	21.5	0.65072	10.99	445.2	6.5436	4.8986	2.4493
124	21.751	0.6583	11.118	451.15	6.553	4.9569	2.4784
125	22.001	0.66579	11.244	456.83	6.5624	5.0122	2.5061
126	22.251	0.67337	11.372	462.83	6.5719	5.0707	2.5353
127	22.501	0.68105	11.502	468.57	6.5815	5.126	2.563
128	22.751	0.68872	11.631	474.67	6.5911	5.1852	2.5926
129	23.001	0.69648	11.762	480.67	6.6009	5.2429	2.6215
130	23.251	0.70416	11.892	486.4	6.6106	5.2977	2.6488
131	23.501	0.71192	12.023	492.3	6.6205	5.3539	2.6769
132	23.751	0.71969	12.154	498.14	6.6304	5.4093	2.7047
133	24.001	0.72727	12.282	503.35	6.64	5.4579	2.729
134	24.251	0.73512	12.415	509.13	6.6501	5.5123	2.7562
135	24.501	0.7428	12.545	514.55	6.66	5.5628	2.7814
136	24.751	0.75047	12.674	519.97	6.6698	5.613	2.8065
137	25.001	0.75805	12.802	525.66	6.6796	5.6661	2.833
138	25.251	0.76563	12.93	530.92	6.6895	5.7144	2.8572
139	25.501	0.77321	13.058	536.23	6.6993	5.7631	2.8815
140	25.751	0.78061	13.183	541.81	6.7089	5.8147	2.9073
141	26.001	0.78819	13.311	547.33	6.7189	5.8653	2.9326
142	26.251	0.79568	13.438	553.07	6.7287	5.9181	2.9591
143	26.501	0.80335	13.567	558.44	6.7388	5.9666	2.9833
144	26.751	0.81094	13.695	563.33	6.7488	6.01	3.005
145	27.001	0.8187	13.826	568.54	6.759	6.0563	3.0282
146	27.251	0.82628	13.954	573.49	6.7691	6.0999	3.05
147	27.501	0.83405	14.086	578.33	6.7794	6.1421	3.071
148	27.751	0.84172	14.215	583.43	6.7897	6.1869	3.0935
149	28.001	0.84948	14.346	588.38	6.8	6.2298	3.1149
150	28.251	0.85725	14.477	593.59	6.8105	6.2754	3.1377
151	28.501	0.8651	14.61	598.58	6.8211	6.3184	3.1592
152	28.751	0.87305	14.744	603.48	6.8318	6.36	3.18
153	29.001	0.88072	14.874	608.32	6.8422	6.4013	3.2007
154	29.251	0.88867	15.008	612.9	6.853	6.4393	3.2197

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ATTACHMENT

G.4: Research Data

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G.4.1: Illinois State Water Survey Data

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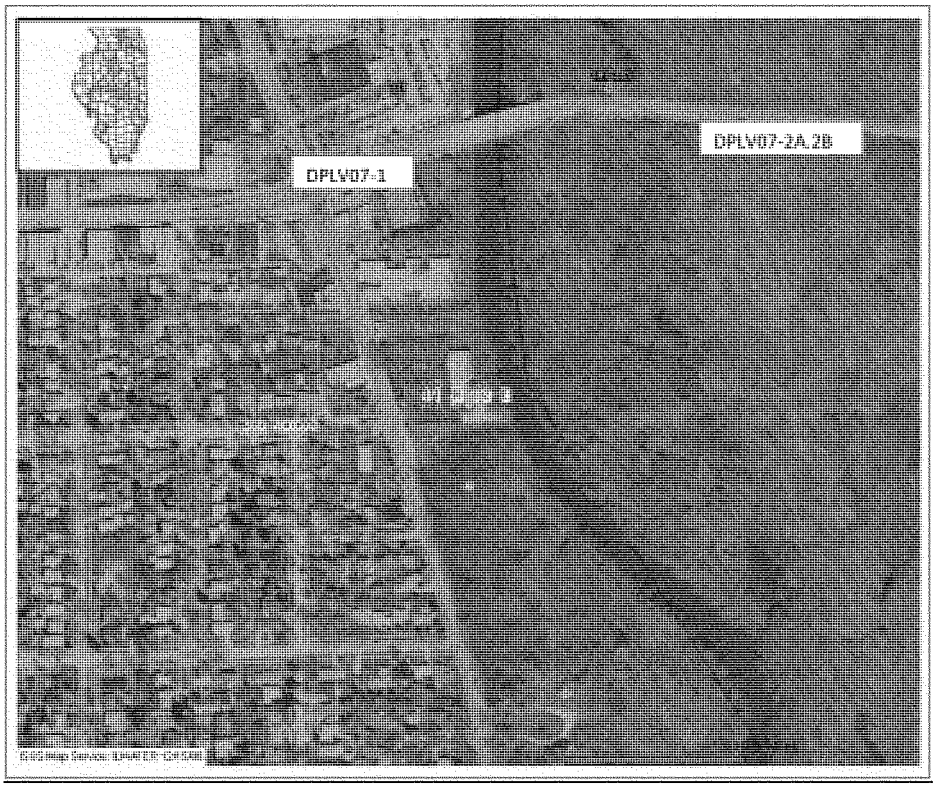
Illinois State Water Survey – Well Database Search Results

SITE NAME: OAKTON-EVERETT LEVEE (DPLV07)

COUNTY: Cook **CITY:** Des Plaines

TOWNSHIP: 41N **RANGE:** 12E **SECTION:** 28,21

AREA PLAN WITH WELL LOCATIONS:



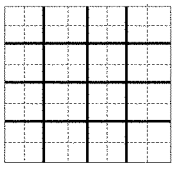
NOTE: Refer to attached sheets for logs available for each location.

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DPLV07-1

Engineering Test	Top	Bottom
Total Depth		331
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED March 1, 1976 **NO.**
ELEVATION 635GL **COUNTY NO.** 26744
LOCATION SE SE SW
LATITUDE 42.025292 **LONGITUDE** -87.876097
COUNTY Cook **API** 120312674400 **21 - 41N - 12E**



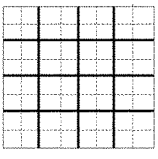
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DPLV07-2A

Engineering Test	Top	Bottom
Total Depth		191
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED May 1, 1976 **NO.**
ELEVATION 635GL **COUNTY NO.** 26742
LOCATION SW SW SE
LATITUDE 42.025352 **LONGITUDE** -87.873586
COUNTY Cook **API** 120312674200 **21 - 41N - 12E**



Page 1

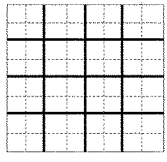
ILLINOIS STATE GEOLOGICAL SURVEY

DPLV07-2B

Engineering Test	Top	Bottom
Total Depth		220
Driller's Log filed		

Permit Date: Permit #:

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED May 1, 1976 NO.
ELEVATION 633GL COUNTY NO. 26746
LOCATION SW SW SE
LATITUDE 42.025352 LONGITUDE -87.873586
COUNTY Cook API 120312674600 21 - 41N - 12E



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G.4.2: Illinois Department of Transportation

(NOTE: DATA PROVIDED ON CD-ROM ONLY)

AECOM

G.4.3: Proposed Floodwall Figure

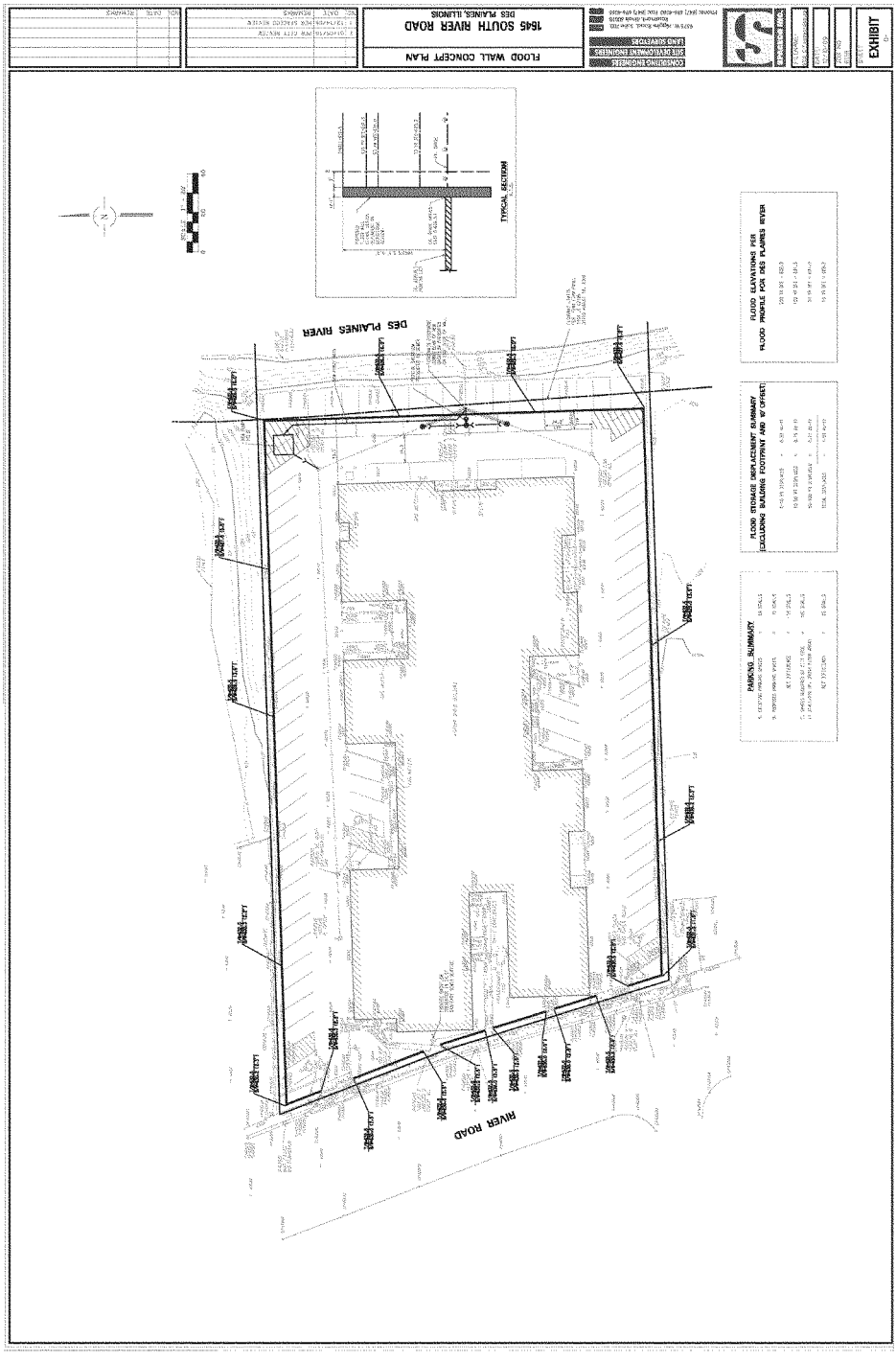
EXHIBIT
FLOOD WALL CONCEPT PLAN
1845 SOUTH RIVER ROAD
DES PLAINES, ILLINOIS
CONCEPTUAL ENGINEERING
NOT FOR CONSTRUCTION
LAND SURVEYORS
TYPICAL SECTION
DES PLAINES RIVER
RIVER ROAD
FLOOD ELEVATIONS PER
FLOOD PROFILE FOR DES PLAINES RIVER
FLOOD STORAGE DISPLACEMENT SUMMARY
EXCLUDING BUILDING FOOTPRINT AND 10' OFFSET
PARKING SUMMARY

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ATTACHMENT

G.5: Site Reconnaissance Photographs

Oakton-Everettte Levee

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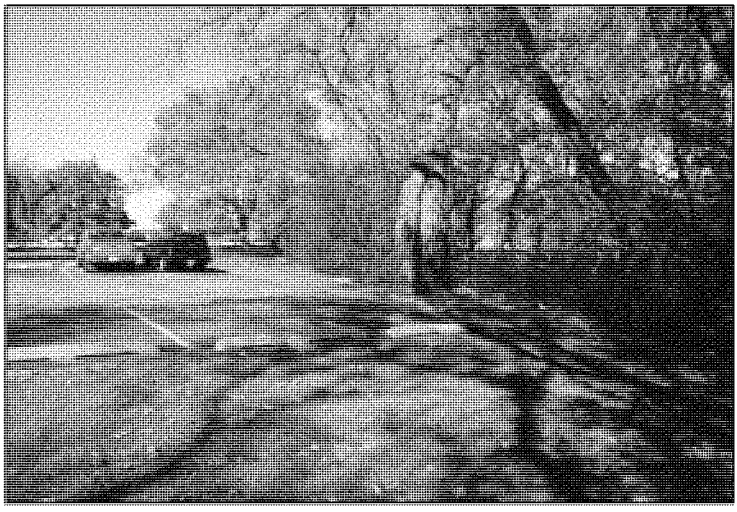
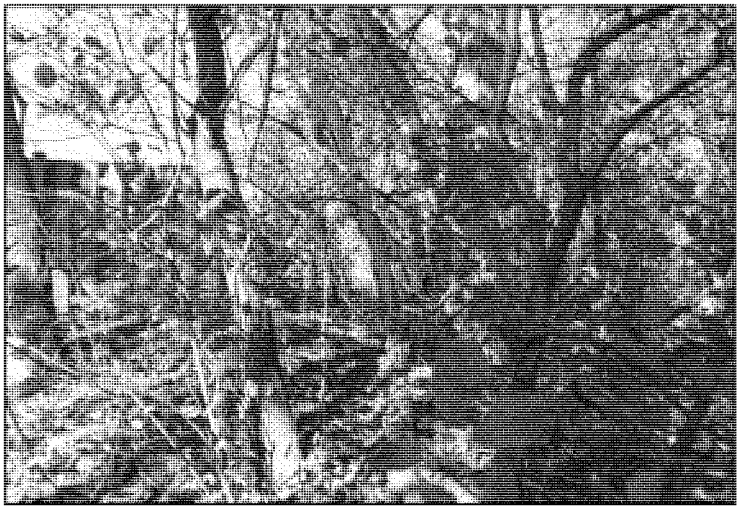


Photograph #1

Looking North at Property Immediately North of Boring DP2-11-14

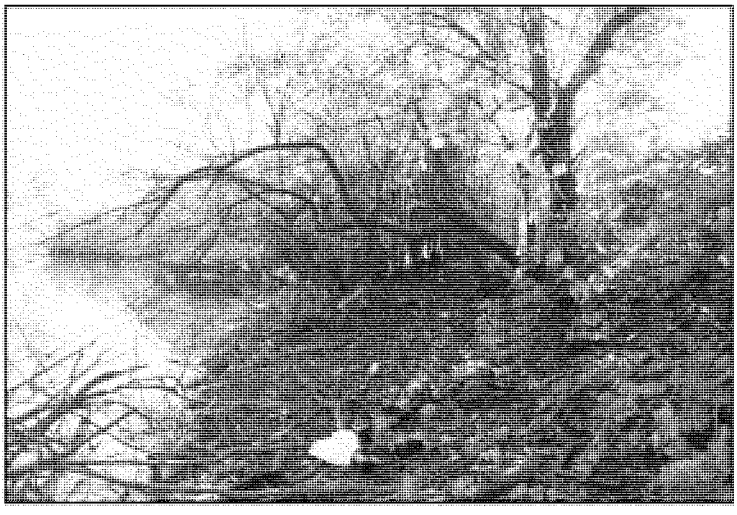


Photograph #2

Looking at Northern Edge of Property at 1645 River Road

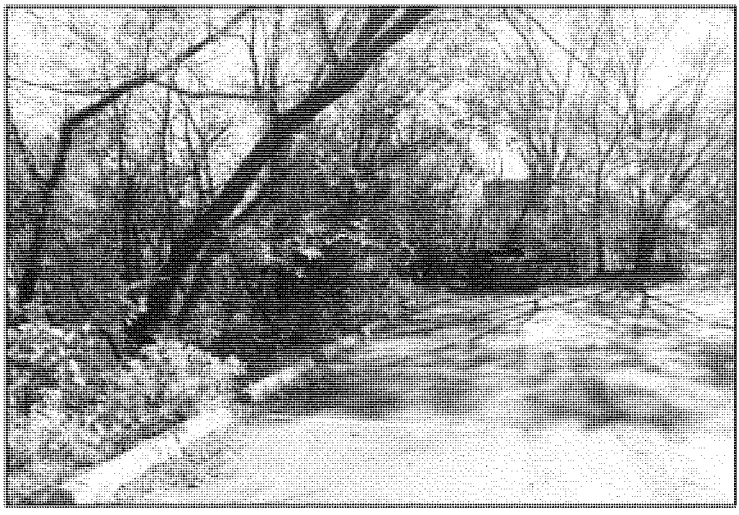
Photograph #3

Looking North Along West Bank from DP2-11-14



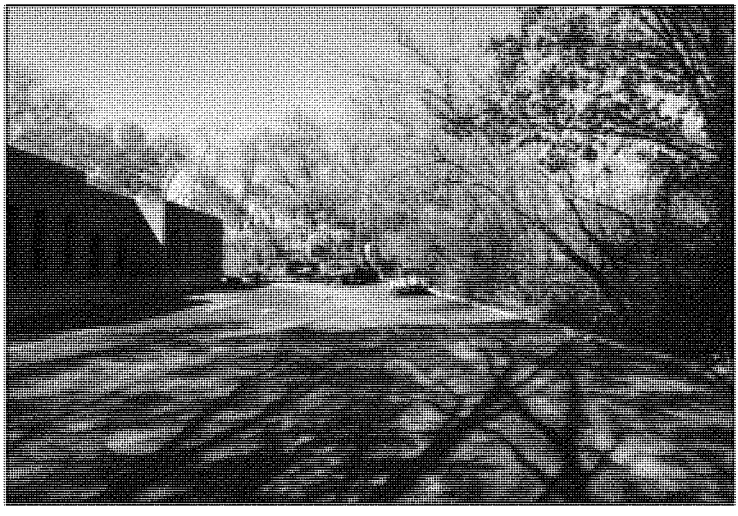
Photograph #4

Looking South Along West Bank from DP2-11-14



Photograph #5

Looking at South and West Edges of Property at 1645 River Road



Photograph #6

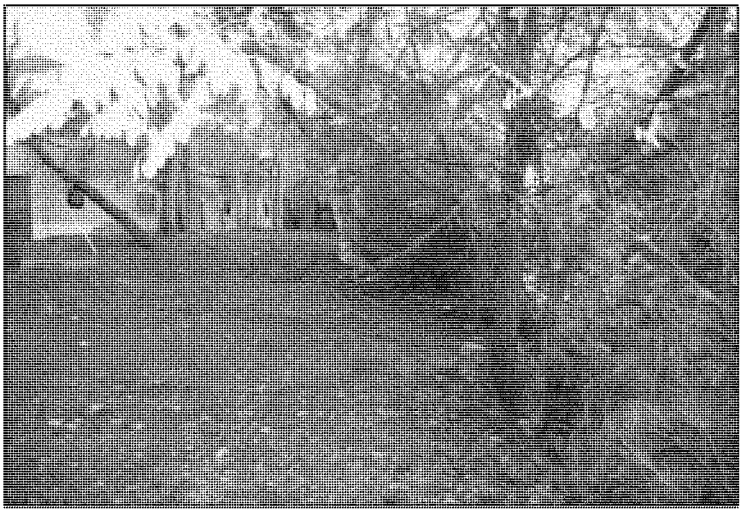
Looking at North and West Edges of Property at 1645 River Road

Photograph #7

Looking South Along West Bank from Southern Property Line at 1645 River Road

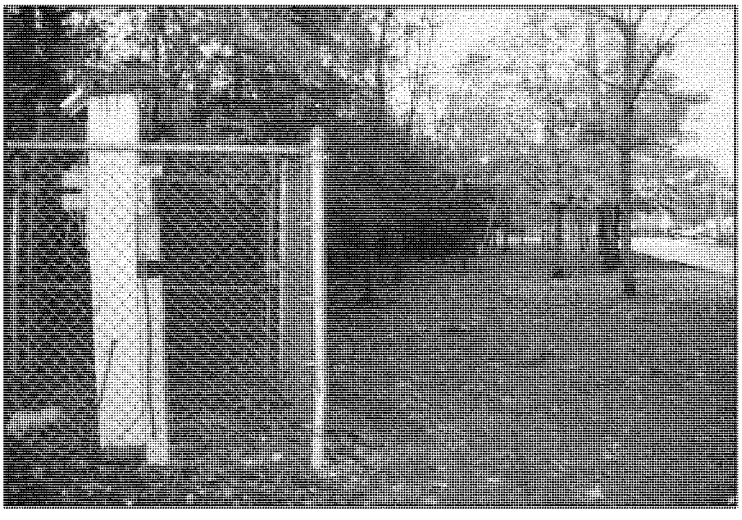
Photograph #8

Looking South from Northeast End of Property Immediately South of 1645 River Road



Photograph #9

Looking North from Southeast End of Property Immediately South of 1645 River Road



Photograph #10

Looking West from Southeast End of Property Immediately South of 1645 River Road

Photograph #11

Drop Shaft for Deep Tunnel Located on District of Cook County Property where DP2-11-15 was Advanced

Photograph #12

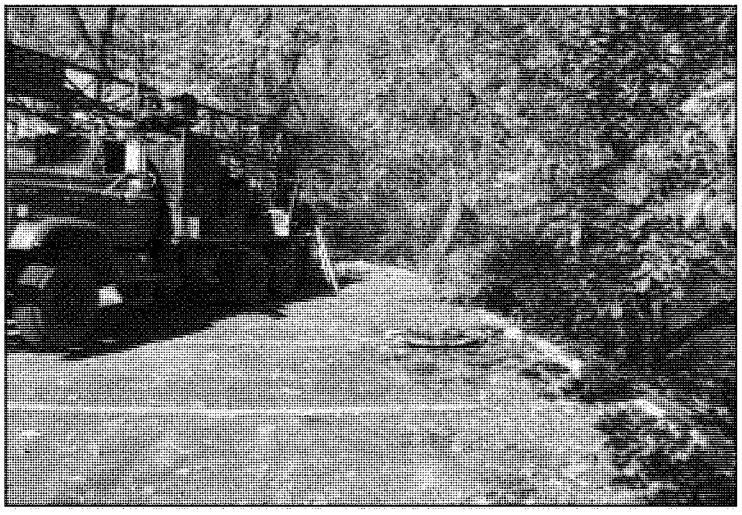
Treeline on District of Cook County Property where DP2-11-15 was Advanced

Photograph #13

Wooded Area Composing Eastern Portion of District of Cook County Property

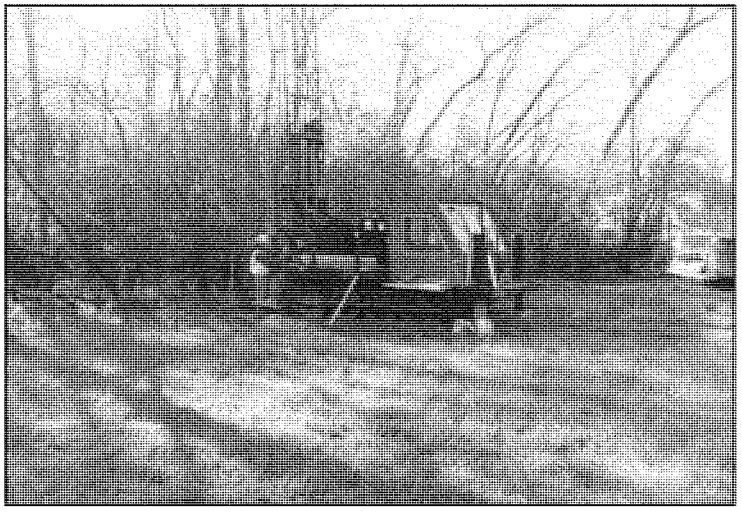
Photograph #14

Eastern Propoerty Line of District of Cook County Property



Photograph #15

Mobile B-61 Truck-mounted Rig used for DP2-11-14



Photograph #16

Diedrich D-50 ATV-mounted Rig used for DP2-11-15

APPENDIX H

Silver Creek Reservoir Data Compilation

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APPENDIX H

Silver Creek Reservoir Data Compilation

1. **Type of Project:** Reservoir
2. **USACE Description:** The Silver Creek Reservoir (SCME02) is along the south side of Irving Park Road and west of Manheim Road in Franklin Park, Illinois. The lot is an existing reservoir that may be deepened as part of Des Plaines II.

3. **Description of Research Results**

AECOM investigated the following resources for potential information with the results as follows:

- Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified three nearby water well logs. The information from the website is included in Attachment H.4.1. At the request of USACE, AECOM interpreted the reported findings on the two detailed well logs from the set and created a gINT boring log with estimated USCS symbols. The boring logs are included in Attachment H.2 and the boring locations are also shown on Figure H.1. The website also contained some geophysical data for the site which has been included on the AECOM CD-ROM prepared for this report.
- Landowner: No landowner provided information was available for this site.
- Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
- Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
- Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment H.5.

4. **Subsurface Explorations**

AECOM performed two soil borings at the project site as discussed below.

a. Boring Locations*

Boring**	Coordinates***		Surface Elevation (ft)	Boring Depth (ft)	Date Drilled	Borehole Status
	Northing (ft)	Easting (ft)				
DP2-11-16	1924650.4	1102016.3	621.18	27	12/20/11	Backfilled with
DP2-11-17	1924392.1	1101700.4	622.29	24	12/20/11	

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						bentonite chips

*: All surveying information based on survey completed by AECOM.
**: All soil borings performed by Strata Earth Services, LLC
***: Based on NAD 83, Illinois State Plane Central

b. Subsurface Conditions

The generalized subsurface profile based on the soil boring completed by Strata at the Oakton-Everett Levee site is as follows:

- *Topsoil:* Topsoil was found at the ground surface at both of the borings and extended to depths of 1.8 feet and 1.3 feet at borings DP2-11-16 and DP2-11-17, respectively.
- *Silty sand:* A thin layer of silty fine sand (USCS: SM) was observed between 1.8 and 2.5 feet deep in boring DP2-11-16. The soil was dense with an SPT-N value of 32 blows per foot (bpf).
- *Silt:* A layer of silt with trace to little clay and trace to some fine sand (USCS: ML) was encountered to a depth of 16 feet in boring DP2-11-16 and to 15.5 feet in boring DP2-11-17. The soil ranged from very dense to medium dense in boring DP2-11-16 with SPT-N values ranging from 74 to 10 blows per foot, with density generally decreasing with depth. The soil ranged from dense to loose with SPT-N values ranging from 47 to 9 bpf, with density generally decreasing with depth.
- *Sandy Gravel:* A layer of sandy fine to coarse gravel with trace amounts of silt (USCS: GP) was encountered between 15.5 and 19 feet below the ground surface in boring DP2-11-17. The stratum was dense with an SPT-N value of 38 bpf.
- *Silty Clay:* A layer of silty clay with trace amounts of sand and gravel (USCS: CL)was encountered from 16 feet to 25 feet in boring DP2-11-16 and from 19 feet to 22 feet in boring DP2-11-17. The soil was hard with calibrated penetrometer values in excess of 7.0 tons per square foot.
- *Probable Bedrock:* The presence of probable bedrock was inferred below 25 feet deep in boring DP2-11-16 and below 22 feet in boring DP2-11-17. The soil borings were advanced 2 feet into the bedrock prior to terminating the borings.

c. Groundwater Conditions

The groundwater observations discussed below were made at the project site at the time of drilling. Groundwater level fluctuations may occur with time and seasonal change due to variations in precipitation, evaporation, and surface water runoff.

Groundwater was encountered in the form of wet soil samples at a depth of 7.5 feet in boring DP2-11-16 and a depth of 10 feet in boring DP2-11-17. The groundwater level in each of the boreholes was 2 feet below the ground surface before the removal of casing and at 6 feet below the ground surface after the removal of casing.

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5. Engineering Properties:

It is AECOM's understanding that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. Given the variability in soil conditions observed in both the borings and the laboratory testing, AECOM recommends that the USACE use extreme caution in the selection of soil properties. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following sections illustrate the range of soil properties which were obtained from the laboratory testing for the site. The complete laboratory testing results are included in attachment H.3.

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf)			
ML soils	105.5	107.7	106.6 (from 2 data points)
Unconfined compressive strength (tsf)			
ML soils*	0.48	0.64	0.56 (from 2 data points)
Maximum dry density (pcf) per standard proctor test			
Soils from 0-2' depth	-	-	101.5 (from 1 data point)
Soils from 2'-10' depth	-	-	113.4 (from 1 data point)

ATTACHMENTS

H.1: Boring Location Plan

H.2: Boring Logs

H.3: Lab Testing Results

H.4: Research Data

H.4.1: Illinois State Water Survey Data

H.5: Site Reconnaissance Photographs

AECOM

ATTACHMENT

H.1: Boring Location Plan

AECOM
EXPLORATION LOCATION PLAN
SILVER CREEK RESERVOIR
DES PLAINES II FEASIBILITY STUDY
UNITED STATES ARMY CORPS OF ENGINEERS – CHICAGO DISTRICT
Legend
AECOM Borings
Borings by others

AECOM

ATTACHMENT

H.2: Boring Logs

Hole No. DP2-11-16

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA/ 2-7/8" RB
2. LOCATION (Coordinates or Station): Silver Creek Reservoir N 1,924,650.4 E 1,102,016.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-16	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10 / UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 12/20/2011 / COMPLETED 12/20/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +621.2
9. TOTAL DEPTH OF HOLE: 27.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) (g)
+621.2	0.0		Topsoil (1.8')	72	1 0.0 1.8	2, 4, 5 N =9 (w = 31.2%) Qp = 2.5 tsf
+619.4	1.8					
+618.7	2.5		Silty fine sand - gray - dense - moist (SM)	100	1.8	16/6" N = 32* (w = 16.2%)
			Silt, trace clay, trace fine sand - gray - very dense - wet (ML)	100	2.0 2 2.5 3.5	28, 37/6" N = 74* (w = 13.7%)
				100	3 5.0 6.0	30, 30/6" N = 60* (w=13.7%)
+613.7	7.5		Silt, trace clay, trace fine sand - gray - medium dense - wet (ML)	100	4 7.5 9.0	5, 5, 5 N = 10 (w = 28.3%)
				52	5 10.0 12.5	3" Shelby Tube (w=20.0%)
+608.2	13.0		Fine to coarse sand, little silt, trace clay, little fine to coarse gravel - gray - medium dense to dense - wet (SP-SM)	100	6 12.5	7/6" N = 14* (w=24.1%)
				60	13.0 6A 13.0 14.0	7, 11 N = 18 (w=13.4%)
+605.2	16.0			50	7 15.0 16.0	10, 17/6" N = 34* (w=9.4%)
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	100	7A 16.0 16.5	17/6" N = 34* (w=12.0%) Qp = 4.5+ tsf

Hole No. DP2-11-16

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 621.2 | **Hole No. DP2-11-16**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL) *(continued)*	90	8 20.0 21.0	36, 25/6" N = 50* (w=10.2%) Qp = 7.0+ tsf SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less Boring advanced with SSA to 10 feet. 4-1/4" casing set to 8.5'. Boring advanced with rock bit to 27 feet. GW at 7.5' W.S. GW at 2' B.C.R. / 6' A.C.R. Borehole backfilled with bentonite chips.
+596.2	25.0		Possible bedrock inferred from drilling resistance.			
+594.2	27.0		End of boring at 27'.			

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines II | HOLE NO. DP2-11-16

Hole No. DP2-11-17

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II	10. SIZE AND TYPE OF BIT: SSA/ 2-7/8" RB
2. LOCATION (Coordinates or Station): Silver Creek Reservoir N 1,924,392.1 E 1,101,700.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Illinois State Plane East NAD83(horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: D-50 ATV
4. HOLE NO. (As shown on drawing title and file number): DP2-11-17	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9 / UNDISTURBED 1
5. NAME OF DRILLER: Mark Baker	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 12/20/2011 / COMPLETED 12/20/2011
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE: +622.3
9. TOTAL DEPTH OF HOLE: 24.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+622.3	0.0		Topsoil (1.3')	85	1 0.0 1.3	2, 2, 9 N = 11 (w=26.4%) Qp = 2.0 tsf
+621.0	1.3		Silt, trace to little clay, trace fine sand with occasional thin clay seams - gray - medium dense to dense - moist (ML)	100	1A 1.3 1.5	9/6" N = 18* (w=14.0%)
				100	2 2.4 3.9	16, 20, 27 N = 47 (w=15.2%)
				100	3 5.0 6.5	17, 13, 12 N = 25 (w=18.3%)
				115	4 7.5 9.5	3" Shelby Tube (w=21.7%)
+612.3	10.0		Silt, trace clay, trace to some fine sand - gray - medium dense to loose - wet (ML)	100	5 10.0 11.5	5, 6, 6 N = 12 (w=24.1%)
				100	6 12.5 14.0	5, 4, 5 N = 9 (w=26.8%)
+606.8	15.5		Sandy fine to coarse gravel, trace silt - gray - dense - wet (GP)	100 70	7 15.0 15.5 7A 15.5 16.5	12/6" N = 24* (w=23.8%) 19, 19 N = 38 (w=10.8%)
+603.3	19.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)			

Hole No. DP2-11-17

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 622.3 | **Hole No. DP2-11-17**

PROJECT: Des Plaines II | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL) *(continued)*	100	8 20.0 20.5	50/6" N = 100+* (w=11.1%) Qp = 7.0+ tsf SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less Boring advanced with SSA to 10 feet. 4-1/4" casing set to 9'. Boring advanced with rock bit to 24 feet. GW at 10' W.S. GW at 2' B.C.R. / 6' A.C.R. Borehole backfilled with bentonite chips. Bulk sample BS-1 obtained from 0 - 2' Bulk sample BS-2 obtained from 2'-10'
+600.3	22.0					
			Possible bedrock inferred from drilling resistance.			
+598.3	24.0					
			End of boring at 24'.			

Hole No. SCM-1

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Silver Creek Reservoir N 41.9 W 87.9	11. DATUM FOR ELEVATION SHOWN (*TBM or MSL*)
3. DRILLING AGENCY: Fox Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (*As shown on drawing title and file number*): SCM-1	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 5/5/1993 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 23.0	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (*Drilling time, water loss, depth weathering, etc., if significant*) g
	0.0		FILL			
	5.0		Silty clay with trace sand and gravel (CL)			
	14.0		Silt with trace clay (ML)			
	15.0		Sand with trace silt (SP)			
	18.0		Clayey silt with trace sand and gravel (CL-ML)			
	23.0		End of boring at 23'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey			

Hole No. SCM-1

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. SCM-1

PROJECT: Des Plaines II - ISWS Logs | INSTALLATION: Chicago District | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			record: API 120313142100 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

Hole No. SCM-3

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines II - ISWS Logs	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Silver Creek Reservoir N 41.9 W 87.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Fox Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): SCM-3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 5/5/1993 / COMPLETED
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 18.0	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
	0.0		FILL			
	7.0		Silty clay (CL)			
	9.0		Silty with some clay (ML)			
	10.0		Clayey silt seam (CL-ML)			
	15.0		Sand and silt seams (SM)			
	18.0		End of boring at 18'. NOTE: Soil descriptions and all information obtained from Illinois State Geological Survey record: API 120313123700 which should be consulted for additional information. AECOM input documented soil descriptions into gINT to create this boring log. AECOM estimated USCS Group Symbol based on provided soil descriptions at the request of USACE. No other interpretations or evaluations of this data was performed by AECOM. AECOM is not responsible for the quality or accuracy of the information provided.			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT: Des Plaines II - ISWS Logs HOLE NO. SCM-3

AECOM

FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 12/20/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 12/20/11 | ☐ SAFETY

RIG MFG/MODEL D50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED 8.5' SIZE 4"

2.5' to 15' thereafter 3 tubes in bore

WATER LEVEL OBSERVATIONS

WL: 7.5 WS OR WD

WL: 2' BCR 6 ACR

WL: _____ AB _____ HR. AB

WL: _____ 24 HR. AB

JOB NO. 60022304 BORING NO. DPL-11-16 CLIENT USACE WEATHER 35° overcast

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
												LARGE GRAVEL 19-EOB
												2 4 5 16
												28 37
												SAMPLE DESCRIPTION
												38 24
												5 5 5
												7 7 11
1	0	1.8	SS	2	4	5	16	1.3	2.5			si organic el bk fgr v.st (OL)
1A	1.8	2	SS				16	0.2	—		1.8	gr f-sznd gray moist dense (SM)
	0	2.5	PA									
2	2.5	3.5	SS	28	37			1.0	—			si gray moist v.dense (ML)
	2.5	5.0	PA									
3	5	6	SS	30	30			1.0	—			same (ML)
	5	7.5	PA									
4	7.5	9	SS	5	5	5		1.5	—			si gray sturated m.dens. (ML)
	7.5	10	PA									
5	10	12.5	3" ST	P	4	5	H	1.3	—			same
	5	E	T	8.5' of 4"					CAS	VG		
	0	12.5	RB								12.5	mix slurry BENTONITE ¼ bag
6	12.5	13	SS	7				0.5	2.5			cl silt trf-csz fgr gray (CL-ML)
6A	13	14	SS		7	11		0.6	—		13	f-csz little fgr tr si gray sat med dense (SP)

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 1.8'
FILL THICKNESS _____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING _____
AFTER BORING COMPLETION _____
WATER LOSS:
AT _____ TO _____
PERCENT LOSS
AT _____ TO _____
PERCENT LOSS _____
BOULDERS OR OBSTRUCTIONS:
AT _____ TO _____
AT _____ TO _____
ARTESIAN PRESSURE:
DEPTH _____
HEIGHT OF SOIL RISE IN CASING _____
PIEZOMETER PVC OR SS DIAMETER _____ IN.
SCREEN DEPTH _____ FT. TO _____ FT.
RISER PIPE _____ FT. TO _____ FT.

AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 12/20/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 12/20/11 | ☐ SAFETY

RIG MFG/MODEL D50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED 8.5' SIZE 4"

WATER LEVEL OBSERVATIONS

WL: 7.5' WS OR WD

WL: 2' BCR 6 ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 602233774 BORING NO. D42-11-16 CLIENT USACE WEATHER 35° Overcast

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
	12.5	15	RB									Large gravel 19 – EOB
7	15	16	SS	10	17			0.5				Some dense with f-cgr
7A	16	16.5	SS			17		0.5	4.5+		16	Si cl t-f-cs sd f-cgr gray hard CL
	15	20	RB									1/4 BY MIX SLURRY BENTONITE
8	20	21	SS	36	25			0.9	4.5+			SAME SOME Sand/ lighter
	20	25	RB								25	apparent Bedrock
	25	27	RB									Same
					EOB	Backfilled		w/ chips				

ABBREVIATIONS

FT + FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS 1.8
FILL THICKNESS
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING
AFTER BORING COMPLETION
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS
BOULDERS OR OBSTRUCTIONS:
AT 22.5 TO 23 cobble
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH
HEIGHT OF SOIL RISE IN CASING
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

AECOM

FIELD BORING LOG

SHEET 1 OF 2

TECHNICIAN Beckett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 12/20/11 | ☐ DONUT

HELPER Franks | BORING COMPLETED 12/20/11 | ☐ SAFETY

RIG MFG/MODEL D-50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED 9' SIZE 4"

WATER LEVEL OBSERVATIONS

WL: 10 (WS) OR WD

WL: 2 BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60255074 BORING NO. DP2-11-17 CLIENT USACE WEATHER 40° mid east

SAMPLE NO.	DEPTH OR ELEVATION FROM	DEPTH OR ELEVATION TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION
												2nd 16:27 17:12 566 545
1	0	1.3	SS	2	2	9		1.1	2.75			Si cl tr organics v stiff Black (CL-OL)
1A	1.3	1.5	SS			9		0.2	—		1.3	Si gray moist dense (ML)
	0	2.5	PA									
2	2.5	4	SS	16	20	27		1.5	—			Same tr f fine sand (ML)
	2.5	5	PA									
3	5	6.5	SS	17	13	12		1.5	—			Same med dense (ML) WET TIP
	5	7.5	PA									
4	7.5	9.5	3"ST	P	U	S	H	2.3	—			Same (ML)
	7.5	10	PA									
5	10	11.5	SS	5	6	6		1.5'	—		10	si v f sand gray med dens SZT (SM)
	SET	9'		of	4"	CASING		MIX	BENTONITE			SLURRY 1/4 BG
	0	12.5	RB									
6	12.5	14	SS	5	4	5		1.5'	—			SAME (SM)
	12.5	15	RB									

ABBREVIATIONS

FT – FISH TAIL
WO – WASH OUT
ST – SHELBY TUBE
SS – SPLIT SPOON
DB – DIAMOND BIT
PA – POWER AUGER
HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS ____
FILL THICKNESS ____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING ____
AFTER BORING COMPLETION ____
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS ____
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH ____
HEIGHT OF SOIL RISE IN CASING ____
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

AECOM

FIELD BORING LOG

SHEET 2 OF 2

TECHNICIAN Bickett | SURFACE ELEV. | 140 LB. HAMMER TYPE:

DRILLER Baker | BORING STARTED 12/20/11 | ☐ DONUT

HELPER Fronks | BORING COMPLETED 12/20/11 | ☐ SAFETY

RIG MFG/MODEL D50 ATV | STATION | ☒ AUTOMATIC

OFFSET | CASING USED 9' SIZE 4"

WATER LEVEL OBSERVATIONS

WL: 10 (WS) OR WD

WL: 2 BCR ____ ACR

WL: ____ AB ____ HR. AB

WL: ____ 24 HR. AB

JOB NO. 60223274 BORING NO. DP11-17 CLIENT USACE WEATHER 38° OVERCAST

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	R LENGTH RECOVERED IN FEET	QP PENETROMETER TEST IN TSF	HNU PHOTO-IONIZATION DETECTION	STRATA CHANGE	SAMPLE DESCRIPTION 12/19/19
7	15	15.5	SS	12				0.5	/			Silt (SM)
7A	15.5	16.5	SS		19	19		0.7	/		15.5	f-c sand some f-c gr gray wet dense (SP)
	15	20	RB								19	
8	20	20.5	SS	50				0.5	4.5+			Cl si tr f-c sand gr gray hard (CL-ML)
	20	22	RB								22	APPARENT BEDROCK - DRILLER NOTES APPEARS HARDER THAN DOLOMITE POSSIBLE VERY LARGE BOULDER
	22	24	RB									
					E	OB		BACK FILLED	W/	CHIPS		
BS1	0	2	BULK		Si	cl	(CL-ML)		BISC	IL/BROWN		
BS2	2	10	BULK		Si		(ML)		gray			

ABBREVIATIONS

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HAS – HOLLOW STEM AUGER
HA – HAND AUGER
RB – ROCK BIT
WS – WHILE SAMPLING
WD – WHILE DRILLING
BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
AB – AFTER BORING

DRILL CREW CHECKLIST:
TOPSOIL THICKNESS ____
FILL THICKNESS ____
CAVE-IN LEVEL:
WHILE DRILLING AND SAMPLING ____
AFTER BORING COMPLETION ____
WATER LOSS:
AT ____ TO ____
PERCENT LOSS
AT ____ TO ____
PERCENT LOSS ____
BOULDERS OR OBSTRUCTIONS:
AT ____ TO ____
AT ____ TO ____
ARTESIAN PRESSURE:
DEPTH ____
HEIGHT OF SOIL RISE IN CASING ____
PIEZOMETER PVC OR SS DIAMETER ____ IN.
SCREEN DEPTH ____ FT. TO ____ FT.
RISER PIPE ____ FT. TO ____ FT.

AECOM

ATTACHMENT

H.3: Lab Testing Results

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

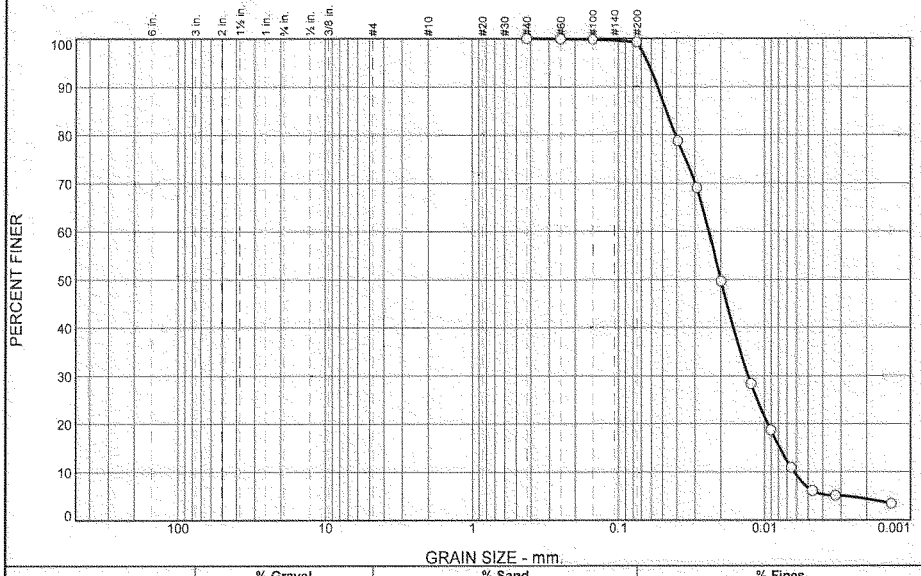
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Dry Den pcf	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Std. Max Den pcf	Opt WC %
BULK SAMPLE																	
	BS-1	0.0'-2.0'	SL. ORGANIC SILTY CLAY LIT. F-C SAND TR. F GRAVEL-DARK BROWN TO BLACK	OL	24.9											101.5	18.6
	BS-2	2.0'-10.0'	SILTY CLAY TRACE F-M SAND - GRAY	CL	21.4											113.4	13.7
DP2-11-16																	
	S-1	0.0'-1.8'	CLAYEY TOPSOIL LITTLE SILT TRACE F-C SAND TRACE F GRAVEL - BLACK ROOTS AND SEAMS OF BROWN AND GRAY NOTED.	OL	31.2	2.0											
	S-1A	1.8'-2.0'	SILTY F SAND - GRAY - MOIST	SM	16.2												
	S-2	2.5'-3.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	13.7												
	S-3	5.0'-6.0'	SILT TRACE F SAND TRACE CLAY - GRAY	ML	13.7								20	20	NP		
	S-4	7.5'-9.0'	SILT TRACE CLAY - GRAY	ML	28.3				0.0	0.7	92.6	6.7					
	S-5	10.0'-12.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	20.0		0.48 @ 7.58%	107.7									
	S-6	12.5'-13.0'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	24.1												
	S-6A	13.0'-14.0'	F-C SAND LITTLE F GRAVEL LITTLE SILT TRACE CLAY - GRAY	SM	13.4				16.0	66.3	12.8	4.9					
	S-7A	16.0'-16.5'	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL TRACE SHALE - GRAY	CL	12.0	7.0+							24	15	9		
	S-7	15.0'-16.0'	F-C SAND LITTLE SILT LITTLE F-C GRAVEL - GRAY - SATURATED LIMESTONE NOTED	SP-SM	9.4												
	S-8	20.0'-21.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	10.2	7.0+											
DP2-11-17																	
	S-1	0.0'-1.3'	CLAYEY TOPSOIL LITTLE SILT TRACE F-C SAND TRACE F GRAVEL - BLACK SEAMS OF GRAY AND BROWN NOTED	CL-OL	26.4	2.0											
	S-1A	1.5'-1.5'	SILT TRACE CLAY TRACE F SAND -	ML	14.0												

LABORATORY TEST SUMMARY

Project Number: 60223274 **Project:** USACE Des Plaines II

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Qu tsf / Strain %	Dry Den pcf	Gravel %	Sand %	Silt %	Clay	LL	PL	PI	Std. Max Den pcf	Opt WC %
			GRAY SEAMS OF CLAY NOTED														
	S-2	2.5'-4.0'	SILT LITTLE CLAY TRACE F SAND - GRAY	ML	15.2				0.0	4.5	84.8	10.7					
	S-3	5.0'-6.5'	SILT TRACE CLAY TRACE F SAND - GRAY LAYER OF CLAY NOTED	ML	18.3												
	S-4	7.5'-9.5'	SILT TRACE F SAND TRACE CLAY - GRAY	ML	21.7		0.64 @ 8.46%	105.5					24	24	NP		
	S-5	10.0'-11.5'	SILT TRACE CLAY TRACE F SAND - GRAY - SATURATED	ML	24.1												
	S-6	12.5'-14.0'	SILT SOME F SAND TRACE CLAY - GRAY	ML	26.8				0.0	30.2	66.5	3.3					
	S-7	15.0'-15.5'	SILT TRACE CLAY TRACE F SAND - GRAY - SATURATED	ML	23.8												
	S-7A	15.5'-16.5'	SANDY F-C GRAVEL TRACE SILT - GRAY - SATURATED LIMESTONE NOTED	GP	10.8												
	S-8	20.0'-20.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	11.1	7.0+											

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.7	92.6	6.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#40	100.0		
#60	99.9		
#100	99.8		
#200	99.3		

* (no specification provided)

Material Description

SILT TRACE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0541 D_{85}= 0.0471 D_{60}= 0.0240
D_{50}= 0.0200 D_{30}= 0.0129 D_{15}= 0.0078
D_{10}= 0.0062 C_u= 3.86 C_c= 1.12

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: DP2-11-16 **Depth:** 7.5'-9.0'
Sample Number: S-4 **Date:** 12/29/2011

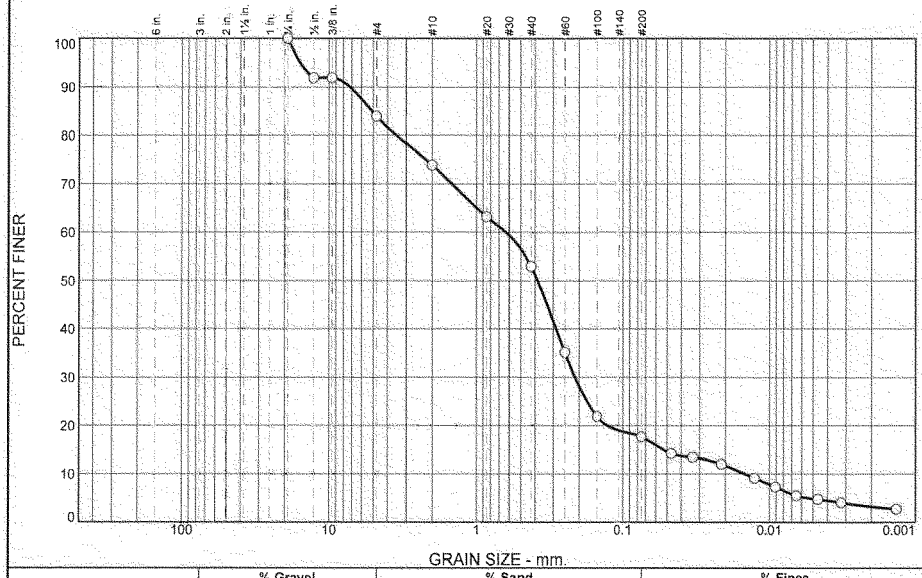
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274 **Figure**

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	16.0	10.1	20.9	35.3	12.8	4.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.50	91.9		
.375	91.9		
#4	84.0		
#10	73.9		
#20	63.2		
#40	53.0		
#60	35.2		
#100	21.9		
#200	17.7		

* (no specification provided)

Material Description

F-C SAND LITTLE F GRAVEL LITTLE SILT TRACE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.1872 D_{85}= 5.0850 D_{60}= 0.6293
D_{50}= 0.3829 D_{30}= 0.2130 D_{15}= 0.0530
D_{10}= 0.0147 C_u= 42.91 C_c= 4.92

Classification

USCS= SM AASHTO=

Remarks

Source of Sample: DP2-11-16 **Depth:** 13.0'-14.0'
Sample Number: 6A **Date:** 12/29/2011

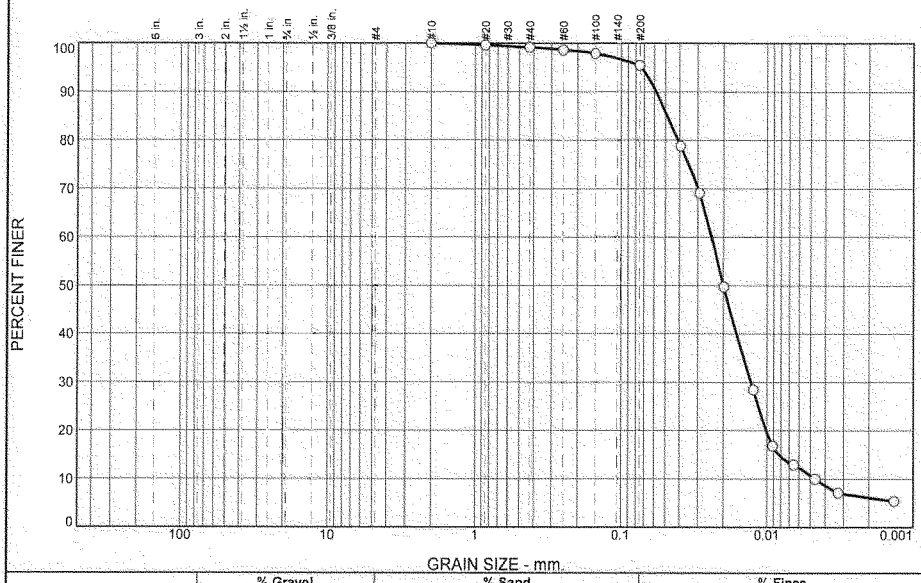
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II

Project No: 60223274 **Figure**

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	3.6	84.8	10.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.6		
#40	99.1		
#60	98.6		
#100	97.9		
#200	95.5		

* (no specification provided)

Material Description

SILT LITTLE CLAY TRACE F SAND - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0579 D_{85}= 0.0484 D_{60}= 0.0241
D_{50}= 0.0200 D_{30}= 0.0129 D_{15}= 0.0083
D_{10}= 0.0046 C_u= 5.21 C_c= 1.48

Classification

USCS= ML AASHTO=

Remarks

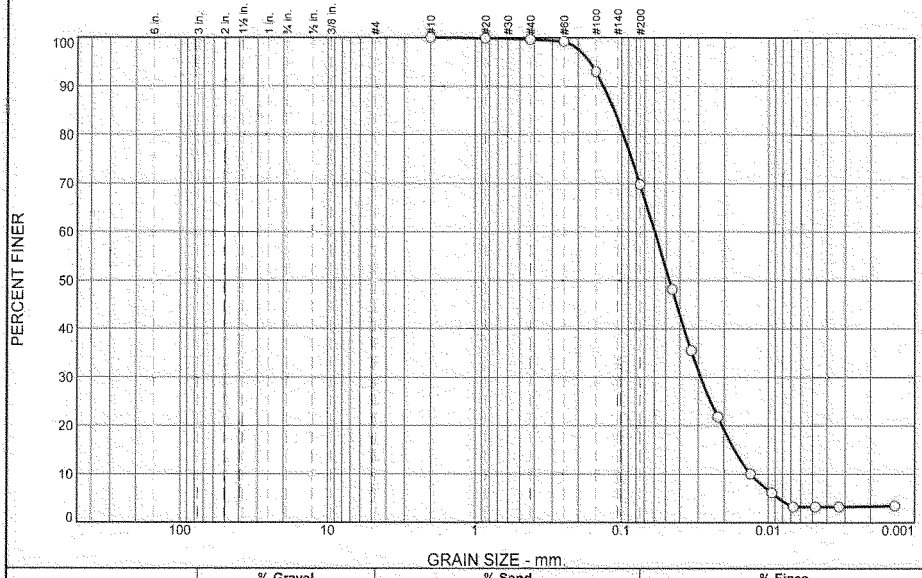
Source of Sample: DP2-11-17 **Depth:** 2.5'-4.0'
Sample Number: S-2 **Date:** 12/29/2011

AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II
Project No: 60223274 **Figure**

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	29.8	66.5	3.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.6		
#60	99.2		
#100	93.1		
#200	69.8		

* (no specification provided)

Material Description

SILT SOME F SAND TRACE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1323 D_{85}= 0.1122 D_{60}= 0.0593
D_{50}= 0.0470 D_{30}= 0.0287 D_{15}= 0.0170
D_{10}= 0.0131 C_u= 4.52 C_c= 1.06

Classification

USCS= ML AASHTO=

Remarks

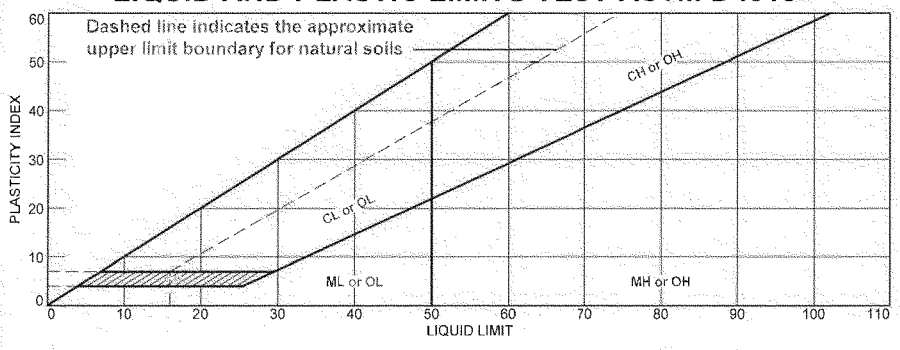
Source of Sample: DP2-11-17 **Depth:** 12.5'-14.0'
Sample Number: S-6 **Date:** 12/29/2011

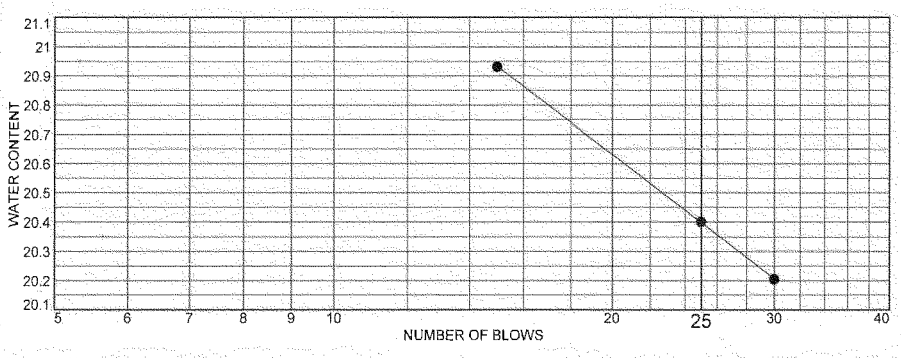
AECOM

Client: US Army Corps of Engineers
Project: USACE Des Plaines II
Project No: 60223274 **Figure**

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILT TRACE F SAND TRACE CLAY - GRAY	20	20	NP			ML

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

● **Source of Sample:** DP2-11-16 **Depth:** 5.0'-6.0' **Sample Number:** S-3

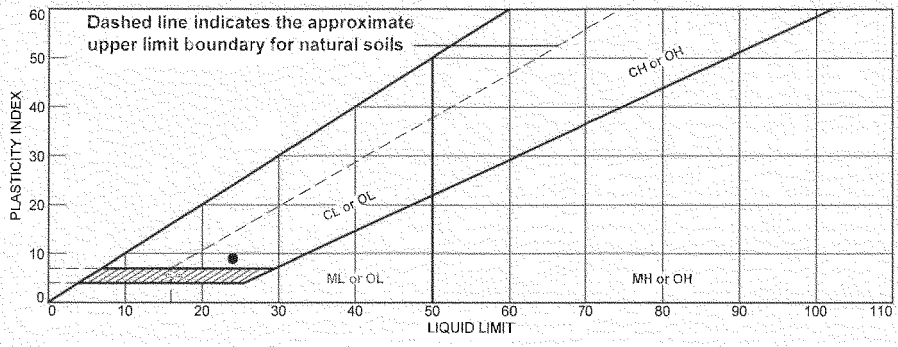
Remarks:

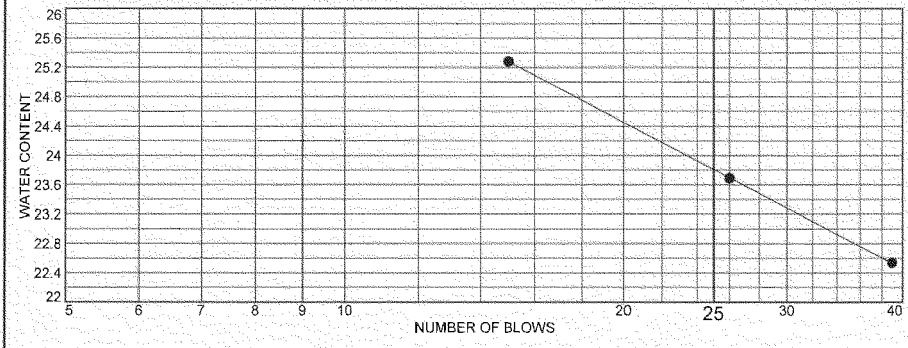
AECOM

Figure

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - GRAY	24	15	9			

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

● **Sample Source:** DP2-11-16 **Depth:** 16.0'-16.5' **Sample No.:** S-7A

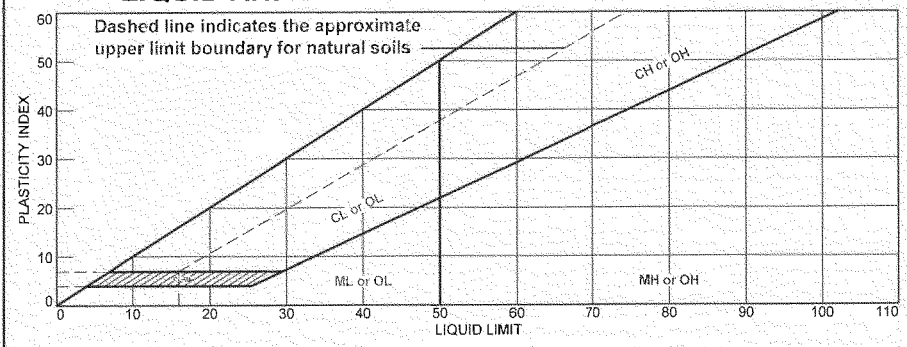
Remarks:

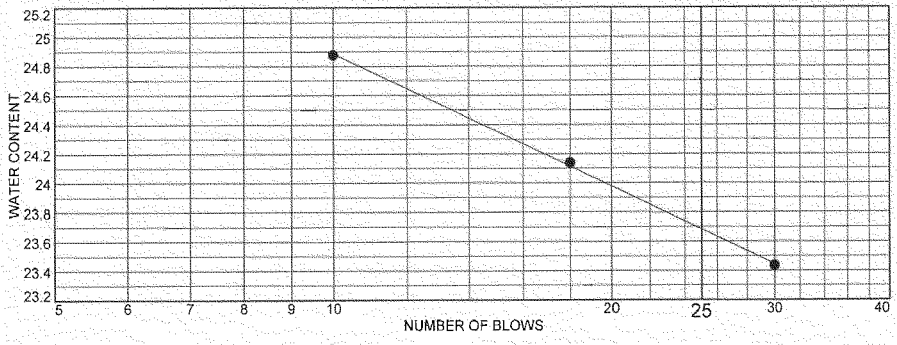
AECOM

Figure

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILT TRACE F SAND TRACE CLAY - GRAY	24	24	NP			ML

Project No. 60223274 **Client:** US Army Corps of Engineers

Project: USACE Des Plaines II

● **Source of Sample:** DP2-11-17 **Depth:** 7.5'-9.5' **Sample Number:** S-4

Remarks:

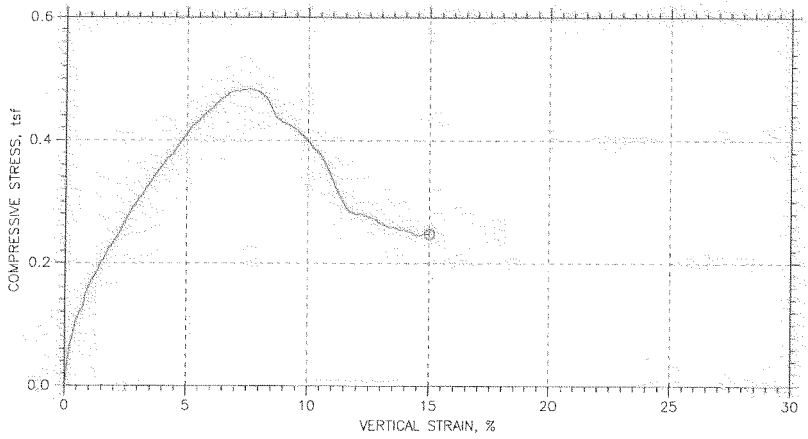
AECOM

Figure

Tested By: EMR **Checked By:** WPQ

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP1116 S5QU			
Initial	Diameter, in	3.0091			
	Height, in	5.6201			
	Water Content, %	19.99			
	Dry Density, pcf	107.7			
	Saturation, %	97.46			
	Void Ratio	0.5477			
Unconfined Compressive Strength, tsf		0.48402			
Undrained Shear Strength, tsf		0.24201			
Time to Failure, min		13.754			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.67			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES
Location: DES PLAINES, IL
Project No.: 60223274
Boring No.: DP-11-16 S5
Sample Type: 3" ST
Description: SILT TRACE F SAND TRACE CLAY - GRAY ML
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Tue, 03-JAN-2012 11:22:45

UNCONFINED COMPRESSION TEST

Project: DES PLAINES
Boring No.: DP-11-16 S5
Sample No.: S-5
Test No.: DP1116 S5QU

Location: DES PLAINES, IL
Tested By: BCM
Test Date: 12/30/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 10.0'-12.5'
Elevation: ----

Soil Description: SILT TRACE F SAND TRACE CLAY - GRAY ML
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.62 in
Specimen Area: 7.11 inA2
Specimen Volume: 39.97 inA3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.67

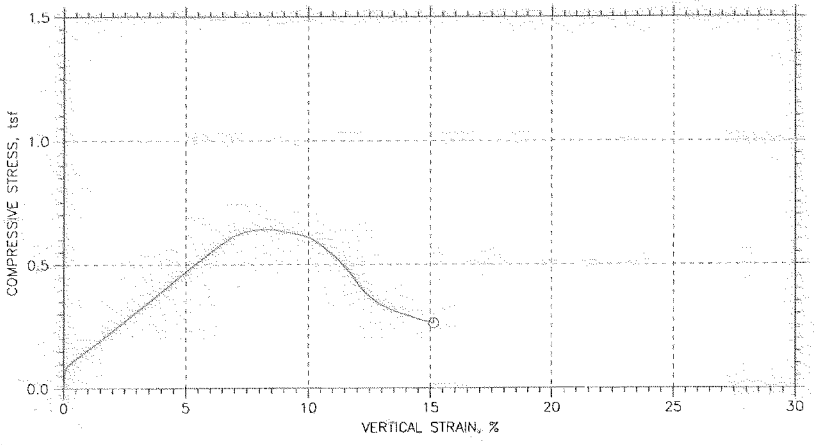
Cap Mass: 0 gm

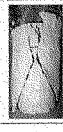
	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	7.1113	0	0
2	0.10393	0.002642	0.04701	2.1258	7.1147	0.021513	0.010757
3	0.20393	0.0056484	0.1005	3.8265	7.1185	0.038703	0.019351
4	0.30393	0.008837	0.15724	5.3854	7.1225	0.05444	0.02722
5	0.40393	0.011843	0.21073	6.6609	7.1263	0.067297	0.033649
6	0.50398	0.015032	0.26747	7.5112	7.1304	0.075845	0.037923
7	0.60393	0.01813	0.32259	8.3615	7.1343	0.084385	0.042192
8	0.70393	0.021227	0.3777	9.3536	7.1383	0.094345	0.047172
9	0.80393	0.024325	0.43282	10.487	7.1422	0.10572	0.052861
10	0.90393	0.027422	0.48793	10.913	7.1462	0.10995	0.054973
11	1.004	0.03052	0.54305	11.338	7.1501	0.11417	0.057084
12	1.1039	0.033617	0.59816	11.905	7.1541	0.11981	0.059905
13	1.2039	0.036806	0.6549	12.33	7.1582	0.12402	0.062009
14	1.304	0.039994	0.71163	12.613	7.1623	0.1268	0.063398
15	1.4039	0.043092	0.76675	13.322	7.1663	0.13384	0.066922
16	1.504	0.046281	0.82349	14.881	7.1704	0.14942	0.074711
17	1.6039	0.049469	0.88022	15.164	7.1745	0.15218	0.07609
18	1.7039	0.052567	0.93534	15.873	7.1785	0.1592	0.079602
19	1.8039	0.055664	0.99045	16.298	7.1825	0.16338	0.081689
20	1.9039	0.058762	1.0456	17.007	7.1865	0.17039	0.085193
21	2.004	0.061859	1.1007	17.432	7.1905	0.17455	0.087274
22	2.1039	0.065048	1.1574	17.715	7.1946	0.17728	0.088642
23	2.2039	0.068145	1.2125	17.999	7.1986	0.18002	0.09001
24	2.3039	0.071334	1.2693	18.565	7.2027	0.18558	0.092792
25	2.4039	0.074523	1.326	18.849	7.2069	0.18831	0.094154
26	2.504	0.07762	1.3811	19.557	7.2109	0.19528	0.097639
27	2.6039	0.080718	1.4362	19.983	7.2149	0.19941	0.099706
28	2.7039	0.083906	1.493	20.408	7.2191	0.20354	0.10177
29	2.8039	0.087004	1.5481	20.55	7.2231	0.20484	0.10242
30	2.9039	0.090101	1.6032	21.116	7.2272	0.21037	0.10518
31	3.004	0.09329	1.6599	21.542	7.2314	0.21448	0.10724
32	3.1039	0.096387	1.7151	21.967	7.2354	0.21859	0.1093
33	3.2039	0.099485	1.7702	22.817	7.2395	0.22693	0.11346
34	3.3039	0.10258	1.8253	22.675	7.2435	0.22539	0.1127
35	3.4039	0.10559	1.8788	22.959	7.2475	0.22808	0.11404
36	3.504	0.10878	1.9355	23.384	7.2517	0.23217	0.11609
37	3.6039	0.11188	1.9906	23.667	7.2558	0.23486	0.11743
38	3.7039	0.11497	2.0457	24.093	7.2598	0.23894	0.11947
39	3.8039	0.11807	2.1009	24.376	7.2639	0.24161	0.12081
40	3.9039	0.12108	2.1544	24.659	7.2679	0.24429	0.12215
41	4.004	0.12417	2.2095	25.085	7.272	0.24836	0.12418
42	4.1039	0.12718	2.263	25.51	7.276	0.25243	0.12622
43	4.2039	0.13028	2.3181	25.935	7.2801	0.2565	0.12825
44	4.3039	0.13338	2.3732	26.644	7.2842	0.26336	0.13168
45	4.4039	0.13647	2.4283	26.785	7.2883	0.26461	0.1323
46	4.504	0.13948	2.4818	27.21	7.2923	0.26866	0.13433
47	4.6039	0.14258	2.5369	27.777	7.2964	0.2741	0.13705
48	4.7039	0.14558	2.5904	28.202	7.3004	0.27814	0.13907
49	4.8039	0.14868	2.6455	28.486	7.3046	0.28078	0.14039
50	4.9039	0.15169	2.699	28.911	7.3086	0.28482	0.14241
51	5.004	0.15478	2.7541	29.478	7.3127	0.29024	0.14512
52	5.254	0.16253	2.8919	30.045	7.3231	0.2954	0.1477
53	5.504	0.17027	3.0297	31.176	7.3335	0.30611	0.15306
54	5.754	0.17793	3.1659	31.745	7.3438	0.31124	0.15562
55	6.004	0.18567	3.3037	32.879	7.3543	0.32189	0.16095
56	6.254	0.19341	3.4415	33.588	7.3648	0.32836	0.16418
57	6.504	0.20125	3.5809	34.58	7.3754	0.33757	0.16879
58	6.754	0.20899	3.7187	35.43	7.386	0.34538	0.17269
59	7.004	0.21692	3.8597	36.281	7.3968	0.35315	0.17658
60	7.254	0.22466	3.9975	36.989	7.4074	0.35953	0.17977
61	7.504	0.2325	4.1369	37.981	7.4182	0.36864	0.18432
62	7.754	0.24033	4.2763	38.548	7.429	0.3736	0.1868
63	8.004	0.24807	4.4141	39.115	7.4397	0.37855	0.18927
64	8.254	0.25564	4.5486	39.965	7.4502	0.38623	0.19312
65	8.504	0.26347	4.688	40.957	7.4611	0.39524	0.19762
66	8.754	0.27121	4.8258	41.666	7.4719	0.4015	0.20075
67	9.004	0.27896	4.9636	42.375	7.4827	0.40773	0.20387
68	9.254	0.28661	5.0998	43.367	7.4935	0.41668	0.20834
69	9.504	0.29436	5.2376	44.217	7.5044	0.42424	0.21212
70	9.754	0.3021	5.3754	44.642	7.5153	0.42769	0.21385
71	10.004	0.30975	5.5115	45.209	7.5261	0.4325	0.21625
72	10.254	0.3174	5.6477	45.918	7.537	0.43865	0.21932
73	10.504	0.32515	5.7855	46.484	7.548	0.44341	0.22171
74	10.754	0.33289	5.9233	47.193	7.5591	0.44951	0.22476
75	11.004	0.34073	6.0627	47.477	7.5703	0.45154	0.22577
76	11.254	0.34847	6.2005	48.327	7.5814	0.45896	0.22948
77	11.504	0.35631	6.3399	48.894	7.5927	0.46365	0.23182
78	11.754	0.36414	6.4793	49.602	7.604	0.46967	0.23483
79	12.004	0.37198	6.6187	49.886	7.6154	0.47165	0.23582
80	12.254	0.37972	6.7565	50.594	7.6266	0.47764	0.23882
81	12.504	0.38755	6.8959	50.878	7.638	0.4796	0.2398

82	12.754	0.3953	7.0337	51.02	7.6493	0.48022	0.24011
83	13.004	0.40304	7.1715	51.02	7.6607	0.47951	0.23976
84	13.254	0.41069	7.3076	51.445	7.672	0.4828	0.2414
85	13.504	0.41844	7.4454	51.586	7.6834	0.48341	0.2417
86	13.754	0.42609	7.5816	51.728	7.6947	0.48402	0.24201
87	14.004	0.43374	7.7177	51.586	7.7061	0.48199	0.24099
88	14.254	0.4414	7.8539	51.586	7.7174	0.48128	0.24064
89	14.504	0.44905	7.9901	51.445	7.7289	0.47924	0.23962
90	14.754	0.4567	8.1262	51.02	7.7403	0.47458	0.23729
91	15.004	0.46445	8.264	50.594	7.7519	0.46992	0.23496
92	15.254	0.47219	8.4018	49.602	7.7636	0.46001	0.23001
93	15.504	0.47993	8.5396	48.469	7.7753	0.44882	0.22441
94	15.754	0.48768	8.6774	47.335	7.787	0.43766	0.21883
95	16.004	0.49542	8.8152	47.051	7.7988	0.43439	0.21719
96	16.254	0.50316	8.953	46.626	7.8106	0.42981	0.21491
97	16.504	0.511	9.0924	46.343	7.8226	0.42654	0.21327
98	16.754	0.51883	9.2318	46.201	7.8346	0.42459	0.21229
99	17.004	0.52676	9.3728	45.918	7.8468	0.42133	0.21066
100	17.254	0.53441	9.509	45.634	7.8586	0.4181	0.20905
101	17.504	0.54216	9.6468	45.067	7.8706	0.41227	0.20614
102	17.754	0.54981	9.7829	44.642	7.8825	0.40777	0.20389
103	18.004	0.55755	9.9207	44.075	7.8945	0.40198	0.20099
104	18.254	0.5653	10.059	43.508	7.9066	0.3962	0.1981
105	18.504	0.57295	10.195	42.8	7.9186	0.38916	0.19458
106	18.754	0.58069	10.332	42.233	7.9308	0.38341	0.19171
107	19.004	0.58844	10.47	41.808	7.943	0.37897	0.18949
108	19.254	0.59609	10.606	40.957	7.9551	0.3707	0.18535
109	19.504	0.60374	10.743	39.824	7.9672	0.35989	0.17994
110	19.754	0.6114	10.879	38.69	7.9794	0.34911	0.17455
111	20.004	0.61905	11.015	37.273	7.9916	0.33581	0.1679
112	20.254	0.62688	11.154	35.855	8.0041	0.32253	0.16127
113	20.504	0.63454	11.291	34.58	8.0164	0.31058	0.15529
114	20.754	0.64219	11.427	33.446	8.0287	0.29994	0.14997
115	21.004	0.65011	11.568	32.312	8.0415	0.28931	0.14465
116	21.254	0.65795	11.707	31.745	8.0542	0.28379	0.14189
117	21.504	0.66578	11.847	31.604	8.067	0.28207	0.14104
118	21.754	0.67353	11.984	31.32	8.0796	0.27911	0.13955
119	22.004	0.68136	12.124	31.604	8.0924	0.28119	0.14059
120	22.254	0.68911	12.262	31.32	8.1051	0.27823	0.13911
121	22.504	0.69685	12.399	31.179	8.1179	0.27653	0.13827
122	22.754	0.70441	12.534	31.037	8.1304	0.27485	0.13743
123	23.004	0.71225	12.673	30.895	8.1433	0.27316	0.13658
124	23.254	0.7199	12.809	30.612	8.1561	0.27023	0.13512
125	23.504	0.72746	12.944	30.045	8.1687	0.26482	0.13241
126	23.754	0.73511	13.08	29.903	8.1815	0.26316	0.13158
127	24.004	0.74277	13.216	29.62	8.1943	0.26026	0.13013
128	24.254	0.75042	13.352	29.478	8.2072	0.2586	0.1293
129	24.504	0.75807	13.489	29.478	8.2201	0.2582	0.1291
130	24.754	0.76572	13.625	29.478	8.2331	0.25779	0.1289
131	25.004	0.77347	13.763	29.053	8.2462	0.25367	0.12683
132	25.254	0.78121	13.9	29.195	8.2594	0.2545	0.12725
133	25.504	0.78896	14.038	29.195	8.2726	0.25409	0.12705
134	25.754	0.7967	14.176	28.911	8.2859	0.25122	0.12561
135	26.004	0.80463	14.317	28.628	8.2996	0.24835	0.12417
136	26.254	0.81237	14.455	28.344	8.3129	0.24549	0.12275
137	26.504	0.8202	14.594	28.344	8.3265	0.24509	0.12255
138	26.754	0.82795	14.732	28.628	8.34	0.24715	0.12357
139	27.004	0.83578	14.871	28.628	8.3536	0.24674	0.12337
140	27.254	0.84344	15.008	28.769	8.367	0.24757	0.12378

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21117S4			
Initial	Diameter, in	2.8835			
	Height, in	6.0102			
	Water Content, %	21.41			
	Dry Density, pcf	105.5			
	Saturation, %	98.51			
	Void Ratio	0.5804			
Unconfined Compressive Strength, tsf		0.64259			
Undrained Shear Strength, tsf		0.3213			
Time to Failure, min		16.5			
Strain Rate, %/min		0.76			
Estimated Specific Gravity		2.67			
Liquid Limit		NP			
Plastic Limit		NP			
Plasticity Index		NP			
Failure Sketch					

Project: DES PLAINES
Location: IL
Project No.: 60223274
Boring No.: DP211-17 S4
Sample Type: 3" ST
Description: SILT TRACE F SAND TRACE CLAY - GRAY ML
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Tue, 03-JAN-2012 11:07:16

UNCONFINED COMPRESSION TEST

Project: DES PLAINES
Boring No.: DP211-17 S4
Sample No.: S-4
Test No.: DP21117S4

Location: IL
Tested By: BCM
Test Date: 12/30/11
Sample Type: 3" ST

Project No.: 60223274
Checked By: WPQ
Depth: 7.5'-9.5'
Elevation: -----

Soil Description: SILT TRACE F SAND TRACE CLAY - GRAY ML
Remarks: TEST PERFORMED AS PER ASTM D 2166.

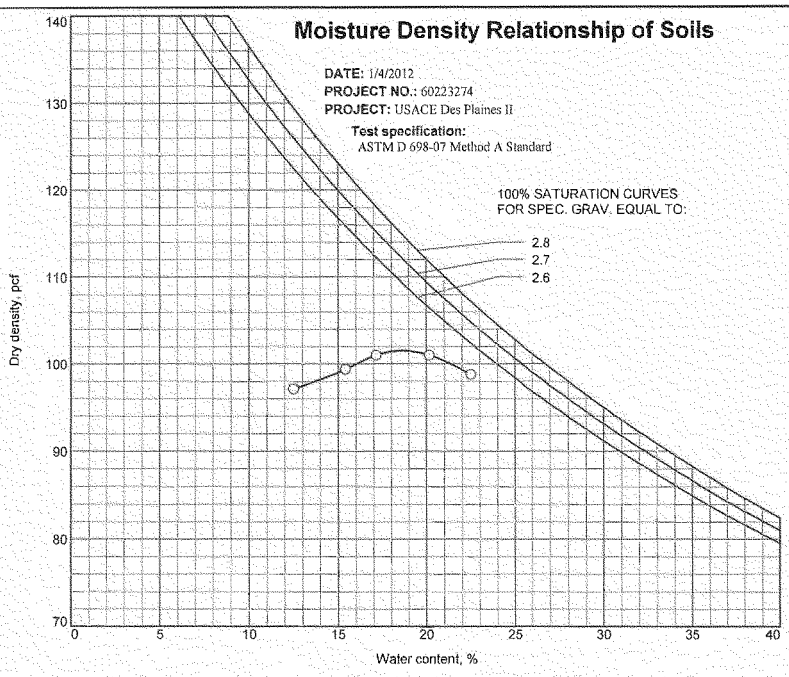
Specimen Height: 6.01 in
Specimen Area: 6.53 inA2
Specimen Volume: 39.25 inA3

Liquid Limit: NP
Plastic Limit: NP
Estimated Specific Gravity: 2.67

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.5301	0	0
2	0.10412	0.0017355	0.028876	5.4197	6.532	0.059739	0.02987
3	0.20412	0.0047498	0.079028	7.1561	6.5353	0.07884	0.03942
4	0.30412	0.0078554	0.1307	7.998	6.5386	0.088069	0.044035
5	0.40412	0.010961	0.18237	8.5768	6.542	0.094394	0.047197
6	0.50415	0.014067	0.23405	8.9977	6.5454	0.098976	0.049488
7	0.60412	0.017264	0.28724	9.4187	6.5489	0.10355	0.051775
8	0.70412	0.020278	0.33739	9.787	6.5522	0.10755	0.053773
9	0.80412	0.023475	0.39058	10.155	6.5557	0.11153	0.055767
10	0.90412	0.026581	0.44226	10.576	6.5591	0.1161	0.058048
11	1.0042	0.029686	0.49393	10.945	6.5625	0.12008	0.060039
12	1.1041	0.032883	0.54712	11.313	6.566	0.12405	0.062026
13	1.2041	0.03608	0.60031	11.681	6.5695	0.12802	0.064011
14	1.3041	0.039277	0.6535	12.05	6.573	0.13199	0.065994
15	1.4041	0.042291	0.70366	12.365	6.5764	0.13538	0.067689
16	1.5042	0.045397	0.75533	12.734	6.5798	0.13934	0.069669
17	1.6041	0.048411	0.80548	13.102	6.5831	0.1433	0.071648
18	1.7041	0.051608	0.85867	13.523	6.5866	0.14782	0.073911
19	1.8041	0.054714	0.91035	13.839	6.5901	0.15119	0.075597
20	1.9041	0.05782	0.96202	14.207	6.5935	0.15514	0.077568
21	2.0042	0.061017	1.0152	14.575	6.5971	0.15907	0.079537
22	2.1041	0.064122	1.0669	14.996	6.6005	0.16358	0.081791
23	2.2041	0.067137	1.117	15.259	6.6039	0.16637	0.083184
24	2.3041	0.070242	1.1687	15.628	6.6073	0.17029	0.085147
25	2.4041	0.073439	1.2219	15.943	6.6109	0.17364	0.086821
26	2.5042	0.076636	1.2751	16.312	6.6144	0.17756	0.088778
27	2.6041	0.07965	1.3252	16.627	6.6178	0.1809	0.090451
28	2.7041	0.082756	1.3769	16.943	6.6213	0.18424	0.09212
29	2.8041	0.085862	1.4286	17.364	6.6247	0.18872	0.094359
30	2.9041	0.089059	1.4818	17.732	6.6283	0.19262	0.096309
31	3.0042	0.092164	1.5335	18.048	6.6318	0.19594	0.097972
32	3.1041	0.095179	1.5836	18.416	6.6352	0.19984	0.099921
33	3.2042	0.098284	1.6353	18.837	6.6386	0.2043	0.10215
34	3.3042	0.1013	1.6854	19.206	6.642	0.20819	0.1041
35	3.4042	0.1044	1.7371	19.521	6.6455	0.2115	0.10575
36	3.5042	0.10742	1.7873	19.89	6.6489	0.21538	0.10769
37	3.6042	0.11043	1.8374	20.311	6.6523	0.21983	0.10991
38	3.7042	0.11354	1.8891	20.679	6.6558	0.2237	0.11185
39	3.8042	0.11664	1.9408	21.047	6.6593	0.22756	0.11378
40	3.9042	0.11966	1.9909	21.416	6.6627	0.23142	0.11571
41	4.0042	0.12267	2.0411	21.731	6.6661	0.23472	0.11736
42	4.1042	0.12578	2.0927	22.152	6.6697	0.23914	0.11957
43	4.2042	0.12888	2.1444	22.521	6.6732	0.24298	0.12149
44	4.3042	0.13181	2.193	22.889	6.6765	0.24684	0.12342
45	4.4042	0.13491	2.2447	23.257	6.68	0.25068	0.12534
46	4.5042	0.13793	2.2949	23.626	6.6835	0.25451	0.12726
47	4.6042	0.14112	2.3481	24.047	6.6871	0.25891	0.12945
48	4.7042	0.14423	2.3997	24.415	6.6906	0.26274	0.13137
49	4.8042	0.14724	2.4499	24.783	6.6941	0.26656	0.13328
50	4.9042	0.15035	2.5016	25.204	6.6976	0.27095	0.13547
51	5.0042	0.15355	2.5547	25.625	6.7013	0.27532	0.13766
52	5.5042	0.16907	2.8131	27.572	6.7191	0.29545	0.14773
53	6	0.18451	3.07	29.519	6.7369	0.31548	0.15774
54	6.5	0.20004	3.3283	31.466	6.7549	0.33539	0.16769
55	7	0.21548	3.5852	33.57	6.7729	0.35687	0.17844
56	7.5	0.23082	3.8405	35.623	6.7909	0.37769	0.18884
57	8	0.24626	4.0973	37.517	6.8091	0.39671	0.19835
58	8.5	0.26151	4.3511	39.727	6.8271	0.41896	0.20948
59	9	0.27677	4.6049	41.831	6.8453	0.43999	0.21999
60	9.5	0.2922	4.8618	43.884	6.8638	0.46033	0.23017
61	10	0.30764	5.1186	45.936	6.8824	0.48056	0.24028
62	10.5	0.32317	5.377	47.988	6.9012	0.50066	0.25033
63	11	0.33879	5.6369	49.987	6.9202	0.52009	0.26004
64	11.5	0.3545	5.8983	52.092	6.9394	0.54048	0.27024
65	12	0.37003	6.1566	54.144	6.9585	0.56023	0.28012
66	12.5	0.38519	6.4089	56.091	6.9773	0.57882	0.28941
67	13	0.40054	6.6642	57.933	6.9963	0.59619	0.2981
68	13.5	0.4157	6.9165	59.616	7.0153	0.61186	0.30593
69	14	0.43095	7.1703	60.774	7.0345	0.62204	0.31102
70	14.5	0.44648	7.4287	61.826	7.0541	0.63105	0.31552
71	15	0.46174	7.6825	62.51	7.0735	0.63628	0.31814
72	15.5	0.47726	7.9408	63.089	7.0934	0.64038	0.32019
73	16	0.49288	8.2007	63.405	7.1134	0.64176	0.32088
74	16.5	0.50859	8.4621	63.668	7.1338	0.64259	0.3213
75	17	0.52412	8.7205	63.405	7.1539	0.63813	0.31907
76	17.5	0.53938	8.9743	62.879	7.1739	0.63108	0.31554
77	18	0.55481	9.2311	62.721	7.1942	0.62772	0.31386
78	18.5	0.57016	9.4865	62.405	7.2145	0.6228	0.3114
79	19	0.58514	9.7357	61.984	7.2344	0.61689	0.30845
80	19.5	0.60012	9.9849	61.458	7.2544	0.60997	0.30498
81	20	0.61556	10.242	60.353	7.2752	0.59729	0.29865

82	20.5	0.63127	10.503	58.775	7.2964	0.57998	0.28999
83	21	0.64698	10.765	56.617	7.3178	0.55706	0.27853
84	21.5	0.66269	11.026	54.67	7.3393	0.53633	0.26816
85	22	0.67803	11.281	52.355	7.3604	0.51214	0.25607
86	22.5	0.69338	11.537	49.514	7.3817	0.48295	0.24148
87	23	0.70854	11.789	46.672	7.4028	0.45394	0.22697
88	23.5	0.7237	12.041	42.989	7.424	0.41692	0.20846
89	24	0.73887	12.293	39.99	7.4454	0.38672	0.19336
90	24.5	0.7543	12.55	37.885	7.4673	0.36529	0.18265
91	25	0.76983	12.809	35.886	7.4894	0.34499	0.1725
92	25.5	0.78536	13.067	34.465	7.5116	0.33035	0.16518
93	26	0.80071	13.322	33.307	7.5338	0.31832	0.15916
94	26.5	0.81596	13.576	32.308	7.5559	0.30786	0.15393
95	27	0.83131	13.831	31.624	7.5783	0.30045	0.15023
96	27.5	0.84647	14.084	30.887	7.6005	0.29259	0.1463
97	28	0.86172	14.338	30.045	7.6231	0.28378	0.14189
98	28.5	0.87716	14.594	29.203	7.646	0.275	0.1375
99	29	0.89278	14.854	28.73	7.6693	0.26971	0.13486
100	29.5	0.90858	15.117	28.046	7.6931	0.26248	0.13124



	Sample No.	Elev. or Depth	Material Description	Specific Gravity	LL	PL	Oversize	% < #200
○	BS-1	0.0'-2.0'	SL. ORGANIC SILTY CLAY LT. F-C SAND TR. F GRAVEL-DARK BROWN TO BLACK					

Sample No.	BS-1			
Natural water content, percent	24.9			
Optimum water content, percent	18.6			
Max dry density, pcf	101.5			

Remarks: TOP SOIL NOTED, GLASS NOTED, NATURAL WATER CONTENT "AS RECEIVED"

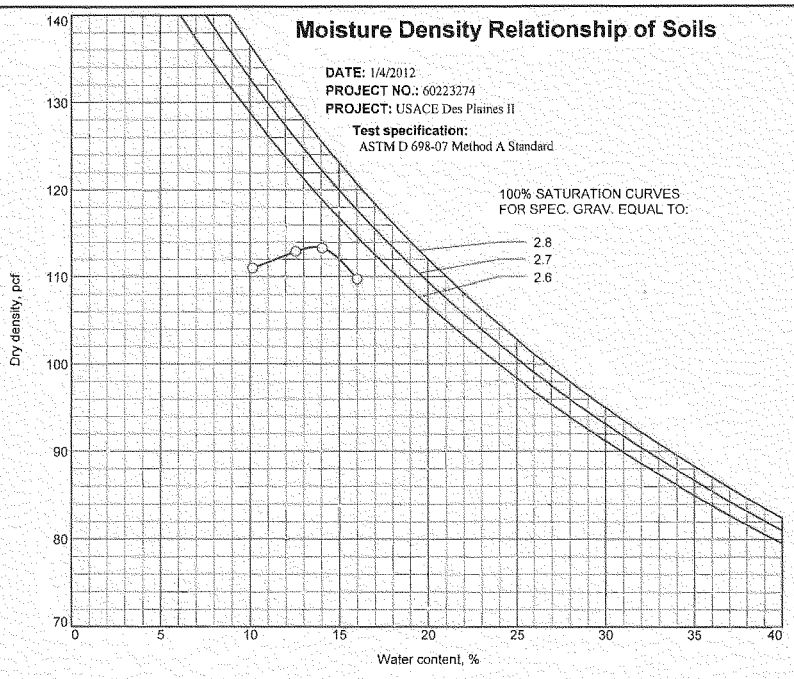
Project: USACE Des Plaines II **Project No.:** 60223274

Location:

Source: BULK SAMPLE

AECOM

Tested By: JAF **Checked By:** WPQ



	Sample No.	Elev. or Depth	Material Description	Specific Gravity	LL	PL	Oversize	% < #200
O	BS-2	2.0'-10.0'	SILTY CLAY TRACE F-M SAND - GRAY					

Sample No.	BS-2			
Natural water content, percent	21.4			
Optimum water content, percent	13.7			
Max dry density, pcf	113.4			

Remarks:	Project: USACE Des Plaines II	Project No.: 60223274
	Location:	
	Source: BULK SAMPLE	
	AECOM	

Tested By: JAF Checked By: WPQ

AECOM

ATTACHMENT

H.4: Research Data

AECOM

H.4.1: Illinois State Water Survey Data

AECOM

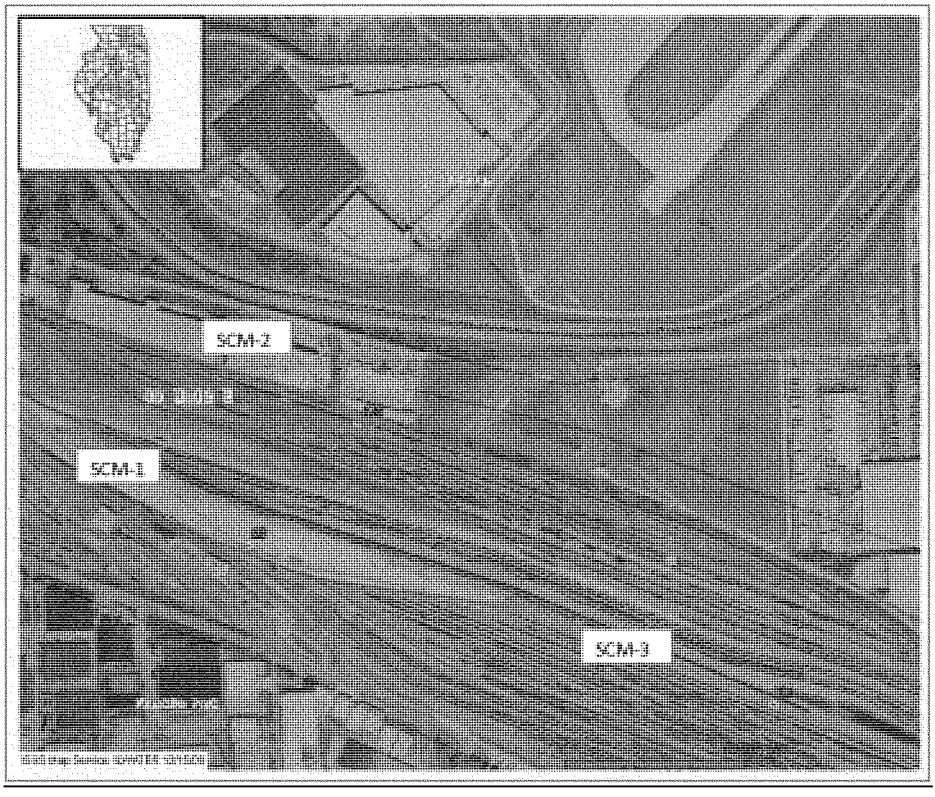
Illinois State Water Survey – Well Database Search Results

SITE NAME: SILVER CREEK RESERVOIR (SCME02)

COUNTY: Cook **CITY:** Franklin Park

TOWNSHIP: 40N **RANGE:** 12E **SECTION:** 20

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

SCM-1

Monitoring	Top	Bottom
fill	0	5
silty clay w/traces sand & gravel	5	14
silt w/trace clay	14	15
sand w/trace silt	15	18
clayey silt w/traces sand & gravel	18	23
Total Depth		23

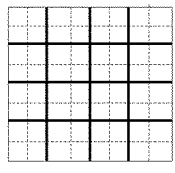
Casing: 2" 304 SS from 0' to 13'
Screen: 10' of 2" diameter .006 slot
Grout: BENTONITE from 0 to 9.
Size hole below casing: 8"

Water from fill, silt, & sand at 5' to 18'.
Static level 8' below casing top which is 2' above GL

Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM C P Rail Systems
DATE DRILLED May 5, 1993 **NO.** MW-8
ELEVATION 0 **COUNTY NO.** 31421
LOCATION SW NE NE
LATITUDE 41.947851 **LONGITUDE** -87.908415
COUNTY Cook **API** 120313142100 **19 - 40N - 12E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

SCM-2

Water Well	Top	Bottom
Total Depth		263
Driller's Log filed		
Sample set # 55129 (68' - 270') Received: February 19, 1968		

Permit Date: **Permit #:**

COMPANY Wehling Well Works Inc.

FARM Simmer W R Co

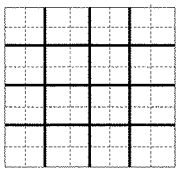
DATE DRILLED November 1, 1967 **NO.** 1

ELEVATION 0 **COUNTY NO.** 00606

LOCATION NE NE NE

LATITUDE 41.949713 **LONGITUDE** -87.906038

COUNTY Cook **API** 120310060600 **19 - 40N - 12E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

SCM-3

Monitoring	Top	Bottom
fill	0	7
silty clay	7	9
silt w/ some clay	9	10
sand and silt seams	18	15
clayey silt seam	10	18
Total Depth		18

Casing: 2" 304 SS from 0' to 8'
Screen: 1' of 2" diameter .006 slot
Grout: BENTONITE from 0 to 4.
Size hole below casing: 8"

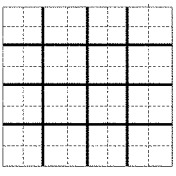
Water from sand at 10' to '.
Static level 6' below casing top which is 2' above GL

Additional location info: Lot: Subdivision: Track 68 o/w Separater

Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM CP Rail Systems
DATE DRILLED May 5, 1993 **NO.** MW-7
ELEVATION 0 **COUNTY NO.** 31237
LOCATION SE NW
LATITUDE 41.945281 **LONGITUDE** -87.897407
COUNTY Cook **API** 120313123700 **20 - 40N - 12E**



AECOM

ATTACHMENT

H.5: Site Reconnaissance Photographs

Photograph #1

Looking Northwest at East Basin from Access Road

Photograph #2

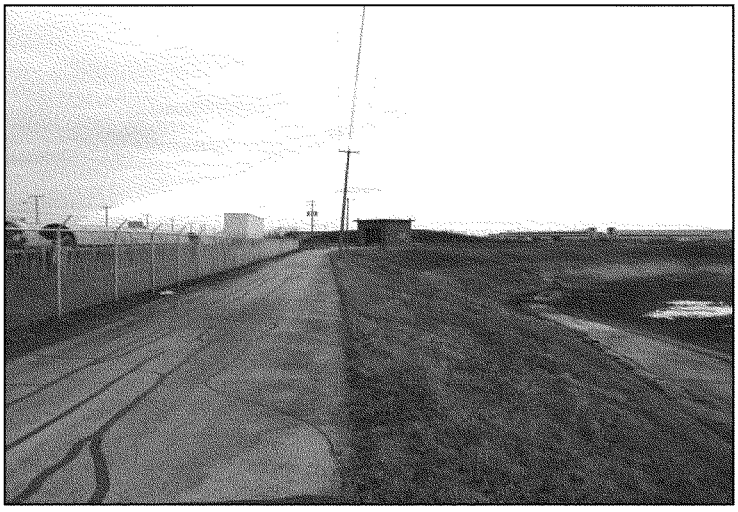
Looking North at East Basin from Access Road

Photograph #3

Looking Northeast at East Basin from Access Road

Photograph #4

Looking East along East Basin from Access Road

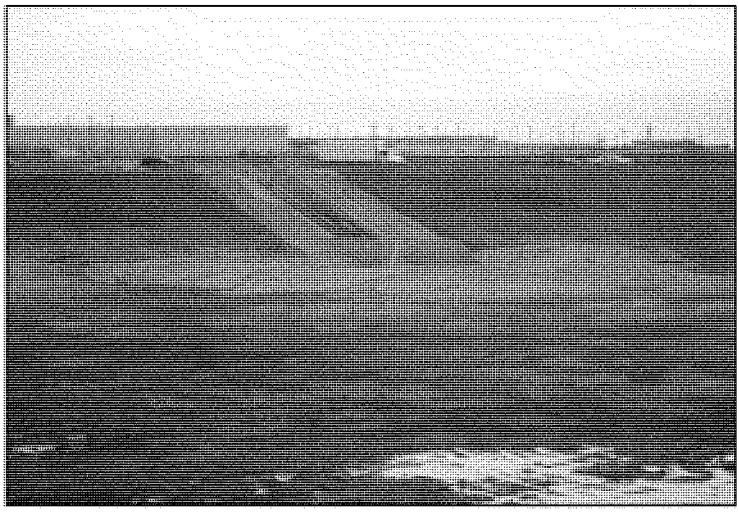


Photograph #5

Looking West along basin from Access Road

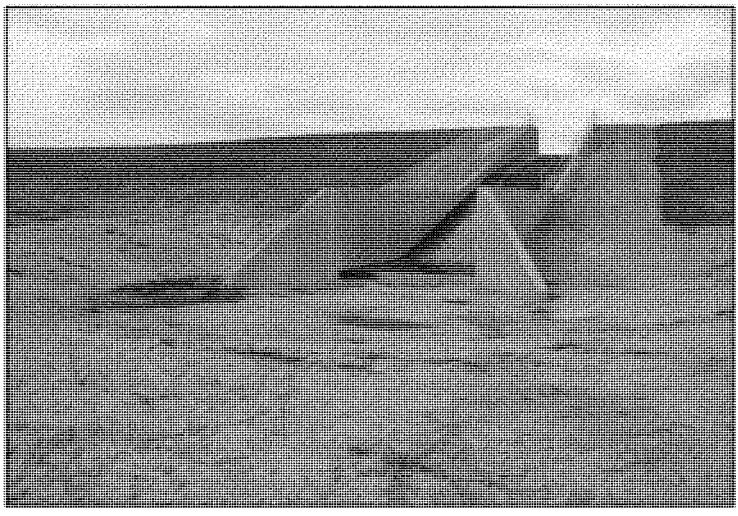
Photograph #6

Looking at Equalization Pipe and Intake at Southwest Corner of East Basin



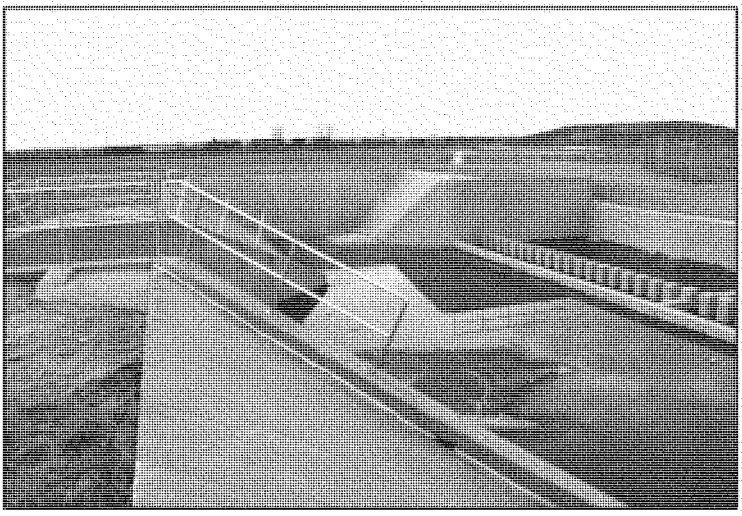
Photograph #7

Looking at Spillway Structure from Access Road



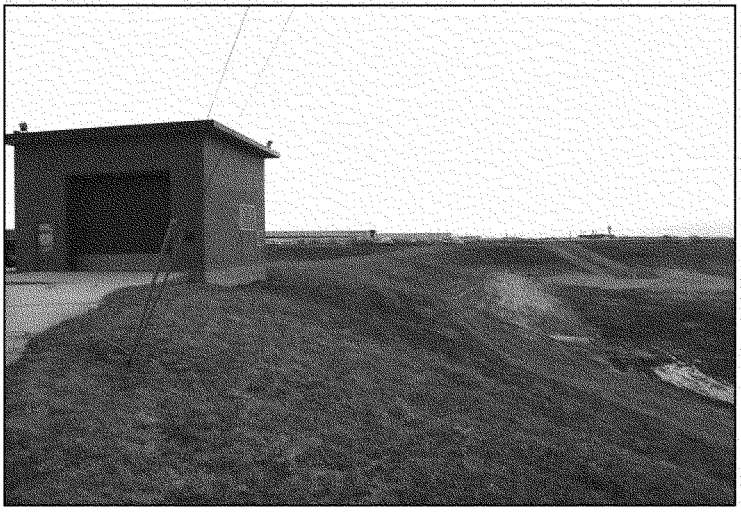
Photograph #8

Looking at Spillway from Bottom of Reservoir



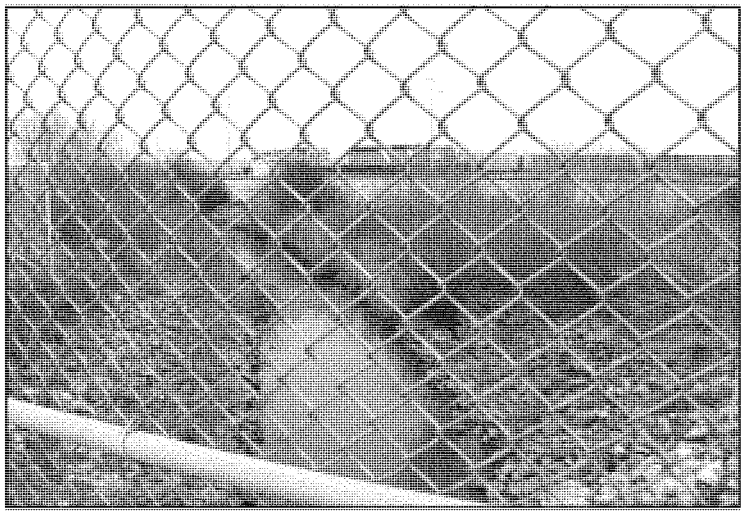
Photograph #9

Looking at Spillway from Top of Reservoir



Photograph #10

Looking at Pump House and Culvert Embankment



Photograph #11

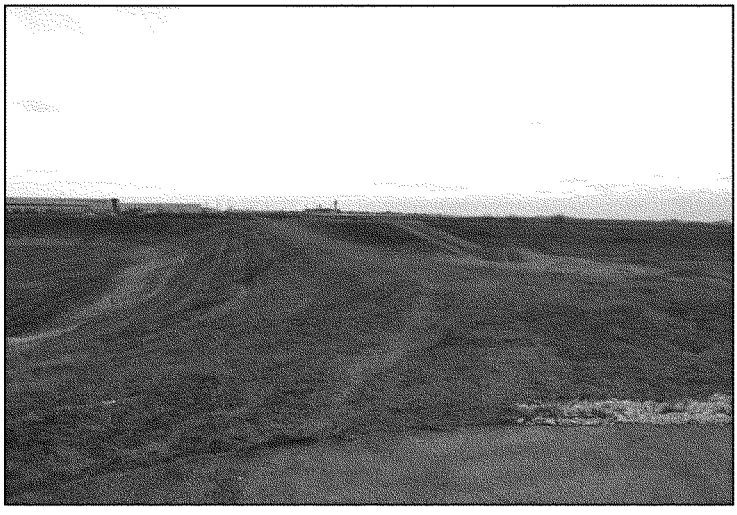
Looking at Culvert Outlet on the South Side of the Pump House

Photograph #12

Looking West along the South Side of the West Basin

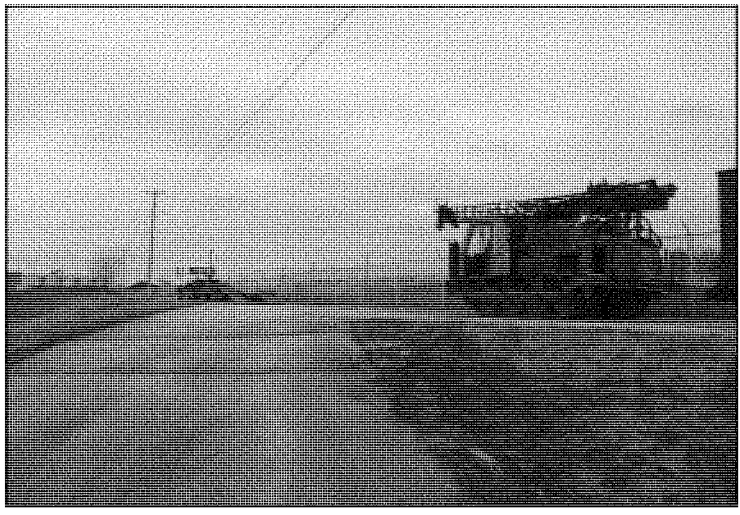
Photograph #13

Looking Northwest from the Pump House at the West Basin



Photograph #14

Looking North at Culvert Embankment from Pump House

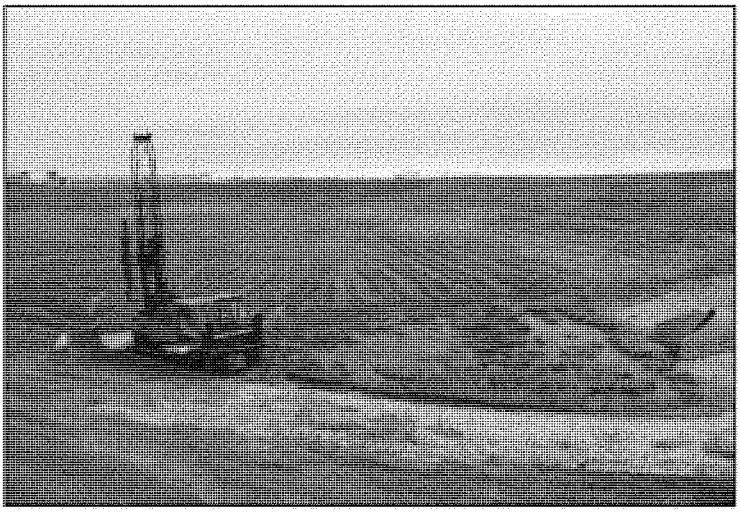


Photograph #15

Unloading Drill Rig at the Access Road

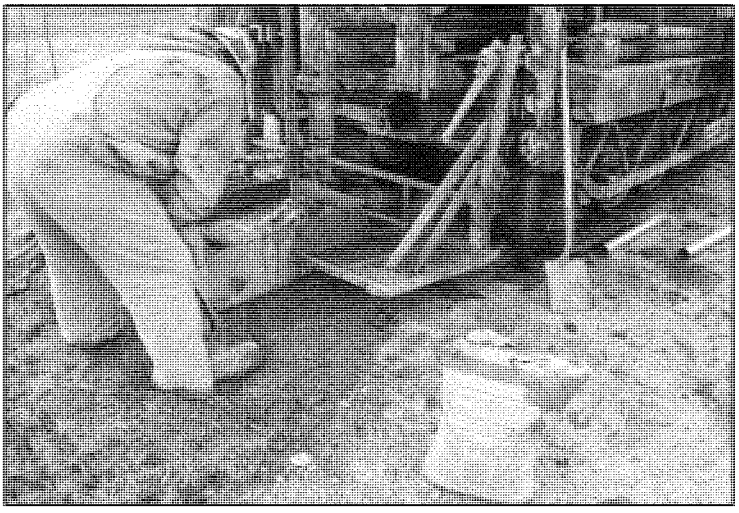
Photograph #16

Drilling at Boring DP2-11-16



Photograph #17

Drilling at Boring DP2-11-17



Photograph #18

Rotary Drilling Activity

APPENDIX I

Dam #1 Data Compilation

AECOM

APPENDIX I

Dam #1 Data Compilation

1. **Type of Project:** Dam Removal
2. **USACE Description:** The Dam #1 site is located east of Hintz Road and Milwaukee Ave in Wheeling, Illinois.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified four nearby water well logs. The information from the website is included in Attachment I.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment I.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

I.1: Research Data

I.1.1: Illinois State Water Survey Data

I.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

I.1: Research Data

AECOM

I.1.1: Illinois State Water Survey Data

AECOM

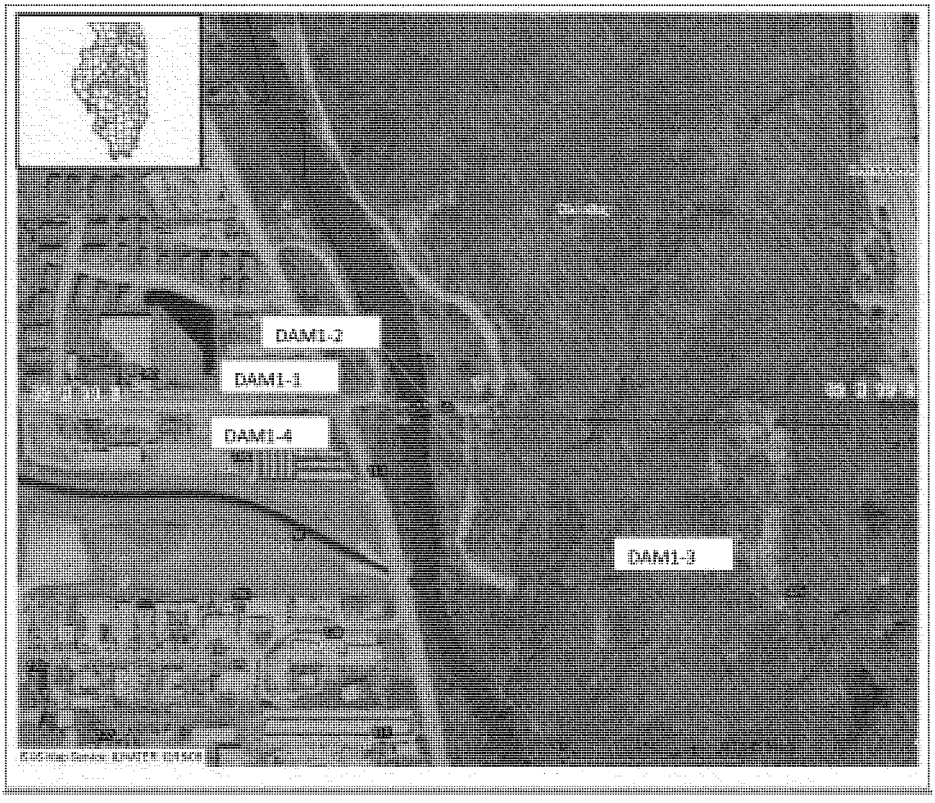
Illinois State Water Survey – Well Database Search Results

SITE NAME: DAM#1 (DAM1)

COUNTY: Cook **CITY:** Wheeling

TOWNSHIP: 42N **RANGE:** 11E **SECTION:** 12,13

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM1-1

Engineering Test	Top	Bottom
Interpretation by: G. E. Ekblaw on 11-FEB-46		
no samples	0	3
clay, silty, leached, blackish-brown, very plastic, soft	3	8
till, silty, calcareous, gray, firm, crumbly	8	16
till, calcareous, gravelly, gray	16	21
till, calcareous, gray, tough	21	27
Total Depth		27

Driller's Log filed

Permit Date: **Permit #:**

COMPANY Cook Cnty. Forest Pres.

FARM Dam 1 West Hole

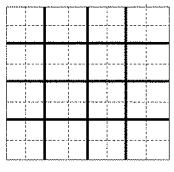
DATE DRILLED January 1, 1946 **NO.**

ELEVATION 635GL **COUNTY NO.** 03690

LOCATION 100'N line, 2150'E line of section

LATITUDE 42.123814 **LONGITUDE** -87.895733

COUNTY Cook **API** 120310369000 **13 - 42N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM1-2

Engineering Test	Top	Bottom
Interpretation by: G. E. Ekblaw on 11-FEB-46		
clay & gravelly clayey sand, leached, dark brown, pebbles to 1/2"	0	3
sand & gravel, clayey, calcareous, light brown, pebbles to 3/4"	3	4
till, silty, calcareous, light brown	4	6
silt & fine sand, sligtly clayey, calcareous, yellowish brown	6	8
till, calcareous, light brown with gray mottling	8	10
sand, mostly medium-grained, calcareous, gray	10	13
till, calcareous, dark gray, tough	13	21
same	21	28
Total Depth		29

Driller's Log filed

Permit Date: **Permit #:**

COMPANY Cook Cnty. Forest Pres.

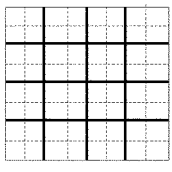
FARM Dam 1 East Hole

DATE DRILLED January 1, 1946 **NO.**

ELEVATION 638GL **COUNTY NO.** 03689

LOCATION 100'N line, 2000'E line of section

LATITUDE 42.12381 **LONGITUDE** -87.895178



COUNTY Cook **API** 120310368900 **13 - 42N - 11E**

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM1-3

Noncommunity - Public Water Well	Top	Bottom
clay	0	15
gravel	15	22
sandy gravel & clay	22	60
gravel	60	68
sand	68	90
gravel	90	95
lime	95	225
Total Depth		225

Casing: 6" CEMENTED IN from 0' to 126'

Size hole below casing: 5.875"

Static level 42' below casing top which is ' above GL
Pumping level ' when pumping at 4 gpm for hours

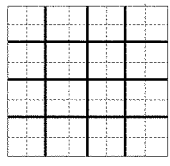
Driller's Log filed

Additional location info: Lot: Subdivision: Dam #1

Address of well: 536 N. Harlem Ave.
River Forest, IL

Permit Date: April 30, 1969 **Permit #:** 6687

COMPANY Wehling Well Works, Inc.
FARM Forest Preserve Dist
DATE DRILLED May 25, 1969 **NO.**
ELEVATION 637GL **COUNTY NO.** 00963
LOCATION SE NE NE
LATITUDE 42.121324 **LONGITUDE** -87.889066
COUNTY Cook **API** 120310096300 **13 - 42N - 11E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM1-4

Water Well	Top	Bottom
dirt, black	0	1
clay, yellow	1	13
clay, blue	13	49
sand & gravel	49	51
clay, blue	51	95
sand & gravel	95	101
limestone	101	113
Total Depth		113

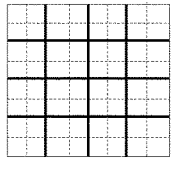
Casing: 4.5" CASING from ' to 101'

Static level 15' below casing top which is ' above GL
Pumping level ' when pumping at 5 gpm for 2 hours

Driller's Log filed

Permit Date: **Permit #:**

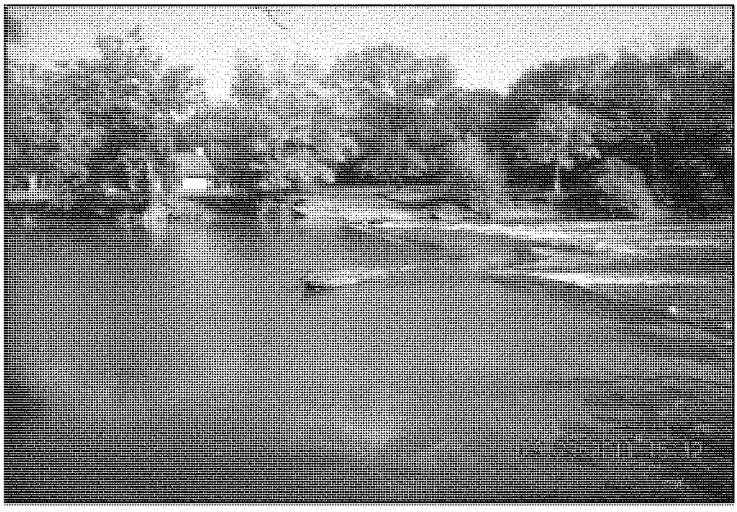
COMPANY Snelten, Cornelius, BA
FARM Costanza, Conrad
DATE DRILLED October 1, 1940 **NO.**
ELEVATION 640GL **COUNTY NO.** 03688
LOCATION 400'N line, 2350'E line of section
LATITUDE 42.122995 **LONGITUDE** -87.896493
COUNTY Cook **API** 120310368800 **13 - 42N - 11E**



AECOM

ATTACHMENT

I.2: Site Reconnaissance Photographs



Photograph #1

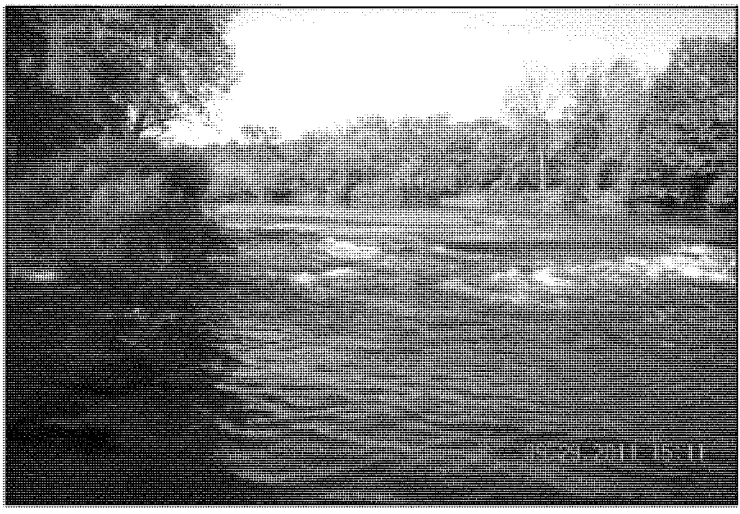
Looking East from 30 ft Upstream of Dam

Photograph #2

Looking East from 30 ft Downstream of Dam

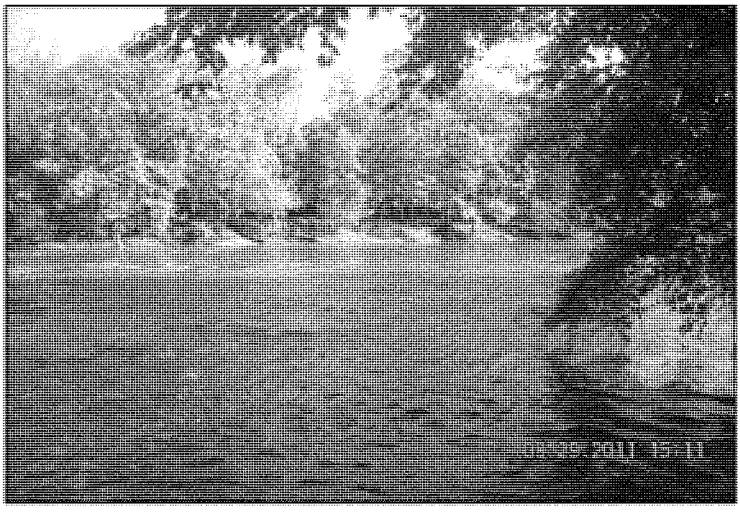
The Des Plaines River Dam No. 1

AECOM



Photograph #3

Looking Upstream from West Bank 30 ft Downstream of Dam

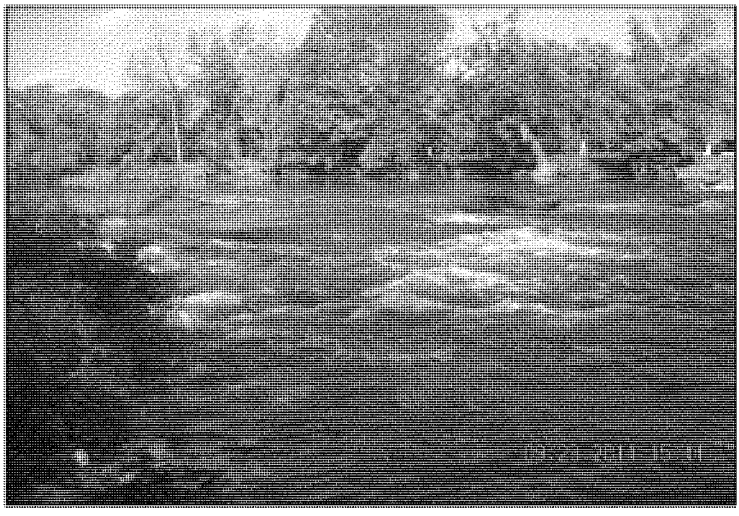


Photograph #4

Looking Downstream from West Bank 30 ft Upstream of Dam

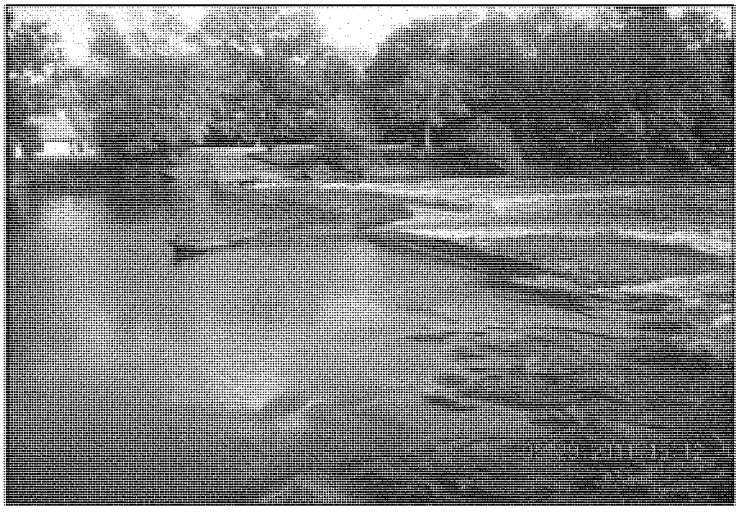
Client: US Army Corps of Engineers
Contract No: W911XK-09-D-0015
Project: Des Plaines II Site Investigations

AECOM Project No: 60223274



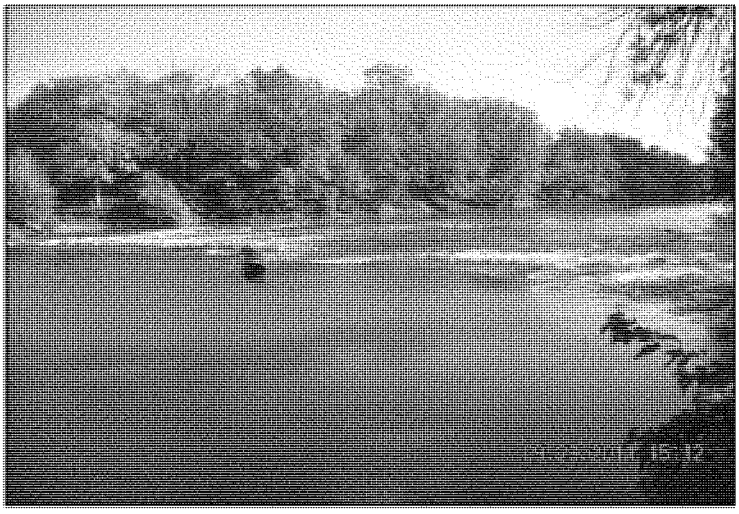
Photograph #5

Looking at Upstream Section of East Bank from 30 ft Downstream of Dam



Photograph #6

Looking at Downstream Section of East Bank from 30 ft Upstream of Dam



Photograph #7

Looking Downstream from West Bank 50 ft Upstream of Dam

Photograph #8

Looking Downstream from West Bank 150 ft Upstream of Dam

Photograph #9

Looking East from West Bank 150 ft Downstream of Dam

Photograph #10

General Site Conditions Surrounding Dam

APPENDIX J

Dam #2 Data Compilation

AECOM

APPENDIX J

Dam #2 Data Compilation

1. **Type of Project:** Dam Removal
2. **USACE Description:** The Dam #2 site is located northeast of Kensington Road and River Road in Wheeling, Illinois.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified three nearby water well logs. The information from the website is included in Attachment J.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are induded in Attachment J.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

J.1: Research Data

J.1.1: Illinois State Water Survey Data

J.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

J.1: Research Data

AECOM

J.1.1: Illinois State Water Survey Data

AECOM

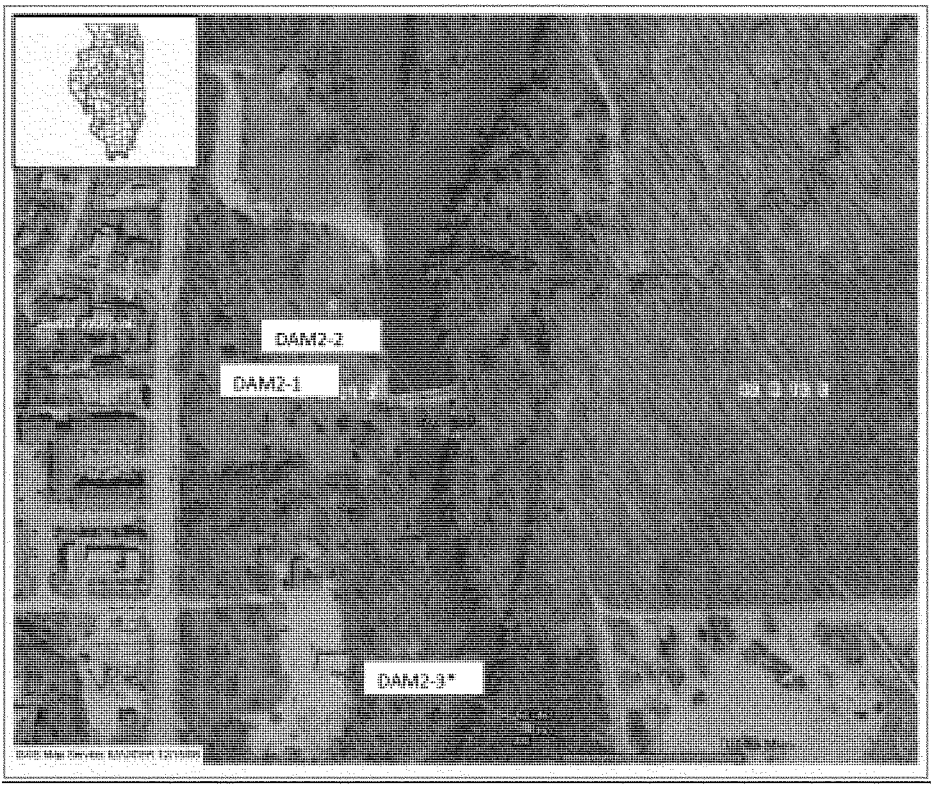
Illinois State Water Survey – Well Database Search Results

SITE NAME: DAM#2 (DAM2)

COUNTY: Cook **CITY:** Wheeling

TOWNSHIP: 42N **RANGE:** 11E **SECTION:** 25

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

*: More than two well/boring logs available for cluster of wells/boring logs. Deepest log is provided on attached sheets.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM2-1

Engineering Test	Top	Bottom
Total Depth		29
Survey Sample Study filed		

Permit Date: **Permit #:**

COMPANY Cook Cnty. Forest Pres.

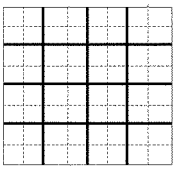
FARM Dam

DATE DRILLED January 1, 1946 **NO.** 2 West Ho

ELEVATION 632GL **COUNTY NO.** 03841

LOCATION 400'S line, 600'E line of section

LATITUDE 42.081625 **LONGITUDE** -87.890347



COUNTY Cook **API** 120310384100 **25 - 42N - 11E**

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DAM2-2

Engineering Test	Top	Bottom
Total Depth		27
Survey Sample Study filed		

Permit Date: **Permit #:**

COMPANY Cook Cnty. Forest Pres.

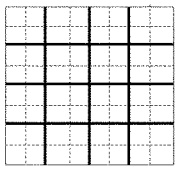
FARM Dam

DATE DRILLED January 1, 1946 **NO.** 2 East Ho

ELEVATION 628GL **COUNTY NO.** 03842

LOCATION 400'S line, 500'E line of section

LATITUDE 42.08162 **LONGITUDE** -87.889977



COUNTY Cook **API** 120310384200 **25 - 42N - 11E**

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM2-3

Noncommunity - Public Water Well	Top	Bottom
top soil	0	2
yellow clay	2	13
blue clay	13	34
gravel	34	50
limestone	50	260
Total Depth		260

Casing: 6" GALVANIZED from 0' to 50'
Size hole below casing: 5.75"

Water from limestone at 50' to 260'.
Static level 20' below casing top which is 2' above GL
Pumping level 140' when pumping at 0 gpm for 1 hour

Permanent pump installed at 140'

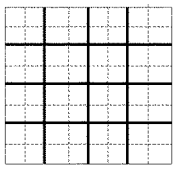
Additional location info: Lot: Subdivision: Foundry Rd.

Address of well: River Rd.
Des Plaines, IL

Location source: Location from permit

Permit Date: May 31, 1991 **Permit #:**

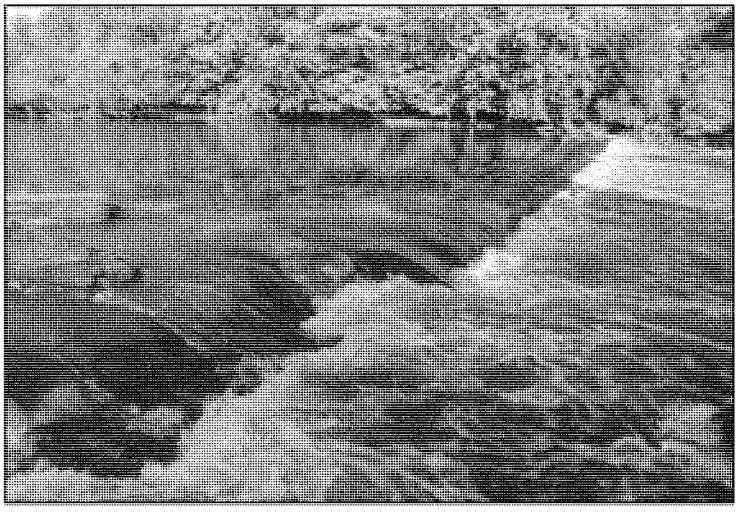
COMPANY Stinnett, James R.
FARM Forest Preserve Dist Cook Cnty
DATE DRILLED June 3, 1991 **NO.**
ELEVATION 0 **COUNTY NO.** 30300
LOCATION NE NE NE
LATITUDE 42.079601 **LONGITUDE** -87.889355
COUNTY Cook **API** 120313030000 **36 - 42N - 11E**



AECOM

ATTACHMENT

J.2: Site Reconnaissance Photographs

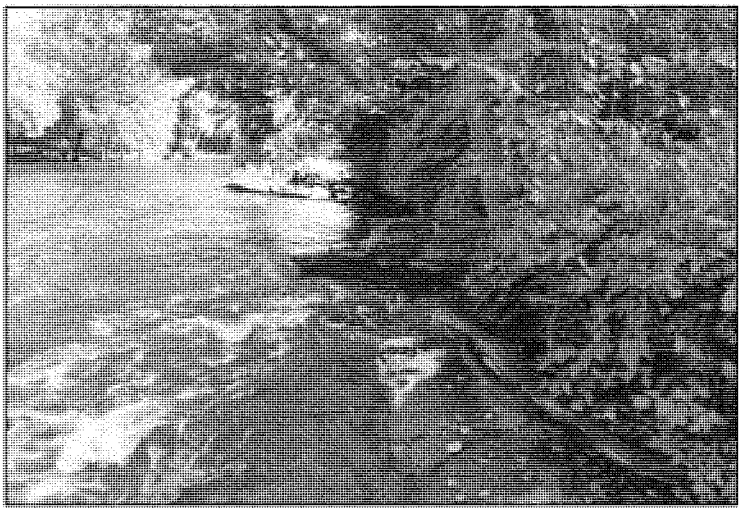


Photograph #1

Looking East from West Abutment

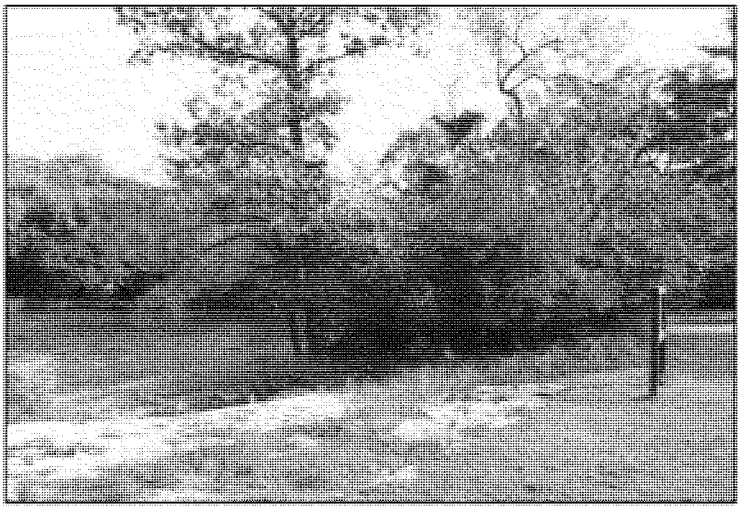
Photograph #2

Looking Upstream from West Abutment



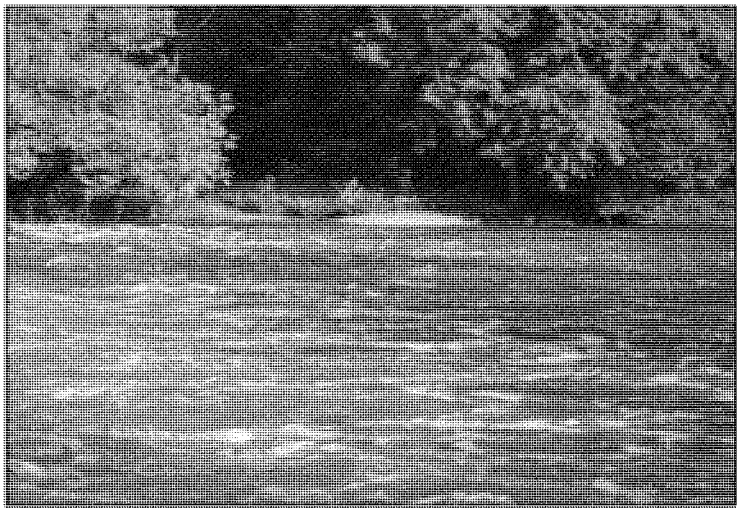
Photograph #3

Looking Downstream from West Abutment



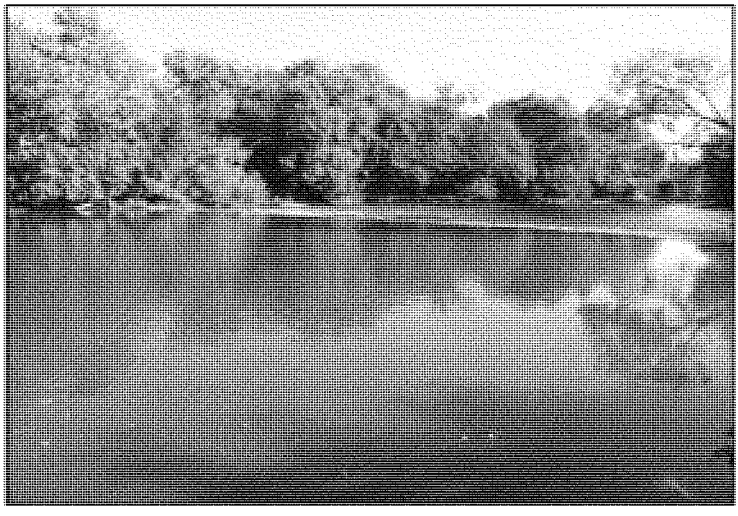
Photograph #4

Looking Downstream from West Abutment



Photograph #5

Downstream Tailwater

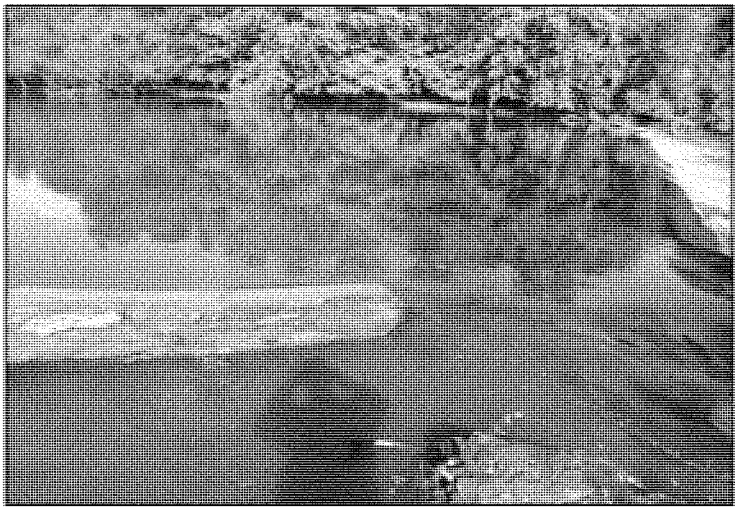


Photograph #6

Looking Downstream from West Bank 75 ft Upstream

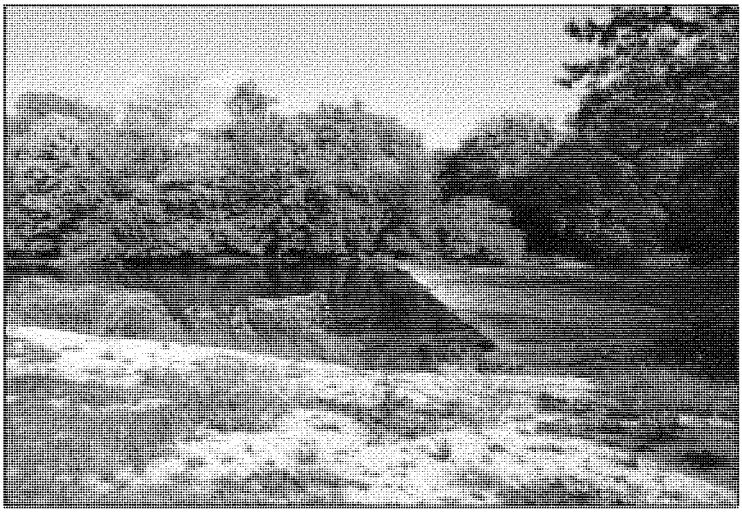
Photograph #7

Looking Downstream from West Bank 200 ft Upstream



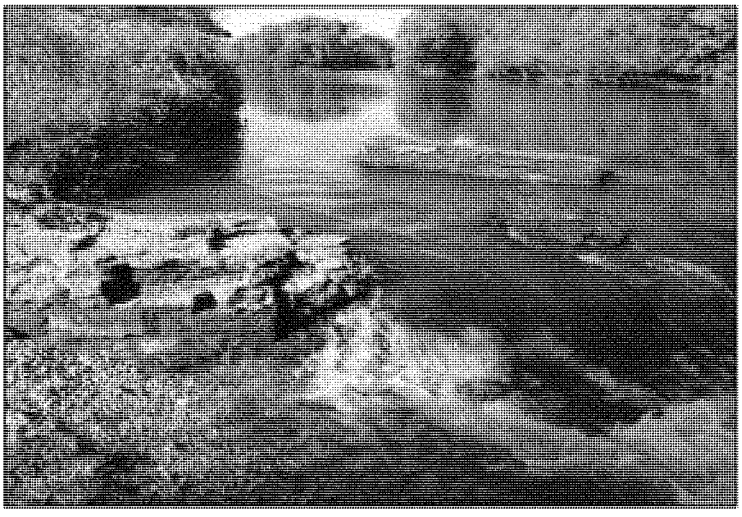
Photograph #8

Debris Accumulated Upstream of Dam



Photograph #9

Looking East from West Bank Previaling Ground Surface



Photograph #10

West Abutment

Photograph #11

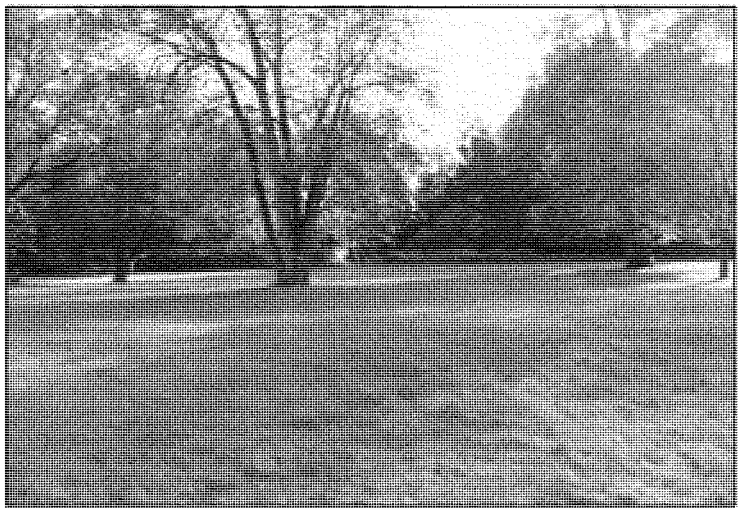
Looking East from West Abutment

Photograph #12

Looking Upstream from West Bank Prevailing Ground Surface

Photograph #13

General Surrounding Site Conditions



Photograph #14

General Surrounding Site Conditions

APPENDIX K

Dam #4 Data Compilation

AECOM

APPENDIX K

Dam #4 Data Compilation

1. **Type of Project:** Dam Removal
2. **USACE Description:** The Dam #4 site is located northeast of River Road and Higgins Road in Rosemont, Illinois.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified six nearby water well logs. The information from the website is included in Attachment K.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment K.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

K.1: Research Data

K.1.1: Illinois State Water Survey Data

K.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

K.1: Research Data

AECOM

K.1.1: Illinois State Water Survey Data

AECOM

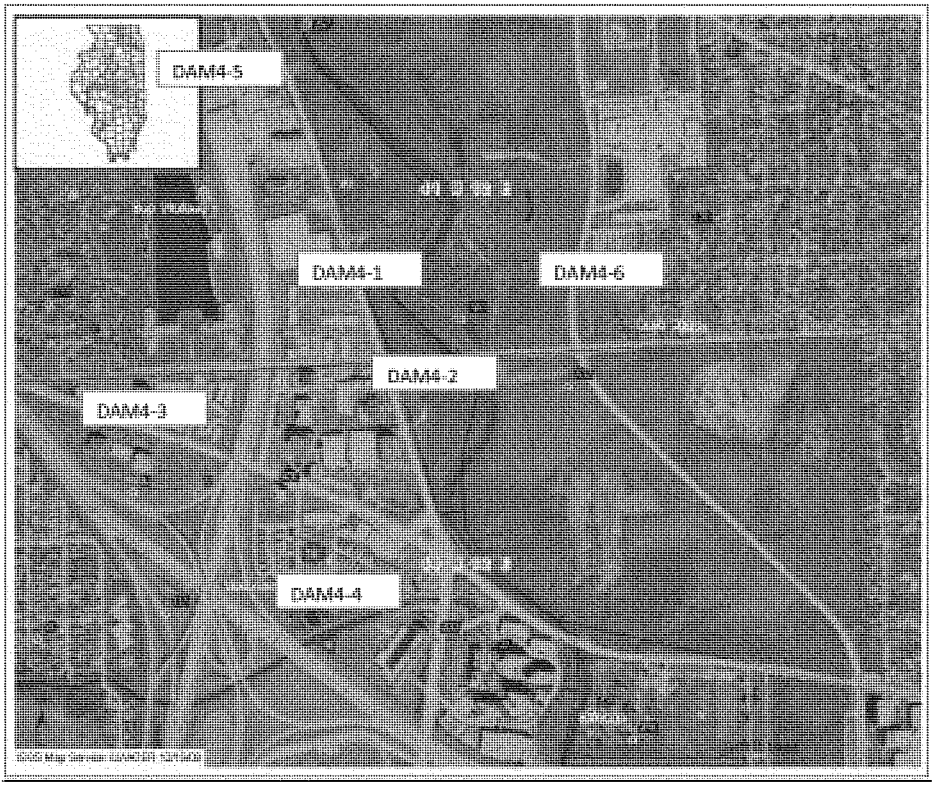
Illinois State Water Survey – Well Database Search Results

SITE NAME: DAM #4 (DAM4)

COUNTY: Cook **CITY:** Rosemont

TOWNSHIP: 40N **RANGE:** 12E **SECTION:** 3

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM4-1

Noncommunity - Public Water Well	Top	Bottom
no record	0	140
Total Depth		140

Permit Date: Permit #:

COMPANY

FARM Des Plains Mobile Home Park

DATE DRILLED January 1, 1983 NO. 5

ELEVATION 0 COUNTY NO. 33487

LOCATION SW SE SW

LATITUDE 41.996756 LONGITUDE -87.859211

COUNTY Cook API 120313348700 34 - 41N - 12E

Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DAM4-2

Water Well	Top	Bottom
Total Depth		102
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Snelton Brothers

FARM Park Ridge Camp

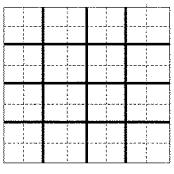
DATE DRILLED January 1, 1936 **NO.** 6

ELEVATION 633GL **COUNTY NO.** 03240

LOCATION 300'N line, 2500'E line of section

LATITUDE 41.99512 **LONGITUDE** -87.855822

COUNTY Cook **API** 120310324000 **3 - 40N - 12E**

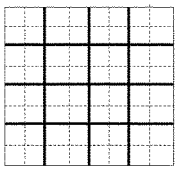


Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DAM4-3

Engineering Test	Top	Bottom
Total Depth		476
Driller's Log filed		

Permit Date: Permit #:

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED April 1, 1976 NO.
ELEVATION 634GL COUNTY NO. 26726
LOCATION SW NW NW
LATITUDE 41.992823 LONGITUDE -87.865362
COUNTY Cook API 120312672600 3 - 40N - 12E



Page 1

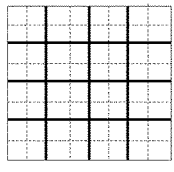
ILLINOIS STATE GEOLOGICAL SURVEY

DAM4-4

Water Well	Top	Bottom
Total Depth		200
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Vanoepen, Ernest
FARM Bolda Edward
DATE DRILLED October 1, 1970 **NO.**
ELEVATION 630GL **COUNTY NO.** 01153
LOCATION SW SE NW
LATITUDE 41.989144 **LONGITUDE** -87.860267
COUNTY Cook **API** 120310115300 **3 - 40N - 12E**



Page 1

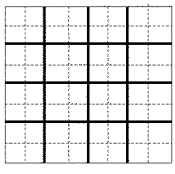
ILLINOIS STATE GEOLOGICAL SURVEY

DAM4-5

Engineering Test	Top	Bottom
Total Depth		257
Driller's Log filed		

Permit Date: **Permit #:**

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED December 1, 1975 **NO.**
ELEVATION 635GL **COUNTY NO.** 26755
LOCATION SW SW NW
LATITUDE 42.003879 **LONGITUDE** -87.86402
COUNTY Cook **API** 120312675500 **34 - 41N - 12E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DAM4-6

Private Water Well	Top	Bottom
black dirt, clay	0	15
small gravel, sand	15	35
clay	35	80
hardpan	80	82
limestone	82	120
Total Depth		120

Casing: 5" PVC SDR 21 200# from 0' to 82'
Screen: 4' of 5" diameter 20 slot
Grout: BENTONITE from 0 to 82.
Water from limestone at 82' to 120'.
Static level 50' below casing top which is 1' above GL
Pumping level 70' when pumping at 0 gpm for 0 hours

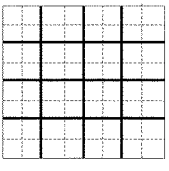
Additional location info: Lot: 8 Subdivision: County Clerk's Div.

Address of well: same as above

Location source: Location from permit

Permit Date: May 22, 1997 **Permit #:**

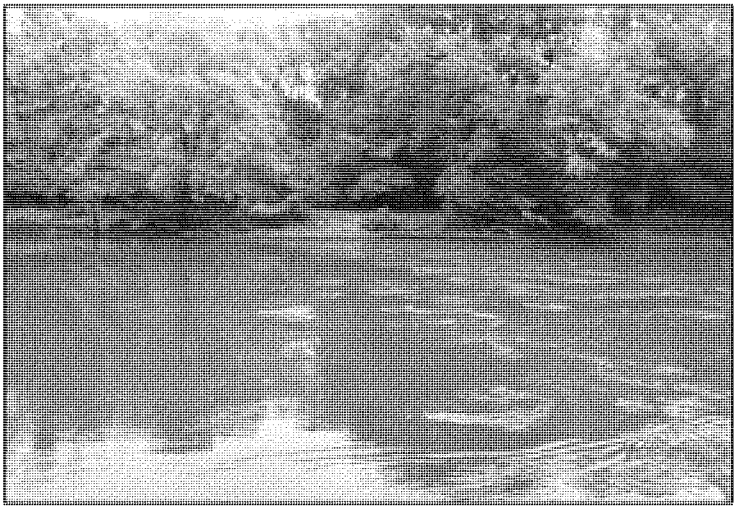
COMPANY Efflandt, Robert
FARM Georganis, George
DATE DRILLED June 12, 1997 **NO.**
ELEVATION 0 **COUNTY NO.** 33725
LOCATION NE SW SE
LATITUDE 41.998787 **LONGITUDE** -87.851835
COUNTY Cook **API** 120313372500 **34 - 41N - 12E**



AECOM

ATTACHMENT

K.2: Site Reconnaissance Photographs

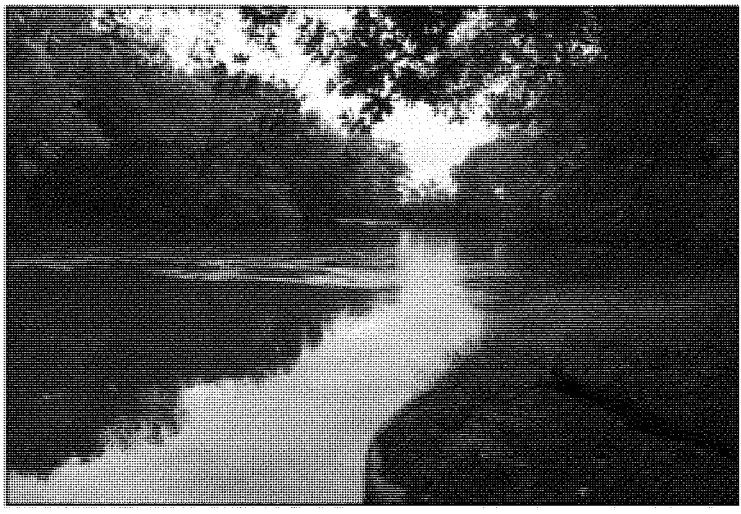


Photograph #1

Looking East from West Abutment

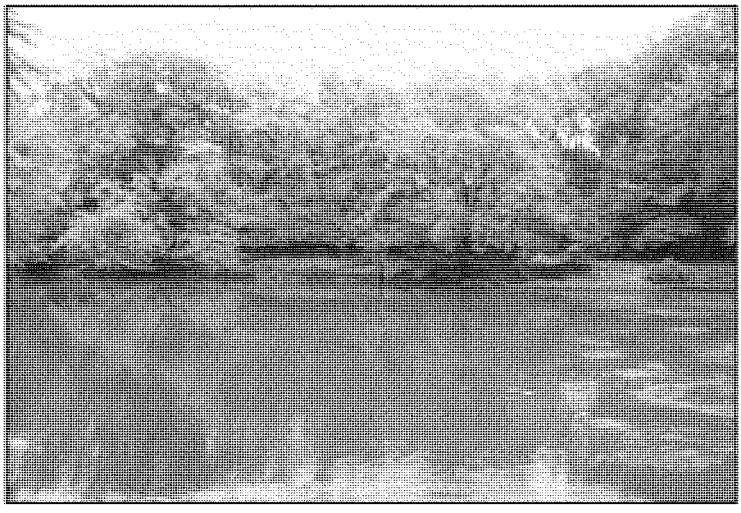
Photograph #2

Looking Upstream from West Abutment



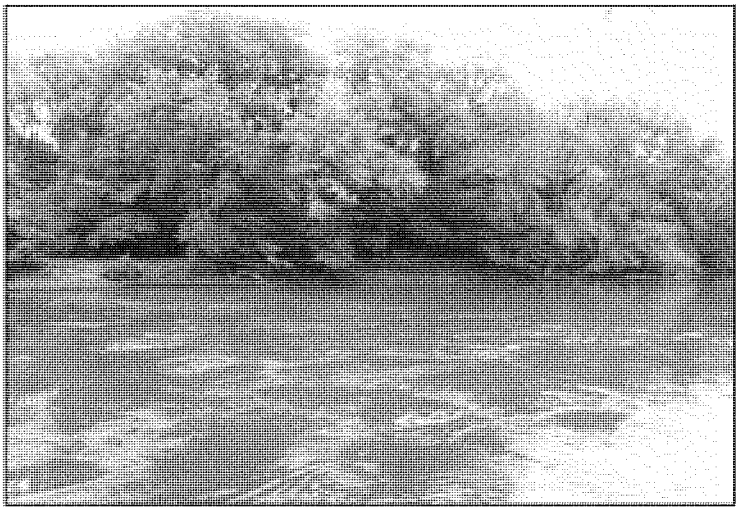
Photograph #3

Looking Downstream from West Abutment



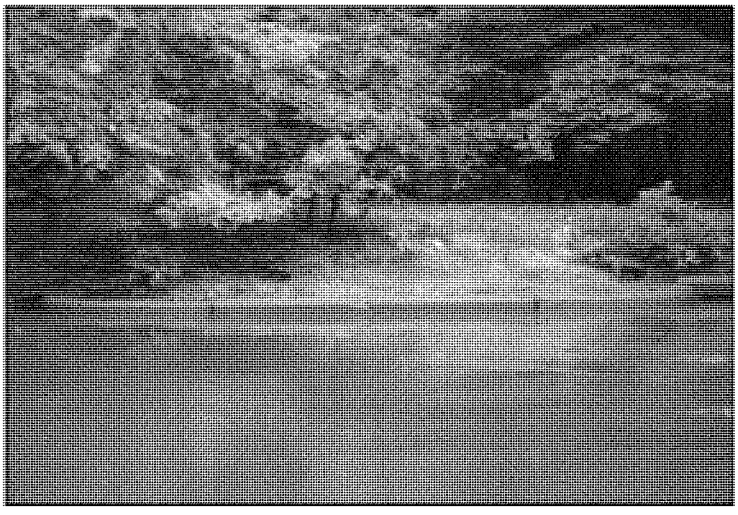
Photograph #4

Upstream Bank of East Abutment



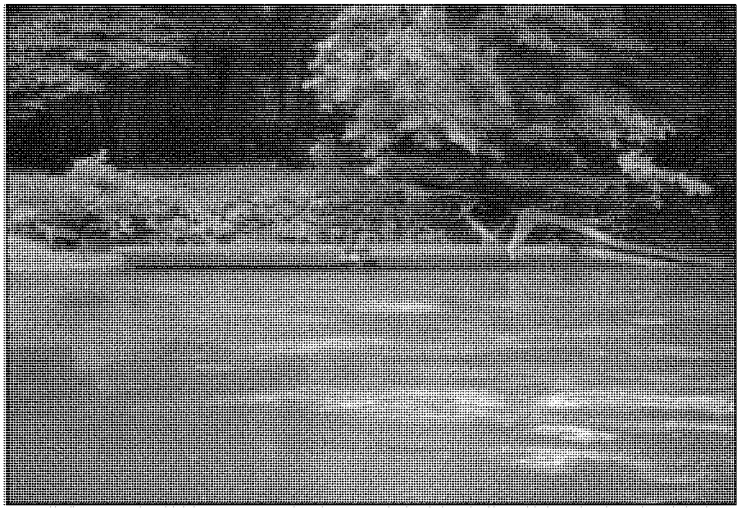
Photograph #5

Downstream Bank of East Abutment



Photograph #6

East Abutment

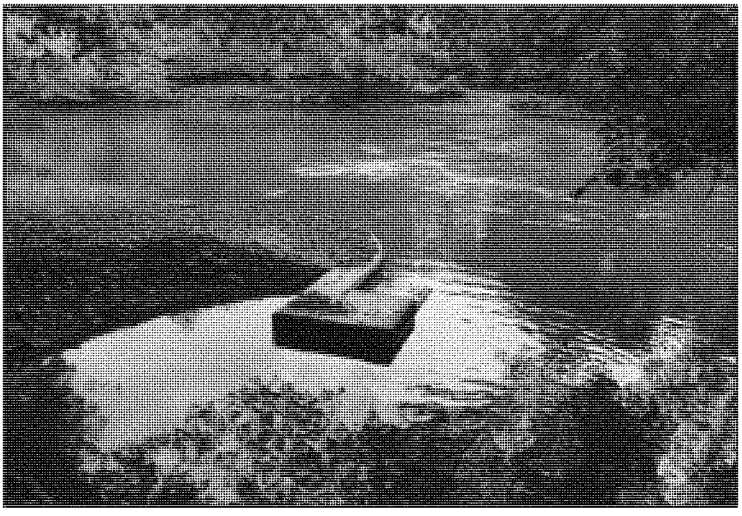


Photograph #7

East Abutment downstream portion)

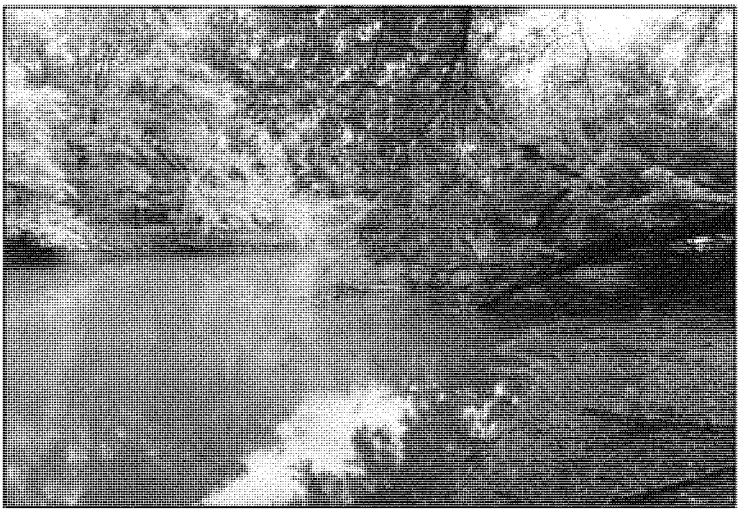
Photograph #8

Upstream End of West Abutment



Photograph #9

Downstream End of West Abutment



Photograph #10

Looking Downstream from West Bank 100 feet Upstream of Dam

Photograph #11

Looking Upstream from West Bank 100 feet Downstream of Dam

Photograph #12

General Site Conditions at the West Abutment

Photograph #13

General Site Conditions Surrounding Dam

Photograph #14

General Site Conditions Surrounding Dam

APPENDIX L

Dempster Avenue Dam Data Compilation

AECOM

APPENDIX L

Dempster Avenue Dam Data Compilation

1. **Type of Project:** Dam Removal
2. **USACE Description:** The Dempster Avenue Dam site is located south of the Miner Street and UP-NW Railroad bridges and east of River Road in Des Plaines, Illinois.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified two nearby water well logs. The information from the website is included in Attachment L.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment L.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

L.1: Research Data

L.1.1: Illinois State Water Survey Data

L.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

L.1: Research Data

AECOM

L.1.1: Illinois State Water Survey Data

AECOM

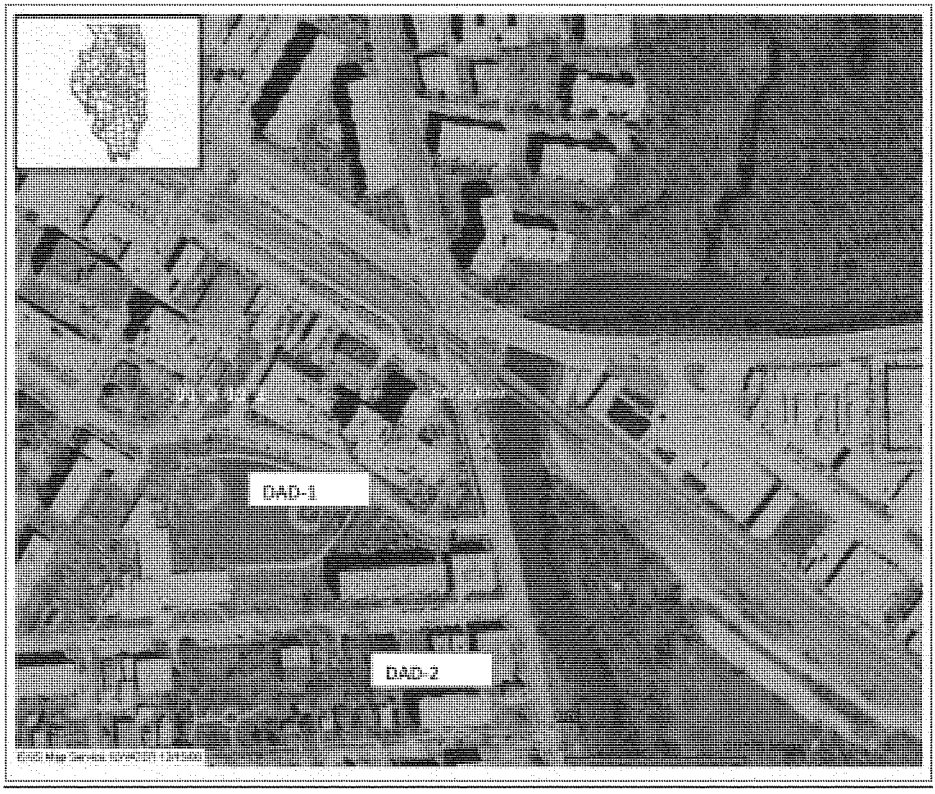
Illinois State Water Survey – Well Database Search Results

SITE NAME: DEMPSTER AVENUE DAM(DAD)

COUNTY: Cook **CITY:** Des Plaines

TOWNSHIP: 41N **RANGE:** 12E **SECTION:** 21

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

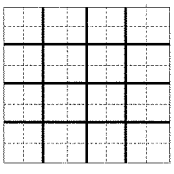
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

DAD-1

Engineering Test	Top	Bottom
Total Depth		
Core #C 13774 (3.5' - 105') Received: August 8, 1992		

Permit Date: **Permit #:**

COMPANY ATEC
FARM MSD OF Chicago
DATE DRILLED **NO.** D3-DS-324
ELEVATION 0 **COUNTY NO.** 30758
LOCATION NW NW NW
LATITUDE 42.037908 **LONGITUDE** -87.883536
COUNTY Cook **API** 120313075800 **21 - 41N - 12E**



ILLINOIS STATE GEOLOGICAL SURVEY

DAD-2

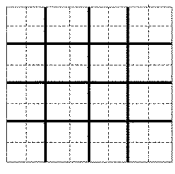
Water Well	Top	Bottom
Total Depth		1670

Driller's Log filed
Survey Sample Study filed
Sample set # 178 (20' - 1610') Received: January 9, 1924

Image viewing help: New users please read this.
GET IMAGE Miscellaneous document

Permit Date: **Permit #:**

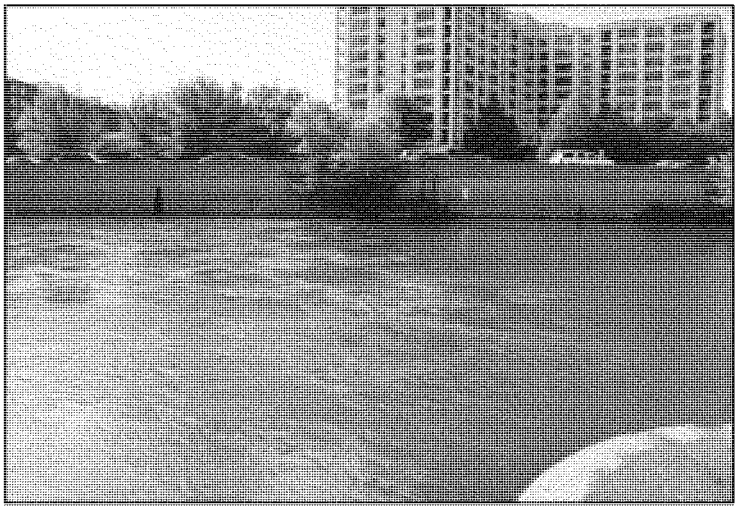
COMPANY Thorne W L
FARM Desplaines City
DATE DRILLED January 1, 1924 **NO.**
ELEVATION 631GL **COUNTY NO.** 03483
LOCATION 800'N line, 600'W line of section
LATITUDE 42.036639 **LONGITUDE** -87.882579
COUNTY Cook **API** 120310348300 **21 - 41N - 12E**



AECOM

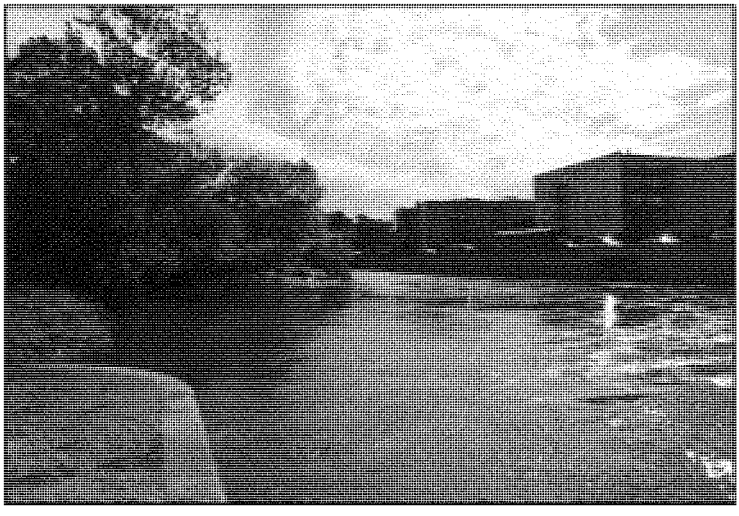
ATTACHMENT

L.2: Site Reconnaissance Photographs



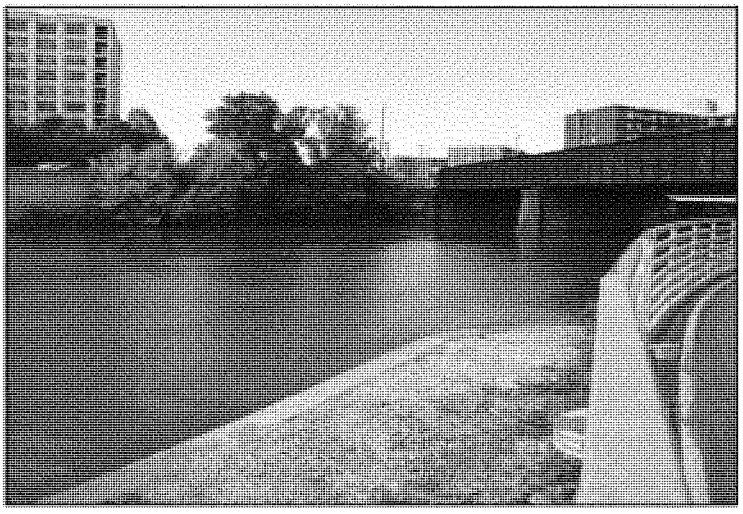
Photograph #1

Looking West from East Abutment



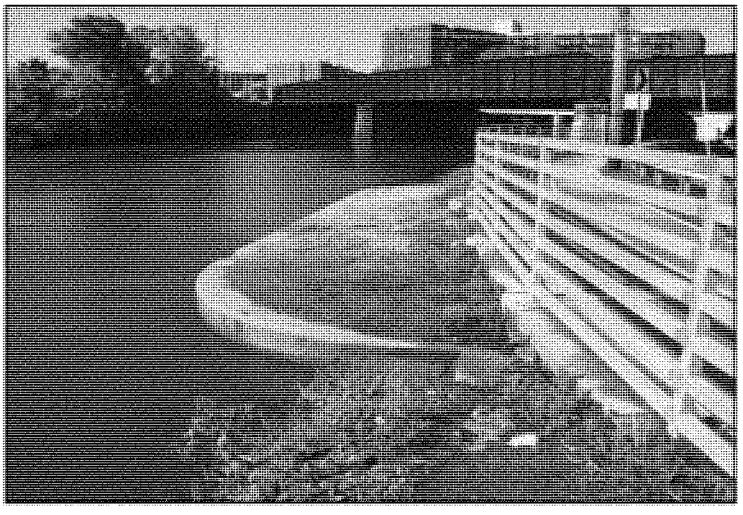
Photograph #2

Looking Downstream from East Abutment



Photograph #3

Looking Upstream from East Abutment

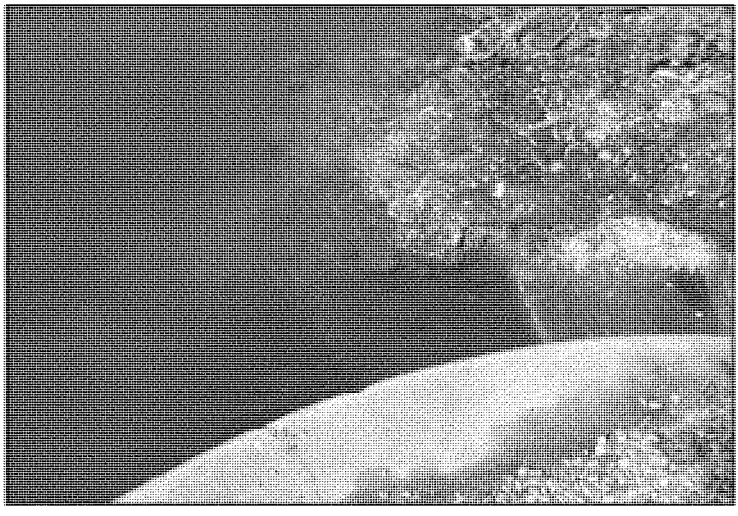


Photograph #4

Downstream End of East Abutment

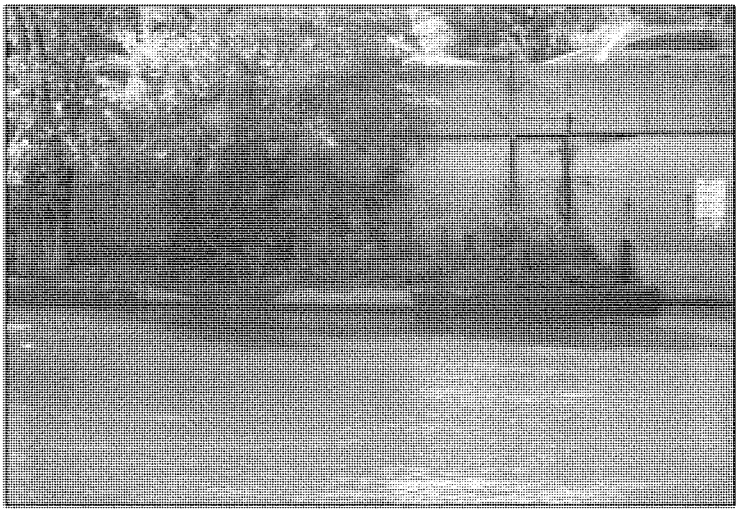
Photograph #5

Downstream End of East Abutment



Photograph #6

Upstream End of East Abutment



Photograph #7

West Abutment Looking from East Bank

Photograph #8

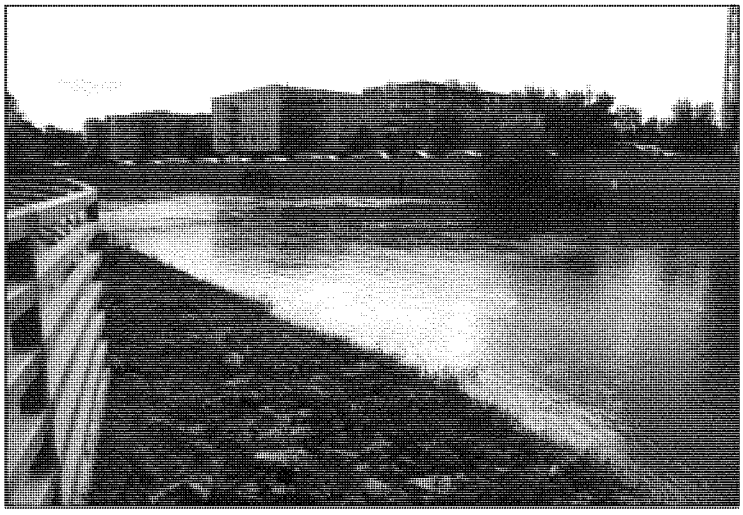
Looking Downstream Along Pedestrian Path from 75 ft Upstream of Dam

Photograph #9

Looking Upstream Along Pedestrian Path from East Abutment

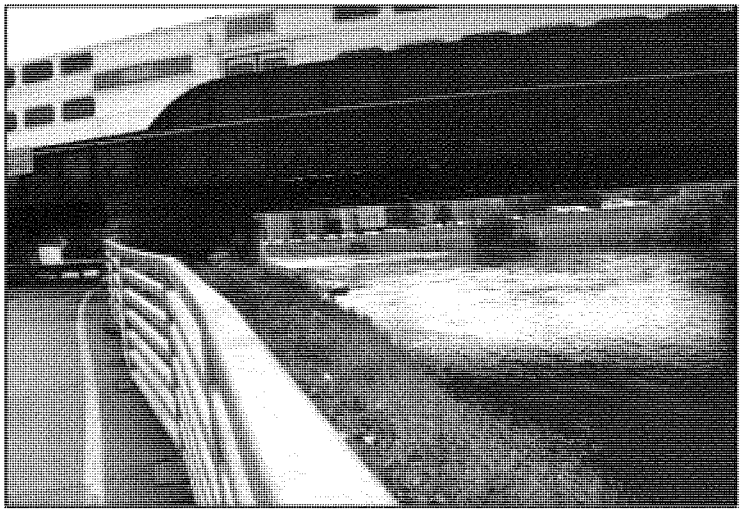
Photograph #10

Pedestrian Path Foundation on East Abutment



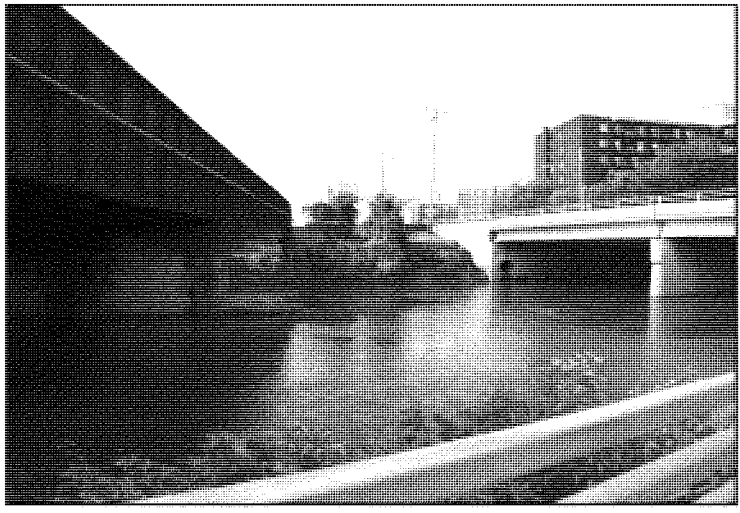
Photograph #11

Looking Downstream from 50 ft Upstream of Dam



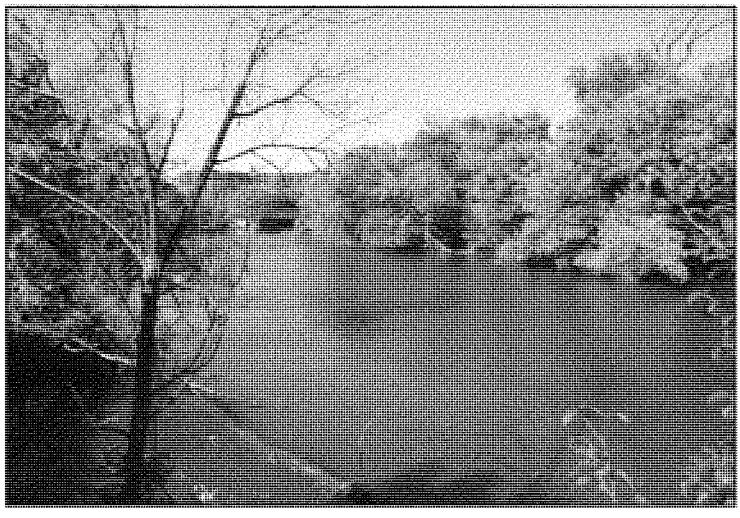
Photograph #12

Looking Downstream from 150 ft Upstream of Dam



Photograph #13

Looking Upstream from 150 ft Upstream of Dam



Photograph #14

Looking Upstream from 500 ft Downstream of Dam

APPENDIX M

Touhy Avenue Dam Data Compilation

AECOM

APPENDIX M

Touhy Avenue Dam Data Compilation

1. **Type of Project:** Dam Removal
2. **USACE Description:** The Touhy Avenue Dam site is located northeast of I-294 and Touhy Avenue in Park Ridge, Illinois.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified four nearby water well logs. The information from the website is included in Attachment M.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): No information was available from IDOT for the project site.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment M.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

M.1: Research Data

M.1.1: Illinois State Water Survey Data

M.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

M.1: Research Data

AECOM

M.1.1: Illinois State Water Survey Data

AECOM

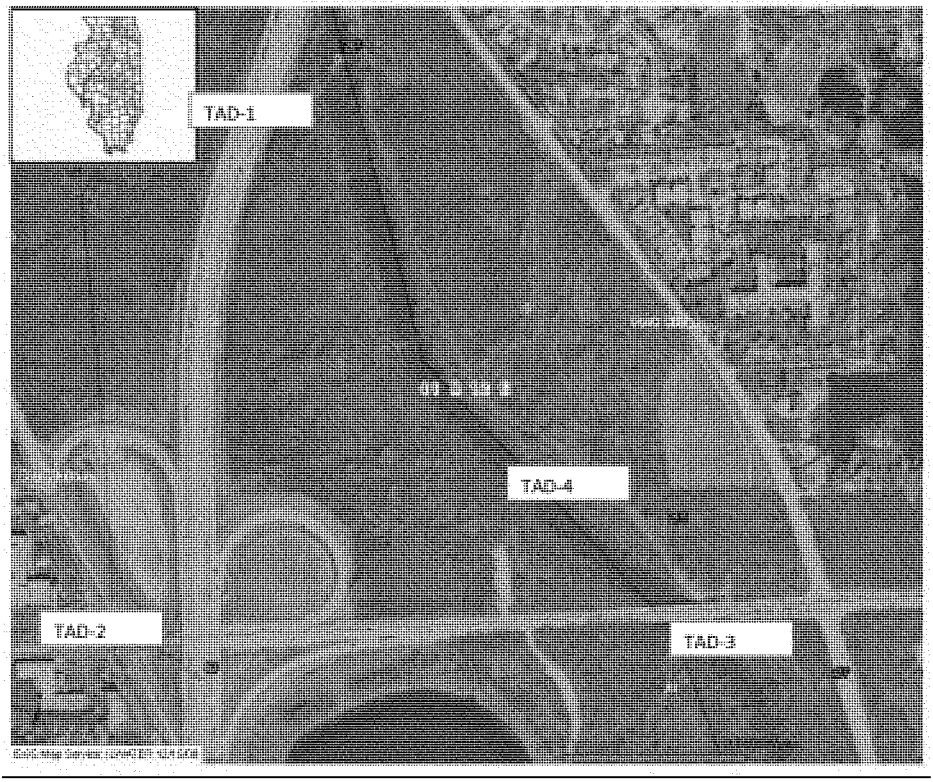
Illinois State Water Survey – Well Database Search Results

SITE NAME: TOUHY AVE DAM (TAD)

COUNTY: Cook **CITY:** Park Ridge

TOWNSHIP: 41N **RANGE:** 12E **SECTION:** 28

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

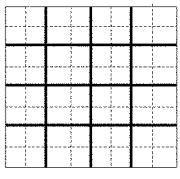
ILLINOIS STATE GEOLOGICAL SURVEY

TAD-1

Engineering Test	Top	Bottom
Total Depth		297
Driller's Log filed		

Permit Date: Permit #:

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED January 1, 1976 NO.
ELEVATION 630GL COUNTY NO. 26747
LOCATION NE NE SE
LATITUDE 42.016495 LONGITUDE -87.86624
COUNTY Cook API 120312674700 28 - 41N - 12E



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

TAD-2

Engineering Test	Top	Bottom
Total Depth		53
Survey Sample Study filed		
Sample set # 32739 (1' - 53') Received: November 1, 1958		

Permit Date: **Permit #:**

COMPANY Soil Testing Services, Inc.

FARM North Ill Toll Rd

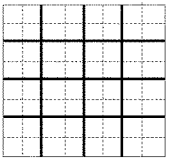
DATE DRILLED January 1, 1959 **NO.** F-1

ELEVATION 0 **COUNTY NO.** 00228

LOCATION 175'N line, 900'E line of section

LATITUDE 42.009658 **LONGITUDE** -87.868489

COUNTY Cook **API** 120310022800 **33 - 41N - 12E**



Page 1

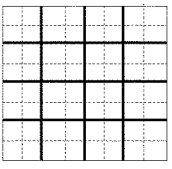
ILLINOIS STATE GEOLOGICAL SURVEY

TAD-3

Engineering Test	Top	Bottom
Total Depth		277
Driller's Log filed		

Permit Date: Permit #:

COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED December 1, 1975 NO.
ELEVATION 634GL COUNTY NO. 26753
LOCATION NW NE NW
LATITUDE 42.009479 LONGITUDE -87.859059
COUNTY Cook API 120312675300 34 - 41N - 12E



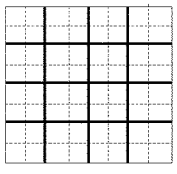
Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

TAD-4

Engineering Test	Top	Bottom
Total Depth		215
Driller's Log filed		

Permit Date: **Permit #:**

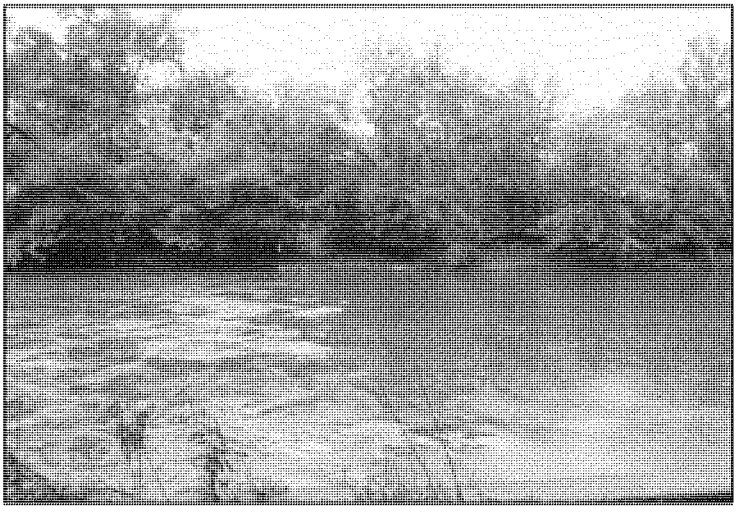
COMPANY Knoeler Bender Stone
FARM Des Plaines Riv Syst
DATE DRILLED January 1, 1976 **NO.**
ELEVATION 621GL **COUNTY NO.** 26745
LOCATION SE SW SW
LATITUDE 42.011214 **LONGITUDE** -87.861471
COUNTY Cook **API** 120312674500 **27 - 41N - 12E**



AECOM

ATTACHMENT

M.2: Site Reconnaissance Photographs

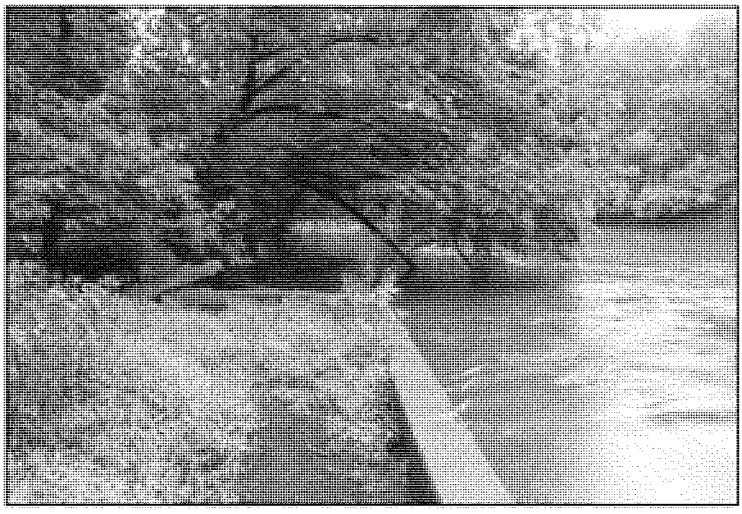


Photograph #1

Looking West from East Abutment

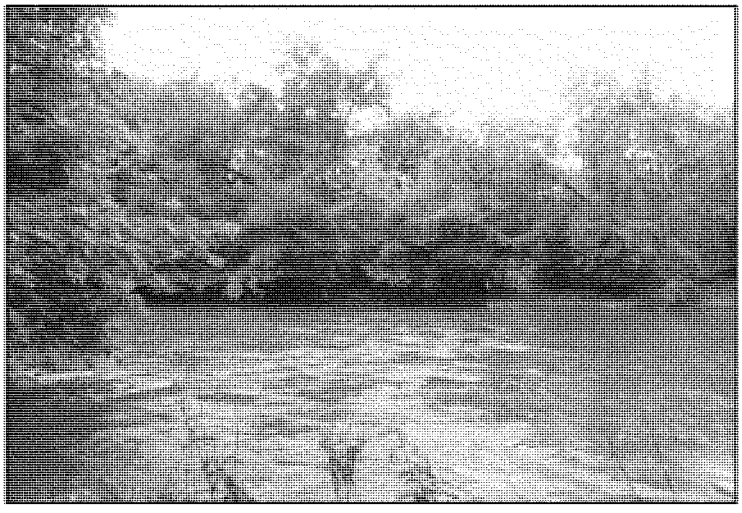
Photograph #2

Looking Upstream from East Abutment



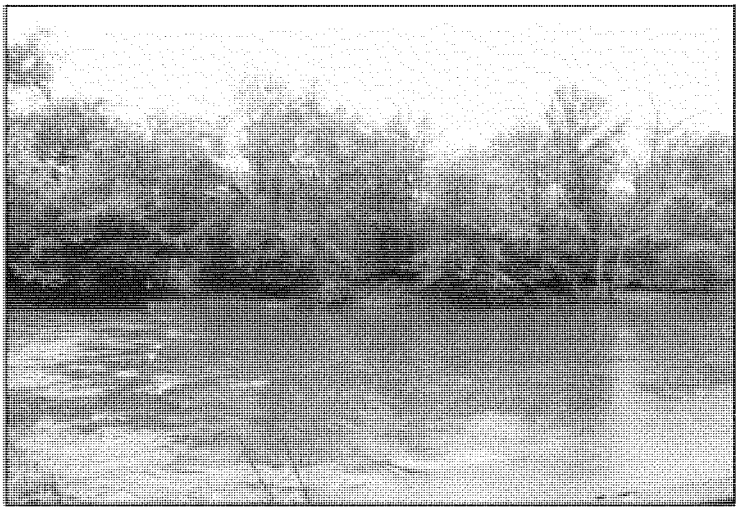
Photograph #3

Looking Downstream from East Abutment



Photograph #4

Downstream Bank of West Abutment



Photograph #5

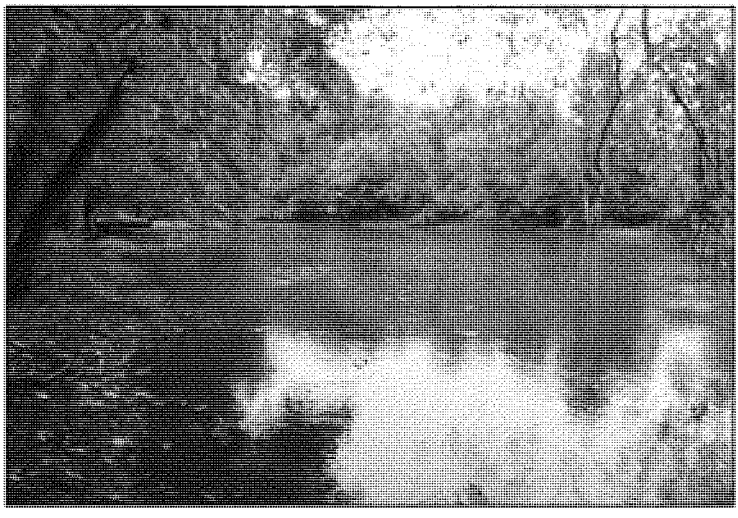
Upstream Bank of West Abutment

Photograph #6

Looking Upstream from 50 ft Downstream of Dam

Photograph #7

Looking Downstream from 50 ft Upstream of Dam

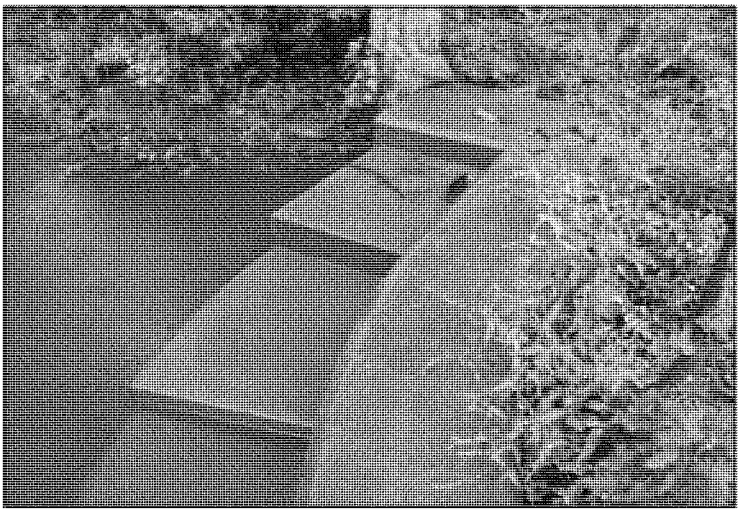


Photograph #8

Looking Downstream from 200 ft Upstream of Dam

Photograph #9

Downstream End of East Abutment



Photograph #10

Upstream End of East Abutment

Photograph #11

General Site Conditions Around Dam

Photograph #12

General Site Conditions Around Dam

Photograph #13

General Site Conditions Around Dam

Photograph #14

General Site Access to Dam

APPENDIX S

First Avenue Bridge Data Compilation

AECOM

APPENDIX S

First Avenue Bridge Data Compilation

1. **Type of Project:** Road Raise (Bridge Raise)
2. **USACE Description:** The First Avenue Bridge raise (DPBM04) extends along First Avenue North of the Des Plaines River to south of River Road in River Grove, Illinois for about 2,000 feet. It raises about 600 feet of River Road, as well.

3. **Description of Research Results**

   AECOM investigated the following resources for potential information with the results as follows:

   - Illinois State Water Survey (ISWS): AECOM performed web-based research on the Illinois State Water Survey and Illinois State Geological Society. Using their interactive GIS website, AECOM identified six nearby water well logs. The information from the website is included in Attachment S.1.1.
   - Landowner: No landowner provided information was available for this site.
   - Illinois Department of Transportation (IDOT): Twenty-eight sheets of soil boring logs and as-built drawings for the project area and vicinity were obtained from IDOT. This information is provided in Attachment S.1.2, and due to its size, is only included on the data CD of this report.
   - Illinois Department of Natural Resources (IDNR): No information was available on the project site from the Illinois Department of Natural Resources.
   - Reconnaissance Photographs: AECOM performed a site visit to photograph the site features. The photographs which were taken are included in Attachment S.2.

4. **Subsurface Explorations**

   Per the project scope, no soil borings were performed for this site.

ATTACHMENTS

S.1: Research Data

S.1.1: Illinois State Water Survey Data

S.1.2: Illinois Department of Transportation

S.2: Site Reconnaissance Photographs

AECOM

ATTACHMENT

S.1: Research Data

AECOM

S.1.1: Illinois State Water Survey Data

AECOM

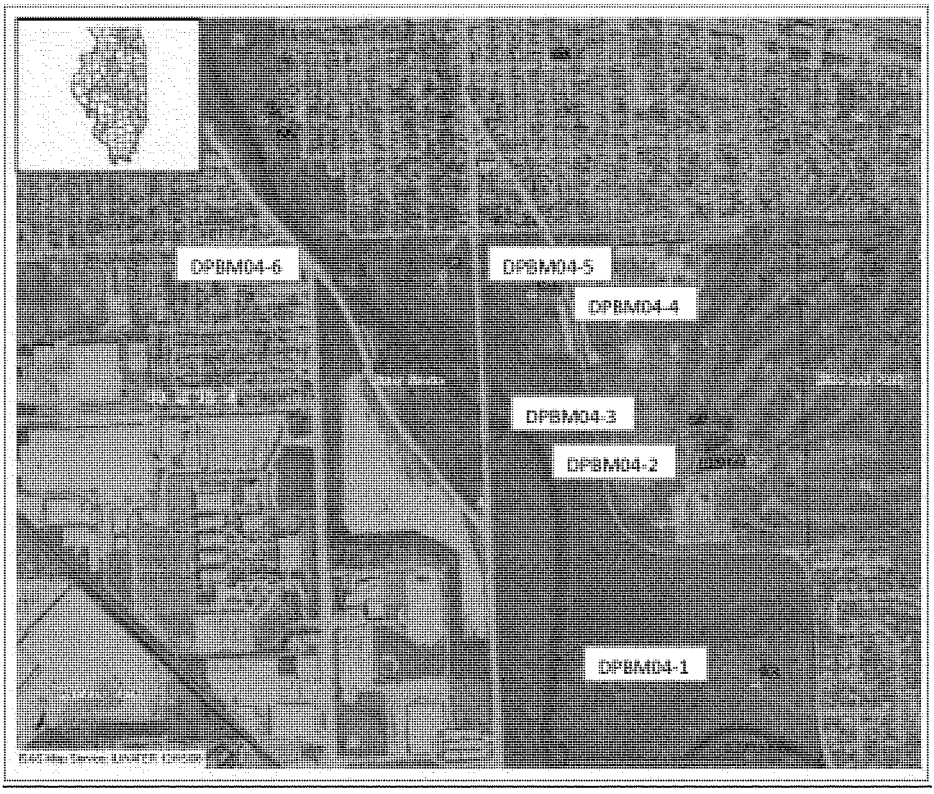
Illinois State Water Survey – Well Database Search Results

SITE NAME: FIRST AVENUE BRIDGE (DPBM04)

COUNTY: Cook **CITY:** River Grove

TOWNSHIP: 40N **RANGE:** 12E **SECTION:** 35

AREA PLAN WITH WELL LOCATIONS:



NOTE: Refer to attached sheets for logs available for each location.

Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DPBM04-1

Water Well	Top	Bottom
Total Depth		136
Driller's Log filed		
Sample set # 1787 (65' - 136') Received: April 5, 1936		

Permit Date: **Permit #:**

COMPANY Snelton Brothers

FARM Park Ridge Camp

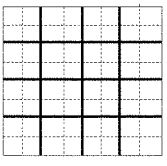
DATE DRILLED January 1, 1935 **NO.** 1

ELEVATION 626GL **COUNTY NO.** 03320

LOCATION 1600'S line, 500'E line of section

LATITUDE 41.91293 **LONGITUDE** -87.827308

COUNTY Cook **API** 120310332000 **35 - 40N - 12E**



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DPBM4-2

Water Well	Top	Bottom
Total Depth		1497
Driller's Log filed		
Sample set # 47149 (0' - 1495') Received: February 25, 1964		

Permit Date: Permit #:

COMPANY Layne Western Co., Inc.

FARM Oak Park Country Clu

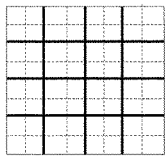
DATE DRILLED November 1, 1963 NO. 3

ELEVATION 629TM COUNTY NO. 00380

LOCATION 2025'N line, 700'E line of section

LATITUDE 41.917543 LONGITUDE -87.82818

COUNTY Cook API 120310038000 35 - 40N - 12E



Page 1

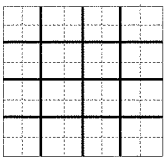
ILLINOIS STATE GEOLOGICAL SURVEY

DPBM4-3

Water Well	Top	Bottom
Total Depth		277
Driller's Log filed		
Sample set # 44080 (0' - 275') Received: July 8, 1963		

Permit Date: **Permit #:**

COMPANY Miller, J. P. Art. Well
FARM Oak Park Country Clu
DATE DRILLED October 1, 1962 **NO.** 3
ELEVATION 629GL **COUNTY NO.** 00472
LOCATION 1000'S line, 1000'E line of NE
LATITUDE 41.918539 **LONGITUDE** -87.829314
COUNTY Cook **API** 120310047200 **35 - 40N - 12E**

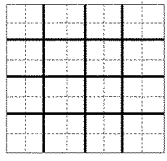


Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DPBM4-4

Water Well	Top	Bottom
Total Depth		134
Driller's Log filed		

Permit Date: Permit #:

COMPANY Water Well Engineer
FARM Forest Preserve Dist
DATE DRILLED January 1, 1964 NO.
ELEVATION 625GL COUNTY NO. 03319
LOCATION 500'N line, 2200'E line of section
LATITUDE 41.921619 LONGITUDE -87.833826
COUNTY Cook API 120310331900 35 - 40N - 12E



Page 1

ILLINOIS STATE GEOLOGICAL SURVEY

DPBM4-5

Water Well	Top	Bottom
Total Depth		84
Driller's Log filed		
Survey Sample Study filed		
Sample set # 1790 (60' - 83.6') Received: April 5, 1936		

Permit Date: **Permit #:**

COMPANY Snelton Brothers

FARM Park Ridge Camp

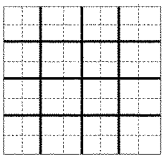
DATE DRILLED January 1, 1935 **NO.** 3

ELEVATION 626GL **COUNTY NO.** 03321

LOCATION 300'N line, 2400'W line of section

LATITUDE 41.922113 **LONGITUDE** -87.836486

COUNTY Cook **API** 120310332100 **35 - 40N - 12E**



Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY** DPBM4-6

Noncommunity - Public Water Well	Top	Bottom
Total Depth		

Permit Date: Permit #:

COMPANY

FARM FPA

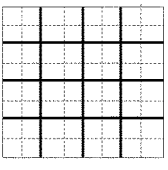
DATE DRILLED NO. 3117

ELEVATION 0 COUNTY NO. 33744

LOCATION NW NE NW

LATITUDE 41.921963 LONGITUDE -87.83921

COUNTY Cook API 120313374400 35 - 40N - 12E



AECOM

S.1.2: Illinois Department of Transportation

(INCLUDED ON DATA CD ONLY)

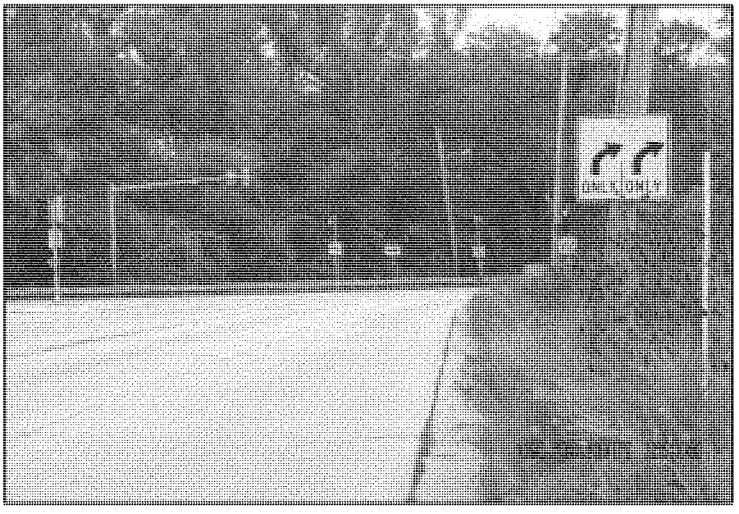
AECOM

ATTACHMENT

S.2: Site Reconnaissance Photographs

First Avenue Bridge Raise

AECOM

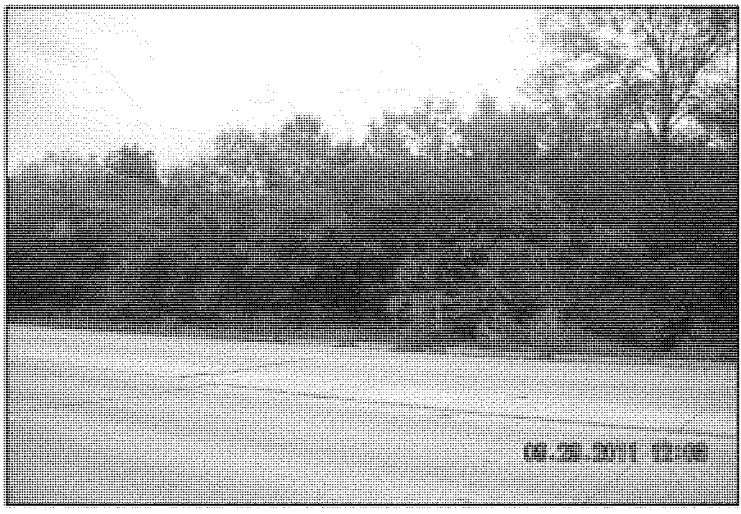


Photograph #1

Looking Southeast Along River Rd from 300 ft Northwest of River Rd at First Avenue

Photograph #2

Looking Northwest Along River Rd from 300 ft Northwest of River Rd at First Avenue



Photograph #3

Forest Preserve Along North Side of River Rd near River Rd at First Avenue

Photograph #4

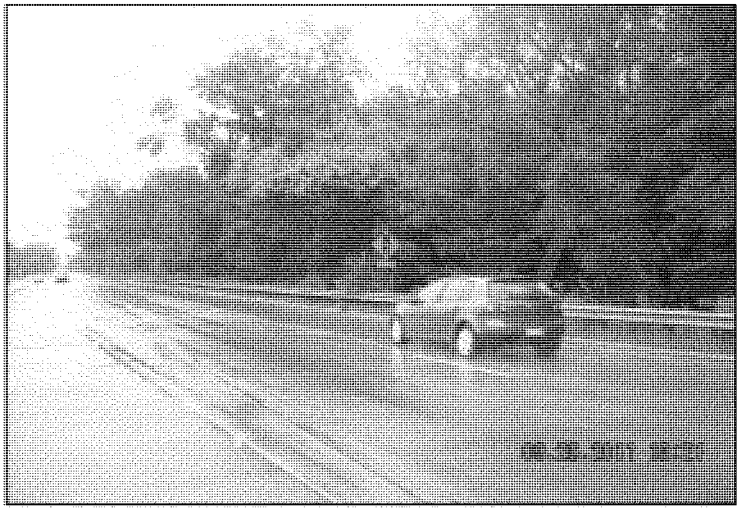
Looking Southwest from 300 ft Northwest of River Rd at First Avenue

Photograph #5

Looking North from Southbound First Avenue 600 ft South of River Rd at First Avenue

Photograph #6

Looking North from Median of First Avenue 600 ft South of River Rd at First Avenue

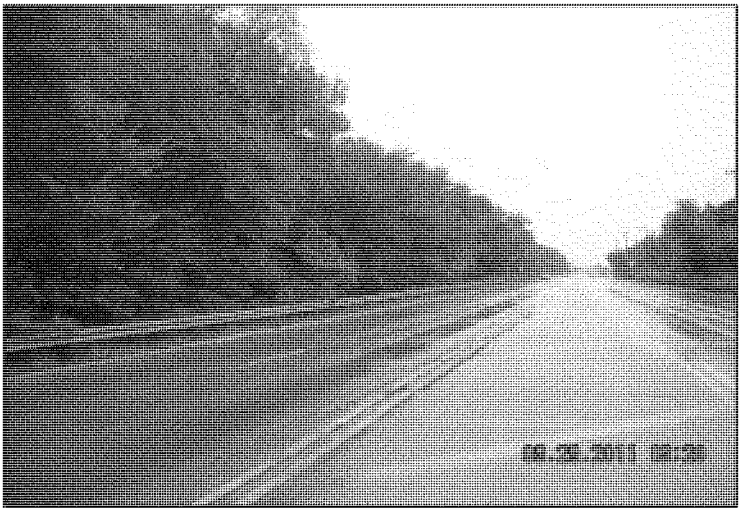


Photograph #7

Looking Northeast from Median of First Avenue 600 ft South of River Rd at First Avenue

Photograph #8

Looking South from Median of First Avenue 600 ft South of River Rd at First Avenue



Photograph #9

Looking South from Median of First Avenue 600 ft South of River Rd at First Avenue

Photograph #10

Looking North from Southbound Side of First Avenue near North Avenue at First Avenue

Photograph #11

Looking South from Southwest Corner of Fullerton Avenue at First Avenue

Photograph #12

Forest Preserve Along East Side of First Avenue

Photograph #13

Looking South Down First Avenue Towards Bridge

Photograph #14

Looking North Down First Avenue Towards Bridge

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PLANS FOR PROPOSED FEDERAL AID HIGHWAY

8481

FOR INDEX OF SHEETS, SEE SHEET NO. 2

SCALES: PLAN 1 INCH = 50'; PROFILE HORIZ. 1 INCH = 50'; PROFILE VERT. 1 INCH = 5'; CROSS SECTION 1 INCH = 5' VERT. 1 INCH = 10' HORIZ.

F.A.U. ROUTE 2748
SECTION 1977-290-BR-COOK COUNTY
PROJECT IX-5003 (673) C-91-328-77

FIRST AVENUE OVER DES PLAINES RIVER BRIDGE RECONSTRUCTION

PROJECT GROSS LENGTH = 799.0 LIN. FT. OR 0.150 MILE.

P-91-328-77

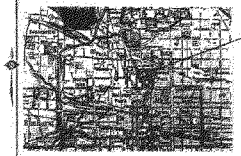
LOCATION OF SECTION INDICATED THUS: —

DESCRIPTION OF IMPROVEMENT

THE IMPROVEMENT INCLUDES THE BRIDGE SUPERSTRUCTURE REPLACEMENT WITH WIDENING, REPAIRS TO THE SUB-STRUCTURE, THE REHABILITATION OF THE APPROACH ROADWAYS OF THE STRUCTURE CARRYING FIRST AVENUE OVER DES PLAINES RIVER, CONSISTING OF A THREE SPAN [illegible] FOOT BACK TO BACK OF ABUTMENTS), NEW REINFORCED CONCRETE [illegible] AS 102'-0" OUT TO OUT) THE NEW PRECAST PRESTRESSED I-BEAMS, ON EXISTING PIERS AND ABUTMENTS WITH NEW CAPS.

DESCRIPTION OF EXISTING

EXISTING STRUCTURE BUILT AS FIRST AVENUE OVER DES PLAINES RIVER, F.A. ROUTE 31, SECTION 05I-080R-150, COOK COUNTY, STA. 56+72.94 IN 1938. THE STRUCTURE IS A THREE SPAN REINFORCED CONCRETE T-BEAM GIRDER, OR CLOSED R.C. ABUTMENTS AND SOLID R.C. PIERS CARRYING FOUR DESIGNATED LANES OF TRAFFIC, 50'-0" OUT TO OUT, 60°-0" BACK TO BACK AND AT 90° SKEW. STRUCTURE NO. 016-0697, FILE NO. 156.



LOCATION MAP

PROJECT LOCATION

PROJECT IS IMPROVEMENT
BEGIN STA. 39+30

PROJECT IS IMPROVEMENT
END STA. 47+20

TRAFFIC DATA

MAJOR CLASSIFICATION
DHV - 2,401
ADT - 28,010
DESIGN SPEED 50 MPH

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SUBMITTED [illegible]
RECOMMENDED [illegible]
APPROVED [illegible]

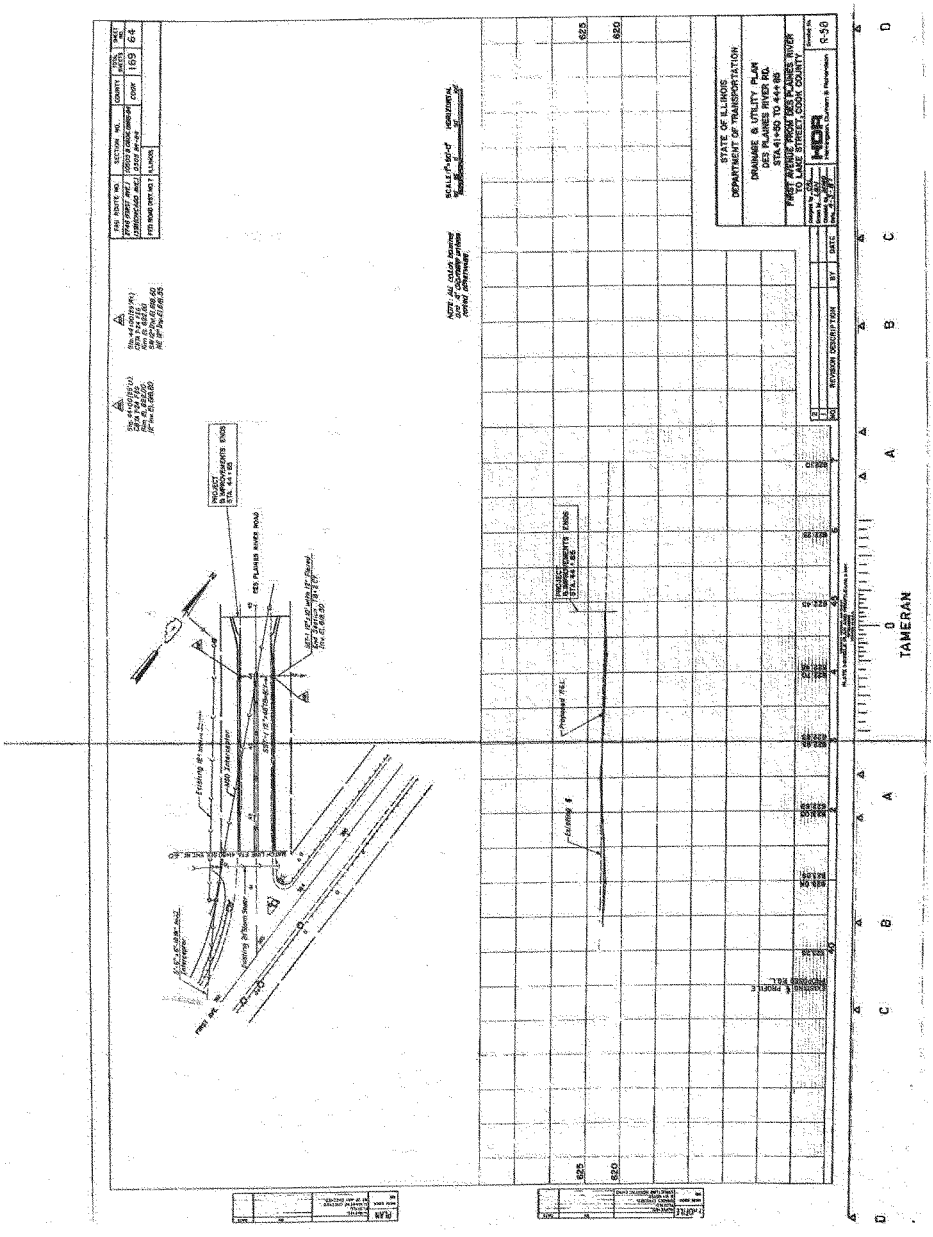
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
FOR DIVISION ADMINISTRATOR

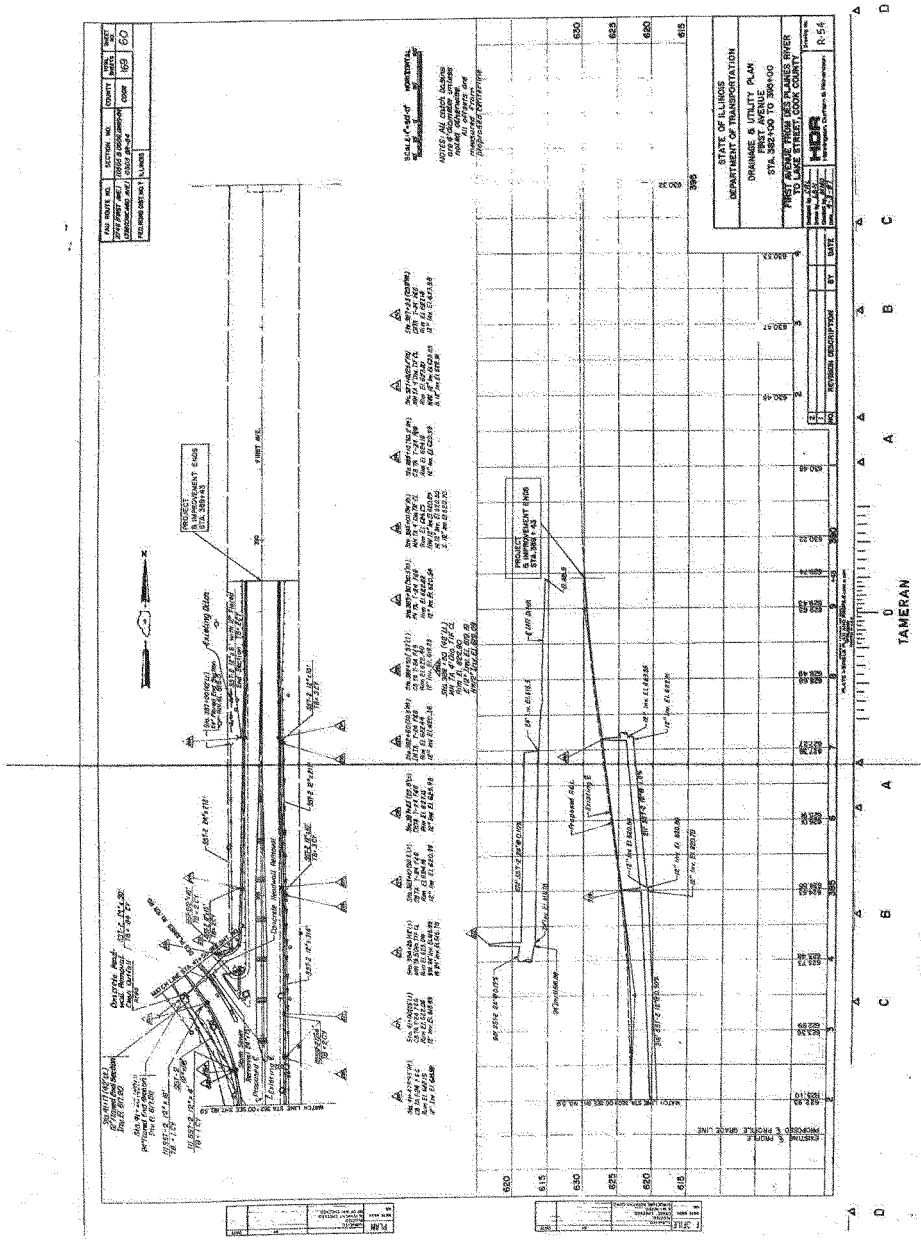
CONTRACT NO. 34687

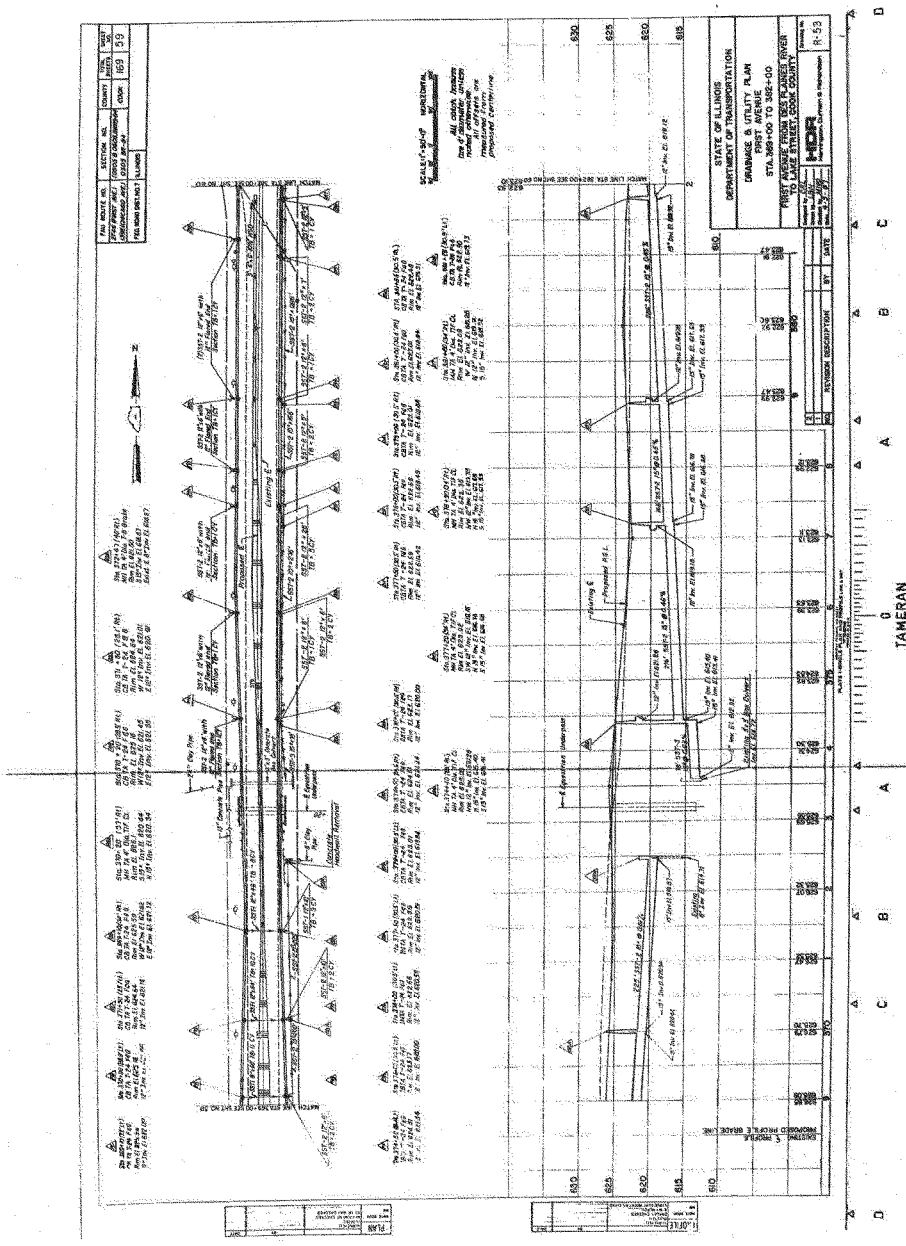
COOK 99XXX JOSTMS RPT-290-BR F.A.U. ROUTE 2748

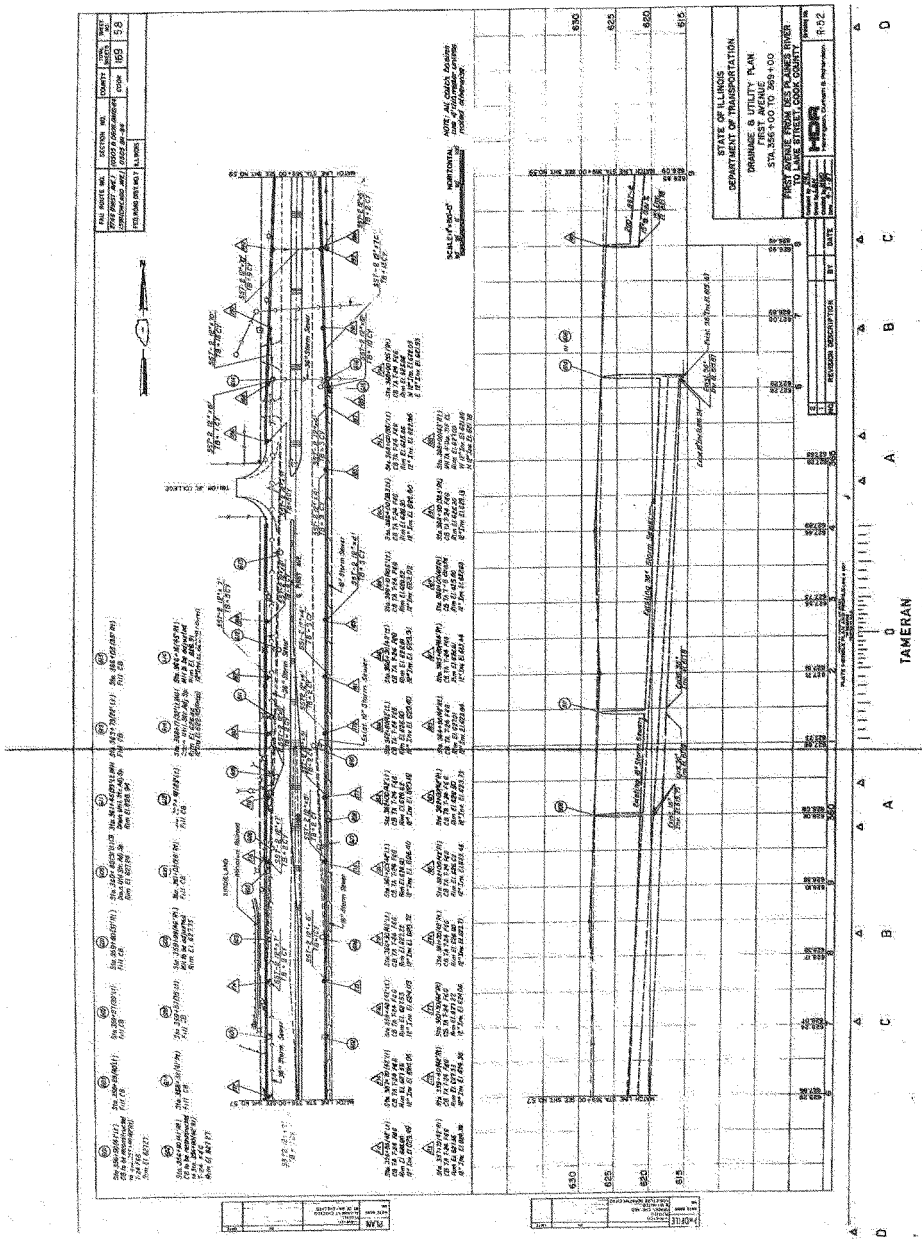
583

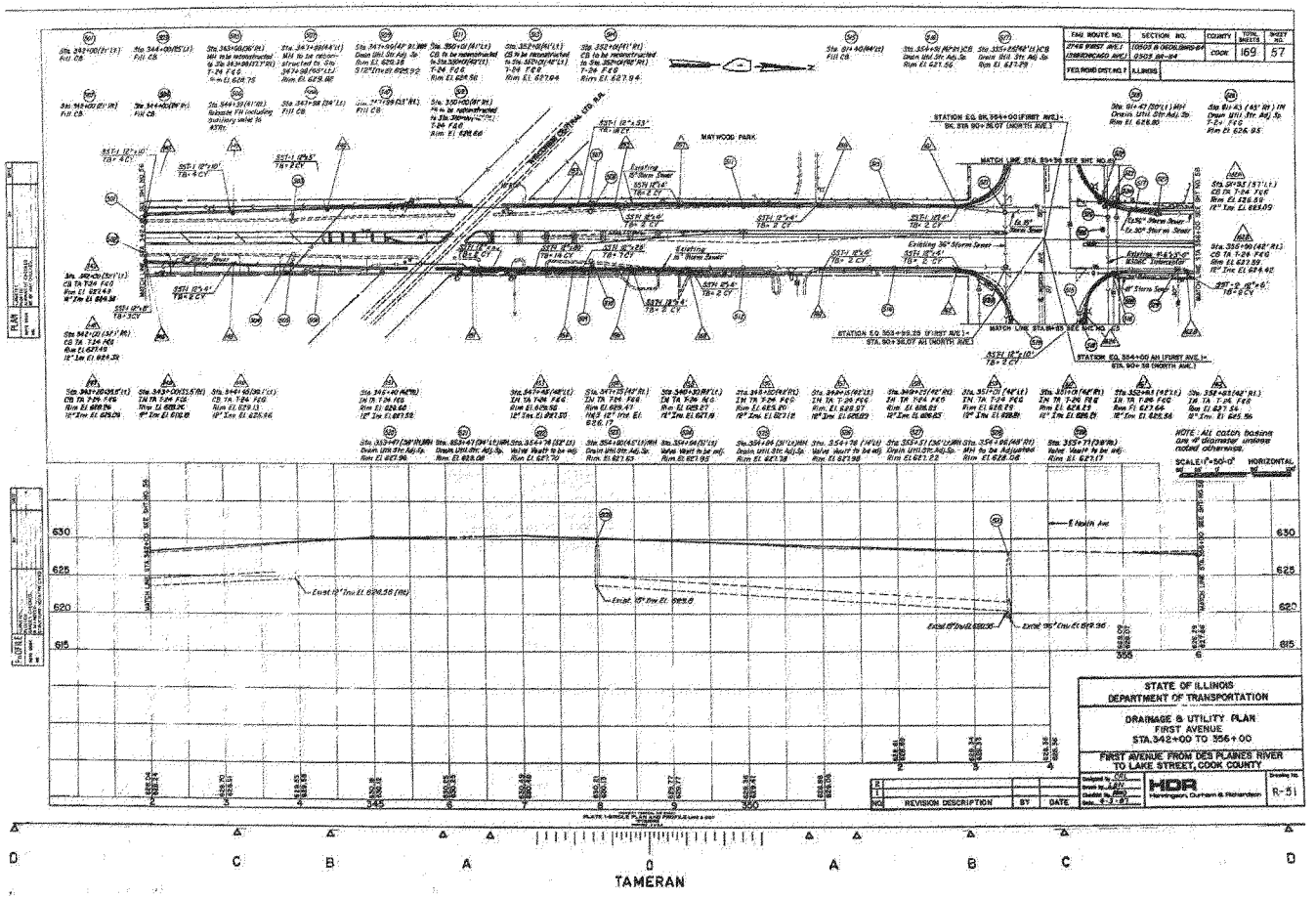
(4)


STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DRAINAGE & UTILITY PLAN
DES PLAINES RIVER RD.
STA.41+50 TO 44+85
FIRST AVENUE FROM DES PLAINES RIVER TO LAKE STREET, COOK COUNTY
HDR
R-58
REVISION DESCRIPTION
BY
DATE
TAMERAN
DES PLAINES RIVER ROAD
PROJECT B.S.MONUMENTS ENDS STA. 44+85
Proposed R.G.L.
Existing ℄
625
620

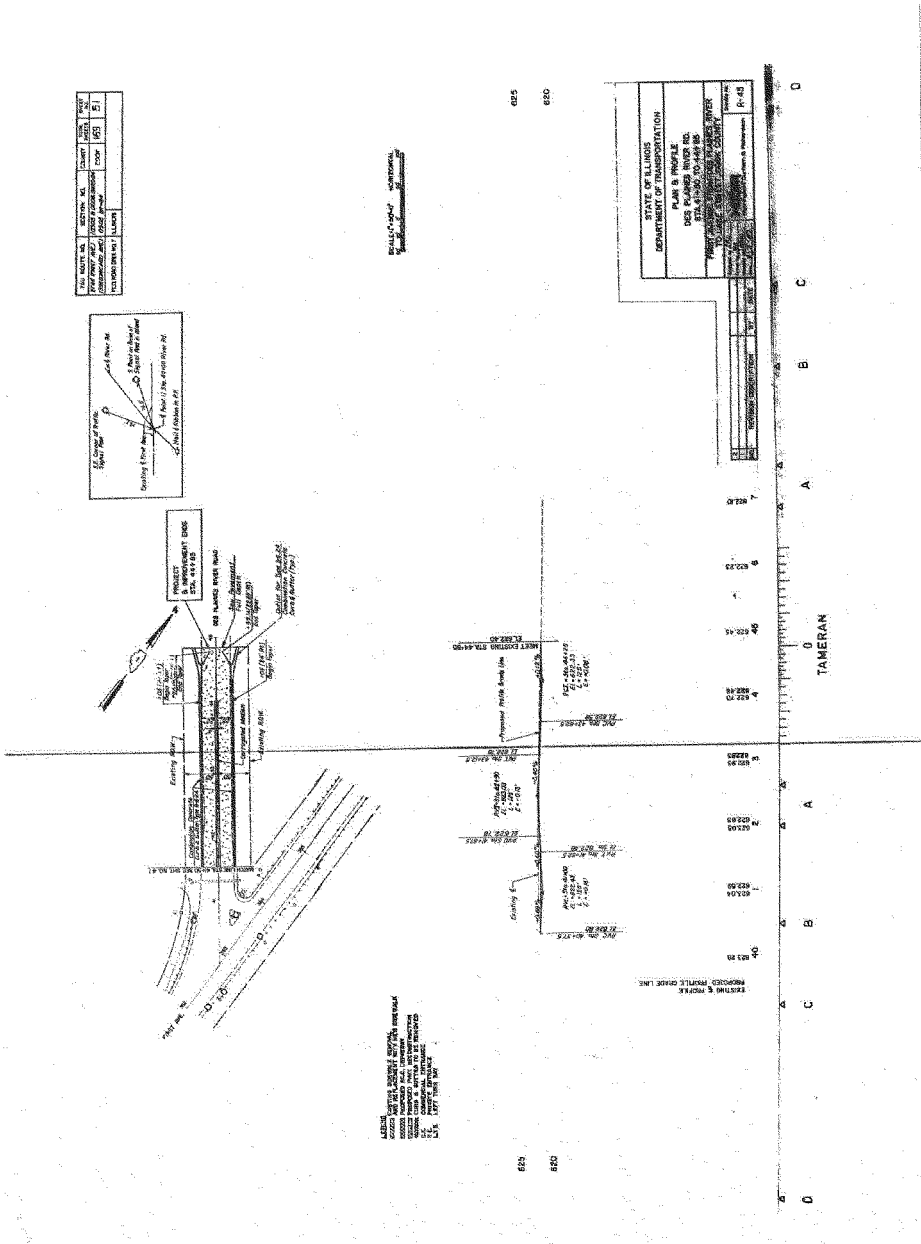

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DRAINAGE & UTILITY PLAN
FIRST AVENUE
STA. 382+00 TO 390+00
FIRST AVENUE FROM DES PLAINES RIVER
TO LAKE STREET, COOK COUNTY
HDR
TAMERAN

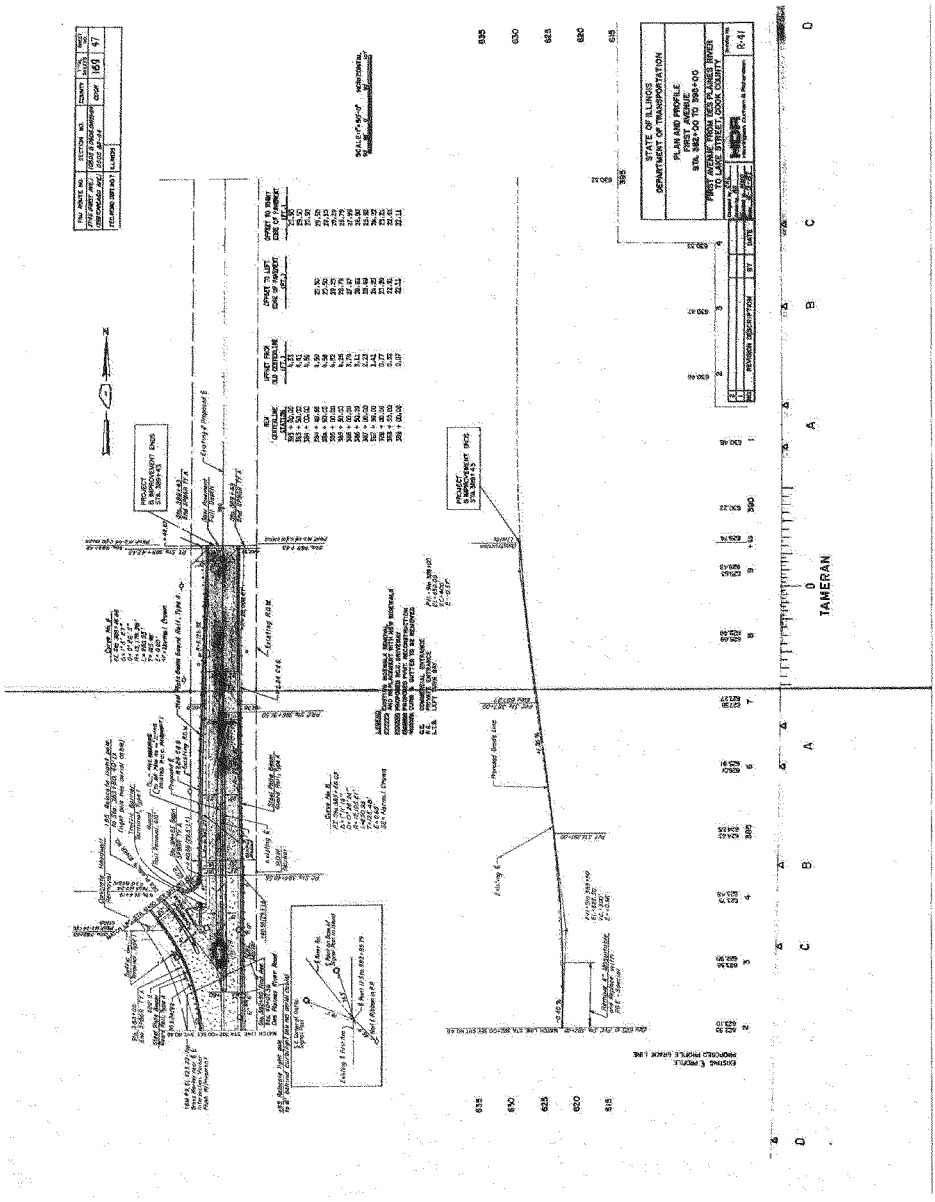

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DRAINAGE & UTILITY PLAN
FIRST AVENUE
STA.369+00 TO 382+00
FIRST AVENUE FROM DES PLAINES RIVER TO LAKE STREET, COOK COUNTY
R-53
TAMERAN

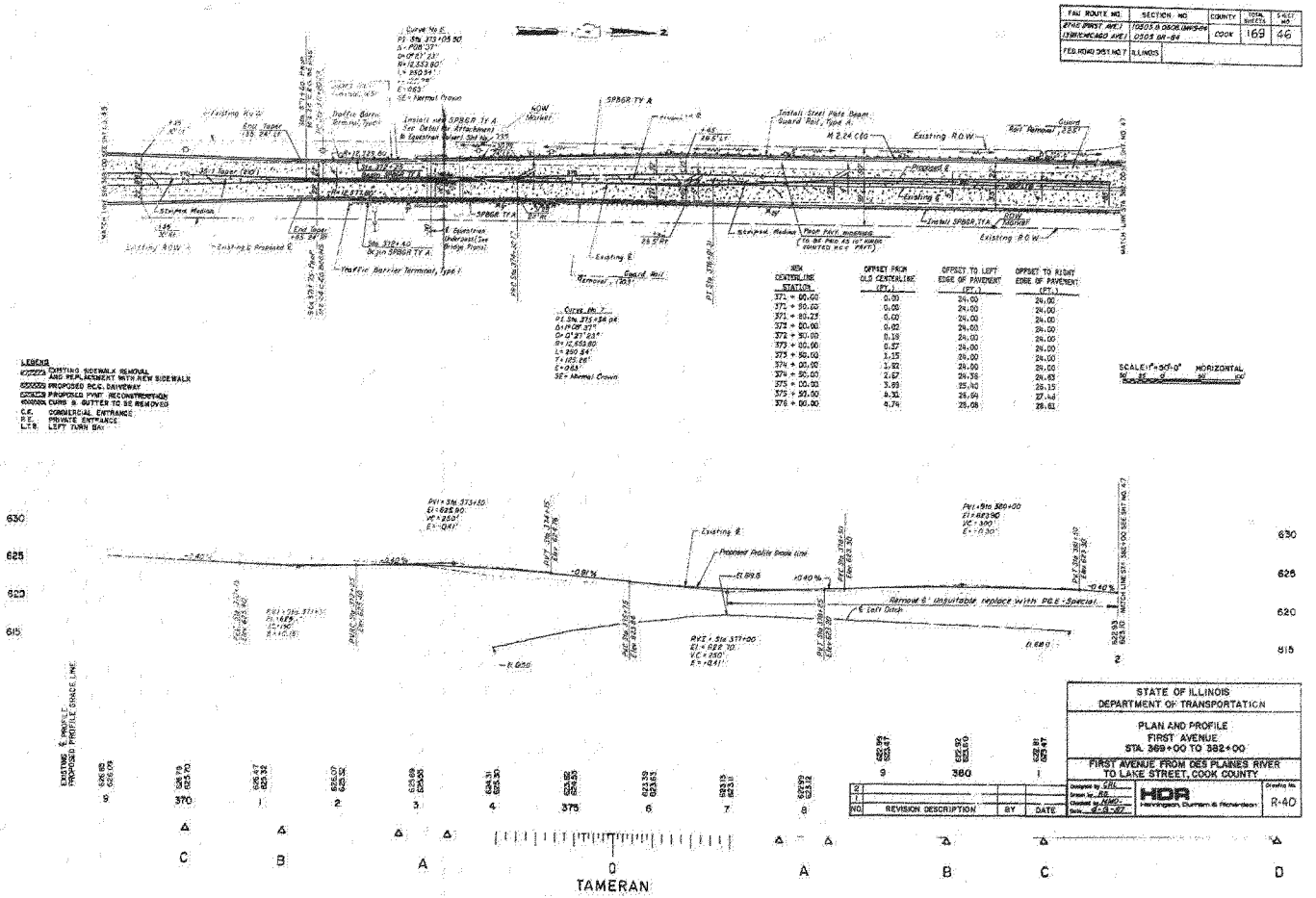

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DRAINAGE & UTILITY PLAN
FIRST AVENUE
STA. 356+00 TO 369+00
FIRST AVENUE FROM DES PLAINES RIVER TO LAKE STREET, COOK COUNTY
TAMERAN
PLAN
PROFILE

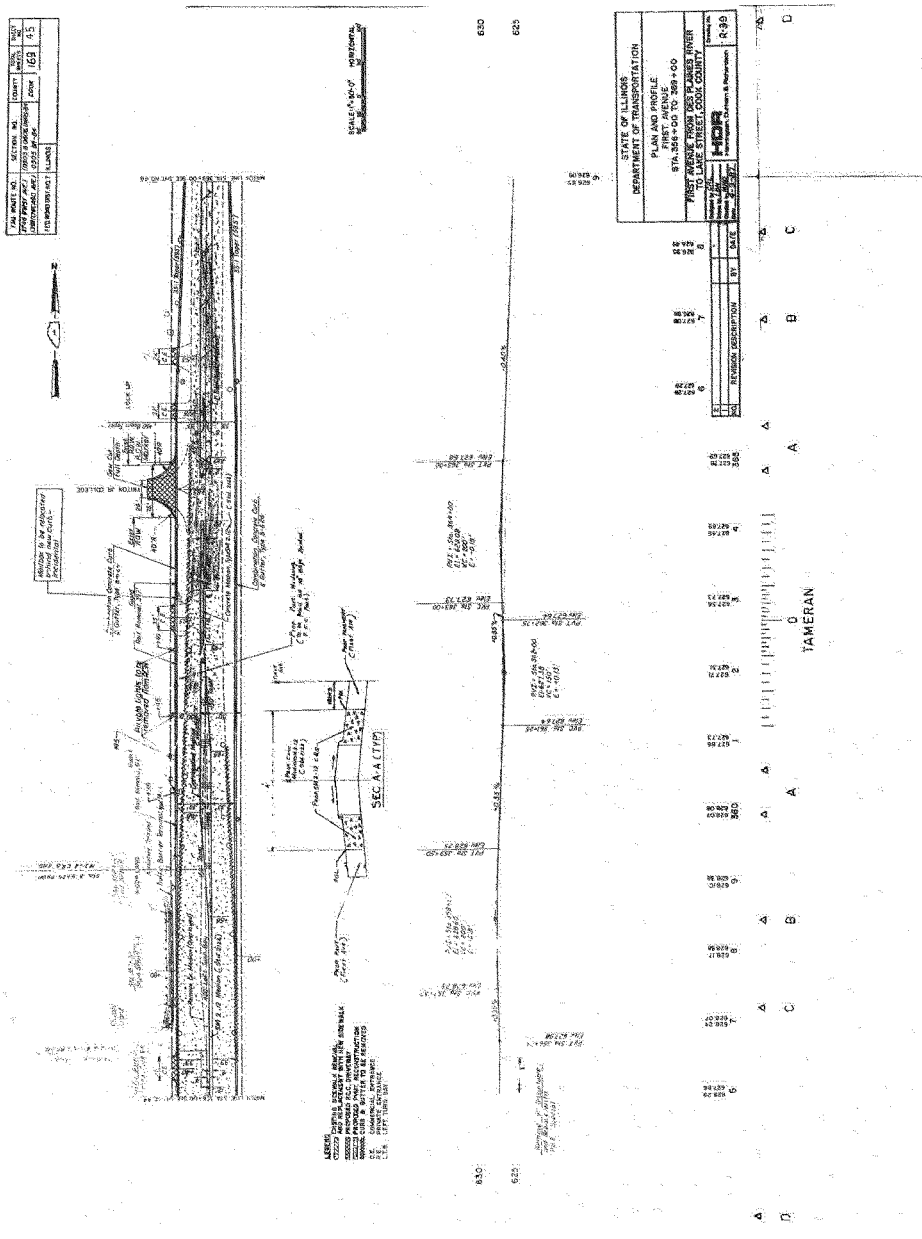


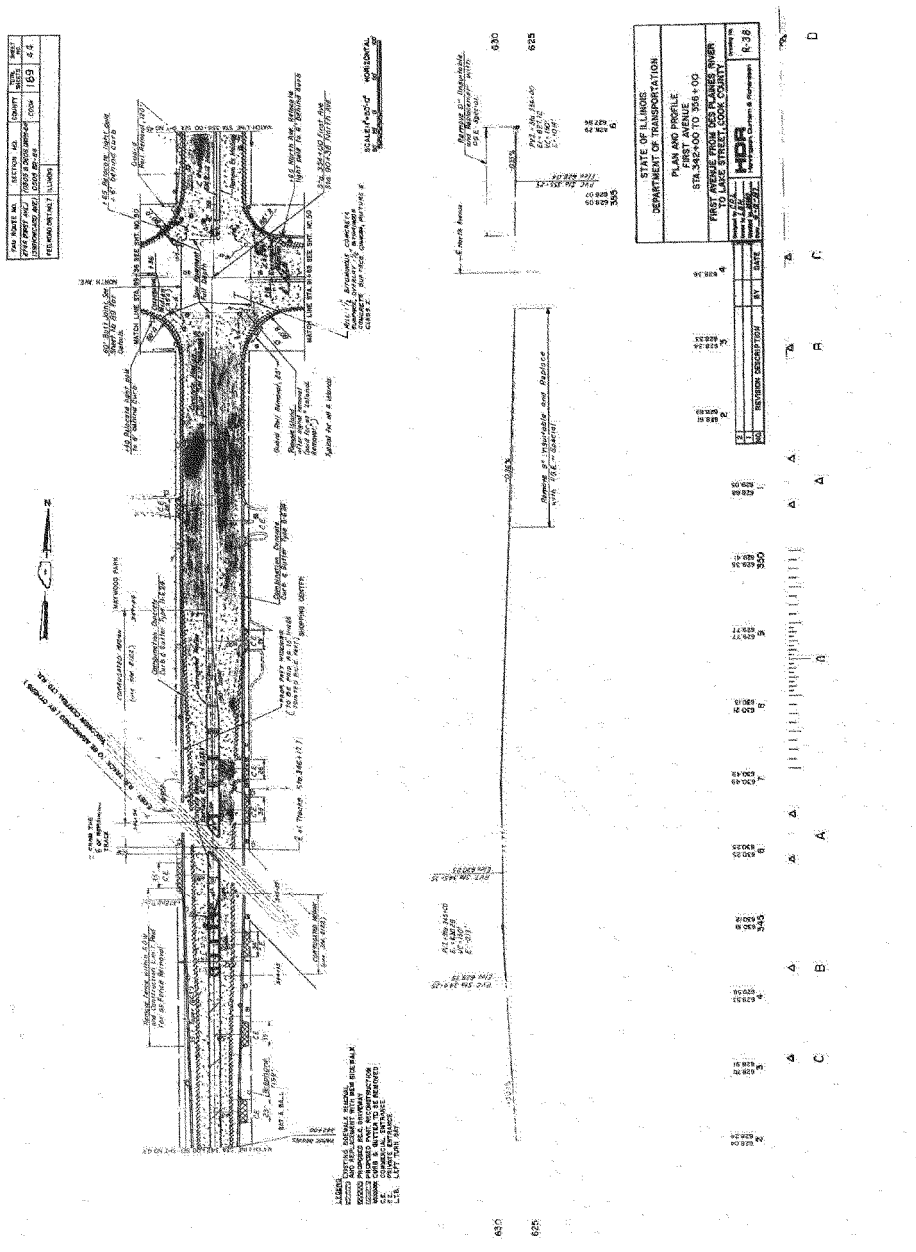
FAU ROUTE NO.
SECTION NO.
COUNTY
TOTAL SHEETS
SHEET NO.
COOK
169
57
FEDERAL DIST. NO. 1
ILLINOIS
MAYWOOD PARK
NOTE: All catch basins are 4' diameter unless noted otherwise.
SCALE: 1"=50'-0" HORIZONTAL
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DRAINAGE & UTILITY PLAN
FIRST AVENUE
STA. 342+00 TO 356+00
FIRST AVENUE FROM DES PLAINES RIVER
TO LAKE STREET, COOK COUNTY
HDR
Harrington, Durham & Richardson
R-51
REVISION DESCRIPTION
BY
DATE
TAMERAN


STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
PLAN & PROFILE
DES PLAINES RIVER RD.
TAMERAN




FAU ROUTE NO.
SECTION NO.
COUNTY
TOTAL SHEETS
SHEET NO.
COOK
169
46
FED. ROAD DIST. NO. 7
ILLINOIS
Existing R.O.W.
Existing ℄
Proposed ℄
Install Steel Plate Beam Guard Rail, Type A
Install SPBGR TY A
Traffic Barrier Terminal, Type 1
Curve No. 7
SCALE: 1"=50'-0" HORIZONTAL
LEGEND
EXISTING SIDEWALK REMOVAL AND REPLACEMENT WITH NEW SIDEWALK
PROPOSED P.C.C. DRIVEWAY
PROPOSED PVMT. RECONSTRUCTION
CURB & GUTTER TO BE REMOVED
C.E. COMMERCIAL ENTRANCE
P.E. PRIVATE ENTRANCE
L.T.B. LEFT TURN BAY
Proposed Profile Grade Line
Remove 6' unsuitable replace with P.C.E. Special
℄ Left Ditch
EXISTING ℄ PROFILE
PROPOSED PROFILE GRADE LINE
TAMERAN
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
PLAN AND PROFILE
FIRST AVENUE
STA. 369+00 TO 382+00
FIRST AVENUE FROM DES PLAINES RIVER TO LAKE STREET, COOK COUNTY
REVISION DESCRIPTION
BY
DATE
HDR
Hannington, Durham & Richardson
R-40


STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
PLAN AND PROFILE
FIRST AVENUE
STA.356+00 TO 369+00
FIRST AVENUE FROM DES PLAINES RIVER
TO LAKE STREET, COOK COUNTY
HDR
R-39
REVISION DESCRIPTION
BY
DATE
SEC A-A (TYP)
TAMERAN


STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
PLAN AND PROFILE
FIRST AVENUE
STA.342+00 TO 356+00
FIRST AVENUE FROM DES PLAINES RIVER
TO LAKE STREET, COOK COUNTY
R-38
REVISION DESCRIPTION
BY
DATE
HDR
Engineering, Inc.
HORIZONTAL
SCALE 1"=20'-0"
630
625
350
345
355

INDEX OF SHEETS

GENERAL NOTES

D C B A A 0 A B C D

TAMERAN

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS
GENERAL NOTES
STATE STANDARDS

FIRST AVENUE FROM DES PLAINES RIVER
TO LAKE STREET, COOK COUNTY

R-2

INDEX OF SHEETS
SEE SHEET NO. 2

FAU ROUTE NO.	SECTION NO.	COUNTY	TOTAL SHEETS	SHEET NO.
2746 (FIRST AVE.)	(0505 & 0606.1) WRS-84 & 0505 BR-84	COOK	169	1
(CHICAGO AVE.)	0505 BR-84			
FED. ROAD DIST. NO. 7	ILLINOIS			

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANS FOR PROPOSED
FEDERAL-AID URBAN PROJECT

68150

STRUCTURAL DESIGN INFORMATION

STRUCTURAL DESIGN TRAFFIC: YEAR 1992
ADT = 37,900 DHV = 5,200 DDHV = 7,600
ROAD - STREET CLASSIFICATION: Class I
PERCENT OF STRUCTURAL DESIGN TRAFFIC, N ON DIVISION LANE:
P = 72 S = 45 N = 65
TRAFFIC FACTOR: TF = 10.83
MINIMUM BOIL SUPPORT:
(N) = 9.0 (STA. 84+50 TO STA. 208+00)

SCALES IN FEET

PLAN & PROFILE HORIZONTAL	50 0 50 100 150 200	1"=50'
PLAN & PROFILE VERTICAL	5 4 3 2 1 0	1"=5'
CROSS-SECTIONS HORIZONTAL	12 8 4 0 4 8 12	1"=10'
CROSS-SECTIONS VERTICAL	5 4 3 2 1 0	1"=5'

F.A.U. ROUTE 2746 (FIRST AVENUE)
F.A.U. ROUTE 1398 (CHICAGO AVENUE) PROJECT IX-6003(653)
SECTION (0505 & 0606.1) WRS-84 & 0505 BR-84
SN 016-0597, 0863, 0698
COOK COUNTY
C-91-268-86

TYPE OF WORK
STA. 84+50 - 208+00 (100% STATE)

P-91-692-84

LOCATION OF SECTION INDICATED THUS: —

FULL SIZE PLANS HAVE BEEN PREPARED USING STANDARD ENGINEERING SCALES. REDUCED SIZED PLANS WILL NOT CONFORM TO STANDARD SCALES, IN MAKING MEASUREMENTS ON REDUCED PLANS, THE ABOVE SCALES MAY BE USED.

R 12 E

T 40 N

T 39 N

NORTH AVE.

LOCATION MAP

SECTION DESIGNATION: FIRST AVENUE
SCDOD URT AREA SERVICE # 13 (PCC-20)

CONSULTANT: HDR INFRASTRUCTURE, INC.

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

NET LENGTH OF IMPROVEMENT = 14,204.41 Lin. Ft. = 2.709 Miles
GROSS LENGTH OF IMPROVEMENT = 14,204.41 Lin. Ft. = 2.709 Miles

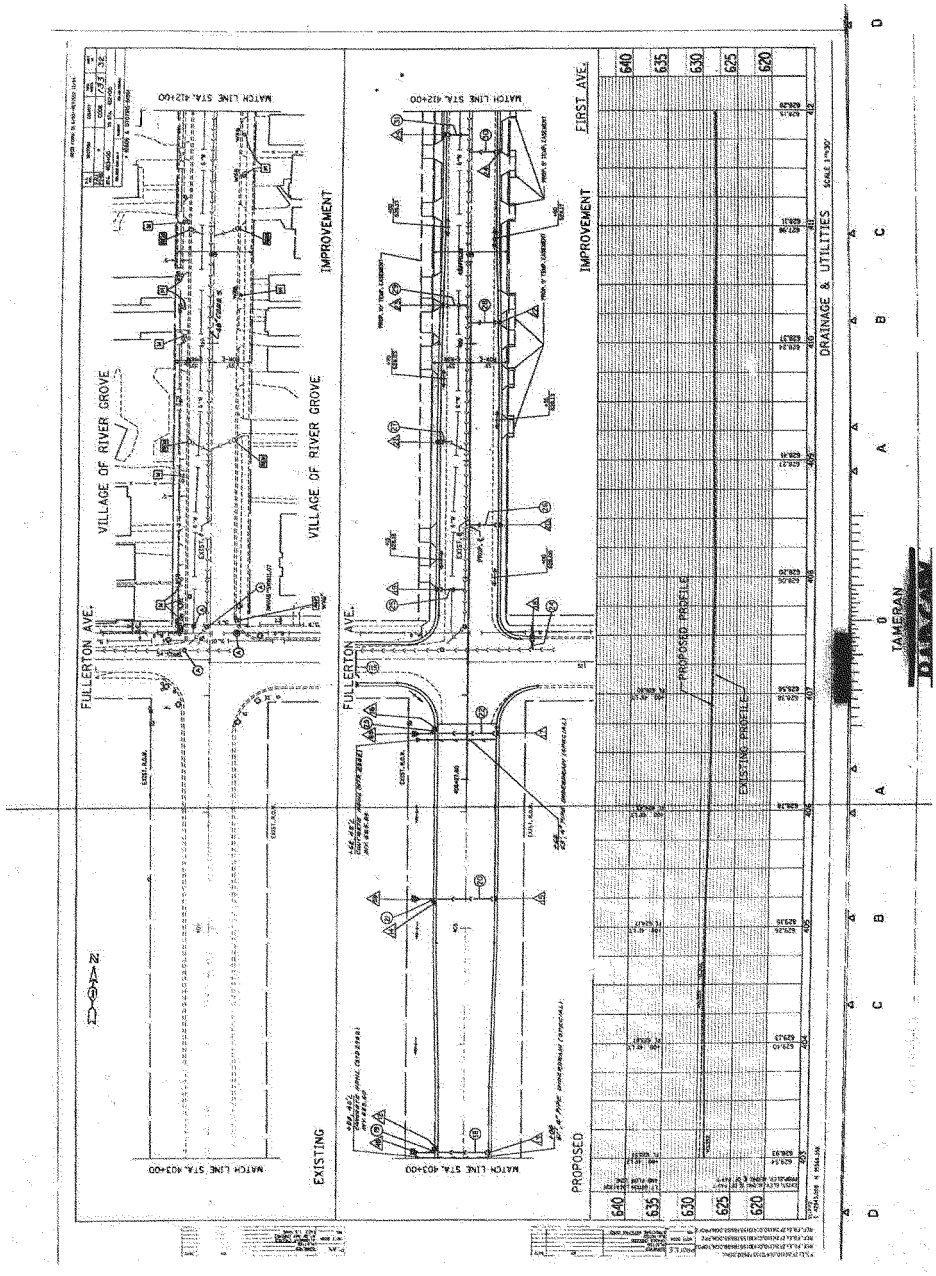
CONTRACT NO. 80451

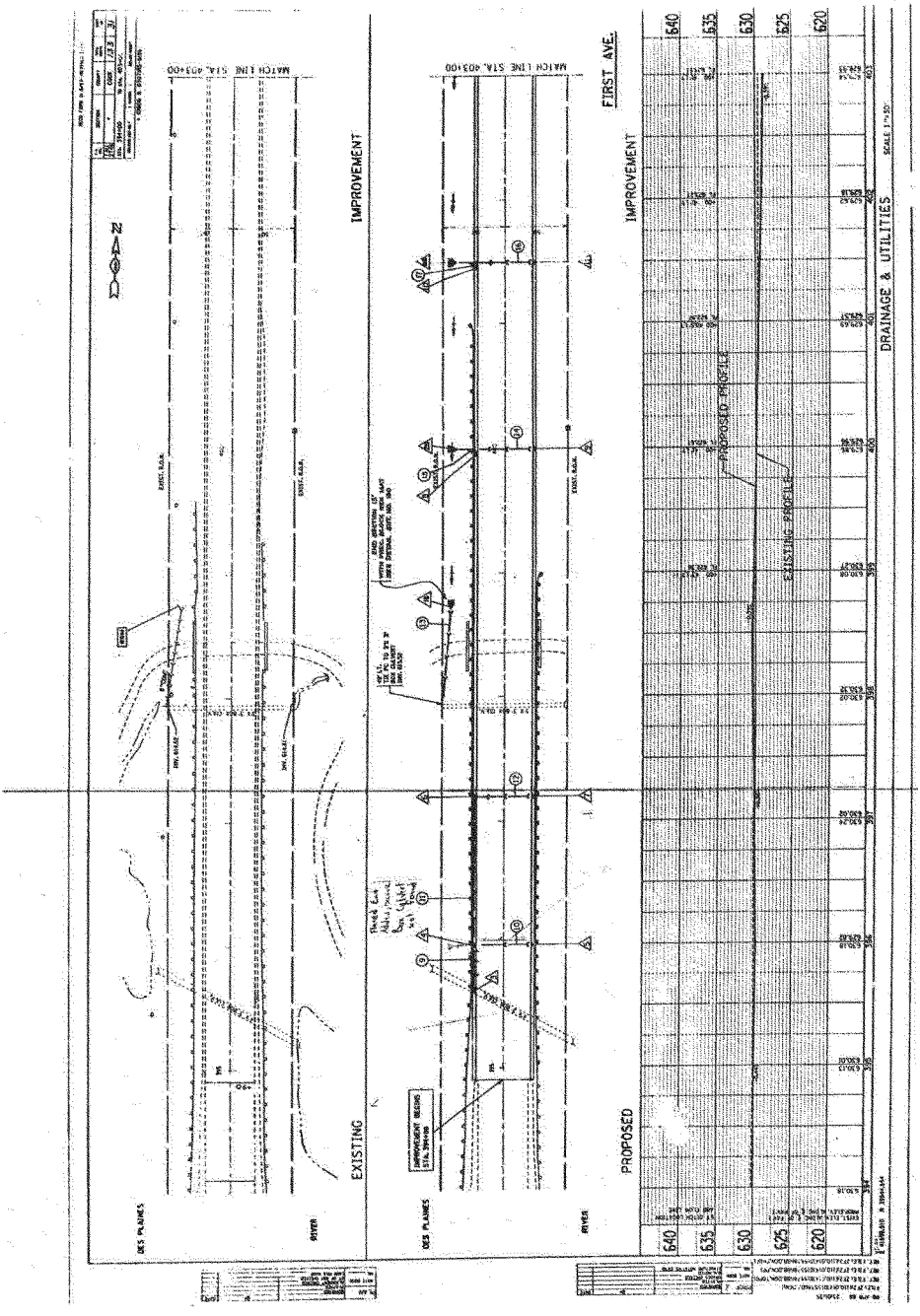
R-1

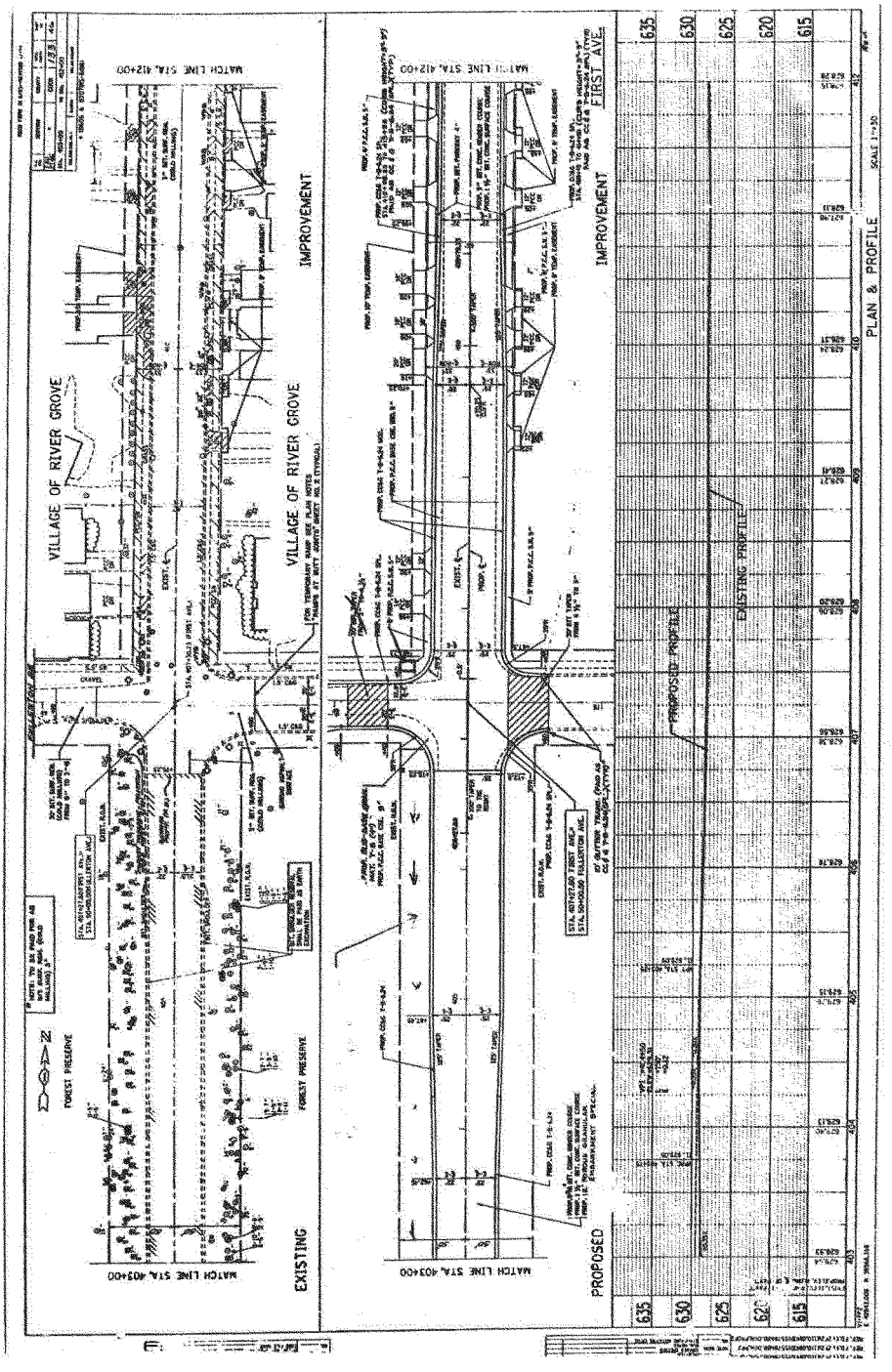
TAMERAN

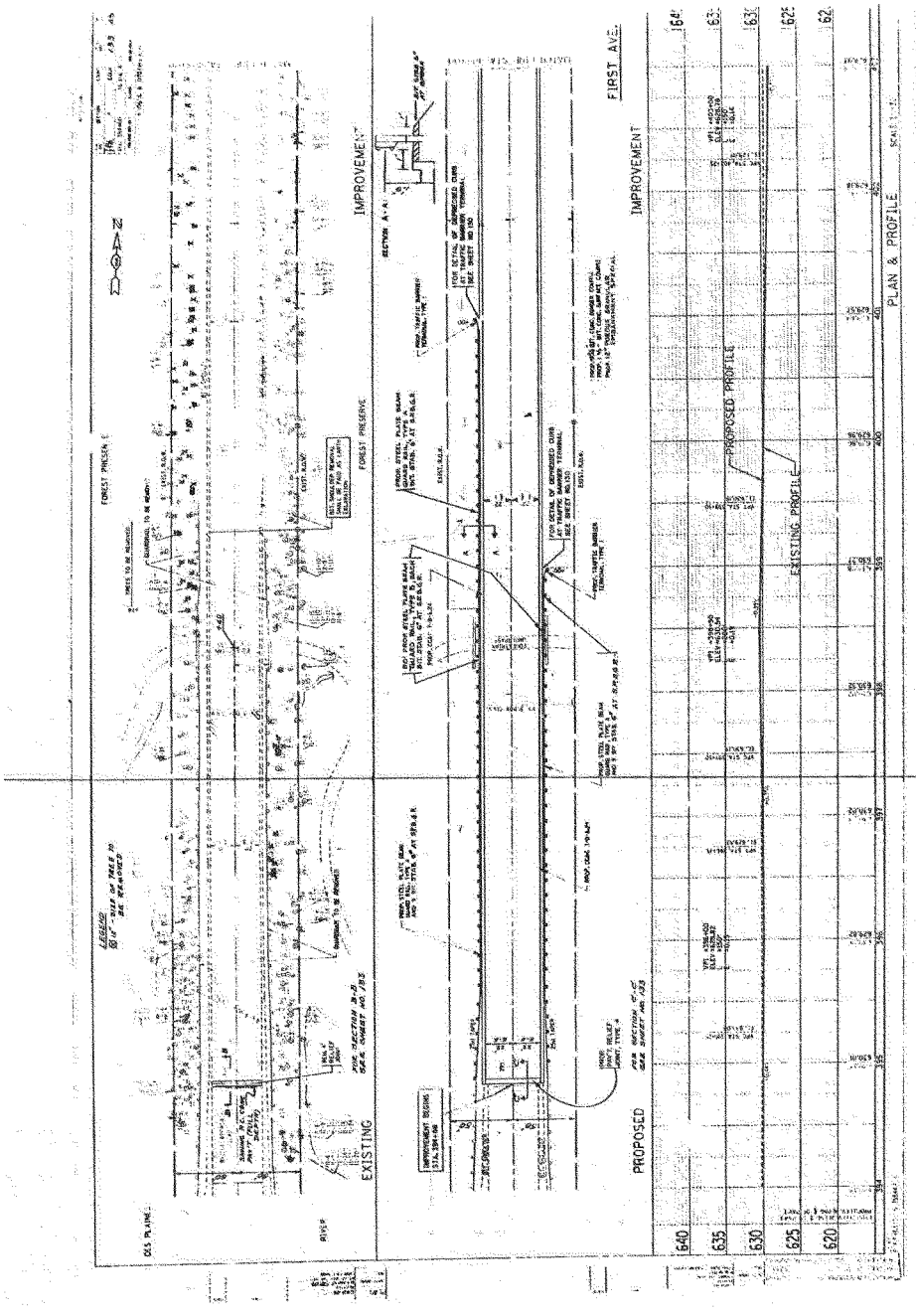
595

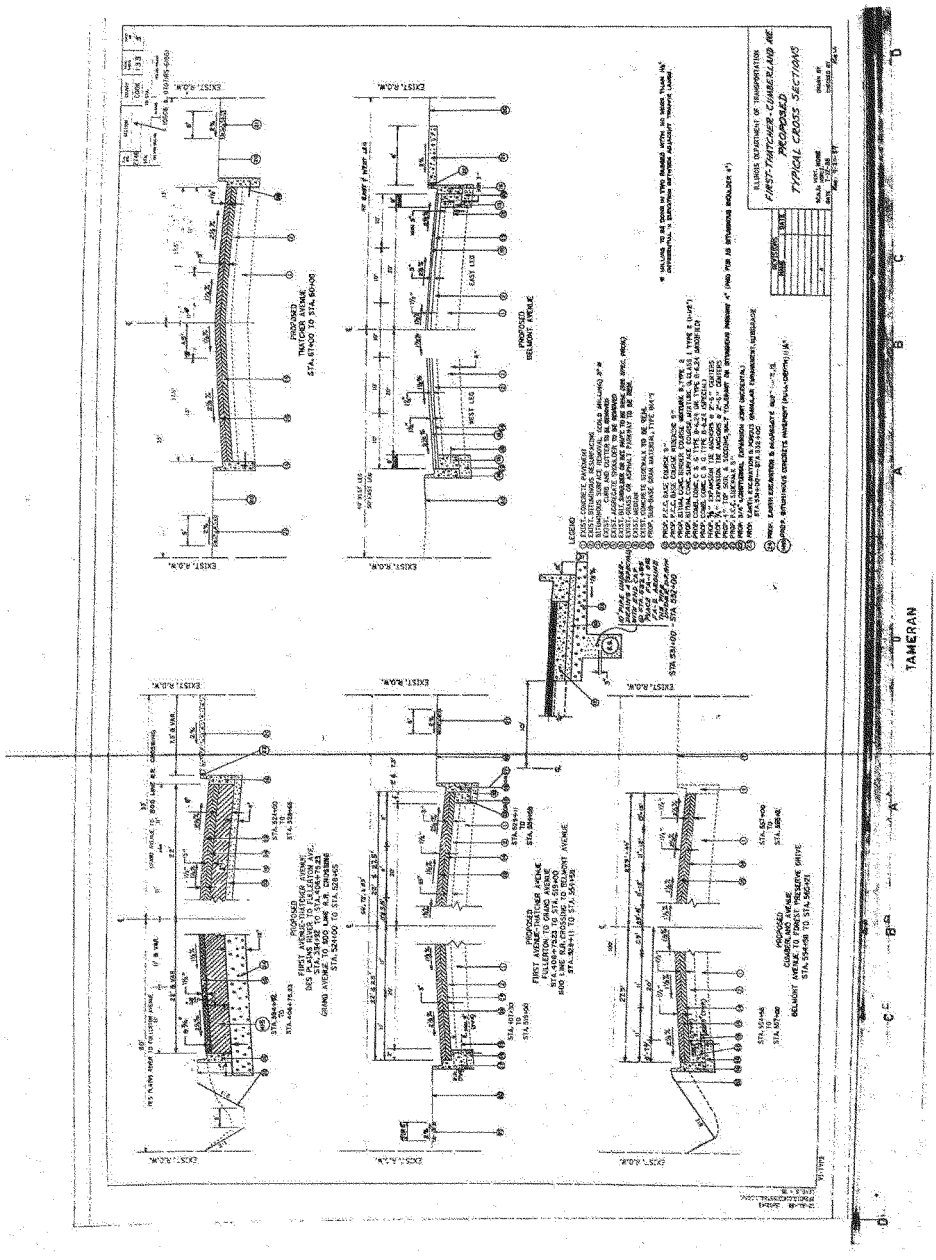
FIRST AVE.
FULLERTON AVE.
THATCHER AVE.
MATCH LINE STA. 403+00
MATCH LINE STA. 412+00
MATCH LINE STA. 514+00
PAVEMENT MARKING PLAN
FIRST AVE.-THATCHER AVE.
LEGEND
TAMERAN


FULLERTON AVE.
VILLAGE OF RIVER GROVE
IMPROVEMENT
FIRST AVE.
EXISTING
PROPOSED
MATCH LINE STA. 403+00
MATCH LINE STA. 412+00
PROPOSED PROFILE
EXISTING PROFILE
DRAINAGE & UTILITIES
TAMERAN


EXISTING
PROPOSED
IMPROVEMENT
IMPROVEMENT
FIRST AVE.
DES PLAINES
DES PLAINES
RIVER
RIVER
MATCH LINE STA. 403+00
MATCH LINE STA. 403+00
EXISTING PROFILE
PROPOSED PROFILE
DRAINAGE & UTILITIES
640
635
630
625
620


VILLAGE OF RIVER GROVE
IMPROVEMENT
FIRST AVE
EXISTING
PROPOSED
MATCH LINE STA. 412+00
MATCH LINE STA. 403+00
FOREST PRESERVE
EXISTING PROFILE
PROPOSED PROFILE
PLAN & PROFILE
635
630
625
620
615


FIRST AVE.
IMPROVEMENT
IMPROVEMENT
EXISTING
PROPOSED
PROPOSED PROFILE
EXISTING PROFILE
PLAN & PROFILE
640
635
630
625
620


ILLINOIS DEPARTMENT OF TRANSPORTATION
FIRST-THATCHER-CUMBERLAND AVE.
PROPOSED
TYPICAL CROSS SECTIONS
TAMERAN

INDEX OF SHEETS

1	TITLE SHEET
2	INDEX OF SHEETS, STATE STANDARDS
3	PLAN NOTES, STRUCTURAL DESIGN INFORMATION
4-5	TYPICAL X-SECTIONS
6-11	SUMMARY OF QUANTITIES
12-13	ALIGNMENT
14-21	R.O.W. PLANS
22-30	STAGE CONSTRUCTION
31-43	DRAINAGE & UTILITIES
44	DRAINAGE STRUCTURE & PIPE TABLE
45-57	PLAN & PROFILE
58-62	LANDSCAPING & PAVEMENT MARKING PLANS
63-66	LIGHTING PLANS & DETAILS
67-95	TRAFFIC SIGNAL PLANS AND DETAILS
97	EQUESTRIAN UNDERPASS REPAIRS, STA. 338+40
98-111	CROSS SECTIONS
112	DETAILS: BRICK BULKHEAD ALLEY PCC SIDEWALK
113	DETAIL OF CARD STANDARD SYMBOLS
114	DETAIL OF SIDEWALK RAMPS FOR THE HANDICAPPED
115	DETAIL OF STORM SEWER CONNECTION TO SEWER
116	DETAIL OF TYPICAL PAVEMENT MARKINGS
117	DETAIL OF TYPICAL OF DUAL DIRECTIONAL SNOW-PLOWABLE RAISED PAVEMENT MARKERS
118	DETAIL OF DRAINAGE & UTILITY STRUCTURE ADJUSTMENT (SPECIAL)
119	DETAIL OF DRIVEWAY RETURN WITHOUT CURB
120	DETAIL OF DRIVEWAY RETURN WITH CURB
121	DETAIL OF PATCHING PAVEMENT REPLACEMENT FOR TRENCH TRAFFIC CONTROL & PROTECTION FOR SIDE ROADS & INTERSECTIONS
122-129	CITY OF CHICAGO - CASE [illegible] AND RAMPS
130	DETAIL OF CONCRETE CURB SECTION WITH PROT. BLOCK REV. 807 DETAIL OF MOVING FIRE HYDRANT, 60' R/T TAPER WITH EXIT JOINT
131	MANHOLE TYPE A, 7 FOOT DIAMETER
132	DETAIL CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT TRAFFIC ISLAND-CUMBERLAND AVE. & 60 FOREST PRESERVE DRIVE CORRUGATED MEDIAN CODE.)
133.0	TEMP PAVEMENT MARKING LETTER & SYMBOLS
133	PAVEMENT RELIEF JOINT DETAILS
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1521-4	MANHOLE, TYPE A
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1685-4	SYMBOLS & ABBREVIATIONS
1698	GRADING TO CONSERVE ADEQUATE ROOT SYSTEMS & TREES
2150-9	CONCRETE CURB & COMBINATION CONCRETE CURB & GUTTER
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2230-15	STEEL PLATE BEAM GUARDRAIL
2252-4	REINFORCED CONCRETE PIPE ELBOW AND PRECAST REINFORCED CONCRETE FLARED END SECTION
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2299-10	DESIGN OF TRAFFIC CONTROL DEVICES
2300-5	FLAGMAN TRAFFIC CONTROL SIGN
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2368	DETAILS OF CONCRETE AND MORTAR HANDHOLES
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2306-6	TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES RURAL, MOVING OPERATION, DAY
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REVISIONS	
ISSUE	DATE

DEPARTMENT OF TRANSPORTATION

FIRST-THATCHER-CUMBERLAND AVE.

INDEX OF SHEETS
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DATE CHECKED BY

DIST.	SECTION	COUNTY	SHEET NO.	SHEET NO.
1	W.W.	COOK	1967	2
DIST.		TOTAL SHEETS		
FED. ROAD DIST. NO.	STATE	FED. AID PROJECT		

* FAP746
* * (1908 & 0707)RS-6186)

602

TAMERAN

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

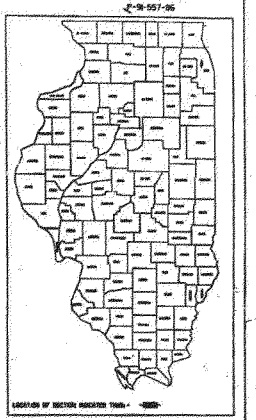
PLANS FOR PROPOSED FEDERAL AID HIGHWAY

69857

FOR INDEX OF SHEETS, SEE SHEET NO. 2

SCALES

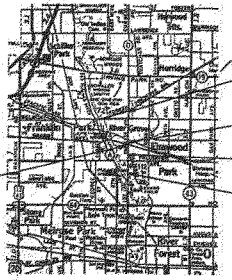
F.A.U. ROUTE 2746
FIRST AVE.-THATCHER AVE.-CUMBERLAND AVE.
DES PLAINES RIVER TO FOREST PRESERVE DRIVE
SECTION (0606 & 0707)RS-6(86)
PAVEMENT WIDENING, RESURFACING, AND TRAFFIC SIGNAL MODERNIZATION
COOK COUNTY
C-91-326-87



IMPROVEMENT LOCATED IN MUNICIPALITIES OF:
- RIVER GROVE
- CHICAGO

FULL SIZE PLANS HAVE BEEN PREPARED USING STANDARD ENGINEERING SCALES. REDUCED SIZED PLANS WILL NOT CONFORM TO STANDARD SCALES. IN MAKING MEASUREMENTS ON REDUCED PLANS, THE ABOVE SCALES MAY BE USED.

CONTRACT NO. 80273



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IMPROVEMENT NET LENGTH=767.29 LIN. FT. (1.453 MILES)

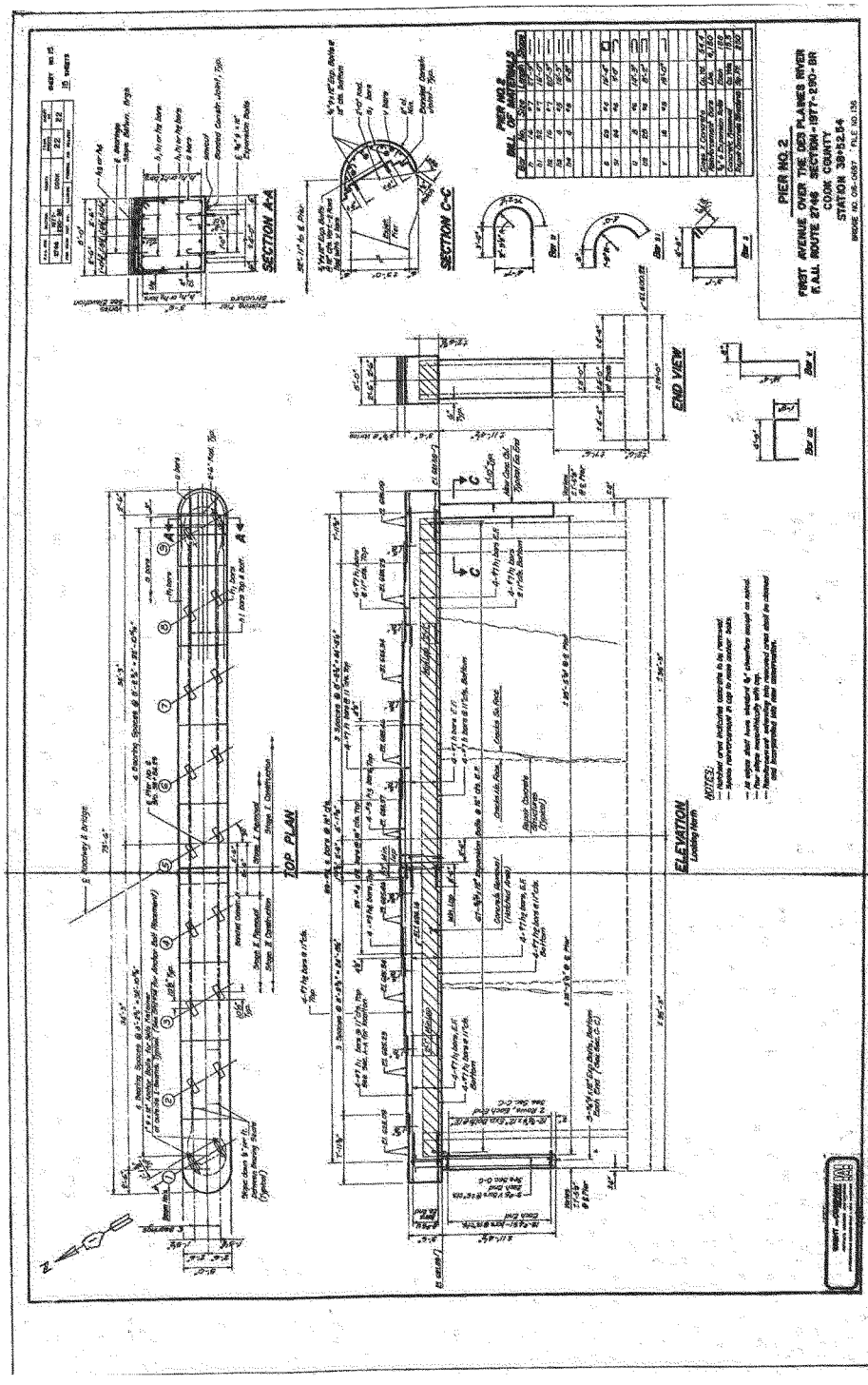
TRAFFIC DATA
1992 ADT=14600-25800 VEHICLES
DESIGN DESIGNATION
2000(DD)- MAJOR ARTERIAL-8 RSDPCC-4R3

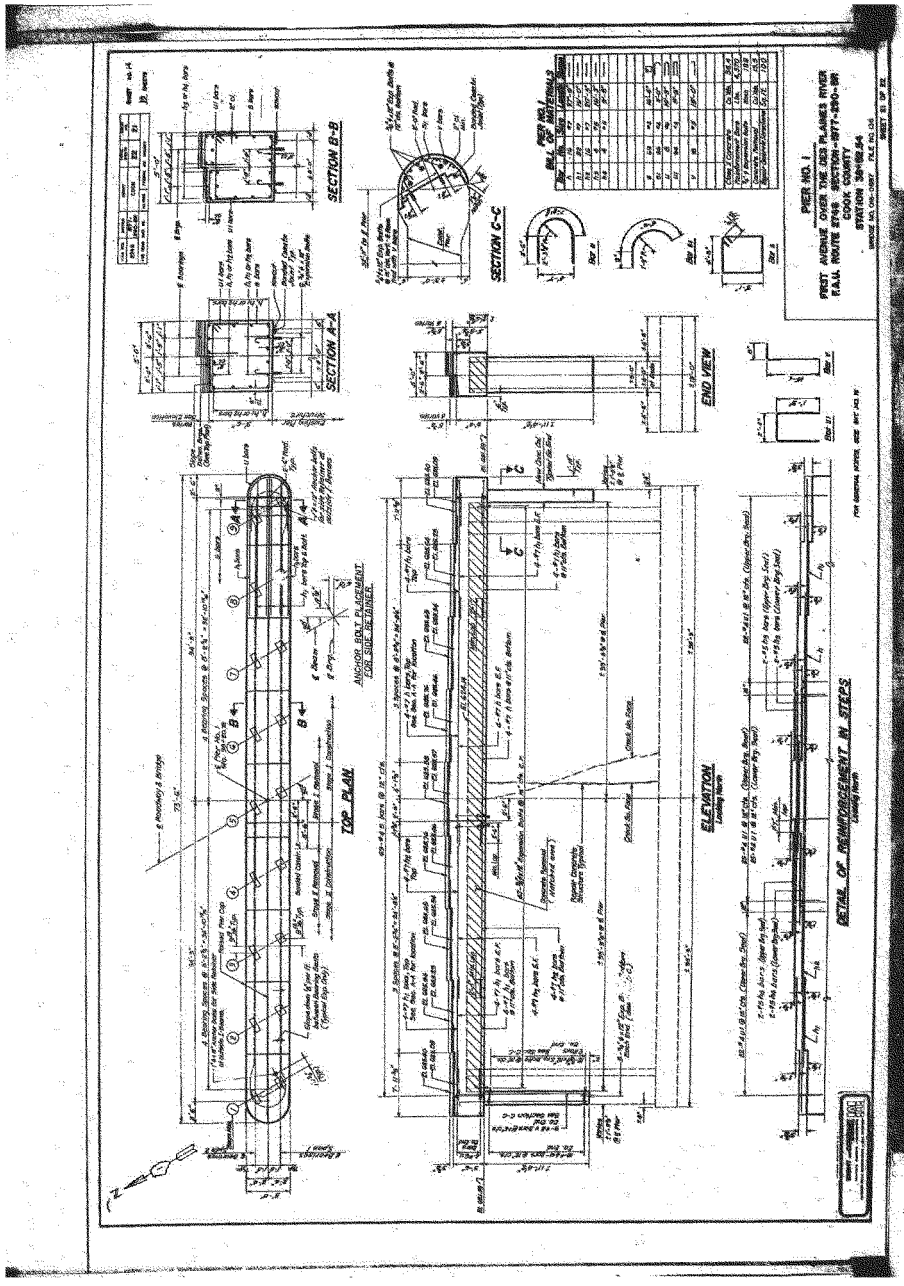
CITY OF CHICAGO
DEPARTMENT OF PUBLIC WORKS

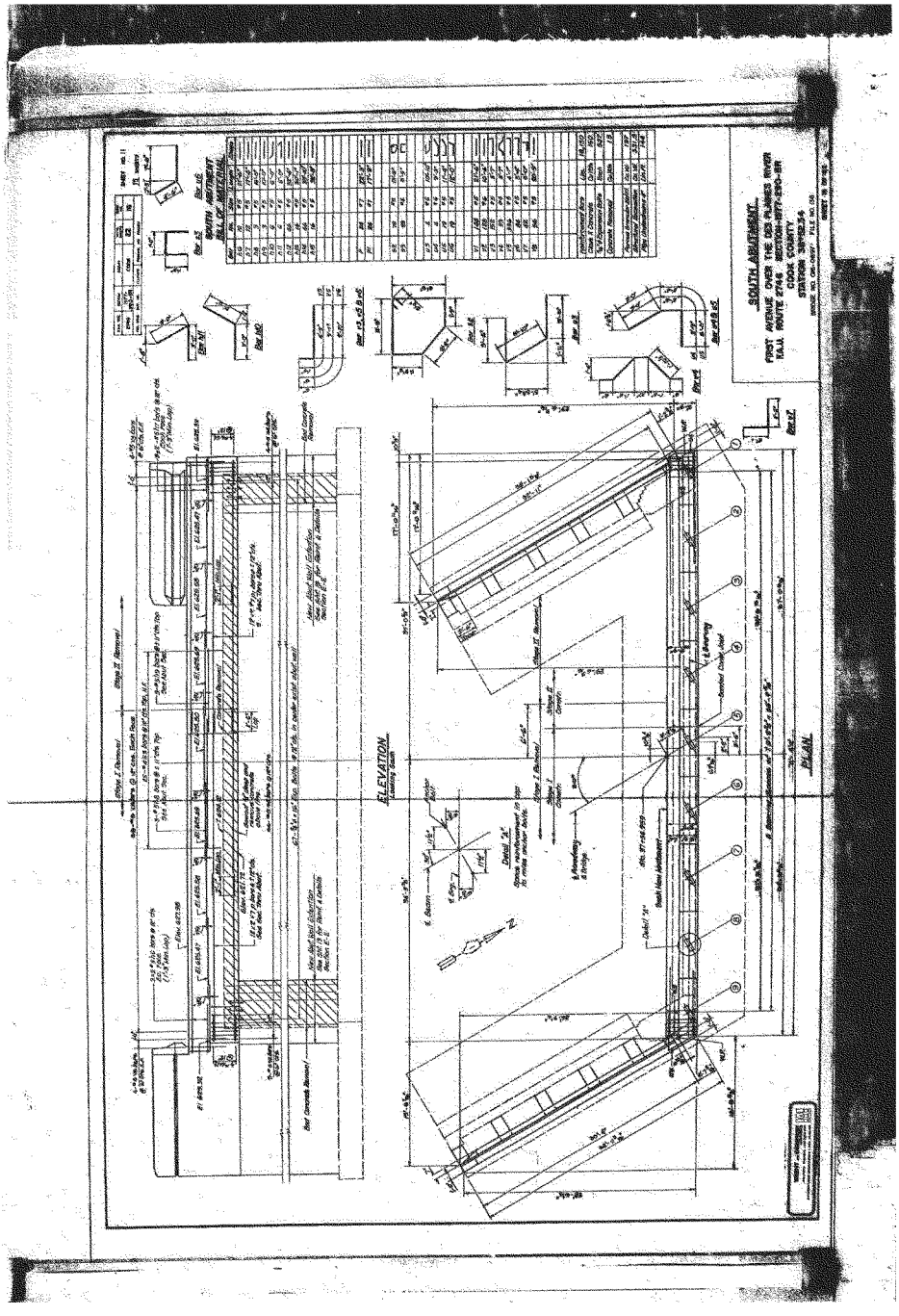
COOK COUNTY SECTION (0606 & 0707)RS-6(86) F.A.U. ROUTE 2746

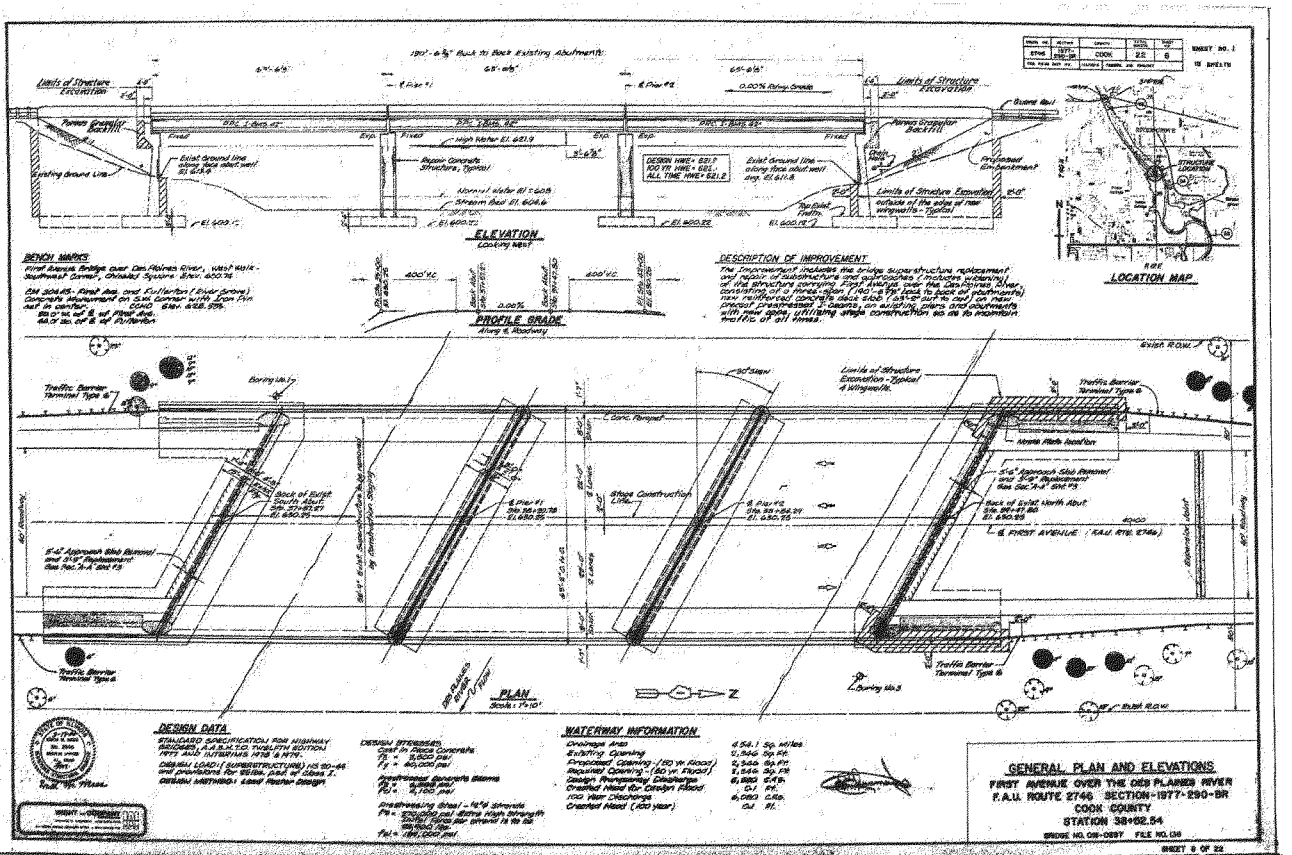
D C B A 0 TAMERAN A B C D

603


PIER NO. 2
FIRST AVENUE OVER THE DES PLAINES RIVER
F.A.I. ROUTE 2746 SECTION-1977-230-BR
COOK COUNTY
STATION 38+52.54
BRIDGE NO. CHI-0497 FILE NO. 136
PIER NO. 2
BILL OF MATERIALS
TOP PLAN
ELEVATION
END VIEW
SECTION A-A
SECTION C-C
NOTES:


PIER NO. 1
FIRST AVENUE OVER THE DES PLAINES RIVER
F.A.U. ROUTE 2746 SECTION-1977-290-BR
COOK COUNTY
STATION 38+62.54
SECTION A-A
SECTION B-B
SECTION C-C
END VIEW
TOP PLAN
ELEVATION
DETAIL OF REINFORCEMENT IN STEPS
ANCHOR BOLT PLACEMENT FOR SIDE RETAINER
PIER NO. 1 BILL OF MATERIALS


SOUTH ABUTMENT
FIRST AVENUE OVER THE DES PLAINES RIVER
F.A.U. ROUTE 2744 SECTION-1977-230-BR
COOK COUNTY
STATION 38+92.34
ELEVATION
PLAN


ELEVATION
PROFILE GRADE
PLAN
LOCATION MAP
DESIGN DATA
WATERWAY INFORMATION
GENERAL PLAN AND ELEVATIONS
FIRST AVENUE OVER THE DES PLAINES RIVER
F.A.U. ROUTE 2746 SECTION-1977-290-BR
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SHEET 6 OF 22

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2.	INDEX OF SHEETS, SUMMARY OF QUANTITIES, & PLAN NOTES
3.	PLAN AND PROFILE OF FIRST AVENUE
4.	CROSS SECTIONS
5.	MAINTENANCE OF TRAFFIC PLANS
6.	APPLICATION OF TRAFFIC CONTROL DEVICES DISTRICT STANDARD 1-1
7.	APPLICATION OF TRAFFIC CONTROL DEVICES DISTRICT STANDARD 1-2
8.	GENERAL PLAN AND ELEVATION OF BRIDGE
9.	GENERAL NOTES, BILL OF MATERIALS, & EXPANSION JOINT DETAILS
10.	MAINTENANCE OF TRAFFIC CROSS SECTIONS
11.	DECK ELEVATIONS
12.	DECK PLAN AND SECTION
13.	DECK DETAILS
14.	FRAMING PLAN AND SECTION
15.	P.C.C. I-BEAM DETAILS
16.	DIAPHRAGM AND BEARING DETAILS NO.1
17.	DIAPHRAGM AND BEARING DETAILS NO.2
18.	SOUTH ABUTMENT
19.	NORTH ABUTMENT
20.	NORTH & SOUTH WINGWALL DETAILS
21.	PIER NO.1
22.	PIER NO.2

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2230-13	STEEL PLATE BEAM GUARD RAIL TYPE A
2298-4	TRAFFIC CONTROL DEVICE-TYPICAL APPLICATION
2299-8	TRAFFIC CONTROL DEVICE- DESIGN
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2303-3	TRAFFIC CONTROL STANDARD
2306-4	TRAFFIC CONTROL STANDARD
2307-4	TRAFFIC CONTROL STANDARD
2308-3	TRAFFIC CONTROL STANDARD
2311-5	TRAFFIC CONTROL STANDARD
2314-3	TRAFFIC CONTROL STANDARD
2315-4	TRAFFIC CONTROL STANDARD
2316-5	TRAFFIC CONTROL STANDARD
2318-3	TRAFFIC CONTROL STANDARD
2340-2	TRAFFIC BARRIER TERMINAL TYPE S
2540-1	TRAFFIC BARRIER TERMINAL TYPE 6
2385-1	TEMPORARY CONCRETE BARRIER
2389	TRAFFIC BARRIER TERMINAL, TYPE 11
1281	TEMPORARY EROSION CONTROL SYSTEMS

SUMMARY OF QUANTITIES

PROJECT IX-5003( )

LOCATION OF WORK FIRST AVENUE

			ROAD STA.	BRIDGE STA.		
			34+30 TO 37+58.40	37+66.40 TO 39+48.87		
			39+48.87 TO 42+40			
			CONSTRUCTION		TYPE	CODE
CODE NO.	PAY ITEM	UNIT	TOTAL QUANTITY	6706	X081	
201001	TREE REMOVAL, SPECIAL (8 in 15 INCH DIAMETER)	EA. DIA.	155	155	-	
202001	SPECIAL EXCAVATION	CU. YD.	125	125	-	
202001	EMBANKMENT	CU. YD.	691	691	-	
211001	BORROW (GRANULAR BACKFILL	TN. YD.	456	92	364	
213002	AGGREGATE SHOULDERS, TYPE A 8"	SQ. YD.	170	170	-	
216004	BITUMINOUS SHOULDERS 6"	SQ. YD.	80	80	-	
508010	BITUMINOUS BASE COURSE 10"	SQ. YD.	440	440	-	
406001	BITUMINOUS MATERIALS (PRIME COAT)	GALLON	190	190	-	
406003	AGGREGATE (PRIME COAT)	TON	1.4	1.4	-	
406007	BITUMINOUS CONCRETE BINDER (COMB)	TON	60	60	-	
406014	BITUMINOUS CONCRETE SURFACE COURSE, MIXTURE F, CLASS 1	TON	88	88	-	
9010[8	REMOVAL OF EXISTING SUPERSTRUCTURES	EACH	1	-	1	
501034	CONCRETE REMOVAL	CU. YD.	61	-	61	
501029	EXPANSION DEVICE 2/4 INCH	EACH	1,450	-	1,450	
540061	STRUCTURE EXCAVATION	CU. YD.	540	-	540	
550901	FLOW ENGINE	EACH	40	-	40	
560302	PROTECTIVE COAT	SQ. YD.	1,615	76	1,540	
564001	CLASS X CONCRETE	CU. YD.	616.4	-	616.4	
564002	FURNISHING AND ERECTING PRESTRESSED CONCRETE I-BEAMS, 45 INCH	LIN. FT.	1,682	-	1,682	
601004	FURNISHING AND ERECTING REINFORCING STEEL	POUND	8,550	-	8,550	
602001	REINFORCEMENT BARS	POUND	78,970	-	78,970	
602002	REINFORCEMENT BARS (EPOXY COATED)	POUND	12,070	-	12,070	
606001	BASE PLATES	EACH	1	-	1	
619015	BITUMINOUS CONCRETE SURFACE REMOVAL	SQ. YD.	2,650	2,650	-	
620006	PAVEMENT REMOVAL AND REPLACEMENT, SPECIAL 10"	SQ. YD.	50	50	-	
630006	STEEL TAPE BEAM GUARD RAIL REMOVAL, SINGLE RAIL	LIN. FT.	650	650	-	
640910	SEEDING, CLASS 1C (SPECIAL)	ACRE	2.13	0.00	2.05	
644004	ENGINEER'S FIELD OFFICE, TYPE A	CAL. MO.	3	-	3	
647003	PAVEMENT MARKING TAPE	LIN. FT.	14,890	12,710	1,380	
648025	TRAFFIC PROTECTION	L.S.	1	1	-	
210007	APPROACH SLAB REMOVAL (NO REPLACEMENT	SQ. YD.	385	-	385	
515019	EXPANSION JOINT REPAIR	LIN. FT.	80	80	-	
X560715	PREFORMED JOINT SEAL 3"	LIN. FT.	79	-	79	
X560716	PREFORMED JOINT SEAL 4"	LIN. FT.	79	-	79	
2101514** X609916	SERVICE CONCRETE STRUCTURE ELASTOMERIC BEARING ASSEMBLY, TYPE 1	SQ. FT. EACH	455 27	-	455 27	
601076	PIPE UNDERDRAINS, 6"	LIN.FT	248	-	248	
7501[0 * 7501[0 *	THERMOPLASTIC PAVEMENT MARKING - LINE 4" THERMOPLASTIC PAVEMENT MARKING - LINE 12"	LIN. FT LIN. FT.	2,060 165	1,690 55	372 110	
606748 X09756	MOBILIZATION TEMPORARY MELDING RAIL	LUMP SUM LIN. FT.	1 374	-	1 191	
701690	TEMPORARY CONCRETE BARRIER	LIN. FT	994		994	
701641	TEMPORARY CONCRETE BARRIER, TERMINAL SECTION	EACH	2		2	
701648	RELOCATE TEMPORARY CONCRETE BARRIER	LIN. FT	726		726	
725527	STEEL PLATE BEAM GUARD RAIL, TYPE A	LIN. FT	575	575	-	
725542	TRAFFIC BARRIER TERMINAL TYPE S	EACH	2	2	-	
725546	TRAFFIC BARRIER TERMINAL TYPE 6	EACH	2	2	-	
725570	TRAFFIC BARRIER TERMINAL TYPE 11	EACH	2	-	2	
* **	DENOTES APPROXIMATE ITEM HALF-PAINTED/PAINTED					

FED. ROAD DIST. NO.	STATE	COUNTY	TOTAL SHEET NO.	SHEET NO.
5	ILL.	COOK	22	2
FED. ROAD DIST. NO.	F.A. RTE. NO.	SECTION		
5	2765	0904		

PLAN NOTES

THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION ADOPTED OCTOBER 1, 1976 INCORPORATED AS "STANDARD SPECIFICATIONS" AND THE "SUPPLEMENTAL SPECIFICATIONS AND RECURRING SPECIAL PROVISIONS" ADOPTED JANUARY 1, 1980 SHALL GOVERN THE CONSTRUCTION OF THIS TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" INCLUDING THE LATEST REVISIONS THEREOF, AND FOR DETAILS NOT SPECIFICALLY SHALL GOVERN FOR THIS PROJECT UNLESS OTHERWISE SHOWN OR NOTED ON PLANS HEREIN.

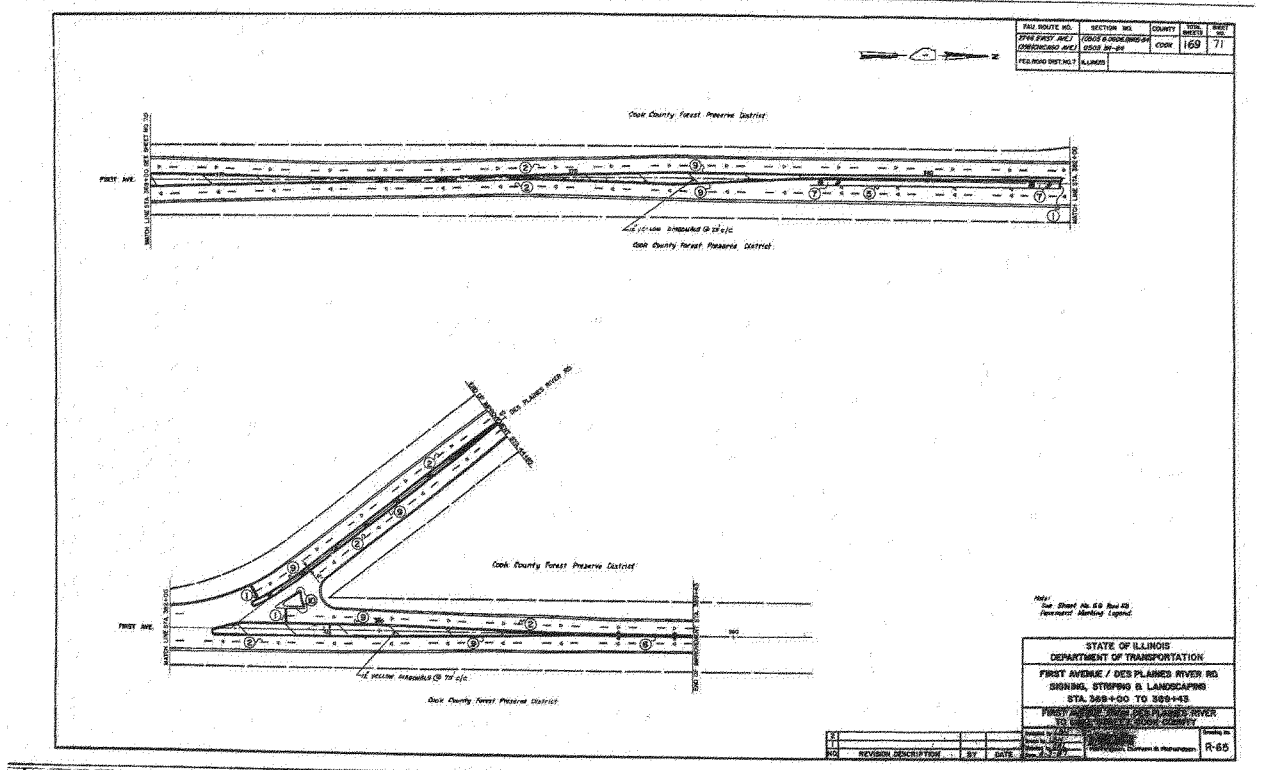
THE CONTRACTOR SHALL VERIFY THE SITE OF THIS PROJECT AND FA UNLESS STRICTLY WITH ALL EXISTING CONDITIONS, TRAFFIC AND OTHER ITEMS THAT AFFECT THE CONTRACT AND THE DETAILED WORK ASPECTS OF CONSTRUCTION.

PLAN DIMENSIONS AND DETAILS RELATIVE TO EXISTING STRUCTURES HAVE BEEN TAKEN FROM EXISTING PLANS AND ARE SUBJECT TO FIELD CONSTRUCTION VARIATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY SUCH DIMENSIONS AND DETAILS IN THE FIELD AND MAKE NECESSARY APPROVED ADJUSTMENTS PRIOR TO CONSTRUCTION OF NEW WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING STRUCTURES OR FOR CHANGES IN THE LINES OF NEW WORK. IF NECESSARY, THE CONTRACTOR WILL BE PAID FOR THE QUANTITY NOTED FURNISHED AT THE UNIT PRICE BID FOR THE WORK.

INDEX OF SHEETS, SUMMARY OF QUAN AND PLAN NOTES.

FIRST AVENUE OVER THE DES PLAINES R
F.A.U. ROUTE 2765 SECTION-1977-290
COOK COUNTY
STATION 36+52.54
BRIDGE NO. 016-0697 FILE NO. 136

608



D C B A 0 A B C D

TAMERAN

AECOM
5555 Glenwood Hills Pkwy, Suite 300
Grand Rapids, Michigan 49512

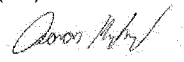
616.942.9600 tel
616.940.4396 fax

FINAL Geotechnical Engineering Report

Des Plaines DPLV09 Investigation
U.S. Army Corps of Engineers – Chicago District

Delivery Order No.: CX 34
Contract No.: W911XK-09-D-0015
AECOM Project No.: 60299932
Date: July 11, 2013

Prepared by:
AECOM
Aaron M. Humphrey, P.E.
Senior Project Engineer
(616) 940-4451



Reviewed by:
AECOM
Paul A. Tarvin, P.E.
Vice President
(414) 944-6080

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1.0 Introduction **1**
2.0 Authorization and Purpose **2**
3.0 Scope of Services **3**
4.0 Procedures **4**
4.1 Soil Borings 4
4.2 Borehole Survey 4
4.3 Laboratory Testing 4
5.0 Exploration Results **6**
5.1 Soil Conditions 6
5.2 Water Conditions 7
6.0 Engineering Properties **8**
7.0 General Qualifications **9**

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Table 1: Boring Location Summary

FIGURES
Figure 1: Boring Location Plan
Figure 2: Subsurface Profile 1
Figure 3: Subsurface Profile 2

APPENDICES
Appendix A – AECOM General Notes
AECOM Soil Classification System
AECOM Field and Laboratory Procedures
AECOM Standard Boring Log Procedures
Appendix B – Final Boring Logs
Field Boring Logs
Appendix C – Laboratory Summary Sheet
Atterberg Limits Test Results
Gradation Test Results
Unconfined Compression Test Results

1.0 Introduction

According to the United States Army Corps of Engineers – Chicago District, the following paragraphs provide background information for the project:

> "The Upper Des Plaines and Tributaries Feasibility Study II (DPII) project has been formulated to build on the benefits achieved by the Upper Des Plaines River Flood Damage Reduction Feasibility Study (Des Plaines I). DPII recommended a plan that further manages flood risk on the main stem in both Illinois and Wisconsin, manages tributary flood risk, and in addition to flood management, restores and enhances degraded ecosystems within the study area.
>
> The focus of the investigation outlined in this report was to perform soil borings at the DPLV09 site in Des Plaines, Illinois. The site includes a levee/floodwall in between Ashland Avenue and Jarvis Avenue.
>
> The project site involved in the investigation was along the Des Plaines River in Des Plaines, Illinois. The western bank of the Des Plaines River will have a floodwall/levee extending from Ashland Avenue to Jarvis Avenue for about 2 miles. It will have a top elevation varying between about 635.7 feet to 633.8 feet (NAVD88). This side of the river is currently occupied by forest preserve, residential, and commercial properties."

2.0 Authorization and Purpose

The United States Army Corps of Engineers (USACE) engaged AECOM to perform soil borings and laboratory testing to obtain geotechnical information needed for the design of the project.

The project was presented by USACE to AECOM in a Request for Proposal (RFP) and scope of work dated October 31, 2012. The contract was awarded on May 8, 2013 as task order CX34 under AECOM's IDIQ contract W911XK-09-D-0015. AECOM subcontracted the drilling services to Strata Earth Sciences, LLC (STRATA) out of Palatine, Illinois.

3.0 Scope of Services

The AECOM services were completed in general accordance with the Des Plaines II DPLV09 Investigation Scope of Work (SOW) dated October 31, 2012. The Scope of Work included, but was not limited to, the following tasks:

- preparing a Quality Control Plan (QCP), and a Hazard Analysis and Accident Prevention Plan (APP);
- staking the boring locations in the field in co-ordination with Mr. Dan Ferris (USACE);
- obtaining utility clearance prior to the performance of the borings;
- mobilizing a truck mounted drilling rig (subcontracted to STRATA) to the project site;
- obtaining representative split spoon and relatively undisturbed Shelby tube soil samples generally at 2.5-foot in the upper 15 feet of borings and at 5-foot intervals at greater depths in general accordance with ASTM standards;
- restoring the boring sites to near pre-boring conditions;
- mobilizing an AECOM survey crew to locate the as-drilled soil boring locations,
- observing soil and groundwater conditions while drilling and sampling and preparing field logs documenting drilling methods, SPT results, soil condition observations, and other pertinent geotechnical-related observations;
- performing laboratory testing on representative samples and preparing final geotechnical boring logs using gINT software;
- preparing a draft geotechnical engineering report dated July 8, 2013 summarizing the field explorations, soil conditions, and laboratory results; and,
- preparing this final geotechnical engineering report to reflect USACE comments to the draft report.

4.0 Procedures

4.1 Soil Borings

A total of eight (8) soil borings were advanced at the project site by Strata Earth Sciences, LLC (STRATA) under subcontract to AECOM using a truck mounted CME 45 rotary drill rig. An AECOM field engineer was on site during the subsurface exploration program to observe the collected samples and log the boreholes.

The borings were advanced using 3-1/4" I.D. hollow stem augers. Representative soil samples were obtained at 2.5-foot intervals in the upper 15 feet of the boring and at 5-foot intervals below 15 feet in general accordance with ASTM D 1586, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils" using an automatic hydraulic hammer. Relatively undisturbed Shelby tube samples were taken in cohesive soils in general accordance with ASTM D1587 "Standard Practice for Thin Walled Tube Sampling". The borings were advanced using these methods to approximately 26 to 36 feet below the ground surface. The soil borings were backfilled with auger cuttings and asphalt patching material upon completion.

The soil samples were returned to the AECOM laboratory in Vernon Hills, Illinois for testing as described later in this report. The results of these observations are shown on the final boring logs that are included in Appendix B. A copy of the AECOM Standard Boring Log, Field, and Laboratory Procedures are included in Appendix A.

An AECOM field engineer was present during the drilling activities to prepare field logs documenting drilling methods, SPT results, soil conditions, groundwater measurements, and other pertinent geotechnical-related observations. It is important to note that the information included on the field logs is based on the initial interpretations of the soil conditions and soil types by the AECOM field representative. These field logs were then used along with additional visual observations and the results of laboratory testing and laboratory classification for completing the final boring logs.

4.2 Borehole Survey

The USACE provided AECOM with a location map and coordinates of the eight (8) proposed soil borings. AECOM located the borings prior to drilling based on review of the figures and on-site consultations with Mr. Dan Ferris (USACE). Following the performance of the soil borings, AECOM mobilized a survey crew to the site to survey the final boring locations.

The soil boring locations are presented on Figure 1 and the coordinates are provided on Table 1.

4.3 Laboratory Testing

Laboratory strength and index tests were completed on selected soil samples to characterize the physical properties of the soils encountered in the soil borings. The table below outlines the laboratory tests and corresponding ASTM designation completed by AECOM:

Laboratory Testing Program Summary

Test Name	Designation	Proposed Number of Tests	Completed Number of Tests
Visual Classification	ASTM D 2488	76	91
Moisture Content	ASTM D 2216	76	91
Atterberg Limits	ASTM D 4318	3	3

Combined Analysis	ASTM D 422	4	4
Dry Density	ASTM D2937 & D221	6	6
Unconfined Compression w/Stress-Strain Curves	ASTM D 2166	6	6

The laboratory testing results are included in Appendix C.

In conjunction with the laboratory testing program, all of the samples were classified in the field in general accordance with the AECOM Soil Classification System. These descriptions and estimated group symbols are in general conformance with the Unified Soil Classification System which serves as the basis for the AECOM Soil Classification System, and are included on the soil boring logs. A brief explanation of the classification of soil samples is included in the Appendix A. The laboratory test results are included within Appendix C of this report.

5.0 Exploration Results

The following subsurface conditions were encountered during the explorations.

5.1 Soil Conditions

A generalized summary of the subsurface conditions encountered during the subsurface exploration program is discussed below. The geologic descriptions provided below are generalized and brief; individual soil boring logs in Appendix B should be reviewed to determine the actual subsurface conditions at the individual boring locations.

Asphalt Pavement
Borings DP2-13-01 and boring DP2-13-05 had approximately 5.5-inches and 5-inches of bituminous asphalt pavement beginning at the ground surface, respectively.

Topsoil
Topsoil was observed in borings DP2-13-02, DP2-13-03, DP2-13-04, DP2-13-06 and DP2-13-08 with thicknesses ranging from 5-inches to 12-inches.

Fill Soils
Non-engineered fill soils were observed in all of the borings except for DP2-13-06 and DP2-13-07. The fill soils in borings DP2-13-01 through DP2-13-04 extended to approximately 2 feet below the ground surface, while at boring DP2-13-05 the fill extended to approximately 9.5 feet below the ground surface, and to approximately 6 feet below the ground surface in borings DP2-13-06 and DP2-13-08. In general, the fill consisted of reworked site soils with interbedded layers of topsoil. Deleterious material was generally not found in the fill with the exception of some glass pieces which were observed in boring DP2-13-02. Additionally, it is important to note that multiple obstructions which required minor relocation of the boring were encountered in boring DP2-13-05.

Silty Clay
The dominant soil layer at the project site consists of a silty clay with trace amounts of fine to coarse sand and fine gravel (USCS: CL) which was identified in all of the borings. The soil layer was observed to have occasional silt (USCS: ML) seams and graded to a clayey silt material (USCS: CL-ML) in some locations. The consistency of this soil layer was in the very stiff to hard range, with calibrated penetrometer readings typically ranging from 2.0 to 7.0 tons per square foot, and was generally hard with average calibrated penetrometer readings. In boring DP2-13-05, a medium stiff zone of this material was encountered from approximately 12 feet to 17 feet below the ground surface where calibrated penetrometer readings of approximately 0.5 tsf to 0.75 tsf were encountered.

Sand
In general, the silty clay stratum described above was relatively uniform and was without thick sand seams which would provide permeable zones underneath the proposed flood protection system. A layer of silty fine to coarse sand (USCS: SM), however, was encountered between 10.5 and 11 feet in boring DP2-13-01. Additionally, a layer of what is presumed to be old river bottom material was encountered between 9.5 and 12 feet below the ground surface in boring DP2-13-02. This layer consists of a black silty fine to coarse sand with trace fine gravel (USCS: SM) and trace amounts of wood. The relative density of the soil is loose with an SPT-N value of 6 blows per foot.

Silt
Relatively thin layers and occasional silt seams were encountered within the silty clay. In addition, a silt stratum (USCS: ML) was encountered near the bottom of borings DP2-13-05 through DP2-13-08. This layer was very dense to extremely dense with SPT-N values typically near or in excess of 100 blows per foot.

Additional variations to the above general profile were noted. Refer to the individual boring logs in Appendix B for specific information. It should be noted that the stratification lines indicated on the boring logs were selected on the basis of laboratory tests, field logs, and visual observations of the recovered samples. The stratification lines that occur on the boring logs are in some cases estimated; in-situ, the transition between soil types in both the horizontal and vertical directions may be gradual.

5.2 Water Conditions

The depth at which water was encountered in the borings ranged from 6 feet in boring DP2-13-07 to 26 feet in boring DP2-13-02 based on observations of moisture in the soil sample. No groundwater was observed in boring DP2-13-08. With the exceptions of borings DP2-13-02 and DP2-13-04 where groundwater was at approximate elevations 602 feet and 609 feet, respectively, groundwater was typically between elevations 618 feet to 624 feet. However, these water level measurements were made under short term conditions in low permeability cohesive soils, and therefore may not be representative of the long term position of the groundwater table. Observation wells would need to be installed and monitored over a period of several weeks in order to determine the long term position of the water table. Additionally, both seasonal and annual fluctuations in groundwater levels will likely occur.

6.0 Engineering Properties

It is AECOM understands that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. AECOM recommends that the USACE use caution in the selection of soil properties, particularly where a layer of softer clay was encountered in boring DP2-13-05 and where the old river bottom deposits were observed in boring DP2-13-02. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following table illustrated the range of soil properties which were obtained from the laboratory testing:

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf)			
CL, CL-ML soils	104.5	124.8	113.5 (from 6 tests)
Unconfined Compressive Strength (tsf)			
CL, CL-ML soils	0.23	3.75	2.17 (from 6 laboratory unconfined compression tests)
CL, CL-ML soils	0.5	7	4.0 (from 70 calibrated hand penetrometer tests)

The designers who will perform the analyses must use discretion during the selection of the soil properties and should review the laboratory testing results in Appendix C separately for each location to be analyzed.

7.0 General Qualifications

The information presented in this report is based on data obtained from soil borings and laboratory testing completed. Variations can occur between borings, the nature and extent of which may not become evident until after construction. If variations are encountered, it may be necessary reevaluate the information contained in this report with respect to the design and construction.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices to aid in the evaluation of this property, and to assist in the design of this project. No other warranty, expressed or implied, is made. The scope of this report is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects relevant to soil characteristics. In the event any changes in the design or location of the structures as outlined in this report are planned, we should be informed so the changes can be reviewed, and the conclusions of this report modified as required.

TABLES

Table 1: Boring Location Summary

Des Plaines II DPLV09
Des Plaines, Illinois
AECOM Project #: 60299932

Table 1: Boring Location Summary

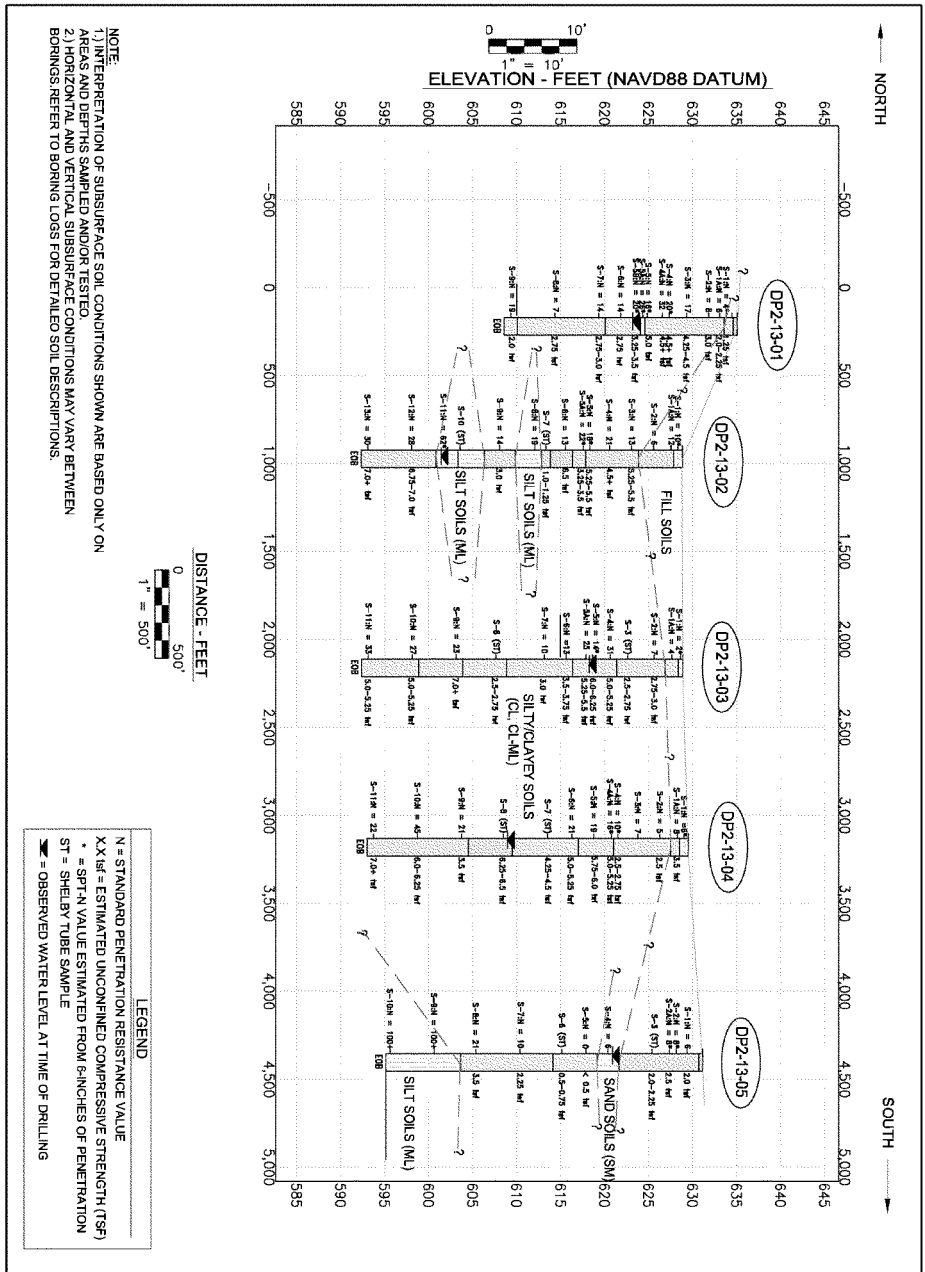
Boring	Coordinates*		Ground Surface Elevation (ft)**	Boring Depth (ft)	Drilling Firm	Date Drilled	Borehole Status
	Northing (ft)	Easting (ft)					
DP2-13-01	1956185.0	1106020.6	635.08	26.5	STRATA	6/11/2013	Backfilled
DP2-13-02	1956172.8	1106774.2	628.83	36.5	STRATA	6/11/2013	Backfilled
DP2-13-03	1955125.9	1107348.2	628.89	36.5	STRATA	6/13/2013	Backfilled
DP2-13-04	1954217.6	1107810.9	629.51	36.5	STRATA	6/11/2013	Backfilled
DP2-13-05	1953350.3	1108649.0	631.13	36	STRATA	6/12/2013	Backfilled
DP2-13-06	1950271.8	1108788.6	631.88	36	STRATA	6/12/2013	Backfilled
DP2-13-07	1949117.1	1109093.4	629.75	36.5	STRATA	6/12/2013	Backfilled
DP2-13-08	1947883.0	1108888.4	631.54	25.8	STRATA	6/13/2013	Backfilled

*: Based on NAD 83, Illinois State Plane East Co-ordinates
**: Ground surface elevation based on NAVD88

FIGURES

Figure 1: Boring Location Summary
Figure 2: Subsurface Profile 1
Figure 3: Subsurface Profile 2

Legend
Boring
AECOM
BORING LOCATIONS
SUBSURFACE INVESTIGATION
DES PLAINES II DPLV09 INVESTIGATION
DES PLAINES, ILLINOIS
O:\Projects\60298932_DPLV09_Investigation\Borings_20130624.mxd



NOTE:
1.) INTERPRETATION OF SUBSURFACE SOIL CONDITIONS SHOWN ARE BASED ONLY ON AREAS AND DEPTHS SAMPLED AND/OR TESTED.
2.) HORIZONTAL AND VERTICAL SUBSURFACE CONDITIONS MAY VARY BETWEEN BORINGS. REFER TO BORING LOGS FOR DETAILED SOIL DESCRIPTIONS.

SUBSURFACE PROFILE #1
SUBSURFACE INVESTIGATION
DES PLAINES II DPLV09
UNITED STATES ARMY CORPS OF ENGINEERS - CHICAGO DISTRICT
DES PLAINES, ILLINOIS

AECOM

Drawn:	DE	07/05/2013
Checked:	AMH	07/08/2013
Approved:	PAT	07/08/2013
Project Number	60299932	
Figure Number	2	

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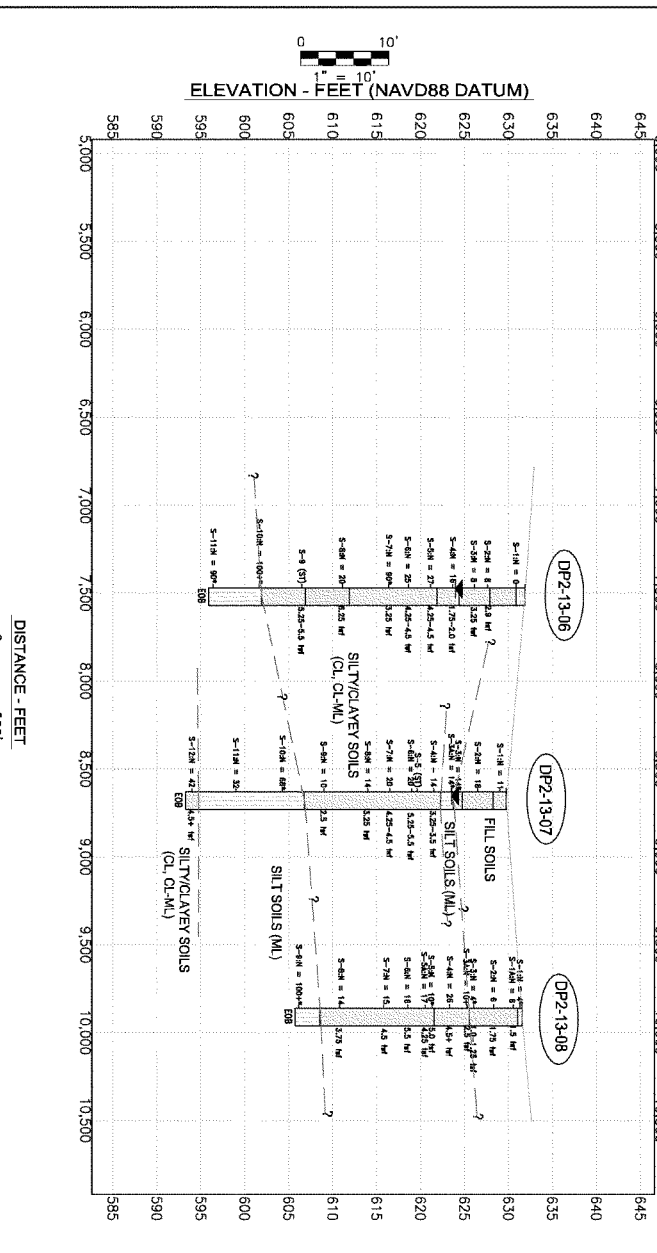

NOTE:
1.) INTERPRETATION OF SUBSURFACE SOIL CONDITIONS SHOWN ARE BASED ONLY ON AREAS AND DEPTHS SAMPLED AND/OR TESTED.
2.) HORIZONTAL AND VERTICAL SUBSURFACE CONDITIONS MAY VARY BETWEEN BORINGS.REFER TO BORING LOGS FOR DETAILED SOIL DESCRIPTIONS.
3.) LAKE MICHIGAN ELEVATION AT TIME OF DRILLING WAS 578.39 FT (NAVD 88)

LEGEND

N = STANDARD PENETRATION RESISTANCE VALUE
X.X tsf = ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (TSF)
* = SPT-N VALUE ESTIMATED FROM 6-INCHES OF PENETRATION
ST = SHELBY TUBE SAMPLE
▼ = OBSERVED WATER LEVEL AT TIME OF DRILLING

AECOM

SUBSURFACE PROFILE #2
SUBSURFACE INVESTIGATION
DES PLAINES II DPLV09
UNITED STATES ARMY CORPS OF ENGINEERS - CHICAGO DISTRICT
DES PLAINES, ILLINOIS

Drawn:	DE	07/05/2013
Checked:	AMH	07/08/2013
Approved:	PAT	07/08/2013
PROJECT NUMBER	60299932	
FIGURE NUMBER	3	

APPENDIX A

AECOM Standard Documents

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AECOM General Notes

Drilling and Sampling Symbols:

SS : Split Spoon - 1-3/8" I.D. 2" O.D. (Unless otherwise noted)	HS : Hollow Stem Auger
ST : Shelby Tube-2" O.D. (Unless otherwise noted)	WS : Wash Sample
PA : Power Auger	FT : Fish Tail
DB : Diamond Bit-NX, BX, AX	RB : Rock Bit
AS : Auger Sample	BS : Bulk Sample
JS : Jar Sample	PM : Pressuremeter Test
VS : Vane Shear	GS : Giddings Sampler
OS : Osterberg Sampler	

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

Water Level Measurement Symbols:

WL : Water Level	WCI : Wet Cave In
WS : While Sampling	DCI : Dry Cave In
WD : While Drilling	BCR : Before Casing Removal
AB : After Boring	ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

Gradation Description and Terminology:

Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; they are described as boulders, cobbles, gravel or sand. Fine grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component of Sample	Size Range	Description of Other Components Present in Sample	Percent Dry Weight
Boulders	Over 8 in. (200 mm)	Trace	1-9
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Little	10-19
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)	Some	20-34
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)	And	35-50
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

Consistency of Cohesive Soils:

Unconfined Compressive Strength, Qu, tsf	Consistency
<0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium (firm)
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
>8.00	Very Hard

Relative Density of Granular Soils:

N-Blows per foot	Relative Density
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
>80	Extremely Dense

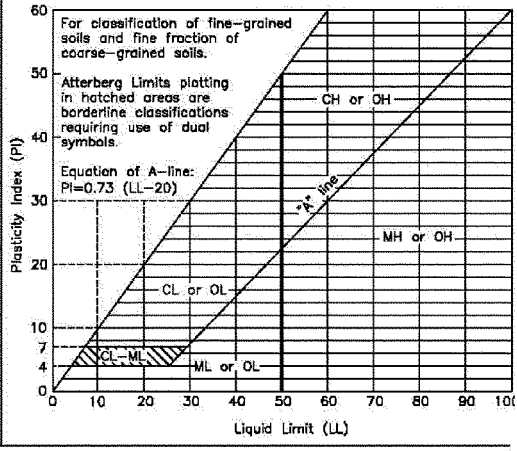
AECOM

AECOM Soil Classification System [1]

Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravel (More than half of coarse fraction is larger than No. 4 sieve size) — Clean gravel (Little or no fines)	GW	Well-graded, gravel, gravel-sand mixtures, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
		GP	Poorly graded gravel, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
	Gravel with fines (Appreciable amount of fines)	GM	Silty gravel, gravel-sand-silt mixtures	Atterberg limits below "A" line or PI less than 4
		GC	Clayey gravel, gravel-sand-clay mixtures	Atterberg limits above "A" line or PI greater than 7
	Sand (More than half of coarse fraction is smaller than No. 4 sieve size) — Clean sand (Little or no fines)	SW	Well-graded sand, gravelly sand, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
		SP	Poorly graded sand, gravelly sand, little or no fines	Not meeting all gradation requirements for SW
	Sand with fines (Appreciable amount of fines)	SM	Silty sand, sand-silt mixtures	Atterberg limits below "A" line or PI less than 4
		SC	Clayey sand, sand-clay mixtures	Atterberg limits above "A" line or PI greater than 7
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve size)	Silt and clay (Liquid limit less than 50)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity	
		CL	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay	
		OL	Organic silt and organic silty clay of low plasticity	
	Silt and clay (Liquid limit greater than 50)	MH	Inorganic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silt	
		CH	Inorganic clay of high plasticity, fat clay	
		OH	Organic clay of medium to high plasticity, organic silt	
	Highly organic soils	PT	Peat and other highly organic soil	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 percent . . . . GW, GP, SW, SP
More than 12 percent . . . . GM, GC, SM, SC
5 to 12 percent . . . . Borderline cases *requiring* dual symbols [3]

Plasticity Chart [2]



1. See AECOM General Notes for component gradation terminology, consistency of cohesive soils and relative density of granular soils.
2. Reference: Unified Soil Classification Systems
3. Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

AECOM

AECOM Field and Laboratory Procedures

Subsurface Exploration Procedures

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer or a drop hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the borehole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the boreholes. They are turned and hydraulically advanced by a truck, trailer or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open boreholes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the boreholes. The open stem allows the sampling tool to be used without removing the augers from the borehole. Hollow stem augers thus provide support to the sides of the borehole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the boreholes. In this process, surface casing and/or drilling fluids are used to maintain open boreholes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (or triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

AECOM

AECOM Field and Laboratory Procedures

Field Sampling Procedures

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) - (ASTM Standard D-1586-99)

In the split-barrel sampling procedure, a 2-inch O.D. split barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - ASTM Standard D-1587-94

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are identified, sealed and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

AECOM

AECOM Laboratory Procedures

Water Content (Wc)
The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)
In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)
In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γd)
The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples
In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in accordance with the AECOM Soil Classification System which is described on a separate sheet. The soil descriptions on the boring logs are derived from this system as well as the component gradation terminology, consistency of cohesive soils and relative density of granular soils as described on a separate sheet entitled "AECOM General Notes". The estimated group symbols included in parentheses following the soil descriptions on the boring logs are in general conformance with the Unified Soil Classification System (USCS) which serves as the basis of the AECOM Soil Classification System.

AECOM

AECOM Standard Boring Log Procedures

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by experienced geotechnical engineers, and as such, differences between the field logs and the final logs may exist. The engineer preparing the report reviews the field logs, laboratory test data and classifications, and using judgment and experience in interpreting this data, may make further changes. It is common practice in the geotechnical engineering profession not to include field logs and laboratory data sheets in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then discarded unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

APPENDIX B

Final Boring Logs

Field Boring Logs

Hole No. DP2-13-01

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,956,185.0 E 1,106,020.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-01	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 13 / UNDISTURBED 0
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/11/2013 COMPLETED 6/11/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +635.1
9. TOTAL DEPTH OF HOLE: 26.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
~~+634.6~~	~~0.5~~		Bituminous Asphalt Pavement (5.5")			
+633.6	1.5		FILL: Clayey topsoil, trace fine gravel - black - stiff - moist (FILL: Topsoil)	100	1	2/6" N = 4* Qp = 1.25 tsf
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown - very stiff to hard (CL)	70	1.0 1.5	
				57	1A 1.5 2.5	3, 3 N = 6 Qp = 2.0-2.25 tsf w = 21.6%
				100	2 2.5 4.0	3, 3, 5 N = 8 Qp = 3.0 tsf w = 19.3%
				100	3 5.0 6.5	5, 7, 10 N = 17 Qp = 4.25-4.5 tsf w = 18.0%
+624.6	10.5			100	4 7.5 8.0	10/6" N = 20* Qp = 4.5+ tsf w = 18.1%
+624.1	11.0		Silty fine to coarse sand, little fine gravel, little clay - gray - medium dense - moist (SM)	100	4A 8.0 9.0	13, 19 N = 32 Qp = 4.5+ tsf
			Silty clay, liittle fine to coarse sand, trace fine gravel, trace shale - gray - very stiff (CL)	80	5 10.0 10.5	8/6" N = 16* Qp =5.0 tsf w = 17.5%
+620.1	15.0			87	5A 10.5 11.0	13/6" N = 26* w = 10.9%
			Silty clay, trace fine sand - gray - very stiff (CL)	100	5B 11.0 11.5	10/6" N = 20* w = 10.6%
					6 12.5 14.0	Q= 3.25-3.5 tsf 5, 6, 8 N = 14 Qp = 2.75 tsf
				100	7 15.0 16.5	5, 7, 7 N = 14 Qp = 2.75-3.0 tsf w = 27.4%
+610.1	25.0				8 20.0 21.5	4, 3, 4 N = 7 Qp = 2.75 tsf w = 22.1%
+608.6	26.5		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff (CL)	100	9 25.0 26.5	5, 8, 11 N = 19 Qp = 2.0 tsf
			End of boring at 26.5'			

SPT Sampling with 140 lb. Auto Hammer 30" of Fall
2" O.D. Split Spoon Sampler
*: SPT-N value based on 6" of penetration or less
w = moisture content

Boring advanced with 4-1/4" HSA to 25 feet
Boring advanced with split spoon sampler to 26.5 feet.

GW at 12' W.D.
GW at 15' A.B.

Borehole backfilled with auger cuttings and asphalt patching material placed at surface.

Hole No. DP2-13-02

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,956,172.8 E 1,106,774.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-02	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 13 / UNDISTURBED 2
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/11/2013 / COMPLETED 6/11/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +628.8
9. TOTAL DEPTH OF HOLE: 36.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+627.8	1.0		Topsoil (12")	100	1 0.0 1.0	2, 5 N = 10*
			FILL: Silty clay, trace fine to coarse sand, trace fine gravel, layers of black silty clay noted, trace glass - brown (FILL: CL)	20	1A 1.0 1.5	6/6" N = 12 Too disturbed for Qp measurement
+623.8	5.0			13	2 2.5 4.0	w = 15.3% 2, 3, 3 N = 6
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown - hard (CL)	100	3 5.0 6.5	Too disturbed for Qp measurement w = 22.9% 4, 5, 8 N = 13
				80	4 7.5 9.0	Qp = 5.25-5.5 tsf w = 17.8% 5, 8, 13 N = 21
+617.8	11.0			100	5 10.0 11.0	Qp = 4.5+ tsf w = 18.1% 5, 9
+616.3	12.5		Silty clay, trace fine sand with ocassional silt seams - gray - very stiff (CL)	100	5A 11.0 11.5	N = 18* Qp = 5.25-5.5 tsf w = 19.8% 11/6"
			Clayey silt, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL-ML)	100	6 12.5 14.0	N = 22* Qp = 3.25-3.5 tsf w = 19.2%
+613.8	15.0			100	7 15.0 16.0	4, 6, 7 N = 13 Qp = 6.5 tsf
+612.8	16.0		Silty clay, little fine to coarse sand, trace fine gravel - gray - stiff (CL)	80	8 16.0 17.5	w = 14.2% 3" Shelby Tube Qp = 1.0-1.25 tsf w = 13.0%
			Silt, trace clay, trace fine sand - gray - medium dense - moist (ML)	100	9 20.0 21.5	11, 11, 8 N = 19 w = 15.0%
+609.8	19.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff (CL)			5, 6, 8 N = 14 Qp = 3.0 tsf w = 18.6%
+606.3	22.5		Silt, trace clay, trace fine sand - gray - moist (ML)			
+603.3	25.5			100	10 25.0 25.5	3" Shelby Tube w = 14.7%
			Sandy silt, trace clay - gray - very dense - moist to wet (ML)	100	11 25.5 26.5	25, 31 N = 62* w = 17.3%
+600.8	28.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	100	12 30.0 31.5	8, 13, 15 N = 28 Qp = 6.75-7.0 tsf
+592.3	36.5			100	13 35.0 36.5	8, 13, 17 N = 30 Qp = 7.0+ tsf w = 14.8%
			End of boring at 36.5'			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with 4-1/4" HSA to 35 feet Boring advanced with split spoon sampler to 36.5 feet. GW at 26' W.D. GW at 33' A.B. Borehole backfilled with auger cuttings and bentonite chips.

Hole No. DP2-13-03

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,955,125.9 E 1,107,348.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-03	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11, UNDISTURBED 2
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/13/2013, COMPLETED 6/13/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +628.9
9. TOTAL DEPTH OF HOLE: 36.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+628.4	0.5		Topsoil (6")	100	1	1/6"
			FILL: Silty fine to medium sand with brown layers of topsoil mixed in sample - brown - loose - moist (FILL: SM)	50	0.0 0.5	N = 2* 2, 2
+626.9	2.0		Silty clay, trace to little fine to coarse sand - brown to dark brown - very stiff (CL)		1A	N = 4
				100	0.5 1.5	w = 14.2% 2, 3, 4
					2	N = 7
				88	2.5 4.0	Qp = 2.75-3.0 tsf w = 21.4%
					3	3" Shelby Tube
+621.4	7.5				5.0 7.5	Qp = 2.5-2.75 tsf w = 21.4%
			Silty clay, trace fine to coarse sand, trace fine gravel -brown - hard (CL)	100	4 7.5 9.0	11, 13, 18 N = 31 Qp = 5.0-5.25 tsf
				100	5	7/6"
				100	10.0 10.5	N = 14* Qp = 6.0-6.25 tsf
+616.4	12.5				5A	w = 19.0%
			Silty clay, trace fine sand - gray - very stiff (CL)	100	10.5 11.5	10, 15 N = 25
					6	Qp = 5.25-5.5 tsf
				100	12.5 14.0	4, 5, 8 N = 13
					7	Qp = 3.5-3.75 tsf
					15.0 16.5	w = 20.8% 4, 4, 6
+608.9	20.0					N = 10 Qp = 3.0 tsf
			Silty clay, little fine to coarse sand, trace fine gravel - gray - very stiff (CL)	92	8 20.0 22.5	3" Shelby Tube Qp = 2.5-2.75 tsf w = 13.6%
+603.9	25.0					
			Silty clay, trace fine sand with silt seams noted - gray - hard (CL)	100	9 25.0 26.5	6, 9, 14 N = 23 Qp = 7.0+ tsf w = 15.0%
+598.9	30.0					
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	100	10 30.0 31.5	7, 12, 15 N = 27 Qp = 5.0-5.25 tsf
				100	11 35.0 36.5	9, 13, 20 N = 33 Qp = 5.0-5.25 tsf w = 15.6%
+592.4	36.5		End of boring at 36.5'			

SPT Sampling with 140 lb. Auto Hammer 30" of Fall
2" O.D. Split Spoon Sampler
*: SPT-N value based on 6" of penetration or less
w = moisture content

Boring advanced with 4-1/4" HSA to 35 feet
Boring advanced with split spoon sampler to 36.5 feet.

GW at 10.5' W.S.
GW at 15' A.B.

Borehole backfilled with auger cuttings.

Hole No. DP2-13-04

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,954,217.6 E 1,107,810.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-04	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 / UNDISTURBED 2
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/11/2013 / COMPLETED 6/11/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +629.5
9. TOTAL DEPTH OF HOLE: 36.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+628.5	1.0		Topsoil (12")	100	1 0.0 1.0	2, 3 N =6*
+627.5	2.0		FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with layers of black silty clay - brown - very stiff (FILL: CL)	40	1A 1.0 1.5	4/6" N = 8
			Silty clay, trace to some fine to medium sand - brown - very stiff (CL)	80	2 2.5 4.0	Qp = 3.5 tsf w = 18.9% 2, 2, 3
				93	3 5.0 6.5	N = 5 Qp = 2.5 tsf w = 19.4% 3, 3, 4
+621.0	8.5			100	4 7.5 8.5	N = 7 Too disturbed for Qp measurement w = 17.3% 4, 5
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	60	4A 8.5 9.0	N = 10* Qp = 2.5-2.75 tsf w = 26.8% 8/6"
+617.0	12.5			100	5 10.0 11.5	N = 16* Qp = 5.0-5.25 tsf 6, 8, 11
			Silty clay, trace fine to medium sand - gray - hard (CL)	100	6 12.5 14.0	N = 19 Qp = 5.75-6.0 tsf w = 19.0%
				70	7 15.0 17.0	8, 10, 11 N = 21 Qp = 5.0-5.25 tsf w = 20.0% 2" Shelby Tube Qp = 4.25-4.5 tsf w = 20.0%
+609.5	▼ 20.0					
			Clayey silt, trace fine sand - gray - hard (CL-ML)	75	8 20.0 22.0	3" Shelby Tube Qp = 6.25-6.5 tsf w = 17.1%
+604.5	25.0					
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff to hard (CL)	100	9 25.0 26.5	7, 9, 12 N = 21 Qp = 3.5 tsf w = 17.8%
				100	10 30.0 31.5	8, 13, 22 N = 45 Qp = 6.0-6.25 tsf w = 17.1%
+593.0	36.5			100	11 35.0 36.5	7, 10, 12 N = 22 Qp = 7.0+ tsf w = 14.8%
			End of boring at 36.5'			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with 4-1/4" HSA to 35 feet Boring advanced with split spoon sampler to 36.5 feet. GW at 20' W.S. GW DRY A.B. Borehole backfilled with auger cuttings.

Hole No. DP2-13-05

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,953,350.3 E 1,108,649.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-05	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9, UNDISTURBED 2
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/12/2013 COMPLETED 6/12/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +631.1
9. TOTAL DEPTH OF HOLE: 36.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+630.7	0.4		Bituminous Asphalt Pavement (5")			
			FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with seams and layers of brown and black silty clay - gray and brown and gray to blue gray - very stiff (FILL: CL)	73	1 1.0 2.5	2, 2, 4 N = 6 Qp = 2.0 tsf
				100	2	w = 23.0%
				60	2.5 3.5	4, 4 N = 8*
			NOTE: Concrete obstruction encountered at 6.5'. Auger refusal occured twice between 5 and 7 fee bgs. Hole relocated twice to avoid obstruction.	100	2A 3.5 4.0	w = 21.1% 4/6" N = 8*
					3 5.0 6.5	Qp = 2.5 tsf w = 18.0% 3" Shelby Tube Qp = 2.0-2.25 tsf
+621.6	9.5					w = 21.1%
			Silty fine to coarse sand, trace fine gravel, wood noted - black - loose - wet (SM)	27	4 10.0 11.5	7, 3, 3 N = 6 w = 32.2%
+619.1	12.0		Silty clay, trace fine to coarse sand, trace fine gravel - brownish gray - medium (CL)	100	5 12.5 14.0	WOR/18" N = 0 Qp < 0.5 tsf
				65	6 15.0 17.0	w = 23.1% 3" Shelby Tube Qp = 0.5-0.75 tsf w = 21.0%
+614.1	17.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff (CL)			
				73	7 20.0 21.5	4, 4, 6 N = 10 Qp = 2.25 tsf
				73	8 25.0 26.5	5, 8, 13 N = 21 Qp = 3.5 tsf
+603.6	27.5		Silt, trace clay, trace fine sand - gray - extremely dense - wet (ML)			w = 16.5%
				100	9 30.0 31.0	30, 57 N = 100+ w = 16.3%
+595.1	36.0			90	10 35.0 36.0	35, 51 N = 100+ w = 17.3%
			End of boring at 36.0'			Boring advanced with 4-1/4" HSA to 35 feet Boring advanced with split spoon sampler to 36.5 feet. GW at 10' W.S. GW at 7' A.B. Borehole backfilled with auger cuttings and bentonite chips and surface patched with asphalt. NOTE: Multiple obstructions (augers refusals) encountered down to 8.5 feet causing need for two relocations of soil boring to bypass obstruction.

Hole No. DP2-13-06

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,950,271.8 E 1,108,788.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-06	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10, UNDISTURBED 1
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN:	16. DATE HOLE: STARTED 6/12/2013, COMPLETED 6/12/2013
8. DEPTH DRILLED INTO ROCK:	17. ELEVATION TOP OF HOLE: +631.9
9. TOTAL DEPTH OF HOLE: 36.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+630.9	1.0		Topsoil (12")	30	1 0.0 2.0	WOH/18", 1 N = 0 w = 16.3%
+627.9	4.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, with clay seams noted - brown - very stiff (CL)	57	2 2.5 4.0	3, 4, 4 N = 8 Qp = 2.9 tsf w = 26.1%
+624.4	7.5		Silty clay, trace fine to coarse sand, trace shale, with silt seams noted - brown - very stiff (CL)	80	3 5.0 6.5	3, 3, 5 N = 8 Qp = 3.25 tsf w = 23.0%
+621.9	10.0		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with layers of sand, gravel, and silt noted - brown - stiff to very stiff (CL)	100	4 7.5 9.0	4, 7, 9 N = 16 Qp = 1.75-2.0 tsf w = 22.3%
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard to very stiff (CL)	100	5 10.0 11.5	7, 11, 16 N = 27 Qp = 4.25-4.5 tsf w = 18.3%
				100	6 12.5 14.0	8, 11, 14 N = 25 Qp = 4.25-4.5 tsf
+611.9	20.0			100	7 15.0 16.0	8, 45/6" N = 90+ Qp = 3.25 tsf w = 15..8%
+606.9	25.0		Clayey silt, little fine to coarse sand, trace fine gravel - brown - hard (CL-ML)	100	8 20.0 21.5	4, 7, 13 N = 20 Qp = 6.25 tsf w = 12.8%
+601.9	30.0		Silty clay, little fine to coarse sand, trace fine gravel - gray - hard (CL)	104	9 25.0 25.8	2" Shelby Tube Qp = 5.25-5.5 tsf w = 16.1%
			Silt, trace clay, trace fine sand, trace fine gravel, trace shale - brown -extremely dense - wet (ML)	100	10 30.0 30.5	62/6" N = 100+*
+595.9	36.0			100	11 35.0 36.0	28, 45 N = 90* w = 16.5%
			End of boring at 36.0'.			Boring advanced with 4-1/4" HSA to 35 feet Boring advanced with split spoon sampler to 36 feet. GW at 8' W.S. GW at 7' A.B. Borehole backfilled with auger cuttings and bentonite chips and surface patched with asphalt.

Hole No. DP2-13-07

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,949,117.1 E 1,109,093.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-07	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 / UNDISTURBED 1
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/12/2013 / COMPLETED 6/12/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +629.8
9. TOTAL DEPTH OF HOLE: 36.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+629.8	0.0		FILL: Fine to coarse sand, little silt, trace clay, trace fine gravel with clay layers noted - gray - medium dense - moist (FILL: SP-SM)	67	1 0.0 1.5	5, 6, 5 N = 11 w = 8.5%
+628.3	1.5		POSSIBLE FILL: Fine to coarse sand, little fine gravel, trace silt, with limestone pieces noted - brown - medium dense - moist (POSSIBLE FILL: SP)	100	2 2.5 4.0	7, 9, 9 N = 18 w = 8.6%
+624.8	5.0					
+623.8	6.0		POSSIBLE FILL: Silty fine to coarse sand, little fine gravel, trace clay - brown - medium dense - moist (POSSIBLE FILL: SM)	100 100	3 5.0 6.0	10, 7 N = 14* w = 12.2%
+622.3	7.5		Silt, trace clay, trace fine sand - brown - medium dense - wet (ML)	80	3A 6.0 6.5	7/6" N = 14* w = 21.0%
			Silty clay, trace fine to coarses sand, trace fine gravel, trace shale - gray - very stiff to hard (CL)	0 87	4 7.5 9.0 5 10.0 10.3	4, 5, 9 N - 14 Qp = 3.25-3.5 tsf w = 18.8% 3" Shelby Tube No Recovery
				100	6 10.0 11.5	6, 9, 11 N = 20 Qp = 5.25-5.5 tsf
				87	7 12.5 14.0 8 15.0 16.5	4, 7, 13 N = 20 Qp = 4.25-4.5 tsf w = 19.9% 5, 6, 8 N = 14 Qp = 3.25 tsf
+606.8	23.0			100	9 20.0 21.5	5, 5, 5 N = 10 Qp = 2.5 tsf w = 17.2%
			Silt, trace to little fine sand, trace clay - gray - very dense to dense - wet (ML)	110	10 25.0 26.0	28, 34 N = 68* w = 15.6%
+594.8	35.0			100	11 30.0 31.5	11, 16, 16 N = 32 w = 8.9%
+593.3	36.5		Clayey silt, little fine to coarse sand, trace fine gravel, trace shale with clay seams noted - gray - dense - wet (CL-ML)	100	12 35.0 36.5	13, 15, 27 N = 42 Qp = 4.5+ tsf w = 11.5%
			End of boring at 36.5'			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with 4-1/4" HSA to 35 feet Boring advanced with split spoon sampler to 36.5 feet. GW at 6' W.S. Borehole backfilled with auger cuttings.

Hole No. DP2-13-08

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV09	10. SIZE AND TYPE OF BIT: 4-1/4" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,947,883.0 E 1,108,888.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45
4. HOLE NO. (As shown on drawing title and file number): DP2-13-08	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 / UNDISTURBED 0
5. NAME OF DRILLER: Steve	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: SEE REMARKS AT END OF LOG
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6/13/2013 / COMPLETED 6/13/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +631.5
9. TOTAL DEPTH OF HOLE: 25.8	18. TOTAL CORE RECOVERY FOR BORING: %
	19. ENGINEER: J. Bickett

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+631.0	0.5		Topsoil (6")	100	1	2/6"
			FILL: Silty clay, trace fine to coarse sand, trace fine gravel with clay layers noted - stiff (FILL: CL)	60	0.0 0.5	N = 4* 2, 4
				93	1A 0.5 1.5	N = 6 Qp = 1.5 tsf w = 23.9%
					2 2.5	3, 3, 3 N = 6
+625.5	6.0			100	4.0 3	Qp = 1.75 tsf w = 24.9%
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with gray clay layers noted - brown - very stiff (CL)	60	5.0 6.0	2, 2 N = 4*
				100	3A 6.0 6.5	Qp = 1.0-1.25 tsf w = 26.6% 5/6"
+621.5	10.0				4	N = 10+ Qp = 2.5 tsf
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard to very stiff (CL)	100	7.5	w = 20.4%
				100	9.0 5 10.0	7, 11, 15 N = 26
				150	10.5 5A 10.5	Qp = 4.5+ tsf 5/6" N = 10*
					11.5 6	Qp = 5.0 tsf w = 17.5% 7, 10
				100	12.5 13.5	N = 17 Qp = 4.25 tsf
					7 15.0 16.5	7, 7, 9 N = 16 Qp = 5.5 tsf w = 14.4%
						5, 6, 9
				100	8 20.0 21.5	N = 15 Qp = 4.5 tsf 5, 6, 8 N = 14 Qp = 3.75 tsf w = 15.2%
+608.5	23.0					
			Silt, trace clay, trace fine sand - gray - extremely dense - moist (ML)			
+605.7	25.8			75	9 25.0 25.8	32, 50/3" N = 100+* w = 13.5%
			End of boring at 25.8'.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" of penetration or less w = moisture content Boring advanced with 4-1/4" HSA to 25 feet Boring advanced with split spoon sampler to 25.8 feet. No groundwater observed. Borehole backfilled with auger cuttings.

FIELD BORING LOG

Prepared By J Bickett

AECOM Project No. 60299932

Drilling Firm STRATA Boring No. DPE-13-01

Date Started: 6/11/13 GSEL Ref.

Date Completed 6/11/13 GSEL

AECOM 750 Corporate Woods Dr, Vernon Hills, Illinois 60061, 847.279.2500

1/2

Driller: STEVE
Helper: Chris
Loction: Des Plaines, IL

Drill Rig: CME 45
Weather: 70° clear
Offset: Painted as drilled

☐ Safety ☒ Auto ☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ From (ft)	Depth ☒ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (233, 335, 5710, 10 13 19, 813 10, 568, 577, 434)	Strata Change	USCS	
	0	0.5		PA								5½" of Asphalt								A S	PHALT
	0.5	1.0		PA								Gvl							0.5	F I	LL
1	1.	1.5		SS	2				0.5	1¼		clayey topsoil tr f grv black				stiff					
1A	1.5	2.5		SS		3	3		0.7	2¼		silty clay tr f c sz & f grv. Brn				v. stiff			1.5	C L	
	1.	2.5		PA																	
2	2.5	4		SS	3	3	5		0.9	3		same									
	2.5	5		PA															4.5		
3	5	6.5		SS	5	7	10		1.5	4.5	+	Same — Hard								C L	
	5	7.5		PA																	
4	7.5	8		SS	10				0.5	4.5	+	Same									
4A	8	9		SS		13	19		1.0	4.5	+	Silty clay tr f c sz, f gvl. gray hard							8	C L	
	7.5	10		PA																	
5	10	10.5		SS	8				0.5	4.5	+	Same									
5A	10.5	11		SS		13			0.5	–		wet silt & coarse sand seam							10.5	S P	- SM
5B	11	11.5		SS			10		0.4	–		clayey silt, some f. sand tr f grv. gray moist							11	M L	
	10	12.5		PA																	
6	12.5	14		SS	5	6	8		1.3	–		same – wet									
	12.5	15		PA																	
7	15	16.5		SS	5	7	7		1.5	3		silty clay tr f sand gray				v. stiff		clayey silt @ tip	15	C L	
	15	20		PA															16.5	M L	
8	20	21.5		SS	4	3	4		1.5	–		clayey silt – saturated, sandy at tip									

Casing Diameter:
Casing Length:
Water Level: 12 WS - WD
Water Level: BCR ACR
Water Level: 15 AB 24 hr AB
Water Level: Hours AB

Backfill Material: ☐ Tremie Grout ☐ Surface Grout ☐ Bentonite Chips ☒ Cuttings ☐ Other

Surface Patch: ☒ Asphalt ☐ Concrete ☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness:
Fill Thickness: 1.5
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG

Prepared By J. Bickett

AECOM Project No. 60299932

Drilling Firm STRATA Boring No. DP2-13-1

Date Started: 6/11 GSEL Ref.

Date Completed 6/11/13 GSEL

AECOM 750 Coroporate Woods Dr Vernon Hills, Illinois 60061 847.279.2500

2/2

Driller: STEVE

Helper: Chris

Loction: Des Plaines

Drill Rig: CME 45

Weather: 70° clear

Offset: Painted and drilled

☐ Safety ☒ Auto ☐ Other

Abbreviations: **ST** - Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger **WS** - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ From (ft)	Elev ☐ To (ft)	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (5 & 11)	Strata Change	USCS
	20	25	PA															25	CL
9	25	26.5	SS	5	8	11		1.5	2½		Silty clay	tr f. sand & gravel		gray	v. stiff				
	26			.5		2		0	B		Backfilled w/ cuttings								
												Asphalt Patch							

Casing Diameter:

Casing Length:

Water Level: 12 WS - WD

Water Level: BCR ACR

Water Level: 15 AB 24 hr AB

Water Level: Hours AB

Backfill Material
- ☐ Tremie Grout
- ☐ Surface Grout
- ☐ Bentonite Chips
- ☒ Cuttings
- ☐ Other

Surface Patch
- ☒ Asphalt
- ☐ Concrete
- ☐ Well?

Boulders/Obstructions: to to

Topsoil Thickness: –

Fill Thickness: 1.5

Water Loss: % to

Water Loss: % to

Cave in:

FIELD BORING LOG
Prepared By J Bickett

AECOM Project No. 60299932
Drilling Firm STRATA Boring No. DP2-13-2

Date Started: 6/11/13 GSEL Ref. _____
Date Completed 6/11 GSEL _____

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

1/2

Driller: STEVE
Helper: Chris
Loction: Des Plaines

Drill Rig: CME 45
Weather: 75° clear
Offset: staked as-drilled

☐ Safety
☒ Auto
☐ Other

Abbreviations: **ST** - Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample Description 4 1/4" HSA

Sample No.	Depth ☒ From (ft)	Depth ☒ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (256 467 / 233 568 / 458 / 5813 / 5911 / 1118 / 25 31)	Strata Change	USCS
1	0	1		SS	2	5			1	–			TOPSOIL							TOPSOIL
1A	1	1.5		SS			6		0.1	–		FILL: SILTY CLAY		BROWN & BLACK				DISTURBED, min. recovery	1	FILL
	0	2.5		HSA																
2	2.5	4		SS	2	3	3		0.2	–		SAME						DIST. BY GRAVEL		
	2.5	5		HSA																
3	5	6.5		SS	4	5	8		1.5	4 1/4		SILTY CLAY TR F-C SZ, F grv. shale		BROWN, HARD					5	CL
	5	7.5		HSA																
4	7.5	9		SS	5	8	13		1.2	4.5	+	SAME								
	7.5	10		HSA																
5	10	11		SS	5	9			1	4.5	+	SAME								
5A	11	11.5		SS			11		0.5	3 3/4		SILTY CLAY TR F-C SZ, F grv, shale		gray V. stiff					11	CL
	0	12.5		PA		0	F	F	S	E	T	3 ft & switch to PA, 45 RB slow turning 4 1/4" HSA								
6	12.5	14		SS	4	6	7		1.5	–		clayey silt tr f sand		gray med dense wet					12.5	CL-ML
	12.5	15		PA																
7	15	16		ST	PUSH		3"		1.0	–		SILT, tr f. SZ		gray moist				ST REFUSAL @ 16'		ML
8	16	17.5		SS	11	11	8		1.2	–		SAME				med dense				
	15	20		PA															19	CL
9	20	21.5		SS	5	6	8		1.5	3 1/2		SILTY CLAY TR F-C SZ & grv, shale		gray V. stiff						
	20	25		PA															22.5	ML
10	25	25.5		ST	PUSH		3"		0.5	–		SILT moist		gray				sample placed in jar		
11	25.5	26.5		SS	25	31			1.0	–		f. sand little silt. moist		gray v. dense					25.5	SM

Casing Diameter: _____
Casing Length: _____
Water Level: 26' WS - WD
Water Level: _____ BCR _____ ACR
Water Level: 33 ft AB _____ 24 hr AB
Water Level: _____ Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☒ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: _____ to _____ _____ to _____
Topsoil Thickness: 1'
Fill Thickness: 4-5 ft
Water Loss: _____ % _____ to _____
Water Loss: _____ % _____ to _____
Cave in: _____

FIELD BORING LOG

Prepared By J Bickett

AECOM Project No. 60259932

Drilling Firm STRATA Boring No. DP2-13-2

Date Started: 6/11/13 GSEL Ref.

Date Completed 6/11 GSEL

AECOM 750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

2/.2

Driller: STEVE
Helper: Chris
Loction: DES PLANES

Drill Rig: CME 45
Weather: 80° clear
Offset: Staked as drilled

☐ Safety
☒ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ From (ft)	Depth ☒ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (8 13 15, 8 13 17)	Strata Change	USCS
	35	30		PA																
12	30	315		SS	8	13	15		1.5	4.5	+	SILTY CLAY TR F-C SZ, F GRV. SHALE GRAY HARD							28	CL
	30	35		PA																
13	35	365		SS	8	13	17		1.5	4.5	+	SAME								
	36	5				2	0		B			BORING Backfilled w/ CUTTINGS								

Casing Diameter:
Casing Length:
Water Level: 26 WS - WD
Water Level: BCR ACR
Water Level: 33' AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☒ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 1'
Fill Thickness: 4-5'
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG
Prepared By J Bickett

AECOM Project No. 60259930
Drilling Firm Strata Boring No. 13-3

Date Started: 6/13/13 GSEL Ref.
Date Completed 6/13/13 GSEL

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

1/2

Driller: Steve
Helper: Chris
Loction: Des Plaines

Drill Rig: CME 45
Weather: 68° clear
Offset: Steked location co-drilled

☐ Safety
☑ Auto
☐ Other

Abbreviations: **ST** - Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☑ From (ft)	Elev ☐ To (ft)	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective / Noun / Constituents / Color / Stiffness/density / Moisture	Sample Notes (172 / 234 / 113 18 / 71015 / 458 / 446 / 6914 / 71215)	Strata Change	USCS
1	0	0.5	SS	1				0.5	–		TOPSOIL			TOP SOIL
1A	0.5	1.5	SS		2	2		0.5	–		F-m Sand tr. clay & SILT Brown moist loose		0.5	S P
	0	2.5	PA											
2	2.5	4	SS	2	3	4		1.5	2¼		SILTY CLAY, Brown v. Stiff		2.5	C L
	2.5	5	PA											
3	5	7.5	ST	3" Pushed				2.2	4.5+		SILTY CLAY TR. F-c Sa f. grv Brn HARD			
4	7.5	9	SS	11	13	18		1.5	4¼		SILTY CLAY TR F-c Sa, f. gravel BRN HARD			
	5	10	PA											
5	10	10.5	SS	7				0.5	4		Same	Spoon casing wet		
5A	10.5	11.5	SS		10	15		1.5	4.5		SILTY CLAY TR F-c Sa, f grv, Shale gray Hard		10.5	C L
	10.5	12.5	PA											
6	12.5	14	SS	4	5	8		1.5	2¾		Same v. stiff tr. f. Sand	clayey silt at tip		
	12.5	15	PA											
7	15	16.5	SS	4	4	6		1.5	2¾		SILTY CLAY / CLAYEY SILT GRAY V. STIFF			
	15	20	PA											
8	20	22.5	ST	3" Pushed				2.3	2.5		SILTY CLAY			
	20	25	PA									auger cuttings wet	24	
9	25	26.5	SS	6	9	14		1.5	–		SILT TR. CLAY & v-f. Sand gray saturated m. dense	seamless sat. Sand		M L
	25	30	PA										27.5	
10	30	31.5	SS	7	12	15		1.5	4.5+		SILTY CLAY TR F-c Sa, f. grvl Shale hard			C L
	30	35	PA											

Casing Diameter:
Casing Length:
Water Level: 10.5' ~~WS~~ - WD
Water Level: BCR ACR
Water Level: 15' AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☑ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 0.5
Fill Thickness: –
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG
Prepared By J. Bickett

AECOM Project No. 60299932
Drilling Firm STRATA Boring No. 13-3

Date Started: 6/13/13 GSEL Ref.
Date Completed 6/13/13 GSEL

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

2/2

Driller: STEVE
Helper: Chris
Loction: DES PLAINES

Drill Rig: CME 45
Weather: 60° Clear
Offset: staked as drilled

☐ Safety
☒ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ From (ft)	Depth ☒ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (9 13 20)	Strata Change	USCS
11	35	36.5	SS		9	13	20		1.5	4.5	+	Silty clay - some -				Hard		Silt/sand seams noted		
	36				5		9		0		B	Backfilled w/ cuttings								

Casing Diameter:
Casing Length:
Water Level: 10.5 WS - WD
Water Level: BCR ACR
Water Level: 15' AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☒ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 0.5
Fill Thickness: –
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG

Prepared By J Bickett

AECOM Project No. 60299932

Drilling Firm Strata Boring No. DP2-13-04

Date Started: 6/11/13 GSEL Ref.

Date Completed 6/11/13 GSEL

AECOM 750 Coroporate Woods Dr Vernon Hills, Illinois 60061 847.279.2500

1/2

Driller: STEVE
Helper: Chris
Loction: DESPLAINES

Drill Rig: CME 45
Weather: 85° clear
Offset: STAKEHOLE DRILLED

☐ Safety
☒ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☐ From (ft)	Elev ☐ To (ft)	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes	Strata Change	USCS
1	0	1	SS	2	3			1.0			TOPSOIL								TOPSOIL
1A	1	1.5	SS			4		.2			FILL: SILTY CLAY TR f-c gr. sand Brown & Black							1.0	F I LL
	0	2.5	PA															2.0	
2	2.5	4	SS	2	2	3		1.2	1¼		Silty Clay Some f. Sand Brown								C L
	2.5	5	PA																
3	5	6.5	SS	3	3	4		1.9	–		Silty Sand trace Clay brown								S C -SM
	5	7.5	PA																
4	7.5	8.5	SS	4	5			1.0			SILTY CLAY seams of silt & sand brown								C L
4A	8.5	9	SS			8		0.3	4.5	+	SILTY CLAY TR. f-c Sa. & grav. Shale Gray							8.5	C L
	7.5	10	PA																
5	10	11.5	SS	6	8	11		1.5	4.5	+	SAME								
	10	12.5	PA																
6	12.5	14	SS	8	10	11		1.5	4.5	+	SAME								
	12.5	15	PA															15	M L
7	15	17	ST	2" TUBE				1.4	–		SILT, TR f sand gray moist								
	15	20	PA																
8	20	21.5	ST	3" TUBE				1.5	–		SAME			WET					
	20	25	PA																
9	25	26.5	SS	7	9	12		1.5	3.5		SILTY CLAY TR f-sand & grv. Gray v Stiff							22.5	C L
	25	30	PA															27.5	
10	30	31.5	SS	8	13	22		1.5	4.5	+	CLAYEY SILT/SILT			moist					M L

234
223 7 9 12
334
458 8 13 22
684
8 10 11

Casing Diameter:
Casing Length:
Water Level: 20 WS - WD
Water Level: BCR ACR
Water Level: DRY AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☒ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 1.0 ft
Fill Thickness:
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG
Prepared By J Bickett

AECOM Project No. 60299932
Drilling Firm STRATA Boring No. 13-4

Date Started: 6/11/13 GSEL Ref.
Date Completed 6/11/13 GSEL

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

2/2

Driller: Steve
Helper: Chris
Loction: Des Plaines

Drill Rig: CME 45 - Truck
Weather: 85° Clear
Offset: STAKED AS-DRILLED

☐ Safety
☑ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☐ From (ft)	Depth ☐ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (7 1012)	Strata Change	USCS
	30	35		PA																
11	35	36.5		SS	7	10	12		13	45	+	Silty CLAY		Tr F-c sand + grv. gray hard					32.5	C L
		3		6	1	5		2	0	B		Backfilled w cuttings								

Casing Diameter:
Casing Length:
Water Level: 70 WS - WD
Water Level: BCR ACR
Water Level: DRY AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☑ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 1 ft
Fill Thickness:
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG

Prepared By J Bickett

AECOM Project No. 60289932

Drilling Firm STRATA Boring No. 1365

Date Started: 6/12/13 GSEL Ref.

Date Completed 6/12/13 GSEL

AECOM 750 Coroporate Woods Dr Vernon Hills, Illinois 60061 847.279.2500

1/2

Driller: STEVE
Helper: Chris
Loction: Des Plaines

Drill Rig: CME 45
Weather: 70° overcast
Offset: ok - Painted loc. WRD.

☐ Safety
☑ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☑ From (ft)	Elev ☐ To (ft)	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (224, 444, 733, WNN, 446, 5812)	Strata Change	USCS
	0	0.4	PA					–	–	–	5" ok Asphalt							0.0	ASPHALT
	0	1	PA															0.4	FILL
1	1	2.5	SS	2	2	4		1.1	2	–	Fill silty clay, little f-c sa/gr. Black & gray								
	1	2.5	PA																
2	2.5	3.5	SS	4	4			1	–		Fill sand, cinder, clay Black & gray moist								
2A	3.5	4	SS			4		0.3	3.5		Silty clay tr. f-c sa, f. grv gray v. stiff								
	2.5	5	PA																
3	5	6.5	ST	3" Push				1.5			Clay, tr grv. & cinder. Fill						unable to push past 1.5 ft		
	5	7.5	PA								Auger Refusal - offset hole ≈ 3' SW.								
	0	6.5	PA								Auger Refusal - offset hole 5' N of original apparent concrete obstruction								
	0	7	PA								obstruction - Drill through							7	OBSTRUCTION
	7	10	PA								END OBSTRUCTION @ 9.5'							9.5	OL
4	10	11.5	SS	7	3	3		0.4	–		Wood, Black silt/organics wet/saturated						NATIVE RIVER BOTTOM		
	10	12.5	PA															12	SC
5	12.5	14	SS	1	WW			1.5	<0.5		Clayey Sand Brown & gray wet v. loose								
	12.5	15	PA															14.5	CL
6	15	17	ST	3" Push				1.3	<0.5		Silty clay Brn & gray soft								
	15	20	PA															17.5	
7	20	21.5	SS	4	4	6		1.1	2.0		Silty clay tr f-c sa f-grv, shale gray v. stiff								CL
	20	25	PA																
8	25	26.5	SS	5	8	12		1.1	4.5	+	Same HARD								

Casing Diameter:
Casing Length:
Water Level: 10 WS - WD
Water Level: BCR ACR
Water Level: 7 AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☑ Bentonite Chips
☑ Cuttings
☐ Other

Surface Patch
☑ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: 7 to 9.5 to
Topsoil Thickness:
Fill Thickness: 9.5
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG
Prepared By J. Bickett

AECOM Project No. 60299932
Drilling Firm Strata Boring No. 13-5

Date Started: 6/12/13 GSEL Ref. _____
Date Completed 6/12/13 GSEL _____

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

2/2

Driller: STEVE
Helper: Chris
Loction: DES PLAINES

Drill Rig: CME 45
Weather: 70° overc.
Offset: Painted as drilled

☐ Safety
☒ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ From (ft)	Depth ☒ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (34 57, 35 51)	Strata Change	USCS
	25	30	PA																27.5	
9	30	31	SS		30	57			1.0	-		SILT	tr. f. Sand	gray	ext. dense	wet				ML
	30	35	PA																	
10	35	36	SS		35	51			0.9	-		Same								
	36				E	O	B					BACKfilled w/ Cuttings & Chips								
												PATCHED w/ ASPHALT								

Casing Diameter: _____
Casing Length: _____
Water Level: 10' WS - WD
Water Level: _____ BCR _____ ACR
Water Level: 7' AB _____ 24 hr AB
Water Level: _____ Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☒ Bentonite Chips
☒ Cuttings
☐ Other

Surface Patch
☒ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: 7.0 to 9.5 ___ to ___
Topsoil Thickness: _____
Fill Thickness: 9.5
Water Loss: _____ % ____ to ____
Water Loss: _____ % ____ to ____
Cave in:

FIELD BORING LOG
Prepared By J Bickett

AECOM Project No. 60299932
Drilling Firm STRATA Boring No. 13-6

Date Started: 6/12/13 GSEL Ref.
Date Completed 6/12/13 GSEL

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

1/1

Driller: STEVE
Helper: Chris
Loction: DESPLAINES

Drill Rig: CME 45 - Trench
Weather: 70° overcast
Offset: Stake as drilled

☐ Safety
☑ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☐ From (ft)	Elev ☐ To (ft)	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/ density	Moisture	Sample Notes (VWW 1 8,45 344 335 4713 479 62 7 11 16 8 11 14)	Strata Change	USCS
1	0	2	SS	W	W	W	1	0.6	–		TOPSOIL						Tree root noted		TOPSOIL
	0	2.5	PA															1.0	
2	2.5	4	SS	3	4	4		0.9	2½		SILTY CLAY		Brown & gray		v. stiff				CL
	2.5	5	PA																
3	5	6.5	SS	3	3	5		1.2	2½		SILTY CLAY		Brn & gray, wet, seams of silt				& sand noted		CL-ML
	5	7.5	PA																
4	7.5	9	SS	4	7	9		1.5	–		SILT & CLAYEY SILT		Brn, wet/sat. Sand seams noted						ML
	7.5	10	PA																
5	10	11.5	SS	7	11	16		1.5	4.5	+	SILTY CLAY		Tr fine sf fgrv. Shale		Gray	Hard		10	CL
	10	12.5	PA																
6	12.5	14	SS	8	11	14		1.5	4.5	+	SAME								
	12.5	15	PA																
7	15	16	SS	8	45			1.0	4.5	+	SAME - LARGE Rock frag. n spoon								
	15	20	PA															18	
8	20	21.5	SS	4	7	13		1.5	3+		CLAYEY SILT,		Gray						CL-ML
	20	25	PA																
9	25	28	ST	2" TUBE				0.8	4.5	+	SAME / SILT @ tip							28	
	25	30																	ML
10	30	30.5	SS	62				0.5	–		SILT WET		Ext. Dense						
	30	35	PA																
11	35	36	SS	28	45			1.0	–		SILT - Saturated				36' EOB		Backfill w/ Cuttings		

Casing Diameter:
Casing Length:
Water Level: 8 WS - WD
Water Level: BCR ACR
Water Level: 7' AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☑ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 1'
Fill Thickness: —
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG

Prepared By J Bickett

AECOM Project No. 60299982

Drilling Firm STRAT Boring No. 13-7

Date Started: 6/12/13 GSEL Ref.

Date Completed 6/12/13 GSEL

AECOM 750 Coroporate Woods Dr, Vernon Hills, Illinois 60061, 847.279.2500

1/2

Driller: STEVE
Helper: Chris
Loction: DES PLAINES

Drill Rig: CME 45
Weather: 80° P. cloudy
Offset: Staked as-drilled

☐ Safety ☒ Auto ☐ Other

Abbreviations: **ST** - Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ From (ft)	Depth ☒ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes	Strata Change	USCS
1	0	1.5		SS	5	6	5		1.0	-		FILL:	Sand, silt gr.	dk brn / black	moist	m. dense		clay @ tip		FILL
	0	2.5		PA								possible							1.5	Poss. FILL
2	2.5	4		SS	7	9	9		1.5	-		FILL:	Sand & GRAVEL	BRN	moist	m. dense				(GP)
	2.5	5		PA																
3	5	6		SS	10	7			1.0	-		SAME	WET - SATURATED							
3A	6	6.5		SS			7		0.5	-		SILT	BRN & GRAY	WET					6.0	ML
	5	7.5		PA																
4	7.5	9		SS	4	5	9		1.2	4¼		SILTY CLAY, TRACE FC	Sz. f. gr. shale	gray	hard				7.5	CL
	7.5	10		PA																
5	10	10.3		ST	3"	Pushed			—			NO RECOVERY ~ ST RIG STOOD UP - POUNDED SPOON								
6	10	11.5		SS	6	9	11		1.3	4.5		SAME								
	10	12.5		PA																
7	12.5	14		SS	4	7	13		1.5	4¼		SAME	—	SAND	SEAM	noted				
	12.5	15		PA																
8	15	16.5		SS	5	6	8		1.3	4		Siltier / sandier								
	15	20		PA																
9	20	21.5		SS	5	5	5		1.5	3¼		SAME	sl. cl.		v. stiff					
	20	25		PA															23	SM
10	25	26		SS	28	34			1.0	-		SILTY V. F. Sand			v. dense	moist				
	25	30		PA															28	
11	30	31.5		SS	11	16	16		1.5	-		SILT	tr. clay	wet	dense					ML

565 759 4713 2834 1077 562 459 555 11 16 16 694

Casing Diameter:
Casing Length:
Water Level: 6 WS WD
Water Level: BCR ACR
Water Level: AB 24 hr AB
Water Level: Hours AB

Backfill Material: ☐ Tremie Grout ☐ Surface Grout ☐ Bentonite Chips ☐ Cuttings ☐ Other

Surface Patch: ☐ Asphalt ☐ Concrete ☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness:
Fill Thickness: 2-6 ft
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG
Prepared By JBklett

AECOM Project No. 60259932
Drilling Firm STRATA Boring No. 13-7

Date Started: 6/12/13 GSEL Ref.
Date Completed 6/12/13 GSEL

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

2/2

Driller: STEVE
Helper: Chris
Loction: DSS PLAINES

Drill Rig: CME 45
Weather: 80° SUNNY
Offset: STAKED AS DRILLED

☐ Safety
☒ Auto
☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☐ From (ft)	Depth ☐ To (ft)	Elev ☐	Method	Blow Counts 6"	6"	6"	6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective	Noun	Constituents	Color	Stiffness/density	Moisture	Sample Notes (13 15 27)	Strata Change	USCS
	30	35		PA																
12	35	36.5		SS	13	15	27		.5	45		SAME - trace to little clay, trace gravel wet								
		36			.5				9	0	R	- Backfill w/ cuttings								

Casing Diameter:
Casing Length:
Water Level: 6 WS - WD
Water Level: BCR ACR
Water Level: AB 24 hr AB
Water Level: Hours AB

Backfill Material
☐ Tremie Grout
☐ Surface Grout
☐ Bentonite Chips
☒ Cuttings
☐ Other

Surface Patch
☐ Asphalt
☐ Concrete
☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness:
Fill Thickness: 2-6 ft
Water Loss: % to
Water Loss: % to
Cave in:

FIELD BORING LOG

Prepared By J. Bickett

AECOM Project No. 60299932

Drilling Firm STRATA Boring No. 13-08

Date Started: 6/13/13 GSEL Ref.

Date Completed 6/13/13 GSEL

AECOM
750 Coroporate Woods Dr
Vernon Hills, Illinois 60061
847.279.2500

Driller: STEVE
Helper: Chris
Loction: Des Plaines

Drill Rig: CME 45
Weather: 67° Clear
Offset: Staked as drilled

☐ Safety ☒ Auto ☐ Other

Abbreviations: **ST**- Shelby Tube, **DB** - Diamond Bit, **PA** - Power Auger, **HSA** - Hollow Stem Auger, **RB** - Rock Bit, **HA** - Hand Auger
WS - While Sampling, **WD** - While Drilling, **BCR** - Before Casing Removal, **ACR** - After Casing Removal, **AB** - After Boring

Sample No.	Depth ☒ Elev ☐ From (ft)	To (ft)	Method	Blow Counts 6" 6" 6" 6"	Recovery (ft)	Qp tsf	PID ppm	Sample Description: Adjective / Noun / Constituents / Color / Stiffness/density / Moisture	Sample Notes	Strata Change	USCS
1	0.0	0.5	SS	2	0.5			TOPSOIL			TOPSOIL
1A	0.5	1.5	SS	2 4	0.6	1.5		FILL: SILTY CLAY TR F gravel Black & Brn stiff		0.5	FILL
	0	2.5	PA								
2	2.5	4	SS	3 3 3	1.4	2.0		SAME - V. STIFF			
	2.5	5	PA								
3	5	6	SS	2 2	1.0	1.4		SAME - STIFF			
3A	6	6.5	SS	5	0.3	2.5		SILTY CLAY TR F-C Sand Brn/gray V. STIFF		6.0	CL
	5	7.5	PA								
4	7.5	9	SS	7 10 15	1.5	4.5+		SAME mostly brn, HARD			
	7.5	10	PA								
5	10	10.5	SS	5	0.5	4.5+		SAME brn & gry			
5A	10.5	11.5	SS	7 10	1.0	4.5+		SILTY CLAY TR F-C Sand F-C gravel gray hard		10.5	CL
	10	12.5	PA								
6	12.5	14	SS	7 7 9	1.5	1.4		SAME			
	12.5	15	PA								
7	15	16.5	SS	5 6 9	1.5	4.5		SAME			
	15	20	PA								
8	20	21.5	SS	5 6 8	1.5	3.5		SAME V. STIFF			
	20	25	PA							23	
9	25	25.8	SS	32 50/5"	0.8	-		SILTY V.F. Sand gray moist extremely dense			SM
	2	5		8 8 10 13				Back filled w/ cuttings			

Casing Diameter:
Casing Length:
Water Level: DRY WS - WD
Water Level: BCR ACR
Water Level: DRY AB 24 hr AB
Water Level: Hours AB

Backfill Material: ☐ Tremie Grout ☐ Surface Grout ☐ Bentonite Chips ☒ Cuttings ☐ Other

Surface Patch: ☐ Asphalt ☐ Concrete ☐ Well?

Boulders/Obstructions: to to
Topsoil Thickness: 0.5
Fill Thickness: 1.0
Water Loss: % to
Water Loss: % to
Cave in:

656

APPENDIX C

Laboratory Testing Summary

Atterberg Limits Test Results

Gradation Test Results

Unconfined Compression Test Results

LABORATORY TEST SUMMARY

Project Number: 60299932 **Project:** USACE CX34: DES PLAINES DPLV09

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Density pcf	Qu tsf	Gravel %	Sand %	Silt %	Clay	LL	PL	PI
DP2-13-1															
	1A	1.5-2.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	21.6	2.0-2.25									
	2	2.5-4.0			19.3										
	3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	18.0	4.25-4.5									
	4	7.8-8.0			18.1										
	5	10.0-10.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.5	5.0									
	5A	10.5-11.0	SILTY F-C SAND LITTLE F GRAVEL LITTLE CLAY - GRAY	SM	10.9				16.5	43.7	26.3	13.5			
	5B	11.0-11.5	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	10.6	3.25-3.5									
	6	12.5-14.0	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL		2.75									
	7	15.0-16.5	SILTY CLAY TRACE F SAND TRACE - GRAY	CL	27.4	2.75-3.0									
	8	20.21.5	SILTY CLAY TRACE F SAND - GRAY	CL	22.1	2.75									
	9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL		2.0									
DP2-13-2															
	1A	1.0-1.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN LAYERS OF BLACK SILTY CLAY AND GLASS NOTED	CL	15.3										
	2	2.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN LAYERS OF BLACK SITY CLAY NOTED	CL	22.9										
	3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	17.8	5.25-5.5									
	4	7.5-9.0			18.1										
	5	10.0-11.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	19.8	5.25-5.5									
	5A	11.0-11.5	SILTY CLAY TRACE F SAND - GRAY SILT SEAMS NOTED	CL	19.2	3.25-3.5									
	6	12.5-14.0	CLAYEY SILT TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL-ML	14.2	6.5									
	7	15.0-16.0	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - GRAY	CL	13.0	1.0-1.25	124.8	3.74							
	8	16.0-17.5	SILT TRACE CLAY TRACE F SAND - GRAY	ML	15.0										
	9	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.6	3.0									
	10	25.0-25.5	SILT TRACE CLAY TRACE F SAND - GRAY	ML	14.7										
	11	25.5-26.5	SANDY SILT TRACE CLAY - GRAY	ML	17.3				0.0	24.4	67.5	8.1			
	12	30.0-31.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL		6.75-7.0									
	13	35.0-36.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	14.8	7.0+									
DP2-13-3															
	1A	0.5-1.5	SILTY F-M SAND - BROWN LAYERS OF TOPSOIL MIXED IN SAMPLE	SM	14.2										
	2	2.5-4.0	SILTY CLAY TRACE F-C SAND - BROWN	CL	21.4	2.75-3.0									
	3	5.0'-7.5'	SILTY CLAY LITTLE F-C SAND - BROWN TO DARK BROWN	CL	22.7	2.5-2.75	104.5	2.17					37	17	20
	4	7.5-9.0				5.0-5.25									
	5	10.0-	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL	CL	19.8	6.0-									

LABORATORY TEST SUMMARY

Project Number: 60299932 **Project:** USACE CX34: DES PLAINES DPLV09

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Density pcf	Qu tsf	Gravel %	Sand %	Silt %	Clay	LL	PL	PI
		10.5	TRACE SHALE - BROWN			5.25									
	5A	10.5-11.5				5.25-5.5									
	6	12.5-14.0	SILTY CLAY TRACE F SAND - GRAY	CL	20.8	3.5-3.75									
	7	15.0-16.5				3.0									
	8	20.0'-22.5'	SILTY CLAY LITTLE F-C SAND TRACE F-C GRAVEL - GRAY	CL	13.6	2.5-2.75	124.2	1.94					28	15	13
	9	25.0-26.5	SILTY CLAY TRACE F SAND - GRAY SILT SEAMS NOTED	CL	15.0	7.0+									
	10	30.0-31.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL		5.0-5.25									
	11	35.0-36.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	15.6	5.0-5.25									
DP2-13-4															
	1A	1.0-1.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN LAYERS OF BLACK SITY CLAY NOTED	CL	18.9	3.5									
	2	2.5-4.0	SILTY CLAY TRACE F SAND - BROWN	CL	19.4	2.5									
	3	5.0'-6.5'	SILTY CLAY SOME F-M SAND - BROWN	CL	17.3				0.6	26.9	34.4	38.1			
	4	7.5-8.5	SILTY CLAY TRACE F SAND T - BROWN	CL	26.8	2.5-2.75									
	4A	8.5-9.0				5.25-5.0									
	5	10.0-11.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	19.0	5.75-6.0									
	6	12.5-14.0	SILTY CLAY TRACE F SAND - GRAY	CL	20.0	5.0-5.25									
	7	15.0-17.0	SILTY CLAY TRACE F-M SAND - GRAY	CL	20.0	4.25-4.5									
	8	20.0-21.5	CLAYEY SILT TRACE F SAND - GRAY	CL-ML	17.1	6.25-6.5	114.5	2.53							
	9	25.0-26.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.8										
	10	30.0-31.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY SILY LAYERS NOTED	CL	15.2	6.0-6.25									
	11	35.0-36.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	14.8	7.0+									
DP2-13-5															
	1	1.0-2.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY SEAMS AND LAYERS OF BROWN AND BLACK SILTY CLAY	CL	23.0	2.0									
	2	2.5-3.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY	CL	21.1										
	2A	3.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.0	2.5									
	3	5.0-6.5	SILTY CLAY TRACE F-C SAND - BROWN AND GRAY TO BLUE GRAY	CL	21.1	2.0-2.25	107.1	2.38							
	4	10.0-11.5	SILTY F-C SAND TRACE F GRAVEL - BLACK	SM	32.2										
	5	12.5-14.0	SILTY CLAY TRACE F SAND - BROWNISH GRAY	CL	23.1										
	6	15.0'-17.0'	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL BROWN AND GRAY	CL	21.0	0.5-.75	105.8	0.23					26	14	12
	7	20.0-21.5				2.25									
	8	25.0-	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL	CL	16.5	3.5									

LABORATORY TEST SUMMARY

Project Number: 60299932 **Project:** USACE CX34: DES PLAINES DPLV09

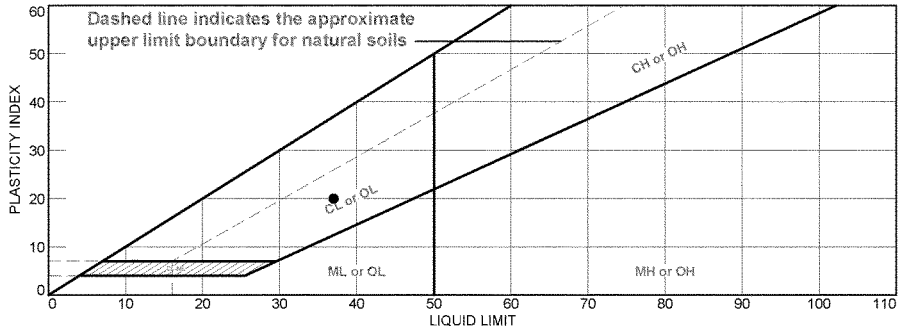
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Density pcf	Qu tsf	Gravel %	Sand %	Silt %	Clay	LL	PL	PI
		26.5	TRACE SHALE - GRAY												
	9	30.0-31.0	SILT TRACE CLAY TRACE F SAND - GRAY	ML	16.3										
	10	35.0-36.0	SILT TRACE CLAY TRACE F SAND - GRAY	ML	17.3										
DP2-13-6															
	2	2.5-4.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN GRAY CLAY SEAMS NOTED	CL	28.1	2.9									
	3	5.0-6.5	SILTY CLAY TRACE F-C SAND TRACE SHALE - BROWN SILT SEAMS NOTED	CL	23.0	3.25									
	4	7.5-9.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN LAYERS OD SAND, GRAVEL AND SILT NOTED	CL	22.3	1.75-2.0									
	5	10.0-11.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.3	4.25-4.5									
	6	12.5-14.0				4.25-4.5									
	7	15.0-16.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	15.8	3.25									
	8	20.0-21.5	CLAYEY SILT LITTLE F-C SAND TRACE F GRAVEL - BROWN	CL-ML	12.8	6.25									
	9	25.0-25.8	SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - GRAY	CL	16.1	5.25-5.5									
	10	30.0-30.5	SILT TRACE CLAY TRACE F SAND - GRAY	ML											
	11	35.0-36.0	SILT TRACE CLAY TRACE F SAND TRACE F GRAVEL TRACE SHALE - BROWN	ML	16.5										
DP2-13-7															
	1	0.0-1.5	F-C SAND LITTLE SILT TRACE CLAY TRACE F GRAVEL - GRAY CLAY LAYERS NOTED	SP-SM	8.5										
	2	2.5-4.0	F-C SAND LITTLE F GRAVEL TRACE SILT - BROWN LIMESTONE PIECES NOTED	SP	9.6										
	3	5.0-6.0	SILTY F-C SAND LITTLE F GRAVEL TRACE CLAY - BROWN	SM	12.2										
	3A	6.0-6.5	SILT TRACE CLAY TRACE F SAND - BROWN	ML	21.0										
	4	7.5-9.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.8	3.25-3.5									
	6	10.0-11.5				5.25-5.5									
	7	12.5-14.0	SILTY CLAY TRACE F SAND - GRAY	CL	19.9	4.25-4.5									
	8	15.0-16.5				3.25									
	9	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.2	2.5									
	10	25.0'-26.0'	SILT LITTLE F SAND TRACE CLAY - GRAY	ML	15.6				0.0	13.0	77.9	9.1			
	11	30.0-31.5	SILT TRACE CLAY TRACE F SAND - GRAY	ML	8.9										
	12	35.0-36.5	CLAYEY SILT LITTLE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY GRAY CLAY SEAMS NOTED	CL-ML	11.5										
DP2-13-8															
	1A	0.5-1.5			23.9										
	2	2.5-4.0			24.9	1.75									
	3	5.0-6.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN GRAY CLAY LAYERS NOTED	CL	26.6	1.0-1.25									
	3A	6.0-6.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN GRAY CLAY SEAMS NOTED	CL	20.4	2.5									
	5	10.0-	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL	CL	17.5	5.0									

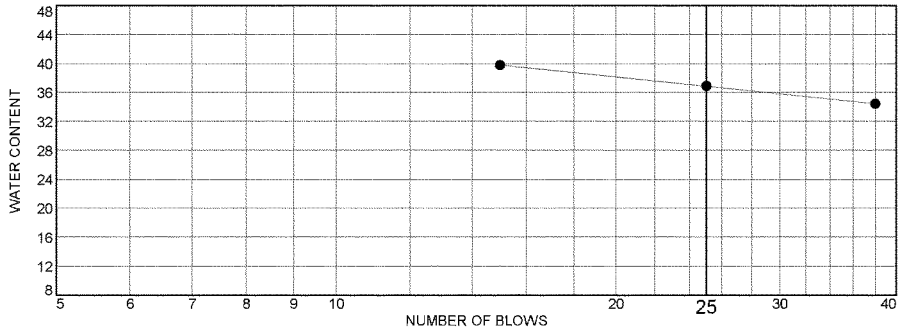
LABORATORY TEST SUMMARY

Project Number: 60299932 **Project:** USACE CX34: DES PLAINES DPLV09

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	Qp tsf	Density pcf	Qu tsf	Gravel %	Sand %	Silt %	Clay	LL	PL	PI
		10.5	TRACE SHALE - BROWN GRAY CLAY LAYERS NOTED												
	5A	10.5-11.5				4.25									
	6	12.5-14.0	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	14.4	5.5									
	8	20.0-21.5	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	15.2	3.75									
	9	25.0-25.8	SILT TRACE CLAY TRACE F SAND - GRAY	ML	13.5										

LIQUID AND PLASTIC LIMITS of SOILS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY LITTLE F-C SAND - BROWN TO DARK BROWN	37	17	20			CL

Project No. 60299932 **Client:** USACE

Project: USACE CX34: DES PLAINES DPLV09

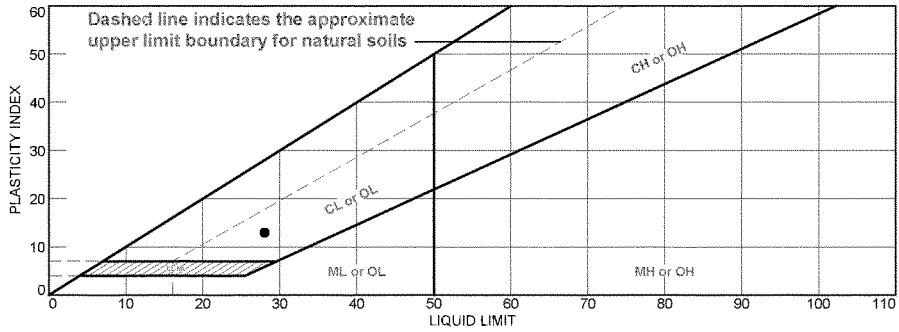
● **Source of Sample:** DP2-13-3 **Depth:** 5.0'-7.5' **Sample Number:** 3

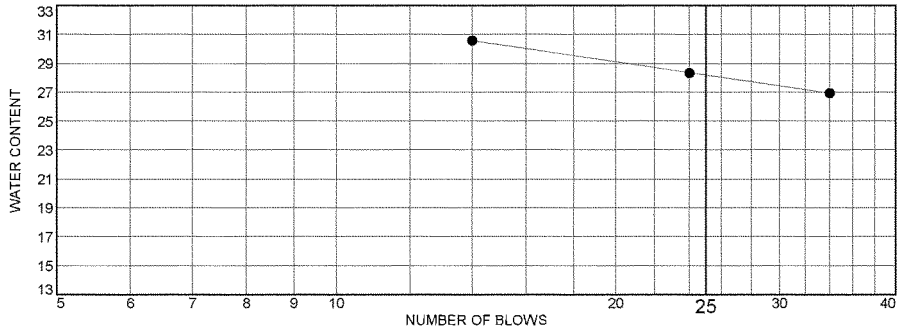
Remarks:
● 2.5-2.75

AECOM

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS of SOILS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY LITTLE F-C SAND TRACE F-C GRAVEL - GRAY	28	15	13			CL

Project No. 60299932 **Client:** USACE

Project: USACE CX34: DES PLAINES DPLV09

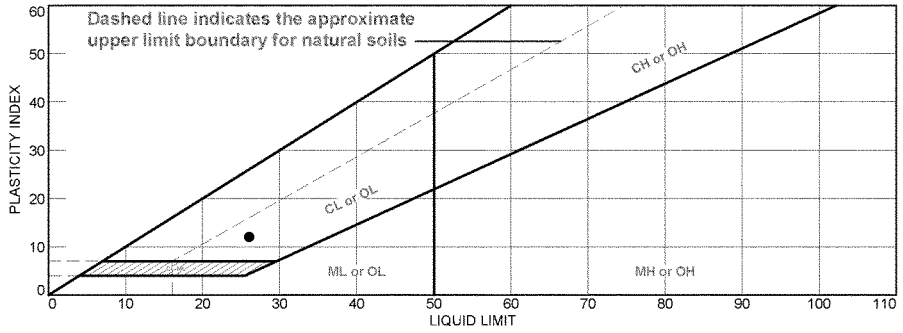
● **Source of Sample:** DP2-13-3 **Depth:** 20.0'-22.5' **Sample Number:** 8

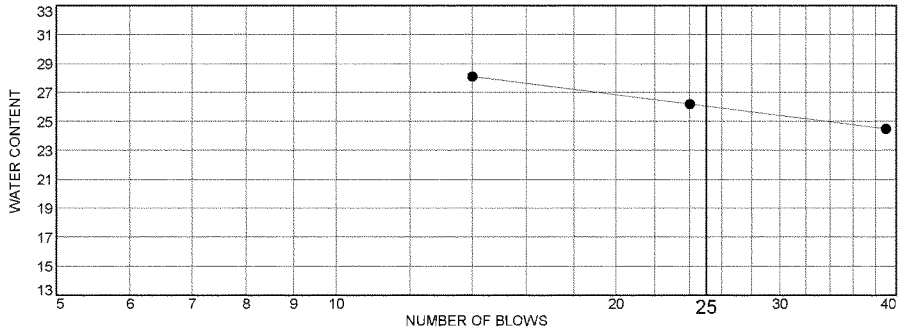
Remarks:
● 2.5-2.75

AECOM

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS of SOILS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN AND GRAY	26	14	12			CL

Project No. 60299932 **Client:** USACE

Project: USACE CX34: DES PLAINES DPLV09

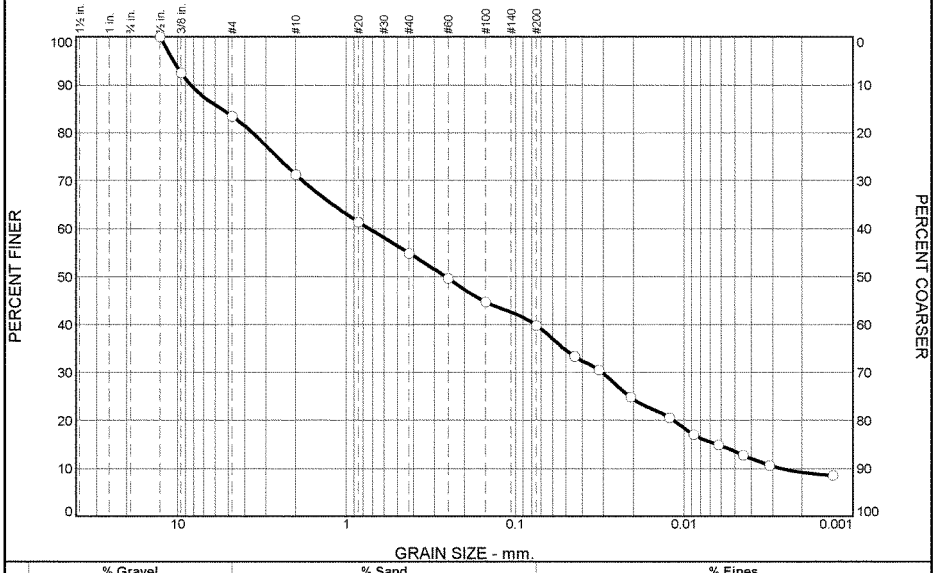
● **Source of Sample:** DP2-13-5 **Depth:** 15.0'-17.0' **Sample Number:** 6

Remarks:
● 0.5-.75

AECOM

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	16.5	12.2	16.4	15.1	26.3	13.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	92.4		
#4	83.5		
#10	71.3		
#20	61.4		
#40	54.9		
#60	49.6		
#100	44.7		
#200	39.8		

* (no specification provided)

Material Description

SILTY F-C SAND LITTLE F GRAVEL LITTLE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.3989 D_{85}= 5.5271 D_{60}= 0.7366
D_{50}= 0.2600 D_{30}= 0.0306 D_{15}= 0.0064
D_{10}= 0.0027 C_u= 272.43 C_c= 0.47

Classification

USCS= SM AASHTO=

Remarks

F.M.=2.31

Source of Sample: DP2-13-1 **Depth:** 10.5-11.0
Sample Number: 5A **Date:** 6/30/2013

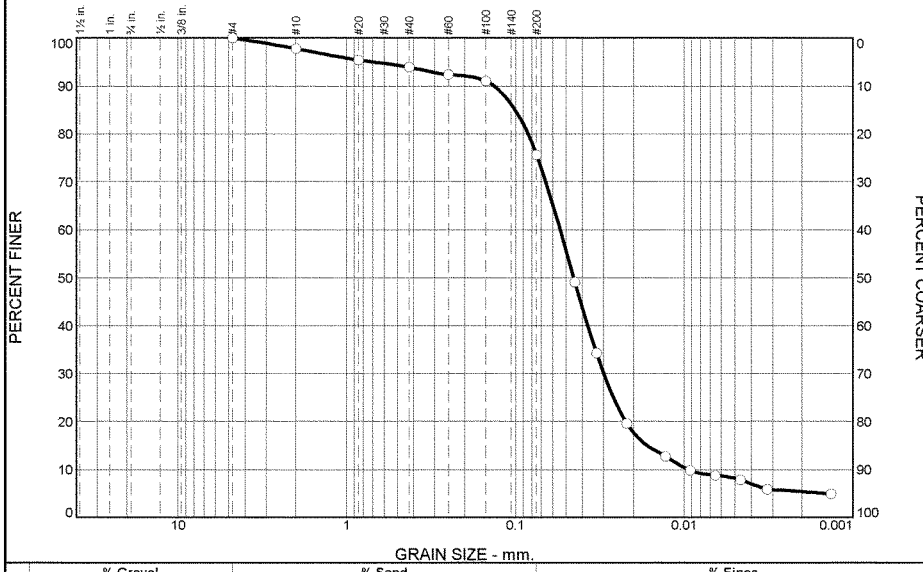
AECOM

Client: USACE
Project: USACE CX34: DES PLAINES DPLV09

Project No: 60299932

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.2	3.9	18.3	67.5	8.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	97.8		
#20	95.4		
#40	93.9		
#60	92.3		
#100	91.0		
#200	75.6		

* (no specification provided)

Material Description

SANDY SILT TRACE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1343 D_{85}= 0.1004 D_{60}=
D_{50}= 0.0453 D_{30}= 0.0300 D_{15}= 0.0166
D_{10}= 0.0095 C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

F.M.=0.27

Source of Sample: DP2-13-2 **Depth:** 25.5-26.5
Sample Number: 11 **Date:** 6/30/13

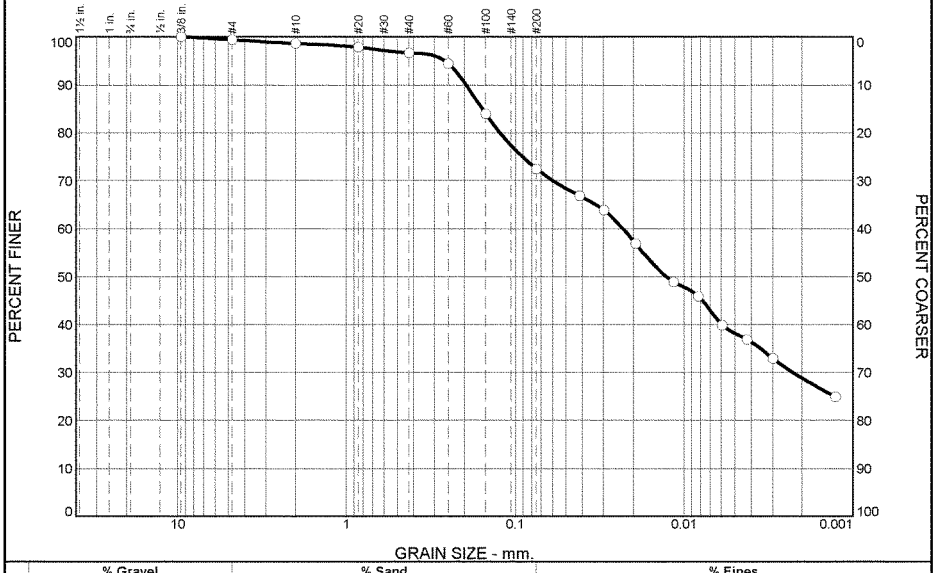
AECOM

Client: USACE
Project: USACE CX34: DES PLAINES DPLV09

Project No: 60299932

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	0.8	1.9	24.2	34.4	38.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.4		
#10	98.6		
#20	97.9		
#40	96.7		
#60	94.4		
#100	84.0		
#200	72.5		

* (no specification provided)

Material Description

SILTY CLAY SOME F-M SAND - BROWN

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1956 D_{85}= 0.1571 D_{60}=
D_{50}= 0.0128 D_{30}= 0.0023 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

F.M.=0.26

Source of Sample: DP2-13-4 **Depth:** 5.0'-6.5'
Sample Number: 3 **Date:** 6/30/13

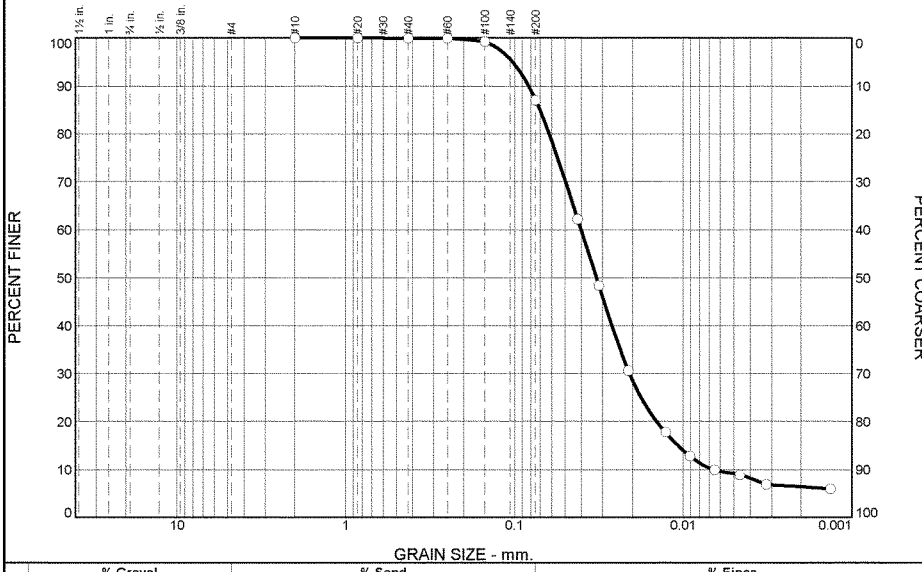
AECOM

Client: USACE
Project: USACE CX34: DES PLAINES DPLV09

Project No: 60299932

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	12.9	77.9	9.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.9		
#100	99.2		
#200	87.0		

* (no specification provided)

Material Description

SILT LITTLE F SAND TRACE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0826 D_{85}= 0.0708 D_{60}=
D_{50}= 0.0327 D_{30}= 0.0209 D_{15}= 0.0107
D_{10}= 0.0067 C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

F.M.=0.01

Source of Sample: DP2-13-7 **Depth:** 25.0'-26.0'
Sample Number: 10 **Date:** 6/30/13

AECOM

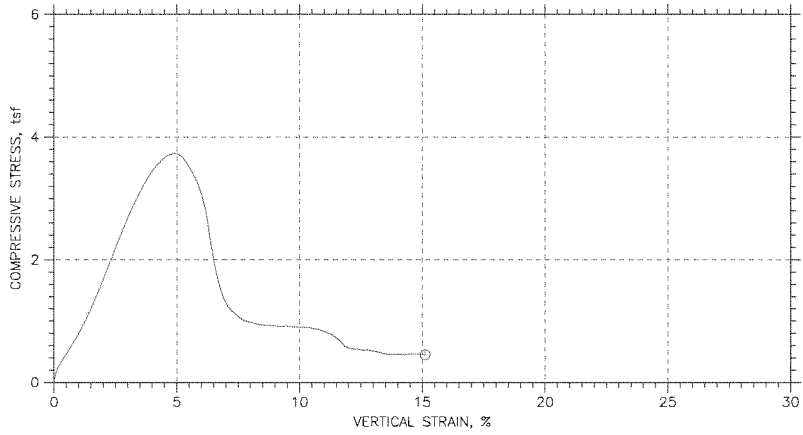
Client: USACE
Project: USACE CX34: DES PLAINES DPLV09

Project No: 60299932

Tested By: EMR **Checked By:** WPQ

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		132S7QU			
Initial	Diameter, in	2.8453			
	Height, in	6.1185			
	Water Content, %	12.97			
	Dry Density, pcf	124.8			
	Saturation, %	97.74			
	Void Ratio	0.36106			
Unconfined Compressive Strength, tsf		3.7371			
Undrained Shear Strength, tsf		1.8686			
Time to Failure, min		7.0001			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES II DPLV09
Location:
Project No.: 60299932
Boring No.: 13-2 S-7
Sample Type: 3" ST
Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Fri, 28-JUN-2013 13:07:08

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II DPLV09
Boring No.: 13-2 S-7
Sample No.: S-7
Test No.: 1325?QU

Location:
Tested By: BCM
Test Date: 6/20/13
Sample Type: 3" ST

Project No.: 60299932
Checked By: WPQ
Depth: 15.0'-16.0'
Elevation: ----

Soil Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.12 in
Specimen Area: 6.36 in^2
Specimen Volume: 38.90 in^3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

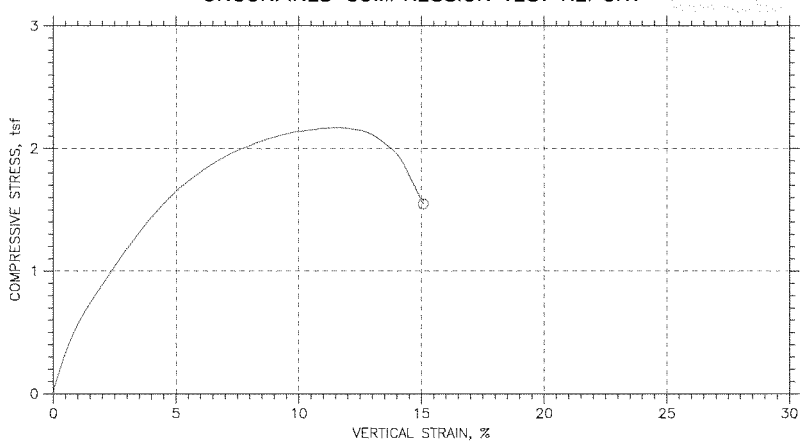
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3583	0	0
2	0.10407	9.1342e-005	0.0014929	1.436	6.3584	0.01626	0.0081301
3	0.20407	0.0038364	0.062701	12.498	6.3623	0.14144	0.070719
4	0.30407	0.0079468	0.12988	19.146	6.3665	0.21653	0.10826
5	0.40407	0.01224	0.20005	24.145	6.371	0.27287	0.13644
6	0.50412	0.016624	0.27171	28.56	6.3756	0.32253	0.16126
7	0.60407	0.0211	0.34486	32.655	6.3803	0.3685	0.18425
8	0.70407	0.025393	0.41502	36.59	6.3848	0.41262	0.20631
9	0.80407	0.029778	0.48668	40.632	6.3894	0.45787	0.22894
10	0.90407	0.034071	0.55685	44.515	6.3939	0.50127	0.25063
11	1.0041	0.038455	0.6285	48.61	6.3985	0.54699	0.27349
12	1.1041	0.04284	0.70016	52.758	6.4031	0.59324	0.29662
13	1.2041	0.047224	0.77182	57.013	6.4077	0.64062	0.32031
14	1.3041	0.051517	0.84199	61.267	6.4123	0.68794	0.34397
15	1.4041	0.055993	0.91514	65.788	6.417	0.73816	0.36908
16	1.5041	0.060286	0.9853	70.362	6.4215	0.78892	0.39446
17	1.6041	0.064944	1.0614	75.308	6.4265	0.84372	0.42186
18	1.7041	0.069146	1.1301	80.094	6.4309	0.89673	0.44836
19	1.8041	0.073622	1.2033	85.147	6.4357	0.95259	0.47629
20	1.9041	0.078098	1.2764	90.412	6.4405	1.0107	0.50537
21	2.0042	0.082391	1.3466	95.677	6.4451	1.0688	0.53442
22	2.1041	0.086866	1.4197	101.31	6.4498	1.131	0.56549
23	2.2041	0.091434	1.4944	107.11	6.4547	1.1948	0.59739
24	2.3041	0.095818	1.566	112.91	6.4594	1.2585	0.62927
25	2.4041	0.10011	1.6362	118.97	6.464	1.3252	0.66259
26	2.5042	0.1044	1.7064	124.98	6.4686	1.3911	0.69556
27	2.6041	0.10879	1.778	130.99	6.4734	1.4569	0.72847
28	2.7041	0.11308	1.8482	137.32	6.478	1.5262	0.76312
29	2.8041	0.11756	1.9213	143.75	6.4828	1.5966	0.79829
30	2.9041	0.12176	1.99	150.35	6.4874	1.6687	0.83433
31	3.0042	0.12614	2.0617	156.94	6.4921	1.7406	0.87029
32	3.1041	0.13044	2.1318	163.54	6.4968	1.8124	0.90621
33	3.2041	0.13482	2.2035	169.97	6.5015	1.8824	0.94118
34	3.3041	0.13921	2.2752	176.84	6.5063	1.9569	0.97845
35	3.4041	0.14332	2.3423	183.43	6.5108	2.0285	1.0142
36	3.5042	0.14779	2.4155	190.29	6.5156	2.1028	1.0514
37	3.6041	0.15199	2.4842	196.94	6.5202	2.1747	1.0874
38	3.7041	0.15647	2.5573	203.69	6.5251	2.2476	1.1238
39	3.8041	0.16076	2.6275	210.18	6.5298	2.3175	1.1588
40	3.9041	0.16506	2.6976	216.88	6.5345	2.3897	1.1948
41	4.0042	0.16935	2.7678	223.26	6.5393	2.4582	1.2291
42	4.1041	0.17364	2.838	229.59	6.544	2.5261	1.263
43	4.2041	0.17812	2.9111	236.08	6.5489	2.5955	1.2978
44	4.3041	0.18241	2.9813	242.46	6.5536	2.6638	1.3319
45	4.4041	0.18679	3.053	248.95	6.5585	2.733	1.3665
46	4.5042	0.19109	3.1231	254.91	6.5632	2.7964	1.3982
47	4.6042	0.19556	3.1963	260.81	6.5682	2.859	1.4295
48	4.7042	0.20004	3.2694	266.34	6.5732	2.9174	1.4587
49	4.8042	0.20442	3.3411	272.03	6.578	2.9775	1.4888
50	4.9042	0.20872	3.4112	277.3	6.5828	3.033	1.5165
51	5.0042	0.21319	3.4844	282.78	6.5878	3.0905	1.5453
52	5.2542	0.22415	3.6635	295.81	6.6001	3.227	1.6135
53	5.5042	0.23493	3.8397	307.24	6.6122	3.3456	1.6728
54	5.7501	0.24571	4.0159	317.98	6.6243	3.4562	1.7281
55	6.0001	0.25658	4.1935	326.76	6.6366	3.545	1.7725
56	6.2501	0.26727	4.3682	333.94	6.6487	3.6163	1.8081
57	6.5001	0.27795	4.5428	340.48	6.6609	3.6804	1.8402
58	6.7501	0.28873	4.719	344.74	6.6732	3.7195	1.8598
59	7.0001	0.29969	4.8982	347.02	6.6857	3.7371	1.8686
60	7.2501	0.31065	5.0773	346.54	6.6984	3.725	1.8625
61	7.5001	0.32162	5.2564	341.17	6.711	3.6603	1.8302
62	7.7501	0.33285	5.4401	332.24	6.7241	3.5575	1.7788
63	8.0001	0.34399	5.6222	320.86	6.737	3.4291	1.7145
64	8.2501	0.35523	5.8058	308.36	6.7502	3.2891	1.6445
65	8.5001	0.36656	5.9909	290.38	6.7635	3.0912	1.5456
66	8.7501	0.37788	6.1761	264.53	6.7768	2.8105	1.4053
67	9.0001	0.3893	6.3627	218.9	6.7903	2.3211	1.1606
68	9.2501	0.40072	6.5493	179.97	6.8039	1.9045	0.95226
69	9.5001	0.41186	6.7314	150.19	6.8172	1.5862	0.79312
70	9.7501	0.42291	6.9121	129.71	6.8304	1.3673	0.68367
71	10	0.43378	7.0897	117	6.8434	1.231	0.6155
72	10.25	0.44493	7.2718	110.14	6.8569	1.1565	0.57827
73	10.5	0.45635	7.4585	103.81	6.8707	1.0879	0.54395
74	10.75	0.46767	7.6436	98.868	6.8845	1.034	0.517
75	11	0.479	7.8287	95.624	6.8983	0.99806	0.49903
76	11.25	0.49042	8.0153	93.816	6.9123	0.9772	0.4886
77	11.5	0.50183	8.2019	92.22	6.9264	0.95864	0.47932
78	11.75	0.51316	8.387	90.784	6.9404	0.94181	0.4709
79	12	0.52421	8.5677	90.465	6.9541	0.93664	0.46832
80	12.25	0.53545	8.7513	90.359	6.9681	0.93366	0.46683
81	12.5	0.5465	8.9319	89.721	6.9819	0.92523	0.46262

82	12.75	0.55755	9.1126	89.029	6.9958	0.91628	0.45814
83	13	0.56851	9.2917	88.976	7.0096	0.91393	0.45697
84	13.25	0.57957	9.4724	89.721	7.0236	0.91974	0.45987
85	13.5	0.59062	9.653	88.923	7.0376	0.90975	0.45487
86	13.75	0.60185	9.8366	89.189	7.0519	0.91061	0.45531
87	14	0.61291	10.017	88.551	7.0661	0.90229	0.45114
88	14.25	0.62423	10.202	88.338	7.0807	0.89827	0.44913
89	14.5	0.63547	10.386	88.285	7.0952	0.89589	0.44795
90	14.75	0.6467	10.57	86.689	7.1097	0.8779	0.43895
91	15	0.65785	10.752	85.519	7.1242	0.86428	0.43214
92	15.25	0.66899	10.934	83.551	7.1388	0.84267	0.42134
93	15.5	0.68004	11.115	80.892	7.1533	0.8142	0.4071
94	15.75	0.6911	11.295	77.754	7.1679	0.78103	0.39051
95	16	0.70215	11.476	73.5	7.1825	0.73679	0.36839
96	16.25	0.71302	11.653	67.969	7.197	0.67997	0.33999
97	16.5	0.72425	11.837	59.193	7.2119	0.59095	0.29548
98	16.75	0.73521	12.016	56.002	7.2266	0.55796	0.27898
99	17	0.74636	12.198	54.885	7.2416	0.5457	0.27285
100	17.25	0.75759	12.382	54.566	7.2568	0.54139	0.2707
101	17.5	0.76883	12.566	53.237	7.272	0.52709	0.26355
102	17.75	0.78006	12.749	53.662	7.2873	0.53019	0.26509
103	18	0.7913	12.933	52.333	7.3027	0.51596	0.25798
104	18.25	0.80244	13.115	51.216	7.318	0.5039	0.25195
105	18.5	0.81359	13.297	49.461	7.3334	0.48561	0.2428
106	18.75	0.82455	13.476	47.652	7.3486	0.46689	0.23344
107	19	0.83569	13.658	46.482	7.3641	0.45447	0.22723
108	19.25	0.84665	13.838	46.801	7.3794	0.45664	0.22832
109	19.5	0.85779	14.02	47.174	7.395	0.4593	0.22965
110	19.75	0.86857	14.196	47.174	7.4102	0.45836	0.22918
111	20	0.87981	14.379	47.44	7.4261	0.45995	0.22998
112	20.25	0.89095	14.562	47.812	7.4419	0.46258	0.23129
113	20.5	0.90219	14.745	47.972	7.458	0.46312	0.23156
114	20.75	0.91342	14.929	47.067	7.4741	0.45342	0.22671
115	21	0.92466	15.112	47.014	7.4902	0.45193	0.22596

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		133S3QU			
Initial	Diameter, in	2.8461			
	Height, in	6.0354			
	Water Content, %	22.69			
	Dry Density, pcf	104.5			
	Saturation, %	98.85			
	Void Ratio	0.62439			
Unconfined Compressive Strength, tsf		2.1705			
Undrained Shear Strength, tsf		1.0853			
Time to Failure, min		15.75			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		37			
Plastic Limit		17			
Plasticity Index		20			
Failure Sketch					

Project: DES PLAINES II DPLV009
Location:
Project No.: 60299932
Boring No.: 13-3 S-3
Sample Type: 3" ST
Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN TO DARK BROWN SAND SEAMS NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Fri, 28-JUN-2013 13:10:33

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II DPLV009
Boring No.: I3-3 S-3
Sample No.: S-3
Test No.: I33S3QU

Location:
Tested By: BCM
Test Date: 6/20/13
Sample Type: 3" ST

Project No.: 60299932
Checked By: WPQ
Depth: 5.0'-7.5'
Elevation: -----

Soil Description: SILTY CLAY LITTLE F-C SAND TRACE F GRAVEL - BROWN TO DARK BROWN SAND SEAMS NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.04 in
Specimen Area: 6.36 in^2
Specimen Volume: 38.40 in^3

Liquid Limit: 37
Plastic Limit: 17
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3618	0	0
2	0.25407	9.1342e-005	0.0015134	0	6.3619	0	0
3	0.50407	0.0023749	0.039349	4.683	6.3643	0.05298	0.02649
4	0.75407	0.013336	0.22096	14.996	6.3759	0.16935	0.084673
5	1.0041	0.024571	0.40711	25.362	6.3878	0.28587	0.14293
6	1.2541	0.037359	0.61899	35.465	6.4014	0.39889	0.19944
7	1.5041	0.049507	0.82028	44.041	6.4144	0.49435	0.24718
8	1.7541	0.061108	1.0125	51.092	6.4269	0.57239	0.28619
9	2.0041	0.072343	1.1986	57.301	6.439	0.64074	0.32037
10	2.2541	0.083761	1.3878	63.142	6.4513	0.7047	0.35235
11	2.5041	0.095179	1.577	68.614	6.4637	0.7643	0.38215
12	2.7541	0.10678	1.7692	74.034	6.4764	0.82306	0.41153
13	3.0041	0.11838	1.9614	79.19	6.4891	0.87866	0.43933
14	3.2541	0.12971	2.1491	84.294	6.5015	0.93351	0.46675
15	3.5041	0.14085	2.3337	89.714	6.5138	0.99165	0.49583
16	3.7541	0.15218	2.5214	94.818	6.5263	1.0461	0.52303
17	4.0041	0.16341	2.7075	100.08	6.5388	1.102	0.551
18	4.2542	0.17538	2.9058	105.39	6.5522	1.1581	0.57907
19	4.5042	0.1878	3.1116	110.34	6.5661	1.2099	0.60496
20	4.7542	0.19958	3.3069	115.34	6.5794	1.2622	0.6311
21	5.0042	0.21082	3.493	120.23	6.592	1.3132	0.65661
22	5.2542	0.22196	3.6776	124.76	6.6047	1.36	0.68001
23	5.5042	0.23338	3.8668	129.44	6.6177	1.4083	0.70415
24	5.7542	0.24471	4.0545	133.76	6.6306	1.4524	0.72621
25	6.0042	0.25612	4.2437	137.81	6.6437	1.4935	0.74673
26	6.2542	0.26736	4.4298	141.96	6.6567	1.5355	0.76776
27	6.5042	0.27841	4.6129	145.86	6.6694	1.5746	0.7873
28	6.7542	0.28955	4.7976	149.54	6.6824	1.6112	0.80562
29	7.0042	0.30052	4.9792	153.33	6.6951	1.6489	0.82446
30	7.2542	0.31212	5.1714	156.85	6.7087	1.6834	0.84171
31	7.5042	0.32445	5.3757	160.12	6.7232	1.7147	0.85736
32	7.7542	0.33705	5.5846	163.43	6.7381	1.7464	0.87318
33	8.0042	0.34829	5.7707	166.48	6.7514	1.7755	0.88773
34	8.2542	0.35961	5.9584	169.43	6.7649	1.8033	0.90164
35	8.5042	0.37103	6.1476	172.38	6.7785	1.831	0.91548
36	8.7501	0.38199	6.3292	174.9	6.7916	1.8542	0.9271
37	9.0001	0.39387	6.5259	177.64	6.8059	1.8792	0.93962
38	9.2501	0.40519	6.7136	180.22	6.8196	1.9027	0.95135
39	9.5001	0.41652	6.9013	182.48	6.8334	1.9227	0.96135
40	9.7501	0.42757	7.0844	184.8	6.8468	1.9433	0.97163
41	10	0.43899	7.2736	187.16	6.8608	1.9642	0.98208
42	10.25	0.45023	7.4597	188.95	6.8746	1.979	0.98948
43	10.5	0.46228	7.6595	191.16	6.8895	1.9978	0.99889
44	10.75	0.47443	7.8608	192.79	6.9045	2.0104	1.0052
45	11	0.48612	8.0545	194.69	6.9191	2.0259	1.013
46	11.25	0.49727	8.2391	196.84	6.933	2.0443	1.0221
47	11.5	0.50841	8.4238	198.37	6.947	2.056	1.028
48	11.75	0.51928	8.6039	199.95	6.9607	2.0682	1.0341
49	12	0.53061	8.7915	201.58	6.975	2.0808	1.0404
50	12.25	0.54193	8.9792	202.84	6.9894	2.0896	1.0448
51	12.5	0.55299	9.1623	204.37	7.0035	2.101	1.0505
52	12.75	0.56376	9.3409	205.84	7.0173	2.112	1.056
53	13	0.57445	9.518	207.05	7.031	2.1203	1.0601
54	13.25	0.58569	9.7041	208.42	7.0455	2.1299	1.065
55	13.5	0.59692	9.8903	209.63	7.06	2.1379	1.0689
56	13.75	0.60998	10.107	210.42	7.077	2.1408	1.0704
57	14	0.62332	10.328	211.47	7.0945	2.1462	1.0731
58	14.25	0.63455	10.514	212.52	7.1092	2.1524	1.0762
59	14.5	0.64588	10.701	213.21	7.1242	2.1548	1.0774
60	14.75	0.65721	10.889	214.42	7.1392	2.1625	1.0812
61	15	0.66835	11.074	215.1	7.154	2.1649	1.0824
62	15.25	0.67977	11.263	215.73	7.1693	2.1666	1.0833
63	15.5	0.69119	11.452	216.52	7.1846	2.1699	1.0849
64	15.75	0.7026	11.641	217.05	7.2	2.1705	1.0853
65	16	0.71384	11.827	217.21	7.2152	2.1675	1.0838
66	16.25	0.72526	12.017	217.16	7.2307	2.1623	1.0812
67	16.5	0.7364	12.201	217.16	7.2459	2.1578	1.0789
68	16.75	0.74773	12.389	217.05	7.2614	2.1521	1.0761
69	17	0.76061	12.602	216.79	7.2791	2.1443	1.0722
70	17.25	0.77221	12.795	215.79	7.2952	2.1297	1.0649
71	17.5	0.78363	12.984	214.73	7.311	2.1147	1.0574
72	17.75	0.79459	13.165	213	7.3263	2.0933	1.0466
73	18	0.80564	13.348	210.47	7.3418	2.0641	1.032
74	18.25	0.81724	13.541	208	7.3581	2.0353	1.0176
75	18.5	0.82847	13.727	205.47	7.374	2.0063	1.0031
76	18.75	0.83971	13.913	202.42	7.3899	1.9722	0.9861
77	19	0.85085	14.098	198.69	7.4058	1.9316	0.96582
78	19.25	0.86191	14.281	192.9	7.4217	1.8714	0.93569
79	19.5	0.87323	14.468	185.06	7.4379	1.7914	0.89569
80	19.75	0.88438	14.653	177.9	7.454	1.7184	0.8592
81	20	0.89671	14.857	169.85	7.4719	1.6367	0.81835

82	20.25	0.90977	15.074	161.12	7.491	1.5486	0.7743

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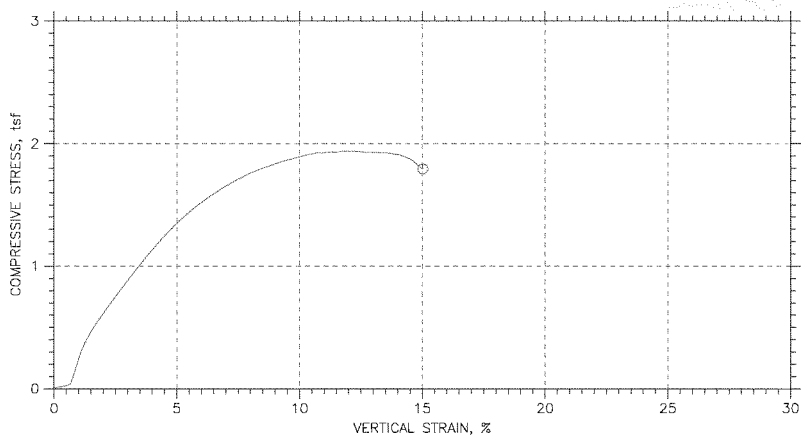
UNCONFINED COMPRESSION TEST REPORT



Symbol		⊙			
Test No.		133S8			
Initial	Diameter, in	2.8551			
	Height, in	5.9406			
	Water Content, %	13.57			
	Dry Density, pcf	124.2			
	Saturation, %	100.64			
	Void Ratio	0.36686			
Unconfined Compressive Strength, tsf		1.9372			
Undrained Shear Strength, tsf		0.96858			
Time to Failure, min		16.001			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		28			
Plastic Limit		15			
Plasticity Index		13			
Failure Sketch					

Project: DES PLAINES II DPLV09
Location:
Project No.: 60299932
Boring No.: 13-3 S-8
Sample Type: 3" ST
Description: SILTY CLAY SOME F-C SAND TRACE F-C GRAVEL - GRAY CL SAND SEAMS NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Fri, 28-JUN-2013 13:47:25

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II DPLV09
Boring No.: 13-3 S-8
Sample No.: S-8
Test No.: 13358

Location:
Tested By: BCM
Test Date: 6/20/13
Sample Type: 3" ST

Project No.: 60299932
Checked By: WPQ
Depth: 20.0'-22.5'
Elevation: ----

Soil Description: SILTY CLAY SOME F-C SAND TRACE F-C GRAVEL - GRAY CL SAND SEAMS NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.94 in
Specimen Area: 6.40 inA2
Specimen Volume: 38.03 inA3

Liquid Limit: 28
Plastic Limit: 15
Estimated Specific Gravity: 2.72

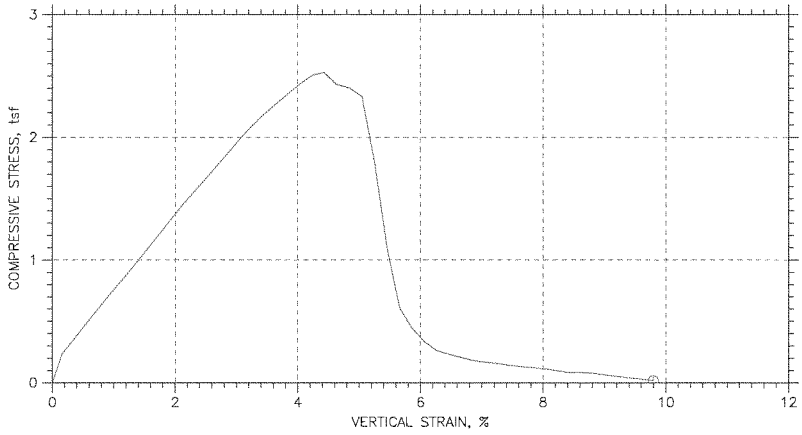
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.4023	0	0
2	0.1002	0.00018165	0.0030579	0	6.4025	0	0
3	0.2002	0.0018165	0.030579	0.30837	6.4043	0.0034669	0.0017334
4	0.30022	0.0063579	0.10703	0.80651	6.4092	0.0090602	0.0045301
5	0.40022	0.010899	0.18347	1.0674	6.4141	0.011982	0.0059912
6	0.50027	0.015622	0.26298	1.3758	6.4192	0.015432	0.0077158
7	0.60022	0.020164	0.33942	1.5656	6.4241	0.017547	0.0087733
8	0.70022	0.024705	0.41587	1.8028	6.4291	0.02019	0.010095
9	0.80022	0.029246	0.49232	2.206	6.434	0.024687	0.012343
10	0.90022	0.033788	0.56876	2.6093	6.439	0.029177	0.014589
11	1.0003	0.038329	0.64521	3.2498	6.4439	0.036311	0.018155
12	1.1002	0.041962	0.70637	5.2186	6.4479	0.058273	0.029137
13	1.2002	0.045777	0.77058	8.6107	6.452	0.096089	0.048044
14	1.3002	0.049592	0.8348	12.216	6.4562	0.13624	0.068118
15	1.4002	0.053588	0.90207	15.988	6.4606	0.17818	0.089088
16	1.5003	0.057585	0.96935	19.736	6.465	0.2198	0.1099
17	1.6002	0.061763	1.0397	23.887	6.4696	0.26584	0.13292
18	1.7002	0.065941	1.11	27.54	6.4742	0.30627	0.15314
19	1.8002	0.070664	1.1895	30.932	6.4794	0.34372	0.17186
20	1.9002	0.075205	1.266	33.826	6.4844	0.37559	0.18779
21	2.0003	0.079746	1.3424	36.578	6.4894	0.40583	0.20291
22	2.1003	0.084106	1.4158	39.163	6.4943	0.43419	0.2171
23	2.2003	0.088647	1.4922	41.535	6.4993	0.46013	0.23007
24	2.3003	0.093007	1.5656	43.741	6.5042	0.48421	0.2421
25	2.4003	0.097549	1.6421	45.971	6.5092	0.5085	0.25425
26	2.5003	0.10209	1.7185	48.059	6.5143	0.53117	0.26559
27	2.6003	0.10645	1.7919	50.122	6.5191	0.55357	0.27678
28	2.7003	0.11081	1.8653	52.02	6.524	0.5741	0.28705
29	2.8003	0.11535	1.9418	53.941	6.5291	0.59484	0.29742
30	2.9003	0.11989	2.0182	55.934	6.5342	0.61633	0.30817
31	3.0003	0.12443	2.0946	57.95	6.5393	0.63805	0.31903
32	3.1003	0.12879	2.168	60.085	6.5442	0.66106	0.33053
33	3.2003	0.13315	2.2414	61.912	6.5491	0.68065	0.34032
34	3.3003	0.13769	2.3179	63.786	6.5542	0.7007	0.35035
35	3.4003	0.14205	2.3913	65.588	6.5592	0.71996	0.35998
36	3.5003	0.14641	2.4646	67.581	6.5641	0.74128	0.37064
37	3.6003	0.15095	2.5411	69.455	6.5693	0.76123	0.38062
38	3.7003	0.15531	2.6145	71.376	6.5742	0.7817	0.39085
39	3.8003	0.15967	2.6879	73.345	6.5792	0.80266	0.40133
40	3.9003	0.16403	2.7613	75.195	6.5841	0.82229	0.41114
41	4.0003	0.16858	2.8377	76.951	6.5893	0.84082	0.42041
42	4.1003	0.17312	2.9142	78.848	6.5945	0.86088	0.43044
43	4.2003	0.17766	2.9906	80.722	6.5997	0.88065	0.44032
44	4.3003	0.1822	3.067	82.596	6.6049	0.90038	0.45019
45	4.4003	0.18674	3.1435	84.446	6.6101	0.91982	0.45991
46	4.5003	0.19128	3.2199	86.415	6.6153	0.94053	0.47026
47	4.6003	0.19582	3.2964	88.313	6.6206	0.96042	0.48021
48	4.7003	0.20037	3.3728	90.163	6.6258	0.97977	0.48988
49	4.8003	0.20509	3.4523	91.871	6.6313	0.9975	0.49875
50	4.9003	0.20963	3.5288	93.745	6.6365	1.017	0.50852
51	5.0004	0.21399	3.6022	95.595	6.6416	1.0363	0.51816
52	5.2504	0.22507	3.7887	100.1	6.6544	1.0831	0.54154
53	5.5004	0.23615	3.9752	104.4	6.6674	1.1274	0.56368
54	5.7504	0.24723	4.1618	108.64	6.6804	1.1709	0.58546
55	6.0004	0.25831	4.3483	112.79	6.6934	1.2133	0.60665
56	6.2504	0.26921	4.5318	116.73	6.7062	1.2533	0.62663
57	6.5004	0.28011	4.7152	120.62	6.7192	1.2925	0.64626
58	6.7504	0.29101	4.8987	124.32	6.7321	1.3296	0.66481
59	7.0004	0.30209	5.0852	127.83	6.7453	1.3645	0.68224
60	7.2504	0.31317	5.2718	131.34	6.7586	1.3992	0.6996
61	7.5004	0.32425	5.4583	134.62	6.772	1.4312	0.71562
62	7.7504	0.33515	5.6418	137.82	6.7851	1.4625	0.73123
63	8.0004	0.34642	5.8314	141	6.7988	1.4932	0.74659
64	8.2504	0.35768	6.021	144.06	6.8125	1.5225	0.76125
65	8.5004	0.36912	6.2136	146.93	6.8265	1.5497	0.77483
66	8.7504	0.38057	6.4062	149.87	6.8406	1.5774	0.78872
67	9.0004	0.39183	6.5958	152.43	6.8544	1.6012	0.80058
68	9.2504	0.40273	6.7793	155.13	6.8679	1.6264	0.81318
69	9.5004	0.41399	6.9689	157.7	6.8819	1.6499	0.82493
70	9.7505	0.42489	7.1524	160.07	6.8955	1.6714	0.83568
71	10	0.43597	7.3389	162.42	6.9094	1.6925	0.84624
72	10.25	0.44705	7.5254	164.69	6.9233	1.7128	0.85638
73	10.5	0.45795	7.7089	166.71	6.9371	1.7303	0.86514
74	10.75	0.46903	7.8954	168.99	6.9512	1.7504	0.87519
75	11	0.48029	8.085	170.91	6.9655	1.7666	0.88332
76	11.25	0.49156	8.2746	172.74	6.9799	1.7818	0.89091
77	11.5	0.503	8.4673	174.56	6.9946	1.7969	0.89844
78	11.75	0.51445	8.6599	176.18	7.0093	1.8097	0.90484
79	12	0.52589	8.8525	177.88	7.0241	1.8234	0.91168
80	12.251	0.53733	9.0452	179.64	7.039	1.8375	0.91873
81	12.501	0.54842	9.2317	181.2	7.0535	1.8497	0.92484

82	12.751	0.55968	9.4213	182.65	7.0683	1.8606	0.93028
83	13.001	0.57076	9.6078	184.12	7.0828	1.8717	0.93584
84	13.251	0.58184	9.7944	185.45	7.0975	1.8813	0.94064
85	13.501	0.59274	9.9778	186.78	7.1119	1.8909	0.94545
86	13.751	0.604	10.167	188.2	7.127	1.9013	0.95065
87	14.001	0.61508	10.354	189.41	7.1418	1.9096	0.95478
88	14.251	0.62635	10.544	190.64	7.1569	1.9179	0.95896
89	14.501	0.63761	10.733	191.9	7.1721	1.9265	0.96324
90	14.751	0.64923	10.929	192.02	7.1879	1.9234	0.96172
91	15.001	0.66086	11.125	192.95	7.2037	1.9285	0.96423
92	15.251	0.67267	11.323	193.85	7.2199	1.9331	0.96657
93	15.501	0.68429	11.519	194.16	7.2358	1.9319	0.96597
94	15.751	0.69574	11.712	195.1	7.2516	1.9372	0.96858
95	16.001	0.70718	11.904	195.53	7.2675	1.9372	0.96858
96	16.251	0.71863	12.097	195.93	7.2834	1.9369	0.96846
97	16.501	0.73007	12.29	196.29	7.2994	1.9362	0.96809
98	16.751	0.74151	12.482	196.43	7.3155	1.9333	0.96666
99	17.001	0.75314	12.678	196.55	7.3319	1.9302	0.96508
100	17.251	0.76477	12.874	196.95	7.3483	1.9298	0.9649
101	17.501	0.77657	13.072	197.41	7.3651	1.9298	0.9649
102	17.751	0.78838	13.271	197.43	7.382	1.9256	0.96281
103	18.001	0.80019	13.47	197.93	7.399	1.926	0.96302
104	18.251	0.812	13.669	197.9	7.416	1.9214	0.9607
105	18.501	0.82362	13.864	197.57	7.4329	1.9138	0.95691
106	18.751	0.83507	14.057	197.57	7.4495	1.9095	0.95477
107	19.001	0.84669	14.253	196.43	7.4665	1.8942	0.94711
108	19.251	0.85795	14.442	195.67	7.4831	1.8827	0.94136
109	19.501	0.8694	14.635	193.68	7.4999	1.8594	0.92968
110	19.751	0.88084	14.828	190.03	7.5169	1.8202	0.91008
111	20.001	0.89247	15.023	187.66	7.5342	1.7933	0.89666

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		134SBQU			
Initial	Diameter, in	2.8724			
	Height, in	5.8319			
	Water Content, %	17.10			
	Dry Density, pcf	114.5			
	Saturation, %	96.18			
	Void Ratio	0.4835			
Unconfined Compressive Strength, tsf		2.5277			
Undrained Shear Strength, tsf		1.2639			
Time to Failure, min		5.7539			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES II DPLV09
Location:
Project No.: 60299932
Boring No.: 13-4 S-8
Sample Type: 3" ST
Description: CLAYEY SILT TRACE F SAND - GRAY CL-ML
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Fri, 28-JUN-2013 13:17:16

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II DPLV09
Boring No.: 13-4 S-8
Sample No.: S-8
Test No.: 134S8QU

Location:
Tested By: BCM
Test Date: 6/20/13
Sample Type: 3" ST

Project No.: 60299932
Checked By: WPQ
Depth: 20.0'-21.5'
Elevation: -----

Soil Description: CLAYEY SILT TRACE F SAND - GRAY CL-ML
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.83 in
Specimen Area: 6.48 in^2
Specimen Volume: 37.79 in^3

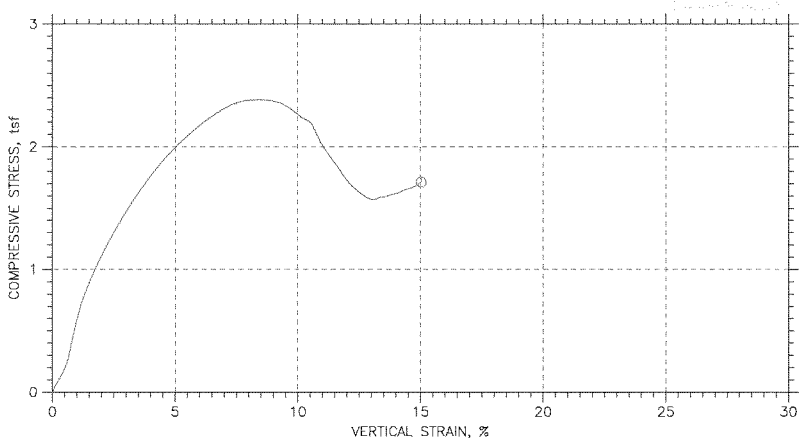
Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

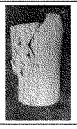
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.4803	0	0
2	0.25408	0.0090429	0.15506	20.942	6.4903	0.23232	0.11616
3	0.50383	0.020552	0.35241	32.097	6.5032	0.35536	0.17768
4	0.75383	0.031696	0.54349	43.2	6.5157	0.47737	0.23868
5	1.0038	0.042931	0.73614	54.039	6.5283	0.59599	0.29799
6	1.2538	0.054257	0.93036	65.036	6.5411	0.71587	0.35794
7	1.5039	0.066223	1.1355	76.139	6.5547	0.83634	0.41817
8	1.7539	0.078098	1.3391	87.399	6.5682	0.95806	0.47903
9	2.0039	0.089241	1.5302	98.607	6.581	1.0788	0.53941
10	2.2539	0.10039	1.7213	109.71	6.5938	1.198	0.59898
11	2.5039	0.11162	1.914	120.97	6.6067	1.3183	0.65916
12	2.7539	0.12276	2.105	132.28	6.6196	1.4388	0.7194
13	3.0039	0.13418	2.3008	142.91	6.6329	1.5513	0.77565
14	3.2539	0.14606	2.5044	153.75	6.6467	1.6655	0.83274
15	3.5039	0.15729	2.6971	164.33	6.6599	1.7765	0.88827
16	3.7539	0.16807	2.8819	174.48	6.6726	1.8827	0.94137
17	4.0039	0.17848	3.0605	184.64	6.6848	1.9887	0.99433
18	4.2539	0.18935	3.2468	194.37	6.6977	2.0895	1.0447
19	4.5039	0.20095	3.4458	203.74	6.7115	2.1857	1.0928
20	4.7539	0.21328	3.6572	212.68	6.7262	2.2766	1.1383
21	5.0039	0.22461	3.8514	220.88	6.7398	2.3597	1.1799
22	5.2539	0.23594	4.0456	228.68	6.7535	2.438	1.219
23	5.5039	0.24717	4.2383	235.47	6.7671	2.5053	1.2527
24	5.7539	0.25822	4.4278	238.04	6.7805	2.5277	1.2639
25	6.0039	0.2701	4.6314	229.42	6.795	2.4309	1.2155
26	6.2539	0.28206	4.8366	227.36	6.8096	2.404	1.202
27	6.504	0.2943	5.0465	220.94	6.8247	2.331	1.1655
28	6.754	0.30618	5.2501	171.38	6.8393	1.8042	0.90208
29	7.004	0.31824	5.4568	103.92	6.8543	1.0916	0.54581
30	7.254	0.3302	5.662	57.985	6.8692	0.60778	0.30389
31	7.504	0.34162	5.8578	42.673	6.8835	0.44636	0.22318
32	7.754	0.3534	6.0598	32.255	6.8983	0.33666	0.16833
33	8.004	0.36491	6.2572	25.204	6.9128	0.26251	0.13126
34	8.254	0.37706	6.4655	22.152	6.9282	0.23021	0.11511
35	8.504	0.3883	6.6581	19.942	6.9425	0.20682	0.10341
36	8.754	0.39944	6.8492	17.469	6.9567	0.1808	0.090401
37	9.004	0.41095	7.0466	16.154	6.9715	0.16683	0.083416
38	9.254	0.42218	7.2392	15.312	6.986	0.15781	0.078905
39	9.504	0.4336	7.435	13.839	7.0008	0.14232	0.071162
40	9.754	0.44584	7.6449	12.786	7.0167	0.1312	0.065601
41	10.004	0.45708	7.8375	11.839	7.0313	0.12123	0.060615
42	10.254	0.4684	8.0318	10.997	7.0462	0.11237	0.056186
43	10.504	0.47946	8.2213	9.6291	7.0607	0.098191	0.049095
44	10.754	0.4906	8.4124	8.1558	7.0755	0.082994	0.041497
45	11.004	0.50275	8.6207	8.2084	7.0916	0.083339	0.04167
46	11.254	0.5138	8.8102	7.6296	7.1063	0.077302	0.038651
47	11.504	0.5254	9.0091	6.3142	7.1219	0.063835	0.031917
48	11.754	0.53682	9.2049	5.0513	7.1372	0.050958	0.025479
49	12.004	0.54787	9.3944	3.8937	7.1522	0.039198	0.019599
50	12.254	0.55956	9.5949	2.9992	7.168	0.030126	0.015063
51	12.504	0.57125	9.7954	1.7364	7.1839	0.017403	0.0087014

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		135S3			
Initial	Diameter, in	2.8142			
	Height, in	5.9051			
	Water Content, %	21.10			
	Dry Density, pcf	107.1			
	Saturation, %	98.09			
	Void Ratio	0.58516			
Unconfined Compressive Strength, tsf		2.3834			
Undrained Shear Strength, tsf		1.1917			
Time to Failure, min		12			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		38			
Plastic Limit		22			
Plasticity Index		16			
Failure Sketch					

Project: DES PLAINES II DPLV09
Location:
Project No.: 60299932
Boring No.: 13-5 S-3
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-M SAND BROWN TO GRAYISH BLUE CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Fri, 28-JUN-2013 13:26:14

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II DPLV09
Boring No.: 13-5 S-3
Sample No.: S-3
Test No.: 13553

Location:
Tested By: BCM
Test Date: 6/20/13
Sample Type: 3" ST

Project No.: 60299932
Checked By: WPG
Depth: 5.0'-6.5'
Elevation: ----

Soil Description: SILTY CLAY TRACE F-M SAND BROWN TO GRAYISH BLUE CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.91 in
Specimen Area: 6.22 in^2
Specimen Volume: 36.73 in^3

Liquid Limit: 38
Plastic Limit: 22
Estimated Specific Gravity: 2.72

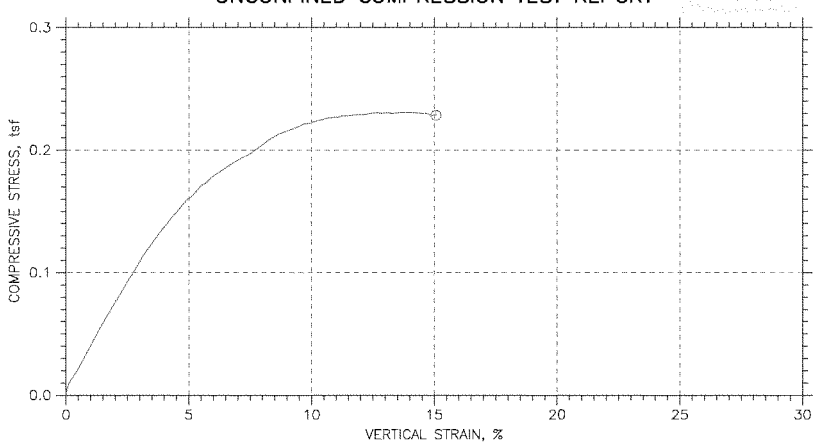
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.22	0	0
2	0.50012	0.0006394	0.010828	0.37228	6.2207	0.0043089	0.0021545
3	0.60007	0.0023749	0.040218	1.5423	6.2225	0.017846	0.008923
4	0.70007	0.0046585	0.078888	3.3506	6.2249	0.038754	0.019377
5	0.80007	0.007216	0.1222	4.627	6.2276	0.053494	0.026747
6	0.90007	0.010778	0.18253	6.4352	6.2314	0.074355	0.037177
7	1.0001	0.014158	0.23976	7.9243	6.235	0.091509	0.045754
8	1.1001	0.017812	0.30163	9.8921	6.2388	0.11416	0.057081
9	1.2001	0.021557	0.36505	11.913	6.2428	0.1374	0.068699
10	1.3001	0.025576	0.43311	14.253	6.2471	0.16427	0.082137
11	1.4001	0.030052	0.50891	17.285	6.2518	0.19906	0.09953
12	1.5001	0.034162	0.57852	20.103	6.2562	0.23136	0.11568
13	1.6001	0.038638	0.65431	24.518	6.261	0.28195	0.14097
14	1.7001	0.042748	0.72392	30.421	6.2654	0.34959	0.17479
15	1.8001	0.047224	0.79971	36.697	6.2702	0.42139	0.21069
16	1.9001	0.051608	0.87396	42.6	6.2749	0.48881	0.2444
17	2.0001	0.056084	0.94975	48.184	6.2797	0.55246	0.27623
18	2.1001	0.060286	1.0209	53.343	6.2842	0.61117	0.30559
19	2.2001	0.06467	1.0952	57.917	6.2889	0.66308	0.33154
20	2.3001	0.069055	1.1694	62.491	6.2936	0.7149	0.35745
21	2.4001	0.073439	1.2437	66.426	6.2983	0.75936	0.37968
22	2.5001	0.077915	1.3194	70.709	6.3032	0.80312	0.40156
23	2.6001	0.082208	1.3921	73.606	6.3078	0.84017	0.42008
24	2.7001	0.086592	1.4664	76.744	6.3126	0.87532	0.43766
25	2.8001	0.090977	1.5406	79.935	6.3173	0.91103	0.45552
26	2.9001	0.095361	1.6149	82.966	6.3221	0.94487	0.47243
27	3.0002	0.099654	1.6876	85.998	6.3268	0.97867	0.48933
28	3.1001	0.10404	1.7618	88.923	6.3316	1.0112	0.5056
29	3.2001	0.10842	1.8361	91.742	6.3364	1.0425	0.52123
30	3.3001	0.11281	1.9103	94.507	6.3412	1.0731	0.53654
31	3.4001	0.1171	1.983	97.432	6.3459	1.1055	0.55273
32	3.5002	0.12167	2.0604	100.04	6.3509	1.1341	0.56707
33	3.6001	0.12578	2.13	102.64	6.3554	1.1629	0.58143
34	3.7001	0.13025	2.2058	105.3	6.3603	1.1921	0.59603
35	3.8001	0.13473	2.2816	107.86	6.3652	1.22	0.61
36	3.9001	0.13911	2.3558	110.46	6.3701	1.2485	0.62427
37	4.0002	0.14359	2.4316	112.96	6.375	1.2758	0.6379
38	4.1001	0.14788	2.5043	115.35	6.3798	1.3019	0.65093
39	4.2001	0.15236	2.5801	117.75	6.3848	1.3278	0.66392
40	4.3001	0.15693	2.6575	120.19	6.3898	1.3543	0.67717
41	4.4001	0.16113	2.7286	122.48	6.3945	1.3791	0.68955
42	4.5002	0.1656	2.8044	124.87	6.3995	1.405	0.70248
43	4.6001	0.17017	2.8817	127.32	6.4046	1.4313	0.71567
44	4.7001	0.17437	2.9529	129.5	6.4093	1.4548	0.72739
45	4.8001	0.17894	3.0302	131.74	6.4144	1.4787	0.73935
46	4.9001	0.18332	3.1045	133.92	6.4193	1.502	0.75101
47	5.0002	0.1878	3.1803	136.31	6.4243	1.5277	0.76384
48	5.2502	0.19894	3.369	141.57	6.4369	1.5836	0.79179
49	5.5002	0.21	3.5562	146.79	6.4494	1.6387	0.81935
50	5.7502	0.22087	3.7402	151.63	6.4617	1.6895	0.84475
51	6.0002	0.23183	3.9259	156.63	6.4742	1.7418	0.87092
52	6.2502	0.2426	4.1084	161.15	6.4865	1.7887	0.89436
53	6.5002	0.25357	4.294	165.67	6.4991	1.8353	0.91767
54	6.7502	0.26444	4.4781	170.08	6.5116	1.8806	0.94031
55	7.0002	0.2754	4.6637	174.23	6.5243	1.9227	0.96137
56	7.2502	0.28654	4.8524	178.06	6.5372	1.9611	0.98055
57	7.5003	0.29759	5.0396	182.21	6.5501	2.0028	1.0014
58	7.7503	0.30874	5.2283	185.77	6.5632	2.038	1.019
59	8.0003	0.31988	5.417	189.23	6.5763	2.0717	1.0359
60	8.2503	0.33112	5.6073	192.84	6.5895	2.1071	1.0535
61	8.5003	0.34208	5.7929	195.98	6.6025	2.1372	1.0686
62	8.7503	0.35304	5.9785	199.33	6.6155	2.1694	1.0847
63	9.0003	0.364	6.1641	202.58	6.6286	2.2004	1.1002
64	9.2503	0.37496	6.3497	205.34	6.6418	2.226	1.113
65	9.5003	0.38592	6.5354	208.11	6.6549	2.2515	1.1258
66	9.7503	0.3967	6.7179	210.87	6.668	2.277	1.1385
67	10	0.40766	6.9035	213.37	6.6813	2.2994	1.1497
68	10.25	0.41862	7.0891	215.61	6.6946	2.3188	1.1594
69	10.5	0.42967	7.2763	218	6.7081	2.3398	1.1699
70	10.75	0.44082	7.465	219.81	6.7218	2.3544	1.1772
71	11	0.45196	7.6537	221.19	6.7355	2.3644	1.1822
72	11.25	0.46311	7.8424	222.63	6.7493	2.3749	1.1875
73	11.5	0.47425	8.0312	223.48	6.7632	2.3791	1.1896
74	11.75	0.48548	8.2214	224.06	6.7772	2.3804	1.1902
75	12	0.49663	8.4101	224.81	6.7912	2.3834	1.1917
76	12.25	0.50777	8.5988	225.07	6.8052	2.3813	1.1907
77	12.5	0.5191	8.7906	225.39	6.8195	2.3797	1.1898
78	12.75	0.53024	8.9794	225.18	6.8336	2.3725	1.1863
79	13	0.54139	9.1681	224.81	6.8478	2.3637	1.1818
80	13.25	0.55253	9.3568	224.17	6.8621	2.3521	1.176
81	13.5	0.56367	9.5455	222.57	6.8764	2.3305	1.1652

82	13.75	0.57536	9.7435	220.66	6.8915	2.3054	1.1527
83	14	0.58742	9.9477	218.16	6.9071	2.2741	1.137
84	14.25	0.59911	10.146	215.39	6.9223	2.2403	1.1202
85	14.5	0.61035	10.336	213.96	6.937	2.2207	1.1103
86	14.75	0.62158	10.526	212.36	6.9518	2.1994	1.0997
87	15	0.63273	10.715	205.77	6.9665	2.1266	1.0633
88	15.25	0.64387	10.904	198.16	6.9812	2.0437	1.0219
89	15.5	0.65474	11.088	192.74	6.9957	1.9837	0.99183
90	15.75	0.6657	11.273	188.27	7.0103	1.9336	0.96682
91	16	0.67675	11.46	183.48	7.0251	1.8805	0.94025
92	16.25	0.68781	11.648	179.18	7.04	1.8325	0.91624
93	16.5	0.69886	11.835	173.86	7.055	1.7743	0.88716
94	16.75	0.70991	12.022	169.02	7.07	1.7213	0.86063
95	17	0.72115	12.212	165.35	7.0853	1.6802	0.84012
96	17.25	0.73238	12.402	162.32	7.1007	1.6459	0.82293
97	17.5	0.74353	12.591	159.92	7.116	1.6181	0.80905
98	17.75	0.75458	12.778	157.53	7.1313	1.5905	0.79524
99	18	0.76572	12.967	156.04	7.1467	1.572	0.78602
100	18.25	0.77668	13.153	156.31	7.162	1.5714	0.78568
101	18.5	0.78774	13.34	158.33	7.1775	1.5882	0.79412
102	18.75	0.7987	13.525	158.86	7.1929	1.5902	0.79508
103	19	0.80975	13.713	160.51	7.2085	1.6032	0.80159
104	19.25	0.82071	13.898	162	7.224	1.6146	0.80729
105	19.5	0.83167	14.084	163.01	7.2396	1.6211	0.81057
106	19.751	0.84272	14.271	165.4	7.2554	1.6414	0.82068
107	20.001	0.85387	14.46	167	7.2715	1.6536	0.82678
108	20.251	0.8651	14.65	168.59	7.2877	1.6656	0.83282
109	20.501	0.87634	14.84	170.93	7.3039	1.685	0.8425
110	20.751	0.88748	15.029	174.12	7.3202	1.7126	0.85632

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		132S7QU			
Initial	Diameter, in	2.863			
	Height, in	5.7787			
	Water Content, %	20.96			
	Dry Density, pcf	105.8			
	Saturation, %	94.15			
	Void Ratio	0.60559			
Unconfined Compressive Strength, tsf		0.23088			
Undrained Shear Strength, tsf		0.11544			
Time to Failure, min		17.251			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		26			
Plastic Limit		14			
Plasticity Index		12			
Failure Sketch					

Project: DES PLAINES II DPLV09
Location:
Project No.: 60299932
Boring No.: 13-5 S-6
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWNISH GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Fri, 28-JUN-2013 13:30:26

UNCONFINED COMPRESSION TEST

Project: DES PLAINES II DPLV09
Boring No.: 13-5 S-6
Sample No.: S-6
Test No.: 132S7QU

Location:
Tested By: BCM
Test Date: 6/20/13
Sample Type: 3" ST

Project No.: 60299932
Checked By: WPQ
Depth: 15.0'-16.0'
Elevation: ----

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWNISH GRAY CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.78 in
Specimen Area: 6.44 in^2
Specimen Volume: 37.20 in^3

Liquid Limit: 26
Plastic Limit: 14
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.4377	0	0
2	0.10415	0.0018165	0.031435	0.35581	6.4397	0.0039782	0.0019891
3	0.20415	0.0063579	0.11002	0.83023	6.4448	0.0092752	0.0046376
4	0.30415	0.010718	0.18547	1.0912	6.4497	0.012181	0.0060905
5	0.40415	0.015441	0.2672	1.2335	6.4549	0.013759	0.0068793
6	0.5042	0.019982	0.34578	1.5181	6.46	0.01692	0.0084602
7	0.60415	0.024523	0.42437	1.7079	6.4651	0.01902	0.0095102
8	0.70415	0.028883	0.49982	1.9451	6.47	0.021646	0.010823
9	0.80417	0.033424	0.5784	2.2298	6.4751	0.024794	0.012397
10	0.90417	0.038147	0.66013	2.4907	6.4805	0.027672	0.013836
11	1.0042	0.042689	0.73872	2.7279	6.4856	0.030284	0.015142
12	1.1042	0.04723	0.81731	3.0363	6.4907	0.033681	0.01684
13	1.2042	0.05159	0.89275	3.2735	6.4957	0.036284	0.018142
14	1.3	0.05595	0.9682	3.5107	6.5006	0.038884	0.019442
15	1.4	0.060491	1.0468	3.7953	6.5058	0.042003	0.021002
16	1.5001	0.065032	1.1254	4.08	6.511	0.045118	0.022559
17	1.6	0.069755	1.2071	4.3409	6.5164	0.047963	0.023982
18	1.7	0.074297	1.2857	4.6256	6.5215	0.051068	0.025534
19	1.8	0.07902	1.3674	4.9102	6.5269	0.054166	0.027083
20	1.9	0.083561	1.446	5.1474	6.5321	0.056737	0.028369
21	2.0001	0.088284	1.5277	5.4321	6.5376	0.059825	0.029913
22	2.1	0.093007	1.6095	5.693	6.543	0.062647	0.031323
23	2.2	0.09773	1.6912	5.9539	6.5484	0.065464	0.032732
24	2.3	0.10227	1.7698	6.1674	6.5537	0.067757	0.033878
25	2.4	0.10699	1.8515	6.4521	6.5591	0.070825	0.035412
26	2.5001	0.11172	1.9333	6.713	6.5646	0.073628	0.036814
27	2.6	0.11626	2.0118	6.9502	6.5699	0.076168	0.038084
28	2.7	0.12098	2.0936	7.1874	6.5754	0.078702	0.039351
29	2.8	0.1257	2.1753	7.4484	6.5808	0.081491	0.040746
30	2.9	0.13025	2.2539	7.6856	6.5861	0.084019	0.04201
31	3.0001	0.13479	2.3325	7.9465	6.5914	0.086802	0.043401
32	3.1	0.13951	2.4142	8.1837	6.597	0.089318	0.044659
33	3.2	0.14405	2.4928	8.4684	6.6023	0.09235	0.046175
34	3.3	0.14859	2.5714	8.7293	6.6076	0.095119	0.04756
35	3.4	0.15313	2.65	8.9191	6.6129	0.097109	0.048554
36	3.5001	0.15768	2.7286	9.18	6.6183	0.099869	0.049934
37	3.6001	0.16222	2.8071	9.4172	6.6236	0.10237	0.051183
38	3.7001	0.16676	2.8857	9.6781	6.629	0.10512	0.052559
39	3.8001	0.1713	2.9643	9.9391	6.6344	0.10786	0.053932
40	3.9001	0.17584	3.0429	10.176	6.6397	0.11035	0.055175
41	4.0001	0.18038	3.1215	10.437	6.6451	0.11309	0.056544
42	4.1001	0.18492	3.2001	10.674	6.6505	0.11556	0.057782
43	4.2001	0.18965	3.2818	10.888	6.6561	0.11778	0.058888
44	4.3001	0.19419	3.3604	11.101	6.6615	0.11999	0.059994
45	4.4001	0.19873	3.439	11.315	6.667	0.1222	0.061098
46	4.5001	0.20345	3.5207	11.528	6.6726	0.1244	0.062198
47	4.6001	0.20799	3.5993	11.742	6.6781	0.1266	0.063298
48	4.7001	0.21254	3.6779	11.955	6.6835	0.12879	0.064396
49	4.8001	0.21726	3.7596	12.193	6.6892	0.13124	0.065618
50	4.9001	0.2218	3.8382	12.359	6.6946	0.13291	0.066457
51	5.0001	0.22652	3.9199	12.62	6.7003	0.13561	0.067803
52	5.2501	0.23815	4.1211	13.046	6.7144	0.1399	0.06995
53	5.5001	0.24978	4.3223	13.592	6.7285	0.14544	0.072722
54	5.7502	0.26122	4.5204	14.019	6.7425	0.1497	0.074852
55	6.0002	0.27285	4.7215	14.517	6.7567	0.1547	0.077348
56	6.2502	0.28429	4.9196	14.992	6.7708	0.15942	0.07971
57	6.5002	0.29573	5.1176	15.276	6.7849	0.16211	0.081054
58	6.7502	0.30718	5.3157	15.727	6.7991	0.16654	0.083271
59	7.0002	0.31844	5.5106	16.201	6.8131	0.17121	0.085607
60	7.2502	0.33007	5.7117	16.439	6.8277	0.17335	0.086675
61	7.5002	0.34151	5.9098	16.866	6.842	0.17748	0.08874
62	7.7502	0.35314	6.111	17.174	6.8567	0.18034	0.090169
63	8.0002	0.3644	6.3059	17.435	6.871	0.1827	0.091349
64	8.2502	0.37603	6.507	17.743	6.8858	0.18553	0.092765
65	8.5005	0.38765	6.7082	18.052	6.9006	0.18835	0.094174
66	8.7505	0.39928	6.9094	18.313	6.9155	0.19066	0.095329
67	9.0005	0.4109	7.1106	18.597	6.9305	0.1932	0.096602
68	9.2505	0.42235	7.3086	18.811	6.9453	0.19501	0.097503
69	9.5005	0.43379	7.5067	19.048	6.9602	0.19704	0.098521
70	9.7505	0.44505	7.7016	19.356	6.9749	0.19981	0.099905
71	10	0.45632	7.8965	19.688	6.9896	0.20281	0.1014
72	10.25	0.46776	8.0945	19.997	7.0047	0.20554	0.10277
73	10.501	0.47902	8.2894	20.353	7.0196	0.20876	0.10438
74	10.751	0.49047	8.4874	20.613	7.0348	0.21098	0.10549
75	11.001	0.50173	8.6823	20.874	7.0498	0.21319	0.1066
76	11.251	0.51336	8.8835	21.064	7.0653	0.21466	0.10733
77	11.501	0.52498	9.0847	21.254	7.081	0.21611	0.10806
78	11.751	0.53661	9.2859	21.444	7.0967	0.21756	0.10878
79	12.001	0.54842	9.4902	21.657	7.1127	0.21923	0.10961
80	12.251	0.56022	9.6945	21.918	7.1288	0.22137	0.11069
81	12.501	0.57185	9.8957	22.013	7.1447	0.22183	0.11092

82	12.751	0.58347	10.097	22.203	7.1607	0.22325	0.11162
83	13.001	0.59492	10.295	22.345	7.1765	0.22418	0.11209
84	13.251	0.60636	10.493	22.487	7.1924	0.22511	0.11256
85	13.501	0.61781	10.691	22.653	7.2083	0.22627	0.11314
86	13.751	0.62907	10.886	22.725	7.2241	0.22649	0.11324
87	14.001	0.64051	11.084	22.82	7.2402	0.22693	0.11346
88	14.251	0.65196	11.282	22.986	7.2564	0.22807	0.11404
89	14.501	0.66358	11.483	23.033	7.2728	0.22802	0.11401
90	14.751	0.67503	11.681	23.128	7.2892	0.22845	0.11422
91	15.001	0.68684	11.886	23.223	7.3061	0.22886	0.11443
92	15.251	0.69846	12.087	23.294	7.3228	0.22903	0.11452
93	15.501	0.70991	12.285	23.389	7.3393	0.22945	0.11472
94	15.751	0.72135	12.483	23.507	7.3559	0.23009	0.11505
95	16.001	0.73279	12.681	23.602	7.3726	0.2305	0.11525
96	16.251	0.74424	12.879	23.602	7.3894	0.22997	0.11499
97	16.501	0.7555	13.074	23.721	7.4059	0.23061	0.11531
98	16.751	0.76695	13.272	23.697	7.4228	0.22986	0.11493
99	17.001	0.77839	13.47	23.792	7.4398	0.23025	0.11513
100	17.251	0.78965	13.665	23.911	7.4566	0.23088	0.11544
101	17.501	0.80128	13.866	23.958	7.474	0.2308	0.1154
102	17.751	0.8129	14.067	24.006	7.4915	0.23071	0.11536
103	18.001	0.82453	14.268	24.029	7.5091	0.2304	0.1152
104	18.251	0.83634	14.473	24.029	7.5271	0.22985	0.11493
105	18.501	0.84796	14.674	24.1	7.5448	0.22999	0.115
106	18.751	0.85941	14.872	23.982	7.5624	0.22833	0.11416
107	19.001	0.87085	15.07	24.053	7.58	0.22847	0.11424

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Final Geotechnical Engineering Report

Des Plaines II DPLV04 & DPLV05 Investigation
Subsurface Investigation
U.S. Army Corps of Engineers – Chicago District

Delivery Order No.: CX37
Contract No.: W911XK-09-D-0015
AECOM Project No.: 60308477
Date: January 2, 2014

Prepared by:
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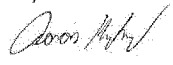

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AECOM Field and Laboratory Procedures
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1.0 Introduction

According to the United States Army Corps of Engineers – Chicago District, the following paragraphs provides background information for the project:

"The Upper Des Plaines and Tributaries Feasibility Study (DPII) project has been formulated to build on the benefits achieved by the Upper Des Plaines River Flood Damage Reduction Feasibility Study (Des Plaines I). DPII recommends a plan that further manages flood risk on the main stem in both Illinois and Wisconsin, manages tributary flood risk, and, in addition to flood management, restores and enhances degraded ecosystems within the study area.

The focus of this investigation is to perform soil borings at the DPLV04 site in River Grove, Illinois and the DPLV05 site in Franklin Park and Schiller Park, Illinois. DPLV04 includes a levee/floodwall extending between Franklin Street and Palmer Street generally along Des Plaines River Road. DPLV05 includes levee/floodwall extending between Irving Park Road and King Avenue, also along Des Plaines River Road.

The project site involved in this investigation is along the Des Plaines River in Schiller Park, Franklin Park, and River Grove, Illinois. The western bank of the Des Plaines River will have a floodwall/levee extending from Ashland Avenue to Jarvis Avenue for about 2 miles. It will have a top elevation varying between about 635.7 to 633.8 feet NAVD88. This side of the river is currently occupied by forest preserve, residential, and commercial properties. The eastern side of the river will have a reservoir in between Algonquin Road and Oakton Street on land currently occupied by forest preserve. The capacity will be about 200 acre-feet and have a crest elevation of about 635.6 feet with the bottom at 622.7 feet NAVD88."

2.0 Authorization and Purpose

The United States Army Corps of Engineers (USACE) engaged AECOM to perform soil borings and laboratory testing to obtain geotechnical information needed for the design of the project.

The project was presented by USACE to AECOM in a Request for Proposal (RFP) and scope of work dated September 17, 2013. The contract was awarded on September 24, 2013 as task order CX37 under AECOM's IDIQ contract W911XK-09-D-0015. AECOM subcontracted the drilling services to Strata Earth Services, LLC (STRATA) out of Palatine, Illinois.

3.0 Scope of Services

The AECOM services were completed in general accordance with the Des Plaines II DPLV04 & DPLV05 Scope of Work (SOW) dated September 17, 2013. The Scope of Work included, but was not limited to, the following tasks:

- preparing a Quality Control Plan (QCP), and a Hazard Analysis and Accident Prevention Plan (APP);
- obtaining utility clearance prior to the performance of the borings;
- obtaining Rights-of-Entry (ROE) through Illinois Department of Transportation for performance of the borings;
- mobilizing a truck mounted drilling rig (subcontracted to STRATA) to the project site;
- obtaining representative split spoon and relatively undisturbed Shelby tube soil samples generally at 2.5-foot intervals in the upper 15 feet of borings and at 5-foot intervals at greater depths in general accordance with ASTM standards to approximate depths of 35 feet;
- staking the as-drilled boring locations for later survey by USACE;
- observing soil and groundwater conditions while drilling and sampling and preparing field logs documenting drilling methods, SPT results, soil condition observations, and other pertinent geotechnical-related observations;
- performing laboratory testing on representative samples and preparing final geotechnical boring logs using gINT software;
- preparing a draft geotechnical engineering report summarizing the field explorations, soil conditions, laboratory results, and recommended engineering properties; and,
- preparing this final geotechnical engineering report to reflect USACE comments to the draft report.

4.0 Procedures

4.1 Soil Borings

A total of nine (9) soil borings were advanced to the proposed depth at the project site by Strata Earth Services, LLC (STRATA) under subcontract to AECOM using a truck mounted CME-45 rotary drill rig. In addition, two borings DP2-13-09 and DP2-13-17 were terminated at shallower depths due to obstructions encountered within 10-feet of the ground surface.

The borings were generally advanced using hollow stem augers; however, in boring DP2-13-10 hollow stem augers were used to advance the borehole to a depth of approximately 10 feet at which point a 4-inch isolation casing was installed and the boring was continued using a roller bit and rotary wash methods with incremental driving of the casing to maintain an open borehole. Representative soil samples were obtained at 2.5-foot intervals in the upper 15 feet of the boring and at 5-foot intervals below 15 feet in general accordance with ASTM D 1586, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils" using an automatic hammer. Relatively undisturbed Shelby tube samples were taken in cohesive soils in general accordance with ASTM D1587 "Standard Practice for Thin Walled Tube Sampling". The borings were advanced using these methods to approximately 35 feet below the ground surface. The soil borings were backfilled with bentonite pellets and auger cuttings.

The soil samples were returned to the AECOM laboratory in Vernon Hills, Illinois for testing as described later in this report. The results of these observations are shown on the final boring logs that are included in Appendix B and the lab summary sheet in Appendix C. A copy of the AECOM Standard Boring Log, Field, and Laboratory Procedures are included in Appendix A.

An AECOM field engineer was present during the drilling activities to prepare field logs documenting drilling methods, SPT results, soil conditions, and other pertinent geotechnical-related observations. It is important to note that the information included on the field logs is based on the initial interpretations of the soil conditions and soil types by the AECOM field representative. These field logs were then used along with additional visual observations and the results of laboratory testing and laboratory classification for completing the final boring logs.

4.2 Borehole Survey

The approximate locations for the borings were provided by USACE to AECOM in the September 17, 2013 Scope of Work. AECOM laid out the boring locations in consultation with USACE at these preliminary locations in order ot obtain utility clearance. Following the completion of the borings, the as-drilled locations were surveyed by USACE. The soil boring locations are presented on Figure 1 and the coordinates are provided on Table 1.

4.3 Laboratory Testing

Laboratory strength and index tests were completed on selected samples to characterize the physical properties of the soils encountered in the soil borings. The table below outlines the laboratory tests and corresponding ASTM designation completed by AECOM:

Laboratory Testing Program Summary

Test Name	Designation	Proposed Number of Tests	Completed Number of Tests
Visual Classification	ASTM D 2488	81	81
Moisture Content	ASTM D 2216	81	85
Hand Penetrometer	N/A	70	49
Atterberg Limits	ASTM D 4318	3	3
Combined Analysis	ASTM D 422	4	4
Dry Density	ASTM D2937 & D221	12	12
Unconfined Compression w/Stress-Strain Curves	ASTM D2166	6	6

The laboratory testing results are included in Appendix C.

In conjunction with the laboratory testing program, all of the samples were classified in the field in general accordance with the AECOM Soil Classification System. These descriptions and estimated group symbols are in general conformance with the Unified Soil Classification System which serves as the basis for the AECOM Soil Classification System, and are included on the soil boring logs. A brief explanation of the classification of soil samples is included in the Appendix A. The laboratory test results are included within Appendix C of this report.

5.0 Exploration Results

The following subsurface conditions were encountered during the explorations.

5.1 Soil Conditions

A generalized summary of the conditions encountered during the subsurface exploration program is discussed below. The geologic descriptions provided below are generalized and brief; individual soil boring logs in Appendix B should be reviewed to determine the actual subsurface conditions at the individual boring locations. In addition, a graphical profile is provided as Figure 2 attached to this report.

Topsoil
Topsoil was observed in borings DP2-13-10 through DP2-13-12 and DP2-13-15 through DP2-13-17 with thicknesses ranging from 5-inches to 30-inches. Two inches of topsoil were also observed at boring DP2-13-09 and DP2-13-09A.

Fill Soils
Non-engineered fill soils were observed in all of the borings.The fill soils ranged from a minimum of 2 feet below the ground surface in boring DP2-13-11 and to a maximum of 10 feet below the ground surface in boring DP2-13-13. In general, the fill consisted of reworked site soils with interbedded layers of topsoil. Deleterious material was generally not found in the fill with the exception of some minor amounts of glass, concrete, cinders and slag which were observed in boring DP2-13-15. Additionally, it is important to note that obstructions which required minor relocation of the borings were encountered in borings DP2-13-09 and DP2-13-17.

Silty Clay
The dominant soil layer at the project site consists of a silty clay with trace amounts of fine to coarse sand and fine gravel (USCS: CL) which was identified in all of the borings. The soil layer was observed to have occasional silt (USCS: ML) seams and graded to a primarily silt material (USCS: ML) at depth in some locations. The consistency of this soil layer was in the very stiff to hard range, with calibrated penetrometer readings typically ranging from 2.0 to greater than 4.5 tons per square foot, and was generally hard with average calibrated penetrometer readings of approximately 4.0 tsf. In boring DP2-13-14, a medium stiff zone of this material was encountered from approximately 5 to 11 feet below the ground surface where calibrated penetrometer readings of approximately 0.75 tsf being encountered. Similarly, a soft zone was found in boring DP2-13-10 between approximately 10 to feet below the ground surface with a calibrated penetrometer reading of 0.25 tsf recorded.

Lower Silt Layer
A fairly consistent silt layer with trace amounts of clay and fine sand (USCS: ML) was encountered in borings DP2-13-09A and DP2-13-10 through DP2-13-15. The layer was typically encountered starting at approximately 20 to 25 feet below the ground surface and extending to 30 to 35 feet below the ground surface. This layer ranged from medium dense to dense relative density and was typically dense.

Sand/Silt Gravel Layers
The overall subsurface profile also consisted of seams and layers of varying thickness of sand and silt soils (USCS: SP, SM, SP-SM, ML) throughout the soil profiles. In general, the layers were medium dense to extremely dense with relative densities generally increasing with increasing depth. Two particularly coarse gravel zones were encountered from 7.5 to 10 feet below the ground surface in boring DP2-13-10 and from 10 to 16 feet below the ground surface in boring DP2-13-11.

Additional variations to the above general profile were noted. Refer to the individual boring logs in Appendix B for specific information. It should be noted that the stratification lines indicated on the boring logs were selected on the basis of laboratory tests, field logs, and visual observations of the recovered samples. The stratification lines that occur on the boring logs are in some cases estimated; in-situ, the transition between soil types in both the horizontal and vertical directions may be gradual.

5.2 Water Conditions

The depth at which water was encountered in the borings ranged from 9.5 feet in boring DP2-13-11 to 19 feet deep in borings DP2-13-13 and DP2-13-14. No groundwater was observed in several of the borings. It should be noted that the water level measurements from the borings were made under short term conditions in low permeability cohesive soils, and therefore may not be representative of the long term position of the groundwater table. Observation wells would need to be installed and monitored over a period of several weeks in order to determine the long term position of the water table. Additionally, both seasonal and annual fluctuations in groundwater levels will likely occur.

6.0 Engineering Properties

AECOM understands that the USACE intends to use the soil boring and laboratory testing data obtained from the investigation described in this report to perform engineering analysis for the project site. AECOM recommends that the USACE use caution in the selection of soil properties. Additional explorations and laboratory testing may be warranted if critical areas of particular concern are identified by USACE. The following table illustrated the range of soil properties which were obtained from the laboratory testing:

Soil Property	Minimum Recorded Value	Maximum Recorded Value	Average Value
Dry density (pcf)			
CL, CL-ML soils	93.4	123	114.4 (from 12 tests)
Unconfined Compressive Strength (tsf)			
CL, CL-ML soils	0.65	5.3	2.58 (from 6 laboratory unconfined compression tests)

The designers who will perform the analyses must use discretion during the selection of the soil properties and should review the laboratory testing results in Appendix C separately for each location to be analyzed.

7.0 General Qualifications

The information presented in this report is based on data obtained from soil borings and laboratory testing completed. Variations can occur between borings, the nature and extent of which may not become evident until after construction. If variations are encountered, it may be necessary reevaluate the information contained in this report with respect to the design and construction.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices to aid in the evaluation of this property, and to assist in the design of this project. No other warranty, expressed or implied, is made. The scope of this report is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects relevant to soil characteristics. In the event any changes in the design or location of the structures as outlined in this report are planned, we should be informed so the changes can be reviewed, and the conclusions of this report modified as required.

TABLES

Table 1: Boring Location Summary

Des Plaines DPLV04-DPLV05
Illinois
AECOM Project #: 60308477

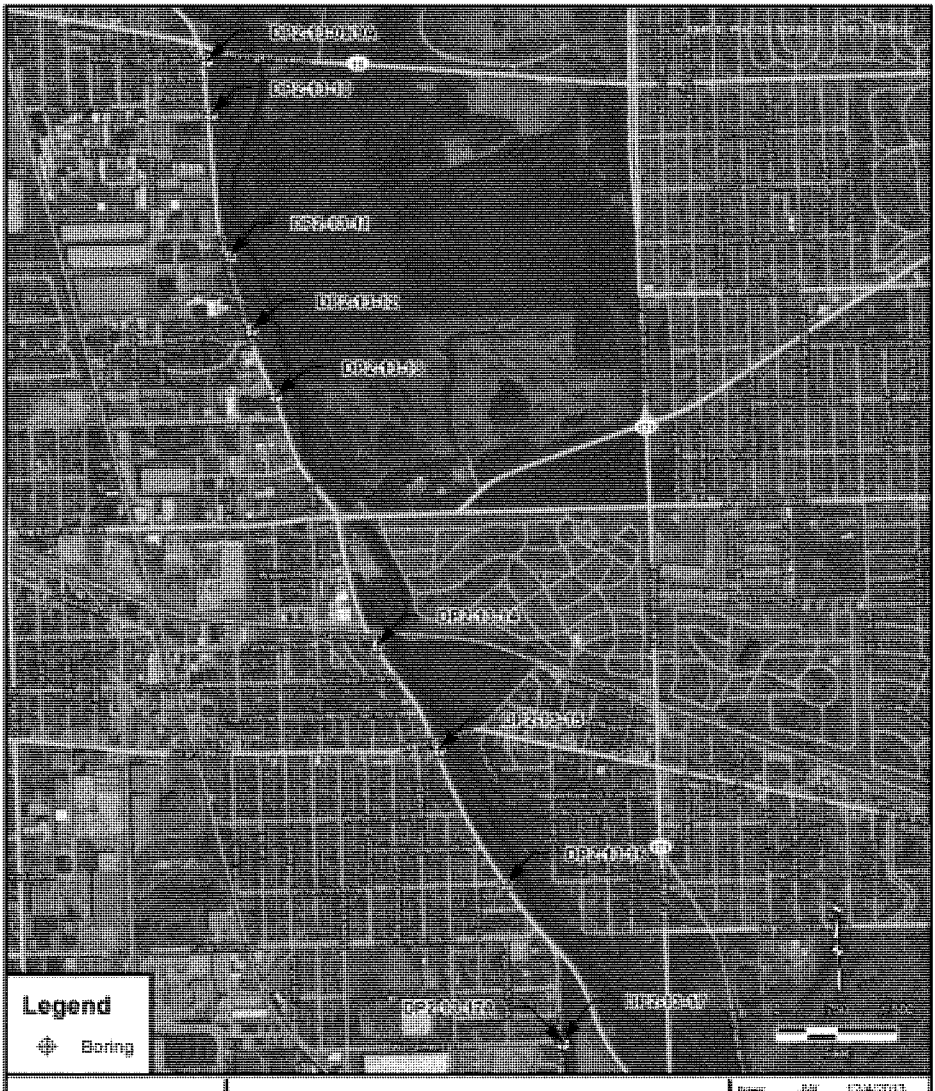
Table 1: Boring Location Summary

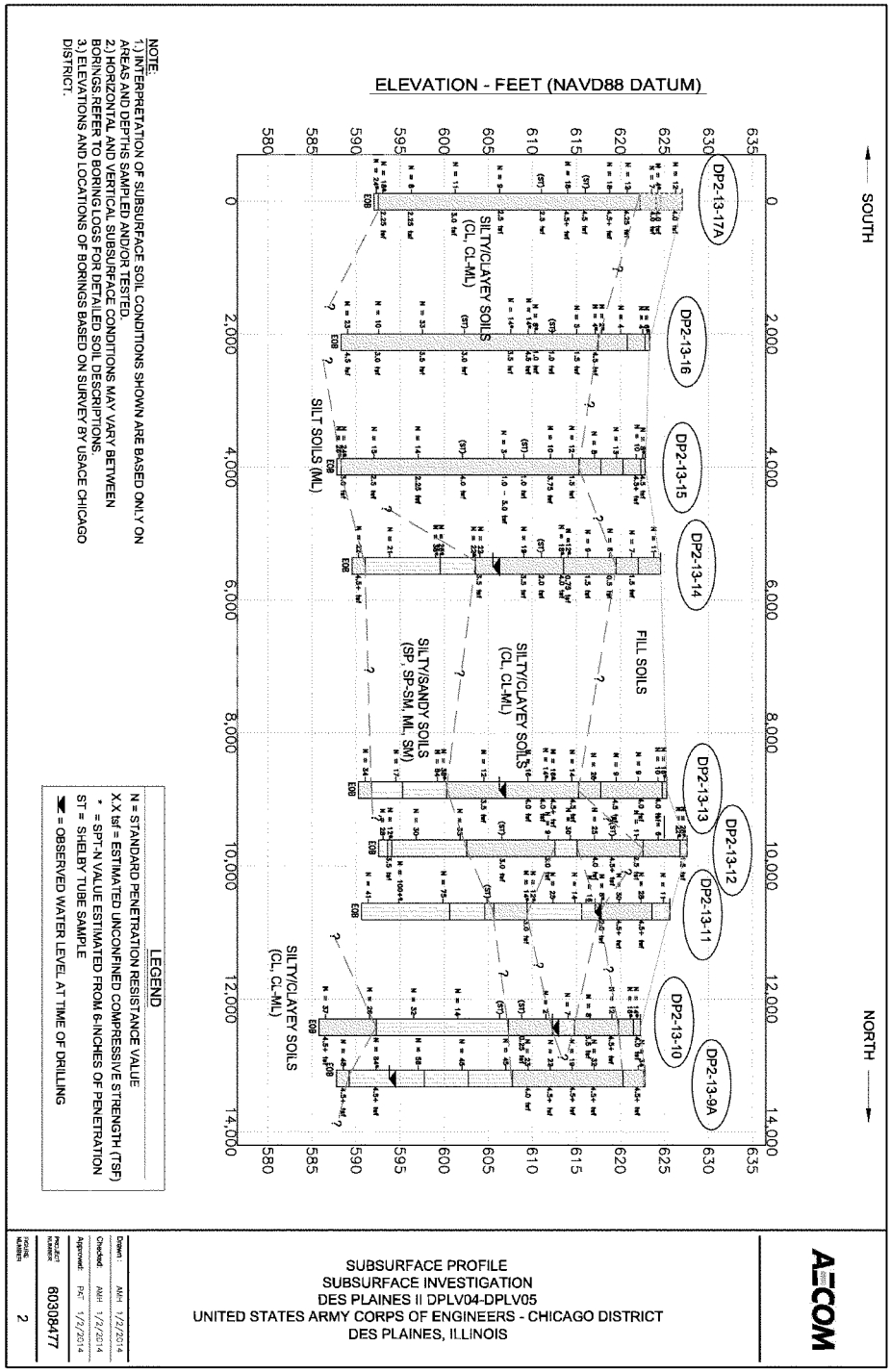
Boring	Coordinates*		Ground Surface Elevation (ft)**	Boring Depth	Drilling Firm	Date Drilled
	Northing (ft)	Easting (ft)				
DP2-13-9	1925804.5	1114026.6	622.73	4	STRATA	11/13/2013
DP2-13-9A	1925806.5	1114026.6	622.73	35	STRATA	11/13/2013
DP2-13-10	1925130.8	1114078.5	622.29	36.5	STRATA	11/12/2013
DP2-13-11	1923354.6	1114318.8	625.61	35	STRATA	11/12/2013
DP2-13-12	1922440.6	1114586.6	627.56	35	STRATA	11/12/2013
DP2-13-13	1921612.7	1114886.7	625.26	35	STRATA	11/14/2013
DP2-13-14	1918492.9	1116156.7	624.54	35	STRATA	11/11/2013
DP2-13-15	1917193.1	1116923.6	622.80	35	STRATA	11/13/2013
DP2-13-16	1915515.6	1117775.0	623.29	35	STRATA	11/11/2013
DP2-13-17	1913549.7	1118475.8	626.82	10	STRATA	11/11/2013
DP2-13-17A	1913517.5	1118471.6	627.03	35	STRATA	11/14/2013

*: Based on NAD 83, Illinois State Plane co-ordinates based on survey results provided by USACE.
**: Ground surface elevation based on NAVD88 datum based on survey results provided by USACE.

FIGURES

Figure 1: Boring Location Plan
Figure 2: Subsurface Profile


Legend
Boring
AECOM
BORING LOCATIONS
SUBSURFACE INVESTIGATION
DES PLAINES DPLV04-DPLV05 INVESTIGATION
DES PLAINES, ILLINOIS
60308477


C:\Users\humphreys\Desktop\Remote gINT\Des Plaines DPLV04-05\FIGURES\FIGURE 2 - PROFILE.dwg; 1/2/2014 11:59:19 AM; HUMPHREY, AARON;
SOUTH
NORTH
ELEVATION - FEET (NAVD88 DATUM)
DP2-13-17A
DP2-13-16
DP2-13-15
DP2-13-14
DP2-13-13
DP2-13-12
DP2-13-11
DP2-13-10
DP2-13-9A
SILTY/CLAYEY SOILS (CL, CL-ML)
SILT SOILS (ML)
SILTY/SANDY SOILS (SP, SP-SM, ML, SM)
FILL SOILS
SILTY/CLAYEY SOILS (CL, CL-ML)
SILTY/CLAYEY SOILS (CL, CL-ML)
NOTE:
1.) INTERPRETATION OF SUBSURFACE SOIL CONDITIONS SHOWN ARE BASED ONLY ON AREAS AND DEPTHS SAMPLED AND/OR TESTED.
2.) HORIZONTAL AND VERTICAL SUBSURFACE CONDITIONS MAY VARY BETWEEN BORINGS.REFER TO BORING LOGS FOR DETAILED SOIL DESCRIPTIONS.
3.) ELEVATIONS AND LOCATIONS OF BORINGS BASED ON SURVEY BY USACE CHICAGO DISTRICT.
LEGEND
N = STANDARD PENETRATION RESISTANCE VALUE
X.X tsf = ESTIMATED UNCONFINED COMPRESSIVE STRENGTH (TSF)
* = SPT-N VALUE ESTIMATED FROM 6-INCHES OF PENETRATION
ST = SHELBY TUBE SAMPLE
= OBSERVED WATER LEVEL AT TIME OF DRILLING
AECOM
SUBSURFACE PROFILE
SUBSURFACE INVESTIGATION
DES PLAINES II DPLV04-DPLV05
UNITED STATES ARMY CORPS OF ENGINEERS - CHICAGO DISTRICT
DES PLAINES, ILLINOIS
Drawn: AMH 1/2/2014
Checked: AMH 1/2/2014
Approved: PAT 1/2/2014
PROJECT NUMBER 60308477
FIGURE NUMBER 2

APPENDIX A

AECOM Standard Documents

AECOM

AECOM General Notes

Drilling and Sampling Symbols:

SS : Split Spoon - 1-3/8" I.D. 2" O.D. (Unless otherwise noted)	HS : Hollow Stem Auger
ST : Shelby Tube-2" O.D. (Unless otherwise noted)	WS : Wash Sample
PA : Power Auger	FT : Fish Tail
DB : Diamond Bit-NX, BX, AX	RB : Rock Bit
AS : Auger Sample	BS : Bulk Sample
JS : Jar Sample	PM : Pressuremeter Test
VS : Vane Shear	GS : Giddings Sampler
OS : Osterberg Sampler	

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

Water Level Measurement Symbols:

WL : Water Level	WCI : Wet Cave In
WS : While Sampling	DCI : Dry Cave In
WD : While Drilling	BCR : Before Casing Removal
AB : After Boring	ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

Gradation Description and Terminology:

Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; they are described as boulders, cobbles, gravel or sand. Fine grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component of Sample	Size Range	Description of Other Components Present in Sample	Percent Dry Weight
Boulders	Over 8 in. (200 mm)	Trace	1-9
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Little	10-19
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)	Some	20-34
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)	And	35-50
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

Consistency of Cohesive Soils:

Unconfined Compressive Strength, Qu, tsf	Consistency
<0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium (firm)
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
>8.00	Very Hard

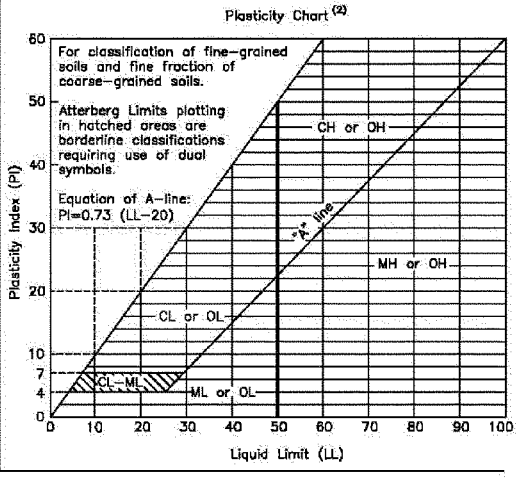
Relative Density of Granular Soils:

N-Blows per foot	Relative Density
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
>80	Extremely Dense

AECOM

AECOM Soil Classification System [1]

	Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria	
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravel (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded, gravel, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent ..... GW, GP, SW, SP. More than 12 percent ..... GM, GC, SM, SC. 5 to 12 percent ..... Borderline cases *requiring* dual symbols [3]	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
			GP	Poorly graded gravel, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravel, gravel-sand-silt mixtures	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are *borderline* cases requiring use of dual symbols
			GC	Clayey gravel, gravel-sand-clay mixtures	Atterberg limits above "A" line or PI greater than 7	
	Sand (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sand (Little or no fines)	SW	Well-graded sand, gravelly sand, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			SP	Poorly graded sand, gravelly sand, little or no fines		Not meeting all gradation requirements for SW
		Sand with fines (Appreciable amount of fines)	SM	Silty sand, sand-silt mixtures	Atterberg limits below "A" line or PI less than 4	Limits plotting in hatched zone with PI between 4 and 7 are *borderline* cases requiring use of dual symbols
			SC	Clayey sand, sand-clay mixtures	Atterberg limits above "A" line or PI greater than 7	
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve size)	Silt and clay (Liquid limit less than 50)		ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity	Plasticity Chart [2]	
			CL	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay		
			OL	Organic silt and organic silty clay of low plasticity		
	Silt and clay (Liquid limit greater than 50)		MH	Inorganic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silt		
			CH	Inorganic clay of high plasticity, fat clay		
			OH	Organic clay of medium to high plasticity, organic silt		
	Highly organic soils		PT	Peat and other highly organic soil		



1. See AECOM General Notes for component gradation terminology, consistency of cohesive soils and relative density of granular soils.
2. Reference: Unified Soil Classification Systems
3. Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

AECOM

AECOM Field and Laboratory Procedures

Subsurface Exploration Procedures

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer or a drop hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the borehole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the boreholes. They are turned and hydraulically advanced by a truck, trailer or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open boreholes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the boreholes. The open stem allows the sampling tool to be used without removing the augers from the borehole. Hollow stem augers thus provide support to the sides of the borehole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the boreholes. In this process, surface casing and/or drilling fluids are used to maintain open boreholes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (or triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

AECOM

AECOM Field and Laboratory Procedures

Field Sampling Procedures

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) - (ASTM Standard D-1586-99)

In the split-barrel sampling procedure, a 2-inch O.D. split barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - ASTM Standard D-1587-94

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are identified, sealed and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

AECOM

AECOM Laboratory Procedures

Water Content (Wc)
The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)
In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)
In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γd)
The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples
In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in accordance with the AECOM Soil Classification System which is described on a separate sheet. The soil descriptions on the boring logs are derived from this system as well as the component gradation terminology, consistency of cohesive soils and relative density of granular soils as described on a separate sheet entitled "AECOM General Notes". The estimated group symbols included in parentheses following the soil descriptions on the boring logs are in general conformance with the Unified Soil Classification System (USCS) which serves as the basis of the AECOM Soil Classification System.

AECOM

AECOM Standard Boring Log Procedures

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by experienced geotechnical engineers, and as such, differences between the field logs and the final logs may exist. The engineer preparing the report reviews the field logs, laboratory test data and classifications, and using judgment and experience in interpreting this data, may make further changes. It is common practice in the geotechnical engineering profession not to include field logs and laboratory data sheets in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then discarded unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

APPENDIX B

Final Boring Logs

Field Boring Logs

Hole No. DP2-13-09

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,925,804.5 E 1,114,026.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-09	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 2 / UNDISTURBED 0
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 0
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/13/2013 / COMPLETED 11/13/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +622.7
9. TOTAL DEPTH OF HOLE: 4.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
622.6			Topsoil (2").	73	S1 0.0 1.5	8, 19, 17 N = 26
	2		FILL: Sandy fine to coarse gravel, trace silt, trace limestone noted - gray - medium dense moist (FILL: GP)	0	S2 2.5 4.0	8, 12, 19 N = 31
618.7	4		End of boring at 4 ft. Borehole grouted.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with split spoon sampler to 4 feet and HSA to 2.5 feet. Boring abandoned and offset 2' North to DP2-13-9A due to obstruction at 2.5' with HSA. Groundwater not encountered

Hole No. DP2-13-09A

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,925,806.5 E 1,114,026.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-09A	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10 / UNDISTURBED 0
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 593.73
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/13/2013 / COMPLETED 11/13/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +622.7
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
622.6			Topsoil (2")			
			FILL: Sandy fine to coarse gravel, trace silt, trace limestone noted - gray - medium dense moist (FILL: GP) (Based on boring DP2-13-09)			
	2					
620.2			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown with seams of gray noted - hard (CL)	60	S1 2.5 4.0	8, 15, 19 N = 34 Qp = 4.5+ tsf w = 14.1%
	4					
				100	S2 5.0 6.5	5, 13, 19 N = 32 Qp = 4.5+ tsf w = 18.5%
	6					
				100	S3 7.5 9.0	10, 8, 11 N = 19 Qp = 4.5+ tsf w = 17.2%
	8					
	10			100	S4 10.0 11.5	6, 9, 13 N = 22 Qp = 4.5+ tsf
	12					
				100	S5 12.5 14.0	7, 9, 14 N = 23 Qp = 4.0 tsf w = 15.6%
	14					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 622.7 | **Hole No. DP2-13-09A**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc.; if significant) g
607.7			Silt, trace clay, trace fine sand - gray - dense - moist (ML)	100	S6 15.0 16.5	6, 20, 25 N = 45 w = 16.8%
	16					
	18					
602.7	20		Silt, some clay, trace fine sand - gray - dense - moist (ML)	100	S7 20.0 21.5	13, 22, 23 N = 45
	22					
	24					
597.7			Silt, trace to little fine to coarse sand, trace clay with occassional sand seams noted - gray - dense to extremely dense - moist to wet (ML)	100	S8 25.0 26.5	19, 29, 29 N = 58
	26					
	28					
	30			100	S9 30.0 31.0	19, 42/6" N = 84*
	32					

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines DPLV04 & DPLV05 | HOLE NO. DP2-13-09A

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 622.7 | **Hole No. DP2-13-09A**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
589.2						
	34		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	100	S10 33.5 35.0	16, 21, 27 N = 48 Qp = 4.5+ tsf w = 10.9%
587.7			End of boring at 35 ft. Borehole grouted.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with HSA to 33.5 feet W.L. @ 29' W.D. W.L. @ 25' A.B.

Hole No. DP2-13-10

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,925,130.8 E 1,114,078.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-10	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 2
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 612.29
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/12/2013 COMPLETED 11/12/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +622.3
9. TOTAL DEPTH OF HOLE: 36.5	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+622.3	0.0		FILL: Clayey topsoil - dark brown to black - hard (FILL: TOPSOIL)	100	S1 0.0 0.8	4, 7/6" N = 14* Qp = 4.0 tsf
621.5			FILL: Fine gravel, little sand, trace silt, limestone noted - gray - medium dense - moist (FILL: GP)	57	S1A 0.8 1.5	8/6" N = 16*
	2					
619.8			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, trace roots, trace limestone - brown - hard to very stiff (CL)	100	S2 2.5 4.0	4, 6, 6 N = 12 Qp = 4.5+ tsf w = 11.4%
	4					
				60	S3 5.0 6.5	3, 4, 4 N = 8 Qp = 3.5 tsf
	6					
614.8			Fine to coarse gravel, trace silt, trace fine to coarse sand, trace limestone, clay layer noted - gray - loose - moist to wet (GP)	33	S4 7.5 9.0	4, 2, 5 N = 7
	8					
612.3	10		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown with seams of gray noted - soft (CL)	6	S5 10.0 11.5	2, 1, 1 N = 2 w = 13.0% Too disturbed for Qp measurement
	12			100	S6 12.5 14.5	3" Shelby Tube Qp = 0.25 tsf w = 19.7%
	14					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 622.3 | **Hole No. DP2-13-10**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
607.3			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray (CL)	95	S7 15.0 17.0	3" Shelby Tube w = 20.8%
	16					
	18					
602.3	20		Silt, trace clay, trace fine sand - gray - medium dense to dense - wet (ML)	67	S8 20.0 21.5	6, 6, 8 N = 14 w = 18.5%
	22					
	24					
				100	S9 25.0 26.5	9, 15, 17 N = 32
	26					
	28					
592.3	30		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	9	S10 30.0 31.5	10, 11, 15 N = 26 Qp = 4.5+ tsf w = 11.0%
	32					

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DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 622.3

Hole No. DP2-13-10

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL) *(continued)*			
	34					
				100	S11 35.0 36.5	13, 14, 23 N = 37 Qp = 4.5+ tsf w = 12.7%
	36					SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content
585.8			End of boring at 36.5 ft. Borehole grouted.			Boring advanced with HSA to 10 feet. 4" HW casing installed to 10 feet. Borring advanced to 35 feet with rock bit. W.L. @ 10' W.S. W.L. @ 5' A.B.

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PROJECT: Des Plaines DPLV04 & DPLV05

HOLE NO. DP2-13-10

Hole No. DP2-13-11

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,923,354.6 E 1,114,318.8	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-11	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 / UNDISTURBED 1
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 616.11
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/12/2013 / COMPLETED 11/12/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +625.6
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+625.6	0.0		FILL: Silty Topsoil - black - medium dense - moist (FILL: TOPSOIL)	67	S1 0.0 1.5	2, 4, 7 N = 11
623.6	2		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown - hard to very stiff (FILL: CL)	100	S2 2.5 4.0	8, 12, 16 N = 28 Qp = 4.5+ tsf
	4			100	S3 5.0 6.5	8, 13, 17 N = 30 Qp = 4.5+ tsf w = 16.1%
	6			100	S4 7.5 8.0	4/6" N = 8* Qp = 2.0 tsf
617.6	8		Fine to coarse sand, trace silt, trace fine gravel with layers of gray clay noted - brown - medium dense - moist to wet (SP-SM)	100	S4A 8.0 9.0	7, 9 N = 16
615.6	10		Fine to coarse sand and fine to coarse gravel, little silt, trace clay - gray - medium dense - wet (SM)	73	S5 10.0 11.5	8, 7, 7 N = 14
	12			87	S6 12.5 14.0	9, 13, 12 N = 25 w = 7.9%
	14					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 625.6 | **Hole No. DP2-13-11**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fine to coarse sand and fine to coarse gravel, little silt, trace clay - gray - medium dense - wet (SM) *(continued)*	100	S7 15.0 16.0	3, 6/6" N = 12"
	16			60	S7A 16.0 16.5	7/6" N = 14* Qp = 3.0 tsf w = 12.7%
609.4			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with layer of gray silt and sand noted - gray - very stiff (CL)			
	18					
605.6	20		Silty fine to coarse gravel, little fine to coarse sand (possible cave-in material) - gray - wet (GM)	100	S8 20.0 21.0	3" Shelby Tube w =14.2%
604.6			Silt, trace fine sand - gray - wet (ML)	100	S8A 21.0 21.5	w = 16.7%
	22					
	24					
600.6			Silt, trace to little fine sand, trace clay - gray - dense to extremely dense - wet (ML)	67	S9 25.0 26.5	18, 32, 43 N = 75 w = 14.5%
	26					
	28					
	30			100	S10 30.0 31.5	20, 42, 50/4" N = 100+*
	32					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 625.6

Hole No. DP2-13-11

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silt, trace to little fine sand, trace clay - gray - dense to extremely dense - wet (ML) *(continued)*			
				100	S11	18, 16, 25
	34				33.5	N = 41
					35.0	w = 15.9%
						SPT Sampling with 140 lb. Auto Hammer 30" of Fall
						2" O.D. Split Spoon Sampler
590.6						*: SPT-N value based on 6" or less of penetration
			End of boring at 35.0 ft. Borehole grouted.			w = moisture content
						Boring advanced with HSA to 33.5 feet.
						W.L. @ 9.5' W.D.
						W.L. @ 11.0' A.B.

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PROJECT: Des Plaines DPLV04 & DPLV05

HOLE NO. DP2-13-11

Hole No. DP2-13-12

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,922,440.6 E 1,114,586.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-12	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 / UNDISTURBED 2
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER():
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/12/2013 / COMPLETED 11/12/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +627.6
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+627.6	0.0		FILL: Clayey Topsoil - black - medium dense - moist (FILL: TOPSOIL)	100	S1 0.0 0.8	4, 14/6" N = 28" Qp = 1.5 tsf
626.8			FILL: Fine to coarse sand, trace clay, trace fine gravel with limestone pieces noted - gray - medium dense to loose - gray (FILL: SP-SM)	100	S1A 0.8 1.5	11/6" N = 22"
	2			100	S2 2.5 4.0	4, 4, 2 N = 6 w = 5.3%
	4					
622.6			Silty clay, trace fine to coarse sand, trace fine to coarse gravel, trace shale - brown to gray with seams of gray noted - very stiff to hard (CL)	100	S3 5.0 6.5	4, 5, 6 N = 11 Qp = 2.5 tsf w =17.1%
	6					
	8			100	S4 7.5 9.5	3" Shelby Tube Qp= 4.5+ tsf w =18.4%
	10			75	S5 9.5 11.5	6, 11, 14, 16 N = 25 Qp = 4.0 tsf w = 18.5%
	12					
615.1			Silt, trace clay, trace fine sand - gray - dense - moist (ML)	100	S6 12.5 14.0	12, 14, 16 N = 30 w = 13.2%
	14					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 627.6 | **Hole No. DP2-13-12**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
612.6			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff (CL)	100	S7 15.0 16.5	3, 4, 5 N = 9 Qp = 3.0 tsf w = 14.7%
	16					
	18					
	20			100	S8 20.0 22.0	3" Shelby Tube Qp = 3.0 tsf w = 17.0%
	22					
	24					
602.6			Silt, trace clay, trace fine sand - gray - dense - moist (ML)	100	S9 25.0 26.5	11, 16, 17 N = 33 w = 16.0%
	26					
	28					
	30			100	S10 30.0 31.5	9, 14, 16 N = 30
	32					

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DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 627.6

Hole No. DP2-13-12

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silt, trace clay, trace fine sand - gray - dense - moist (ML) *(continued)*			
594.1			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - very stiff (CL)	100	S11 33.5 34.0	6/6" N = 12* Qp = 3.5 tsf w = 8.9%
593.6	34		Silty fine to coarse sand, trace fine gravel with layers of silt noted - gray - medium dense - moist (SM)	100	S11A 34.0 35.0	12, 16 N = 28
592.6			End of boring at 35 ft. Borehole grouted.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with HSA to 33.5 feet. Groundwater not observed

Hole No. DP2-13-13

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,921,612.7 E 1,114,886.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-13	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 14 / UNDISTURBED 0
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 606.26
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/14/2013 / COMPLETED 11/14/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +625.3
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+625.3	0.0		FILL: Fine to coarse sand and fine to coarse gravel with seams of silt - brown - medium dense - moist (FILL: SP-GP)	100	S1 0.0 0.5	8/6" N = 16*
624.8			FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown - hard (FILL: CL)	100	S1A 0.5 1.5	7, 3 N = 10 Qp = 4.0 tsf
	2					
				100	S2 2.5 4.0	3, 4, 5 N = 9 Qp = 4.0 tsf w = 19.0%
	4					
				100	S3 5.0 6.5	2, 3, 6 N = 9 Qp = 4.5 tsf w = 15.0%
	6					
617.8			FILL: Silt, trace clay, trace fine to coarse sand, trace fine gravel with seams of gray and layer of sandier silt noted - brown - medium dense - moist (FILL: ML)	100	S4 7.5 9.0	7, 10, 10 N = 20 w = 15.1%
	8					
615.3	10		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown - hard to very stiff (CL)	100	S5 10.0 11.5	3, 6, 8 N = 14 Qp = 4.5 tsf w = 13.1%
	12			100	S6 12.5 13.5	6, 8/6" N = 16* Qp = 4.5+ tsf w = 9.0%
				100	S6A 13.5 14.0	7/6" N = 14* Qp = 4.0 tsf w = 19.9%
	14					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 625.3

Hole No. DP2-13-13

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown - hard to very stiff (CL) *(continued)*	100	S7 15.0 16.5	5, 7, 9 N = 16 Qp = 4.0 tsf w = 14.4%
	16					
	18					
	20			100	S8 20.0 21.5	3, 5, 7 N = 12 Qp = 3.5 tsf w = 18.7%
	22					
	24					
600.3			Silt, trace clay, trace fine sand - gray - dense to extremely dense - moist to wet (ML)	100	S9 25.0 25.5	19/6" N = 38* w = 17.9%
	26					
	28					
595.3	30		Fine to coarse sand, some silt, trace clay, trace fine gravel - gray - medium dense - wet (SM)	100	S10 30.0 31.5	10, 7, 10 N = 17
	32					

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PROJECT: Des Plaines DPLV04 & DPLV05

HOLE NO. DP2-13-13

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 625.3 | **Hole No. DP2-13-13**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Fine to coarse sand, some silt, trace clay, trace fine gravel - gray - medium dense - wet (SM) *(continued)*			
591.8	34		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray (CL)	100	S11 33.5 35.0	9, 16, 18 N = 34 w = 10.9% Too disturbed for Qp measurement
590.3			End of boring at 35 ft. Borehole grouted.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with HSA to 33.5 feet. W.L. @ 19' W.D. W.L. @ 26' A.B.

Hole No. DP2-13-14

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,918,492.9 E 1,116,156.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-14	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 13 / UNDISTURBED 1
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER():
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/11/2013 / COMPLETED 11/11/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +624.5
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+624.5	0.0		FILL: Silty clay and gravel - brown (FILL: GC)	100	S1 0.0 1.5	3, 4, 7 N = 11 Too disturbed for Qp measurement
	2					
622.0			FILL: Clayey topsoil - black -stiff (FILL: TOPSOIL)	73	S2 2.5 4.0	2, 3, 4 N = 7 Qp = 1.5 tsf
	4					
619.5			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occassional seams of gray noted - gray to brown - stiff to medium (CL)	80	S3 5.0 6.5	2, 3, 3 N = 6 Qp = 0.5 tsf w = 21.6%
	6					
				100	S4 7.5 9.0	2, 4, 5 N = 9 Qp = 1.5 tsf w = 21.0%
	8					
	10			100	S5 10.0 11.0	3, 6/6" N =12* Qp = 0.75 tsf w = 22.7%
613.5			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with seams of gray noted - brown - hard to very stiff (CL)	100	S5A 11.0 11.5	9/6" N = 18* Qp = 4.0 tsf w = 18.1%
	12			100	S6 12.5 14.5	3" Shelby Tube Qp = 2.0 tsf w = 20.7%
	14			100	S7 14.5	5, 8, 11, 15 N = 19

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 624.5 | **Hole No. DP2-13-14**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with seams of gray noted - brown - hard to very stiff (CL) *(continued)*		16.5	Qp = 3.5 tsf w = 21.8%
	16					
	18					
	20			100	S8 20.0 21.0	5, 11/6" N = 22 Qp = 3.5 tsf w = 18.1%
603.5			Silty fine sand - gray - medium dense - moist (SM)	100	S8A 21.0 21.5	11/6" N = 22*
	22					
	24					
599.5			Silt, trace clay, trace fine sand - gray - medium dense to dense - moist (ML)	100	S9 25.0 26.0	3, 13/6" N = 26* w = 18.8%
	26					
	28					
	30			100	S10 30.0 31.5	5, 9, 12 N = 21 w = 17.3%
	32					

ENG FORM 1836-A JUN 67 | PROJECT Des Plaines DPLV04 & DPLV05 | HOLE NO. DP2-13-14

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 624.5

Hole No. DP2-13-14

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
			Silt, trace clay, trace fine sand - gray - medium dense to dense - moist (ML) *(continued)*			
591.0	34		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - gray - hard (CL)	100	S11 33.5 35.0	4, 11, 11 N = 22 Qp = 4.5+ tsf w = 9.3%
589.5			End of boring at 35 ft. Borehole grouted.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with HSA to 33.5 feet. W.L. @ 19' W.D. W.L. @ 26' A.B.

ENG FORM 1836-A JUN 67

PROJECT: Des Plaines DPLV04 & DPLV05

HOLE NO. DP2-13-14

Hole No. DP2-13-15

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,917,193.1 E 1,116,923.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-15	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 / UNDISTURBED 2
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 0
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/13/2013 / COMPLETED 11/13/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +622.8
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) (g)
+622.8	0.0		FILL: Clayey topsoil - black - hard (FILL: TOPSOIL)	80	S1 0.0 0.5	4/6" N = 8* Qp = 4.5 tsf
622.3			FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace shale, limestone noted - gray - hard (FILL: CL)	40	S1A 0.5 1.5	5, 5 N = 10 Qp = 4.5+ tsf
	2					
620.3			FILL: Silty fine to coarse sand, trace clay, trace fine to coarse gravel with concrete, limestone, slag and cinders noted - very dark gray - medium dense - moist (FILL: SM)	100	S2 2.5 4.0	4, 6, 7 N = 13
	4					
617.8			FILL: Fine to coarse sand, little fine gravel, little silt, trace clay with slag and cinders noted - dark brownish gray to black - loose - moist (FILL: SM)	100	S3 5.0 6.5	4, 4, 4 N = 8 w = 9.8%
	6					
615.3			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - dark brownish gray to brown - stiff to hard (CL)	60	S4 7.5 9.0	4, 5, 7 N = 12 Qp = 1.5 tsf w = 26.9%
	8					
	10			100	S5 10.0 11.5	3, 4, 6 N = 10 Qp = 3.75 tsf w = 23.9%
	12			100	S6 12.5 15.0	3" Shelby Tube Qp = 1.0 tsf w = 29.0%
	14					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 622.8

Hole No. DP2-13-15

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - dark brownish gray to brown - stiff to hard (CL) *(continued)*	100	S7 15.0 17.0	WOH, WOH, 3, 5 N = 3 Qp = 1.0 - 3.0 tsf w = 23.7%
	16					
	18					
	20			100	S8 20.0 21.5	3" Shelby Tube Qp = 4.0 tsf w = 19.0%
	22					
	24					
				80	S9 25.0 26.5	3, 6, 8 N = 14 Qp = 2.25 tsf w = 19.8%
	26					
	28					
	30			100	S10 30.0 31.5	5, 6, 9 N = 15 Qp = 2.5 tsf
	32					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 622.8

Hole No. DP2-13-15

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - dark brownish gray to brown - stiff to hard (CL) *(continued)*			
				100	S11 33.5 34.5	10, 12/6" N = 24* Qp = 3.0 tsf w = 16.0%
	34					
588.3						
			Silt, trace clay, trace fine sand with seams of sand noted - gray - medium dense - moist (ML)	100	S11A 34.5 35.0	14/6" N = 28* w = 10.5%
587.8			End of boring at 35 ft. Borehole grouted.			
						SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with HSA to 33.5 feet. Groundwater not observed.

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PROJECT: Des Plaines DPLV04 & DPLV05

HOLE NO. DP2-13-15

Hole No. DP2-13-16

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,915,515.6 E 1,117,775.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-16	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 / UNDISTURBED 2
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 0
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 11/11/2013 / COMPLETED 11/11/2013
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE: +623.3
9. TOTAL DEPTH OF HOLE: 35.0	18. TOTAL CORE RECOVERY FOR BORING: %
	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+623.3	0.0		FILL: Silty topsoil - black - loose - moist (FILL: TOPSOIL)	40	S1 0.0 0.5	3/6" N = 6*
622.8			FILL: Silty clay with sand and gravel - dark brown (FILL: CL)	80	S1A 0.5 1.5	2, 2 N = 4 Too disturbed for Qp measurement
	2					
620.8			FILL: Silty fine to coarse sand, trace fine gravel with layers of clay noted - dark brown - loose to very loose - moist (FILL: SM)	33	S2 2.5 4.0	2, 2, 2 N = 4 w = 13.3%
	4					
				100	S3 5.0 5.8	1, 1/6" N = 2*
617.5	6		Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown to gray - hard to stiff (CL)	100	S3A 5.8 6.5	2/6" N = 4* Qp = 4.5 tsf w = 20.8%
				100	S4 7.5 9.0	2, 2, 3 N = 5 Qp = 1.5 tsf w = 12.9%
	8					
	10			100	S5 10.0 12.0	3" Shelby Tube Qp = 1.0 tsf w = 14.1%
	12					
				100	S6 12.5 13.5	2, 4/6" N = 8* Qp = 1.0 tsf w = 13.9%
				100	S6A 13.5 14.0	7/6" N = 14* Qp = 4.5 tsf w = 17.5%
	14					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 623.3 | **Hole No. DP2-13-16**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown to gray - hard to stiff (CL) *(continued)*	100	S7 15.0 16.5	4, 6, 8 N = 14* Qp = 3.5 tsf
	16					
	18					
	20			100	S8 20.0 22.0	3" Shelby Tube Qp = 3.0 tsf w = 19.9%
	22					
	24					
				100	S9 25.0 26.5	4, 7, 16 N = 33 Qp = 3.5 tsf w = 19.1%
	26					
	28					
	30			100	S10 30.0 31.5	3, 4, 6 N = 10 Qp = 3.0 tsf w = 22.3%
	32					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 623.3

Hole No. DP2-13-16

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale - brown to gray - hard to stiff (CL) *(continued)*			
				100	S11	4, 7, 16
	34				33.5	N = 23
					35.0	Qp = 4.5 tsf
						SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content
588.3			End of boring at 35 ft. Borehole grouted.			Boring advanced with HSA to 33.5 feet.
						Groundwatar not observed.

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PROJECT: Des Plaines DPLV04 & DPLV05

HOLE NO. DP2-13-16

Hole No. DP2-13-17

DRILLING LOG	DIVISION: Great Lakes and Ohio River	INSTALLATION: Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines DPLV04 & DPLV05	10. SIZE AND TYPE OF BIT: 3.25" HSA
2. LOCATION (Coordinates or Station): Des Plaines, IL N 1,913,549.7 E 1,118,475.8	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NAD 83 (horiz) NAVD88 (vert)
3. DRILLING AGENCY: STRATA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 45 Truck
4. HOLE NO. (As shown on drawing title and file number): DP2-13-17	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 4 / UNDISTURBED 0
5. NAME OF DRILLER: Scott Komen	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER()
	16. DATE HOLE: STARTED 11/11/2013 / COMPLETED 11/11/2013
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE: +626.8
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING: %
9. TOTAL DEPTH OF HOLE: 10.0	19. GEOLOGIST: J. Toonen

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+626.8	0.0		FILL: Clayey topsoil - black - very stiff - moist (FILL: TOPSOIL)	53	S1 0.0 1.5	2, 10, 15 N = 25 Qp = 2.5 tsf
	2					
624.3			FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occasional layers of black topsoil and seams ot silt and seams of brown and black noted - gray - hard (FILL: CL)	60	S2 2.5 4.0	3, 8, 9 N = 17 Qp = 4.5+ tsf w = 13.0%
	4					
				66	S3 5.0 6.5	5, 6, 8 N = 14 Qp = 4.5+ tsf
	6					
				93	S4 7.5 9.0	6, 9, 10 N = 19 Qp = 4.5+ tsf w = 14.5%
	8					SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content
617.8			End of boring at 9 ft. Borehole grouted.			Boring advanced with HSA to 10 feet. Drilled through 3" +/- of concrete into 3' void. Abandoned boring and patched with concrete. Groundwater not encountered
	10					

Hole No. DP2-13-17A

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF
	Great Lakes and Ohio River	Chicago District	1 / 3 SHEETS

1. PROJECT	Des Plaines DPLV04 & DPLV05
2. LOCATION (Coordinates or Station)	Des Plaines, IL N 1,913,517.5 E 1,118,471.6
3. DRILLING AGENCY	STRATA
4. HOLE NO. (As shown on drawing title and file number)	DP2-13-17A
5. NAME OF DRILLER	Scott Komen
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	35.0
10. SIZE AND TYPE OF BIT	3.25" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NAD 83 (horiz) NAVD88 (vert)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 45 Truck
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER()	
16. DATE HOLE	STARTED 11/14/2013 / COMPLETED 11/14/2013
17. ELEVATION TOP OF HOLE	+627.0
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+627.0	0.0		FILL: Silty clay with some topsoil - dark brown - hard (FILL: CL)	100	S1 0.0 1.5	3, 6, 6 N = 12 Qp = 4.0 tsf
	2					
624.5			FILL: Silty clay (possible organic topsoil), trace fine to medium sand with layer of gray clay noted - black - hard (FILL: CL)	100	S2 2.5 3.0	2/6" N = 4* Qp = 4.0 tsf
624.0			Possible FILL: Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occassional seams of gray and gray - gray - hard (Possible FILL: CL)	50	S2A 3.0 4.0	w = 25.5% 3, 4 N = 7 Qp = 4.0 tsf w = 25.2%
	4					
622.0			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occassional seams of gray and gray silt noted - gray - hard to very stiff (CL)	100	S3 5.0 6.5	4, 5, 7 N = 12 Qp = 4.25 tsf w = 16.4%
	6					
				100	S4 7.5 9.0	5, 7, 11 N = 18 Qp = 4.5+ tsf w = 15.7%
	8					
	10			100	S5 10.0 12.0	3" Shelby Tube Qp = 4.5 tsf w = 11.5%
	12			66	S6 12.0 14.0	5, 7, 10, 11 N = 18 Qp = 4.5+ tsf w = 17.7%
	14					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 627.0 | **Hole No. DP2-13-17A**

PROJECT: Des Plaines DPLV04 & DPLV05 | INSTALLATION: Chicago District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occassional seams of gray and gray silt noted - gray - hard to very stiff (CL) *(continued)*	100	S7 15.0 17.0	3" Shelby Tube Qp = 2.5 tsf w = 20.5%
	16					
	18					
	20			100	S8 20.0 21.5	2, 4, 5 N = 9 Qp = 2.5 tsf w = 20.3%
	22					
	24					
				100	S9 25.0 26.5	3, 5, 6 N = 11 Qp = 3.0 tsf w = 18.7%
	26					
	28					
	30			100	S10 30.0 31.5	3, 4, 4 N = 8 Qp = 2.25 tsf
	32					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 627.0

Hole No. DP2-13-17A

PROJECT: Des Plaines DPLV04 & DPLV05

INSTALLATION: Chicago District

SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse sand, trace fine gravel, trace shale with occassional seams of gray and gray silt noted - gray - hard to very stiff (CL) *(continued)*			
				100	S11 33.5 34.5	5, 9/6" N = 18* Qp = 2.25 tsf w = 21.7%
	34					
592.5			Silt, trace clay, trace fine sand - gray - medium dense - moist (ML)	100	S12 34.5 35.0	12/6" N = 24* w = 18.8%
592.0			End of boring at 35 ft. Borehole grouted.			SPT Sampling with 140 lb. Auto Hammer 30" of Fall 2" O.D. Split Spoon Sampler *: SPT-N value based on 6" or less of penetration w = moisture content Boring advanced with HSA to 33.5 feet. Groundwater not observed.

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JAY Boring Started 11-13-13

Driller SCOTT Boring Completed 11-18-13

Helper _____ Station _____

RIG/MFT/Model CME 45 Offset _____ Casing Used _____ Size _____ Sheet 1 of 1

Job No. 60308477 Boring No. DB2-13-9 Client USACE Weather _____

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☐ Automatic — Sample Description
1	0	1.5	SS	8	11	7		1.1		GP	0.2	2" TOPSOIL / 0.8' CRUSHED STONE FILL
	0	2.5	DB									
2	2.5	4.0	SS	8	12	19		0.1				ROCK TIP
	0	2.5	HSA									EOD HIT OBSTRUCTION OFFSET 2'N
3	5											

Water Level Observations

WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Peizometer PVC or SS
Diameter _____ In.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRS Boring Started 11-13-13

Driller Geoff Boring Completed 11-13-13

Helper _____ Station _____

RIG/MFT/Model CME 45 Offset 2' North of DP2-13-9 Casing Used _____ Size _____ Sheet 1 of 3

Job No. 60308477 Boring No. DP2-13-SA Client USACE Weather Sunny 20's

140 lb. Hammer Type: Located 2' North of DP2-13-9
☐ Safety
☒ Automatic

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
	0	2.5	HSA									
1	2.5	4.0	SS	8	15	19		0.9	4.5+	CL		Light Brown Silty Clay trc. Sand
	2.5	5.0	HSA									
2	5	6.5	SS	5	13	19		1.5	4.5+			Same
	5	7.5	HSA									
3	7.5	9.0	SS	10	8	11		1.5	4.5+			Same
	7.5	10	HSA									
4	10	11.5	SS	6	9	13		1.1	4.5+			Same
	10	12.5	PA									Pulled HSA due to slow advance. Switch to Solid Stem
5	12.5	14.0	SS	7	9	14		1.5	4.0	CL	12.5	Gray Brown Silty Clay
	12.5	15	PA									
6	15	16.5	SS	6	20	25		1.5	–	ML	15	Gray Silt to Sand
	15	20	PA									
7	20	21.5	SS	13	22	23		1.5				Same
	20	25	PA									
8	25	26.5	SS	19	24	24		1.5				Same
	25	30	PA									Water @ 29'
9	30	31	SS	19	42/4			1.0				Same
	30	33.5	PA									

Water Level Observations
WL: 29 WS or WD
WL: _____ BCR _____ ACR
WL: 25 (AB) _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____

Pelzometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-13-13

Driller SCOTT Boring Completed 11-13-13

Helper _____ Station _____

RIG/MFT/Model CME 45 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60608477 Boring No. DP2-139A Client USACE Weather _____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
1A	33.5	35.5	SS	16	21	27		1.5	4.5+	CL	33.5	GRAY BROWN SILTY CLAY

140 lb. Hammer Type:
☐ Safety
☐ Automatic

CAVE IN TO 23.5'

Water Level Observations
WL: 23 WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____

Peizometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

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AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-12-13

Driller SCOTT Boring Completed 11-12-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used 10' Size 4" (HW) Sheet 1 of 2

Job No. 60306477 Boring No. DP2-13-10 Client USACE Weather SUNNY 20's

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Tsf in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☒ Automatic — Sample Description
1	0	0.8	SS	4	7			0.8	4.0	CL		GRAVEL TOPSOIL DARK BROWN TO BLACK FILL
1A	0.8	1.5	SS			8		0.4		GP	0.8	GRAY CRUSHED GRAVEL FILL
	0	2.5	PA									
2	2.5	4.0	SS	4	6	6		1.5	4.5	CL	2.5	BROWN SILTY CLAY TRACE GRAVEL
	2.5	5.0	PA									
3	5.0	6.5	SS	3	4	4		0.9	3.5			SAME
	5.0	7.5	PA									
4	7.5	9.0	SS	4	2	5		0.5		GP	7.5	LT. BROWN F-C GRAVEL
	7.5	10.0	PA									
5	10	11.5	SS	2	1	1		0.1		CL	10	GRAY BROWN SILTY CLAY
	0	10	HW									SET CASING
	10	12.5	RB									DRILL W/MUD
6	12.5	14.5	3" ST					2	0.25	CL	12.5	GRAY SILTY CLAY
	12.5	15	RB									
7	15	17	3" ST					1.9	3.0			SAME
	15	20	RB									
8	20	21.5	SS	4	4	8		1.0		ML	20	GRAY SILT TRACE SAND
	20	25	RB									
9	25	26.5	SS	9	15	17		1.5				SAME

Water Level Observations
WL: 10 (WS) or WD
WL: _____ BCR _____ ACR
WL: 5' (AB) HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Peizometer PVC or SS
Diameter _____ in.
Screen Depth _____ FT. to _____ FT.
Riser Pipe _____ FT. to _____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-12-13

Driller Scott Boring Completed 11-12-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60308727 Boring No. DP2-13-12 Client USACE Weather _____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☒ Automatic — Sample Description
	25	30	RB							GP	29	F.G. GRAVEL
10	30	31.5	SS	10	11	15		14	4.5+	ML CL	30	GRAY BROWN SILTY CLAY
	30	35	RB									
11	35	36.5	SS	12	14	23		15	4.5+			SAME

Water Level Observations

WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____

Peizometer PVC or SS
Diameter _____ In.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-12-13

Driller SCOTT Boring Completed 11-12-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 1 of 2

Job No. 60308477 Boring No. DP2-B-11 Client USACE Weather SUNNY 20's

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☒ Automatic — Sample Description
1	0	1.5	SS	2	4	7		1.0				BLACK SILTY TOPSOIL FILL
	0	2.5	PA								2.0	
2	2.5	4.0	SS	8	12	16		1.5	4.5T	CL		BROWN SILT CLAY FILL
	2.5	5.0	PA									
3	5.0	6.5	SS	8	13	17		1.5	4.5T	CL		SAME TR SAND TR GRAVEL FILL
	5	7.5	PA									
4	7.5	8.0	SS	4				0.5	2.0			SAME
4A	8.0	9.0	SS		7	9		1.0		SP	8.0	BR F-C SAND TR SILT
	8.0	10	PA									WATER @ 9.5'
5	10	11.5	SS	8	7	7		1.1		SP GP		BR F-C SAND SOME GRAVEL TR SILT
	10	12.5	PA									
6	12.5	14.0	SS	9	13	12		1.3				SAME
	12.5	15	PA									
7	15	16	SS	3	6			1.2				SAME
7A	16	16.5	SS			7		0.3	3.0	CL	16.2	GRAY DK SI CLAY TR SAND
	15	20	PA						3.0			
8	20	21.5	3" ST					1.0	4.0			SAME
	20	25	PA									
9	25	26.5	SS	18	32	43		1.0	—	M-L	25	GRAY SILT TR SAND

Water Level Observations

WL: 9.5 WS or WD

WL: _____ BCR _____ ACR

WL: 11.0 AB _____ HR, AB

WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Peizometer: PVC or SS
Diameter _____
Screen Depth _____ FT. to _____ FT.
Riser Pipe _____ FT. to _____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-12-13

Driller SCOTT Boring Completed 11-12-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60308477 Boring No. DP2-13-11 Client USACE Weather _____

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☐ Automatic — Sample Description
	25	30	PA									
10	30	31.5	SS	20	42	72		1.5				SAME
	30	33.5	PA									
11	33.5	35.0	SS	18	16	25		1.5				SAME

Water Level Observations

WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Pelzometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRJ Boring Started 11-12-13

Driller SCOTT Boring Completed 11-12-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 1 of 2

Job No. 60306477 Boring No. DP2-B-12 Client USACE Weather SUNNY 20'S

140 lb. Hammer Type: ☐ Safety ☒ Automatic — NO WATER IN BORE HOLE DURING OR AFTER DRILLING

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
1	0	0.8	SS	4	14			0.8	1.5	CL		BLACK CLAYEY TOPSOIL FILL
1A	0.8	1.5	SS			11		0.7		CL	0.8	LT GRAY SILTY SAND AND GRAVEL FILL
	0	2.5	PA									
2	2.5	4.0	SS	4	4	2		1.5				SAME FILL
	2.5	5.0	PA									
3	5.0	7.5	SS	4	5	6		1.5	3.5	CL	5.0	BROWN SILTY CLAY
	5.0	7.5	PA									
4	7.5	9.5	SS					2.0	4.5			SAME
5	9.5	11.5	SS	6	11	14	16	1.5	4.0			SAME
	7.5	12.5	PA									
6	12.5	14.0	SS	12	14	16		1.5	—	ML	12.5	GRAY SILT TR F SAND
	12.5	15	PA									
7	15	16.5	SS	3	4	5		1.5	3.0	CL	15	GRAY BROWN SILTY CLAY TRACE F. GRAVEL
	15	20	PA									
8	20	22	3" ST					2.0	3.0	CL		SAME
	20	25	PA									
9	25	26.5	SS	11	16	17		1.5	—	ML	25	GRAY SILT TR CLAY TR F. SAND
	25	30	PA									
10	30	31.5	SS	9	14	16		1.5	-			SAME

Water Level Observations

WL: DRY WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Pelzometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRS Boring Started 11-12-13

Driller Scott Boring Completed 11-12-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60308477 Boring No. DP2-13-12 Client USACE Weather _____

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	OP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☑ Automatic — Sample Description
	30	33.5	PA									
11	33.5	34.0	SS	6				0.5	3.5	CL	33	GRAY BA SI CLAY, SOME SAND
11A	34	35	SS		12	16		1.0		SP	34	GRAY BROWN F-C SAND TR SILT

Water Level Observations
WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Pelzometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

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AECOM

13A 35 South of 13

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-14-13

Driller SU Boring Completed 11-14-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used NONE Size _____ Sheet 1 of 2

Job No. 60304477 Boring No. DB2-13-13 Client USACE Weather SUNNY 30's

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
1	0	0.5	SS	6				0.5		SO OR		BROWN SAND AND GRAVEL SOME SILT FILL
1A	0.5	1.5	SS		7	3		1.0	4.0	CL	0.5	DARK BROWN SILTY CLAY FILL
	0	2.5	PA									
2	2.5	4.0	SS	3	4	5		1.5	4.0	CL	2.5	BROWN SILTY CLAY FILL
	2.5	5.0	PA									
3	5.0	6.5	SS	2	3	6		1.5	4.5	CL		BROWN SILTY CLAY TR. SA TR GRAVEL
	5	7.5	PA									
4	7.5	9	SS	7	10	16		1.5	4.0			BROWN SILTY CLAY WITH SOME SAND FILL
	7.5	10	PA									
5	10	11.5	SS	3	6	8		1.5	4.5	SL	10.0	BROWN SANDY CLAY TR GRAVEL
	10	12.5	PA									
6	12.5	13.5	SS	6	8			1.0	4.5+			SAME
6A	13.5	14	SS			7		0.5	4.0		13.5	BROWN SILTY CLAY TO SA TO GRAVEL
	13.5	15	PA									
7	15	16.5	SS	5	7	9		1.5	4.0			BROWN SILTY CLAY WITH SOME SAND SEAMS
	15	20	PA									WATER @ 19'
8	20	21.5	SS	3	5	7			3.5		20	GRAY BROWN SILTY CLAY
	20	25	PA									
9	25	26.5	SS	19	31	54		0.5		HL	25	GRAY SILT

140 lb. Hammer Type:
- ☐ Safety
- ☐ Automatic

Water Level Observations
WL: 19' WS or WD
WL: _____ BCR _____ ACR
WL: 26' AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Pelzometer PVC or SS
Diameter _____ in.
Screen Depth _____ FT. to _____ FT.
Riser Pipe _____ FT. to _____ FT.

BORELOG.XLS

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AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-14-13

Driller _____ Boring Completed _____

Helper _____ Station _____

RIG/MFT/Model CME75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60308477 Boring No. DP2-13-13 Client USACE Weather _____

140 lb. Hammer Type:
☐ Safety
☒ Automatic

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
9A	25.5	25	SS		32	67		1.0			25.5	GRAY SAND
	25	30	PA								27.0	
10	30	31.5	SS	10	7	16		1.5		SP		GRAY BROWN F-C SAND SOME SILT
	30	33.5	PA									
11	33.5		SS	9	16	18		1.5		CC	33.5	GRAY BROWN SILTY CLAY TR SA

Water Level Observations
WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: 26' AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Peizometer PVC or SS
Diameter _____ In.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-11-13

Driller SU Boring Completed 11-11-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 1 of 2

Job No. 60284477 Boring No. DB2-13-14 Client DSACR Weather RAIN 40's

Water Level Observations: WL: DRY WS or WD; WL: _____ BCR _____ ACR; WL: _____ AB _____ HR, AB; WL: _____ 24 hr. AB

140 lb. Hammer Type: ☐ Safety ☒ Automatic

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
1	0	1.5	SS	3	4	7		1.5	—	GP CL		BROWN SILTY CLAY AND GRAVEL FILL
	0	2.5	PA								2	
2	2.5	4.0	SS	2	3	4		1.1	1.5			BLACK CLAYEY TOPSOIL FILL
	2.5	5.0	PA									
3	5	6.5	SS	2	3	3		1.2	0.5	CL	5'	GRAY BROWN SILTY CLAY W/POCKETS OF TOPSOIL
	5	7.5	PA									
4	7.5	9.0	SS	2	4	5		1.5	1.5			SAME
	7.5	10	PA									
5	10	11	SS	3	6			1.0	0.75			SAME
5A	11	11.5	SS			9		0.5	4.0	CL	11	BROWN SILTY CLAY
	10	12.5	PA									
6	12.5	14.5	3" ST					2	2		12.5	GRAY BROWN SILTY CLAY
7	14.5	16.5	SS	5	8	11	15	2	4.5+			SAME
	12.5	20	PA									
8	20	21	SS	5	11			1.0	3.5			SAME
8A	21	21.5	SS			11		0.5		SP	21	GRAY BROWN FINE SAND TRACE OF SILT AND CLAY
	20	25	PA								22	
9	25	26.0	SS	3	13	19		1.5	4.5+	CL		GRAY BROWN SILTY CLAY
9A	26	26.5	SS							ML	26	GRAY CLAYEY SILT

Abbreviations: MC - Macro Core; LB - Large Bore; ST - Shelby Tube; DB - Diamond Bit; DB - Diamond Bit; PA - Power Auger; HSA - Hollow Stem Auger; RB - Rock Bit; HA - Hand Auger; WS - While Sampling; WD - While Drilling; BCR - Before Casing Removal; ACR - After Casing Removal; AB - After Boring; AWO - After Wash Out

Drill Crew Checklist: Topsoil Thickness _____; Fill Thickness _____

Cave-in Level: While Drilling & Sampling _____; After Boring Completion _____

Water Loss: At _____ to _____; Percent Loss _____; At _____ to _____; Percent Loss _____

Boulders or Obstructions: At _____ to _____; At _____ to _____

Artesian Pressure: Depth _____; Height of Soil Rise in Casing _____

Peizometer PVC or SS: Diameter _____ In; Screen Depth ____ FT. to ____ FT.; Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

750

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started _____

Driller SU Boring Completed _____

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60308472 Boring No. DP2-13.14 Client USACE Weather _____

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☑ Automatic — Sample Description
	25	30	PA									
10	30	32.5	SC	5	9	12		1.5	4.5+			GRAY BROWN SILTY CLAY
	30	33.5	PA									
11	33.5	35	SS	4	11	11		1.5	4.5+	MAL CL	33.5	GRAY BROWN CLAYEY SILT

Water Level Observations

WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____

Piezometer PVC or SS
Diameter _____ In.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JNS Boring Started 11-13-13

Driller Scott Boring Completed 11-13-13

Helper _____ Station _____

RIG/MFT/Model CME 45 Offset _____ Casing Used _____ Size _____ Sheet 1 of 2

Job No. 60308477 Boring No. DP2-13-15 Client USACE Weather Sunny 20's

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☑ Automatic — Sample Description
1	0	0.5'	GS	4				0.4	4.5			BLACK CLAYEY TOPSOIL FILL
	0.5	1.5	GS		5	5		0.4	4.5			BRN SI CLAY SOME GRAVEL FILL
	0	2.5	PA									
2	2.5	4.0	SS	4	6	7		1.5		SP 5m		BLACK F-C SAND TRACE GRAVEL TRACE TOPSOIL SOME SILT FILL
	2.5	5.0	PA									
3	5'	6.5	SS	4	4	4		1.5				SAME
	5	7.5	PA									
4	7.5	9.0	SS	4	5	7		0.9	1.5		7.5	DARK BROWN SI. CLAY FR SAND TR TOPSOIL FILL
	7.5	10	PA									
5	10	11.5	SS	3	4	6		1.5	3.75			DARK BROWN SILTY CLAY TR SAND
	10	12.5	PA									
6	12.5	15	3ST					2.5	1.0		12.5	LIGHT BROWN SILTY CLAY
7	15	17	SS	WH	WH	3	5	2.0	1.0 3.0			SAME
	15	20	PA									
8	20	21.5	3ST					1.5	4.0		20	GRAY BROWN SILTY CLAY
	20	25	PA									
9	25	26.5	SS	3	6	8		1.2	2.25			SAME
	25	30	PA									
10	30	31.5	SS	5	6	9		1.5	2.5			SAME

Water Level Observations

WL: DRY WS or WD
WL: BCR ACR
WL: AB HR, AB
WL: 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness
Fill Thickness

Cave-in Level:
While Drilling & Sampling
After Boring Completion

Water Loss:
At ____ to ____
Percent Loss
At ____ to ____
Percent Loss

Boulders or Obstructions:
At ____ to ____
At ____ to ____

Artesian Pressure:
Depth
Height of Soil Rise in Casing
Peizometer PVC or SS
Diameter ____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

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AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-13-13

Driller Scott Boring Completed 11-13-13

Helper _____ Station _____

RIG/MFT/Model Case 45 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60306477 Boring No. DB2-13-55 Client USACE Weather _____

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☑ Automatic — Sample Description
	30	32.5	PB									
S11	32.5	34.5	SS	10	12	14		1.0	3.0			SAME
11A	34.5	35	SS			14		0.5		ML	34.5	GRAY SILT TRACE CLAY

Water Level Observations

WL:_____WS or WD
WL:_____BCR_____ACR
WL:_____AB_____HR, AB
WL:_____24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness_____
Fill Thickness_____

Cave-in Level:
While Drilling & Sampling_____
After Boring Completion_____

Water Loss:
At_____to_____
Percent Loss
At_____to_____
Percent Loss

Boulders or Obstructions:
At_____to_____
At_____to_____

Artesian Pressure:
Depth_____
Height of Soil Rise in Casing_____
Pelzometer PVC or SS
Diameter_____in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-11-13

Driller SU Boring Completed 11-11-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 1 of 2

Job No. 60308477 Boring No. BP2-13-16 Client USACE Weather Cloudy 40's

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☐ Automatic — Sample Description
	0	0.2	SS	3				0.2				BLACK SILTY TOPSOIL FILL
1	0.5	1.5	SS		2	2		0.5	-	CL SC	0.2	DARK BROWN SILTY CLAY WITH SAND AND GRAVEL FILL
	0	2.5	PA									
2	2.5	4	SS	2	2	2		0.5		SP	2.5	DARK BROWN SILTY SAND TRACE CLAY FILL
	2.5	5	PA									
3	5	5.8	SS	1	1			0.8				SAME
3A	5.8	6.5	SS			2		0.7	4.5	CL	5.8	BROWN SILTY CLAY
	5	7.5	PA									
4	7.5	9	SS	2	2	3		1.5	1.5			SAME
	7.5	10	PA									
5	10	12	3" ST					2.0	1.0			SAME
	10	12.5	PA									
6	12.5	13.5	SS	2	4			1.0	1.0			SAME
6A	13.5	14.0	SS			7		0.5	4.5	CL	13.5	GRAY BROWN SILTY CLAY
	12.5	15	PA									
7	15	16.5	SS	4	6	8		1.5	3.5			SAME
	15	20	PA									
8	20	22	3" ST					2.0	3.0			SAME
	20	25	PA									

Water Level Observations
WL: DRY WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____

Piezometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started 11-11-13

Driller SU Boring Completed 11-11-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60306477 Boring No. DP2-13-16 Client USACE Weather _____

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	CP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☐ Automatic — Sample Description
9	25	26.5	SS	4	7	18		1.5	3.5			SAME
	25	30	PA									
10	30	31.5	SS	3	4	6		1.5	3.0			SAME
	30	33.5	PA									
11	33.5	35	SS	4	7	16		1.5	4.5			SAME

Water Level Observations

WL: _____ WS or WD
WL: _____ BCR _____ ACR
WL: _____ AB _____ HR, AB
WL: _____ 24 hr, AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____

Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Pelzometer PVC or SS
Diameter _____ In.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer JRT — Surface Elevation —
Technician — Boring Started 11-17-13
Driller SO — Boring Completed 11-11-13
Helper S.G. — Station —
RIG/MFT/Model CME 75 — Offset — Casing Used — Size — Sheet 1 of 1

Job No. — Boring No. DP2-13-17 Client USACE Weather CLOUDY 40's

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
1	0	1.5	SS	2	10	15		0.6	4.5+			BLACK CLAYEY TOPSOIL STONE @ TIP FILL
	0	2.5	PA									
2	2.5	4.0	SS	3	8	9		0.9	4.5+	CL	2.5	DARK BROWN SILTY CLAY TR. SAND TR. TOPSOIL FILL
	2.5	5.0	PA									
3	5.0	6.5	SS	5	6	8		1.0	4.5+			SAME
	5.0	7.5	PA									
4	7.5	9.0	SS	6	9	16		1.4	4.5+			SAME W/CONCRETE @ TIP
	7.5	10	PA									@ 9' DRILLED THROUGH 3"± CONCRETE 3'± VOID
5												ABANDON BOREHOLE PATCHING WITH CONCRETE

140 lb. Hammer Type:
☐ Safety
☐ Automatic

Water Level Observations
WL: WS or WD
WL: BCR ACR
WL: AB HR, AB
WL: 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness
Fill Thickness

Cave-in Level:
While Drilling & Sampling
After Boring Completion

Water Loss:
At to
Percent Loss
At to
Percent Loss

Boulders or Obstructions:
At to
At to

Artesian Pressure:
Depth
Height of Soil Rise in Casing
Pelzometer PVC or SS
Diameter in.
Screen Depth FT. to FT.
Riser Pipe FT. to FT.

BORELOG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician SRT Boring Started 11-14-13

Driller SW Boring Completed 11-14-13

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset 15' SOUTH OF DP2-13-17 Casing Used NONE Size _____ Sheet 1 of 2

Job No. 60354477 Boring No. DP2-13-17A Client USACE Weather SUNNY 30'S

Water Level Observations: WL: DRY WS or WD; WL: _____ BCR _____ ACR; WL: _____ AB _____ HR, AD; WL: _____ 24 hr. AB

Sample No.	Depth or Elevation From	To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	140 lb. Hammer Type: ☐ Safety ☒ Automatic — Sample Description
1	0	7.5	SS	3	6	6		1.5	4.0	CL		DARK BROWN SI CLAY SOME TOPSOIL
	0	2.5	PA									
2	2.5	3.0	SS	2				0.5	4.0			SAME
2A	3.0	4.0	SS		3	4		0.5	4.0	CL	3.0	LT BR SILTY CLAY
	3	5	PA									
3	5	6.5	SS	4	5	7		1.5	4.25			LT BROWN SILTY CLAY 1" SAND SEAM @ 6'
	5	7.5	PA									
4	7.5	9.0	SS	5	7	11		1.5	4.5+	CL	7.5	GRAY BROWN SILTY CLAY
	25	10	PA									
5	10	12	3" ST					2.0	4.5			SAME
6	12	14	SS	5	7	10	11	1.5	4.5			SAME
	12	15	PA									
7	15	17	3" ST					2.0	2.5			SAME
	15	20	PA									
8	20	21.5	SS	2	4	5		1.5	2.5			SAME
	20	25	PA									
9	25	26.5	SS	3	5	6		1.5	3.0			SAME
	25	30	PA									
10	30	31.5	SS	3	4	4		1.5	2.25			SAME

Abbreviations: MC - Macro Core; LB - Large Bore; ST - Shelby Tube; DB - Diamond Bit; DB - Diamond Bit; PA - Power Auger; HSA - Hollow Stem Auger; RB - Rock Bit; HA - Hand Auger; WS - While Sampling; WD - While Drilling; BCR - Before Casing Removal; ACR - After Casing Removal; AB - After Boring; AWO - After Wash Out

Drill Crew Checklist: Topsoil Thickness _____; Fill Thickness _____

Cave-in Level: While Drilling & Sampling _____; After Boring Completion _____

Water Loss: At _____ to _____; Percent Loss At _____ to _____; Percent Loss _____

Boulders or Obstructions: At _____ to _____; At _____ to _____

Artesian Pressure: Depth _____; Height of Soil Rise in Casing _____

Pelzometer PVC or SS Diameter _____ in. Screen Depth ____ FT. to ____ FT. Riser Pipe ____ FT. to ____ FT.

BOREOLG.XLS

AECOM

Field Boring Log

Engineer _____ Surface Elevation _____

Technician JRT Boring Started _____

Driller _____ Boring Completed _____

Helper _____ Station _____

RIG/MFT/Model CME 75 Offset _____ Casing Used _____ Size _____ Sheet 2 of 2

Job No. 60308477 Boring No. DP2-13 Y7A Client _____ Weather _____

140 lb. Hammer Type:
- ☐ Safety
- ☐ Automatic

Sample No.	Depth or Elevation From	Depth or Elevation To	Sample Method	Penetration Record Split Spoon Blows 6"	6"	6"	6"	R Length Recovered (feet)	QP Penetrometer Test in TSF	PID PID Detection	Strata Change	Sample Description
	30	33.5	PA									
11	33.5	34.5	SS	5	9			1.0	2.25			Same
11.1	34.5	35	SS			12		0.5		ML	34.5	Gray Silt

Water Level Observations

WL: ____ WS or WD
WL: ____ BCR ____ ACR
WL: ____ AB ____ HR, AB
WL: ____ 24 hr. AB

Abbreviations
MC - Macro Core
LB - Large Bore
ST - Shelby Tube
DB - Diamond Bit
DB - Diamond Bit
PA - Power Auger
HSA - Hollow Stem Auger
RB - Rock Bit
HA - Hand Auger
WS - While Sampling
WD - While Drilling
BCR - Before Casing Removal
ACR - After Casing Removal
AB - After Boring
AWO - After Wash Out

Drill Crew Checklist:
Topsoil Thickness _____
Fill Thickness _____

Cave-in Level:
While Drilling & Sampling _____
After Boring Completion _____

Water Loss:
At _____ to _____
Percent Loss
At _____ to _____
Percent Loss

Boulders or Obstructions:
At _____ to _____
At _____ to _____

Artesian Pressure:
Depth _____
Height of Soil Rise in Casing _____
Peizometer PVC or SS
Diameter _____ in.
Screen Depth ____ FT. to ____ FT.
Riser Pipe ____ FT. to ____ FT.

BORELOG.XLS

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APPENDIX C

Laboratory Testing Summary

Atterberg Limits Test Results

Gradation Test Results

Unconfined Compression Test Results

LABORATORY TEST SUMMARY

Project No.: 60308477 **Project:** DES PLAINES 2 **Client:** U.S.A.C.E.

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	LL	PL	PI	Gravel %	Sand %	Silt %	Clay %	Density pcf	Qu tsf
DP2-13-09														
	S-1	0.0'-1.5'	SANDY F-C GRAVEL TRACE SILT - GRAY - MOIST - LIMESTONE NOTED	GP										
	S-2	5.0'-6.5'	NO TESTING											
DP2-13-09A														
	S-1	2.5'-4.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	14.1									
	S-2	5.0'-6.5'			18.9									
	S-3	7.5'-9.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	17.2									
	S-4	10.0'-11.5'	NO TESTING											
	S-5	12.5'-14.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	15.6									
	S-6	15.0'-16.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	16.8									
	S-7	20.0'-21.5'	SILT, SOME CLAY, TRACE F SAND - GRAY	ML					0.0	3.9	73.8	22.3		
	S-8	25.0'-26.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML										
	S-9	30.0'-31.0'	SILT LITTLE F-C SAND TRACE CLAY - GRAY - SEAMS OF SAND NOTED	ML										
	S-10	33.5'-35.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	10.9									
DP2-13-10														
	S-1	0.0'-0.9'	NO TESTING											
	S-1A	0.8'-7.5'	F GRAVEL LITTLE SAND TRACE SILT - GRAY - WET - LIMESTONE NOTED	GP										
	S-2	2.5'-4.0'			11.4									
	S-3	5.0'-7.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - ROOTS LIMESTONE AND LAYER OF GRAY SILT NOTED	CL	16.6									
	S-4	7.5'-9.0'	F-C GRAVEL TRACE SILT TRACE F-C SAND - GRAY - LIMESTONE AND LAYER OF CLAY NOTED	GP-GM										
	S-5	10.0'-11.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	13.0									
	S-6	12.5'-14.5'			19.7									
	S-7	15.0'-17.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF .5 TON CLAY NOTED	CL	20.8	32	17	15					115.40	2.10
	S-9	25.0'-26.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML										
	S-8	20.0'-21.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	18.5									
	S-10	30.0'-31.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	11.0									
	S-11	35.0'-36.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	12.7									
DP2-13-11														
	S-1	0.0'-	NO TESTING											

LABORATORY TEST SUMMARY

Project No.: 60308477 **Project:** DES PLAINES 2 **Client:** U.S.A.C.E.

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	LL	PL	PI	Gravel %	Sand %	Silt %	Clay %	Density pcf	Qu tsf
		1.5'												
	S-2	2.5'-4.5'	NO TESTING											
	S-3	5.0'-6.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	16.1									
	S-4	7.5'-8.0'	NO TESTING											
	S-4A	8.0'-9.0'	F-C SAND TRACE SILT TRACE F GRAVEL - BROWN - LAYERS OF GRAY CLAY NOTED	SP-SM										
	S-5	10.0'-11.5'	NO TESTING											
	S-6	12.5'-14.0'	F-C SAND AND F-C GRAVEL LITTLE SILT TRACE CLAY - GRAY	SM	7.9				37.3	42.1	12.6	8.0		
	S-7	15.0'-16.0'	NO TESTING											
	S-7A	16.0'-16.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF GRAY SILT AND SAND NOTED	CL	12.7									
	S-8	20.0'-21.5'	SILTY F-C GRAVEL LITTLE F-C SAND - GRAY - POSSIBLE CAVE IN	GM	14.2									
	S-8A	20.0'-21.5'	SILT TRACE SAND - GRAY	ML	16.7									
	S-9	25.0'-27.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	14.5									
	S-10	30.0'-31.5'	SILT LITTLE F SAND TRACE CLAY - GRAY	ML										
	S-11	33.5'-35.0'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	15.9									
DP2-13-12														
	S-1	0.0'-0.8'	NO TESTING											
	S-1A	0.8'-1.5'	NO TESTING											
	S-2	2.5'-4.0'	F-C SAND TRACE CLAY TRACE F GRAVEL - GRAY - LIMESTONE PIECES NOTED	SP-SM	5.3									
	S-3	5.0'-6.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	17.1									
	S-4	7.5'-9.5'	SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	18.4								123.00	5.31
	S-5	9.5'-11.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.5									
	S-6	12.5'-14.0'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	13.2									
	S-7	15.0'-16.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	14.7									
	S-8	20.0'-22.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	17.0								116.90	
	S-9	25.0'-26.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	16.0									
	S-10	30.0'-31.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML										
	S-11	33.5'-34.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	ML	8.9									
	S-11A	34.0'-35.0'	SILTY F-C SAND TRACE F GRAVEL - GRAY - LAYERS OF SILT NOTED	SM										
DP2-13-13														
	S-1	0.0'-	NO TESTING											

LABORATORY TEST SUMMARY

Project No.: 60308477 **Project:** DES PLAINES 2 **Client:** U.S.A.C.E.

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	LL	PL	PI	Gravel %	Sand %	Silt %	Clay %	Density pcf	Qu tsf
		0.5'												
	S-1A	0.5'-1.5'	NO TESTING											
	S-2	2.5'-4.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	19.0									
	S-3	5.0'-6.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	15.0									
	S-4	7.5'-9.0'	SILT TRACE CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN - SEAMS OF GRAY AND LAYER OF SANDIER SILT NOTED	ML	15.1									
	S-5	10.0'-11.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWNISH GRAY	CL	13.1	34	20	14						
	S-6	12.5'-13.5'			9.0									
	S-6A	13.5'-14.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	19.9									
	S-7	15.0'-16.5'			14.4									
	S-8	20.0'-21.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.7									
	S-9	25.0'-25.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	17.9									
	S-10	30.0'-31.5'	F-C SAND COME SILT TRACE CLAY TRACE F GRAVEL - GRAY - WET	SM					7.5	57.3	27.4	7.8		
	S-11	33.5'-35.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	10.9									
DP2-13-14														
	S-1	0.0'-1.5'	NO TESTING											
	S-2	2.5'-4.0'	NO TESTING											
	S-3	5.0'-7.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	21.6									
	S-4	7.5'-9.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	21.0									
	S-5	10.0'-11.0'			22.7									
	S-5A	11.0'-11.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	18.1									
	S-6	12.5'-14.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	20.7								109.40	3.23
	S-7	14.5'-16.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	21.8									
	S-8	20.0'-21.0'			18.1									
	S-8A	21.0'-21.5'	SILTY F SAND - GRAY - MOIST	SM										
	S-9	25.0'-26.0'	SILT TRACE CLAY TRACE F SAND - GRAY - LAYER OF GRAY CLAY NOTED	ML	18.8									
	S-9A	26.0'-26.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	20.8									
	S-10	30.0'-31.5'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	17.3									
	S-11	33.5'-35.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	9.3	20	12	8						

LABORATORY TEST SUMMARY

Project No.: 60308477 **Project:** DES PLAINES 2 **Client:** U.S.A.C.E.

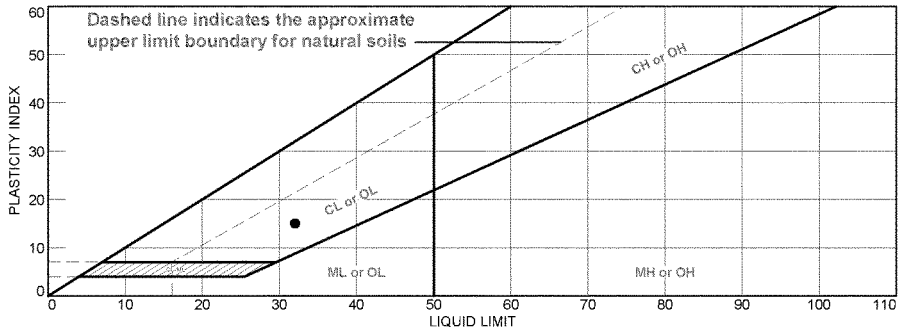
Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	LL	PL	PI	Gravel %	Sand %	Silt %	Clay %	Density pcf	Qu tsf
DP2-13-15														
	S-1	0.0'-0.5'	NO TESTING											
	S-1A	0.5'-1.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LIMESTONE NOTED	CL										
	S-2	2.5'-4.0'	SILTY F-C SAND TRACE CLAY TRACE F-C GRAVEL - VERY DARK GRAY - MOIST - CONCRETE, LIMESTONE, SLAG AND CINDERS NOTED	SM										
	S-3	5.0'-6.5'	F-C SAND LITTLE F GRAVEL LITTLE SILT TRACE CLAY - DARK BROWNISH GRAY TO BLACK - MOIST - SLAG AND CINDERS NOTED	SM	9.8				18.9	55.5	17.4	8.2		
	S-4	7.5'-9.0'	SILTY CLAY TRACE F SAND - DARK BROWNISH GRAY TO BLACK	CL	26.9									
	S-5	10.0'-11.5'			23.9									
	S-6	12.5'-14.5'	SILTY CLAY TRACE F SAND - BROWN - SEAMS OF DARK BROWN NOTED	CL	29.0								93.40	0.65
	S-7	15.0'-17.0'			23.7									
	S-8	20.0'-21.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	19.0								115.80	
	S-9	25.0'-26.5'			19.8									
	S-10	30.0'-31.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL										
	S-11	33.5'-34.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAMS OF SILT NOTED	CL	16.0									
	S-11A	34.5'-35.0'	SILT TRACE CLAY TRACE F SAND - GRAY - SEAMS OF SAND NOTED	ML	10.5									
DP2-13-16														
	S-1	0.0'-1.5'	NO TESTING											
	S-2	2.5'-4.0'			13.3									
	S-3	5.0'-5.8'	SILTY F-C SAND TRACE F GRAVEL - BROWN - LAYERS OF CLAY NOTED	SM										
	S-3A	5.8'-6.5'			20.8									
	S-4	7.5'-9.0'			12.9									
	S-5	10.0'-12.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	14.1								124.60	1.28
	S-6	10.5'-13.5'			13.9									
	S-6A	13.5'-14.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN	CL	17.5									
	S-7	15.0'-16.5'	NO TESTING											
	S-8	20.0'-22.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	19.9								111.40	
	S-9	25.0'-26.5'			19.1									
	S-10	30.0'-31.5'	SILTY CLAY TRACE F SAND - GRAY	CL	22.3									
	S-11	33.5'-35.0'	NO TESTING											
DP2-13-17														

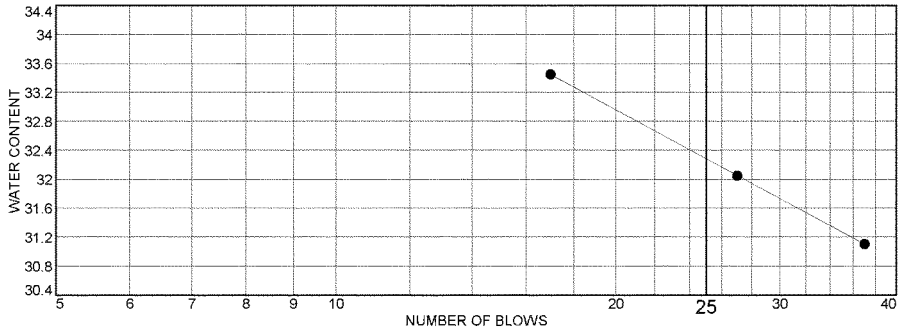
LABORATORY TEST SUMMARY

Project No.: 60308477 **Project:** DES PLAINES 2 **Client:** U.S.A.C.E.

Boring No.	Sample No.	Depth	Sample Description	USCS	WC %	LL	PL	PI	Gravel %	Sand %	Silt %	Clay %	Density pcf	Qu tsf
	S-1	0.0'-1.5'	NO TESTING											
	S-2	2.5'-4.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF BLACK TOPSOIL NOTED	CL	13.0									
	S-3	5.0'-6.5'	NO TESTING											
	S-4	7.5'-9.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - SEAMS OF SILT AND SEAMS OF BROWN AND BLACK NOTED	CL	14.5									
DP2-13-17A														
	S-1	0.0'-1.5'	NO TESTING											
	S-2	2.5'-3.0'	SILTY CLAY (POSSIBLE ORGANIC TOPSOIL) TRACE F-M SAND - BLACK - LAYER OF GRAY CLAY NOTED	CL	25.5									
	S-2A	3.0'-4.0'			25.2									
	S-3	5.0'-6.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF GRAY NOTED	CL	16.4									
	S-4	7.5'-9.0'			15.7									
	S-5	10.0'-12.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - BROWN - SEAMS OF SILT NOTED	CL	11.5								122.07	
	S-5A	10.0'-12.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	16.9								116.47	
	S-6	12.0'-14.0'			17.7									
	S-7	15.0'-17.0'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	20.5								111.64	2.95
	S-8	20.0'-21.5'			20.3									
	S-9	25.0'-26.5'	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	CL	18.7								113.26	
	S-10	30.0'-31.5'	NO TESTING											
	S-11	33.5'-34.5'	SILTY CLAY TRACE F SAND - GRAY - SEAMS OF SILT NOTED	CL	21.7									
	S-12	34.5'-35.0'	SILT TRACE CLAY TRACE F SAND - GRAY	ML	18.8									

LIQUID AND PLASTIC LIMITS of SOILS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY - LAYER OF .5 TON CLAY	32	17	15			CL

Project No. 60308477 **Client:** U.S.A.C.E.

Project: DES PLAINES 2

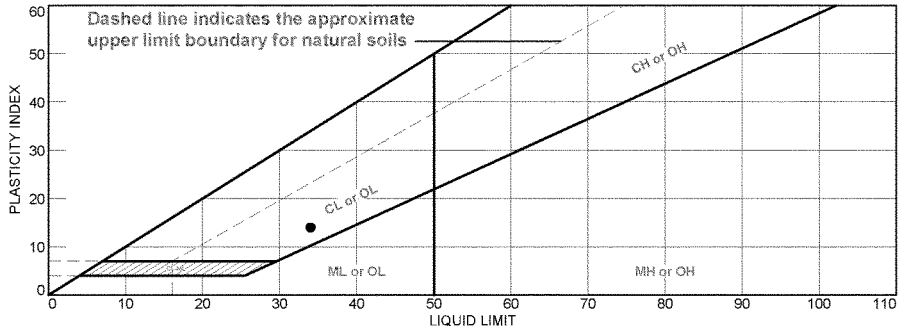
● **Source of Sample:** DP2-13-10 **Depth:** 15.0'-17.0' **Sample Number:** S-7

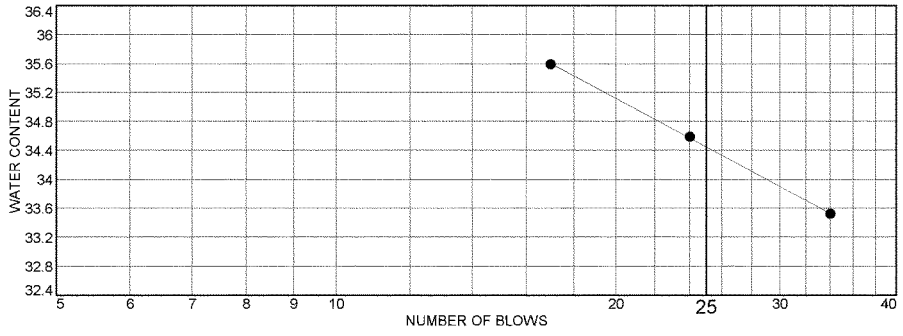
Remarks:

AECOM

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS of SOILS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWNISH GRAY	34	20	14			CL

Project No. 60308477 **Client:** U.S.A.C.E.

Project: DES PLAINES 2

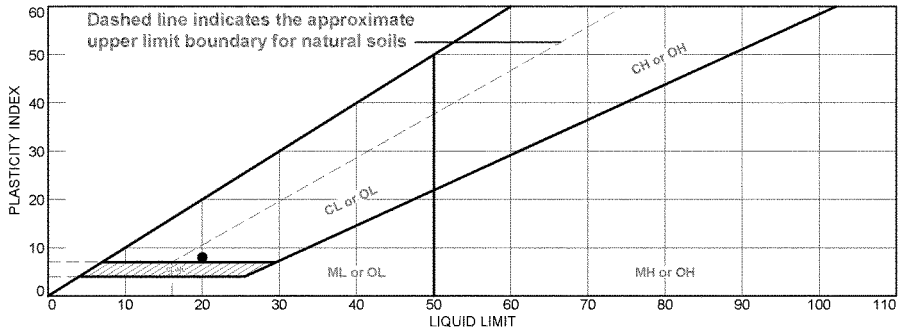
Remarks:

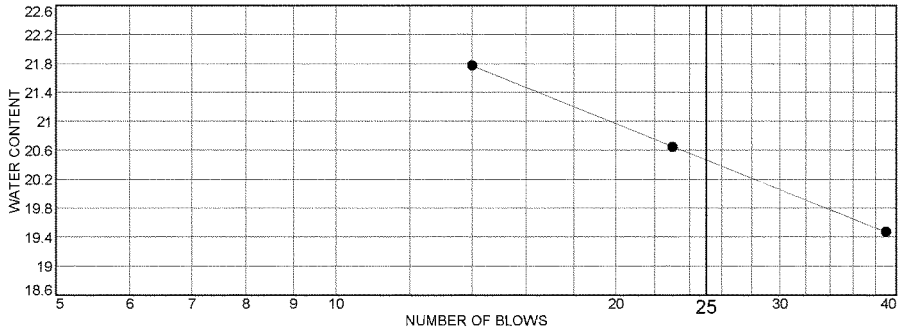
● **Source of Sample:** DP2-13-13 **Depth:** 10.0'-11.5' **Sample Number:** S-5

AECOM

Tested By: EMR **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS of SOILS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	SILTY CLAY TRACE F-C SAND TRACE F GRAVEL TRACE SHALE - GRAY	20	12	8			CL

Project No. 60308477 **Client:** U.S.A.C.E.

Project: DES PLAINES 2

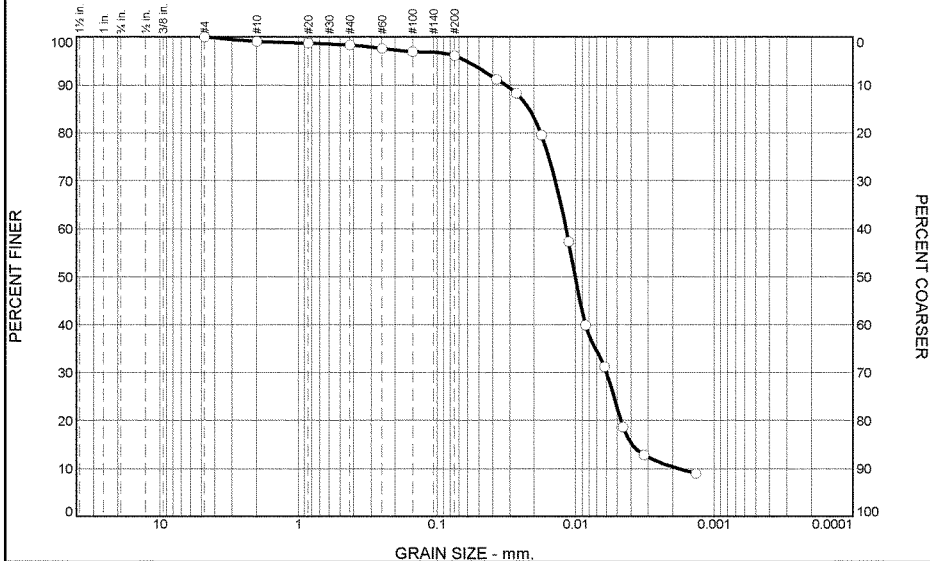
● **Source of Sample:** DP2-13-14 **Depth:** 33.5'-35.0' **Sample Number:** S-11

Remarks:

AECOM

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.9	0.8	2.2	73.8	22.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.1		
#20	98.7		
#40	98.3		
#60	97.6		
#100	96.9		
#200	96.1		

* (no specification provided)

Material Description

SILTY CLAY TRACE F SAND - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0320 D_{85}= 0.0218 D_{60}=
D_{50}= 0.0101 D_{30}= 0.0060 D_{15}= 0.0039
D_{10}= 0.0018 C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

F.M.=0.09

Source of Sample: DP2-13-09A **Depth:** 20.0'-21.5'
Sample Number: S-7 **Date:** 12-13-13

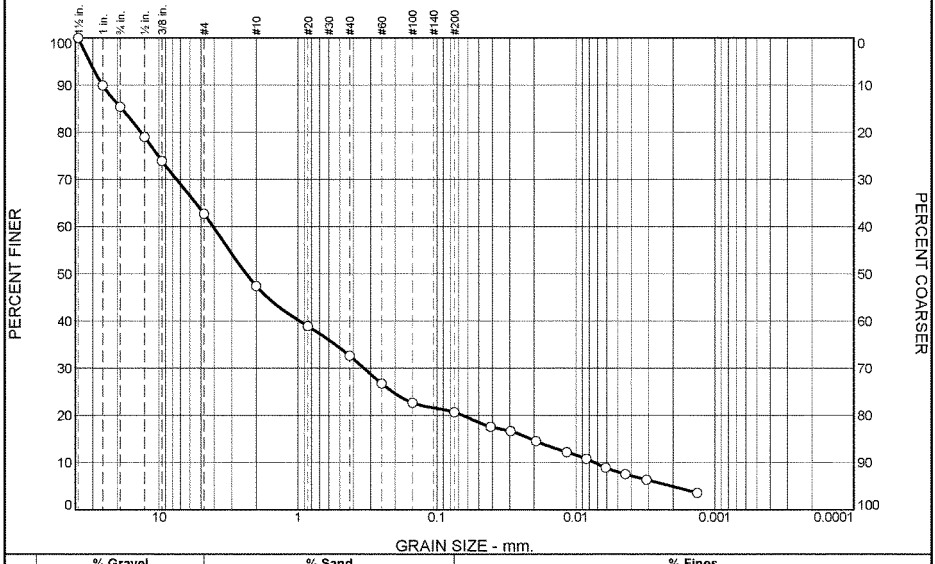
AECOM

Client: U.S.A.C.E.
Project: DES PLAINES 2

Project No: 60308477

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.6	22.7	15.3	14.8	12.0	12.6	8.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	89.9		
.75	85.4		
.5	79.0		
.375	73.9		
#4	62.7		
#10	47.4		
#20	38.9		
#40	32.6		
#60	26.7		
#100	22.7		
#200	20.6		

* (no specification provided)

Material Description

F-C SAND AND F-C GRAVEL LITTLE SILT TRACE CLAY - GRAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 25.4982 D_{85}= 18.5527 D_{60}= 4.0793
D_{50}= 2.3598 D_{30}= 0.3353 D_{15}= 0.0211
D_{10}= 0.0073 C_u= 556.70 C_c= 3.76

Classification

USCS= SM AASHTO=

Remarks

F.M.=3.99

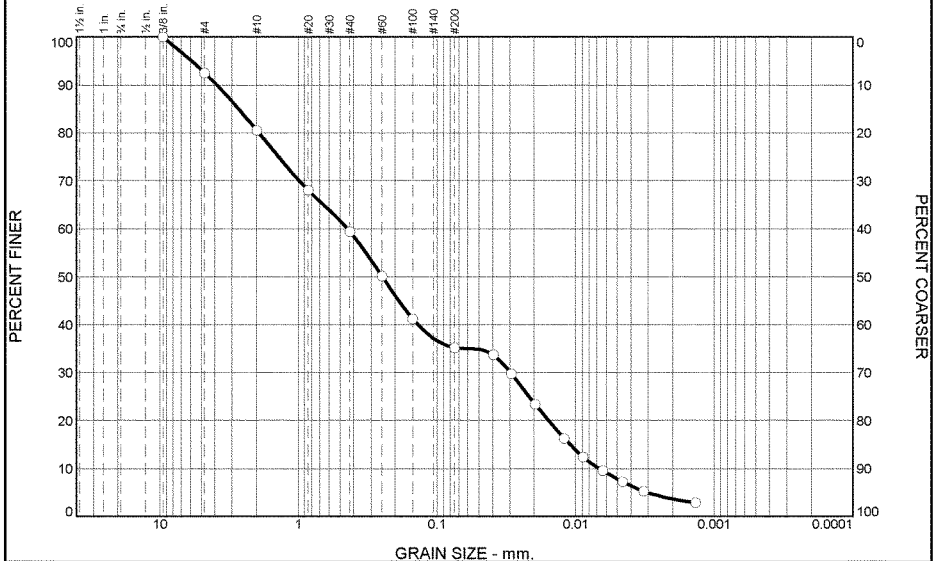
Source of Sample: DP2-13-11 **Depth:** 12.5'-14.0'
Sample Number: S-6 **Date:** 12-13-13

AECOM

Client: U.S.A.C.E.
Project: DES PLAINES 2
Project No: 60308477

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.5	12.0	21.2	24.1	27.4	7.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	92.5		
#10	80.5		
#20	68.0		
#40	59.3		
#60	50.1		
#100	41.2		
#200	35.2		

* (no specification provided)

Material Description

F-C SAND COME SILT TRACE CLAY TRACE F GRAVEL - GRAY - WET

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.8937 D_{85}= 2.7067 D_{60}= 0.4446
D_{50}= 0.2488 D_{30}= 0.0296 D_{15}= 0.0110
D_{10}= 0.0068 C_u= 65.77 C_c= 0.29

Classification

USCS= SM AASHTO=

Remarks

F.M.=1.93

Source of Sample: DP2-13-13 **Depth:** 30.0'-31.5'
Sample Number: S-10 **Date:** 12-13-13

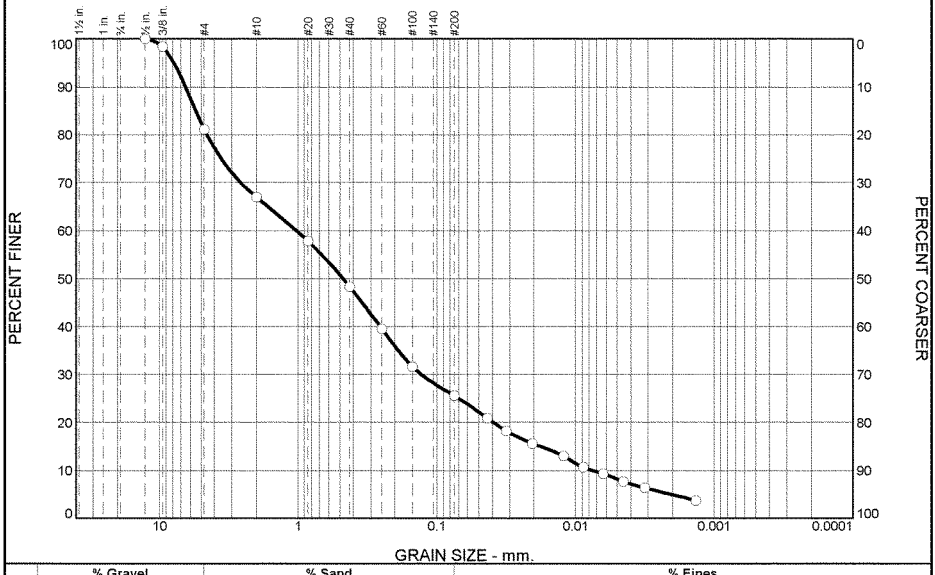
AECOM

Client: U.S.A.C.E.
Project: DES PLAINES 2

Project No: 60308477

Tested By: EMR **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.9	14.1	18.7	22.7	17.4	8.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.4		
#4	81.1		
#10	67.0		
#20	57.8		
#40	48.3		
#60	39.5		
#100	31.6		
#200	25.6		

* (no specification provided)

Material Description

F-C SAND LITTLE F GRAVEL LITTLE SILT TRACE CLAY - DARK BROWNISH GRAY TO BLACK - MOIST - SLAG AND CINDERS NOTED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.5110 D_{85}= 5.4748 D_{60}= 1.0273
D_{50}= 0.4759 D_{30}= 0.1297 D_{15}= 0.0181
D_{10}= 0.0076 C_u= 134.62 C_c= 2.14

Classification

USCS= SM AASHTO=

Remarks

F.M.=2.63

Source of Sample: DP2-13-15 **Depth:** 5.0'-6.5'
Sample Number: S-3 **Date:** 12-13-13

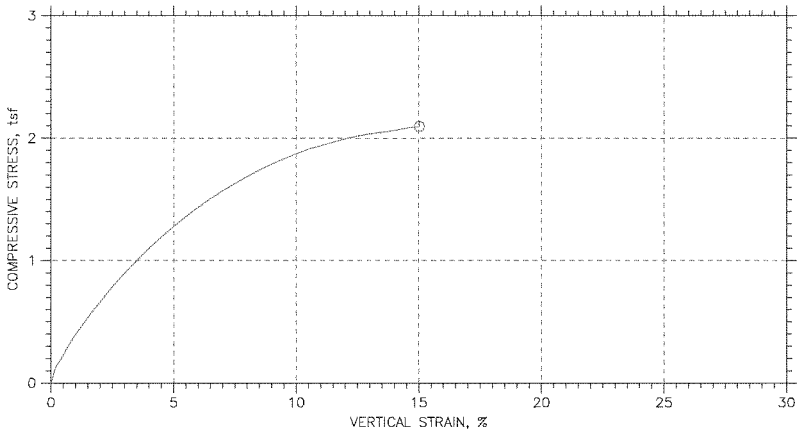
AECOM

Client: U.S.A.C.E.
Project: DES PLAINES 2
Project No: 60308477

Tested By: EMR **Checked By:** WPQ

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21310S7QU			
Initial	Diameter, in	2.6244			
	Height, in	6.1413			
	Water Content, %	16.74			
	Dry Density, pcf	115.4			
	Saturation, %	96.69			
	Void Ratio	0.471			
Unconfined Compressive Strength, tsf		2.0954			
Undrained Shear Strength, tsf		1.0477			
Time to Failure, min		15			
Strain Rate, %/min		1.52			
Estimated Specific Gravity		2.72			
Liquid Limit		32			
Plastic Limit		17			
Plasticity Index		15			
Failure Sketch					

Project: DES PLAINES 2
Location: FRANKLIN PARK, IL
Project No.: 60308477
Boring No.: DP2-13-10 **Sample No.: 7 Depth: 15.0'-17.0'**
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY - LAYER OF .5 TON CLAY NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 19-DEC-2013 15:26:07

UNCONFINED COMPRESSION TEST

Project: DES PLAINES 2
Boring No.: DP2-13-10
Sample No.: S-7
Test No.: DP21310S7QU

Location: FRANKLIN PARK, IL
Tested By: BCM
Test Date: 12/16/13
Sample Type: 3" ST

Project No.: 60308477
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: -----

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY - LAYER OF .5 TON CLAY NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.14 in
Specimen Area: 5.41 inA2
Specimen Volume: 33.22 inA3

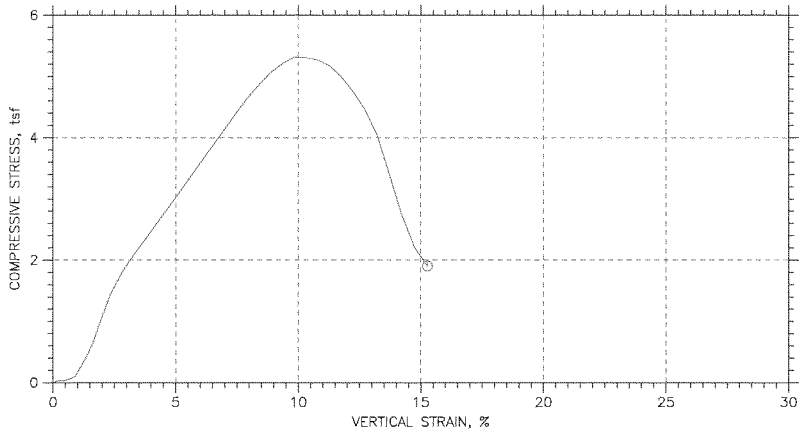
Liquid Limit: 32
Plastic Limit: 17
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	5.4094	0	0
2	0.25013	0.011715	0.19076	9.7555	5.4198	0.1296	0.064799
3	0.50013	0.026659	0.4341	15.472	5.433	0.20505	0.10252
4	0.75013	0.04271	0.69546	22.658	5.4473	0.29948	0.14974
5	1.0001	0.058023	0.9448	28.847	5.461	0.38033	0.19016
6	1.2501	0.073244	1.1926	34.197	5.4747	0.44973	0.22487
7	1.5001	0.088096	1.4345	39.389	5.4882	0.51675	0.25838
8	1.7501	0.10396	1.6928	44.687	5.5026	0.58471	0.29236
9	2.0002	0.11974	1.9497	49.617	5.517	0.64753	0.32376
10	2.5001	0.14981	2.4394	59.372	5.5447	0.77097	0.38549
11	3.0001	0.18099	2.9471	68.603	5.5737	0.8862	0.4431
12	3.5001	0.21198	3.4517	77.048	5.6028	0.99011	0.49506
13	4.0001	0.24196	3.9399	85.177	5.6313	1.089	0.54452
14	4.5001	0.2737	4.4566	93.202	5.6618	1.1852	0.59262
15	5.0001	0.30451	4.9583	100.44	5.6917	1.2706	0.63529
16	5.5001	0.33541	5.4615	107.52	5.722	1.3529	0.67647
17	6.0001	0.36613	5.9617	114.23	5.7524	1.4298	0.71491
18	6.5001	0.39685	6.4619	120.42	5.7832	1.4993	0.74963
19	7.0001	0.42784	6.9666	126.51	5.8145	1.5665	0.78326
20	7.5001	0.45764	7.4518	131.75	5.845	1.623	0.81148
21	8.0001	0.48919	7.9655	137.31	5.8776	1.682	0.84102
22	8.5001	0.51935	8.4566	142.45	5.9092	1.7357	0.86785
23	9.0001	0.55062	8.9658	147.33	5.9422	1.7851	0.89257
24	9.5001	0.5818	9.4735	151.84	5.9755	1.8295	0.91477
25	10	0.6128	9.9782	156.14	6.009	1.8709	0.93544
26	10.5	0.64388	10.484	160.28	6.043	1.9097	0.95486
27	11	0.67442	10.982	163.59	6.0768	1.9383	0.96913
28	11.5	0.70587	11.494	166.95	6.1119	1.9667	0.98333
29	12	0.73595	11.983	170.2	6.1459	1.9939	0.99693
30	12.5	0.76703	12.49	173.08	6.1815	2.016	1.008
31	13	0.79775	12.99	175.6	6.217	2.0336	1.0168
32	13.5	0.82801	13.483	177.75	6.2524	2.0469	1.0234
33	14	0.85974	13.999	180.16	6.29	2.0623	1.0311
34	14.5	0.89074	14.504	182.99	6.3271	2.0824	1.0412
35	15	0.92238	15.019	185.25	6.3655	2.0954	1.0477

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		DR21312S5QU			
Initial	Diameter, in	2.676			
	Height, in	6.1173			
	Water Content, %	13.49			
	Dry Density, pcf	123.			
	Saturation, %	96.53			
	Void Ratio	0.38023			
Unconfined Compressive Strength, tsf		5.3148			
Undrained Shear Strength, tsf		2.6574			
Time to Failure, min		10.504			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES 2
Location: FRANLIN PARK, IL
Project No.: 60308477
Boring No.: DR2-13-12 Sample No.: 5 Depth: 7.5'-9.5'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN CL SHALE NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 19-DEC-2013 15:27:15

UNCONFINED COMPRESSION TEST

Project: DES PLAINES 2
Boring No.: DR2-13-12
Sample No.: S-5
Test No.: DR21312S5QU

Location: FRANLIN PARK, IL
Tested By: BCM
Test Date: 12/16/13
Sample Type: 3" ST

Project No.: 60308477
Checked By: WPQ
Depth: 7.5'-9.5
Elevation: ----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWN CL SHALE NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.12 in
Specimen Area: 5.62 in^2
Specimen Volume: 34.40 in^3

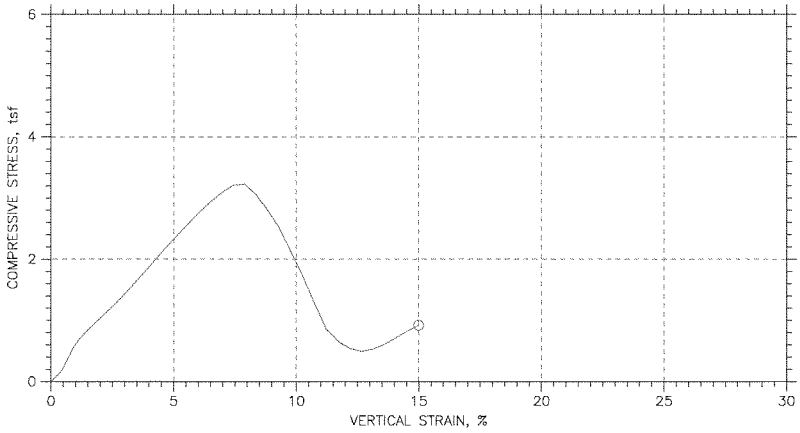
Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	5.6242	0	0
2	0.25028	0.011235	0.18366	2.0742	5.6345	0.026504	0.013252
3	0.50028	0.026033	0.42555	2.3401	5.6482	0.02983	0.014915
4	0.75028	0.040556	0.66297	4.4674	5.6617	0.056812	0.028406
5	1.0003	0.055079	0.90038	7.9775	5.6753	0.10121	0.050604
6	1.2542	0.06942	1.1348	20.795	5.6887	0.26319	0.1316
7	1.5042	0.084402	1.3812	34.25	5.7029	0.43241	0.21621
8	1.7542	0.099654	1.6291	51.801	5.7173	0.65235	0.32617
9	2.0042	0.11454	1.8724	74.989	5.7315	0.94203	0.47101
10	2.5041	0.14313	2.3398	115.35	5.7589	1.4422	0.72111
11	3.0041	0.172	2.8116	144.61	5.7869	1.7992	0.89959
12	3.5041	0.20114	3.288	168.33	5.8154	2.084	1.042
13	4.0041	0.23009	3.7613	189.87	5.844	2.3392	1.1696
14	4.5039	0.25905	4.2346	212.26	5.8728	2.6022	1.3011
15	5.0039	0.28828	4.7125	234.65	5.9023	2.8624	1.4312
16	5.5039	0.31705	5.1828	257.41	5.9316	3.1245	1.5623
17	6.0039	0.34537	5.6457	280.28	5.9607	3.3855	1.6928
18	6.5039	0.37396	6.1131	303.57	5.9903	3.6487	1.8244
19	7.0039	0.40255	6.5804	326.76	6.0203	3.9079	1.9539
20	7.5039	0.43077	7.0418	349.89	6.0502	4.1639	2.0819
21	8.0039	0.45918	7.5062	373.61	6.0806	4.424	2.212
22	8.5039	0.48768	7.9721	396.22	6.1114	4.668	2.334
23	9.0039	0.51654	8.4439	416.64	6.1428	4.8834	2.4417
24	9.5039	0.54531	8.9142	435.41	6.1746	5.0772	2.5386
25	10.004	0.57381	9.3801	449.56	6.2063	5.2154	2.6077
26	10.504	0.60195	9.84	460.46	6.238	5.3148	2.6574
27	11.004	0.63026	10.303	462.43	6.2702	5.3101	2.655
28	11.504	0.66013	10.791	461.74	6.3045	5.2733	2.6366
29	12.004	0.68973	11.275	456.1	6.3389	5.1806	2.5903
30	12.504	0.71932	11.759	442.38	6.3736	4.9974	2.4987
31	13.004	0.74882	12.241	422.86	6.4086	4.7508	2.3754
32	13.504	0.77878	12.731	398.4	6.4446	4.451	2.2255
33	14	0.80856	13.218	363.99	6.4807	4.0438	2.0219
34	14.5	0.83852	13.707	309.05	6.5175	3.4141	1.7071
35	15	0.86894	14.205	251.61	6.5553	2.7636	1.3818
36	15.5	0.90173	14.741	202.58	6.5965	2.2111	1.1055
37	16	0.93416	15.271	175.82	6.6378	1.9072	0.95358

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		DR21314S6QU			
Initial	Diameter, in	2.8043			
	Height, in	6.2618			
	Water Content, %	19.08			
	Dry Density, pcf	110.9			
	Saturation, %	97.62			
	Void Ratio	0.53161			
Unconfined Compressive Strength, tsf		3.229			
Undrained Shear Strength, tsf		1.6145			
Time to Failure, min		8.5038			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES 2
Location: FRANLIN PARK, IL
Project No.: 60308477
Boring No.: DR2-13-14 **Sample No.: 6 Depth: 12.5'-14.5'**
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWNISH GRAY CL SHALE AND SEAMS OF GRAY NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 19-DEC-2013 15:28:46

UNCONFINED COMPRESSION TEST

Project: DES PLAINES 2
Boring No.: DR2-13-14
Sample No.: S-6
Test No.: DR21314S6QU

Location: FRANLIN PARK, IL
Tested By: BCM
Test Date: 12/16/13
Sample Type: 3" ST

Project No.: 60308477
Checked By: WPQ
Depth: 12.5'-14.5'
Elevation: ----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F-C GRAVEL - BROWNISH GRAY CL SHALE AND SEAMS OF GRAY NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.26 in
Specimen Area: 6.18 in^2
Specimen Volume: 38.68 in^3

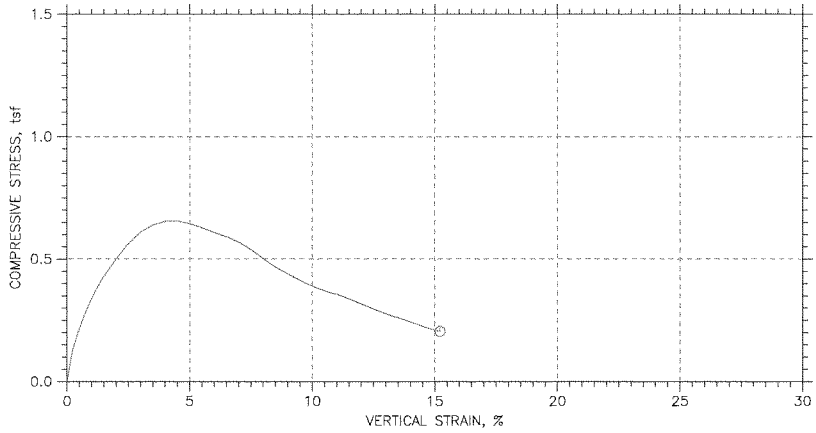
Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.1766	0	0
2	0.25412	0.011874	0.18963	6.1693	6.1883	0.071779	0.035889
3	0.50385	0.026946	0.43032	14.945	6.2033	0.17346	0.086729
4	0.75385	0.042291	0.67539	31.485	6.2186	0.36454	0.18227
5	1.0039	0.056724	0.90586	47.706	6.233	0.55106	0.27553
6	1.2539	0.07143	1.1407	59.459	6.2479	0.6852	0.3426
7	1.5039	0.085862	1.3712	68.766	6.2625	0.79061	0.39531
8	1.7539	0.10048	1.6046	76.903	6.2773	0.88207	0.44104
9	2.0039	0.11509	1.838	84.987	6.2922	0.97248	0.48624
10	2.5038	0.14368	2.2946	100.73	6.3216	1.1473	0.57363
11	3.0038	0.173	2.7628	117.27	6.3521	1.3292	0.66462
12	3.5038	0.20205	3.2267	135.46	6.3825	1.5281	0.76404
13	4.0038	0.23119	3.692	154.66	6.4134	1.7363	0.86814
14	4.5038	0.26042	4.1588	174.44	6.4446	1.9489	0.97444
15	5.0038	0.28983	4.6285	194.7	6.4763	2.1646	1.0823
16	5.5038	0.31906	5.0953	213.85	6.5082	2.3658	1.1829
17	6.0038	0.34792	5.5563	232.84	6.54	2.5634	1.2817
18	6.5038	0.37679	6.0172	251.4	6.572	2.7542	1.3771
19	7.0038	0.40629	6.4884	268.84	6.6052	2.9305	1.4653
20	7.5038	0.43579	6.9595	284.69	6.6386	3.0877	1.5438
21	8.0038	0.46521	7.4293	297.35	6.6723	3.2087	1.6043
22	8.5038	0.49453	7.8975	300.75	6.7062	3.229	1.6145
23	9.0038	0.52367	8.3628	285.86	6.7403	3.0536	1.5268
24	9.5038	0.55226	8.8194	264.22	6.774	2.8083	1.4042
25	10.004	0.58158	9.2877	238.74	6.809	2.5245	1.2623
26	10.504	0.61144	9.7647	203	6.845	2.1353	1.0677
27	11.004	0.64131	10.242	166.68	6.8813	1.744	0.87198
28	11.504	0.67173	10.727	124.18	6.9188	1.2923	0.64615
29	12.004	0.7027	11.222	83.339	6.9573	0.86245	0.43123
30	12.504	0.73384	11.719	63.448	6.9965	0.65293	0.32647
31	13.004	0.76362	12.195	52.492	7.0344	0.53728	0.26864
32	13.504	0.79312	12.666	48.344	7.0724	0.49216	0.24608
33	14.004	0.82245	13.134	52.173	7.1105	0.5283	0.26415
34	14.504	0.85186	13.604	60.416	7.1492	0.60846	0.30423
35	15.004	0.881	14.069	71.266	7.1879	0.71386	0.35693
36	15.504	0.90977	14.529	82.7	7.2265	0.82397	0.41198
37	16.004	0.93863	14.99	92.752	7.2657	0.91913	0.45957

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21315S6QU			
Initial	Diameter, in	2.8268			
	Height, in	6.0807			
	Water Content, %	28.98			
	Dry Density, pcf	93.38			
	Saturation, %	96.32			
	Void Ratio	0.81841			
Unconfined Compressive Strength, tsf		0.65488			
Undrained Shear Strength, tsf		0.32744			
Time to Failure, min		4.5002			
Strain Rate, %/min		0.5			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES 2
Location: FRANLIN PARK, IL
Project No.: 60308477
Boring No.: DP2-13-15 **Sample No.: 6 Depth: 13.5'-14.5'**
Sample Type: 3" ST
Description: SILTY CLAY TRACE F SAND - BROWN CL SEAMS OF DARK BROWN NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 19-DEC-2013 15:30:12

UNCONFINED COMPRESSION TEST

Project: DES PLAINES 2
Boring No.: DP2-13-15
Sample No.: S-6
Test No.: DP21315S6QU

Location: FRANLIN PARK, IL
Tested By: BCM
Test Date: 12/16/13
Sample Type: 3" ST

Project No.: 60308477
Checked By: WPQ
Depth: 13.5'-14.5
Elevation: -----

AECOM

Soil Description: SILTY CLAY TRACE F SAND - BROWN CL SEAMS OF DARK BROWN NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.08 in
Specimen Area: 6.28 in^2
Specimen Volume: 38.16 in^3

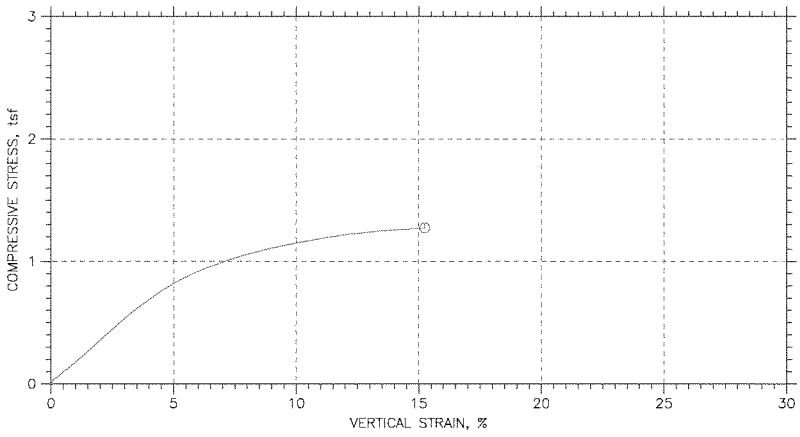
Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2758	0	0
2	0.25418	0.012546	0.20632	10.595	6.2888	0.1213	0.060649
3	0.50418	0.027397	0.45056	17.623	6.3042	0.20127	0.10063
4	0.75418	0.042341	0.69632	23.602	6.3198	0.26889	0.13445
5	1.0042	0.057378	0.9436	28.795	6.3356	0.32723	0.16362
6	1.2542	0.072598	1.1939	33.253	6.3517	0.37694	0.18847
7	1.5042	0.088096	1.4488	37.344	6.3681	0.42222	0.21111
8	1.7542	0.10544	1.734	40.963	6.3866	0.4618	0.2309
9	2.0042	0.12084	1.9873	44.319	6.4031	0.49835	0.24918
10	2.5041	0.15092	2.4819	50.141	6.4356	0.56097	0.28049
11	3.0002	0.182	2.9931	54.809	6.4695	0.60998	0.30499
12	3.5002	0.21244	3.4938	57.694	6.503	0.63877	0.31939
13	4.0002	0.24455	4.0217	59.425	6.5388	0.65434	0.32717
14	4.5002	0.27554	4.5314	59.792	6.5737	0.65488	0.32744
15	5.0002	0.30598	5.032	59.11	6.6084	0.64402	0.32201
16	5.5002	0.33596	5.5251	57.851	6.6429	0.62703	0.31352
17	6.0002	0.36613	6.0211	56.383	6.6779	0.60791	0.30395
18	6.5002	0.39934	6.5673	54.914	6.717	0.58863	0.29432
19	7.0002	0.43006	7.0725	53.026	6.7535	0.56532	0.28266
20	7.5002	0.46105	7.5822	50.299	6.7907	0.5333	0.26665
21	8.0002	0.49168	8.0858	46.994	6.8279	0.49555	0.24778
22	8.5002	0.52212	8.5865	44.057	6.8653	0.46205	0.23102
23	9.0002	0.55477	9.1235	41.592	6.9059	0.43363	0.21682
24	9.5002	0.58457	9.6135	39.284	6.9433	0.40737	0.20368
25	10	0.61483	10.111	37.291	6.9818	0.38457	0.19228
26	10.5	0.6449	10.606	35.77	7.0204	0.36685	0.18343
27	11.004	0.67746	11.141	34.459	7.0627	0.35129	0.17564
28	11.504	0.70929	11.665	32.676	7.1045	0.33115	0.16557
29	12.004	0.73964	12.164	30.735	7.1449	0.30972	0.15486
30	12.504	0.77072	12.675	28.847	7.1867	0.289	0.1445
31	13.004	0.80163	13.183	27.116	7.2288	0.27008	0.13504
32	13.504	0.83373	13.711	25.648	7.273	0.2539	0.12695
33	14.004	0.865	14.225	23.969	7.3166	0.23587	0.11794
34	14.504	0.89507	14.72	22.343	7.3591	0.2186	0.1093
35	15.004	0.92505	15.213	21.032	7.4019	0.20458	0.10229

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⏲			
Test No.		DR2131655QU			
Initial	Diameter, in	2.8177			
	Height, in	6.2933			
	Water Content, %	14.07			
	Dry Density, pcf	124.6			
	Saturation, %	105.44			
	Void Ratio	0.36299			
Unconfined Compressive Strength, tsf		1.2741			
Undrained Shear Strength, tsf		0.63707			
Time to Failure, min		16.503			
Strain Rate, %/min		1.14			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES 2
Location: FRANLIN PARK, IL
Project No.: 60308477
Boring No.: DR2-13-16 Sample No.: 5 Depth: 10.0'-12.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN CL SHALE NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 19-DEC-2013 15:31:05

UNCONFINED COMPRESSION TEST

Project: DES PLAINES 2
Boring No.: DR2-13-16
Sample No.: S-5
Test No.: DR21316S5QU

Location: FRANLIN PARK, IL
Tested By: BCM
Test Date: 12/16/13
Sample Type: 3" ST

Project No.: 60308477
Checked By: WPQ
Depth: 10.0'-12.0'
Elevation: ----

AECOM

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - BROWN CL SHALE NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.29 in
Specimen Area: 6.24 inA2
Specimen Volume: 39.24 inA3

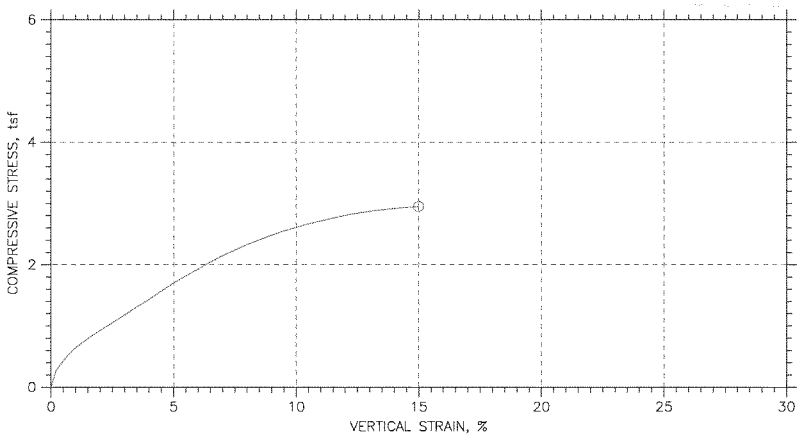
Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area inA2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2357	0	0
2	0.25028	0.0068507	0.10886	3.2974	6.2425	0.038032	0.019016
3	0.50027	0.018177	0.28883	5.1588	6.2538	0.059394	0.029697
4	0.75027	0.031422	0.49929	8.5094	6.267	0.097762	0.048881
5	1.0003	0.045945	0.73006	11.488	6.2815	0.13167	0.065836
6	1.2503	0.060286	0.95794	14.945	6.296	0.1709	0.085452
7	1.5003	0.074901	1.1902	18.348	6.3108	0.20934	0.10467
8	1.7503	0.089698	1.4253	22.018	6.3259	0.25061	0.1253
9	2.0003	0.10459	1.6619	25.9	6.3411	0.29409	0.14704
10	2.5039	0.135	2.1452	33.772	6.3724	0.38158	0.19079
11	3.0039	0.16469	2.6169	41.483	6.4033	0.46645	0.23322
12	3.5039	0.19438	3.0886	49.035	6.4344	0.54869	0.27435
13	4.0039	0.22388	3.5574	56.002	6.4657	0.62362	0.31181
14	4.5039	0.25347	4.0277	62.384	6.4974	0.6913	0.34565
15	5.0039	0.28261	4.4907	68.713	6.5289	0.75776	0.37888
16	5.5039	0.3123	4.9624	74.297	6.5613	0.8153	0.40765
17	6.0033	0.34208	5.4356	79.35	6.5941	0.86641	0.4332
18	6.5033	0.37167	5.9058	83.711	6.6271	0.90948	0.45474
19	7.0033	0.40035	6.3616	87.806	6.6593	0.94935	0.47467
20	7.5034	0.42958	6.826	91.05	6.6925	0.97954	0.48977
21	8.0034	0.45927	7.2977	94.826	6.7266	1.015	0.5075
22	8.5034	0.48886	7.768	98.017	6.7609	1.0438	0.52192
23	9.0034	0.51828	8.2353	100.84	6.7953	1.0684	0.53421
24	9.5034	0.54787	8.7056	103.76	6.8303	1.0938	0.54689
25	10.003	0.57701	9.1686	106.37	6.8651	1.1156	0.55778
26	10.503	0.60651	9.6374	108.81	6.9007	1.1353	0.56766
27	11.003	0.63611	10.108	111.31	6.9368	1.1554	0.57768
28	11.503	0.6657	10.578	113.44	6.9733	1.1713	0.58564
29	12.003	0.69475	11.039	115.67	7.0095	1.1882	0.59409
30	12.503	0.72425	11.508	117.64	7.0466	1.202	0.60101
31	13.003	0.75376	11.977	119.77	7.0842	1.2173	0.60864
32	13.503	0.78317	12.444	121.58	7.122	1.2291	0.61455
33	14.003	0.81258	12.912	123.01	7.1602	1.237	0.61849
34	14.503	0.84172	13.375	124.77	7.1985	1.2479	0.62397
35	15.003	0.87131	13.845	126.15	7.2378	1.2549	0.62747
36	15.503	0.90082	14.314	127.59	7.2774	1.2623	0.63115
37	16.003	0.93023	14.781	128.76	7.3173	1.2669	0.63347
38	16.503	0.95918	15.241	130.19	7.357	1.2741	0.63707

UNCONFINED COMPRESSION TEST REPORT

AECOM



Symbol		⊙			
Test No.		DP21317AS7			
Initial	Diameter, in	2.7882			
	Height, in	6.152			
	Water Content, %	20.45			
	Dry Density, pcf	111.6			
	Saturation, %	106.64			
	Void Ratio	0.5217			
Unconfined Compressive Strength, tsf		2.9507			
Undrained Shear Strength, tsf		1.4754			
Time to Failure, min		15.004			
Strain Rate, %/min		0.5			
Estimated Specific Gravity		2.72			
Liquid Limit		---			
Plastic Limit		---			
Plasticity Index		---			
Failure Sketch					

Project: DES PLAINES 2
Location: FRANLIN PARK, IL
Project No.: 60308477
Boring No.: DP2-13-17A Sample No.: 7 Depth: 15.0'-17.0'
Sample Type: 3" ST
Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL SHALE NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Thu, 19-DEC-2013 15:32:01

UNCONFINED COMPRESSION TEST

Project: DES PLAINES 2
Boring No.: DP2-13-17A
Sample No.: S-7
Test No.: DP21317AS7

Location: FRANLIN PARK, IL
Tested By: BCM
Test Date: 12/16/13
Sample Type: 3" ST

Project No.: 60308477
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: -----

Soil Description: SILTY CLAY TRACE F-C SAND TRACE F GRAVEL - GRAY CL SHALE NOTED
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 6.15 in
Specimen Area: 6.11 in^2
Specimen Volume: 37.56 in^3

Liquid Limit: ---
Plastic Limit: ---
Estimated Specific Gravity: 2.72

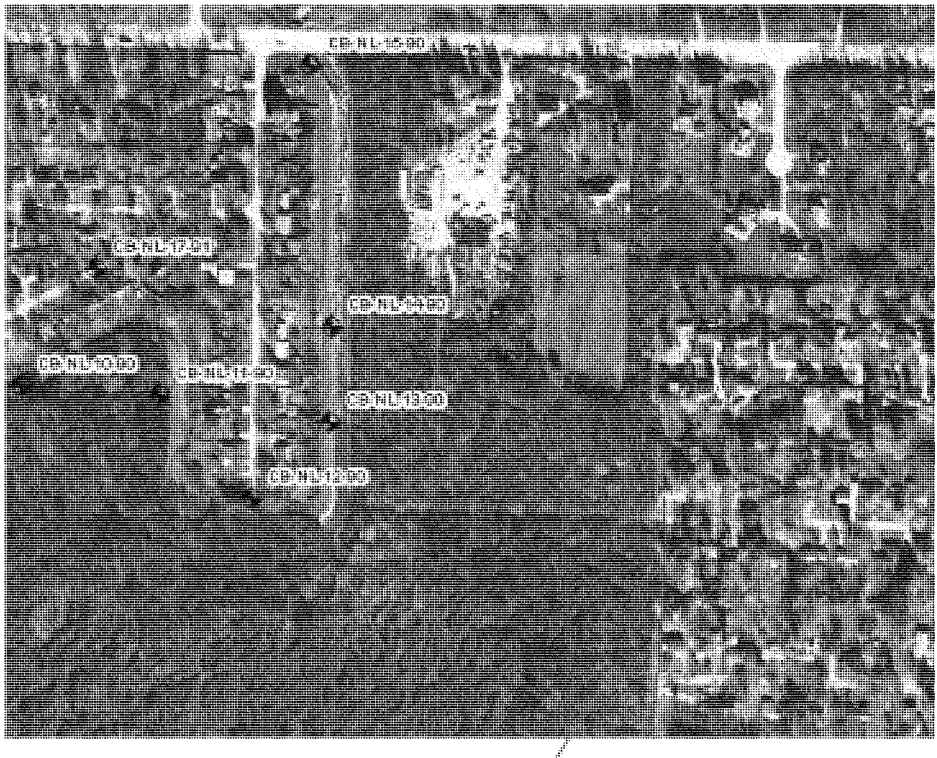
Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.1057	0	0
2	0.25418	0.012177	0.19793	22.763	6.1178	0.2679	0.13395
3	0.50418	0.027397	0.44534	34.302	6.133	0.40269	0.20135
4	0.75418	0.042987	0.69875	44.896	6.1486	0.52573	0.26287
5	1.0042	0.058116	0.94467	53.341	6.1639	0.62307	0.31153
6	1.2542	0.074074	1.2041	60.526	6.1801	0.70515	0.35257
7	1.5042	0.08948	1.4545	66.925	6.1958	0.77772	0.38886
8	1.7542	0.10452	1.6989	73.009	6.2112	0.84632	0.42316
9	2.0042	0.11955	1.9433	78.726	6.2267	0.91032	0.45516
10	2.5041	0.15009	2.4396	90.003	6.2584	1.0354	0.51772
11	3.0041	0.18117	2.945	101.65	6.2909	1.1633	0.58167
12	3.5041	0.21097	3.4293	113.66	6.3225	1.2943	0.64716
13	4.0041	0.24399	3.9661	125.88	6.3578	1.4255	0.71276
14	4.5041	0.27434	4.4594	138.36	6.3907	1.5588	0.77942
15	5.0041	0.30451	4.9498	150.48	6.4236	1.6866	0.84332
16	5.5041	0.33606	5.4626	162.28	6.4585	1.8091	0.90455
17	6.0041	0.36705	5.9664	173.5	6.4931	1.9239	0.96196
18	6.5041	0.39749	6.4612	184.25	6.5274	2.0324	1.0162
19	7.0041	0.4271	6.9426	194.85	6.5612	2.1382	1.0691
20	7.5041	0.45865	7.4554	204.29	6.5976	2.2294	1.1147
21	8.0041	0.48891	7.9472	213.73	6.6328	2.3201	1.16
22	8.5041	0.52073	8.4645	222.33	6.6703	2.3999	1.1999
23	9.0041	0.55173	8.9683	230.72	6.7072	2.4768	1.2384
24	9.5041	0.58226	9.4647	238.59	6.744	2.5472	1.2736
25	10.004	0.61363	9.9745	245.36	6.7822	2.6047	1.3024
26	10.504	0.6437	10.463	252.07	6.8192	2.6615	1.3307
27	11.004	0.67534	10.978	258.31	6.8586	2.7117	1.3558
28	11.504	0.70532	11.465	264.13	6.8963	2.7576	1.3788
29	12.004	0.73595	11.963	270.06	6.9353	2.8037	1.4018
30	12.504	0.76713	12.47	275.04	6.9755	2.839	1.4195
31	13.004	0.79674	12.951	279.45	7.0141	2.8686	1.4343
32	13.504	0.82949	13.483	283.7	7.0572	2.8944	1.4472
33	14.004	0.8602	13.983	287.63	7.0982	2.9176	1.4588
34	14.504	0.89064	14.477	290.99	7.1393	2.9346	1.4673
35	15.004	0.9221	14.989	294.34	7.1822	2.9507	1.4754

APPENDIX G – GEOTECHNICAL DESIGN

Attachment 3 – Previous Soil Boring Logs and Maps

Existing soil borings near Adler Park Levee (DPLV15)



site removed from plan

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-11-90

DRILLING LOG

DIVISION: North Central
INSTALLATION: Chicago District
SHEET 1 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Stations): N 2053225 E 1089375
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-11-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/13/90; COMPLETED 12/13/90
17. ELEVATION TOP OF HOLE: 649.8
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Kingsbury

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
649.8	0.0		Dark grey organic silty clay, trace fine sand, roots present, high plasticity, wet OH		AU-1 0.0-1.0	W_c = 66.9%
				12/18"	SS-2 1.0-2.5	4/8/7 W_c = 8.9%
648.4	1.4		Gray coarse to fine sand, trace silt, trace fine gravel, medium dense, well graded, dry SW-SM			
			Changed to silty fine sand at 3.5'	14/18"	SS-3A,B 3.5-5.0	4/6/9 W_c = 15.9% (SS-3A) W_c = 20.2% (SS-3B)
645.8	4.0		Gray clayey silt, trace fine sand, medium dense, moist CL-ML/ML			Water level at 3.5' while drilling.
644.2	5.6		Gray coarse to fine sand, trace to little silt, medium dense, well graded, saturated SM/SW-SM	12/18"	SS-4 6.0-7.5	5/7/5 W_c = 11.4% Sieve Analysis Gravel = 2% Sand = 86% Fines = 12%
						Field perm test on 12/13/90 Test Depth: 7.0-9.0' k = 1x10^{-3} cm/sec
			Lenses of clayey silt at 8.5'	14/18"	SS-5 8.5-10.0	3/4/8 W_c = 20.6%
			Trace coarse to fine gravel at 11.0'	14/18"	SS-6 11.0-12.5	5/7/7 W_c = 15.9%
				12/18"	SS-7 13.5-15.0	5/5/5 W_c = 17.7%
				10/18"	SS-8 16.0-17.5	6/7/8 W_c = 19.0%
			Trace coarse to fine gravel at 18.5'	12/18"	SS-9 18.5-20.0	18/16/14 W_c = 5.7%
629.8	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT 220A - North Libertyville HOLE NO. CB-NL-11-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-11-90

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	2 OF 2 SHEETS
1. PROJECT	North Libertyville Flood Control
2. LOCATION (Coordinates or Station)	N 2053225, E 1089375
3. DRILLING AGENCY	Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number)	CB-NL-11-90
5. NAME OF DRILLER	Manuel Rosario
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25.0'
8. DEPTH DRILLED INTO ROCK	0.0'
9. TOTAL DEPTH OF HOLE	25.0'
10. SIZE AND TYPE OF BIT	3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45/ATV
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER	See Remarks
16. DATE HOLE	STARTED 12/13/90 / COMPLETED 12/13/90
17. ELEVATION TOP OF HOLE	649.8
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	R. Krishna Murthy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
629.8	20.0		Gray coarse to fine sand, trace to little silt, trace coarse to fine gravel, medium dense, well graded, saturated SM/SW-SM			
628.6	21.2		Gray silty clay, trace coarse to fine sand, trace fine gravel, low plasticity, moist CL	12/18"	SS-10 21.0-22.5	6/7/11 q_u* = 2.0 tsf w_c = 15.3%
						q_u* = 2.0 tsf w_c = 17.6% UC Test γ_d = 115.9 pcf q_u = 1.4 tsf Atterberg Limits LL = 26 PI = 12
				20/24"	31-11 23.5-25.5	
624.3	25.5		End of boring at 25.5'.			Water level at 0.0' immediately after drilling. Water level at ground surface after delayed period. Boring was tremie ground using Volclay®. Reference Locations: 1. 120' west of southwest corner of residence at 30330 East End Avenue. 2. 116' west of northwest corner of residence at 30300 East End Avenue. 3. 110' south of northwest corner of residence at 30316 East End Avenue.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT 220A - North Libertyville Flood Control | HOLE NO. CB-NL-10-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-12-90

DRILLING LOG

DIVISION: North Central
INSTALLATION: Chicago District
SHEET 1 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2052931, E 1089669
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-12-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (USGS or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-65/ATV
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/13/90; COMPLETED 12/13/90
17. ELEVATION TOP OF HOLE: 656.1
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krysha

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
656.1	0.0		Grayish brown coarse to fine sand, little silt, loose, well graded, moist, fill SW-SM		AU-1 0.0-1.1	W_c = 6.2%
				12/18"	SS-2 1.0-2.5	4/3/4 W_c = 16.0% Disturbed sample
654.9	1.2		Gray and brown silty clay, little fine sand, trace coarse to medium sand roots present, medium stiff, low plasticity, moist CL			
653.0	3.1		Brown clayey coarse to fine sand, little silt, medium dense, well graded, moist SC	14/18"	SS-3 3.5-5.0	4/5/7 W_c = 10.3%
650.6	5.5		Dark brown coarse to fine sand, little silt, medium dense, well graded, moist SM			
				14/18"	SS-4 6.0-7.5	8/12/13 W_c = 8.8%
			Changed to gray at 8.5'	14/18"	SS-5 8.5-10.0	6/7/7 W_c = 12.2%
645.5	10.6		Gray silt, trace fine sand, medium dense, moist ML	12/18"	SS-6 11.0-12.5	5/7/7 W_c = 15.3% Atterberg Limits Non-Plastic Water level at 13.0' while drilli
				14/18"	SS-7 13.5-15.0	5/5/5 W_c = 18.3%
640.7	15.4		Gray coarse to fine sand, trace silt, trace coarse to fine gravel, medium dense, well graded, saturated, SW-SM	16/18"	SS-8 16.0-17.5	5/11/9 W_c = 8.0% Field perm test on 12/13/90 Test dept: 18.0-20.0 K = 5x10^{-4} cm/sec Sieve Analysis Gravel = 45% Sand = 50% Fines = 5%
			Dense at 18.5'	16/18"	SS-9 18.5-20.0	28/25/21 W_c = 6.9%
636.1	20.0					

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. MODIFIED BY PATRICK ENGINEERING 11/84

PROJECT 220A - North Libertyville Flood Control — HOLE NO. CB-NL-12-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-12-90

DRILLING LOG

DIVISION: North Central
INSTALLATION: Chicago District
SHEET 2 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2052931, E 1089649
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-12-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/13/90; COMPLETED 12/13/90
17. ELEVATION TOP OF HOLE: 656.1
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krishna Reddy

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
636.1	20.0		Gray coarse to fine sand, trace silt, trace coarse to fine gravel, medium dense to dense, well graded, saturated SW-SM	14/18"	SS-10 21.0-22.5	12/15/13 W_c = 5.7%
				8/18"	SS-11 23.5-25.0	7/8/14 q_u* = 2.5 tsf W_c = 20.3%
632.1	24.0		Gray silty clay, trace fine sand, very stiff, low plasticity, moist CL			
631.1	25.0		End of Boring at 25.0'.			Water level could not be measured because borehole was caved in at 8.0'. Water was not encountered within top 8.0'. Boring was tremie grouted using Volclay®. Reference Locations: 1. Located at the dead end of East End Avenue roadway. 2. 90' east of southeast corner of residence at 30270 East End Avenue. 3. 40' west of southwest corner of residence at 30257 East End Avenue.

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. MODIFIED BY PATRICK ENGINEERING 11/64

PROJECT 220A - North Libertyville Flood Control — HOLE NO. CB-NL-12-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-13-90

DRILLING LOG

DIVISION: North Central | INSTALLATION: Chicago District | SHEET 1 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2053157, E 1089873
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-13-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-7/8" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (USM or NGS): NGVD (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/17/90; COMPLETED 12/18/90
17. ELEVATION TOP OF HOLE: 654.5
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Kuykendall

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
654.5	0.0		Dark gray to gray organic silty clay, little coarse to fine sand, roots present, medium plasticity, moist to wet OL		AU-1 0.0-1.0	W_c = 16.8%
653.5	1.0		Brownish-gray silty clay, trace coarse to fine sand, medium stiff, low to medium plasticity, wet CL	12/18"	SS-2 1.0-2.5	4/4/5 q_u* = 1.0 tsf W_c = 21.8% Pockets of sand at 1.0'.
651.5	3.0		Brown coarse to fine sand, little silt, medium dense, well graded, moist SM	12/18"	SS-3 3.5-5.0	7/12/14 W_c = 10.6%
			Changed to silty fine sand at 6.0'	14/18"	SS-4A,B 6.0-7.5	6/9/10 q_u* = 1.25 tsf (SS-4B) W_c = 20.1% (SS-4A) W_c = 19.2% (SS-4B)
647.5	7.0		Gray silt, trace fine sand, medium dense, moist ML			
			Lenses of silty clay at 8.5'	12/18"	SS-5 8.5-10.0	6/7/9 W_c = 20.0%
						Water level at 10.5' while drilling.
644.1	10.4		Gray silty clay, trace fine sand, stiff, low plasticity, moist CL	24/24"	ST-6 11.0-13.0	q_u* = 1.5 tsf W_c = 22.9% UC Test T_d = 105.7 pcf q_u = 1.2 tsf
641.3	13.2		Gray coarse to fine sand and fine gravel, trace silt, medium dense, well graded, saturated SW	14/18"	SS-7 13.5-15.0	5/6/13 W_c = 11.2% Field perm test on 12/17/90 Test Depth: 16.5'-18.0' k = 1x10^{-3} cm/sec
						Sieve Analysis (SS-8) Gravel = 42% Sand = 55% Fines = 3%
				14/18"	SS-8 16.0-17.5	3/7/11 W_c = 10.9%
						Terminated drilling on 12/17/90. Resumed drilling on 12/18/90. Water level at 7.0' before drilling.
			Trace coarse to fine gravel at 18.5'	14/18"	SS-9 18.5-20.0	10/12/15 W_c = 9.9%
634.5	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT 220A - North Libertyville Flood Control | HOLE NO. CB-NL-13-90

Flood Control | CB-NL-13-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-13-90

DRILLING LOG

DIVISION: North Central
INSTALLATION: Chicago District
SHEET 2 OF 5 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2053157, E 1089873
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-13-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3 7/8" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/17/90; COMPLETED 12/18/90
17. ELEVATION TOP OF HOLE: 654.5
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krishna Reddy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
634.5	20.0		Gray coarse to fine sand, trace silt, trace coarse to fine gravel, medium dense, well graded, saturated SW-SM			
				14/18"	SS-10 21.0-22.5	9/9/11 W_c = 17.4%
631.4	23.1		Gray silty clay, trace coarse to fine sand, stiff, low plasticity, moist CL	12/18"	SS-11 23.5-25.0	10/5/6 Q_u* = 1.5 taf W_c = 15.4%
629.5	25.0		End of Boring at 25.0'.			Water level at 7.0' immediately after drilling. Water level stabilized at 7.0'. Borehole was tremie grouted using Volclay®. Reference Locations: 1. 5' east of drainage ditch. 2. 80' east of residence at 30285 East End Avenue. 3. 72' east of residence at 30305 East End Avenue.

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. MODIFIED BY PATRICK ENGINEERING 11/84

PROJECT 220A - North Libertyville Flood Control | HOLE NO. CB-NL-13-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-14-90

DRILLING LOG

DIVISION: North Central | INSTALLATION: Chicago District | SHEET 1 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2053634, E 1089872
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-14-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (☐ GS or ☒ MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9, UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/17/90, COMPLETED 12/17/90
17. ELEVATION TOP OF HOLE: 653.0
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krishna Reddy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
653.0	0.0		Dark gray to gray organic silty clay, little coarse to fine sand, roots present, medium plasticity, wet CL		AU-1 0.0-1.0	W_c = 24.9%
652.0	1.0		Gray silty clay, trace coarse to fine sand, very stiff, medium plasticity, dry CL	12/18"	SS-2 1.0-2.5	5/6/9 q_u* = 2.5 tsf W_c = 16.8%
						Sieve Analysis (SS-3) Gravel = 14% Sand = 74% Fines = 12%
649.9	3.1		Gray coarse to fine sand, little fine gravel, little silt, medium dense, well graded, moist to saturated SM	10/18"	SS-3 3.5-5.0	4/6/5 W_c = 11.8%
						Field perm test on 12/17/90 Test Depth: 4.0' k = 1x10^{-3} cm/sec Water level at 6.0' while drilling.
647.5	5.5		Gray silt, trace fine sand, medium dense, moist to saturated ML	10/18"	SS-4 6.0-7.5	6/5/11 W_c = 18.2%
						Atterberg Limits Non-Plastic
				14/18"	SS-5 8.5-10.0	3/6/8 W_c = 19.9%
642.6	10.4		Gray silty clay, trace fine sand, stiff, medium plasticity, moist CL			
				16/18"	SS-6 11.0-12.5	3/7/7 q_u* = 1.75 tsf W_c = 18.9%
						q_u* = 1.5 tsf
				24/24"	ST-7 13.5-15.5	W_c = 23.0%
						Atterberg Limits LL = 31 PI = 14
						Consolidation Test W_c = 22.7%, γ_d = 107.8 pcf e_o = 0.60, C_c = 0.04, C_r = 0.007
				24/24"	ST-8 16.0-18.0	q_u* = 1.5 tsf W_c = 26.8%
						UC Test γ_d = 99.1 pcf q_u = 1.2 tsf
634.8	18.2		Gray coarse to fine sand, trace fine gravel, trace silt, dense, well graded, saturated SW-SM	16/18"	SS-9 18.5-20.0	10/21/20 W_c = 7.6% Blown at 18.5'.
633.0	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.
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PROJECT 220A – North Libertyville Flood Control | HOLE NO. CB-NL-14-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-14-90

DRILLING LOG

DIVISION: North Central

INSTALLATION: Chicago District

SHEET 2 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2053434, E 1089872
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-14-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (USBM or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9; UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/17/90; COMPLETED 12/17/90
17. ELEVATION TOP OF HOLE: 653.0
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krishna Reddy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
633.0	20.0		Gray coarse to fine sand, trace fine gravel, trace silt, dense, well graded, saturated SW-SW			
				14/18"	SS-10 21.0-22.5	10/18/20 W_c = 10.2% Blowin at 21.0'.
			Trace coarse gravel at 23.5'	16/18"	SS-11 23.5-25.0	19/22/35 W_c = 19.2%
628.0	25.0		End of Boring at 25.0'.			Water level at 5.5' immediately after drilling. Water level stabilized at 5.0' after about 1/2-hour from completion of drilling. Borehole was tremie grouted using Volclay®. Reference Locations: 1. 3' east of drainage ditch. 2. 85' east of southeast residence at 30345 East End Avenue. 3. 92' east of northeast residence at 30331 East End Avenue.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT 220A - North Libertyville Flood Control

HOLE NO. CB-NL-14-90

Flood Control 1 CB-NL-14-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-15-90

DRILLING LOG

DIVISION: North Central

INSTALLATION: Chicago District

SHEET 1 OF 2 SHEETS

1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2054188, E 1089798
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-15-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9; UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/14/90; COMPLETED 12/14/90
17. ELEVATION TOP OF HOLE: 650.6
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krishna Reddy

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
650.6	0.0		Gray to dark gray organic silty clay, trace coarse to fine sand, roots present, medium plasticity, wet CL		AU-1 0.0-1.0	w_c = 34.2%
				3/18"	SS-2 1.0-2.5	1/1/1 w_c = 28.1%
647.8	2.8		Grayish-brown silty clay, trace coarse to fine sand, trace fine gravel, stiff to very stiff, low plasticity, moist CL			
				14/18"	SS-3 3.5-5.0	3/4/6 q_u* = 2.0 tsf w_c = 21.0%
645.2	5.4		Light gray silty clay, trace coarse to fine sand, trace fine gravel, very stiff, low plasticity, moist CL			
				16/24"	ST-4 6.0-8.0	q_u* = 2.5 tsf w_c = 17.5% UC Test γ_d = 115.3 pcf q_u = 3.0 tsf
				24/24"	ST-5 8.5-10.5	q_u* = 3.0 tsf Water level at 11.0' while drilling.
639.8	10.8		Gray coarse to fine sand, little silt, some coarse to fine gravel, loose, well graded, saturated SM			
				12/18"	SS-6 11.0-12.5	5/4/3 w_c = 13.7% Field perm test on 12/14/90 Test Depth: 11.5'-13.5' k = 2x10^{-4} cm/sec Sieve Analysis Gravel = 29% Sand = 55% Fines = 16%
			Changed to silty fine sand at 13.5'	14/18"	SS-7 13.5-15.0	3/3/6 w_c = 23.0%
635.2	15.4		Gray silty clay, trace coarse to fine sand, trace fine gravel, stiff, medium plasticity, moist CL			
				18/18"	SS-8 16.0-17.5	4/7/8 q_u* = 1.75 tsf w_c = 18.2%
632.6	18.0		Gray coarse to fine sand, little silt, trace coarse to fine gravel, medium dense, poorly graded, saturated SM			
				4/18"	SS-9 18.5-20.0	5/6/6 w_c = 9.5%
630.6	20.0					

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. MODIFIED BY PATRICK ENGINEERING 11/84

PROJECT ZZUA - North Libertyville Flood Control — HOLE NO. CB-NL-15-90

Existing soil boring near Adler Park Levee (DPLV15)

Hole No. CB-NL-15-90

DRILLING LOG

DIVISION: North Central

INSTALLATION: Chicago District

SHEET 2 OF 2 SHEETS

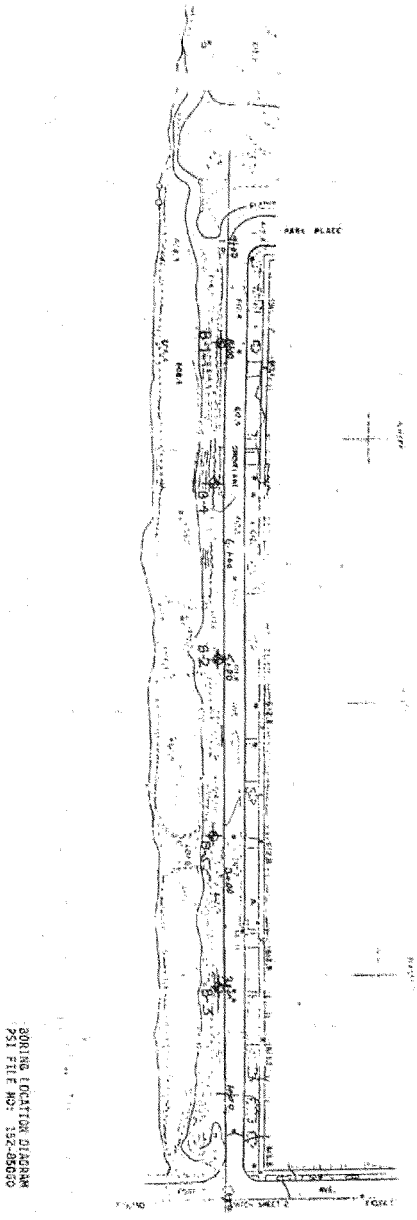
1. PROJECT: North Libertyville Flood Control
2. LOCATION (Coordinates or Station): N 2054188, E 1089708
3. DRILLING AGENCY: Patrick Drilling, Inc.
4. HOLE NO. (As shown on drawing title and file number): CB-NL-15-90
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 25.0'
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 25.0'
10. SIZE AND TYPE OF BIT: 3-7/8" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (USGS or MSL): MSL (1929 NGVD)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-45/ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9; UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See Remarks
16. DATE HOLE: STARTED 12/14/90; COMPLETED 12/14/90
17. ELEVATION TOP OF HOLE: 650.6
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: R. Krishna Reddy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
630.6	20.0		Gray coarse to fine sand, little silt, trace coarse to fine gravel, medium dense, poorly graded, saturated SM	16/18"	SS-10 21.0-22.5	4/6/10 W_c = 18.6%
627.5	23.1		Gray silty clay, trace coarse to fine sand, trace fine gravel, very stiff, low plasticity, moist CL	18/18"	SS-11 23.5-25.0	5/8/8 Q_u* = 2.5 tsf W_c = 18.7%
625.6	25.0		End of Boring at 25.0'.			Water level at 9.0' immediately after drilling. Water level stabilized at 7.0' after 1/2 hour of completion of drilling. Boring was tremie grouted using Volclay®. Reference Locations: 1. 56' north of northeast corner of residence at 30465 East End Avenue. 2. 3' west of drainage ditch. 3. 16' south of bridge abutment located on Buckley Road.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. MODIFIED BY PATRICK ENGINEERING 11/84

PROJECT ZUA : North Libertyville Flood Control | HOLE NO. CB-NL-15-90

Borings along Grovelend Ave Levee (DPLV01)



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Borings along Grovelend Ave Levee (DPLV01)

Professional Service Industries, Inc.

RECORD OF SUBSURFACE EXPLORATION

Boring B-1

Project Name: Groveland Avenue Berm Date of Boring: May 17, 1988

Site: Riverside, Illinois Project No: 152-85060

DESCRIPTION	DEPTH (feet)	SAMPLE	N	Q_u	Q_p	M_c	REMARKS
SURFACE 612							γ_d (pcf)
Dark brown silty clay TOPSOIL		1AU				16	
Very stiff brown silty CLAY, trace organics		2SS	12	-	3.25	21	
Stiff brown and gray silty CLAY	5	3SS	5	-	1.5	31	
		4SS	7	1.9	1.5	26	119
Slightly compact silty fine to medium SAND	10	5SS	5	-			
Total depth of boring = 11.5'							
Groundwater not encountered	15						
	20						

6/87 IN

Borings along Grovelend Ave Levee (DPLV01)

Professional Service Industries, Inc.

RECORD OF SUBSURFACE EXPLORATION

Boring B-2

Project Name: Groveland Avenue Berm Date of Boring: May 17, 1988

Site: Riverside, Illinois Project No.: 152-85060

DESCRIPTION	DEPTH (feet)	SAMPLE	N	Q_u	Q_p	M_c	REMARKS
SURFACE 612							γ_d (pcf)
Dark brown silty CLAY		1AU				13	
Stiff to very stiff brown silty CLAY		2SS	19	-	1.75	22	
	5	3SS	15	2.1	3.5	25	99
Brown silty sandy CLAY		4SS	5	-	-	23	
	10						▼
Medium dense to dense brown fine to course SAND		5SS	10				
		6SS	18				
	15						
Weathered Rock		7SS	100/16"				
		8SS	100/2"				
	20						
		9SS	100/0"				
Total depth of boring = 21.5' Groundwater encountered at 10' while drilling							

6/87 1M-2

Borings along Grovelend Ave Levee (DPLV01)

Professional Service Industries, Inc.

RECORD OF SUBSURFACE EXPLORATION

Boring B-3

Project Name: Groveland Avenue Berm Date of Boring: May 17, 1988

Site Riverside, Illinois Project No.: 152-85060

DESCRIPTION	DEPTH (Feet)	SAMPLE	N	Q_u	Q_p	M_c	REMARKS
SURFACE 612							γ_d (pcf)
Very stiff dark brown silty CLAY		1AU				18	
		2SS	16	-	2.5	31	
	5	3SS	16	1.9	4.0	25	100
Stiff brown silty CLAY							
Slightly compact brown silty fine SAND		4SS	5	-	-	-	
	10	5SS	6	-	-	-	
Total depth of boring = 11.5'							
Groundwater not encountered	15						
	20						

6/87 1M3

Borings along Grovelend Ave Levee (DPLV01)

Professional Service Industries, Inc.

RECORD OF SUBSURFACE EXPLORATION

Boring B-4

Project Name: Groveland Avenue Berm Date of Boring: May 19, 1988

Site: Riverside, Illinois Project No: 152-85060

DESCRIPTION	DEPTH (feet)	SAMPLE	N	σ_u	σ_p	M_c	REMARKS
SURFACE							
Light and dark brown silty CLAY, trace organics		1SS	24*	-	-	15	* 35 lb. hammer
Very stiff dark brown and gray sandy CLAY		2SS	79*	-	3.5	13	
		3SS	59*	-	-	17	
Total depth of boring = 4.5'	5						
No groundwater encountered	10						
	15						
	20						

6/87 1M

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Borings along Grovelend Ave Levee (DPLV01)

Professional Service Industries, Inc.

RECORD OF SUBSURFACE EXPLORATION

Boring B-5

Project Name: Groveland Avenue Berm Date of Boring: May 19, 1988

Site: Riverside, Illinois Project No.: 152-85060

DESCRIPTION	DEPTH (Feet)	SAMPLE	$w\%$	Q_u	Q_p	M_c	REMARKS
SURFACE							
Very stiff light and dark brown silty CLAY, trace organics		1SS	14*			20	* 35 lb. hammer
		2SS	23*		2.5	21	
		3SS	47*			19	
Total depth of boring = 4.5'	5						
	10						
	15						
	20						

6/87 1M5

Borings along Grovelend Ave Levee (DPLV01)

Professional Service Industries

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split-spoon.
- Qu: Unconfined compressive strength, TSF
- Qp: Penetrometer value, unconfined compressive strength, TSF
- Mc: Water content, %
- LL: Liquid limit, %
- PI: Plasticity Index, %
- δ d: Natural dry density, PCF
- ▽: Apparent groundwater level at time noted after completion.

DRILLING AND SAMPLING SYMBOLS

- SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
- ST: Shelby Tube - 3" O.D., except where noted.
- AU: Auger Sample.
- DB: Diamond Bit.
- CB: Carbide Bit.
- WS: Washed Sample.

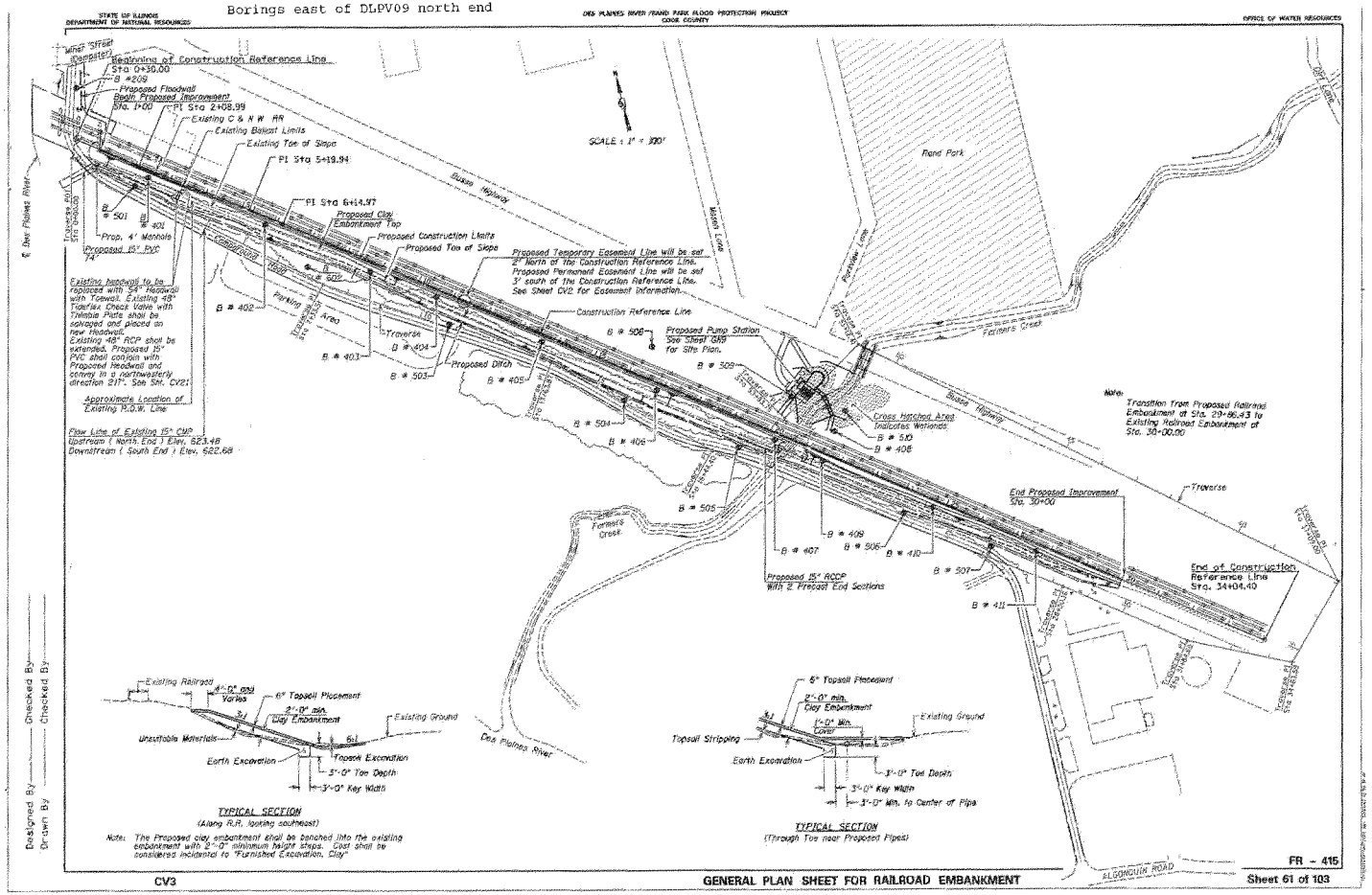
RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

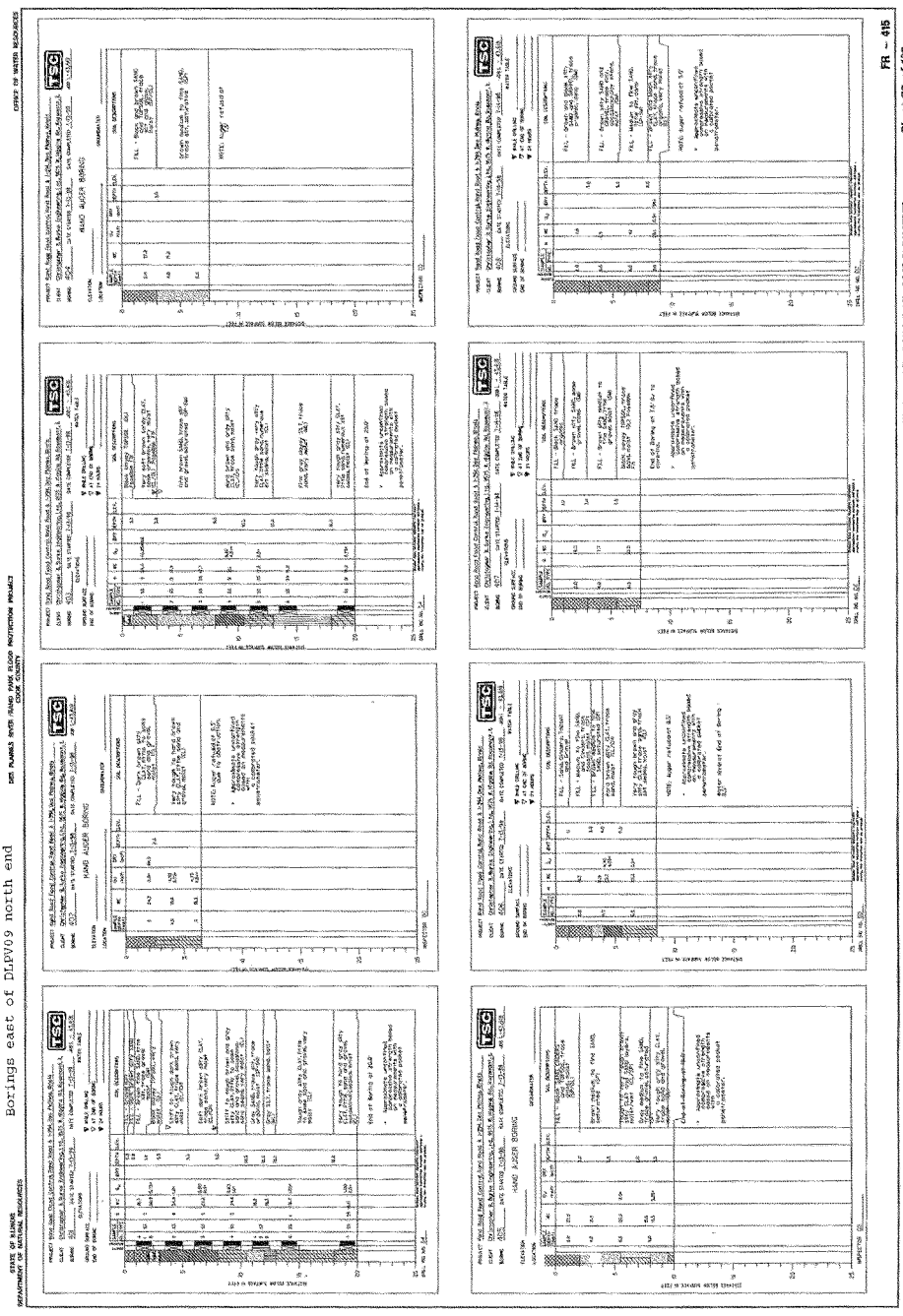
TERM (NON-COHESIVE SOILS)	STANDARD PENETRATION RESISTANCE
Very Loose	0 - 2
Loose	2 - 4
Slightly Compact	4 - 8
Medium Dense	8 - 16
Dense	16 - 26
Very Dense	Over 26

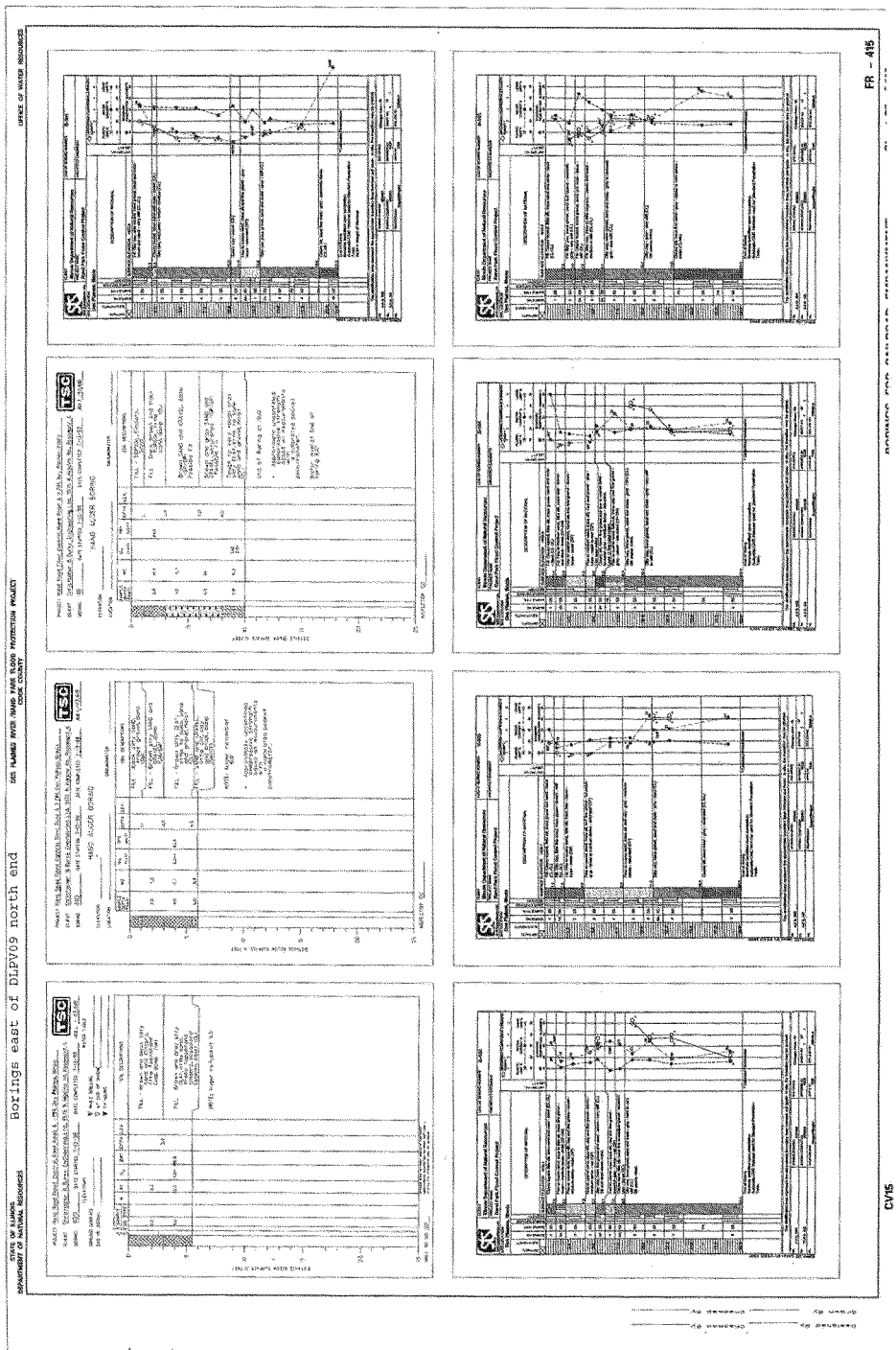
TERM (COHESIVE SOILS)	Qu - (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

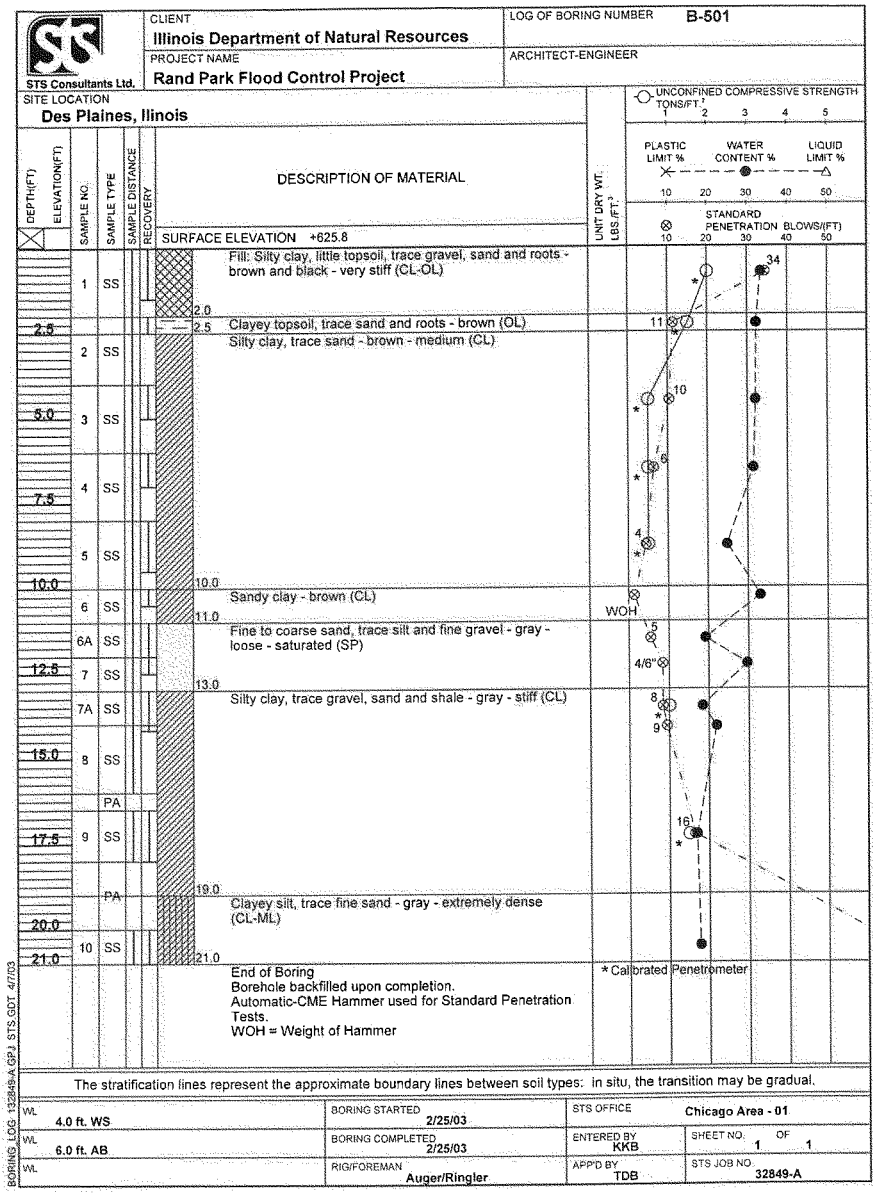
PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		


Borings east of DLPV09 north end
STATE OF ILLINOIS
DEPARTMENT OF NATURAL RESOURCES
DES PLAINES RIVER (RAND PARK) FLOOD PROTECTION PROJECT
COOK COUNTY
OFFICE OF WATER RESOURCES
Beginning of Construction Reference Line
Sta 0+30.00
Proposed Floodwall
Begin Proposed Improvement
Sta. 1+00
PI Sta 2+08.99
Existing C & N W RR
Existing Ballast Limits
Existing Toe of Slope
PI Sta 5+19.94
PI Sta 6+14.97
Proposed Clay Embankment Top
Proposed Construction Limits
Proposed Toe of Slope
Proposed Temporary Easement Line will be set 2' North of the Construction Reference Line. Proposed Permanent Easement Line will be set 3' south of the Construction Reference Line. See Sheet CV2 for Easement Information.
Construction Reference Line
Prop. 4' Manhole
Proposed 15" RCP
Existing headwall to be replaced with 54" Headwall with Fencell. Existing 48" Tideflex Check Valve with Trihinge Parts shall be salvaged and placed on new Headwall. Existing 48" RCP shall be extended. Proposed 15" RCP shall conjoin with Proposed headwall and convey in a northwesterly direction 217'. See Sht. CV21
Approximate Location of Existing M.G.W. Line
Flow Line of Existing 15" CMP
Upstream (North End) Elev. 623.48
Downstream (South End) Elev. 622.68
Parking Area
Traverse
Proposed Ditch
Proposed Pump Station See Sheet CV5 for Site Plan.
Cross Hatched Area Indicates Wetlands
Proposed 15" RCCP With 2 Precast End Sections
End Proposed Improvement Sta. 33+00
End of Construction Reference Line Sta. 34+04.40
Transition from Proposed Railroad Embankment at Sta. 29+86.43 to Existing Railroad Embankment at Sta. 36+00.00
Note:
Busse Highway
Rand Park
Farmer's Creek
Des Plaines River
Algonquin Road
SCALE : 1" = 200'
Existing Railroad
4'-0" ±
Varies
6" Topsoil Placement
2'-0" min.
Clay Embankment
Existing Ground
Unsuitable Materials
Earth Excavation
Topsoil Excavation
3'-0" Toe Depth
3'-0" Key Width
TYPICAL SECTION
(Along R.R. looking southeast)
Note: The Proposed clay embankment shall be benched into the existing embankment with 2'-0" minimum height steps. Cost shall be considered incidental to "Furnished Excavation, Clay"
6" Topsoil Placement
2'-0" min.
Clay Embankment
1'-0" Min.
Cover
Existing Ground
Topsoil Stripping
Earth Excavation
3'-0" Toe Depth
3'-0" Key Width
3'-0" Min. to Center of Pipe
TYPICAL SECTION
(Through Toe near Proposed Pipes)
Designed By
Checked By
Drawn By
Checked By
CV3
GENERAL PLAN SHEET FOR RAILROAD EMBANKMENT
FR - 415
Sheet 61 of 103


STATE OF ILLINOIS
DEPARTMENT OF NATURAL RESOURCES
Borings east of DLPV09 north end
DES PLAINES RIVER ROAD PARK FLOOD PROTECTION PROJECT
COOK COUNTY
OFFICE OF WATER RESOURCES
HAND AUGER BORING
CV14
BORINGS FOR RAILROAD EMBANKMENT
Sheet 72 of 103
FR - 415


STATE OF ILLINOIS
DEPARTMENT OF NATURAL RESOURCES
Borings east of DLPV09 north end
DES PLAINES RIVER TRAIL AND FLOOD PROTECTION PROJECT
OFFICE OF WATER RESOURCES
CVIS
FR - 415


STS Consultants Ltd.
CLIENT
Illinois Department of Natural Resources
LOG OF BORING NUMBER B-501
PROJECT NAME
Rand Park Flood Control Project
ARCHITECT-ENGINEER
SITE LOCATION
Des Plaines, Illinois
DEPTH(FT)
ELEVATION(FT)
SAMPLE NO.
SAMPLE TYPE
SAMPLE DISTANCE
RECOVERY
DESCRIPTION OF MATERIAL
SURFACE ELEVATION +625.8
UNIT DRY WT. LBS./FT.3
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2
PLASTIC LIMIT %
WATER CONTENT %
LIQUID LIMIT %
STANDARD PENETRATION BLOWS/(FT)
Fill: Silty clay, little topsoil, trace gravel, sand and roots - brown and black - very stiff (CL-OL)
2.0
Clayey topsoil, trace sand and roots - brown (OL)
2.5
Silty clay, trace sand - brown - medium (CL)
10.0
Sandy clay - brown (CL)
11.0
Fine to coarse sand, trace silt and fine gravel - gray - loose - saturated (SP)
13.0
Silty clay, trace gravel, sand and shale - gray - stiff (CL)
19.0
Clayey silt, trace fine sand - gray - extremely dense (CL-ML)
21.0
End of Boring
Borehole backfilled upon completion.
Automatic-CME Hammer used for Standard Penetration Tests.
WOH = Weight of Hammer
* Calibrated Penetrometer
WOH
4/6"
55/6"
The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.
WL 4.0 ft. WS
WL 6.0 ft. AB
WL
BORING STARTED 2/25/03
BORING COMPLETED 2/25/03
RIG/FOREMAN Auger/Ringler
STS OFFICE Chicago Area - 01
ENTERED BY KKB
SHEET NO. 1 OF 1
APP'D BY TDB
STS JOB NO. 32849-A
BORING_LOG_32849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-502

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

SITE LOCATION: Des Plaines, Illinois

SURFACE ELEVATION +628.4

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
		1	SS			Clayey topsoil, little silt, trace sand and roots - black (CL-OL)		16/6"
	1.0	1A	SS			Fine to medium sand, trace to little silt, trace fine gravel - brown - medium dense - moist (SP-SM)		16
2.5	2.0	2	SS			Fine to coarse sand, trace to little silt, clay and fine gravel - brown - medium dense - moist (SW-SM)		19
	4.0	3	SS			Fine to coarse sand, trace silt, clay and fine gravel - brown - medium dense - wet (SP)		12/6"
5.0	5.0	3A	SS			Silty clay, trace fine gravel and sand - brown - very stiff (CL)		32
	6.0	4	SS			Silt and sand seams noted. Fine to coarse sand, trace silt, clay and fine gravel - brownish gray - dense - wet (SP)		17/6"
7.5	7.0	4A	SS			Clayey sand, little silt, trace fine to medium gravel - brownish gray - dense (SC)		31
	8.0	5	SS			Silty clay, trace gravel, sand and shale - gray - hard to very stiff (CL) Silt seams noted.		23
10.0		6	SS					34
12.5		7	SS					18
15.0			PA					
17.5		8	SS					25
20.0	20.0					End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.		

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0 ft. WS	BORING STARTED 2/25/03	STS OFFICE Chicago Area - 01	
WL 12.0 ft. AB	BORING COMPLETED 2/25/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-502A

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

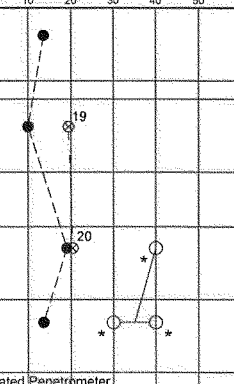
SITE LOCATION: Des Plaines, Illinois

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
				SURFACE ELEVATION +628.4	
	1	ST		Fine to coarse sand, little silt, trace clay and gravel - brown - moist (SM)	112
2.0					
2.5		PA		Drilling without sampling.	
	2	SS		Fine to coarse sand, trace silt, clay and gravel - brown - moist (SW-SM)	108
4.5					
5.0		PA		Drilling without sampling.	
6.0					
	3	SS		Silty clay, little sand, trace gravel - gray - hard (CL)	
7.5					
8.0					
	4	ST		Silty clay, trace gravel, sand and shale - gray - very stiff to hard (CL)	120
10.0					
				End of Boring Monitor Well installed to 8 ft. - See Field Well Installation Diagram Automatic-Mobile Hammer used for Standard Penetration Tests. 3 in. ST and SS samplers used.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 7.0 ft. WS	BORING STARTED 3/6/03	STS OFFICE Chicago Area - 01	
WL 6.0 ft. AB	BORING COMPLETED 3/6/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Baker	APP'D BY TDB	STS JOB NO. 32849-A

BORING LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: **Illinois Department of Natural Resources**

LOG OF BORING NUMBER: **B-503**

PROJECT NAME: **Rand Park Flood Control Project**

ARCHITECT-ENGINEER:

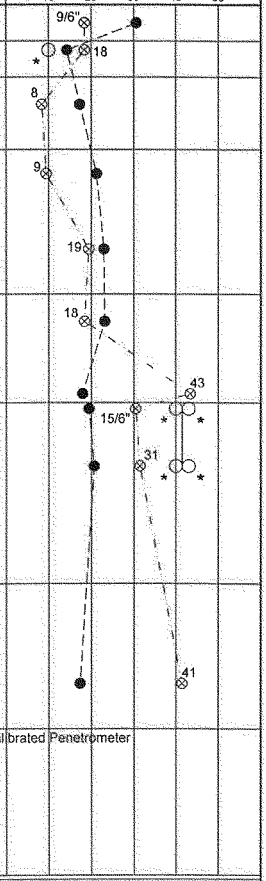
SITE LOCATION: **Des Plaines, Illinois**

UNCONFINED COMPRESSIVE STRENGTH TONS/FT² (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT LBS./FT³
					SURFACE ELEVATION +629.1	
	1	SS			Fill: Clayey topsoil, little silt, trace gravel and sand - black (CL-OL)	
1.0	1A	SS			Fill: Silty clay, little fine sand, trace gravel - brown - stiff (CL-SC)	
2.0 2.5	2	SS			Fill: Fine to coarse sand, little silt, trace clay - brown - loose - moist (SM)	
4.0 5.0	3	SS			Fine to coarse sand, little silt and fine gravel - brownish gray - loose to medium dense - saturated (SW-SM)	
7.5	4	SS				
8.0	5	SS			Fine to coarse sand, little silt and clay - gray - medium dense - saturated (SW-SM)	
10.0	6	SS				
11.0	6A	SS			Silty clay, trace gravel, sand and roots - gray - hard (CL)	
12.5	7	SS				
15.0 16.0		PA			Clayey silt, trace sand - gray - saturated (CL-ML)	
17.5	8	SS				
20.0 20.0					End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.	



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0 ft. WD	BORING STARTED 2/25/03	STS OFFICE Chicago Area - 01	
WL 4.0 ft. AB	BORING COMPLETED 2/25/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-503A

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

SITE LOCATION: Des Plaines, Illinois

SURFACE ELEVATION +629.1

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5 / PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % 10 20 30 40 50 / STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50
		PA		Drilling without sampling. 1.0		
2.5	1	ST		Fine to coarse sand, little clay, trace silt and gravel - brown - moist (SM) 3.0	97	
		PA		Drilling without sampling. 4.0		
5.0	2	SS		Sandy clay, little silt - brown (CL) 6.0		6
		PA		Drilling without sampling. 7.0		
7.5	3	SS		Fine to coarse sand, trace silt and clay - brown - moist (SM) 9.0	104	28
10.0		ST		Drilling without sampling.		
12.5		PA		13.0		
	4	ST		Silty clay, little sand, trace gravel and shale - gray - very stiff (CL) 15.0		*
15.0				End of Boring Monitor Well installed to 11 ft. - See Field Well Installation Diagram Automatic-Mobile Hammer used for Standard Penetration Tests. 3 in. ST and SS samplers used.		* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0 ft. WS	BORING STARTED 3/6/03	STS OFFICE Chicago Area - 01	
WL 4.5 ft. AB	BORING COMPLETED 3/6/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Baker	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-504

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

SITE LOCATION: Des Plaines, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT² (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT³
						SURFACE ELEVATION +626.9	
		1	SS			Fill: Clayey topsoil, little silt, trace gravel, sand and roots - black (CL-OL)	
	1.0	1A	SS			Fill: Fine to medium sand, little silt, trace clay - brown and black - loose (SP-SM)	
2.5	2.0	2	SS			Fine to coarse sand, little silt and fine gravel - brown - loose - moist (SW-SM)	
	4.0	3	SS			Fine to medium sand, little silt, clay and gravel - gray - loose - moist to wet (SW-SM)	
5.0	5.0	3A	SS			Clay layer noted.	
	6.0		PA			Clayey silt, trace fine gravel and fine to coarse sand - brownish gray - medium dense - saturated. Layer of fine sand noted.	
7.5	8.0	4	SS			Fine to coarse sand, little silt, trace clay and fine gravel - gray - dense - saturated (SW-SM)	
	10.0	5	SS			Silty clay, trace gravel, sand and shale - gray - hard (CL) Silt seams noted.	
10.0		6	SS			Silty clay, trace gravel, sand and shale - gray - very stiff to stiff (CL)	
12.5		7	SS				
15.0			PA				
17.5		8	SS				
20.0	20.0					End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.	

5/6", 5, 7, 4/6", 17, 33, 20, 22, 19, 25

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0 ft. WS	BORING STARTED 2/25/03	STS OFFICE Chicago Area - 01	
WL 4.0 ft. AB	BORING COMPLETED 2/25/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG_32849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-504A

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

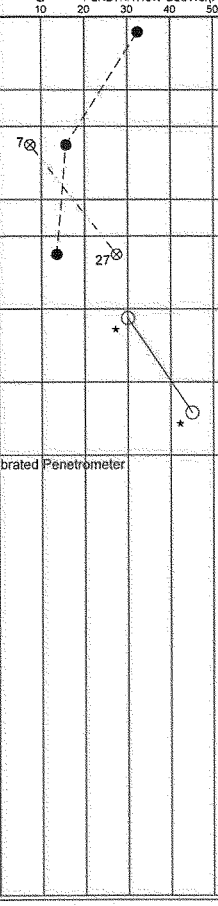
SITE LOCATION: Des Plaines, Illinois

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +626.9	
		1	ST			Fill: Sandy topsoil, trace roots - black - moist (OL)	77
						2.0	
2.5			PA			Drilling without sampling.	
						3.0	
		2	SS			Silty fine to medium sand - brown - moist (SM)	113
5.0						5.0	
			PA			Drilling without sampling.	
						6.0	
		3	SS			Fine to coarse sand, little silt, trace clay - brown - moist (SM)	115
7.5						8.0	
		4	ST			Silty clay, trace sand and gravel - gray (CL) Boulders noted, sample disturbed.	
10.0						10.0	
		5	SS			Silty clay, trace gravel, sand and shale - gray - hard (CL)	
12.0						12.0	
						End of Boring Monitor Well installed to 8 ft. - See Field Well Installation Diagram Automatic-Mobile Hammer used for Standard Penetration Tests. 3 in. ST and SS samplers used.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.5 ft. WS	BORING STARTED 3/6/03	STS OFFICE Chicago Area - 01	
WL 7.0 ft. AB	BORING COMPLETED 3/6/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Baker	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

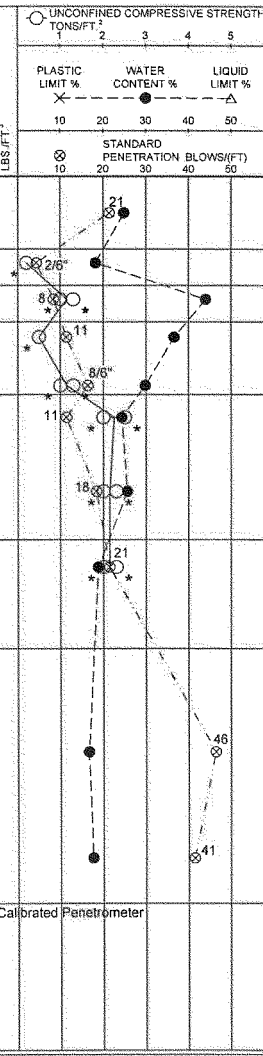
LOG OF BORING NUMBER: B-505

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

SITE LOCATION: Des Plaines, Illinois

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION +624.8	
		1	SS			Fill: Clayey topsoil, little silt, trace sand and roots - black (CL-OL)	
	2.0						
2.5		2	SS			Fill: Silty clay, trace gravel, sand and topsoil - brownish gray - very soft (CL)	
	3.0						
		2A	SS			Fill: Clayey topsoil, trace gravel, sand and roots - black - stiff (OL)	
	4.0						
5.0		3	SS			Fill: Silty clay, trace to little organics - brown and black - medium to stiff (CL-OL)	
		3A	SS				
	6.0						
		4	SS			Silty clay, trace gravel, sand and shale - gray to brownish gray - very stiff (CL)	
7.5							
		5	SS				
10.0	10.0						
		6	SS			Silty clay - gray - very stiff (CL) Silt seams noted.	
12.5							
	13.0						
			PA			Clayey silt, trace fine sand - gray - dense to very dense - moist (CL-ML)	
15.0							
		7	SS				
17.5			PA				
		8	SS				
20.0	20.0						
						End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 6.0 ft. WS	BORING STARTED 2/26/03	STS OFFICE Chicago Area - 01	
WL 8.0 ft. AB	BORING COMPLETED 2/26/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-506

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

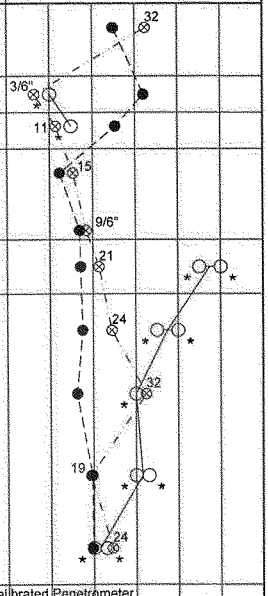
SITE LOCATION: Des Plaines, Illinois

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
					SURFACE ELEVATION +631.1	
	1	SS			Fill: Clayey topsoil, little silt, trace gravel, sand and roots - black (CL-OL)	
2.0						
2.5	2	SS			Fill: Silty clay, little organics, trace gravel, sand and roots - black - stiff (CL-OL)	
3.0						
	2A	SS			Silty clay, trace gravel and sand - brown - stiff (CL)	
4.0						
5.0	3	SS			Fine to medium sand, little silt and gravel - brown - medium dense - moist (SP-SM)	
	4	SS*				
6.5						
7.5	4A	SS			Silty clay, trace gravel, sand and shale - brown - hard (CL) Silt seams noted.	
8.0						
	5	SS			Silty clay, trace gravel, sand and shale - gray - very stiff to hard (CL)	
10.0						
	6	SS				
12.5						
	7	SS				
15.0	8	SS				
16.0						
					End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 6.0 ft. WS	BORING STARTED 2/26/03	STS OFFICE Chicago Area - 01	
WL 12.0 ft. AB	BORING COMPLETED 2/26/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-507

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

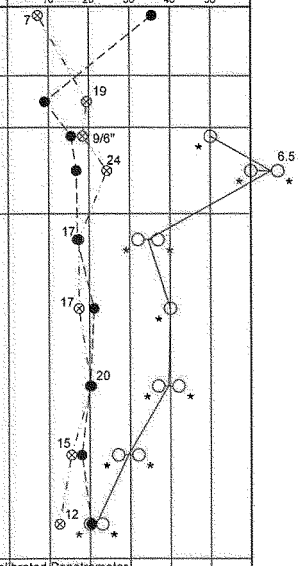
SITE LOCATION: Des Plaines, Illinois

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION +631.9	
		1	SS			Fill: Clayey topsoil, little silt, trace gravel, sand, roots and crushed concrete - black (CL-OL)	
						2.0	
2.5		2	SS			Fine to medium sand, little silt and fine gravel - brown - medium dense - moist (SP-SM)	
						3.5	
		2A	SS			Silty clay, trace gravel, sand and shale - brown to brownish gray - hard (CL)	
5.0		3	SS				
						6.0	
		4	SS			Silty clay, trace gravel, sand and shale - gray - very stiff (CL)	
7.5		5	SS				
10.0		6	SS				
12.5		7	SS				
15.0		8	SS				
16.0						16.0	
						End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL Dry WD	BORING STARTED 2/26/03	STS OFFICE Chicago Area - 01	
WL Dry AB	BORING COMPLETED 2/26/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG 32849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-508

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

SITE LOCATION: Des Plaines, Illinois

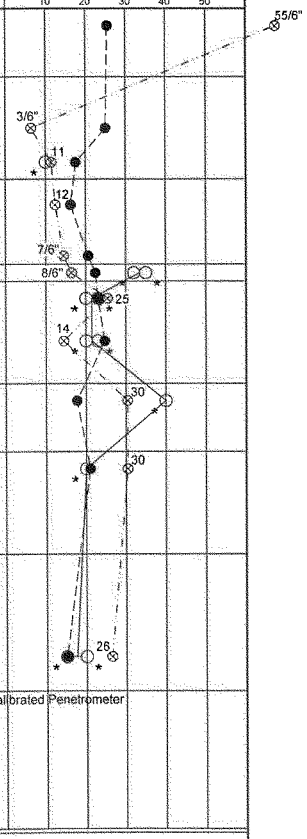
DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION +629.9	
		1	SS			Fill: Clayey topsoil, little silt, trace gravel, sand, crushed concrete and brick - black (CL-OL)	
			PA			2.0 Fill: Silty clay, trace sand - brown and gray - stiff (CL) Fine sand layers noted.	
2.5		2	SS				
		2A	SS			5.0	
5.0		3	SS			Silty fine to coarse sand, trace fine gravel - brownish gray - medium dense - moist (SM)	
7.5		4	SS*			7.5	
		4A	SS			8.0 Silty clay, trace gravel, sand and shale - brown- very stiff (CL)	
		4B	SS			Silt seams noted. Silty clay, trace fine sand - gray - very stiff (CL) Silt seams noted.	
10.0		5	SS			11.0	
		6	SS			Silty clay, trace gravel, sand and shale - gray - hard (CL)	
12.5						13.0	
		7	SS			Clayey silt, trace fine sand - gray - very stiff - moist (CL-ML)	
15.0						16.0	
			PA			Silty clay, trace gravel, sand and shale - gray - stiff to very stiff (CL)	
17.5		8	SS				
20.0						20.0	
						End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %

10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 6.0 ft. WS	BORING STARTED 2/26/03	STS OFFICE Chicago Area - 01	
WL 8.0 ft. AB	BORING COMPLETED 2/26/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG_32849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources
LOG OF BORING NUMBER: B-509
PROJECT NAME: Rand Park Flood Control Project
ARCHITECT-ENGINEER:
SITE LOCATION: Des Plaines, Illinois

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE / RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5 / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % 10 20 30 40 50 / STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50
				SURFACE ELEVATION +623.1		
	1	SS		Fill: Clayey topsoil, little silt, trace fine gravel and fine sand - black (CL-OL)		7
2.5	2	SS		Fill: Silty clay, little organics, trace fine gravel and fine sand - black - stiff (CL-OL)		7
5.0	3	SS		Silty clay, trace gravel, sand and shale - brownish gray - stiff (CL)		7
7.5	4	SS		Silty clay, trace gravel, sand and shale - gray - very stiff to stiff (CL) Silt and sand seams noted.		15
	5	SS				19
10.0	6	SS		Clayey silt - gray - medium dense - saturated (CL-ML)		11/6"
	6A	SS		Silty clay, trace gravel, sand and shale - gray - very stiff (CL) Silt seams noted.		25
12.5	7	SS		Silt, trace clay and sand - gray - medium dense - saturated (ML)		21
15.0	8	SS		Fine to coarse sand, little silt - gray - medium dense - saturated (SP-SM)		21
		PA				
17.5	9	SS		Clayey silt, trace fine sand - gray - extremely dense - wet (CL-ML)		50/6"
19.0				End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.		

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0 ft. WD	BORING STARTED 2/26/03	STS OFFICE Chicago Area - 01	
WL 6.0 ft. AB	BORING COMPLETED 2/26/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING LOG 132849-A.GPJ STS.GDT 4/7/03

STS Consultants Ltd.

CLIENT: Illinois Department of Natural Resources

LOG OF BORING NUMBER: B-510

PROJECT NAME: Rand Park Flood Control Project

ARCHITECT-ENGINEER:

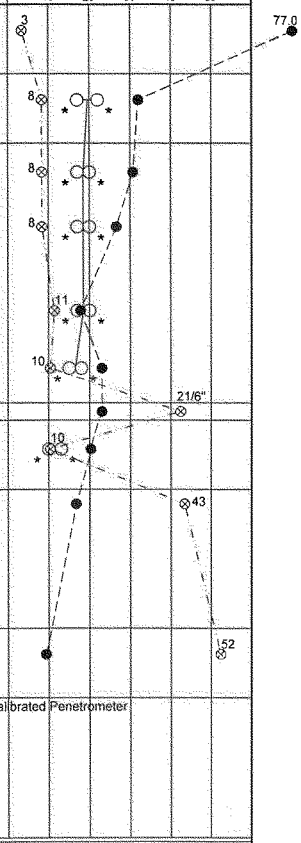
SITE LOCATION: Des Plaines, Illinois

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +623.7	
		1	SS			Fill: Clayey topsoil, little silt, trace gravel and roots - black (CL-OL)	
						2.0	
2.5		2	SS			Fill: Silty clay, little organics, trace fine to coarse sand - brown, gray and black - stiff to very stiff (CL-OL)	
						4.0	
5.0		3	SS			Silty clay, trace gravel, sand and shale - brownish gray - stiff to very stiff (CL) Silt seams noted.	
		4	SS				
7.5							
		5	SS				
10.0		6	SS				
						11.5	
		6A	SS			12.0 Silt, trace clay and sand - gray - dense - saturated (ML)	
12.5		7	SS			Silty clay, trace sand - gray - stiff (CL) Silt seams noted.	
						14.0	
15.0		8	SS			Clayey silt, trace sand - gray - dense - moist (CL-ML)	
			PA				
17.5							
						18.0	
		9	SS			Fine to coarse sand, trace silt and gravel - gray - very dense - moist to wet (SP)	
20.0						20.0	
						End of Boring Borehole backfilled upon completion. Automatic-CME Hammer used for Standard Penetration Tests.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)

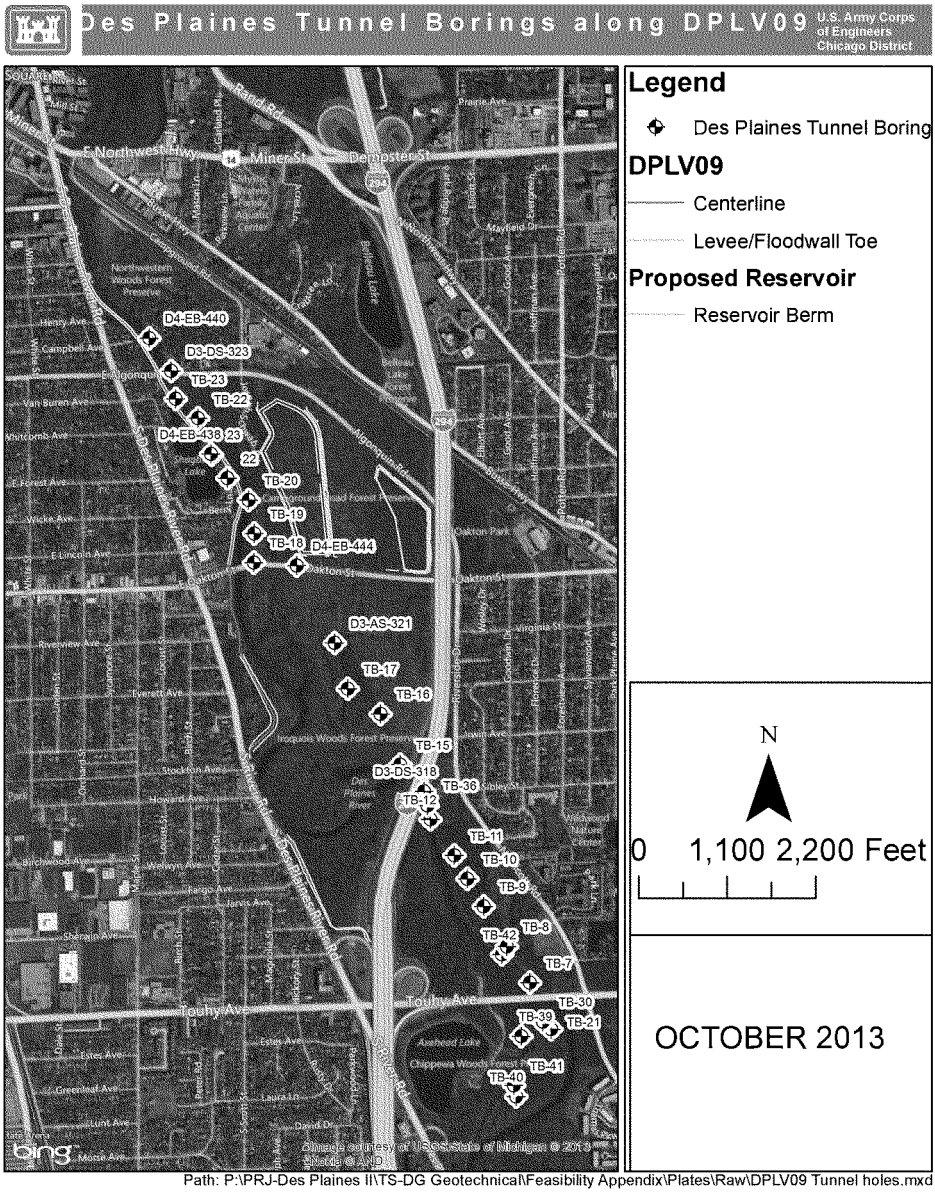


* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 2.0 ft. WS	BORING STARTED 2/27/03	STS OFFICE Chicago Area - 01	
WL 2.0 ft. AB	BORING COMPLETED 2/27/03	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Auger/Ringler	APP'D BY TDB	STS JOB NO. 32849-A

BORING_LOG 132849-A.GPJ STS.GDT 4/7/03



Path: P:\PRJ-Des Plaines II\TS-DG Geotechnical\Feasibility Appendix\Plates\Raw\DPLV09 Tunnel holes.mxd

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS - %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					FILL - SILTY CLAY, SAND, GRAVEL, ORGANICS.	11	SS	1.3								8.7
								19	SS									16.2
								24	SS									18.7
								23	SS									11.2
							9.5'	22	SS	3.0	2.34							21.5
							GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.	25	SS									106.4
							14.5'	16	SS	2.75	2.31							128.3
							GRAY CLAYEY SILT, SOME FINE TO MEDIUM SAND, TRACE MEDIUM GRAVEL.	18	SS	1.75	1.78	11.1	16.2	27.3				118.2
							25.0'	38	SS	5.0+	8.94							116.2
							GRAY SILTY CLAY, TRACE FINE TO MEDIUM SAND, TRACE FINE GRAVEL.	50	SS	5.0+	6.07							11.3
							30.0'	47	SS	5.0+	5.50							12.2
							GRAY CLAYEY SILT, LITTLE FINE TO COARSE SAND, POCKETS AND SEAMS OF SILT.	93	SS	5.0+	11.06	10.0	14.4	24.4				129.8
							45.0'	146	SS	5.0+	10.73							118.1
							GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL, POCKETS OF SILT.	92	SS	2.25	2.60	28.7	19.1	47.8				115.7
							60.0'	25	SS	2.75								16.6
							GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE TO MEDIUM GRAVEL.	48	SS	3.5+								10.2
							62.8'											
							ROCK - SEE SHEET 2 OF 2											

W 7-27-76

This Sheet Prepared By Knowlt, Benner, Stone & Associates, Inc.

CONTRACT 75-131-2H

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS

DRILL HOLE DATA

HOLE NO. D3-AS-312

DATE: 2-23-76

SHEET 1 OF 2

SHEET NO. B-33

459

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

(A)

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

(A)

BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67

This Sheet Prepared By Knowles, Bender, Stone & Associates, Inc.

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION (HOLE NUMBER D3-DS-313; Coordinates: N 1937683.745 Angle: 0°; E 629821.35 Bearing: ; Location N.W. TOLLWAY & DES PLAINES RIVER; Ground Elevation (CCD) 40.83)	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS - %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					TOPSOIL - DARK GRAY SILTY CLAY, SOME ORGANICS, TRACE FINE TO MEDIUM SAND.	25	SS									33.8
							3.0' BROWN SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.	11	SS	1.25								23.7
5							6.0' GRAY AND BROWN SILTY FINE TO MEDIUM SAND AND FINE TO MEDIUM GRAVEL.	8	SS	1.2								18.9
							9.7' GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.	13	SS									17.0
10							10.5' FINE TO COARSE GRAVEL.	35	SS									15.8
							13.0' GRAY CLAYEY SILT, TRACE SAND, TRACE GRAVEL.	101	SS	5.0	6.23							12.82
15								100/5"	SS	5.0								12.61
20								154/6"	SS	5.0	1.81							11.65
25							28.5' GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE TO MEDIUM GRAVEL.	157/0"	SS	5.0	5.73							12.65
30								95	SS	5.0	8.99							11.54
35								118	SS	5.0	4.99							10.42
40								64	SS	3.25	2.34							11.78
45							46.5' GRAY CLAYEY SILT, TRACE FINE TO MEDIUM SAND, TRACE FINE GRAVEL.	45	SS	2.25	1.53							13.28
50							50.9' GRAY CLAYEY SILT AND FINE TO COARSE SAND, TRACE FINE GRAVEL.	100/4"	SS	ROCK								
55									CORE									
60																		
65							66.8' WELL ROUNDED GRAVEL.											
70							74.3' ROCK - SEE SHEET 2 OF 2											
75																		
80																		
85																		
90																		
95																		
100																		
105																		
110																		
115																		
120																		

CONTRACT 75-131-2H

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS

DRILL HOLE DATA

HOLE NO. D3-DS-313

DATE: 12-19-75

SHEET 1 OF 2

SHEET NO. B-35

461

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3 - inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

(A) BLOWS PER FOOT: "N" As defined in A.S.T.M. Designation D 1586 - 67

This Sheet Prepared By Knowles, Bender, Stone & Association, Inc.

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT - N	SAMPLE TYPE	UNCONFINED COMPRESSIVE STRENGTH	POCKET PENETROMETER	PLASTICITY INDEX	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT - %	GRAIN SIZE - % GRAVEL	SAND	SILT	CLAY	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE												35.5							
5							5	SS	0.5	0.5				45.6							
							7	SS	0.2	0.2				50.3							
							2	SS	0.2	0.2				53.8							
10							6	SS						26.6							
							3	SS		0.2				17.5							
15							3	SS		0.3				25.1							
							5	SS		0.5				18.1							
20							5	SS		0.5				23.8							
							83	SS		2.5				15.1							
25							60/0"	SS		5.0				9.7							
							35	SS		5.0				18.4							
30							43	SS		5.0				15.0							
							34	SS		5.0				18.5							
35							30	SS		5.0				16.7							
							28	SS		5.0				25.8							
40							28	SS		5.0				19.4							
							50/0"	SS		5.0				18.3							
45							50/0"	SS		5.0				16.6							
50																					
55																					
60																					
65																					
70																					
75																					
80																					
85																					
90																					
95																					
100																					
105																					
110																					
115																					
120																					

Boring Location
Ground Elevation (CCD) 30.18

FILL - SILT, SAND, GRAVEL, BRICK, GLASS, PAPER, WOOD, RUBBER HOSE, METAL, CINDERS.

13.5'
GRAY FINE TO COARSE SAND, SOME SILT, LITTLE CLAY, TRACE SHELL FRAGMENTS.

20.0'
GRAY SILT AND FINE TO COARSE SAND, LITTLE FINE GRAVEL.

23.0'
GRAY FINE TO MEDIUM GRAVEL, TRACE FINE TO COARSE SAND, TRACE SILT.

26.0'
GRAY SILT, LITTLE CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL.

40.0'
GRAY SILTY CLAY, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.

50.0'
GRAY SILT, TRACE CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.

65.0'
GRAY SILT AND FINE TO COARSE SAND, LITTLE FINE GRAVEL, TRACE CLAY.

70.0'
GRAY SILTY CLAY AND FINE TO COARSE SAND, TRACE FINE GRAVEL.

75.0'
ROCK - SEE SHEET 2 OF 2

CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D3-CS-3I4
DATE: 3-5-76
SHEET 1 OF 2

SHEET NO. B-37

463

NOTES AND LEGEND

FORMATION: Based on H.B.Willman , 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3 - inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer- Tons per square foot.

UNCONFINED COMPRESSIVE STRENGYH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586 - 67

Title Sheet Prepared By Knowlton, Metzger, Stone & Associates, Inc.

DESCRIPTION

HOLE NUMBER D3-DS-315
Coordinates: N. 1941122.32 Angle: 0°
E. 629231.09 Bearing:
Location DEVON & DEE
Ground Elevation (CCD) 591.77

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT - N	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - % GRAVEL	SAND	SILT	CLAY	DENSITY (LBS / CU FT)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE			1	11											(127)	(13.9)
					2	14											1627	16.5
					3	18											1683	16.9
					4	20											1612	17.6
					5	22											1586	18.3
					6	24												
					7	26												
					8	28												
					9	30												
					10	32												
					11	34												
					12	36												
					13	38												
					14	40												
					15	42												
					16	44												
					17	46												
					18	48												
					19	50												
					20	52												
					21	54												
					22	56												
					23	58												
					24	60												
					25	62												
					26	64												
					27	66												
					28	68												
					29	70												
					30	72												
					31	74												
					32	76												
					33	78												
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					46	104												
					47	106												
					48	108												
					49	110												
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					56	124												
					57	126												
					58	128												
					59	130												
					60	132												
					61	134												
					62	136												
					63	138												
					64	140												
					65	142												
					66	144												
					67	146												
					68	148												
					69	150												
					70	152												
					71	154												
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					74	160												
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					80	172												
					81	174												
					82	176												
					83	178												
					84	180												
					85	182												
					86	184												
					87	186												
					88	188												
					89	190												
					90	192												
					91	194												
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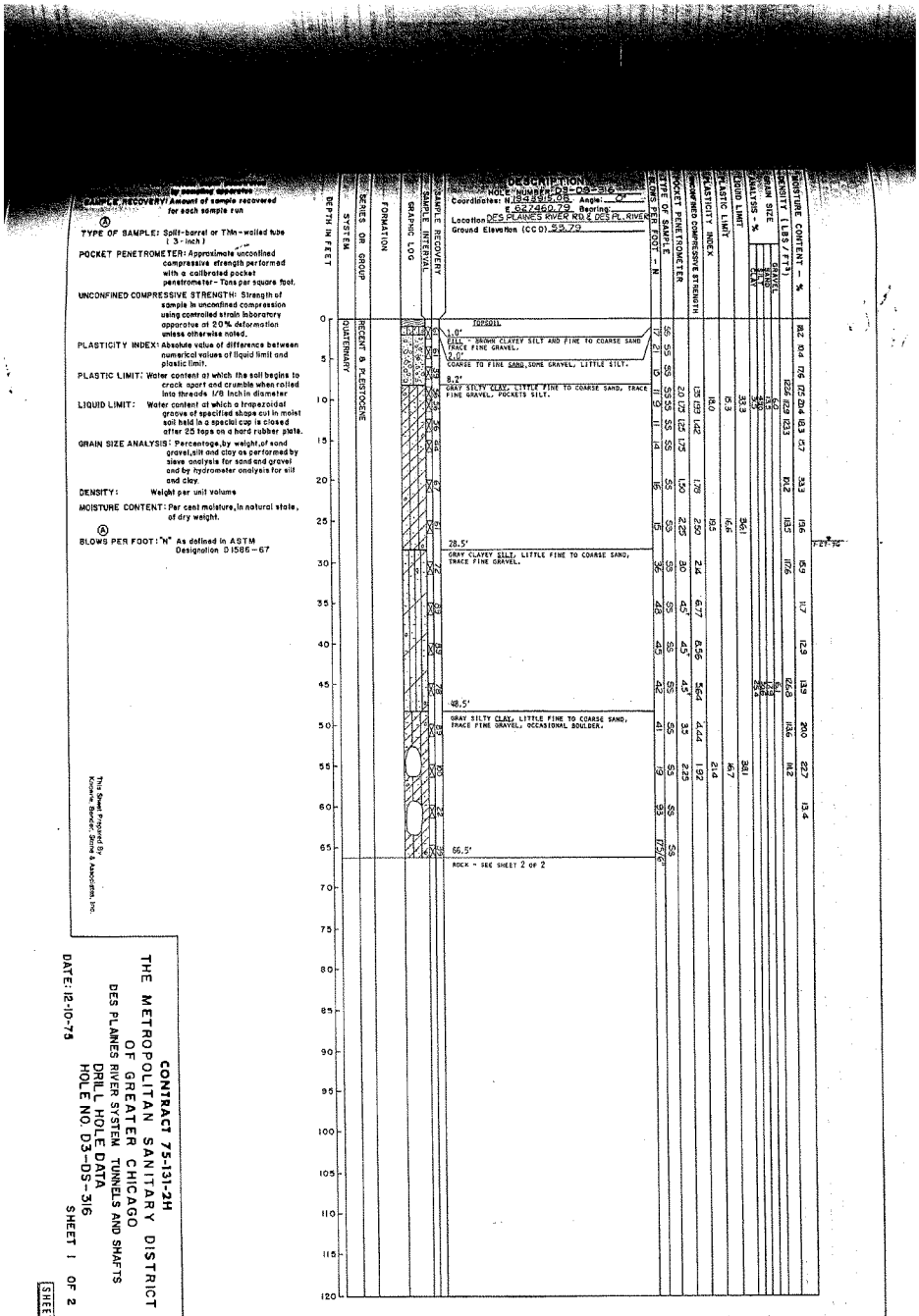
					98	208												
					99	210												
					100	212												
					101	214												
					102	216												
					103	218												
					104	220												
					105	222												
					106	224												
					107	226												
					108	228												
					109	230												
					110	232												
					111	234												
					112	236												
					113	238												
					114	240												
					115	242												
					116	244												
					117	246												
					118	248												
					119	250												
					120	252												

0.0' TOPSOIL 1.3'
BROWN SILTY CLAY, TRACE SAND, TRACE ORGANICS. 3.3'
BROWN FINE TO COARSE SAND, AND SILTY CLAY, LITTLE FINE GRAVEL. 6.3'
GRAY AND BROWN SILTY CLAY, LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL. 10.0'
GRAY CLAYEY SILT, LITTLE FINE TO COARSE SAND, TRACE FINE TO COARSE GRAVEL. 18.5'
GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL. 25.3'
GRAY SILT, TRACE CLAY, TRACE FINE SAND. 28.0'
GRAY SILTY CLAY, LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL. 35.0'
GRAY CLAYEY SILT, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL. 39.0'
GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL. 56.5'
GRAY CLAYEY SILT, LITTLE FINE TO COARSE SAND, LITTLE FINE TO COARSE GRAVEL. 63.1'
ROCK - SEE SHEET 2 OF 2

							19	55	4.0								(127)	(13.9)
							30	55	4.5+	5.6	43	239					1627	16.5
							31	55	4.5+								1683	16.9
							36	55	4.0								1612	17.6
							28	55	4.5+								1586	18.3
							37	55	4.5+	2.8	23	78						
							23	55	4.5+									
							32	55	4.5+	7.8	26	202						
							55	55	4.5+	1.2	19	202						
							55	55	4.5+	4.0	23	239						
							23	55	4.5+									
							60	55	4.5+	5.9	26	301						
							31	55	4.5+	3.0	21	301						
							57	55	4.5+	2.3	20	602						
							31	55	4.5+									
							64	55	4.5+	6.02	26.3	602						
							66	55	4.5+	12.48	18.5	1204						

by sampling apparatus



SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

This Sheet Prepared By Kowkie, Bender, Stirrel & Associates, Inc.

DESCRIPTION

HOLE NUMBER: D3-DS-316

Coordinates: N 1843915.08 Angle: 0° E 627460.79 Bearing:

Location DES PLAINES RIVER RD. & DES PL. RIVER

Ground Elevation (CCD) 53.79

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - %	DENSITY (LBS / FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE														
1						6	17	SS								10.2
2						61	21	SS								10.4
3						33	10	SS								17.6
4						56	11	SS								17.5
5						56	9	SS								20.4
6						44	11	SS								18.3
7						67	14	SS								15.7
8						61	16	SS								33.3
9						72	15	SS								19.6
10						83	36	SS								15.9
11						89	48	SS								11.7
12						78	45	SS								12.9
13						89	42	SS								13.9
14						100	41	SS								20.0
15						22	19	SS								22.7
16						55	93	SS								13.4
17						76	175/6"	SS								
18																
19																
20																
21																
22																
23																
24																
25																
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119																
120																

TOPSOIL

1.0' FILL - BROWN CLAYEY SILT AND FINE TO COARSE SAND TRACE FINE GRAVEL.

2.0' COARSE TO FINE SAND, SOME GRAVEL, LITTLE SILT.

8.2' GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL, POCKETS SILT.

28.5' GRAY CLAYEY SILT, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL.

48.5' GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL, OCCASIONAL BOULDER.

66.5' ROCK - SEE SHEET 2 OF 2

17	21	10	11	9	11	14	16	15	36	48	45	42	41	19	93	175/6"
56	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
20	175	125	175	150	225	30	45	45	45	45	45	35	225	225	225	
135	193	142	178	250	214	6.77	8.56	5.64	4.44	1.92						
18.0	18.0	19.5	16.6	19.5	16.7	21.4										
33.3	33.3	36.1														
16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6
20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3
19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9
20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7
13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4

CONTRACT 75-131-2H

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS

DRILL HOLE DATA

HOLE NO. D3-DS-316

DATE: 12-10-75

SHEET 1 OF 2

SHEET NO. B-46

4-72

DESCRIPTION

HOLE NUMBER TB-21 1 of 2
Coordinates: N 1,946,313.02 Angle: 0°
E 628,526.08 Bearing: N.A.
Location STA. 829+98.57 N 375.65'
Ground Elevation (CCD) 43.57

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - %	DENSITY (LBS / FT³)	MOISTURE CONTENT - %
0	QUATERNARY	PRECENT & PLEISTOCENE														
5						20										36.9
10						22	2									19.5
15						20	10		24	14						18.3
20						20	17		45+							12.7
25						20	18									16.3
30						22	19			16	9.0	14.2	23.2			12.7
35						20	33		45+							12.4
40						20	36		45+							12.6
45						20	41		45+	64	16.6	16.0	27.6			11.9
50						20	42		45+	60	9.0	16.0	28.5			12.6
55						20	49		45+	57	5.7	16.0	28.5			9.5
60						20	51		45+	37	28	38	51			20.3
65						20	56		45+							9.7
70						20	56		45+							12.6
75						20	56		45+							8.7
80						20	56		45+							12.2
85						20	56		45+							
90						20	56		45+							
95						20	56		45+							
100						20	56		45+							
105						20	56		45+							
110						20	56		45+							
115						20	56		45+							
120						20	56		45+							
125						20	56		45+							
130						20	56		45+							
135						20	56		45+							
140						20	56		45+							

DARK GRAY SILTY CLAY (CL), LITTLE SAND

11.0
GRAY SILTY CLAY (CL)

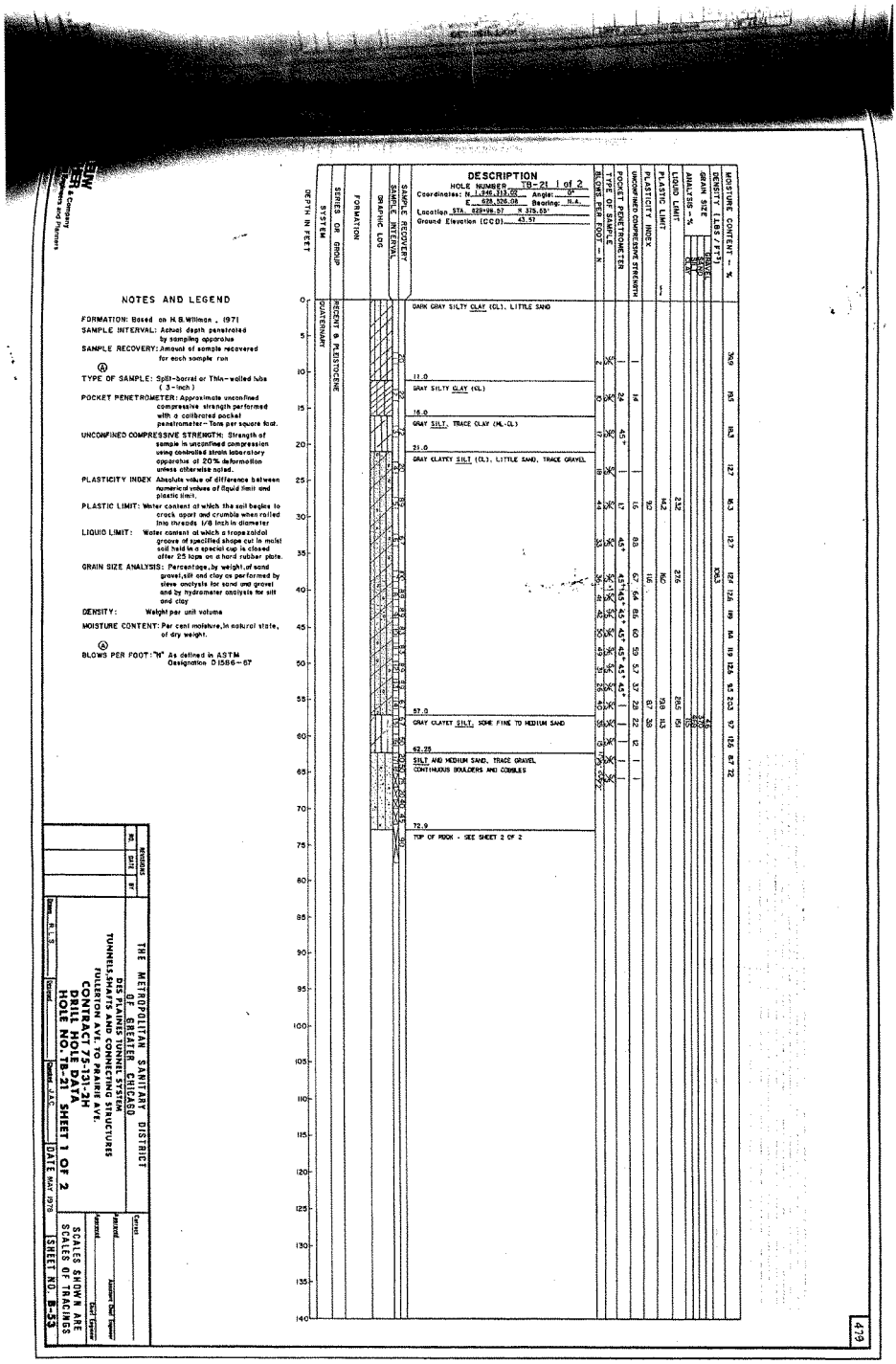
16.0
GRAY SILT, TRACE CLAY (ML-CL)

21.0
GRAY CLAYEY SILT (CL), LITTLE SAND, TRACE GRAVEL

57.0
GRAY CLAYEY SILT, SOME FINE TO MEDIUM SAND

62.25
SILT AND MEDIUM SAND, TRACE GRAVEL
CONTINUOUS BOULDERS AND COBBLES

72.9
TOP OF ROCK - SEE SHEET 2 OF 2



NOTES AND LEGEND

FORMATION: Based on H.B.Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

REVISIONS		
NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-21 SHEET 1 OF 2

Drawn R.L.S. Checked Checked J.A.C. DATE MAY 1978

Correct
Approved Assistant Chief Engineer
Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-53

479

DESCRIPTION

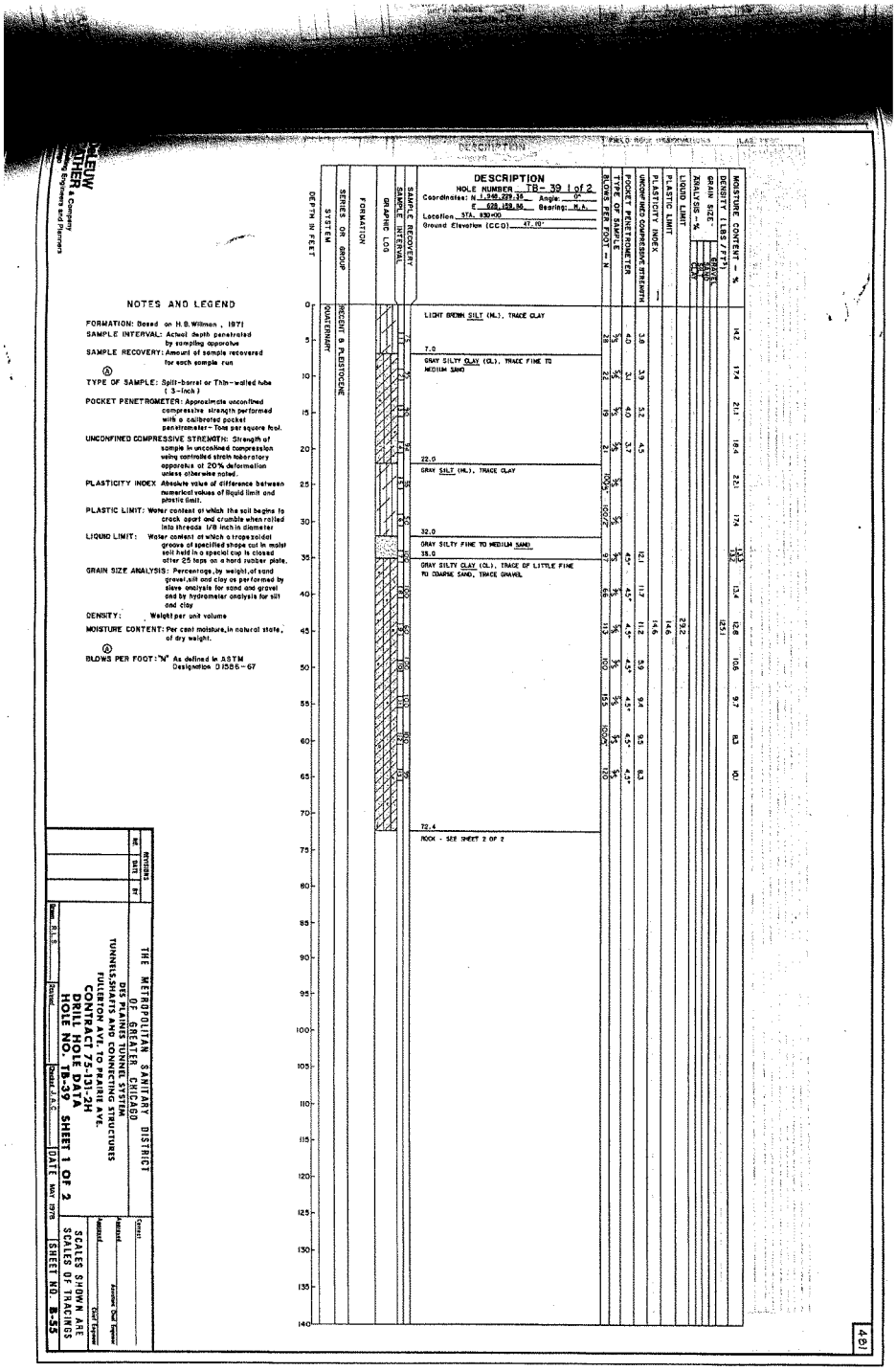
HOLE NUMBER TB-39 1 of 2

Coordinates: N 1,946,229.36 Angle: 0°
E 628,159.86 Bearing: N.A.

Location STA. 830+00

Ground Elevation (CCD) 47.10'

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS - %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					LIGHT BROWN SILT (ML), TRACE CLAY											
5							7.0	28	5/6	4.0	3.9	3.8					14.2	17.4
10							GRAY SILTY CLAY (CL), TRACE FINE TO MEDIUM SAND	22	5/6	3.1	3.9						17.4	21.1
15								19	5/6	4.0	3.2							
20							22.0	21	5/6	3.7	4.5						18.4	22.1
25							GRAY SILT (ML), TRACE CLAY	100/5"	100/5"									
30							32.0		5/6								17.4	13.3
35							GRAY SILTY FINE TO MEDIUM SAND	97	5/6	4.5*	12.1	11.7	14.6	14.6	29.2	125.1	13.4	12.8
40							GRAY SILTY CLAY (CL), TRACE OF LITTLE FINE TO COARSE SAND, TRACE GRAVEL	66	5/6	4.5*	11.7	11.2						
45								113	5/6	4.5*	11.2	5.9					10.6	9.7
50								100	5/6	4.5*	5.9	9.4						
55								115	5/6	4.5*	9.4	9.5					8.3	10.1
60								100/5"	100/5"	4.5*	9.5	8.3						
65								120	5/6	4.5*	8.3							
70							72.4											
75							ROCK - SEE SHEET 2 OF 2											



NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

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LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

REVISIONS		
NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-39 SHEET 1 OF 2

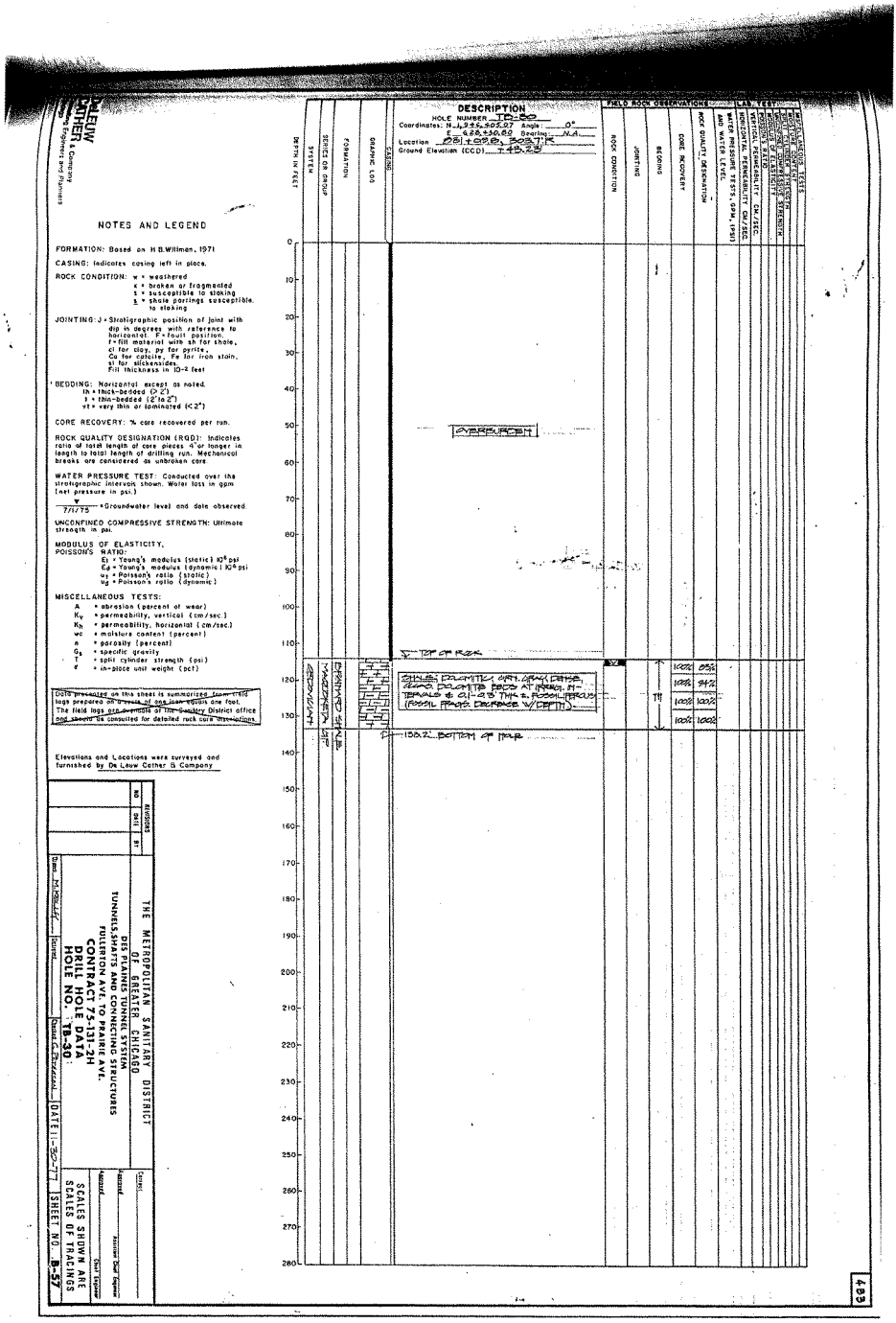
Drawn R.L.S. Revised Checked J.A.C. DATE MAY 1978

Contract
Approved Assistant Chief Engineer
Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-55

481



DE LEUW, CATHER, & Company
Engineers and Planners

NOTES AND LEGEND

FORMATION: Based on H.B.Willman, 1971

CASING: Indicates casing left in place.

ROCK CONDITION: w = weathered
k = broken or fragmented
s = susceptible to sloking
s' = shale porings susceptible to sloking

JOINTING: J = Stratigraphic position of joint with dip in degrees with reference to horizontal. F = Fault position. f = fill material with sh for shale, cl for clay, py for pyrite, Ca for calcite, Fe for iron stain, sl for slickensides. Fill thickness in 10-2 feet

BEDDING: Horizontal except as noted.
th = thick-bedded (2'-5')
t = thin-bedded (.2' to 2')
vt = very thin or laminated (<.2')

CORE RECOVERY: % core recovered per run.

ROCK QUALITY DESIGNATION (RQD): Indicates ratio of total length of core pieces 4" or longer in length to total length of drilling run. Mechanical breaks are considered as unbroken core.

WATER PRESSURE TEST: Conducted over the stratigraphic intervals shown. Water loss in gpm (net pressure in psi.)

▼ 7/1/75 = Groundwater level and date observed.

UNCONFINED COMPRESSIVE STRENGTH: Ultimate strength in psi.

MODULUS OF ELASTICITY, POISSON'S RATIO:
E_s = Young's modulus (static) 10^6 psi
E_d = Young's modulus (dynamic) 10^6 psi
μ_s = Poisson's ratio (static)
μ_d = Poisson's ratio (dynamic)

MISCELLANEOUS TESTS:
A = abrasion (percent of wear)
K_v = permeability, vertical (cm/sec)
K_h = permeability, horizontal (cm/sec)
wc = moisture content (percent)
n = porosity (percent)
G_s = specific gravity
T = split cylinder strength (psi)
γ = in-place unit weight (pcf)

Data presented on this sheet is summarized from field logs prepared on a basis of one foot. The field logs are on file at the Chicago District office and should be consulted for detailed rock core descriptions.

Elevations and Locations were surveyed and furnished by De Leuw Cather & Company

DESCRIPTION
HOLE NUMBER TB-30
Coordinates: N 1,945,502.07 Angle 0°
E 628,230.60 Bearing N/A
Location 251+09.85 Sta. 3+75 Rt.
Ground Elevation (GCD) +45.2'

FIELD ROCK DESIGNATION

LABORATORY TESTS

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	CASING	DESCRIPTION	ROCK CONDITION	JOINTING	BEDDING	CORE RECOVERY	ROCK QUALITY DESIGNATION	WATER PRESSURE TESTS (GPM, PSI) AND WATER LEVELS	HORIZONTAL PERMEABILITY CM/SEC.	VERTICAL PERMEABILITY CM/SEC.	POISSON'S RATIO	MODULUS OF ELASTICITY	UNCONFINED COMPRESSIVE STRENGTH	MISCELLANEOUS TESTS
0						OVERBURDEN												
110						TOP OF ROCK												
120	ORDOVICIAN		MAQUOKETA SHALE			SHALE; FOSSILIFEROUS, GRAY, GRAY/BROWN, HARD, SOLID TO BROKEN AT TIMES, AT INTERVALS A CLAY SEAM, THIN, FOSSILIFEROUS (FOSSIL FRAGS. DECREASE W/DEPTH)	W			100%	85%							
130										100%	94%							
140										100%	100%							
150						150.2' BOTTOM OF HOLE				100%	100%							
160																		
170																		
180																		
190																		
200																		
210																		
220																		
230																		
240																		
250																		
260																		
270																		
280																		

REVISIONS		
NO	SHT #	BY

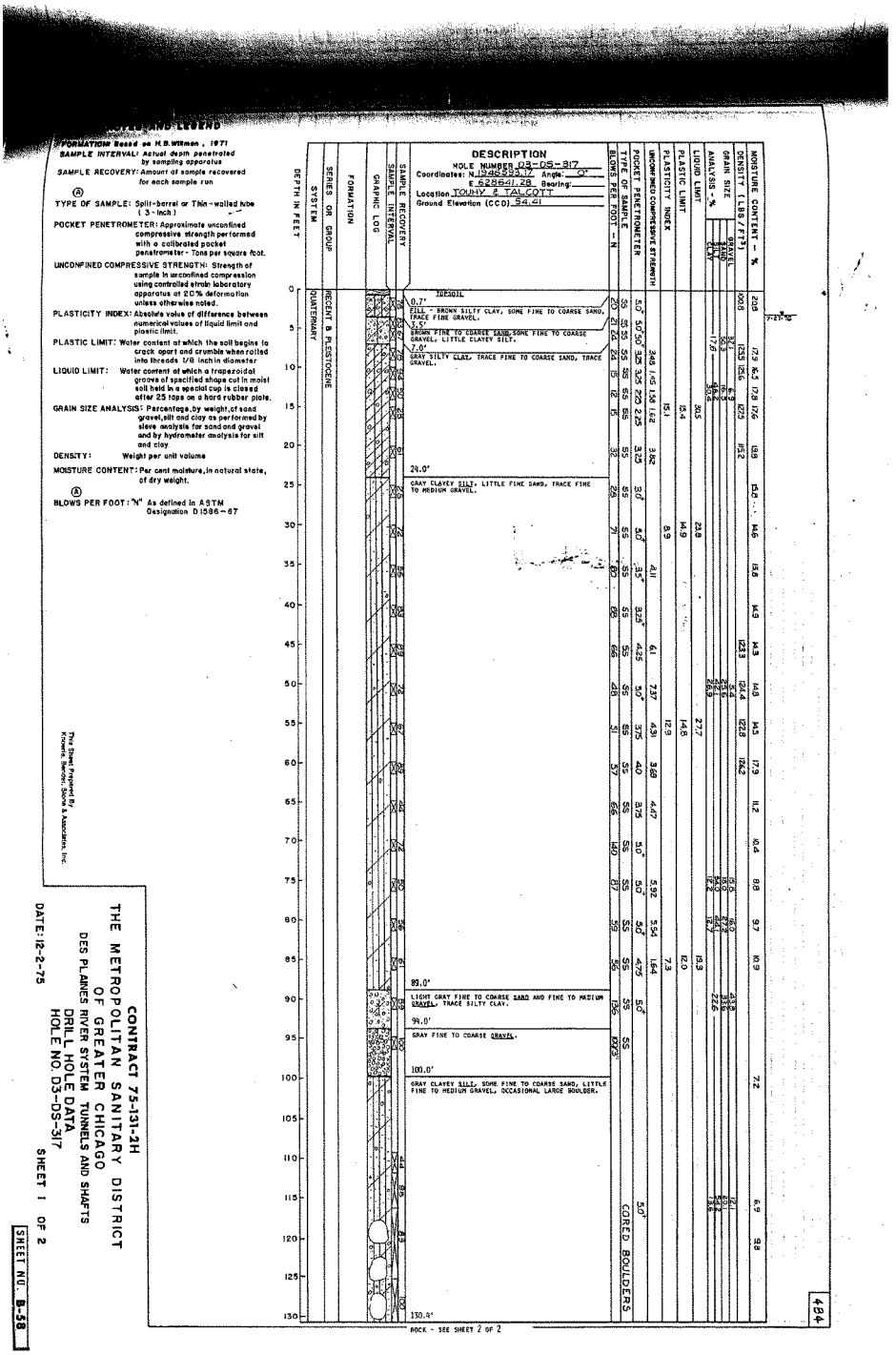
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 74-132-2H
DRILL HOLE DATA
HOLE NO. TB-30

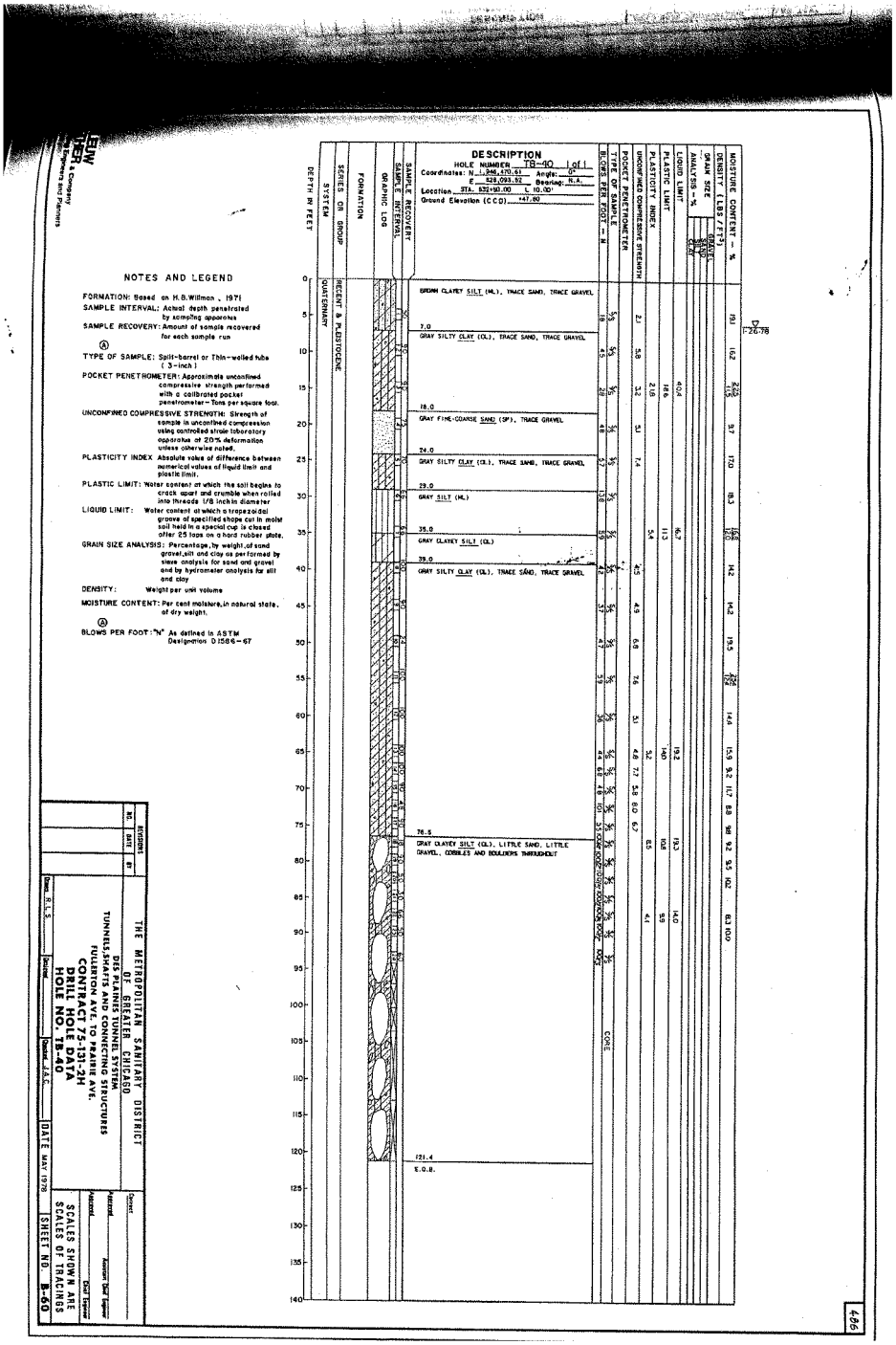
Drawn: M. Mihalic | Correct.
Traced: C. Petersen | DATE: 1-30-77 | SHEET NO. B-57

Submitted: _____ Chief Engineer
Approved: _____ Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

689


SOIL AND ROCK LEGEND
FORMATION Based on H.B. Willman, 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage by weight of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67
This Sheet Prepared By Kronen, Sencer, Stone & Associates, Inc.
DESCRIPTION
HOLE NUMBER D3-DS-317
Coordinates: N 1946233.17 Angle: 0°
E 628641.28 Bearing:
Location TOUHY & TALCOTT
Ground Elevation (CCD) 54.21
0.7' TOPSOIL
FILL - BROWN SILTY CLAY, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.
3.5' BROWN FINE TO COARSE SAND, SOME FINE TO COARSE GRAVEL, LITTLE CLAYEY SILT.
7.0' GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE GRAVEL.
24.0' GRAY CLAYEY SILT, LITTLE FINE SAND, TRACE FINE TO MEDIUM GRAVEL.
89.0' LIGHT GRAY FINE TO COARSE SAND AND FINE TO MEDIUM GRAVEL, TRACE SILTY CLAY.
94.0' GRAY FINE TO COARSE GRAVEL.
100.0' GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, LITTLE FINE TO MEDIUM GRAVEL, OCCASIONAL LARGE BOULDER.
130.4' CORED BOULDERS
ROCK - SEE SHEET 2 OF 2
DEPTH IN FEET
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
TYPE OF SAMPLE
BLOWS PER FOOT - N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS - %
GRAVEL
SAND
SILT
CLAY
DENSITY (LBS/FT³)
MOISTURE CONTENT - %
QUATERNARY
RECENT & PLEISTOCENE
CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D3-DS-317
DATE: 12-2-75
SHEET 1 OF 2
SHEET NO. B-58
484


DESCRIPTION
HOLE NUMBER TB-40 1 of 1
Coordinates: N 1,946,470.61 Angle: 0°
E 528,093.92 Bearing: N.A.
Location STA. 832+90.00 L 10.00'
Ground Elevation (CCD) +47.80
DEPTH IN FEET
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
BLOWS PER FOOT - N
TYPE OF SAMPLE
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS - %
GRAVEL
SAND
CLAY
DENSITY (LBS/FT³)
MOISTURE CONTENT - %
NOTES AND LEGEND
FORMATION: Based on H.B.Willman, 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67
SYSTEM
QUATERNARY
RECENT & PLEISTOCENE
BROWN CLAYEY SILT (ML), TRACE SAND, TRACE GRAVEL
7.0
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
18.0
GRAY FINE-COARSE SAND (SP), TRACE GRAVEL
24.0
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
29.0
GRAY SILT (ML)
35.0
GRAY CLAYEY SILT (CL)
39.0
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
76.5
GRAY CLAYEY SILT (CL), LITTLE SAND, LITTLE GRAVEL, COBBLES AND BOULDERS THROUGHOUT
121.4
E.O.B.
CORE
1-26-78
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-40
SCALES SHOWN ARE SCALES OF TRACINGS
SHEET NO. B-60
486

NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer—Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67

DESCRIPTION

HOLE NUMBER TB-41 1 of 1

Coordinates: N 1,246,809.01 Angle: 0°
E 628,070.58 Bearing: N.A.

Location STA. 533+90.00 L 1.00'

Ground Elevation (CCD) 153.2

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT — N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS — %	DENSITY (LBS/FT³)	MOISTURE CONTENT — %
0	QUATERNARY	RECENT & PLEISTOCENE					GRAY CLAYEY SILT (ML), SOME SAND	7	5/5	0.6							32.7
5																	13.1
10							6.0 BROWN SAND AND GRAVEL (SP-GP)	21	5/5								16.8
15							13.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	37	5/5	4.3							18.7
20								41	5/5	4.5							17.5
25							23.0 GRAY CLAYEY SILT (ML), TRACE SAND	39	5/5	3.7							15.9
30							28.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	26	5/5	3.8							25.3
35							33.0 GRAY CLAYEY SILT (ML), SOME SAND	105	5/5	3.7							18.9
40							38.0 GRAY SILT (ML), TRACE SAND	109	5/5	1.7							16.9
45							43.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	25	5/5	1.5							15.3
50							48.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	37	5/5								15.0
55							53.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	50	5/5	4.5+							14.6
60								36	5/5	4.5+							15.7
65								34	5/5	4.3						123.3	16.2
70								30	5/5	3.3		7.9	15.0	22.9			20.8
75							73.0 GRAY CLAYEY SILT (ML), TRACE SAND, TRACE GRAVEL	34	5/5	1.0							24.6
80								49	5/5	4.5+							11.3
85								48	5/5	4.3							17.7
90								100/5	5/5	4.5+							15.1
95								74	5/5	4.5+							10.4
100								52	5/5	4.0							14.6
105								65	5/5	4.5							10.8
110								48	5/5	4.5+							12.5
115								100/5	5/5	4.5+							9.0
120								75									
125																	
130																	
135																	
140																	

▽ 2-20-78

REVISIONS		
NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM

TUNNELS, SHAFTS AND CONNECTING STRUCTURES

FULLERTON AVE. TO PRAIRIE AVE.

CONTRACT 75-131-2H

DRILL HOLE DATA

HOLE NO. TB-41

Drawn R.L.S. Designed Checked J.A.C. DATE MAY 1978 SHEET NO. B-61

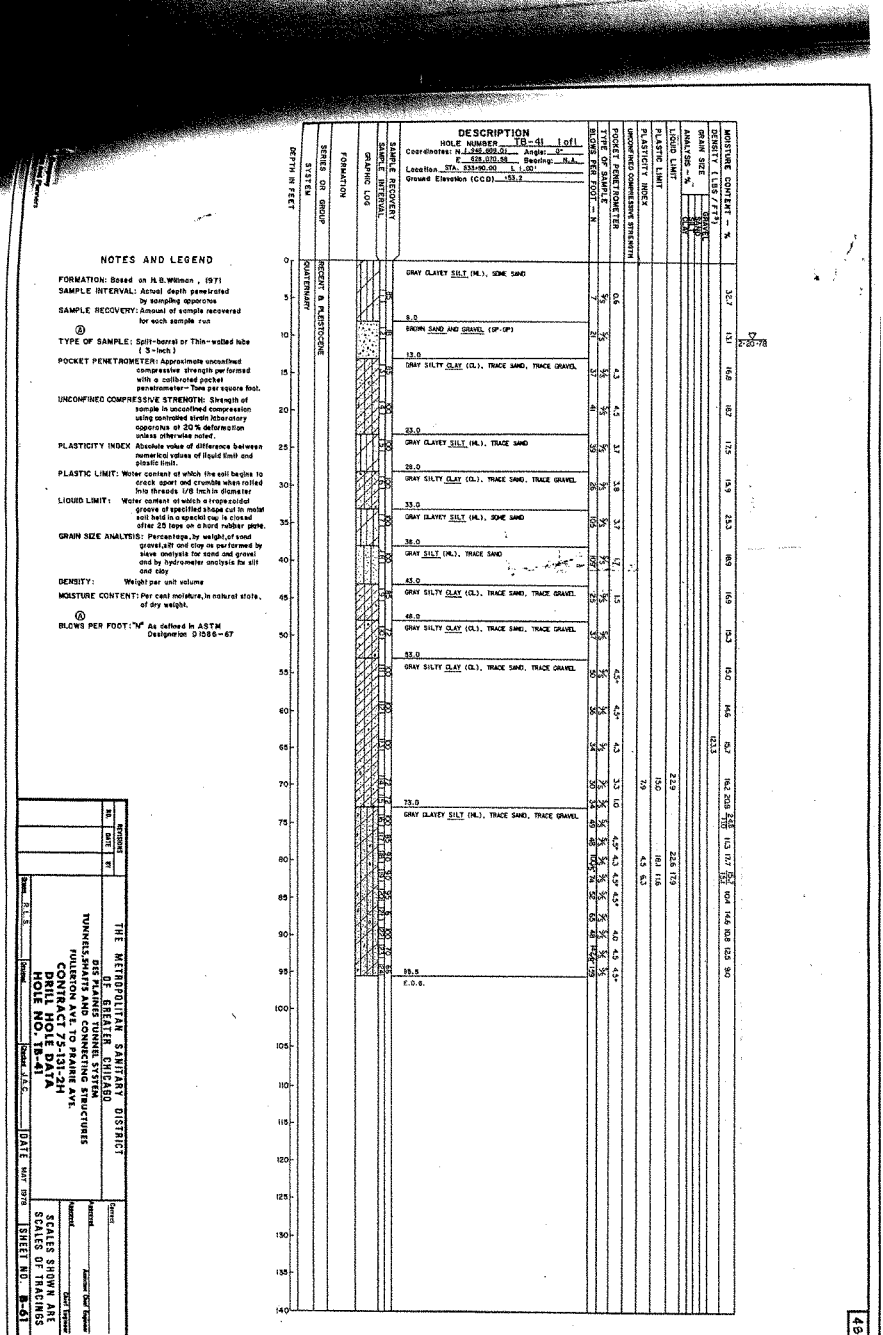
Correct

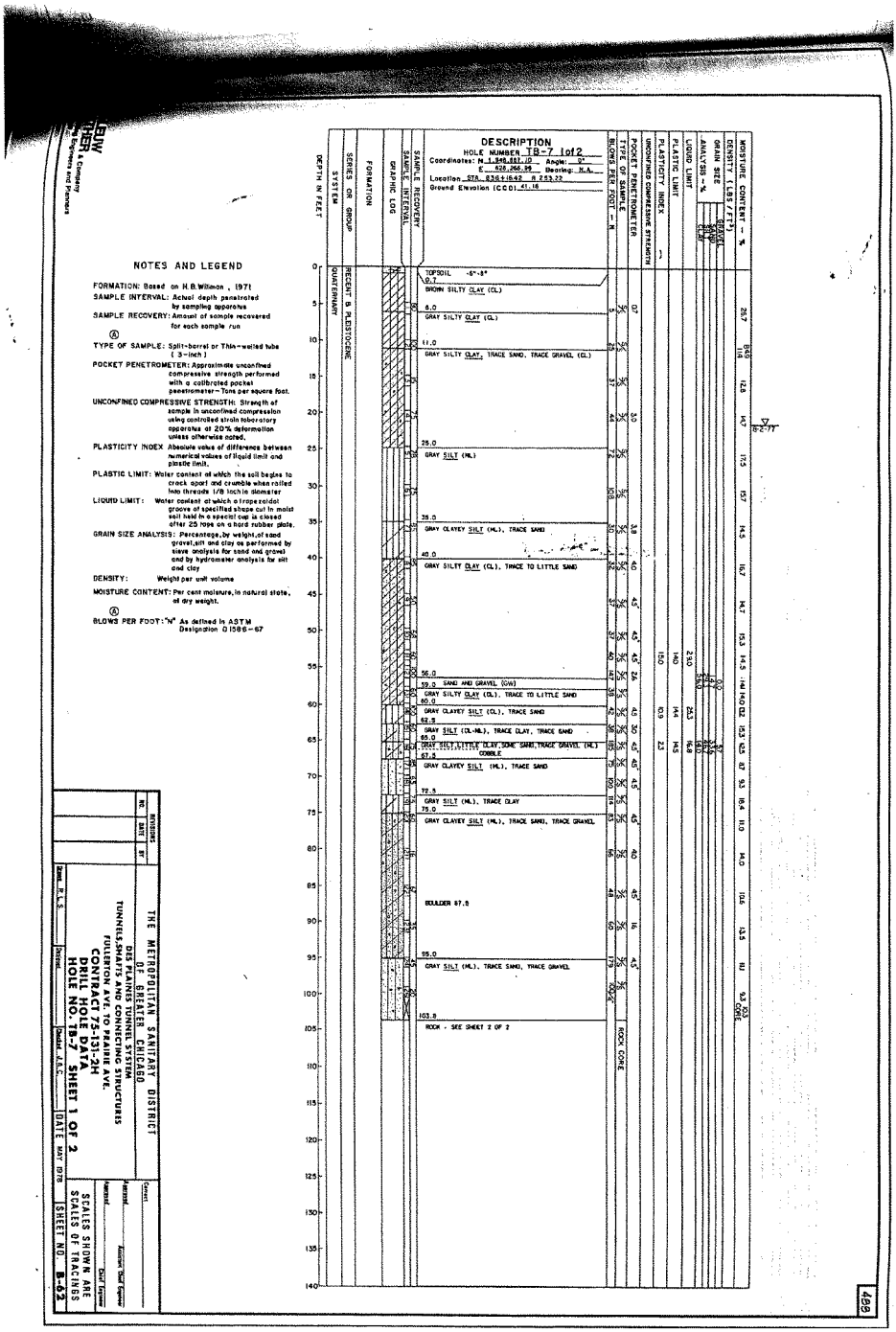
Approved Assistant Chief Engineer

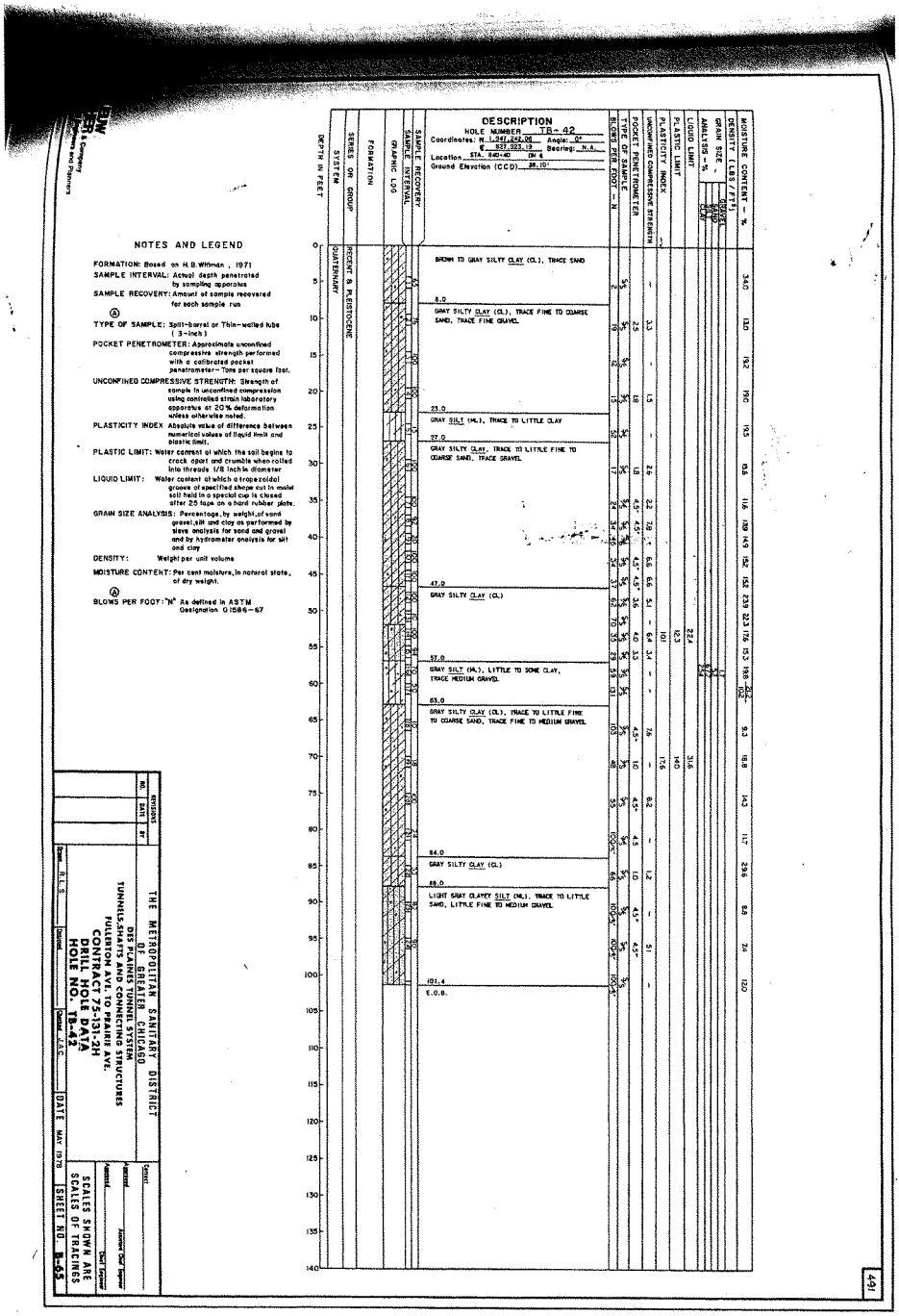
Approved Chief Engineer

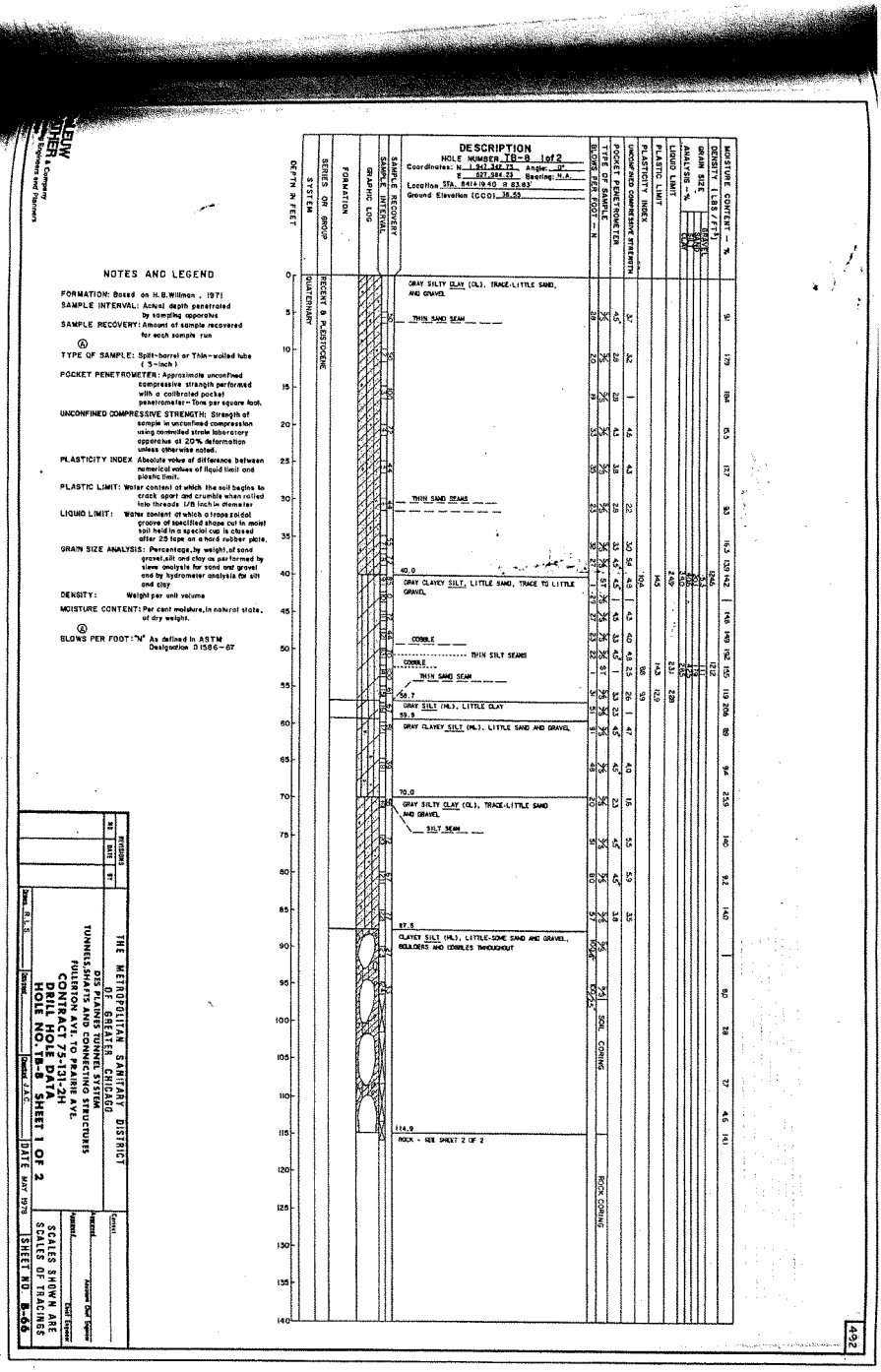
SCALES SHOWN ARE SCALES OF TRACINGS

487




DESCRIPTION
HOLE NUMBER TB-7 1of2
Coordinates: N 1,348,887.10 Angle: 0°
E 828,266.99 Bearing: N.A.
Location STA. 838+16.42 R 259.22
Ground Elevation (CCD) 41.16
DEPTH IN FEET
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
BLOWS PER FOOT - N
TYPE OF SAMPLE
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
ANALYSIS - %
GRAIN SIZE
DENSITY (LBS/FT³)
MOISTURE CONTENT - %
QUATERNARY
RECENT & PLEISTOCENE
TOPSOIL -6"-8"
BROWN SILTY CLAY (CL)
GRAY SILTY CLAY (CL)
GRAY SILTY CLAY, TRACE SAND, TRACE GRAVEL (CL)
GRAY SILT (ML)
GRAY CLAYEY SILT (ML), TRACE SAND
GRAY SILTY CLAY (CL), TRACE TO LITTLE SAND
SAND AND GRAVEL (GW)
GRAY SILTY CLAY (CL), TRACE TO LITTLE SAND
GRAY CLAYEY SILT (CL), TRACE SAND
GRAY SILT (CL-ML), TRACE CLAY, TRACE SAND
GRAY SILT, LITTLE CLAY, SOME SAND, TRACE GRAVEL (ML)
COBBLE
GRAY CLAYEY SILT (ML), TRACE SAND
GRAY SILT (ML), TRACE CLAY
GRAY CLAYEY SILT (ML), TRACE SAND, TRACE GRAVEL
BOULDER 87.5
GRAY SILT (ML), TRACE SAND, TRACE GRAVEL
ROCK - SEE SHEET 2 OF 2
ROCK CORE
NOTES AND LEGEND
FORMATION: Based on H.B.Willman, 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer-Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 tops on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-7 SHEET 1 OF 2
SCALES SHOWN ARE SCALES OF TRACINGS
SHEET NO. B-62
DATE MAY 1978
REVISIONS
NO. DATE BY
Drawn R.L.S.
Checked J.A.C.
Approved
Assistant Chief Engineer
Chief Engineer
488


DESCRIPTION
HOLE NUMBER TR-42
Coordinates: N 1,941,462.08 Angle: 0°
E 927,503.19 Bearing: N.S.
Location STA. 842+40 DN 4
Ground Elevation (CCD) 38.10'
NOTES AND LEGEND
FORMATION: Based on H.B.Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer- Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a groove/cold groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67
BROWN TO GRAY SILTY CLAY (CL), TRACE SAND
8.0
GRAY SILTY CLAY (CL), TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL
23.0
GRAY SILT (ML), TRACE TO LITTLE CLAY
27.0
GRAY SILTY CLAY, TRACE TO LITTLE FINE TO COARSE SAND, TRACE GRAVEL
47.0
GRAY SILTY CLAY (CL)
57.0
GRAY SILT (ML), LITTLE TO SOME CLAY, TRACE MEDIUM GRAVEL
63.0
GRAY SILTY CLAY (CL), TRACE TO LITTLE FINE TO COARSE SAND, TRACE FINE TO MEDIUM GRAVEL
84.0
GRAY SILTY CLAY (CL)
88.0
LIGHT GRAY CLAYEY SILT (ML), TRACE TO LITTLE SAND, LITTLE FINE TO MEDIUM GRAVEL
101.4
E.O.B.
DEPTH IN FEET
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
TYPE OF SAMPLE
BLOWS PER FOOT — N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE - %
ANALYSIS - %
DENSITY (LBS / FT3)
MOISTURE CONTENT - %
QUATERNARY
RECENT & PLEISTOCENE
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 71-12H
DRILLING LOG
HOLE NO. TR-42
SCALES SHOWN ARE SCALES OF TRACINGS
DATE MAY 1978
SHEET NO. B-65
Approved
Assistant Chief Engineer
Chief Engineer
Drawn R.L.S.
Checked
Traced
Checked A.S.C.
NO. REVISIONS BY DATE
Harza Engineering Company Consulting Engineers and Planners
491


DESCRIPTION
HOLE NUMBER TB-8 1of2
Coordinates: N 1,967,362.73 Angle: 0°
E 627,564.93 Bearing: N.A.
Location STA. 8414+40.40 R 83.83'
Ground Elevation (COD) 38.55
NOTES AND LEGEND
FORMATION: Based on H.B.Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STREMGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage,by weight,of sand gravel,silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture,in natural state, of dry weight.
BLOWS PER FOOT:"N" As defined in ASTM Designation D1586-67
GRAY SILTY CLAY (CL), TRACE-LITTLE SAND, AND GRAVEL
THIN SAND SEAM
THIN SAND SEAMS
40.0
GRAY CLAYEY SILT, LITTLE SAND, TRACE TO LITTLE GRAVEL
COBBLE
THIN SILT SEAMS
COBBLE
THIN SAND SEAM
58.7
GRAY SILT (ML), LITTLE CLAY
59.9
GRAY CLAYEY SILT (ML), LITTLE SAND AND GRAVEL
70.0
GRAY SILTY CLAY (CL), TRACE-LITTLE SAND AND GRAVEL
SILT SEAM
87.9
CLAYEY SILT (ML), LITTLE-SOME SAND AND GRAVEL, BOULDERS AND COBBLES THROUGHOUT
114.9
ROCK - SEE SHEET 2 OF 2
DEPTH IN FEET
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
BLOWS PER FOOT - N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS - %
GRAVEL
SAND
SILT
CLAY
MOISTURE CONTENT - %
QUATERNARY
RECENT & PLEISTOCENE
SOIL CORING
ROCK CORING
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS,SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-8 SHEET 1 OF 2
DATE MAY 1975
SCALES SHOWN ARE SCALES OF TRACINGS
SHEET NO. B-66
DRAWN R.L.S.
CHECKED J.A.C.
ELLIS ARNOLD & JACOBS
Consulting Engineers and Planners
4932

NOTES AND LEGEND

FORMATION: Based on H.B.Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer—Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER TB-9 1 of 2

Coordinates: N 1,947,843.24 Angle: 0°
E 627,692.19 Bearing: N.A.

Location STA. 846+85.14 R 2.31'

Ground Elevation (CCD) 49.33

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - %	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					BROWN SILTY SAND (SM), TRACE GRAVEL										1
5							7.5 GRAY SILTY CLAY (CL), TRACE TO LITTLE SAND	20	2½	1	3.6	4.5	3.2	6.7			172
10								22	2½	1	4.5	4.5	4.5				164
15								20	2½	1	4.5	4.5	4.0	4.5			152
20								18	2½	1	4.5	4.5	4.0	4.5			166
25								29	2½	1	4.5	4.5	4.5	4.5			151
30							COBBLE	52½	2½	1	4.5	4.5	4.5	4.5			233
35								31	2½	1	4.5	4.5	4.5	4.5			133
40								47	2½	1	4.5	4.5	4.5	4.5			177
45							THIN SAND SEAM	46	2½	1	4.5	4.5	4.5	4.5			110
50							46.5 GRAY CLAYEY SILT, LITTLE SAND, TRACE GRAVEL	37	2½	1	4.5	4.5	4.5	4.5	4.5		115
55							THIN SAND SEAM	37	2½	1	4.5	4.5	4.5	4.5			110
60							61.5 GRAY SILTY CLAY, LITTLE SAND, TRACE GRAVEL (CL)	37	2½	1	4.5	4.5	4.5	4.5	4.5		120
65							66.5 GRAY SILT (ML), TRACE SAND	37	2½	1	4.5	4.5	4.5	4.5			129
70							71.0 GRAY CLAYEY SILT (ML), TRACE SAND	37	2½	1	4.5	4.5	4.5	4.5			134
75							SAND SEAM	67	2½	1	4.5	4.5	4.5	4.5			166
80							76.2 GRAY SILTY CLAY (CL), TRACE SAND	100½	2½	1	4.5	4.5	4.5	4.5			84
85							83.0 GRAY CLAYEY SILT, TRACE SAND (CL)	65	2½	1	4.5	4.5	4.5	4.5			230
90							87.7 GRAY SANDY SILT (ML) TRACE GRAVEL	100½	2½	1	4.5	4.5	4.5	4.5			56
95							91.0 GRAY CLAYEY SILT (ML), LITTLE TO TRACE SAND, COBBLES THROUGHOUT	100½	2½	1	4.5	4.5	4.5	4.5			79
100								100½	2½	1	4.5	4.5	4.5	4.5			83
105								100½	2½	1	4.5	4.5	4.5	4.5			73
110								100½	2½	1	4.5	4.5	4.5	4.5			78
115								100½	2½	1	4.5	4.5	4.5	4.5			63
120								100½	2½	1	4.5	4.5	4.5	4.5			82
125							123.5 ROCK - SEE SHEET 2 OF 2	100½	2½	1	4.5	4.5	4.5	4.5			108
130																	151
135																	
140																	

▽ 9-9-77

REVISIONS		
NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-9 SHEET 1 OF 2

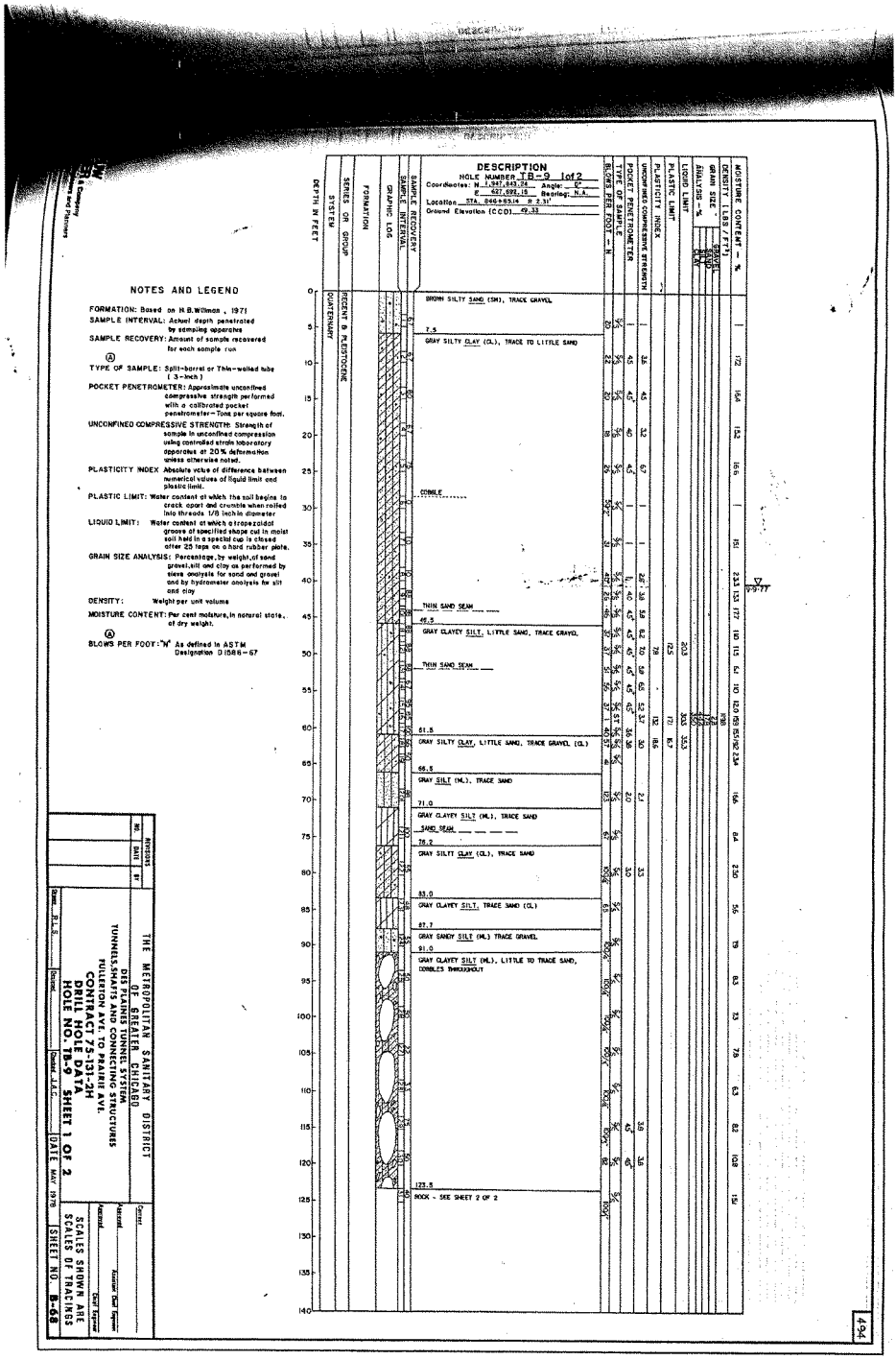
Drawn R.L.S. Checked Checked J.A.C. DATE MAY 1978

Correct
Approved Assistant Chief Engineer
Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-68

494



NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer – Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER TB-10 1 of 2

Coordinates: N 1,949,183.96 Angle: 0°
E 927,494.30 Bearing: N.A.

Location STA. 850+79.08 ℄

Ground Elevation (CCD) +51.96

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT – N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS – %	DENSITY (LBS/FT³)	MOISTURE CONTENT – %
0	QUATERNARY	RECENT & PLEISTOCENE														
5							30	3	1	1						149
10							15	3	1.5	1.4						128
15							24	3	4.5	4.0						120
20							30	3	4.5	5.7						102
25							30	3	4.5	4.5						112
30							76	3	4.5	4.4						154
35							58	3	4.5	4.4						153
40							61	3	4.5	4.4						132
45							33	3	4.5	4.0						152
50							44	3	4.5	4.0						152
55							45	3	4.5	4.3						154
60							49	3	4.5	4.1						149
65							29	3	3.5	3.0						157
70							22	3	3.5	3.5						185
75							26	3	4.5	4.5						235
80							40	3	4.5	4.5						185
85							83	3	4.5	4.5						204
90																92
95																92
100																132
105																102
110																84
115																82
120																82
125																
130																
135																
140																

DESCRIPTION	DEPTH IN FEET
BROWN DENSE SILTY SAND (SM)	0
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	8.0
GRAY CLAYEY SILT, TRACE SAND, TRACE GRAVEL (CL), GRAVEL AND COBBLES AT 22'-7"	20.0
GRAY SILT (ML), TRACE CLAY	28.5
THIN SAND AND GRAVEL SEAM	43.0
GRAY SILTY CLAY, TRACE TO LITTLE SAND, TRACE GRAVEL (CL)	43.0
THIN SAND AND GRAVEL SEAM	71.2
GRAY SILT (ML), TRACE CLAY, TRACE SAND, TRACE GRAVEL	75.0
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	86.6
BOULDER	
BOULDER	
BOULDERS, COBBLES AND GRAVEL IN A MATRIX OF CLAYEY SILT, SOME COARSE SAND	110.7
SANDY CLAY, TRACE OF FINE GRAVEL (CL)	112.6
BOULDERS, COBBLES AND GRAVEL IN A MATRIX OF CLAYEY SILT, SOME COARSE SAND	122.6
ROCK - SEE SHEET 2 OF 2	

REVISIONS NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.

CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-10 SHEET 1 OF 2

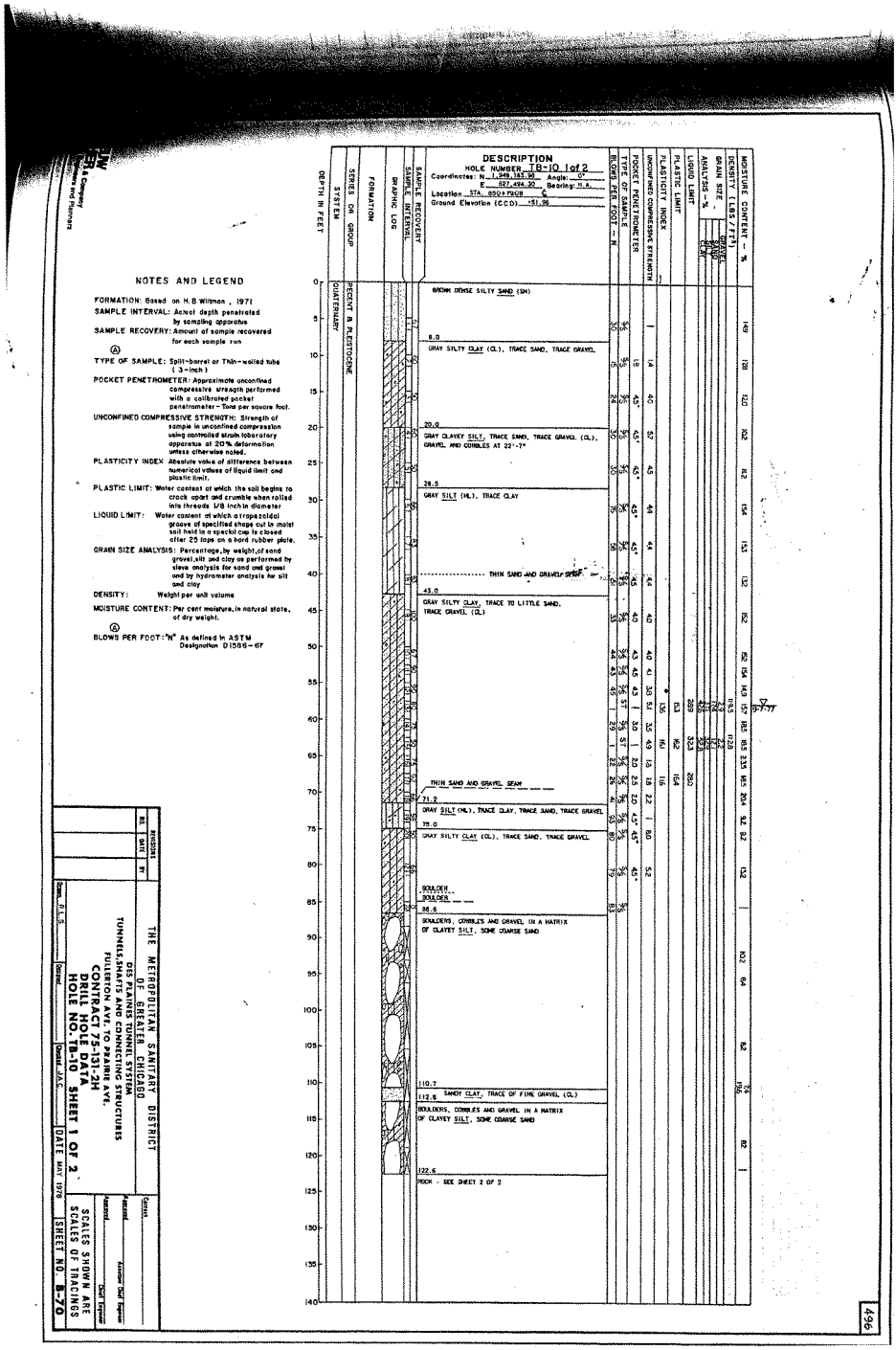
Drawn R.L.S. Checked Checked J.A.C. DATE MAY 1978

Checked
Approved Assistant Chief Engineer
Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-70

496



NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer—Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

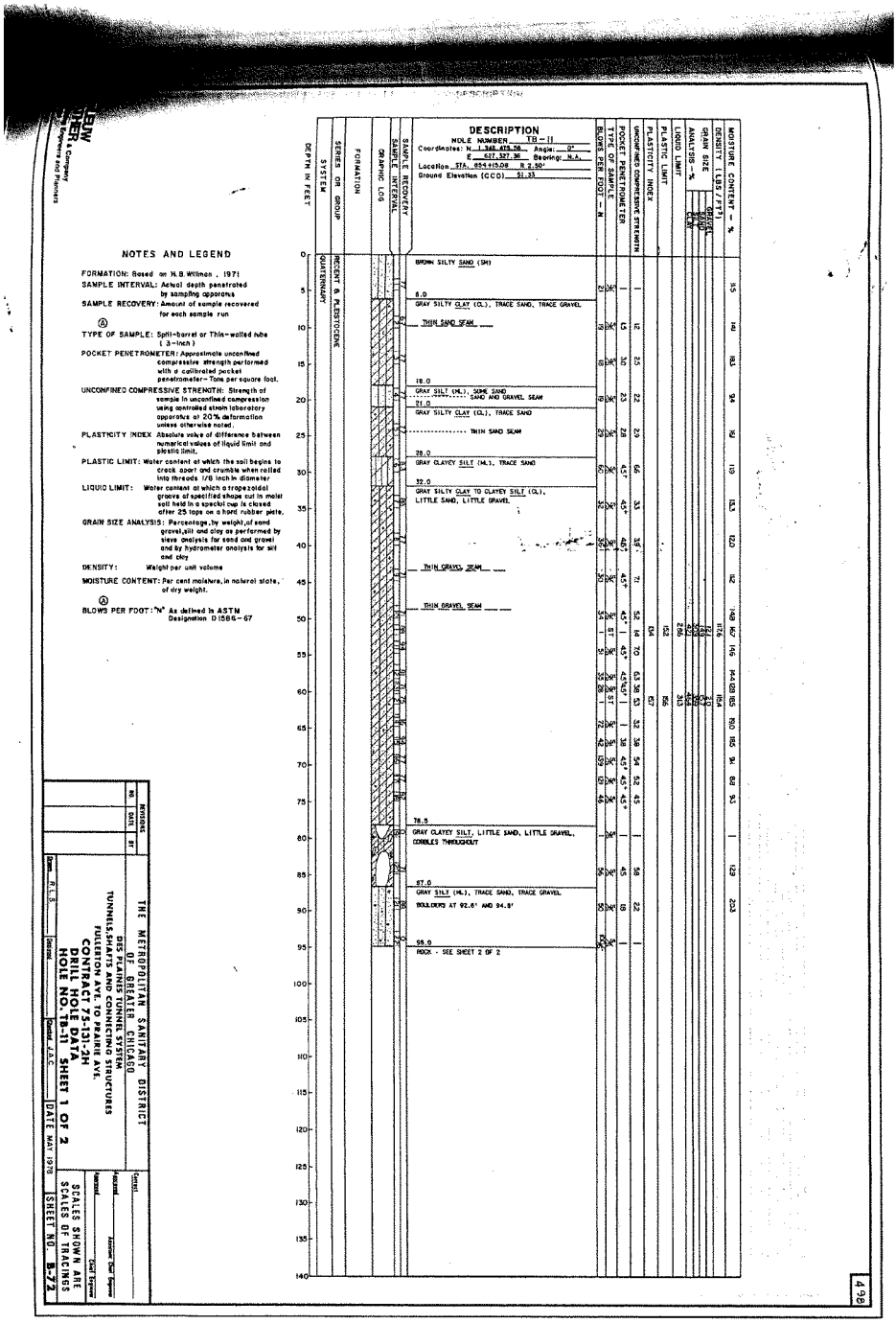
DESCRIPTION

HOLE NUMBER TB-11

Coordinates: N 1,348,415.56 Angle: 0°
E 627,327.36 Bearing: N.A.

Location STA. 654+15.08 R 2.50'

Ground Elevation (CCD) 51.33



DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE RECOVERY	SAMPLE INTERVAL	DESCRIPTION	BLOWS PER FOOT — N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS — %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT — %
0	QUATERNARY	RECENT & PLEISTOCENE					BROWN SILTY SAND (SM)											
5							6.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	21	Ⓐ		1							9.5
10							THIN SAND SEAM	19	Ⓐ	1.5	12							14.1
15							18.0 GRAY SILT (ML), SOME SAND	18	Ⓐ	3.0	2.5							18.3
20							SAND AND GRAVEL SEAM 21.0 GRAY SILTY CLAY (CL), TRACE SAND	19	Ⓐ	2.3	2.2							9.4
25							THIN SAND SEAM	29	Ⓐ	2.8	2.9							16.1
30							28.0 GRAY CLAYEY SILT (ML), TRACE SAND	60	Ⓐ	4.5*	6.6							11.9
35							32.0 GRAY SILTY CLAY TO CLAYEY SILT (CL), LITTLE SAND, LITTLE GRAVEL	32	Ⓐ	4.5*	3.3							13.3
40								36	Ⓐ	4.5*	3.9*							12.0
45							THIN GRAVEL SEAM	30	Ⓐ	4.5*	7.1							11.2
50							THIN GRAVEL SEAM	34	Ⓐ	4.5*	5.2	14	70	154	152	2.86	11.76	14.8
55								51	Ⓐ	4.5*	4.5*	14	70				14.6	14.7
60								35	Ⓐ	4.5*	4.5*	14	70				14.4	14.8
65								28	Ⓐ	4.5*	4.5*	14	70				14.5	18.5
70								72	Ⓐ	4.5*	5.3	53	157	156	313	313	15.0	19.0
75								42	Ⓐ	4.5*	5.2	38	54				18.5	9.4
80							78.5 GRAY CLAYEY SILT, LITTLE SAND, LITTLE GRAVEL, COBBLES THROUGHOUT	139	Ⓐ	4.5*	4.5*	45	45				8.8	8.3
85								46	Ⓐ	4.5*	4.5*	45	45				9.3	1
90							87.0 GRAY SILT (ML), TRACE SAND, TRACE GRAVEL BOULDERS AT 92.6' AND 94.5'	56	Ⓐ	4.5	1	5.8	22					12.9
95								50	Ⓐ	4.5	1	18	22					20.3
100							99.0 ROCK - SEE SHEET 2 OF 2											
105																		
110																		
115																		
120																		
125																		
130																		
135																		
140																		

REVISIONS		
NO	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM

TUNNELS, SHAFTS AND CONNECTING STRUCTURES

FULLERTON AVE. TO PRAIRIE AVE.

CONTRACT 75-131-2H

DRILL HOLE DATA

HOLE NO. TB-11 SHEET 1 OF 2

Drawn R.L.S. Checked J.A.C. DATE MAY 1978

Checked

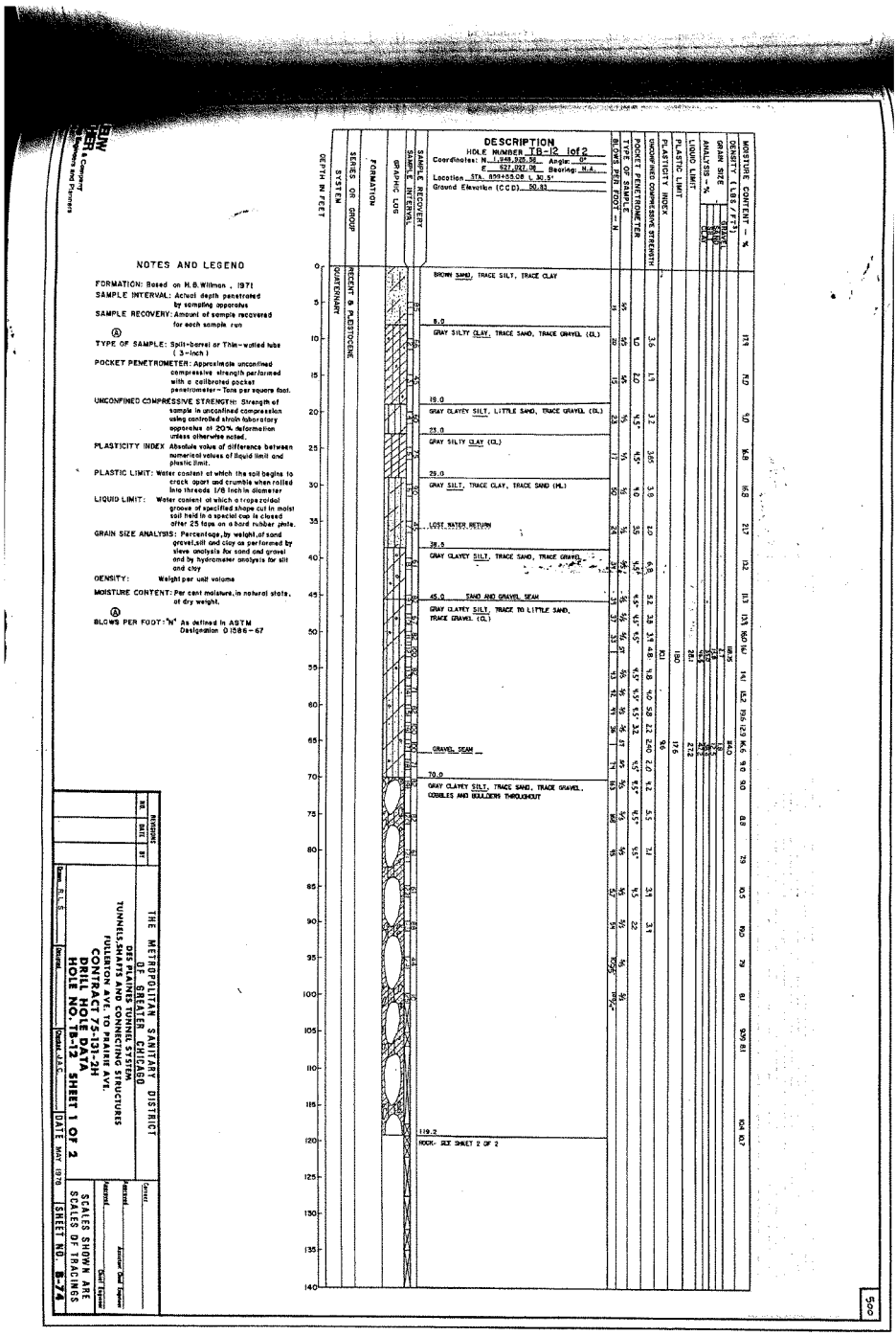
Approved Assistant Chief Engineer

Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-72

498



NOTES AND LEGEND

FORMATION: Based on H.B.Willman , 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer- Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586 – 67

DESCRIPTION
HOLE NUMBER TB-12 1of 2
Coordinates: N 1,849,926.96 Angle: 0°
E 627,097.08 Bearing: N.A.
Location STA. 859+55.08 L 30.5'
Ground Elevation (CCD) 90.83

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT — N	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS — % GRAVEL	SAND	SILT	CLAY	DENSITY (LBS / CU FT)	MOISTURE CONTENT — %
0	QUATERNARY	RECENT & PLEISTOCENE					16	4.5*	3.6	1.1							119	11.9
5							20	4.0	2.0	1.1								9.0
10							25	4.5*	3.2	1.2								10.8
15							13	4.5*	3.65	1.1								8.8
20							25	4.5*	3.9	1.1								8.8
25							11	4.0	2.0	1.1								21.7
30							56	4.5*	6.8	2.2								13.2
35							67	4.5*	8.2	3.8	3.1	28.1	0.5	43.5	43.5	12.5		13.3
40							54	4.5*	8.2	4.8	1.8	19.0	1.5	43.5	43.5	11.5		9.5
45							57	4.5*	8.2	4.0	1.8	19.0	1.5	43.5	43.5	11.5		14.1
50							35	4.5*	8.2	5.8	2.2	24.0	1.5	43.5	43.5	11.5		15.2
55							15	4.5*	9.6	2.2	2.0	24.0	1.5	43.5	43.5	11.5		19.6
60							74	4.5*	9.6	3.2	1.2	24.0	1.5	43.5	43.5	11.5		12.3
65							96	4.5*	9.6	3.2	1.2	24.0	1.5	43.5	43.5	11.5		19.6
70							69	4.5*	9.6	4.2	2.0	24.0	1.5	43.5	43.5	11.5		9.0
75							100/4"	4.5*	8.8	5.5	2.1	24.0	1.5	43.5	43.5	11.5		8.8
80							45	4.5*	7.3	3.9	2.1	24.0	1.5	43.5	43.5	11.5		7.3
85							57	4.5*	5.5	3.9	2.1	24.0	1.5	43.5	43.5	11.5		9.0
90							54	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
95							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
100							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
105							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
110							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
115							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
120							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
125							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
130							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
135							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5
140							100/4"	4.5*	4.5	2.2			1.5	43.5	43.5	11.5		9.5

119.2 ROCK- SEE SHEET 2 OF 2

GRAVEL SEAM

GRAY CLAYEY SILT, TRACE SAND, TRACE GRAVEL, COBBLES AND BOULDERS THROUGHOUT

SAND AND GRAVEL SEAM

GRAY CLAYEY SILT, TRACE TO LITTLE SAND, TRACE GRAVEL (CL)

LOST WATER RETURN

GRAY CLAYEY SILT, TRACE SAND, TRACE GRAVEL

GRAY SILT, TRACE CLAY, TRACE SAND (ML)

GRAY SILTY CLAY (CL)

GRAY CLAYEY SILT, LITTLE SAND, TRACE GRAVEL (CL)

GRAY SILTY CLAY, TRACE SAND, TRACE GRAVEL (CL)

BROWN SAND, TRACE SILT, TRACE CLAY

8.0

18.0

23.0

29.0

38.5

45.0

70.0

119.2

SHEET NO. B-74

DATE MAY 1978

Drawn R.L.S. Checked J.S.C.

Approved Assistant Chief Engineer

Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-12 SHEET 1 OF 2

TUNNELS, SHAFTS AND TUNNEL STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.

DES PLAINES TUNNEL SYSTEM

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

Consult

REVISIONS
NO. DATE BY

HARZA ENGINEERING COMPANY
Consulting Engineers and Planners

502

NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER TB-36 1 of 2

Coordinates: N 1,242,104.25 Angle: 0°

E 628,991.85 Bearing: N.A.

Location STA. 661+27.80 R 29.33'

Ground Elevation (CCD) 51.04

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - %	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					GRAY SILTY CLAY (CL), SOME SAND, LITTLE GRAVEL										
5					36	56		33	3/4"	1	57	23	173	306	2.3	139	192
10					36	56		21	3/4"	1	23	23	173	306	2.3	139	213
15					36	56		20	3/4"	1	1	1	1	1	1	1	1
20					36	56		28	3/4"	1	42	25	96	251	2.4	134	240
25					36	56		23	3/4"	1	25	53	48	135	1.5	155	155
30					36	56	30.0 GRAY SILT, LITTLE CLAY, TRACE SAND, TRACE GRAVEL (ML)	100	3/4"	1	45	45	22	34	1.5	153	174
35					36	56		54	3/4"	1	33	33	33	33	1.5	174	122
40					36	56		125+	3/4"	1	33	33	33	33	1.5	174	122
45					36	56	45.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	36	3/4"	1	45	45	82	57	3.5	35	12.7
50					36	56		34	3/4"	1	45	45	57	35	3.5	160	160
55					36	56		34	3/4"	1	45	45	35	35	3.5	159	158
60					36	56		43	3/4"	1	45	45	35	35	3.5	158	252
65					36	56		26	3/4"	1	45	45	18	24	4.3	162	107
70					36	56	69.0 GRAY CLAYEY SILT (CL), SOME SAND, SOME GRAVEL	76	3/4"	1	45	45	44	43	4.3	61	86
75					36	56		111	3/4"	1	45	45	61	45	4.5	83	100
80					36	56		106	3/4"	1	45	45	57	45	4.5	102	76
85					36	56	84.0 GRAY CLAYEY SILT, SOME SAND, SOME GRAVEL, BOULDERS THROUGHOUT	37	3/4"	1	45	45	70	33	4.5	76	80 96
90					36	56		44	3/4"	1	45	45	1	1	1	80	87
95					36	56		100/4"	100/4"	1	5/4"	5/4"	1	1	1	1	1
100					36	56		100/2"	100/2"	1	5/4"	5/4"	1	1	1	1	1
105					36	56		100/2"	100/2"	1	5/4"	5/4"	1	1	1	1	1
110					36	56	110.2 ROCK - SEE SHEET 2 OF 2										
115																	
120																	
125																	
130																	
135																	
140																	

SOIL CORING

ROCK CORING

REVISIONS		
NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM

TUNNELS, SHAFTS AND CONNECTING STRUCTURES

FULLERTON AVE. TO PRAIRIE AVE.

CONTRACT 75-131-2H

DRILL HOLE DATA

HOLE NO. TB-36 SHEET 1 OF 2

Drawn R.L.S. Checked J.A.C. DATE MAY 1978

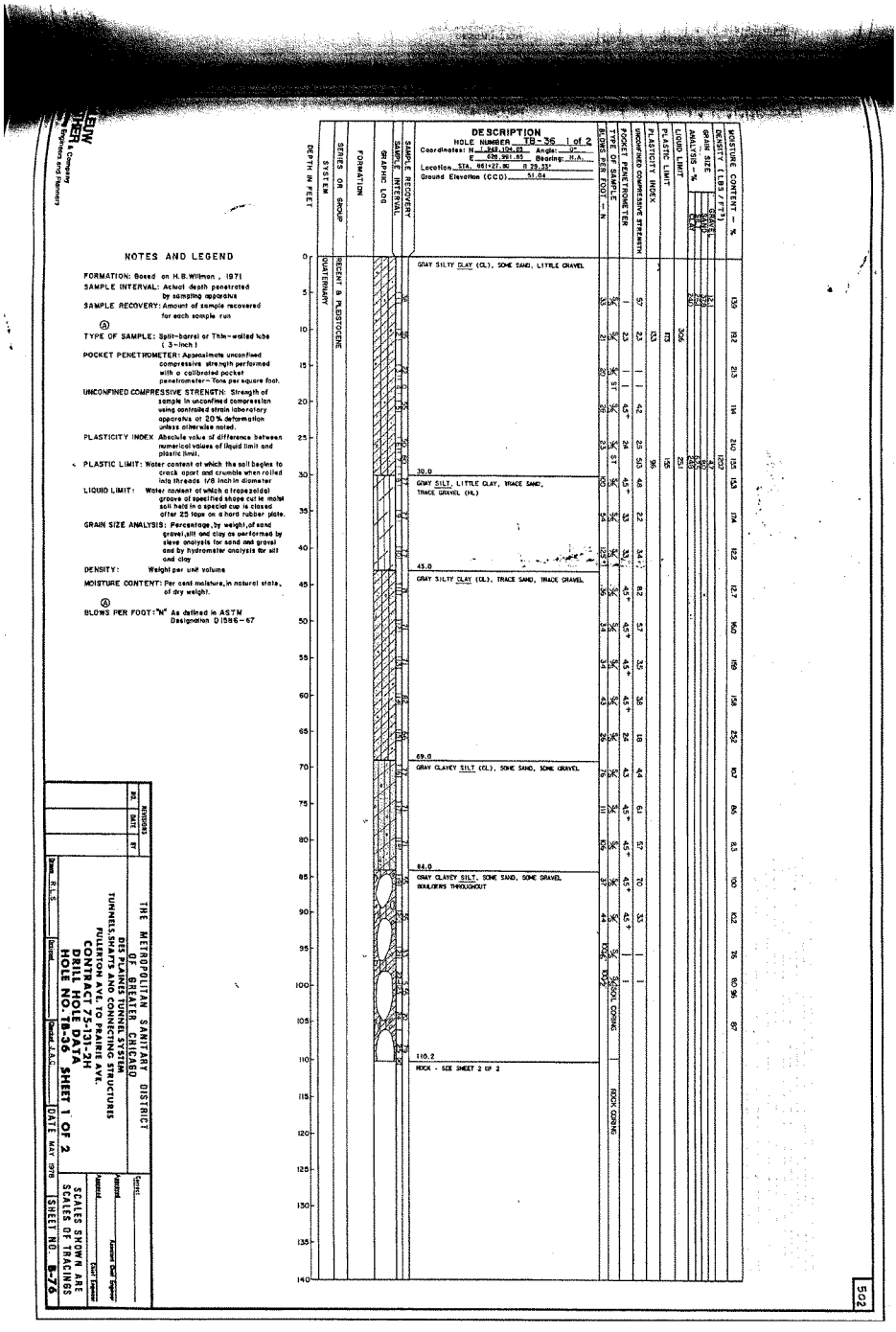
Correct: Assistant Chief Engineer

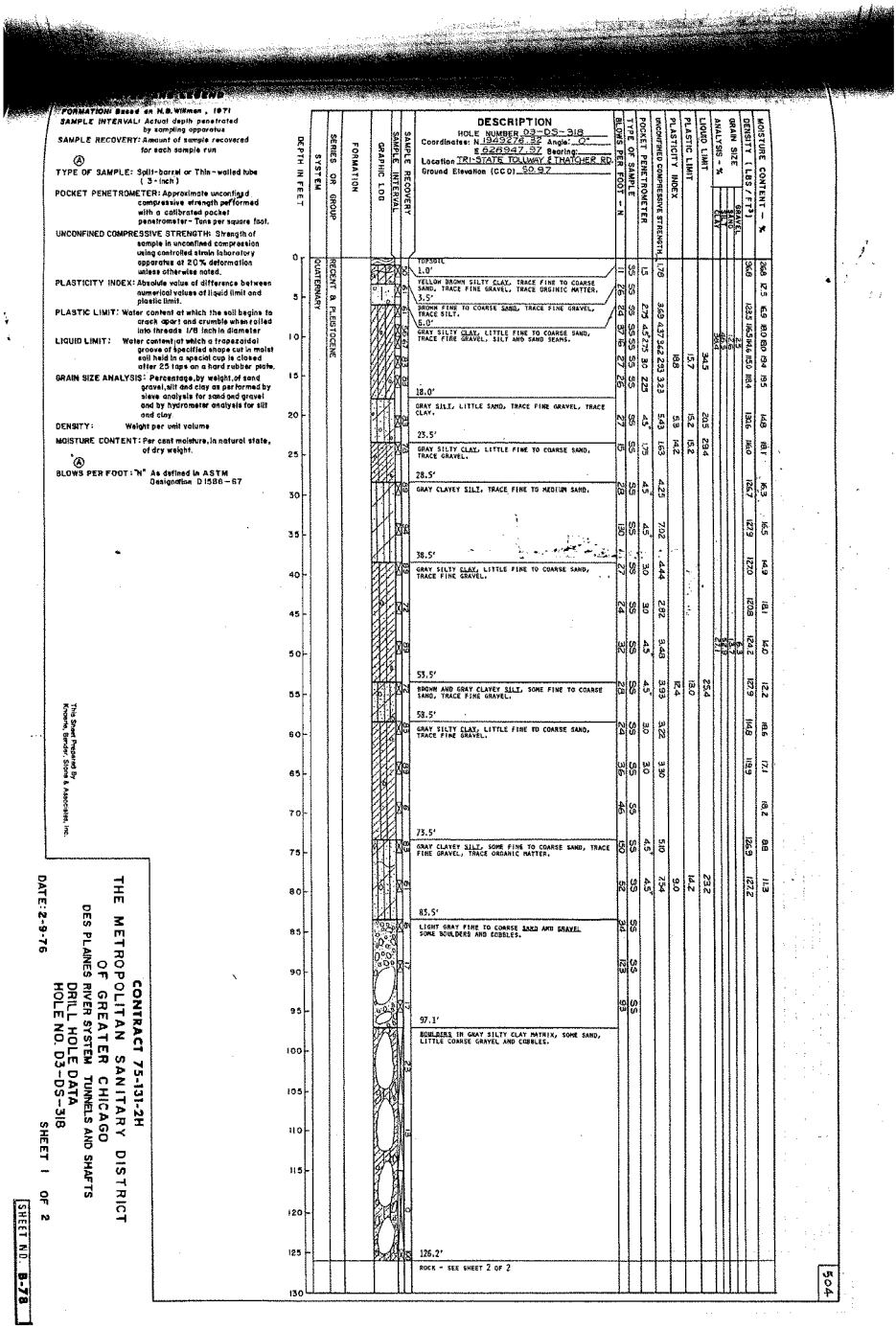
Approved: Assistant Chief Engineer

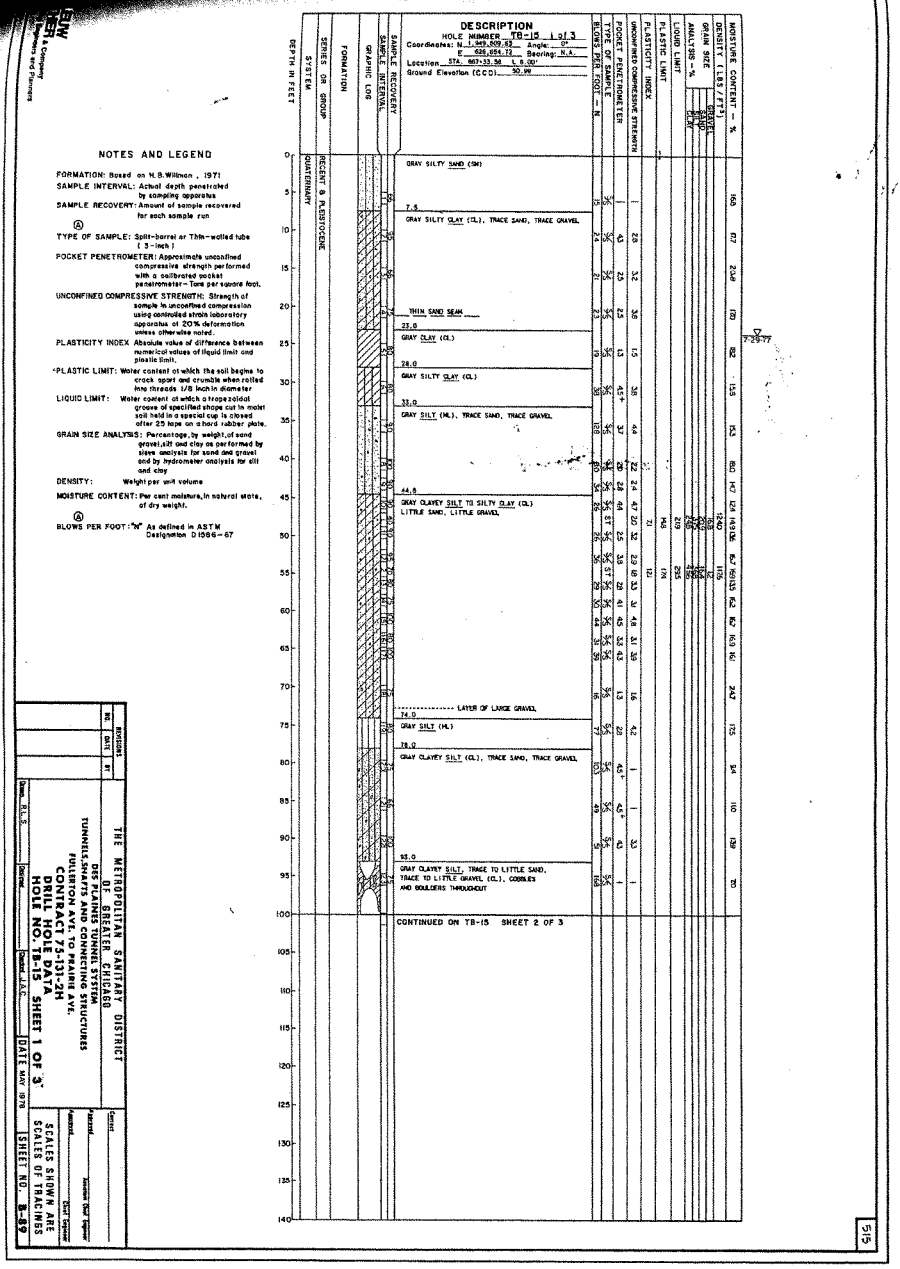
SCALES SHOWN ARE SCALES OF TRACINGS

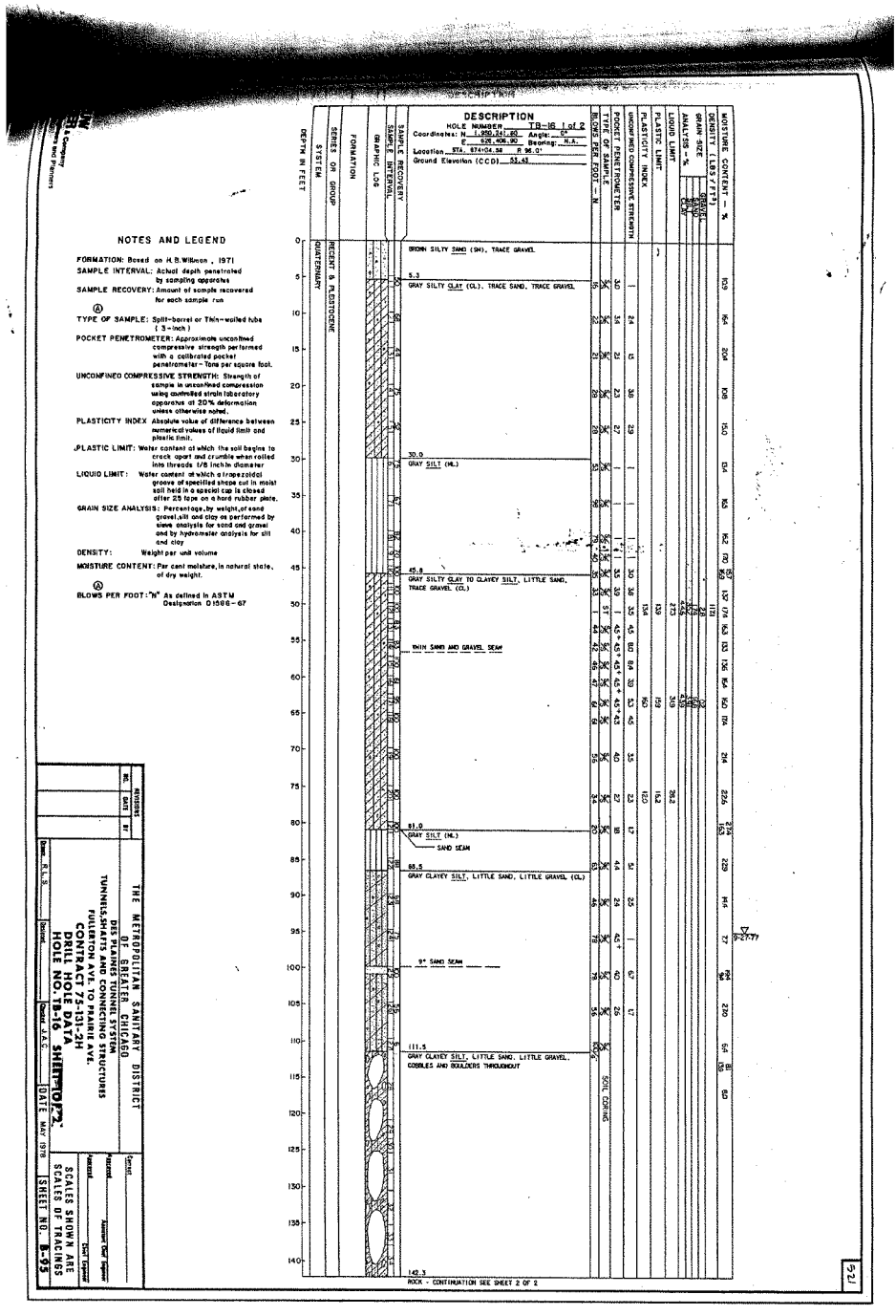
SHEET NO. B-76

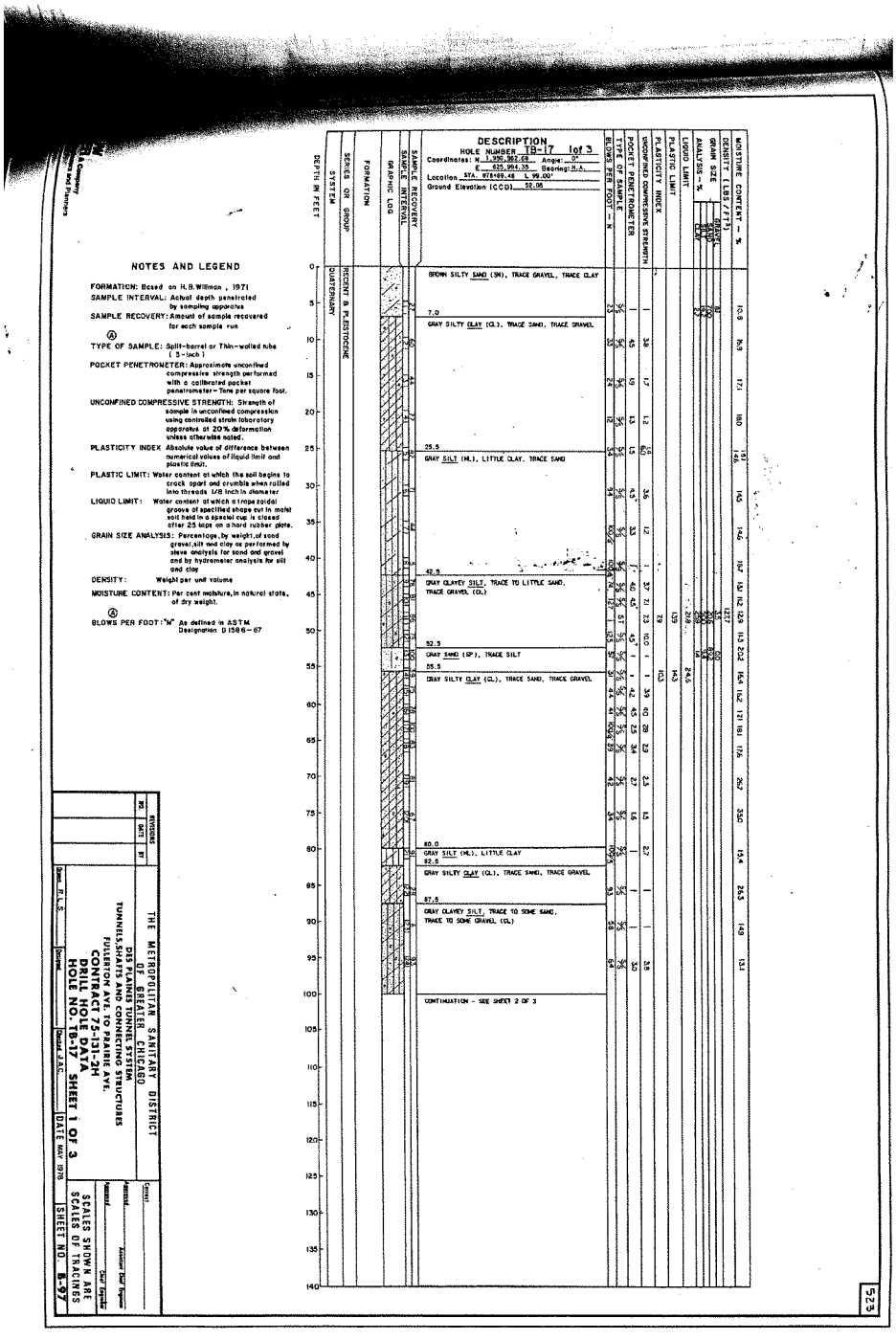
502




LEGEND
FORMATION: Based on H.B. Willman, 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: 'N' As defined in ASTM Designation D1586-67
DESCRIPTION
HOLE NUMBER D3-DS-318
Coordinates: N 1959276.32 Angle: 0°
E 628947.97 Bearing:
Location TRI-STATE TOLLWAY & THATCHER RD.
Ground Elevation (CCD) 590.97
MOISTURE CONTENT - %
DENSITY (LBS/FT³)
GRAIN SIZE ANALYSIS - %
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
UNCONFINED COMPRESSIVE STRENGTH, T/FT²
POCKET PENETROMETER
TYPE OF SAMPLE
BLOWS PER FOOT - N
SAMPLE RECOVERY
SAMPLE INTERVAL
GRAPHIC LOG
FORMATION
SERIES OR GROUP
SYSTEM
DEPTH IN FEET
TOPSOIL 1.0'
YELLOW BROWN SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL, TRACE ORGANIC MATTER. 3.5'
BROWN FINE TO COARSE SAND, TRACE FINE GRAVEL, TRACE SILT. 6.0'
GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL, SILT AND SAND SEAMS. 18.0'
GRAY SILT, LITTLE SAND, TRACE FINE GRAVEL, TRACE CLAY. 23.5'
GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE GRAVEL. 28.5'
GRAY CLAYEY SILT, TRACE FINE TO MEDIUM SAND. 38.5'
GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL. 53.5'
BROWN AND GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL. 58.5'
GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL. 73.5'
GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL, TRACE ORGANIC MATTER. 83.5'
LIGHT GRAY FINE TO COARSE SAND AND GRAVEL SOME BOULDERS AND COBBLES. 97.1'
BOULDERS IN GRAY SILTY CLAY MATRIX, SOME SAND, LITTLE COARSE GRAVEL AND COBBLES. 126.2'
ROCK - SEE SHEET 2 OF 2
QUATERNARY
RECENT & PLEISTOCENE
Tri-State Tollway
Thatcher Rd.
Thick Bored Prepared by Knowles, Morrow, Stone & Associates, Inc.
CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D3-DS-318
DATE: 2-9-76
SHEET 1 OF 2
SHEET NO. B-78
504


NOTES AND LEGEND
FORMATION: Based on H.B.Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3 - inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
*PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a tapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586 - 67
DESCRIPTION
HOLE NUMBER TB-15 1 of 3
Coordinates: N 1,949,009.82 Angle: 0°
E 626,654.72 Bearing: N.A.
Location STA. 867+33.56 L ft. (Q)
Ground Elevation (CCD) 90.99
SAMPLE RECOVERY
SAMPLE INTERVAL
GRAPHIC LOG
FORMATION
SERIES OR GROUP
SYSTEM
DEPTH IN FEET
TYPE OF SAMPLE
BLOWS PER FOOT — N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS — %
DENSITY LBS / (FT)3
MOISTURE CONTENT — %
QUATERNARY
RECENT & PLEISTOCENE
GRAY SILTY SAND (SM)
7.5
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
THIN SAND SEAM
23.0
GRAY CLAY (CL)
28.0
GRAY SILTY CLAY (CL)
33.0
GRAY SILT (ML), TRACE SAND, TRACE GRAVEL
44.5
GRAY CLAYEY SILT TO SILTY CLAY (CL) LITTLE SAND, LITTLE GRAVEL
LAYER OF LARGE GRAVEL
74.0
GRAY SILT (ML)
78.0
GRAY CLAYEY SILT (CL), TRACE SAND, TRACE GRAVEL
93.0
GRAY CLAYEY SILT, TRACE TO LITTLE SAND, TRACE TO LITTLE GRAVEL (CL), COBBLES AND BOULDERS THROUGHOUT
CONTINUED ON TB-15 SHEET 2 OF 3
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT (C) - 13
DRILLING LOG DATA
HOLE NO. TB-15 SHEET 1 OF 3
DATE MAY 1970
SHEET NO. B-89
SCALES SHOWN ARE SCALES OF TRACINGS
REVISIONS
Drawn R.L.S.
Checked
Chief Engineer
Approved
Assistant Chief Engineer
Consultant
Engineers and Planners
515


NOTES AND LEGEND
FORMATION: Based on H.B. Wilmon , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586 - 67
DESCRIPTION
HOLE NUMBER TB-16 1 of 2
Coordinates: N 1,950,341.60 Angle 0°
E 926,406.90 Bearing N.A.
Location STA. 874+04.58 R 96.0'
Ground Elevation (CCD) 53.43
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
TYPE OF SAMPLE
BLOWS PER FOOT — N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE
ANALYSIS - %
DENSITY (LBS / FT³)
MOISTURE CONTENT — %
DEPTH IN FEET
QUATERNARY
RECENT & PLEISTOCENE
BROWN SILTY SAND (SM), TRACE GRAVEL
5.3
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
30.0
GRAY SILT (ML)
40.8
GRAY SILTY CLAY TO CLAYEY SILT, LITTLE SAND, TRACE GRAVEL (CL)
THIN SAND AND GRAVEL SEAM
81.0
GRAY SILT (ML)
SAND SEAM
88.5
GRAY CLAYEY SILT, LITTLE SAND, LITTLE GRAVEL (CL)
9" SAND SEAM
111.9
GRAY CLAYEY SILT, LITTLE SAND, LITTLE GRAVEL, COBBLES AND BOULDERS THROUGHOUT
140.3
ROCK - CONTINUATION SEE SHEET 2 OF 2
SOIL CORING
9-27-77
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FOR CONTRACT 71-127-2H
CONTRACT 72-127-2H
DRILL HOLE DATA
HOLE NO. TB-16 SHEET 1 OF 2
SCALES SHOWN ARE SCALES OF TRACINGS
Drawn R.L.S.
Traced
Detail
Checked J.A.C.
Approved
Assistant Chief Engineer
Chief Engineer
DATE MAY 1978
SHEET NO. B-93
REVISIONS
NO.
DATE
BY
Sheet 1 of 2 Sheets
Contract Documents
921


NOTES AND LEGEND
FORMATION: Based on H.B.Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (5-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer-Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a rope of soil grooves of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67
DESCRIPTION
HOLE NUMBER TB-17 1of 3
Coordinates: N 1,930,982.08 Angle: 0°
E 625,994.35 Bearing: N.A.
Location STA. RT&RR 48 L 99.00'
Ground Elevation (CCD) 58.05
BROWN SILTY SAND (SM), TRACE GRAVEL, TRACE CLAY
7.0
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
25.5
GRAY SILT (ML), LITTLE CLAY, TRACE SAND
42.5
GRAY CLAYEY SILT, TRACE TO LITTLE SAND, TRACE GRAVEL (CL)
52.5
GRAY SAND (SP), TRACE SILT
55.5
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
80.0
GRAY SILT (ML), LITTLE CLAY
82.5
GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL
87.5
GRAY CLAYEY SILT, TRACE TO SOME SAND, TRACE TO SOME GRAVEL (CL)
CONTINUATION - SEE SHEET 2 OF 3
DEPTH IN FEET
SYSTEM
QUATERNARY
SERIES OR GROUP
RECENT & PLEISTOCENE
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
BLOWS PER FOOT - N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS - %
DENSITY - LBS/CU.FT.
MOISTURE CONTENT - %
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
HOLE NO. TB-17 SHEET 1 OF 3
SCALES SHOWN ARE SCALES OF TRACINGS
DATE MAY 1970
SHEET NO. B-97
REVISIONS
Approved
Assistant Chief Engineer
Chief Engineer
Drawn
Checked
Designed
Traced
Checked
Notes and Plans
523

NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ **TYPE OF SAMPLE:** Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ **BLOWS PER FOOT:** "N" As defined in ASTM Designation D 1586-67

This Chart Prepared By Kaselik, Barnard, Stone & Associates, Inc.

DESCRIPTION

HOLE NUMBER D3-AS-321
Coordinates: N 1551124.075 Angle: 0°
E 625838.372 Bearing:
Location SOUTH OF DAYTON & EAST OF RIVER RD
Ground Elevation (CCD) 52.95

Depth in Feet	Description	Blows per Foot - N	Pocket Penetrometer	Unconfined Compressive Strength	Plasticity Index	Plastic Limit	Liquid Limit	Analysis - % Gravel	Analysis - % Sand	Analysis - % Silt	Analysis - % Clay	Grain Size	Density (LBS/FT³)	Moisture Content - %
0	DARK GRAY SILTY CLAY, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL, TRACE ORGANIC MATERIAL.	SS 12	1.5	4.64	16.1	16.0	54.1						137	26.13
2.5'	YELLOW-BROWN FINE TO COARSE SAND, SOME CLAYEY SILT, TRACE FINE GRAVEL.	SS 12	0.5	3.50									128	14.68
5.0'	GRAY SILTY CLAY, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.	SS 25	2.3	3.69									150	17.49
7.0'	GRAY CLAYEY SILT, LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL.	SS 25	2.4	3.01									120.8	18.53
9.5'	GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE TO MEDIUM GRAVEL.	SS 24	2.6	2.49									143.1	15.9
33.0'	GRAY SILT, TRACE CLAY, TRACE FINE SAND, TRACE FINE GRAVEL.	SS 19	2.0	3.12									116.1	18.00
43.0'	GRAY SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL.	SS 16	1.5	1.64									121.1	16.65
		SS 23	1.8											
		SS 29	2.5											
		100/6"	1.7											
		143	2.8											
		SS 29	3.4	4.43	N.P.	N.P.	19.2						118.4	17.57
		SS 45	2.8											
		SS 35	4.0	5.28									119.2	18.25
		SS 44	4.3	5.51									120.2	16.55
		SS 44	4.3	6.21									120.6	15.62
		SS 45	3.0	2.07									100.9	15.97
		SS 19	3.2	3.40									111.4	26.18
83.0'	LIGHT GRAY FINE TO COARSE SAND AND FINE TO MEDIUM GRAVEL, TRACE SILT.	SS 22	4.0	2.25			17.3						105.7	13.75
		SS 53	3.5	2.08			13.3						109.6	21.95
		SS 45	4.5"	7.05										22.73
93.0'	GRAY SILT, TRACE CLAY, SOME FINE TO COARSE SAND, LITTLE FINE TO COARSE GRAVEL.	SS 109	4.5"										84.0	8.74
103.0'	LIGHT GRAY GRAVEL, TRACE SILTY CLAY.	100/0.6"	4.5"										114	8.27
108.0'	GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, LITTLE FINE TO MEDIUM GRAVEL.	SS 87	4.5"										96	9.42
		SS 92	4.5"											
		100/0.2"	4.5"											

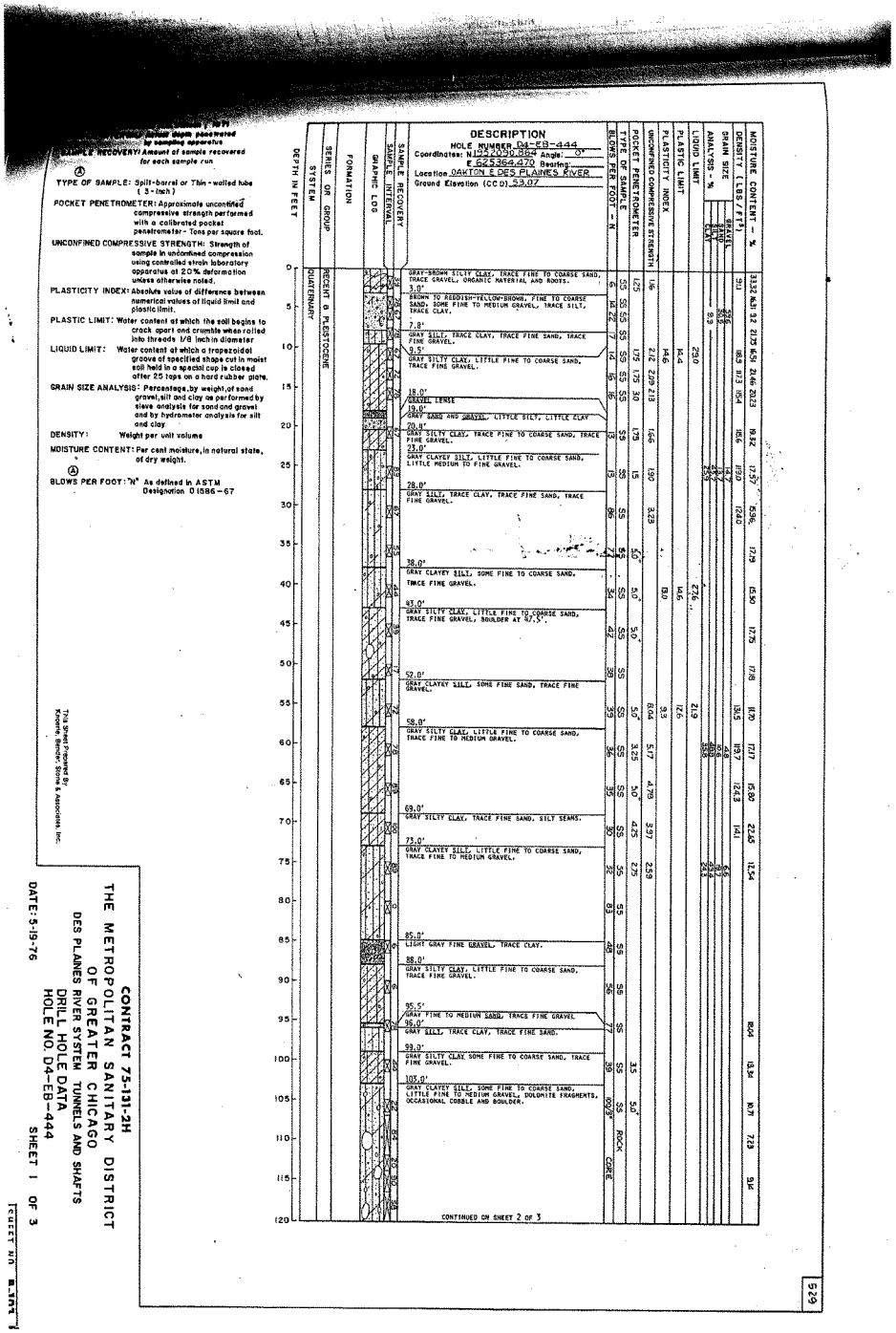
SYSTEM: QUATERNARY
SERIES OR GROUP: RECENT & PLEISTOCENE
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120

CONTINUED ON SHEET 2 OF 3

526

CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D3-AS-321
DATE: 4-20-76
SHEET 1 OF 3

SHEET NO. B-100



SAMPLE RECOVERY: Amount of sample recovered for each sample run

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in undrained compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage by weight of sand, gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

This Sheet Prepared By Tippetts, Abbett, McCarthy, Stratton & Associates, Inc.

CONTRACT 75-131-2H

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS

DRILL HOLE DATA

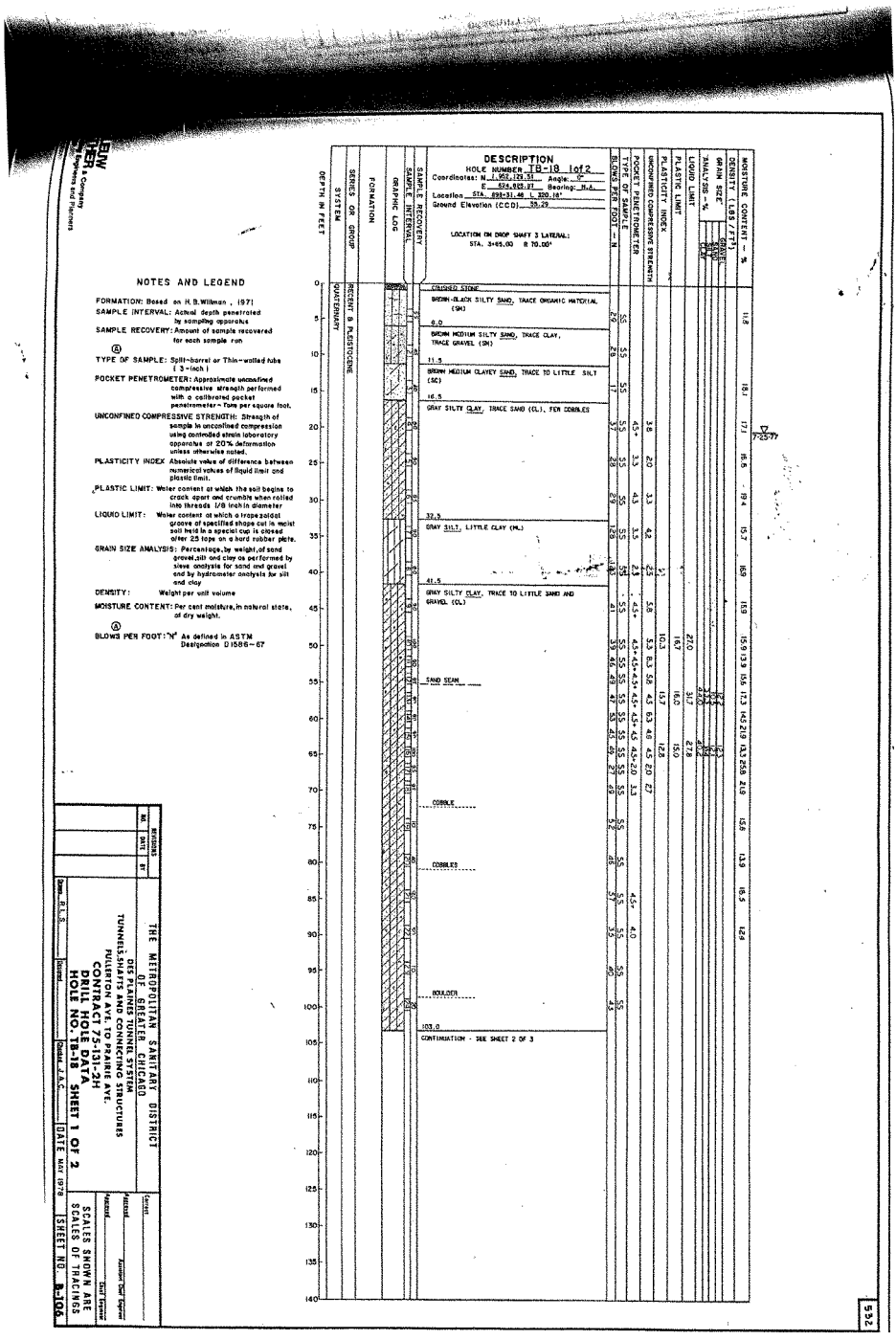
HOLE NO. D4-EB-444

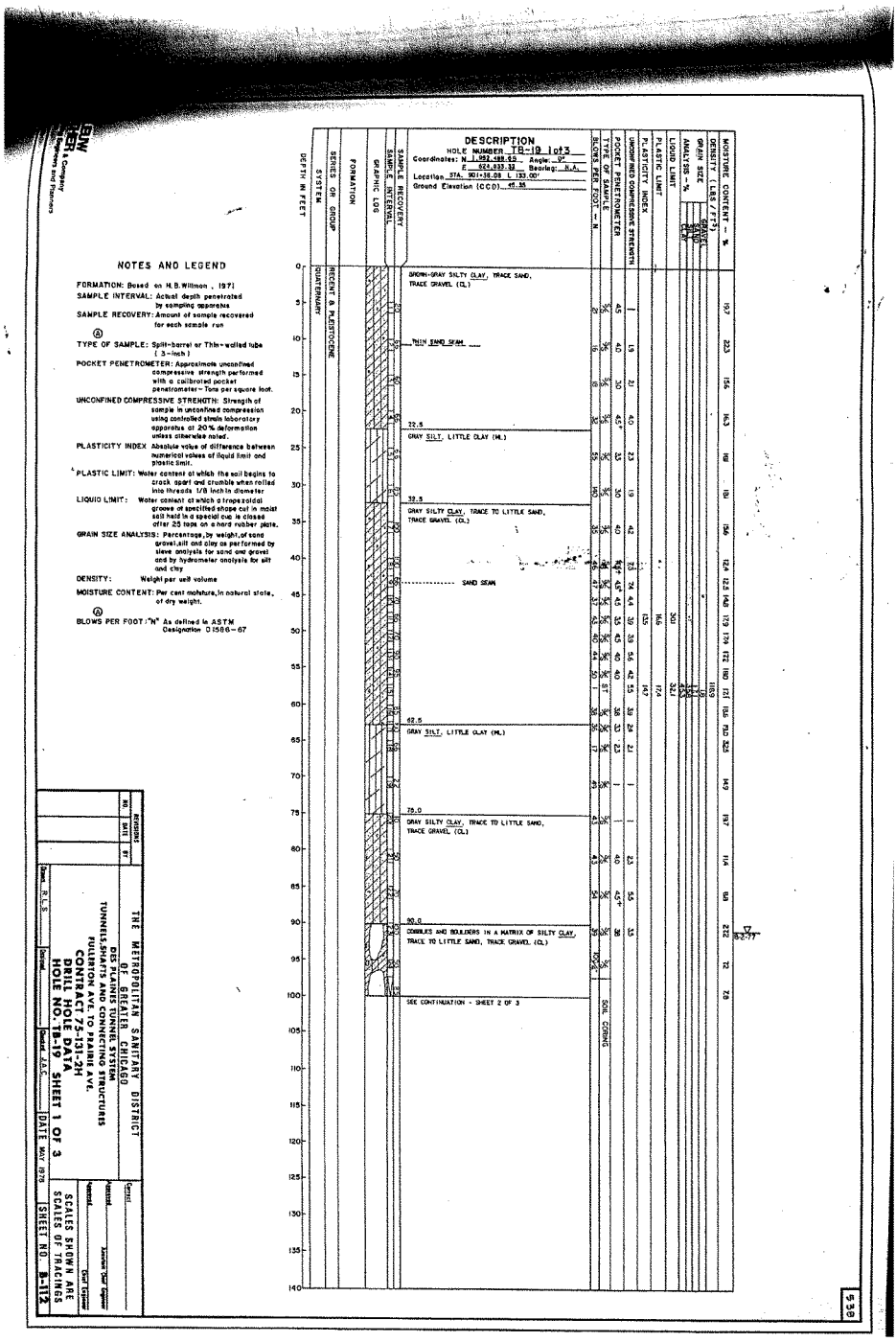
DATE: 5-19-76

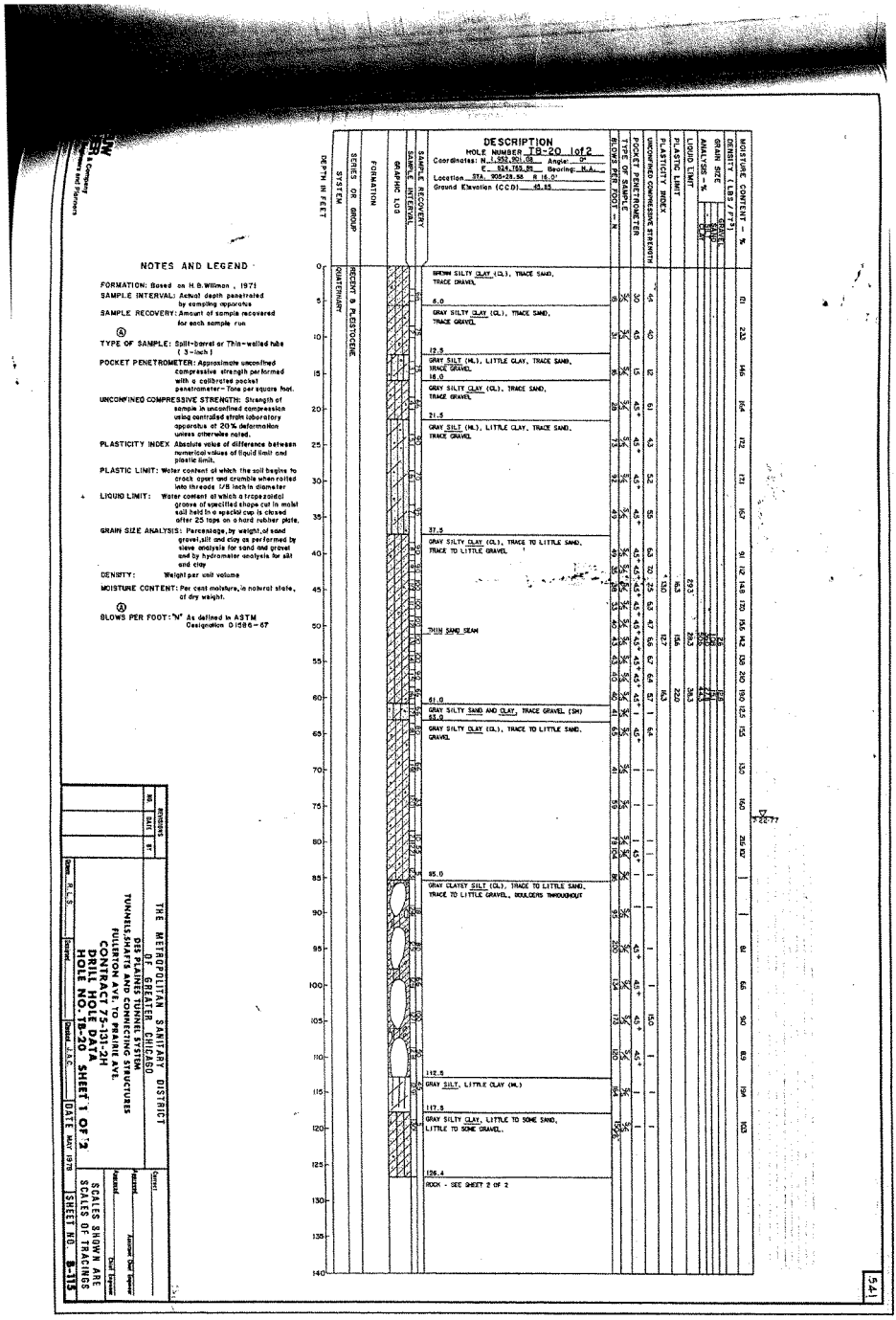
SHEET 1 OF 3

PROJECT NO. 8.1.1.1

529


DESCRIPTION
HOLE NUMBER TB-18 1of2
Coordinates: N 1,955,129.51 Angle: 0°
E 824,825.27 Bearing: N-S
Location STA. 898+31.48 L 320.16'
Ground Elevation (CCD) 33.29
LOCATION ON DROP SHAFT 3 LATERAL:
STA. 3+65.00 R 70.00'
NOTES AND LEGEND
FORMATION: Based on H.B.Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer- Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67
DEPTH IN FEET
SYSTEM
SERIES OR GROUP
FORMATION
GRAPHIC LOG
SAMPLE INTERVAL
SAMPLE RECOVERY
BLOWS PER FOOT — N
TYPE OF SAMPLE
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS — %
DENSITY (LBS / FT³)
MOISTURE CONTENT — %
QUATERNARY
RECENT & PLEISTOCENE
CRUSHED STONE
BROWN-BLACK SILTY SAND, TRACE ORGANIC MATERIAL (SM)
6.0
BROWN MEDIUM SILTY SAND, TRACE CLAY, TRACE GRAVEL (SM)
11.5
BROWN MEDIUM CLAYEY SAND, TRACE TO LITTLE SILT (SC)
16.5
GRAY SILTY CLAY, TRACE SAND (CL), FEW COBBLES
32.5
GRAY SILT, LITTLE CLAY (ML)
41.5
GRAY SILTY CLAY, TRACE TO LITTLE SAND AND GRAVEL (CL)
SAND SEAM
COBBLE
COBBLES
BOULDER
103.0
CONTINUATION - SEE SHEET 2 OF 3
7-25-77
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-18 SHEET 1 OF 2
Drawn R.L.S.
Traced
Checked J.A.C.
DATE MAY 1978
SCALES SHOWN ARE SCALES OF TRACINGS
SHEET NO. B-106
Engineers and Planners
Harza Engineering Company
REVISIONS
NO.
DATE
BY
Correct
Approved
Assistant Chief Engineer
Chief Engineer


NOTES AND LEGEND
FORMATION: Based on H.B.Willman , 1971
SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus
SAMPLE RECOVERY: Amount of sample recovered for each sample run
TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)
POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.
UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.
PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.
PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter
LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.
GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay
DENSITY: Weight per unit volume
MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.
BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586 - 67
DESCRIPTION
HOLE NUMBER TB-19 1 of 3
Coordinates: N 1,952,188.65 Angle - 0°
E 824,833.32 Bearing: N.A.
Location STA. 901+36.08 L 133.00'
Ground Elevation (CCD) 69.36
SAMPLE INTERVAL
SAMPLE RECOVERY
GRAPHIC LOG
FORMATION
SERIES OR GROUP
SYSTEM
DEPTH IN FEET
BLOWS PER FOOT - N
POCKET PENETROMETER
UNCONFINED COMPRESSIVE STRENGTH
PLASTICITY INDEX
PLASTIC LIMIT
LIQUID LIMIT
GRAIN SIZE ANALYSIS - %
DENSITY (LBS / FT³)
MOISTURE CONTENT - %
BROWN-GRAY SILTY CLAY, TRACE SAND, TRACE GRAVEL (CL)
THIN SAND SEAM
22.5
GRAY SILT, LITTLE CLAY (ML)
32.5
GRAY SILTY CLAY, TRACE TO LITTLE SAND, TRACE GRAVEL (CL)
SAND SEAM
62.5
GRAY SILT, LITTLE CLAY (ML)
75.0
GRAY SILTY CLAY, TRACE TO LITTLE SAND, TRACE GRAVEL (CL)
90.0
COBBLES AND BOULDERS IN A MATRIX OF SILTY CLAY, TRACE TO LITTLE SAND, TRACE GRAVEL (CL)
SEE CONTINUATION - SHEET 2 OF 3
RECENT & PLEISTOCENE
QUATERNARY
SOIL CORING
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-19 SHEET 1 OF 3
DATE MAY 1970
SHEET NO. B-112
SCALES SHOWN ARE SCALES OF TRACINGS
REVISIONS
NO. DATE BY
Drawn R.L.S.
Checked A.K.S.
Approved
Contract
Assistant
Assistant Chief Engineer
Chief Engineer
S.S.D.
LEIBEN FISCHER & Company Engineers and Planners



NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER TB-20 1of2

Coordinates: N 1,552,201.08 Angle: 0°
E 924,755.98 Bearing: N.A.

Location STA. 905+28.58 R 16.0'

Ground Elevation (CCD) 48.85

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS - %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE															
5							18		30	45							121
10							31		45	40							233
15							16		15	12							146
20							28		45+	61							164
25							73		45+	43							172
30							92		45+	52							171
35							49		45+	55							167
40							49		45+	63	70	25	63				91
45							35		45+	65	47	65	67				112
50							38		45+	63	47	66	67				148
55							33		45+	65	47	66	67				170
60							40		45+	64	47	66	67				156
65							40		45+	57	47	66	67				142
70							41		45+	64	47	66	67				138
75							65		45+	64	47	66	67				210
80							41		45+	64	47	66	67				190
85							59		45+	64	47	66	67				125
90							78		45+	64	47	66	67				155
95							86		45+	64	47	66	67				130
100							95		45+	64	47	66	67				160
105							134		45+	64	47	66	67				215
110							173		45+	64	47	66	67				107
115							120		45+	64	47	66	67				81
120							164		45+	64	47	66	67				66
125							150/2		45+	64	47	66	67				90
130																	89
135																	194
140																	103

BROWN SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL

6.0

GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL

12.5

GRAY SILT (ML), LITTLE CLAY, TRACE SAND, TRACE GRAVEL

16.0

GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL

21.5

GRAY SILT (ML), LITTLE CLAY, TRACE SAND, TRACE GRAVEL

37.5

GRAY SILTY CLAY (CL), TRACE TO LITTLE SAND, TRACE TO LITTLE GRAVEL

THIN SAND SEAM

61.0

GRAY SILTY SAND AND CLAY, TRACE GRAVEL (SM)

63.0

GRAY SILTY CLAY (CL), TRACE TO LITTLE SAND, GRAVEL

85.0

GRAY CLAYEY SILT (CL), TRACE TO LITTLE SAND, TRACE TO LITTLE GRAVEL, BOULDERS THROUGHOUT

112.5

GRAY SILT, LITTLE CLAY (ML)

117.5

GRAY SILTY CLAY, LITTLE TO SOME SAND, LITTLE TO SOME GRAVEL.

126.4

ROCK - SEE SHEET 2 OF 2

▽ 3-22-77

REVISIONS

NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM

TUNNELS, SHAFTS AND CONNECTING STRUCTURES

FULLERTON AVE. TO PRAIRIE AVE.

CONTRACT 75-131-2H

DRILL HOLE DATA

HOLE NO. TB-20 SHEET 1 OF 2

Drawn R.L.S. Checked J.A.C. Checked J.A.C. DATE MAY 1978

Correct

Approved Assistant Chief Engineer

Approved Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-115

541

SAMPLE RECORD

FORMATION: Based on H.B. Wilman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67

DESCRIPTION

HOLE NUMBER 22

Coordinates: N 1953181.60 Angle: 0°

E 624498.99 Bearing:

Location 300' S. OF CUL-DE-SAC AT BERRY

Ground Elevation (CCD) 51.61

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - %	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					BROWN MOTTLED GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.										23.7
5							6.0'									104.4	23.1
10							BROWN AND GRAY FINE TO COARSE SAND AND CLAYEY SILT, TRACE FINE GRAVEL.	3	SS	0.75	1.75						22.3
15							17.0'	4	SS	0.5						104.3	24.4
20							GRAY AND BROWN SILTY CLAY, LITTLE FINE TO COARSE SAND, TRACE FINE GRAVEL.	1	SS	0.5	0.42					20.4	24.4
25								22	SS	4.5	5.04					20.4	14.9
30								23	SS	4.0	5.94					19.7	16.8
35								25	SS	4.5	5.12					19.7	16.5
40								25	SS	4.5	5.62					22.0	15.6
45								25	SS	4.5	6.76					19.4	16.1
50								25	SS	4.5	1.75					22.0	17.6
55								25	SS	4.5	1.75					22.0	10.5
60								25	SS	4.0	4.23					22.0	21.0
65								25	SS	4.5	3.57					22.5	20.9
70							68.0' GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.	25	SS	4.5	3.62					22.5	21.0
75							78.0'	25	SS	4.5	6.36					19.8	11.6
80							GRAY SILTY CLAY, SOME FINE TO COARSE SAND, TRACE FINE TO MEDIUM GRAVEL.	25	SS	4.5	4.54					19.9	15.4
85							83.0' GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.	31	SS	2.5						19.9	10.4
90							88.0' GRAY SILTY CLAY, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.	55	SS	4.5	6.61					19.8	11.3
95							92.0' LIGHT GRAY FINE TO COARSE GRAVEL AND COARSE TO FINE SAND, LITTLE SILT.	42	SS	4.5						19.8	11.3
100							96.5' TOTAL DEPTH	102	SS								
105																	
110																	
115																	
120																	

This Sheet Prepared By Kaiserle, Bender, Stone & Associates, Inc.

CONTRACT 75-131-2H

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS

DRILL HOLE DATA

HOLE NO. 22

DATE: 6-14-76

SHEET 1 OF 1

SHEET NO. B-117

543

NOTES AND LEGEND

FORMATION: Based on H.B.Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

TYPE OF SAMPLE: (A) Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 taps on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

(A) BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

This Sheet Prepared By Knowlls, Border, Stone & Associates, Inc.

DESCRIPTION

HOLE NUMBER 23
Coordinates: N 1959874.93 Angle: 0°
E 624302.90 Bearing
Location CHA-DE-SAC AT BERRY
Ground Elevation (CCD) 52.11

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	TYPE OF SAMPLE	BLOWS PER FOOT - N	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - % GRAVEL	SAND	SILT	CLAY	DENSITY (LBS / FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE																	
5																			
10																			
15																			
20																			
25																			
30																			
35																			
40																			
45																			
50																			
55																			
60																			
65																			
70																			
75																			
80																			
85																			
90																			
95																			
100																			
105																			
110																			
115																			
120																			

DEPTH	SAMPLE RECOVERY	BLOWS PER FOOT - N	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - % GRAVEL	SAND	SILT	CLAY	DENSITY (LBS / FT³)	MOISTURE CONTENT - %
	1/4	34											35.7
	7/12	11											21.9
	12/12	7											26.7
7.0'	24/24	9	0.5	0.12	0.77								536
	24/24	3	0.5	0.5	0.3								6.9
	24/24	3	0.5	0.5	0.3								11.6
	24/24	17	0.5	4.81	2.25								15.0
28.0'	24/24	29	4.5	3.91	2.75								15.2
	24/24	145	4.5	5.63	4.5								12.7
43.0'	24/24	44	4.5	3.74	4.5								15.9
	24/24	89	4.5	5.73	4.5								15.1
	24/24	54	4.5	7.16	4.5								18.8
	24/24	36	4.5	8.39	4.5								17.6
63.0'	24/24	42	4.5	6.83	3.25								19.2
	24/24	44	4.5	7.04	4.5								17.0
68.0'	24/24	88	1.5	3.59	7.25								16.3
71.0'	24/24	92	1.5	1.9	4.5								22.9
73.0'	24/24	32	4.5	3.75	4.46								19.2
78.0'	24/24	64	4.5	4.5	4.5								17.1
	24/24	56	11/6"	10.24	2.41								18.3
96.5' TOTAL DEPTH	24/24	122											12.0
													9.2

CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. 23
DATE: 6-14-76

SHEET 1 OF 1

SHEET NO. B-119

545

NOTES AND LEGEND

FORMATION: Based on H.B.Willman, 1971

CASING: Indicates casing left in place.

ROCK CONDITION: w = weathered
x = broken or fragmented
s = susceptible to slaking
s̲ = shale partings susceptible to slaking

JOINTING: J = Stratigraphic position of joint with dip in degrees with reference to horizontal. F = fault position. f = fill material with sh for shale, cl for clay, py for pyrite, Ca for calcite, Fe for iron stain, sl for slickensides. Fill thickness in 10^{-2} feet

BEDDING: Horizontal except as noted.
th = thick-bedded (>2')
t = thin-bedded (2' to 2")
vt = very thin or laminated (<2")

CORE RECOVERY: % core recovered per run.

ROCK QUALITY DESIGNATION (RQD): Indicates ratio of total length of core pieces 4" or longer in length to total length of drilling run. Mechanical breaks are considered as unbroken core.

WATER PRESSURE TEST: Conducted over the stratigraphic intervals shown. Water loss in gpm (net pressure in psi.)

▼ 7/1/75 = Groundwater level and date observed.

UNCONFINED COMPRESSIVE STRENGTH: Ultimate strength in psi.

MODULUS OF ELASTICITY, POISSON'S RATIO:
E_t = Young's modulus (static) 10^6 psi
E_d = Young's modulus (dynamic) 10^6 psi
u_t = Poisson's ratio (static)
u_d = Poisson's ratio (dynamic)

MISCELLANEOUS TESTS:
A = abrasion (percent of wear)
K_v = permeability, vertical (cm/sec.)
K_h = permeability, horizontal (cm/sec.)
wc = moisture content (percent)
n = porosity (percent)
G_s = specific gravity
T = split cylinder strength (psi)
γ = in-place unit weight (pcf)

Elevations and Locations were surveyed and furnished by DENI ASSOCIATES

This Sheet Prepared By Knoerle, Bender, Stone & Associates, Inc.

DESCRIPTION

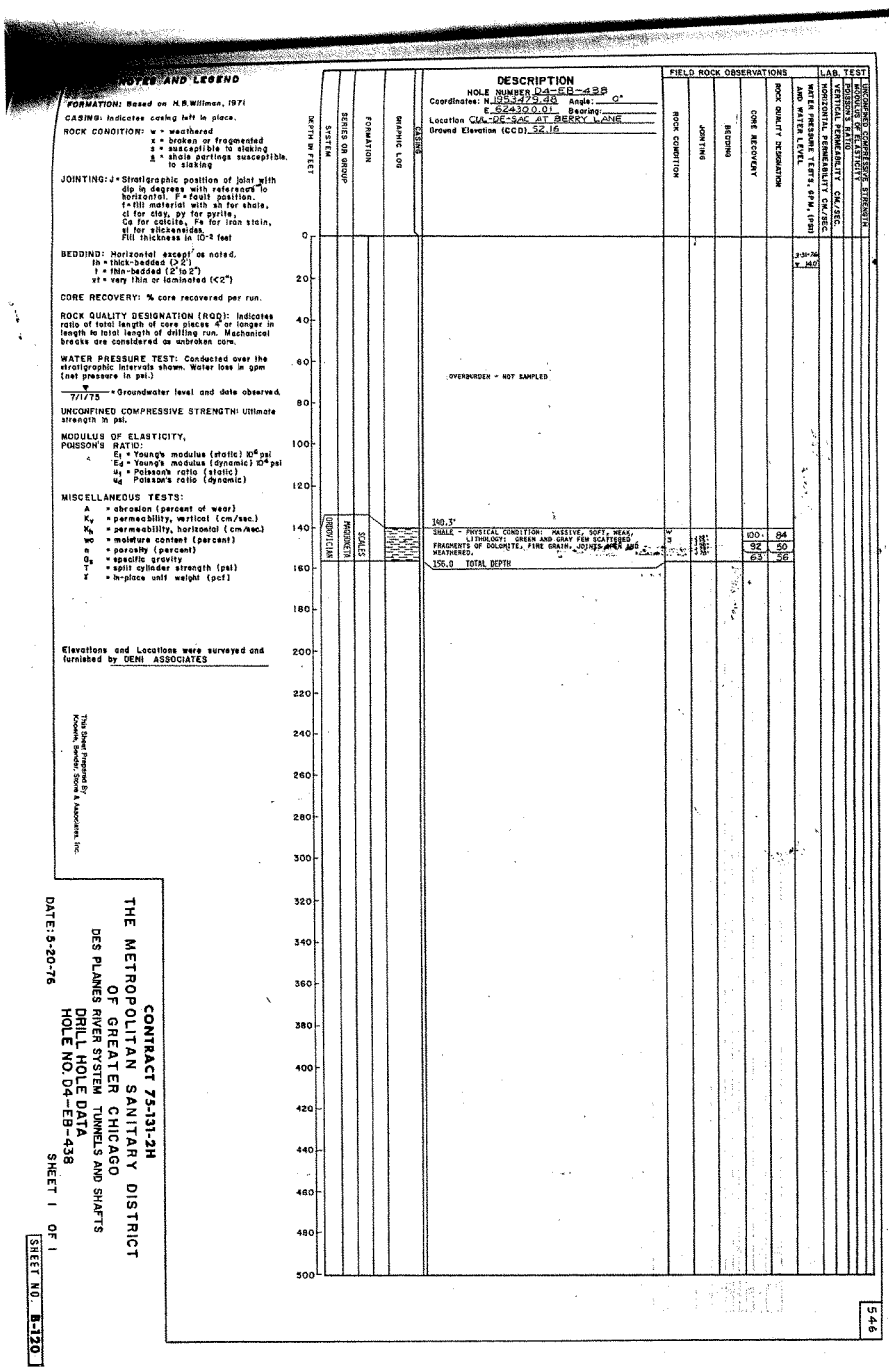
HOLE NUMBER D4-EB-438
Coordinates: N 195347.48 Angle: 0°
E 624300.01 Bearing:
Location CUL-DE-SAC AT BERRY LANE
Ground Elevation (CCD) 52.16

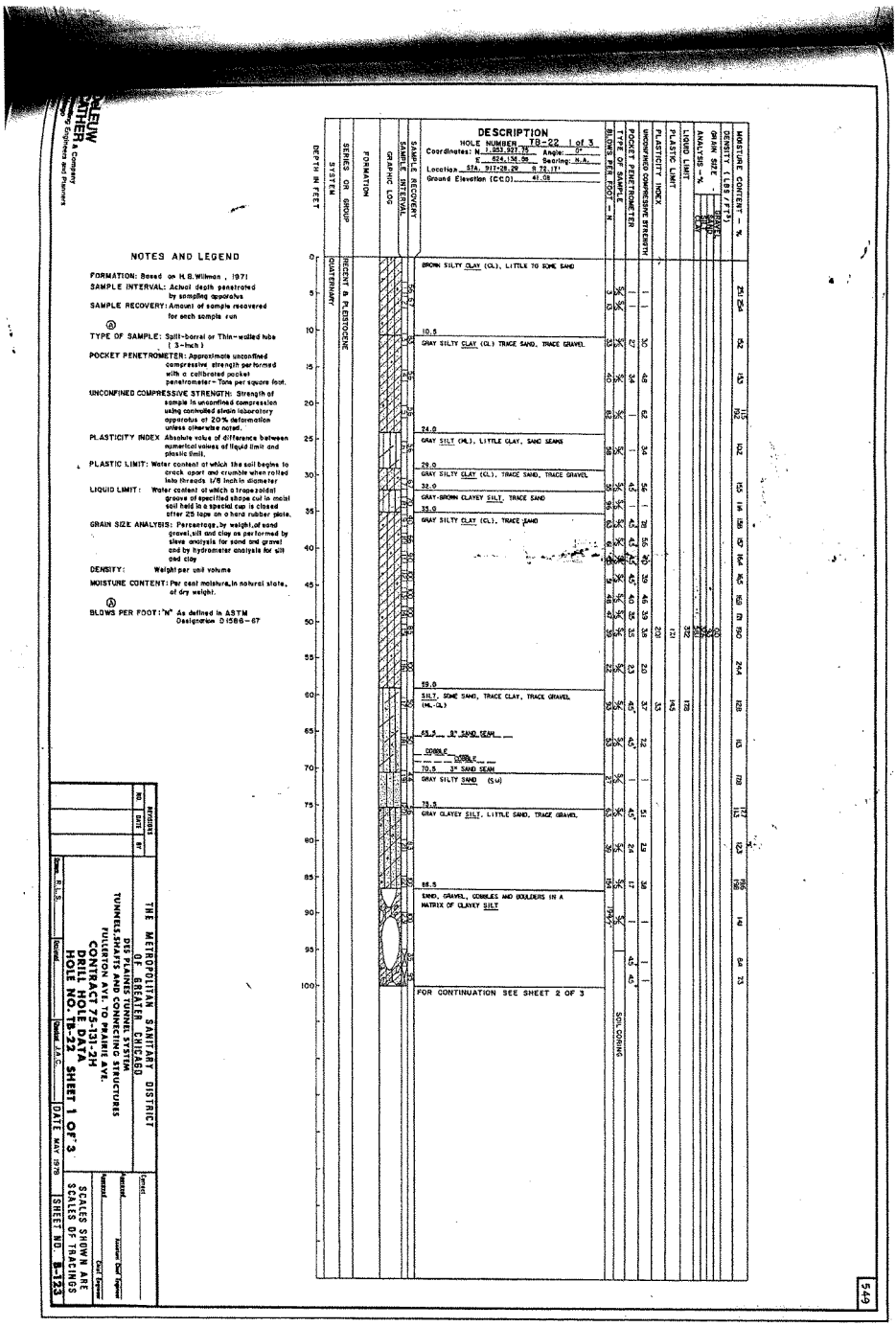
DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	CASING	DESCRIPTION	ROCK CONDITION	JOINTING	BEDDING	CORE RECOVERY	ROCK QUALITY DESIGNATION	WATER PRESSURE TESTS, GPM, (PSI) AND WATER LEVEL	HORIZONTAL PERMEABILITY CM/SEC.	VERTICAL PERMEABILITY CM/SEC.	POISSON'S RATIO	MODULUS OF ELASTICITY	UNCONFINED COMPRESSIVE STRENGTH
0												3-31-76 ▼ 140					
20						OVERBURDEN - NOT SAMPLED											
40																	
60																	
80																	
100																	
120																	
140	ORDOVICIAN	MAQUOKETA	SCALES			140.3' SHALE - PHYSICAL CONDITION: MASSIVE, SOFT, WEAK, LITHOLOGY: GREEN AND GRAY FEW SCATTERED FRAGMENTS OF DOLOMITE, FINE GRAIN, JOINTS OPEN AND WEATHERED.	s				100	84					
160						156.0 TOTAL DEPTH											
180																	
200																	
220																	
240																	
260																	
280																	
300																	
320																	
340																	
360																	
380																	
400																	
420																	
440																	
460																	
480																	
500																	

CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D4-EB-438
DATE: 5-20-76
SHEET 1 OF 1

SHEET NO. B-120

546





NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX: Absolute value of difference between numerical values of liquid limit and plastic limit.

PLASTIC LIMIT: Water content at which the soil begins to crack apart and crumble when rolled into threads 1/8 inch in diameter

LIQUID LIMIT: Water content at which a trapezoidal groove of specified shape cut in moist soil held in a special cup is closed after 25 tops on a hard rubber plate.

GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER TB-22 1 of 3

Coordinates: N 1,953,927.75 Angle: 0°

E 624,136.06 Bearing: N.A.

Location STA. 917+28.29 ft 72.17'

Ground Elevation (CCD) 41.08

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS - %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					BROWN SILTY CLAY (CL), LITTLE TO SOME SAND											251 254
5								3	13		1	1						152
10							10.5 GRAY SILTY CLAY (CL) TRACE SAND, TRACE GRAVEL	33	33		30	48						133
15								40	40		27	34						115 192
20								82	82		62	62						102
25							24.0 GRAY SILT (ML), LITTLE CLAY, SAND SEAMS	58	58		34	34						102
30							29.0 GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	95	95		56	56						155
35							32.0 GRAY-BROWN CLAYEY SILT, TRACE SAND	96	96		1	1						114
40							35.0 GRAY SILTY CLAY (CL), TRACE SAND	61	61		78	56						158
45								48	48		45	45						157
50								47	47		39	39						164
55								22	22		38	38						165
60							59.0 SILT, SOME SAND, TRACE CLAY, TRACE GRAVEL (ML-CL)	93	93		20	20						150
65							65.5 8" SAND SEAM	53	53		37	37						244
70							COBBLE COBBLE 70.5 3" SAND SEAM	27	27		22	22						128
75							73.5 GRAY SILTY SAND (SM)	63	63		1	1						113
80							75.5 GRAY CLAYEY SILT, LITTLE SAND, TRACE GRAVEL	39	39		51	51						128
85								154	154		23	23						123
90							86.5 SAND, GRAVEL, COBBLES AND BOULDERS IN A MATRIX OF CLAYEY SILT	194	194		38	38						186
95											1	1						141
100											45	45						84
											SOIL CORING							73

FOR CONTINUATION SEE SHEET 2 OF 3

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM

TUNNELS, SHAFTS AND CONNECTING STRUCTURES

FULLERTON AVE. TO PRAIRIE AVE.

CONTRACT 75-131-2H

DRILL HOLE DATA

HOLE NO. TB-22 SHEET 1 OF 3

Scale R.L.S. Checked Checked J.A.C. DATE MAY 1978

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-123

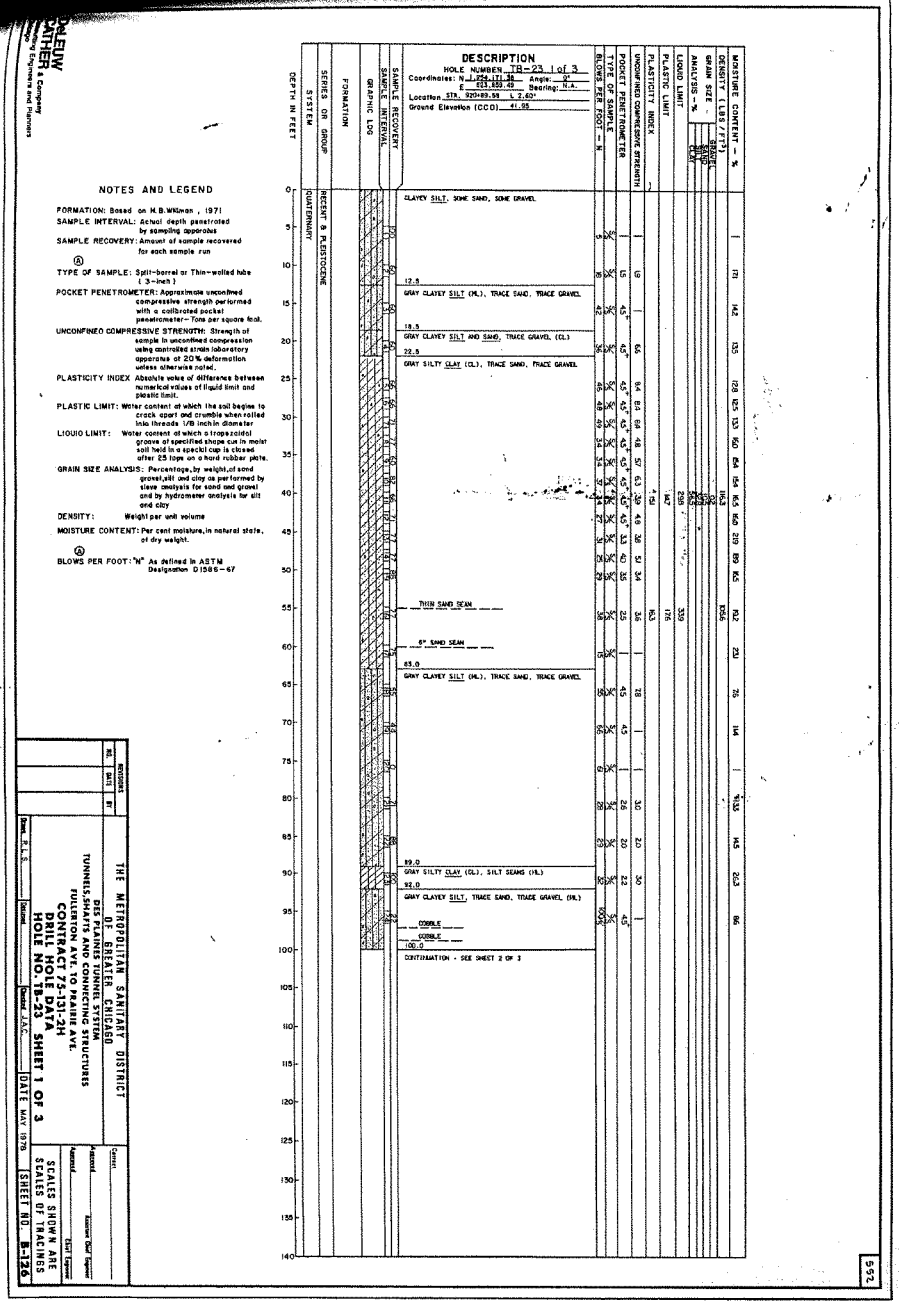
REVISIONS: NO. DATE BY

Approved Assistant Chief Engineer

Approved Chief Engineer

549

DELEUW CATHER & Company
Consulting Engineers and Planners



NOTES AND LEGEND

FORMATION: Based on H.B.Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer—Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

PLASTICITY INDEX Absolute value of difference between numerical values of liquid limit and plastic limit.

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GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER TB-23 1 of 3

Coordinates: N 1,254,171.36 Angle: 0°
E 623,850.49 Bearing: N.A.

Location STA. 920+89.98 L 2.60'

Ground Elevation (CCD) 41.95

Depth in Feet	Series or Group	Formation	Description	Blows per Foot — N	Type of Sample	Pocket Penetrometer	Unconfined Compressive Strength	Plasticity Index	Plastic Limit	Liquid Limit	Analysis — % Clay	Analysis — % Silt	Analysis — % Sand	Analysis — % Gravel	Density (Lbs/Ft³)	Moisture Content — %
0	QUATERNARY / RECENT & PLEISTOCENE		CLAYEY SILT, SOME SAND, SOME GRAVEL													
5				5	Ⓐ											171
10				8	Ⓐ		1.5	1								142
12.5			GRAY CLAYEY SILT (ML), TRACE SAND, TRACE GRAVEL	15	Ⓐ	4.5										135
15				42	Ⓐ											
18.5			GRAY CLAYEY SILT AND SAND, TRACE GRAVEL (CL)	45	Ⓐ	4.5	6.6									128
20				36	Ⓐ											
22.5			GRAY SILTY CLAY (CL), TRACE SAND, TRACE GRAVEL	45	Ⓐ	4.5	8.4	8.4	8.4	24						125
25				46	Ⓐ	4.5	8.4	8.4	8.4	24						133
30				46	Ⓐ	4.5	6.4	4.8	5.7	6.3						150
35				46	Ⓐ	4.5	4.5	4.5	4.5	4.5						154
40				34	Ⓐ	4.5	4.5	4.5	4.5	4.5						145
45				34	Ⓐ	4.5	4.5	4.5	4.5	4.5						160
50				31	Ⓐ	4.5	4.5	4.5	4.5	4.5						169
55			THIN SAND SEAM	36	Ⓐ	4.5	4.5	3.0	3.7	3.4						162
60			8" SAND SEAM	15	Ⓐ											
63.0			GRAY CLAYEY SILT (ML), TRACE SAND, TRACE GRAVEL	50	Ⓐ	4.5	4.5		28							76
65				56	Ⓐ	4.5										114
70				6	Ⓐ											
75				6	Ⓐ											
80				28	Ⓐ				26	20						133
85				28	Ⓐ				26	20						145
89.0			GRAY SILTY CLAY (CL), SILT SEAMS (ML)	32	Ⓐ				22	20						263
92.0			GRAY CLAYEY SILT, TRACE SAND, TRACE GRAVEL (ML)	50/6"	Ⓐ	4.5										86
95			COBBLE													
100			COBBLE													
100.0			CONTINUATION - SEE SHEET 2 OF 3													

REVISIONS		
NO.	DATE	BY

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES TUNNEL SYSTEM
TUNNELS, SHAFTS AND CONNECTING STRUCTURES
FULLERTON AVE. TO PRAIRIE AVE.
CONTRACT 75-131-2H
DRILL HOLE DATA
HOLE NO. TB-23 SHEET 1 OF 3

Direct. R.L.S. | Checked | Checked J.A.C. | DATE MAY 1978

Correct:
Approved: Assistant Chief Engineer
Approved: Chief Engineer

SCALES SHOWN ARE SCALES OF TRACINGS

SHEET NO. B-126

552

NOTES AND LEGEND

FORMATION: Based on H.B. Willman, 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ

TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

POCKET PENETROMETER: Approximate unconfined compressive strength performed with a calibrated pocket penetrometer - Tons per square foot.

UNCONFINED COMPRESSIVE STRENGTH: Strength of sample in unconfined compression using controlled strain laboratory apparatus at 20% deformation unless otherwise noted.

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GRAIN SIZE ANALYSIS: Percentage, by weight, of sand gravel, silt and clay as performed by sieve analysis for sand and gravel and by hydrometer analysis for silt and clay.

DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ

BLOWS PER FOOT: "N" As defined in ASTM Designation D1586-67

DESCRIPTION

HOLE NUMBER D3-DS-323
Coordinates: N 1954515.716 Angle: 0°
E 623795.95 Bearing:
Location ALGONQUIN RD. & DES PLAINES RIVER
Ground Elevation (CCD) 46.46

DEPTH IN FEET	SYSTEM	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	DESCRIPTION	BLOWS PER FOOT - N	TYPE OF SAMPLE	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	ANALYSIS - %	GRAIN SIZE	DENSITY (LBS/FT³)	MOISTURE CONTENT - %
0	QUATERNARY	RECENT & PLEISTOCENE					TOPSOIL - BLACK HUMUS, TRACE BROWN CLAY AND SILT.	6	SS	1.0	2.52	2.4	23.1	46.5			90.4	30.1
5							5.5' BROWN SILTY CLAY, SOME SAND, TRACE GRAVEL.	6	SS	1.0	3.0	3.5	14.1	23.1			104.7	26.3
10								12	SS	3.0	3.75	2.1	14.1	21.0			102.5	23.6
15							17.5' GRAY CLAYEY SILT, TRACE SAND, TRACE SMALL TO MEDIUM GRAVEL.	20	SS	2.5	2.52	3.5	17.3	23.1			96.4	26.2
20							23.0' GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.	23	SS	3.0	3.57	2.7	14.1	21.0			126.4	27.7
25							27.0' GRAY FINE TO COARSE SAND AND GRAVEL, SOME SILT AND CLAY.	25	SS	4.5*	6.18	6.9	6.9				125.7	16.5
30							29.0' GRAY CLAYEY SILT, LITTLE SAND, TRACE GRAVEL.	36	SS	4.5*	2.72	6.9	6.9				129.1	15.1
35								34	SS	2.5	6.49	4.15	4.15				122.1	15.0
40							43.0' GRAY SILTY CLAY, TRACE SAND, TRACE GRAVEL, OCCASIONAL COBBLE.	35	SS	4.5*	4.5*	4.11	4.11				123.5	13.2
45								40	SS	4.5*	4.33	6.86	6.86				123.2	16.1
50								43	SS	4.5*	2.75	2.75	2.75				117.3	19.0
55								25	SS	2.5	2.75	1.91	1.91				109.8	22.5
60								18	SS	2.5	2.75	2.86	2.86				99.6	26.5
65							65.0' GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, TRACE FINE GRAVEL.	25	SS	4.5*	4.5*	1.93	1.93					12.1
70								34	SS	2.25	2.25							12.5
75							75.0' BOULDERS, GRAY SILTY CLAY MATRIX, LITTLE FINE TO COARSE GRAVEL, TRACE SAND.	58	SS									134.6
80								46	SS									91.1
85																		94.2
90																		91.1
95																		94.2
100																		94.2
105																		94.2
110																		94.2
115																		94.2
120																		94.2

CORED BOULDERS

OVERBURDEN CONTINUED ON SHEET 2 OF 3

This Sheet Prepared By Knowles, Barnes, Stone & Associates, Inc.

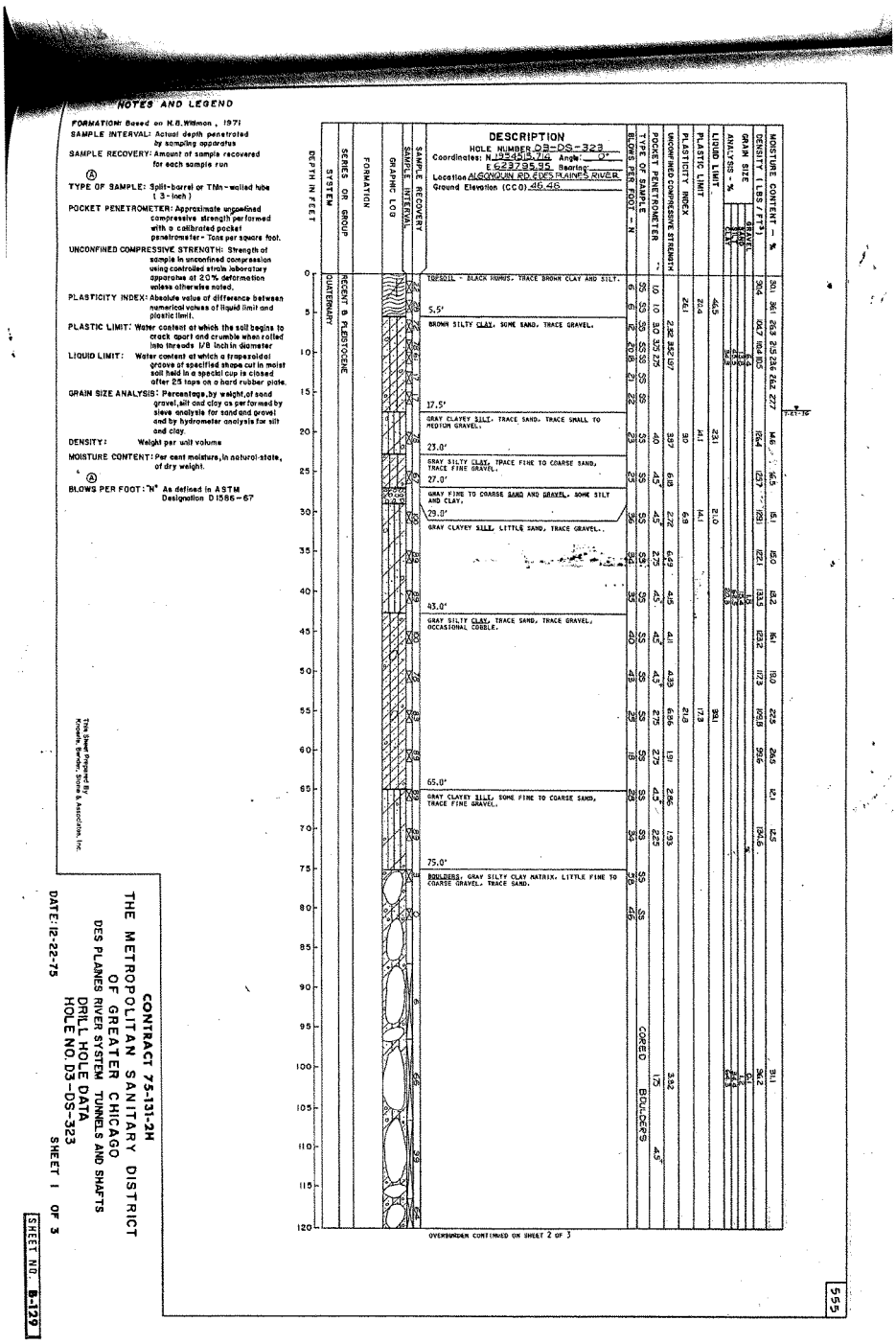
CONTRACT 75-131-2H
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS
DRILL HOLE DATA
HOLE NO. D3-DS-323

DATE: 12-22-75

SHEET 1 OF 3

SHEET NO. B-129

555



NOTES AND LEGEND

FORMATION: Based on N.B.Willman , 1971

SAMPLE INTERVAL: Actual depth penetrated by sampling apparatus

SAMPLE RECOVERY: Amount of sample recovered for each sample run

Ⓐ TYPE OF SAMPLE: Split-barrel or Thin-walled tube (3-inch)

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DENSITY: Weight per unit volume

MOISTURE CONTENT: Per cent moisture, in natural state, of dry weight.

Ⓐ BLOWS PER FOOT: "N" As defined in ASTM Designation D 1586-67

This Sheet Prepared By Woodward, Gizienski, Storrs & Associates, Inc.

DESCRIPTION

HOLE NUMBER D4-EB-440
Coordinates: N 954926.43 Angle: 0°
E 623529.456 Bearing
Location METHODIST CAMPGROUND
Ground Elevation (CCD) 45.11

DEPTH IN FEET	SERIES OR GROUP	FORMATION	GRAPHIC LOG	SAMPLE INTERVAL	SAMPLE RECOVERY	BLOWS PER FOOT — N	POCKET PENETROMETER	UNCONFINED COMPRESSIVE STRENGTH	PLASTICITY INDEX	PLASTIC LIMIT	LIQUID LIMIT	GRAIN SIZE ANALYSIS - % GRAVEL	SAND	SILT	CLAY	DENSITY (LBS./FT³)	MOISTURE CONTENT — %
0	QUATERNARY SYSTEM	RECENT & PLEISTOCENE		1	16	23											24.0
				2	18	55	3.0										22.5
				3	20	55	1.0										25.9
				4	20	55	0.75										24.0
				5	20	55	3.0										22.4
				6	20	55	4.5+	1.74	3.20	2.54	5.46					126.1	15.44
				7	20	73	4.5+	8.60	8.32	7.35	15.67					123.7	18.36
				8	20	23	4.5+	4.5+	4.32	3.78	8.10					125.9	15.15
				9	20	27	4.5+	4.5+	4.32	3.78	8.10					122.0	15.45
				10	20	54	4.5+	4.5+	4.32	3.78	8.10					117.3	16.44
				11	20	33	4.5+	4.5+	4.32	3.75	8.07					116.8	16.68
				12	20	24	4.5+	4.5+	4.32	3.0	7.32					116.8	20.2
				13	20	26	4.5+	4.5+	4.32	1.0	5.32					106.8	18.6
				14	20	24	4.5+	4.5+	4.32	3.0	7.32					118.0	19.0
				15	20	53	4.5+	4.5+	4.32	2.5	6.82					127.7	13.9
				16	20	54	4.5+	4.5+	4.32	4.5+	8.82					114.9	16.0
				17	20	54	4.5+	4.5+	4.32	3.5	7.82					122.2	16.3
				18	20	55	4.5+	4.5+	4.32	3.5	7.82					118.5	17.0
				19	20	55	4.5+	4.5+	4.32	4.0	8.32					121.3	16.3
				20	20	55	4.5+	4.5+	4.32	4.5+	8.82						17.5
				21	20	55	4.5+	4.5+	4.32	4.5+	8.82						11.7
				22	20	55	4.5+	4.5+	4.32	4.5+	8.82						7.1
				23	20	55	4.5+	4.5+	4.32	4.5+	8.82						7.5
				24	20	100/0"	4.5+	4.5+	4.32	4.5+	8.82						6.4
				25	20	100/0"	4.5+	4.5+	4.32	4.5+	8.82						
				26	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				27	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				28	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				29	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				30	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				31	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				32	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				33	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				34	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				35	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				36	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				37	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				38	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				39	20	55	4.5+	4.5+	4.32	4.5+	8.82						
				40	20	55	4.5+	4.5+	4.32	4.5+	8.82						
120																	

1.0' FILL - GRAVEL AND FINE TO COARSE SAND

BLACK-GRAY SILTY CLAY, MOTTLED BROWN, SOME FINE TO COARSE SAND, LITTLE FINE GRAVEL, ORGANIC MATERIAL.

5.0'

GRAY SILTY CLAY, MOTTLED YELLOW, LITTLE FINE TO COARSE SAND, TRACE FINE TO COARSE GRAVEL.

10.0'

GRAY CLAYEY SILT, TRACE FINE TO MEDIUM SAND

12.7'

GRAY SILTY CLAY, TRACE FINE SAND.

14.5'

GRAY SILT, SOME TO TRACE FINE SAND, FINE TO COARSE SAND AND FINE GRAVEL STARTING AT 23.0' TO 43.0', TRACE CLAY.

33.0

GRAY SILTY CLAY, TRACE FINE TO COARSE SAND, TRACE FINE GRAVEL.

63.0'

GRAY CLAYEY SILT, LITTLE FINE TO COARSE SAND, LITTLE MEDIUM TO FINE GRAVEL.

78.0'

GRAY SILT, SOME FINE TO COARSE SAND, SOME FINE TO COARSE GRAVEL, TRACE CLAY.

94.0'

GRAY CLAYEY SILT, SOME FINE TO COARSE SAND, SOME FINE TO COARSE GRAVEL.

108.0'

GRAY SILT, SOME FINE TO COARSE SAND, LITTLE FINE TO COARSE GRAVEL, OCCASIONAL BOULDER AND COBBLES.

ROCK CORE

SEE PAGE 2 OF 3

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CONTRACT 75-131-2H

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

DES PLAINES RIVER SYSTEM TUNNELS AND SHAFTS

DRILL HOLE DATA

HOLE NO. D4-EB-440

DATE: 5-6-76

SHEET 1 OF 3

SHEET NO. B-132

APPENDIX G – GEOTECHNICAL DESIGN

Attachment 4 – Site Settlement, Seepage and Stability Analyses

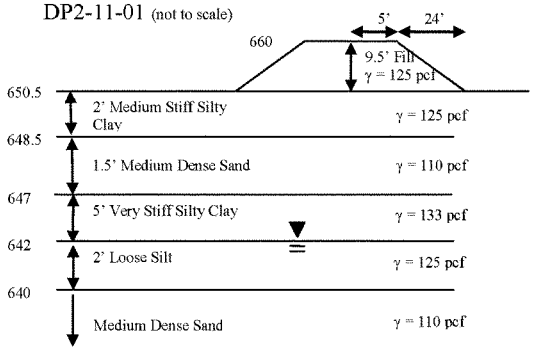
US Army Corps of Engineers Chicago District	PROJECT TITLE: Des Plaines II – Adler Park Levee	COMPUTED BY: DJF	DATE: 12/27/11	SHEET: 1 of 7
	COMPUTATION TITLE: Settlement, Seepage and Stability Analyses	CHECKED BY: YG	DATE: 1/4/12	

This site was removed from the recommended plan.

Settlement

1. For the Des Plaines II Feasibility Study, the proposed Adler Park Levee site had two soil borings completed near the proposed levee footprint; DP2-11-01 and 02. DP2-11-01 encountered topsoil underlain by silty clay to about 2 feet below grade. A sand layer about 1-½ feet thick was encountered beneath the silty clay. Beneath the sand layer at about 3-½ feet below grade, about 5 feet of silty clay was present underlain by about 2 feet of silt. Sand was encountered at about 10 ½ feet below grade which continued to the termination of the boring about 25 feet below grade. DP2-11-02 encountered silty clay throughout the boring depth and did not encounter any sand seam or layer. Both borings encountered water between elevations 640 and 645 feet NAVD.

2. For the settlement analysis, the levee is anticipated to be constructed to elevation 660 feet NAVD88 and use a 10-foot wide crest with 2.5H: 1V slopes. The slopes may be syeepened to 2H: 1V which would be less conservative. Since DP2-11-02 was drilled at elevation 660 ft, DP2-11-01 was used to estimate the anticipated settlement. The profile is shown below, with the topsoil removed.



3. Material properties for the existing soils are shown in the table below. The unit weights and void ratios of the soils were assumed for all but Silty Clay (2), which was provided by AECOM lab testing. The Compression Index (C_C) was developed using the equation presented in EM 1110-1-1904 on Table 3-7 which correlates the natural moisture content. Each clay layer was assumed to be normally consolidated to be conservative, although it is likely that it is overconsolidated.

	γ_{sat} (pcf)	e_o	C_c*
Silty Clay (1)	125	0.8	0.21
Sand	110	1	0.05
Silty Clay (2)+	133	0.52	0.25
Silt	125	1	0.20
Sand	110	1	0.05

+Based on laboratory test

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*Clays use $C_C = 0.012wc$, Silts use Cc = 0.20, Sands use Cc = 0.05

4. The Boussinesq chart for an embankment load of infinite length was used to find the influence factors under vertical stress. The influence factors were doubled for the calculations since the chart was for only half of the embankment. The below equation was used for all the layers since they are all assumed to be normally consolidated.

$$S_c = C_c \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}' + \Delta\sigma_v}{\sigma_{vo}'}$$

5. A summary of the primary consolidation settlement is shown in the table below:

Layer	H	z	a/z	b/z	I	σ_{vo}'	$\Delta\sigma_v$	s (ft)
Silty Clay (1)	2	1	24	5.0	0.5	125	1187.5	0.24
Sand	1.5	2.75	8.73	1.82	0.49	332.5	1163.8	0.02
Silty Clay (2)	5	6	4.00	0.83	0.48	747.5	1140	0.33
Silt	2	9.5	2.53	0.53	0.40	1142.6	950	0.05
Sand	8	15.25	1.57	0.33	0.33	1431.3	926.3	0.05
							Total	**0.69**

6. A sample calculation for the settlement of the silty clay (2) layer is shown below:

Initial Properties

W = depth to water table = 8.5 feet
γ_c = wet density of clay fill and silty clay (1) = 125 pcf
γ_w = wet density of water = 62.4 pcf
H_B = height of proposed berm = 9.5 feet
a = length of proposed berm slope = 24 feet
b = half of proposed crest width = 5 feet
H_1 = Height of Silty Clay (1) layer = 2 feet
H_2 = Height of Sand layer = 1.5 feet
γ_s = wet density of sand = 110 pcf

Silty Clay (2) Layer:

H = height = 5 feet
d = depth to top of layer = 3.5 feet
γ = wet density = 133 pcf
e_o = void ratio = 0.52
w_c = water content = 20.6%

z = depth to midpoint = d + H/2 = 3.5 + 5/2 = 6 feet
C_c = compression index = $0.012w_c$ = 0.012 * 20.6 = 0.25
σ_{vo}' = initial pressure on midpoint = $H_1 * \gamma_c + H_2 * \gamma_s + H/2 * \gamma$ =
2*125 + 1.5*110 + (5/2)*133 = 747.5 psf

$\Delta\sigma_v'$ = additional absolute pressure = $\gamma_c * H_B$ = 125 * 9.5 = 1187.5 psf

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a/z = Boussinesq factor = 24/6 = 4
b/z = Boussinesq factor = 5/6 = 0.83
I = Boussinesq influence value = 0.48 (from chart)
$\Delta\sigma_v$ = additional pressure at midpoint = $\Delta\sigma_v$'(I*2) = 1187.5 *(0.48*2) = 1140 psf

$$S_c = Settlement = C_c \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}' + \Delta\sigma_v}{\sigma_{vo}'} = 0.25 \frac{5}{1+0.52} \log \frac{747.5+1140}{747.5} = 0.33 feet$$

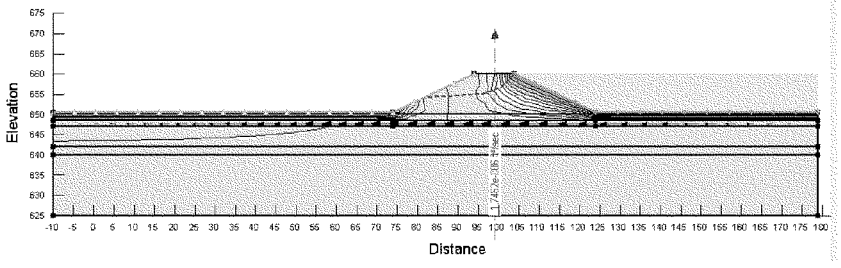
7. Since this analysis is only for the feasibility stages, secondary settlement and post-construction settlement were not investigated. Generally, these forms of settlement will add a few more inches to the project.

8. Based on the analysis above, the settlement will likely be about ¾-foot, which is acceptable. If both the Silty Clay (1) and (2) layers are considered pre-consolidated, the settlement is about ¼-foot. Actual primary settlement is likely somewhere in between. Additional testing would need to be performed to determine the actual consolidation of the clay. Overbuild of the levees should be anticipated.

Seepage

9. Another concern for the Adler Park Levee is seepage through the higher permeable sand layers during the design flood event. The worst case scenario was assumed to be the profile based on DP2-11-01. The assumed material properties are shown in the table below, along with the SEEP/W analysis of the flow. The flood height is assumed to be at the levee height, elevation 660 feet NAVD.

	K (ft/sec)
Silty Clay and Silt	10^{-8}
Sand	10^{-2}



10. Based on these assumed characteristics, the anticipated flow for a 2.5:1 sloped berm is about 2.0e-6 cfs/ft, or 9.3e-4 gpm/ft. This is considered an insignificant amount of seepage.

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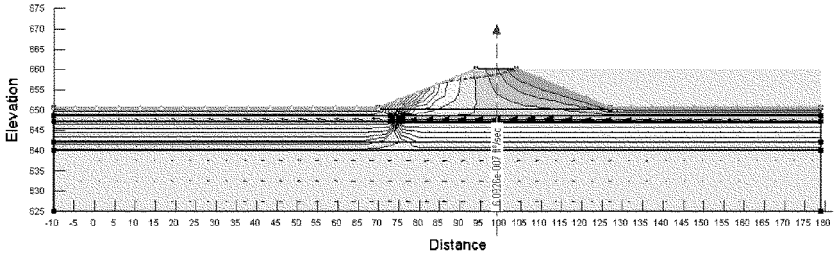
11. A second concern for seepage is piping which results from excessive pressure on the protected side of the levee forcing a seepage path up through the ground. The Critieal Gradient (i_c) is defined as ($\gamma_{sat} - \gamma_w$)/γ_w which is the weight ratio of the soil. It is compared to the Exit Gradient (i_e) which the force upwards at the toe and is obtained using SEEP/W. The Factor of Safety is defined as i_c/i_e.

Material	Unit Weight (pcf)	Exit Gradient, i_e (y-direction)	Critical Gradient, i_c	Factor of Safety
Silty Clay (1)	125	2.19	1.0	0.46

12. As shown in the above table, these assumed values present an unacceptable Factor of Safety of 0.46. According to EM 1110-2-1901, the Factor of Safety should be at least 1.5.

13. In order to meet the required factor of safety, a Clay cutoff was added to the upper Sand layer. A thickness of 2 feet is enough to reduce the exit gradient to 0.62, which equates to a factor of safety at 1.6. While this exceeds the minimum recommended factor of safety, there may be other pockets of sand in the subsurface which would increase the exit gradient.



14. For the final design, this piping issue should be investigated to determine a proper mitigating technique to reduce the pressure caused by water piping through sand layers. Additional data including the extents of sand, laboratory data on hydraulic conductivity, and site profile would help to better define how much piping would occur. Regardless of the laboratory data, the existing North Libertyville Estates Levee less than 1,000 feet to the west of the proposed project can provide useful performance data.

15. North Libertyville Estates Levee was constructed in 1998 and in the early 2000's, sand boils occurred during high water events. In order to reduce the water pressure that causes sand boils, relief wells were installed in 2007.

Stability

16. An evaluation of the end of construction, long term, and rapid drawdown stability were completed for the DP2-11-01 cross section. The following table was developed using data provided by AECOM. The density of Silty Clay (2) and cohesions are based on the laboratory data, while the friction angles are assumed based on conservative estimates.

Soil	γ_{sat} (pcf)	End of Construction		Long Term	
		c	φ	c	φ

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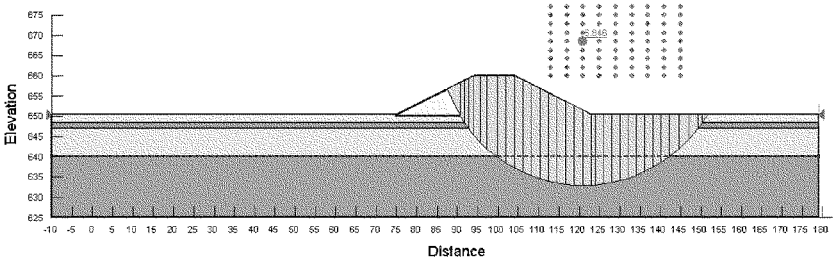
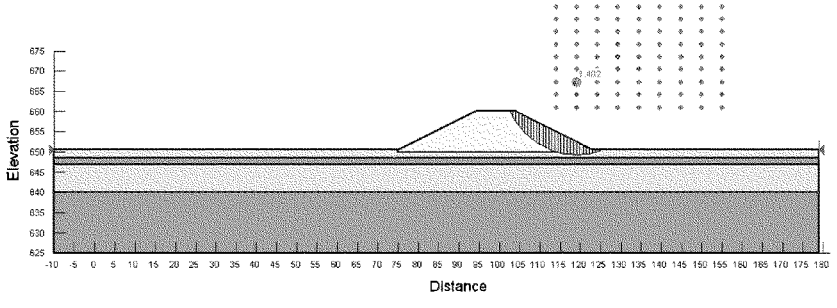
Silty Clay Fill	125	2000	0	0	28
Silty Clay (1)	125	1000	0	0	28
Sand	110	0	26	0	26
Silty Clay (2)	133	2000	0	0	28

17. The minimum recommended factors of safety for the conditions of end of construction, long term, and rapid drawdown are 1.3, 1.5, and 1.0, respectively based on EM 1110-2-1902, Table 3-1.

18. The end of construction case was analyzed using 2H: 1V slopes which produced an acceptable factor of safety at 6.8. The analysis is shown in the below figure.



19. The long term case was analyzed using 2H: 1V slopes, as well, which produced a factor of safety at 1.48, which is below the minimum of 1.5. This result neglects the surface failures on the face of the proposed berm since it will be protected with vegetation. The analysis is shown in the below figure.



20. A second long term case was performed using a slope of 2.5H: 1V. This produces a factor of safety at 1.65, again ignoring the surface failures. The analysis is shown in the below figure.

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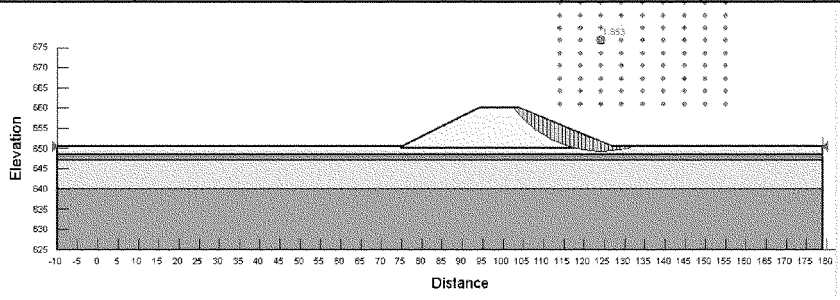
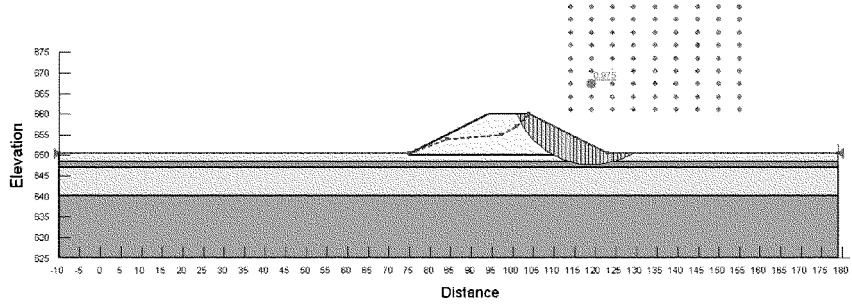
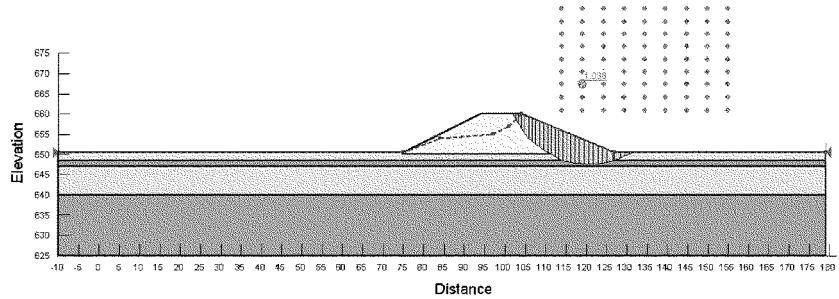


21. A rapid drawdown case was also run to simulate a fully saturated levee being subject to a sudden reduction in water level on the river side. The levee was first modeled with a 2H: 1V slope. To simulate the cohesion realized with the landscaping, a cohesion value of 50 psf was applied to the Silty Clay Fill and Silty Clay (1). This produced a factor of safety at 0.98, which is lower than the minimum 1.0. The analysis is shown below.



22. To increase the factor of safety, the slope was flattened to 2.5H: 1V and resulted in an acceptable factor of safety at 1.04. This is shown below.



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23. Considering portions of the North Libertyville Levee were constructed with 2H: 1V slopes, it would seem that the proposed Adler Park Levee could use these slopes, as well. Further analysis should be completed on the soil properties of the proposed levee as they are likely better than the conservative values used in this analysis.

Conclusion

24. Based on the above stability, seepage, and settlement analyses, the Alder Park Levee may experience seepage concerns due to sand layers in the subsurface profile. Observations from the nearby project of North Libertyville, relief wells or a cutoff trench could be considered in the final design. This analysis used a 2-foot wide cutoff trench to mitigate piping.

25. It is recommended the slopes of the berms be constructed with a 2.5H: 1V ratio. Portions of North Libertyville are 2H: 1V and further analysis is required during the final design to determine if the same can be applied at Adler Park. Overbuild of about 1 foot should be anticipated at this time.

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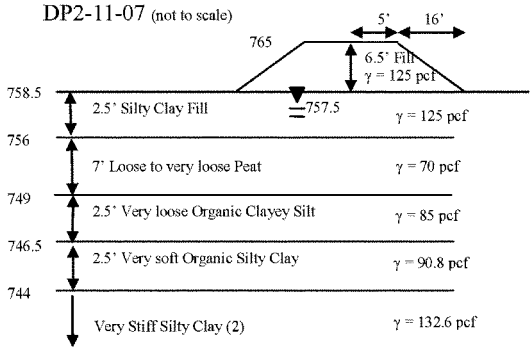
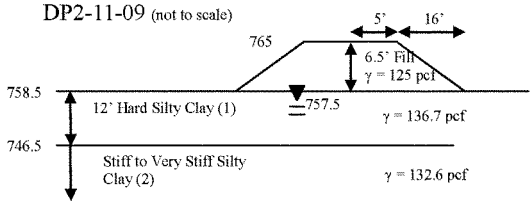
Settlement

1. For the Des Plaines II Feasibility Study, the proposed Bull Creek Reservoir site had four soil borings completed along the proposed berm; DP2-11-06 thru 09. DP2-11-06 and 09 encountered topsoil underlain by very stiff to hard silty clay while DP2-11-07 and 08 encountered layers of peat and organic clay before encountering native silty clay. Therefore, these two cases were analyzed for settlement. It was assumed the topsoil would be stripped prior to placement of the berms.

2. DP2-11-06 and 09 did not encounter water, likely due to the amount of low permeability clay present. However, DP2-11-07 and 08 encountered water at 3 feet below grade, with the water rising to ½-foot below grade in DP2-11-07. The USDA Natural Resources Conservation Service Web Soil Survey states the water table in this area ranges from 7 to 46 cm below grade. Based on these data sources, the water table was assumed to be 1 foot below grade.

3. The berm is anticipated to be at elevation 765 NAVD88 and use a 10-foot wide crest with 2.5H: 1V slopes. To model each of the cases, DP2-11-07 and 09 were used with the profiles shown below. The ground elevations were taken below the topsoil at each boring; at 758.5 feet for DP2-11-07 and 763.7 feet for DP2-11-09. To compare the difference in settlement between organic soils and clays, both cross sections used the same elevation at 758.5 feet.





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4. Material properties for the existing soils are shown in the table below. The unit weights were assumed for the fill soils, peat, and clayey silt. The remaining soils were analyzed by AECOM who provided the wet density and void ratio. The Compression Indices (C_C & C_S) were developed using equations presented in EM 1110-1-1904 on Table 3-7 which correlates the natural moisture content. Silty Clay (2) was the only soil to be assumed overconsolidated, although Silty Clay (1) may be as well.

	γ_{sat} (pcf)	e_o	C_c*	C_s**
Silty Clay Fill	125	0.8	0.27	
Peat	70	3	4.60	
Organic Clayey Silt	85	3	4.49	
Organic Silty Clay	90.8+	2.38+	1.06	
Silty Clay (1)	136.7+	0.44+	0.20	
Silty Clay (2)	132.6+	0.53+		0.05

+Based on laboratory test

*Organics assume $C_C = 0.0115wc$; Non-organics assume $C_C = 0.012wc$

** Assumed $Cs = 0.25C_C$

5. The Boussinesq chart for an embankment load of infinite length was used to find the influence factors under vertical stress. The influence factors were doubled for the calculations since the chart was for only half of the embankment. Two cases were used to find the settlement of the foundation. The first equation was used for the Silty Clay (2) layer since it is considered overconsolidated while the second equation was used for the other layers since they are considered normally consolidated.

$$S_c = C_s \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}'+\Delta\sigma_v}{\sigma_{vo}'}$$

$$S_c = C_c \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}'+\Delta\sigma_v}{\sigma_{vo}'}$$

6. A summary of the primary consolidation settlement is shown in the table below:

DP2-11-07

Layer	H	z	a/z	b/z	I	σ_{vo}'	$\Delta\sigma_v$	s (ft)
Clay Fill	2.5	1.25	12.8	4.0	1.0	141	813	0.31
Peat	7	6	2.67	0.83	0.94	246	763	4.94
O Clayey Silt	2.5	10.75	1.49	0.47	0.84	300	601	1.44
O Silty Clay	2.5	13.25	1.21	0.38	0.76	364	585	0.34
Silty Clay (2)	5	17.25	0.93	0.29	0.70	593	536	0.06
							Total	**7.10**

DP2-11-09

Layer	H	z	a/z	b/z	I	σ_{vo}'	$\Delta\sigma_v$	s (ft)
Silty Clay (1)	12	6	2.67	0.83	0.94	508	715	0.67
Silty Clay (2)	8	16	1.00	0.31	0.70	1235	488	0.04
							Total	**0.71**

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7. A sample calculation for the settlement of the peat layer is shown below:

Initial Properties
- W = depth to water table = 1 foot
- γ_c = wet density of clay fill = 125 pcf
- γ_w = wet density of water = 62.4 pcf
- H_B = height of proposed berm = 6.5 feet
- a = length of proposed berm slope = 16 feet
- b = half of proposed crest width = 5 feet

Peat Layer:
- H = height = 7 feet
- d = depth to top of layer = 2.5 feet
- γ_p = wet density = 70 pcf
- e_o = void ratio = 3
- w_c = water content = 400%

z = depth to midpoint = d + H/2 = 2.5 + 7/2 = 6 feet
C_c = compression index = $0.0115 w_c$ = 0.0115 * 400 = 4.6
σ_{vo}' = initial pressure on midpoint = $W * \gamma_c + (d - W)*(\gamma_c - \gamma_w) + H/2*(\gamma_p - \gamma_w)$ =
1*125 + (2.5 – 1)*(125-62.4) + (7/2)*(70-62.4) = 245.5 psf

$\Delta\sigma_v'$ = additional absolute pressure = $\gamma_c * H_B$ = 125 * 6.5 = 812.5 psf
a/z = Boussinesq factor = 16/6 = 2.67
b/z = Boussinesq factor = 5/6 = 0.83
I = Boussinesq influence value = 0.47 (from chart)
$\Delta\sigma_v$ = additional pressure at midpoint = $\Delta\sigma_v'$(I*2) = 812.5 *(0.47*2) = 763.8 psf

$$S_c = Settlement = C_c \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}'+\Delta\sigma_v}{\sigma_{vo}'} = 4.6 \frac{7}{1+3} \log \frac{245.5+763.8}{245.5} = 4.94\, feet$$

8. Since this analysis is only for the feasibility stages, secondary settlement and post-construction settlement were not investigated. Generally, these forms of settlement will add a few more inches to the project.

9. Based on the DP2-11-09 analysis, areas without organic soils would produce around ¾-foot of settlement which would be acceptable. If both clay layers are considered pre-consolidated, the settlement is about ¼-foot. Actual settlement is likely somewhere in between. Additional testing is required to determine the actual consolidation of the clays. Overbuild of the levees should be anticipated.

10. Based on the DP2-11-07 analysis, the organic layers cause a great amount of settlement of about 7 feet and would require additional work to mitigate. The 7-foot thick Peat is anticipated to settle about 5 feet. Possible methods to reduce the settlement of areas with organic soils are shown below. The design phase of this project would better define which method or combination of methods would be used.

    a. Partial or total removal of the organic soils.
    b. Dewatering the site with wick drains.

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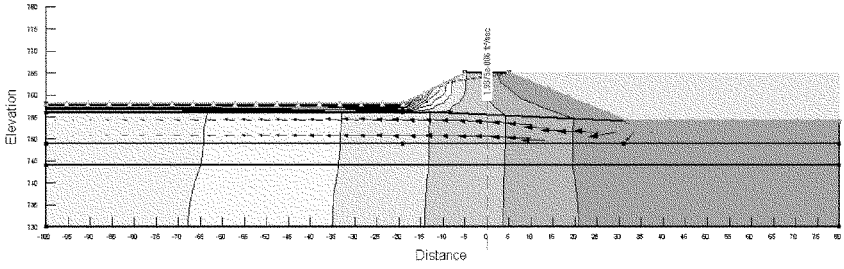
c. Preloading areas where organic soils are known to exist.

Seepage

11. Another concern for the Bull Creek site is seepage through the higher permeable peat when the reservoir is full. The worst case scenario was assumed to be the profile based on DP2-11-07. The assumed material properties are shown in the table below, along with the SEEP/W analysis of the flow. The reservoir is assumed to be at maximum capacity, elevation 765 feet NAVD.

	K (ft/sec)
Silty Clay Fill	10^{-8}
Peat	10^{-5}
Organic Clayey Silt/Silty Clay	10^{-7}
Silty Clay	10^{-8}



12. Based on these assumed characteristics, the anticipated flow for a 2.5:1 sloped berm is about 2.0e-6 cfs/ft, or 9.0e-4 gpm/ft. This is considered an insignificant amount of seepage.

13. A second concern for seepage is piping which results from excessive pressure on the protected side of the levee forcing a seepage path up through the ground. The Critical Gradient (i_c) is defined as ($\gamma_{sat} - \gamma_w$)/γ_w which is the weight ratio of the soil. It is compared to the Exit Gradient (i_e) which the force upwards at the toe and is obtained using SEEP/W. The Factor of Safety is defined as i_c/i_e.

Material	Unit Weight (pcf)	Exit Gradient, i_e (y-direction)	Critical Gradient, i_c	Factor of Safety
Silty Clay Fill	125	2.8	1.0	0.36

14. As shown in the above table, these assumed values present an unacceptable Factor of Safety of 0.36. According to EM 1110-2-1901, the Factor of Safety should be at least 1.5.

15. Since additioual measures to ensure the berm is stable will include possibly flattening the inner slope to 5H: 1V, this cross section was modeled. Leaving the peat layer in place with these slopes creates an exit gradient at 2.5, which results in a factor of safety at 0.4. Therefore, a cutoff trench would be necessary.

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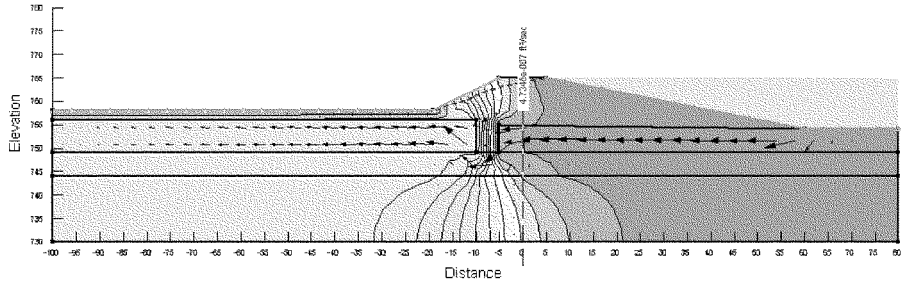
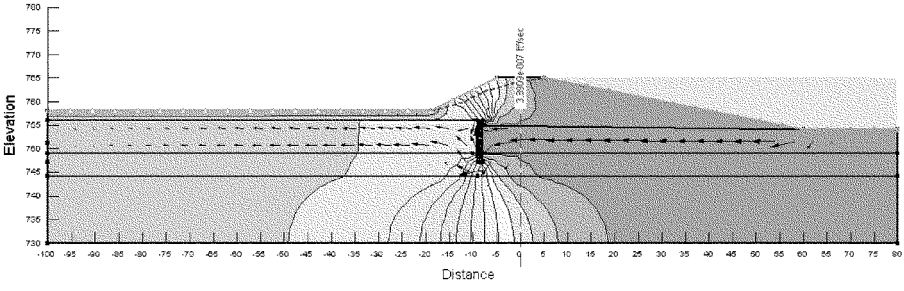
16. The trench should extend through the peat and organic clayey silt, but does not have to extend through the organic silty clay and should be at least 5 feet wide. Since the organic silty clay was encountered about 10 feet below grade (after stripping topsoil), this trench should be either benched or sloped to prevent cave-ins for such a deep trench. This produces an exit gradient of 0.65, which equates to a factor of safety at 1.54. This is acceptable and shown below.



17. Alternatively, sheet pile can be installed to reduce the uncertainty of excavating the organic soils. Dewatering would not be necessary using this method. Based on the analysis below with the sheet pile extending through the peat and organic clayey silt and 2 feet into the organic silty clay, the exit gradient is at 0.59, which equates to a factor of safety at 1.7. This is acceptable.



18. Additional data including the extents of the actual peat layer, laboratory data on hydraulic conductivity, and site profile would help to better define how much this layer would affect seepage.

Stability

19. An evaluation of the end of construction and long term stability were completed for the DP2-11-07 cross section, as well. A rapid drawdown case was not completed since the reservoir will empty slowly. The following table was developed using data provided by AECOM. The density and cohesions are directly from the laboratory data, while the long term friction angles are assumed based on previous estimations. For the long term case, a cohesion value of 25 psf was applied to the Silty Clay Fill since the slope will be vegetated.

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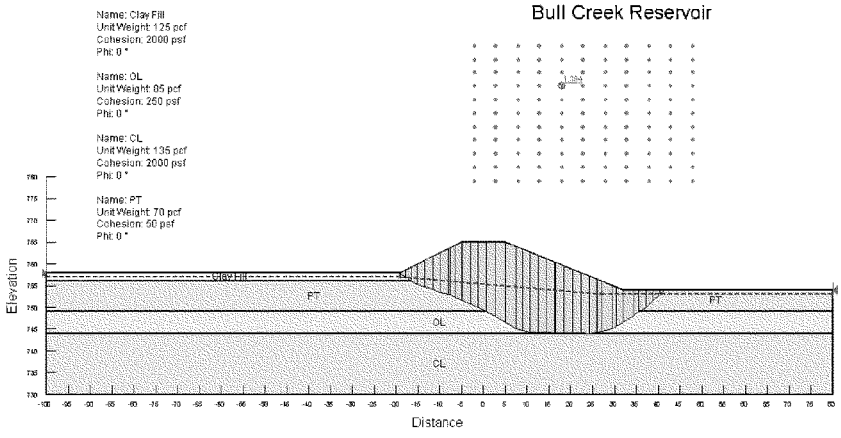
Soil	γ_{sat} (pcf)	End of Construction		Long Term	
		c	φ	c	φ
Silty Clay Fill	125	2000	0	25	28
Peat	70	50	0	0	15
Organic Silty Clay/Clayey Silt	90	250	0	0	20
Silty Clay	135	2000	0	0	26

20. The minimum recommended factors of safety for the conditions of end of construction and long term are 1.3 and 1.5, respectively based on EM 1110-2-1902, Table 3-1.

21. The end of construction case was analyzed using 2.5H: 1V slopes which produced an acceptable factor of safety at 1.36. The analysis is shown in the below figure.



22. Running the same cross section with the long term conditions produces a factor of safety of 0.98, which is less than the recommended 1.5. The analysis is shown below.

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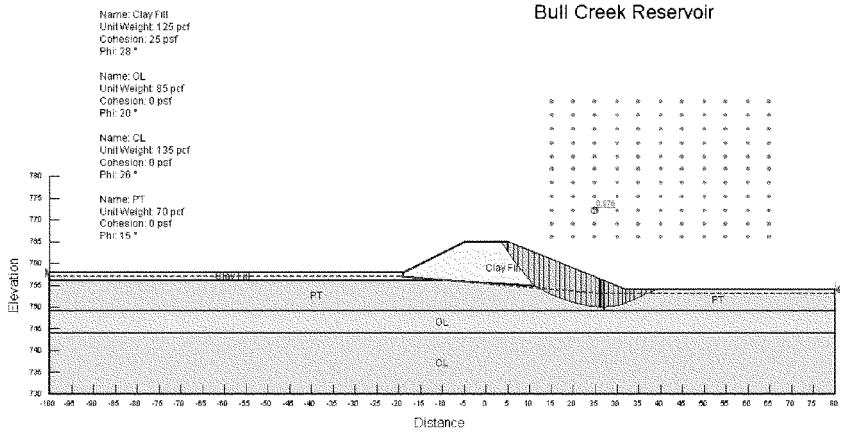
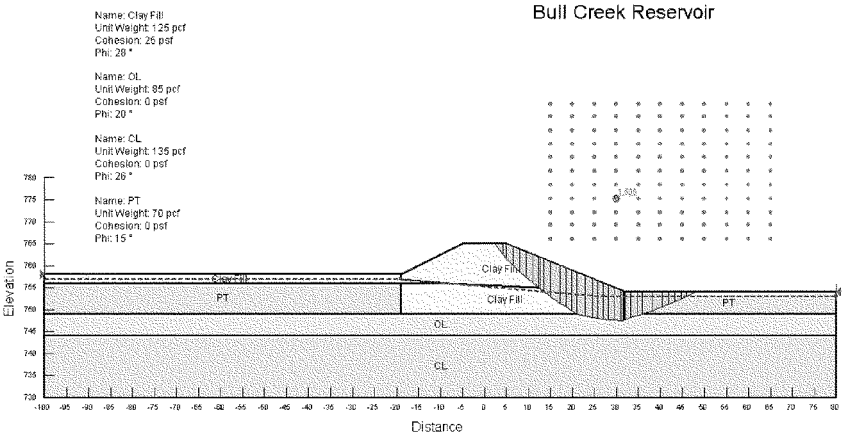


23. In order to achieve an acceptable factor of safety, the Peat was replaced with Silty Clay Fill. This results in a factor of safety at 1.51 as shown below.



24. On the land side, a slope of 2H: 1V exceeded the recommended factor of safety at 1.54 when the peat is removed. This cross section is shown below.

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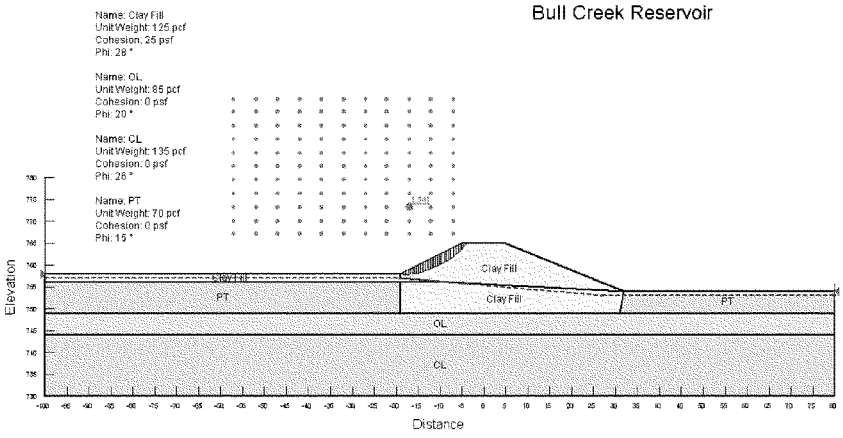
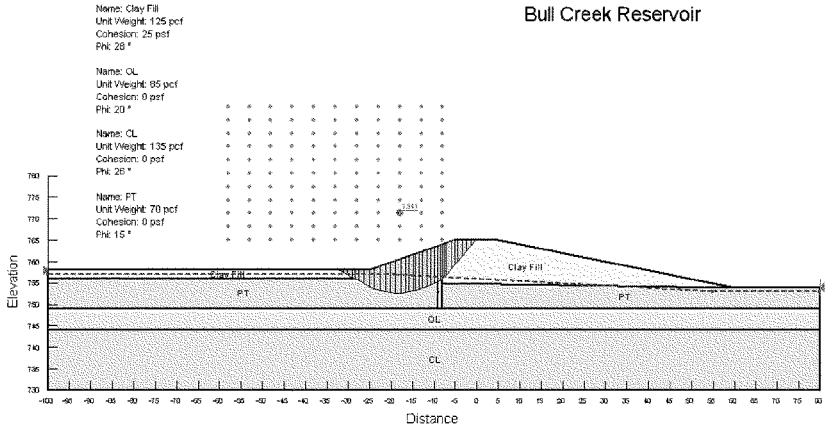


25. On the land side, a slope of 3H: 1V is required to exceed the recommended factor of safety when the peat remains. This cross section is shown below and results in a factor of safety at 1.541.



26. Another method to create a more stable slope on the reservoir side is to flatten it without removing the peat soils. By flattening the slope to a 5H: 1V ratio, the factor of safety is 1.504. This is shown in the below analysis.

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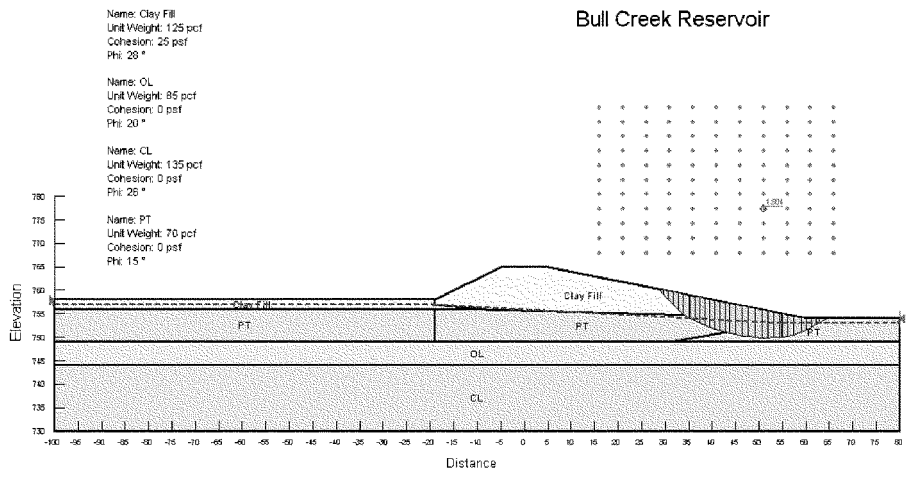

Conclusion

27. Based on the above stability, seepage, and settlement analyses, the Bull Creek Reservoir will require additional preparatory work in order to construct a stable berm due to the organic layer present. One option is to remove the peat and organic clayey silt layers from the cross section and replace them with Silty Clay Fill. Another method would be to flatten the reservoir side slope to 5H: 1V which will still require some sort of cutoff such as clay or sheet pile. Other more cost effective methods may be available and should be examined during the final design phase. Additional investigation is required before constructing these berms to determine the extents of the organic soils, as well as, establishing engineering quantities to the soils. Areas without the organic soils are ideal for constructing the berm, as seepage and slope stability are not an issue and settlement is anticipated to be on the order of 1 foot or less. The final layout of the berm should avoid areas where these organic soils are thickest. Overbuild of about ¾-foot should be anticipated at this time in areas without organics.

28. Slopes of 2.5H: 1V on the reservoir side and 2H: 1V on the land side are recommended if no organic layer is present. With the peat layer in place, the reservoir slope should be at least 5H: 1V on the reservoir side and 3H: 1V on the land side and some method to mitigate piping should be designed. This could be in the form of at least a 5-foot wide cutoff trench, sheet pile extending at least 2 feet beyond the peat, toe drains, or relief wells. Additional analyses should be completed during the design phase when more information is available.

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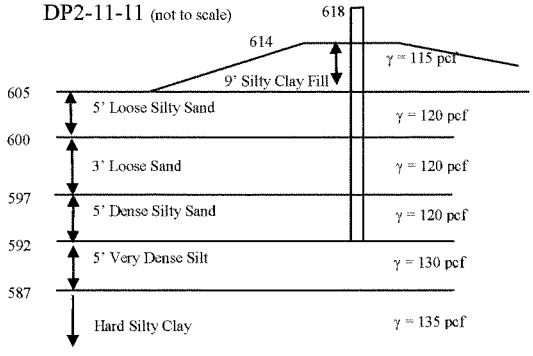
Floodwall

1. For the analysis, the floodwall is anticipated to be constructed to elevation 618 NAVD88 out of Steel Sheet Piles (SSP). Borings DP2-11-10 and 11 were completed along the proposed floodwall alignment with DP2-11-10 near the north end of Groveland Avenue and DP2-11-11 near the south end. Both borings encountered about ¾ feet of topsoil at the surface. Beneath the topsoil, each encountered silty clay fill to about 5 feet below grade underlain by native medium stiff silty clay with a 1-foot thick sand layer in DP2-11-11 at about 8 feet below grade. At about 9-½ to 10 feet below grade, dense silt was encountered in DP2-11-10 while loose silty sand was encountered in DP2-11-11. Beneath the silt in DP2-11-10, hard silty clay at about 13 feet below grade was encountered to about 17.5 feet where auger refusal on inferred bedrock was encountered. Beneath the silty sand in DP2-11-11, dense silt was encountered about 20 feet with hard silty clay encountered at 25 feet below grade. This extended to the termination depth of the boring at 30.5 feet. Water was observed between 7-½ and 12 feet below grade. The profile is shown below, with the asphalt removed. The soil characteristics are based on conservative values from AECOM laboratory tests. The sheet pile is assumed to extend to the top of the extremely dense silt layer, about 22.5 feet below grade.



Seepage

2. Seepage analysis was completed for the Groveland Floodwall portion based on DP2-11-11. The assumed material properties are shown in the table below, along with the SEEP/W analysis of the flow. The flood height is assumed to be at the floodwall height, elevation 618 feet NAVD. The cross section does show the river bed, based on contour lines and the existing berm with a clay cutoff on the river side.

Material	K (ft/sec)
Clay Fill and Silt	10^{-7}
Clay cutoff and Silty Clay	10^{-9}
Silty Sand	10^{-4}
Sand	10^{-2}
Floodwall	10^{-21}

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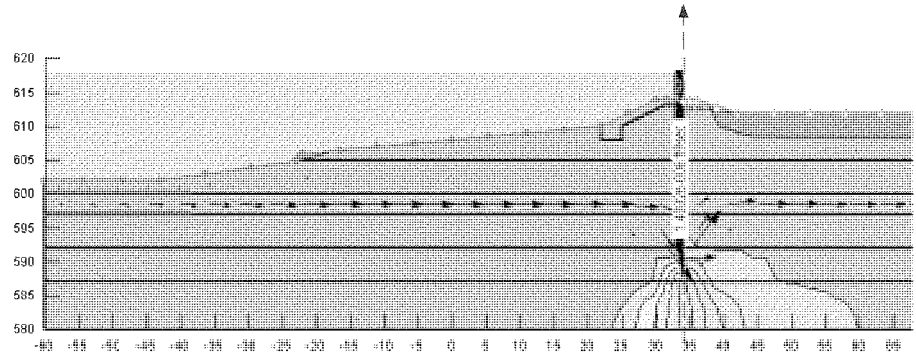

3. Based on these assumed characteristics, the anticipated flow for the floodwall portion is about 1.4e6 cfs/ft, or 8.6e-5 gpm/ft. This is considered an insignificant amount of seepage.

4. A second concern for seepage is piping which results from excessive pressure on the protected side of the levee forcing a seepage path up through the ground. The Critical Gradient (i_c) is defined as $(\gamma_{sat} - \gamma_w)/\gamma_w$ which is the weight ratio of the soil. It is compared to the Exit Gradient (i_e) which the force upwards at the toe and is obtained using SEEP/W. The Factor of Safety is defined as i_c/i_e.

Material	Unit Weight (pcf)	Exit Gradient, i_e (y-direction)	Critical Gradient, i_c	Factor of Safety
Clay Fill	115	0.19	0.84	4.4

5. According to EM 1110-2-1901, the Factor of Safety should be at least 1.5, which this cross section meets.

Stability

6. ETL-1110-2-575 describes three failure modes that all floodwalls should be checked against. The first is creation of a flood-side gap in cohesive soils, second is rotational stability failure around the floodwall point, and the third is rating the floodwall against criteria for consolidation of deflections. Each of these failure modes are checked in the analysis below.

7. The flood-side gap is caused when cohesive soils are present on the water side of the floodwall and a high water event occurs. Floodwaters enter the gap which extends to the cohesionless soil, which lacks the ability to sustain a vertical face in the submerged state. A stability analysis was completed to determine how the gap filled with water affects the stability of the floodwall.

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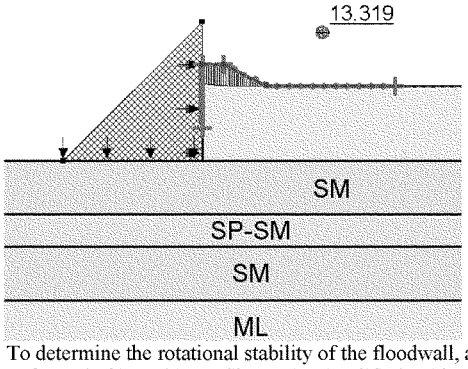
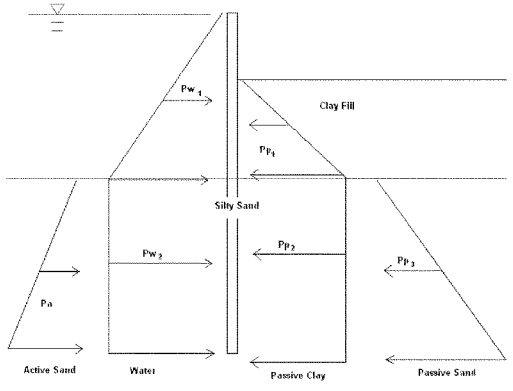
8. The cross section was drawn without the floodwall and cohesive river side soils to determine how a saturated gap would act on the land side soils. A load of 62.4 psf was applied to represent the water and the protected side is considered to be completely saturated to be overly conservative. The existing berm is shown on the cross section which has a 2-foot tall berm with a 2-foot wide bench and 2H: 1V slope. Based on these characteristics, the gap analysis produces a factor of safety of 13.3, which is much greater than the recommended 1.0. It is shown below.



9. To determine the rotational stability of the floodwall, an analysis using CWALSHT should be performed. Since this profile can be simplified to blocks passive pressure acting against the water and active pressures, the following free body diagram was developed. The protected side was assumed to be unsaturated to be overly conservative.



γ_c = unit weight of clay = 115 pcf
γ_s = unit weight of silty sand = 120 pcf
γ_w = unit weight of water = 62.4 pcf
φ_c = friction angle of clay = 28 deg.
φ_s = friction angle of silty clay and sand = 30 deg.
D = depth of water to silty clay = 13 ft
H_1 = height of clay along pile = 7 ft

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H_2 = height of silty sand along pile = 13 ft
K_{Pc} = Rankine's coefficient of passive earth pressure clay = $\tan^2(45 + \varphi/2) = \tan^2(45 + 28/2) = 2.8$
K_{Ps} = Rankine's coefficient of passive earth pressure silty sand=$\tan^2(45 + \varphi/2) = \tan^2(45 + 30/2) = 3.0$
K_{As} = Rankine's coefficient of active earth pressure silty sand = $\tan^2(45 - \varphi/2) = \tan^2(45 - 30/2) = 0.33$

P_{P1} = Passive pressure clay above silty sand = $0.5K_{Pc}\gamma_c H_1^2 = 0.5*2.8*115*7^2 = 7889$ lb
x_{p1} = location of passive pressure from bottom = $H_2+H_1/3 = 13 + 7/3 = 15.3$ ft
P_{P2} = Passive pressure clay in silty sand = $K_{Pc}\gamma_c H_1 H_2 = 0.5*2.8*115*7*13 = 14651$ lb
x_{p2} = location of passive pressure from bottom = $H_2/2 = 13/2 = 6.5$ ft
P_{P3} = Passive pressure silty sand = $0.5K_{Ps}\gamma_s H_2^2 = 0.5*3*120*13^2 = 30420$ lb
x_{p3} = location of passive pressure from bottom = $H_2/3 = 13/3 = 4.3$ ft

P_{W1} = Water pressure above silty sand = $0.5\gamma_w D^2 = 0.5*62.4*13^2 = 5272.8$ lb
x_{w1} = location of water pressure from bottom = $H_2 + D/3 = 13 + 13/3 = 17.3$ ft
P_{W2} = Water pressure below silty sand = $\gamma_w D H_2 = 62.4*13*13 = 10545.6$ lb
x_{w2} = location of water pressure from bottom = $H_2/2 = 13/2 = 6.5$ ft

P_A = Active pressure silty sand = $0.5K_{As}\gamma_s H_2^2 = 0.5*0.33*120*13^2 = 3346.2$ lb
x_A = location of passive pressure from bottom = $H_2/3 = 13/3 = 4.3$ ft

FS_f = factor of safety force = $P_P/P_W = (7889+14651+30420) / (5272.8+10545.6+3346.2) = 2.76$
FS_m = factor of safety moment = $(P_{P1}*w_{p1}+P_{P2}*w_{p2}+P_{P3}*w_{p3}) / (P_A*x_A+P_{W1}*x_{w1}+P_{W1}*x_{w1}) =$
$(7889*15.3 + 14651*6.5 + 30420*4.3) / (5272.8*17.3 + 10545.6*6.5 + 3346.2*4.3) = 2.0$

10. Since both the force and moment factors of safety are well above the minimum recommended 1.5, the floodwall appears to be stable.

11. The final check is based on maximum water levels for a deformation evaluation. The heights are shown on Table B-2 of ETL-1110-2-575. This floodwall height is elevation 618 ft, with a maximum of about 6 feet between the protected side ground and the flood height, ignoring the berm on the land side to be conservative. The foundation type is Stiff Clay (s_u>1500 psf) and the elevation 618 protection level is equivalent to the 0.2% chance exceedance level (500-year storm), which equates to a maximum of 12 feet before permanent deflection of the soils occurs. Since the height of the floodwall is only 6 feet, permanent deflection is not anticipated.

Conclusion

12. Based on the analysis above, the proposed floodwall does not appear susceptible to the flood-side gap, rotational instability, or deformation. Once a final cross section has been developed, these cases should be rechecked to ensure no problems arise.

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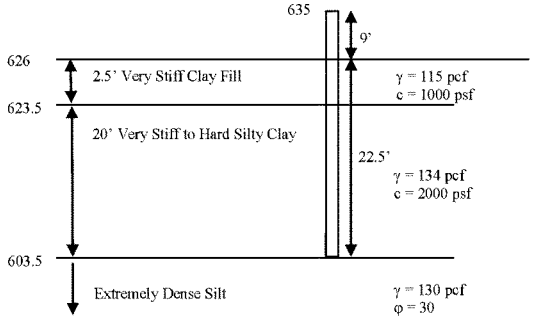
The Oakton-Everett Floodwall is a portion of DPLV09 in between Oakton Street and Everett Ave. Other locations were not analyzed as this was the only portion with completed soil borings at this time.

Floodwall

1. For the analysis, the floodwall is anticipated to be constructed to elevation 635 NAVD88 out of Steel Sheet Piles (SSP). DP2-11-14 was used since it is along the proposed floodwall area, rather than levee. Groundwater was assumed to be at the level of the Des Plaines River. The profile is shown below, with the asphalt removed. The soil characteristics are based on conservative values from AECOM laboratory tests. The sheet pile is assumed to extend to the top of the extremely dense silt layer, about 22.5 feet below grade.

DP2-11-14 (not to scale)



Seepage

2. Seepage analysis was completed for the Oakton-Everett Floodwall portion based on DP2-11-14. The assumed material properties are shown in the table below, along with the SEEP/W analysis of the flow. The flood height is assumed to be at the levee height, elevation 635 feet NAVD. Additionally, the cross section ignores any built up area on either side of the floodwall to be conservative. The cross section does show the river bed, based on the contour lines near DP2-11-14.

Material	K (ft/sec)
Silty Clay	10^{-8}
Silt and Clay Fill	10^{-7}
Floodwall	10^{-21}

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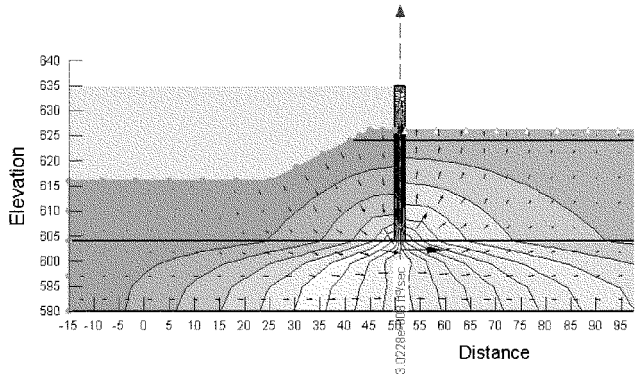

3. Based on these assumed characteristics, the anticipated flow for the floodwall portion is about 3.0e-8 cfs/ft, or 1.8e-6 gpm/ft. This is considered an insignificant amount of seepage.

4. A second concern for seepage is piping which results from excessive pressure on the protected side of the levee forcing a seepage path up through the ground. The Critical Gradient (i_c) is defined as $(\gamma_{sat} - \gamma_w)/\gamma_w$ which is the weight ratio of the soil. It is compared to the Exit Gradient (i_e) which the force upwards at the toe and is obtained using SEEP/W. The Factor of Safety is defined as i_c/i_e.

Material	Unit Weight (pcf)	Exit Gradient, i_e (y-direction)	Critical Gradient, i_c	Factor of Safety
Clay Fill	115	0.09	0.84	9.3

5. According to EM 1110-2-1901, the Factor of Safety should be at least 1.5, which this cross section meets.

6. In order to find the minimum depth where seepage controls, the floodwall bottom was raised until the piping factor of safety dropped to below 1.5. This occurs when the floodwall extends to elevation 621 and is shown below. Since the floodwall will require greater depth for structural stability, it is determined that as long as the soil profile does not encounter a layer of coarse grained materials, the seepage depth will not control the total depth of the floodwall piles.

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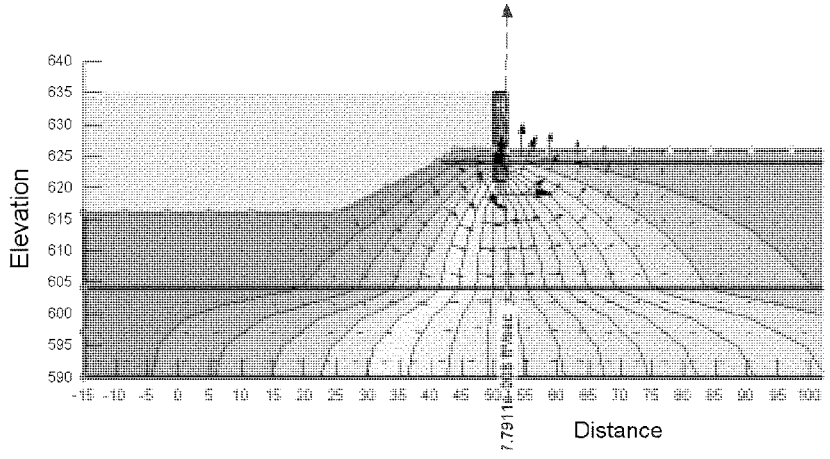

Stability

7. ETL-1110-2-575 describes three failure modes that all floodwalls should be checked against. The first is creation of a flood-side gap in cohesive soils, second is rotational stability failure around the floodwall point, and the third is rating the floodwall against criteria for consolidation of deflections. Each of these failure modes are checked in the analysis below.

8. The flood-side gap is caused when cohesive soils are present on the water side of the floodwall and a high water event occurs. Floodwaters enter the gap which extends to a depth of Z_0 defined below. A stability analysis was completed to determine how the gap filled with water affects the stability of the floodwall. The depth of a potential gap can be defined as $Z_0 = 2c/(\gamma_{sat} - \gamma_{water})$

$$Z_0 = 2c/(\gamma_{sat} - \gamma_{water}) = 2*2000/(134-62.4) = 55.9 \text{ ft}$$

9. Since the total height of the floodwall is less than Z_0 (55.9 > 31), the potential gap extends the entire length of the floodwall. The cross section was drawn without the floodwall and river side soils to determine how a saturated gap would act on the land side soils. A load of 62.4 psf was applied to represent the water and the protected side is considered to be completely saturated to be overly conservative. A 4-foot tall berm with a 5-foot wide bench and 2H: 1V slope was added to the land side cross section. Based on these characteristics, the gap analysis produces a factor of safety of 5.599, which is much greater than the recommended 1.0. It is shown below.

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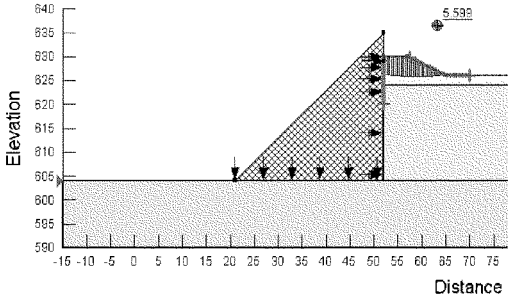
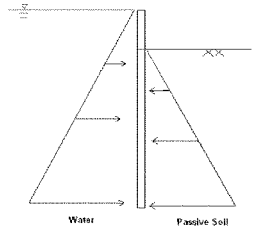


10. To determine the rotational stability of the floodwall, an analysis using CWALSHT should be performed. Since this profile can be simplified to a block of passive pressure acting against the water pressure, the following free body diagram was developed. The protected side was assumed to be unsaturated to be overly conservative.



γ = unit weight of clay = 134 pcf
γ_w = unit weight of water = 62.4 pcf
φ = friction angle of clay = 30 deg.
D = depth of water to pile tip = 31 ft
H = height of soil along pile = 22.5 ft
K_P = Rankine's coefficient of passive earth pressure = $\tan^2(45 + \varphi/2) = \tan^2(45 + 30/2) = 3.0$

P_P = Passive pressure = $0.5K_P\gamma H^2 = 0.5*3*134*22.5^2 = 101756$ lb
x_p = location of passive pressure from bottom = H/3 = 22.5/3 = 7.5 ft

P_W = Water pressure = $0.5\gamma_w D^2 = 0.5*62.4*31^2 = 29983$ lb
x_w = location of water pressure from bottom = D/3 = 31/3 = 10.3 ft

FS_f = factor of safety force = $P_P/P_W = 101756/29983 = 3.4$
FS_m = factor of safety moment = $(P_P*w_p)/(P_W*x_w) = (101756*7.5)/(29983*10.3) = 2.5$

11. Since both the force and moment factors of safety are well above the minimum recommended 1.5, the floodwall appears to be stable.

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12. The final check is based on maximum water levels for a deformation evaluation. The heights are shown on Table B-2 of ETL-1110-2-575. This floodwall height is elevation 635 ft, with a maximum of about 9 feet between the protected side ground and the flood height. This height ignores any berm that may be constructed on the land side to be conservative. The foundation type is Stiff Clay (s_u>1500 psf) and the elevation 635 protection level is equivalent to the 0.2% chance exceedance level (500-year storm), which equates to a maximum of 12 feet before permanent deflection of the soils occurs. Since the height of the floodwall is only 9 feet, permanent deflection is not anticipated.

Conclusion

13. Based on the analysis above, the proposed floodwall does not appear susceptible to the flood-side gap, rotational instability, or deformation. Once a final cross section has been developed, these cases should be rechecked to ensure no problems arise.

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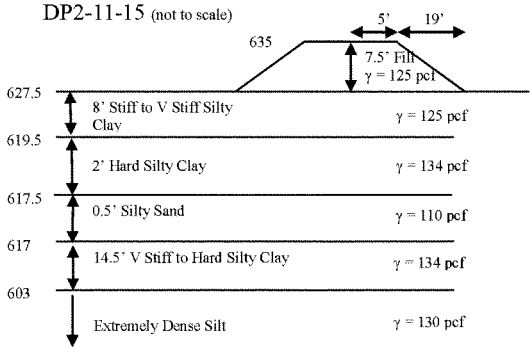
The Oakton-Everett Levee is a portion of DPLV09 in between Oakton Street and Everett Ave. Other locations were not analyzed as this was the only portion with completed soil borings at this time.

Settlement

1. For the Des Plaines II Feasibility Study, the proposed Oakton Everett Levee site had two soil borings completed with one along proposed floodwall (DP2-11-14) and one along proposed levee (DP2-11-15). DP2-11-14 encountered asphalt and crushed stone underlain by about 2 feet of silty clay fill while DP2-11-15 encountered topsoil. Beneath these materials, both borings encountered very stiff to hard silty clay to about 22 feet below grade where extremely dense silt was present. DP-11-15 encountered a seam of sand about ½-foot thick 11 feet below grade. DP2-11-14 terminated in the silt while DP2-11-15 encountered hard silty clay at 35 feet to the termination depth of 36 feet below grade. DP2-11-14 encountered water about 9 feet below grade (617 NAVD) while DP2-11-15 did not encounter any water. This may be due to DP2-11-14's proximity to the river, whose normal water level is around elevation 620 feet.

2. For the settlement analysis, the levee is anticipated to be constructed to elevation 635 NAVD88 and use a 10-foot wide crest with 2.5H: 1V slopes. DP2-11-15 was used to approximate the settlement since it is along the proposed levee area, rather than floodwall. Groundwater was ignored. The profile is shown below, with the topsoil removed.



3. Material properties for the existing soils are shown in the table below. The unit weights and void ratios were assumed for all but Silty Clay, which was provided by AECOM lab testing. The Compression Indices (C_C & C_S) were developed using the equation presented in EM 1110-1-1904 on Table 3-7 which correlates the natural moisture content. Silty Clay (1) was considered to be normally consolidated for conservatism, while Silty Clay (2) overconsolidated. Though, it is likely that both are overconsolidated.

	γ_{sat} (pcf)	e_o	C_c*	C_s**
Silty Clay (1)	125	0.5	0.24	
Silty Clay (2)	134+	0.43+	0.20	0.05
Silty Sand	110	1	0.05	

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Silt	130	0.5	0.20	

+Based on laboratory test
*Clays use $C_C = 0.012wc$, Silts use Cc = 0.20, Sands use Cc = 0.05
**Silty Clay (2) considered overconsolidated Cs = 0.25*Cc

4. The Boussinesq chart for an embankment load of infinite length was used to find the influence factors under vertical stress. The influence factors were doubled for the calculations since the chart was for only half of the embankment. The below equations were used, depending on if the layer was assumed to be normally consolidated or overconsolidated.

$$S_c = C_c \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}' + \Delta\sigma_v}{\sigma_{vo}'}$$

$$S_c = C_s \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}' + \Delta\sigma_v}{\sigma_{vo}'}$$

5. A summary of the primary consolidation settlement is shown in the table below:

Layer	H	z	a/z	b/z	I	σ_{vo}'	$\Delta\sigma_v$	s (ft)
Silty Clay (1)	8	4	4.75	1.25	0.49	500	919	0.58
Silty Clay (2)	2	9	2.11	0.56	0.45	1134	844	0.02
Sand	0.5	10.25	1.85	0.49	0.43	1295.5	806	0
Silty Clay (2)	14	17.5	1.09	0.29	0.35	2261	656	0.06
Silt	5.5	27.25	0.70	0.18	0.28	3556.5	525	0.04
							Total	**0.70**

6. A sample calculation for the settlement of the first Silty Clay (2) layer is shown below:

Initial Properties
- γ_c = wet density of clay fill and silty clay (1) = 125 pcf
- H_B = height of proposed berm = 7.5 feet
- a = length of proposed berm slope = 19 feet
- b = half of proposed crest width = 5 feet
- H_1 = Height of Silty Clay (1) layer = 8 feet

Silty Clay (2) Layer:
- H = height = 2 feet
- d = depth to top of layer = 8 feet
- γ = wet density = 134 pcf
- e_o = void ratio = 0.43
- w_c = water content = 17%

z = depth to midpoint = d + H/2 = 8 + 2/2 = 9 feet
C_c = compression index = $0.012w_c$ = 0.012 * 17 = 0.204
C_S = compression index = $0.25*C_C$ = 0.25 * 0.204 = 0.051

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σ_{vo}' = initial pressure on midpoint = $H_1 * \gamma_c + H/2 * \gamma = 8*125 + (2/2)*134 = 1134$ psf

$\Delta\sigma_v'$ = additional absolute pressure = $\gamma_c * H_B = 125 * 7.5 = 937.5$ psf
a/z = Boussinesq factor = 19/9 = 2.11
b/z = Boussinesq factor = 5/9 = 0.56
I = Boussinesq influence value = 0.45 (from chart)
$\Delta\sigma_v$ = additional pressure at midpoint = $\Delta\sigma_v'(I*2) = 937.5 *(0.45*2) = 843.75$ psf

$$S_c = Settlement = C_S \frac{H_o}{1+e_o} \log \frac{\sigma_{vo}'+\Delta\sigma_v}{\sigma_{vo}'} = 0.05 \frac{2}{1+0.43} \log \frac{843.75+1134}{843.75} = 0.026 feet$$

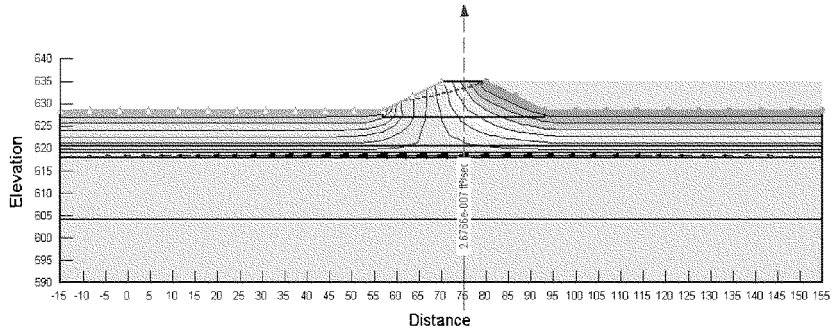
7. Since this analysis is only for the feasibility stages, secondary settlement and post-construction settlement were not investigated. Generally, these forms of settlement will add a few more inches to the project.

8. Based on the analysis above, the settlement will likely be about ¾-foot, which is acceptable. If both the Silty Clay (1) and (2) layers are considered pre-consolidated, the settlement is about ¼-foot. Actual primary settlement is likely somewhere in between. Additional testing would need to be performed to determine the actual consolidation of the clay. Overbuild of the levees should be anticipated.

Seepage

9. Seepage analysis was completed for the Oakton-Everett Levee portion based on DP2-11-15. The assumed material properties are shown in the table below, along with the SEEP/W analysis of the flow. The flood height is assumed to be at the levee height, elevation 635 feet NAVD.

	K (ft/sec)
Silty Clay	10^{-8}
Silt	10^{-7}
Sand	10^{-2}



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10. Based on these assumed characteristics, the anticipated flow for a 2:1 sloped berm is about 2.6e-7 cfs/ft, or 1.2e-4 gpm/ft. This is considered an insignificant amount of seepage.

11. A second concern for seepage is piping which results from excessive pressure on the protected side of the levee forcing a seepage path up through the ground. The Critical Gradient (i_c) is defined as ($\gamma_{sat} - \gamma_w$)/γ_w which is the weight ratio of the soil. It is compared to the Exit Gradient (i_e) which the force upwards at the toe and is obtained using SEEP/W. The Factor of Safety is defined as i_c/i_e.

Material	Unit Weight (pcf)	Exit Gradient, i_e (y-direction)	Critical Gradient, i_c	Factor of Safety
Silty Clay (1)	125	0.52	1.0	1.9

12. According to EM 1110-2-1901, the Factor of Safety should be at least 1.5, which this cross section meets. However, additional investigations should be completed to determine if more permeable sand seams are present closer to the surface in the soil stratum.

Stability

13. An evaluation of the end of construction, long term, and rapid drawdown stability were completed for the Boring 15 cross section. The following table was developed using data provided by AECOM. The density of both silty clays and cohesions are based on the laboratory data, while the friction angles are assumed based on conservative estimates. For the long term case, a cohesion value of 25 psf was applied to the Silty Clay Fill since the slope will be vegetated.

Soil	γ_{sat} (pcf)	End of Construction		Long Term	
		c	φ	c	φ
Silty Clay Fill	125	2000	0	25	28
Silty Clay (1)	125	2000	0	0	28
Silty Clay (2)	134	2000	0	0	28
Sand	110	0	26	0	26
Silt	130	0	30	0	30

14. The minimum recommended factors of safety for the conditions of end of construction, long term, and rapid drawdown are 1.3, 1.5, and 1.0, respectively based on EM 1110-2-1902, Table 3-1.

15. The end of construction case was analyzed using 2H: 1V slopes for construction which produced an acceptable factor of safety at 9.3. The analysis is shown in the below figure.

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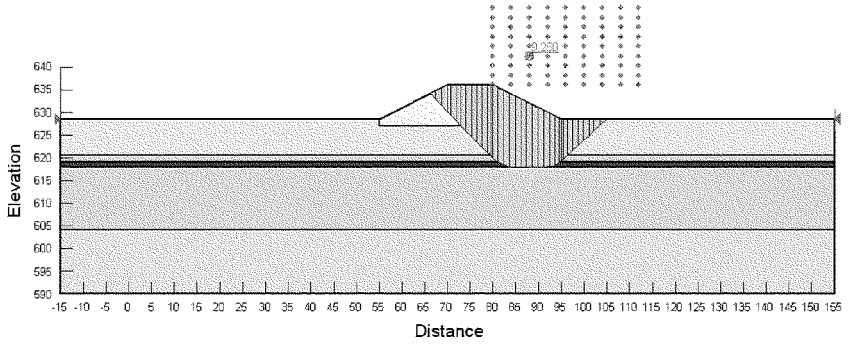
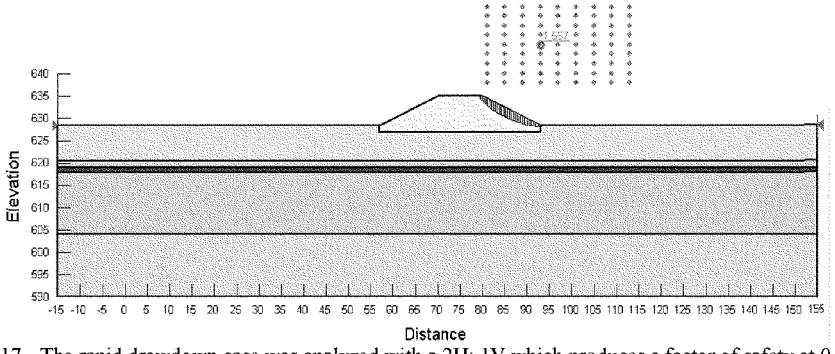
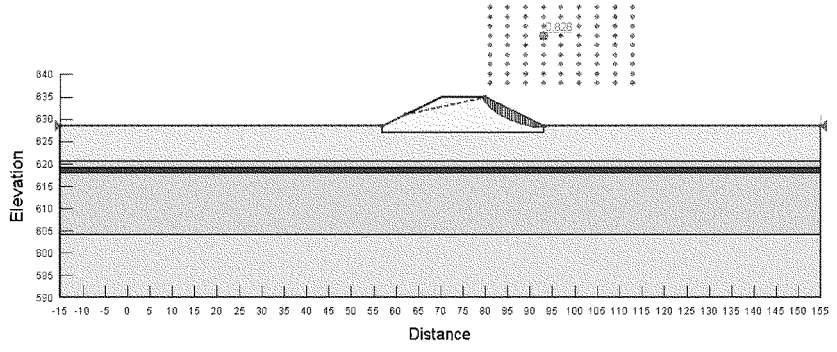


16. The long term case was analyzed using 2H: 1V slopes, as well, which produced a factor of safety at 1.55, which is above the minimum of 1.5. The analysis is shown in the below figure.



17. The rapid drawdown case was analyzed with a 2H: 1V which produces a factor of safety at 0.83, which is less than recommended.



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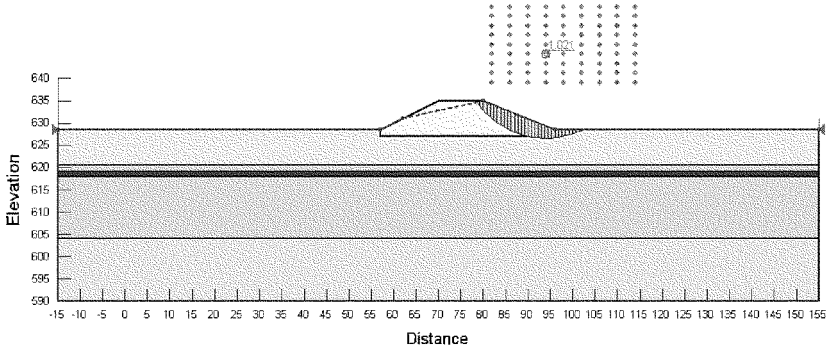
18. In order to achieve an acceptable factor of safety for rapid drawdown, the slope was flattened to 2.5H: 1V. This results in a factor of safety at 1.02, which is acceptable.



Conclusion

19. Based on the above stability, seepage, and settlement analyses, it is recommended the levee portion of the Oakton-Everett Levee be constructed with a 2.5H: 1V slope. Overbuild of about 1 foot should be anticipated at this time. Additional analysis should be completed when more information is available during the design phase to determine if steeper slopes can be used for this project.

20. The northern area of the proposed project is anticipated to be constructed with concrete and sheetpile floodwall. At this time, the only issue for floodwall construction noted is the extremely dense silt encountered about 25 feet below grade would be difficult to drive piles into. Floodwall analysis would be completed during the design phase.

FOR CONTINUATION OF HOUSE DOCUMENT 114-105

UPPER DES PLAINES RIVER AND TRIBUTARIES, ILLINOIS AND WISCONSIN: INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

SEE PART 3