ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

Gainesville Regional Utilities
Deerhaven Plant
Gainesville, Florida

Prepared for
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Washington, D.C.

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CDM Smith Project
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CDM Smith

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1.1 Introduction

Following the December 22, 2008 dike failure at the Tennessee Valley Authority's Kingston, Tennessee coal combustion waste (CCW) ash pond dredging cell that resulted in a spill of over 1 billion gallons of coal ash slurry, covering more than 300 acres that impacted residences and infrastructure, the United States Environmental Protection Agency (USEPA) is embarking on an initiative to prevent the catastrophic failure from occurring at other facilities located at electrical utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry.

This assessment of the stability and functionality of the Gainesville Regional Utilities (GRU) Deerhaven Plant CCW impoundments is based on a review of limited available documents, site assessments conducted by CDM Smith on August 28 and 29, 2012, and technical information provided subsequent to the site visit. In summary, GRU Deerhaven Plant ash impoundment embankments are rated as **POOR** for continued safe and reliable operation, because static and seismic engineering studies following the best professional engineering practice to support acceptable safety factors have not been presented. However, a **FAIR** classification and acceptable performance is expected with minor remedial actions and providing that analyses documenting structural stability under all required loading conditions are conducted.

It is critical to note that the condition of the embankment(s) depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the embankments will continue to represent the condition of the embankments at some point in the future. Only through continued care and inspection can there be a chance that unsafe conditions will be detected.

1.2 Purpose and Scope

CDM Smith was contracted by the USEPA to perform site assessments of selected surface impoundments. As part of this contract, CDM Smith conducted site assessments of the following CCW impoundments at the Deerhaven Plant: Ash Cell #1, Ash Cell #2, Pump Back Cell #1, and Pump Back Cell #2. These impoundments, referred to as the Process Water Ponds, are located northwest of the generation plant. The purpose of this report is to provide the results of the assessments and evaluations of the conditions and potential for waste release from the CCW impoundments. Six additional impoundments, including three stormwater ponds, Coal Stockpile Runoff Collection Pond, Lime Sludge Cell #1, and Lime Sludge Cell #2 were observed during CDM Smith's site assessment. Lime Sludge Cell #1 and Lime Sludge Cell #2 (Lime Sludge Ponds) receive the solid by-products generated by the treatment of groundwater extracted from the Floridian aquifer and process wastewater, treated by the brine concentrator at the water treatment plant. The stormwater ponds, Coal Stockpile Runoff Collection Pond and the Lime Sludge Ponds are not used to store/process CCW and therefore do not fall within EPA's assessment scope criteria.

Site visits were conducted by CDM Smith representatives on August 28 and 29, 2012 to collect relevant information, inventory the impoundments, and perform visual assessments of the CCW impoundments.

1.3 Conclusions and Recommendations

1.3.1 Conclusions

The following conclusions are based on our visual observations during site assessments on August 28 and 29, 2012 and a review of the limited documentation provided by GRU.

1.3.1.1 Conclusions Regarding Structural Soundness of the CCW impoundments

CCW impoundments appear to be structurally sound based on visual observations of the structural element components (i.e. inlet structures, earth embankments and outlet structures). No documentation to evaluate and assess structural stability and soundness of the impoundments was provided.

1.3.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of CCW impoundments

Supporting technical documentation was not provided. No probable maximum precipitation (PMP) analysis required under Federal Emergency Management Agency (FEMA) standards was provided. Visual examination of the impoundment earth structures did not show evidence of previous overtopping of the embankment.

1.3.1.3 Conclusions Regarding Adequacy of Supporting Technical Documentation

Supporting data and documentation have not been provided. Liquefaction potential analyses for embankment foundations have not been performed, and original record drawings available for the Process Water Ponds are incomplete. Therefore, supporting documentation was not sufficient with regard to a complete analysis of impoundment safety.

1.3.1.4 Conclusions Regarding Description of the CCW impoundments

The description of the CCW impoundments provided by a GRU representative was generally consistent with the visual observations by CDM Smith during our site assessment. However, only four (4) sheets of the record drawings were provided, making it difficult to assess potential discrepancies against the intended design of the CCW impoundments. Drawings provided are included in Appendix A-1.

1.3.1.5 Conclusions Regarding Field Observations

During visual observations and site assessments, minor signs of areas of erosion, erosion rills, and scarps were observed on the exterior and interior slopes of the embankments. No apparent unsafe conditions or conditions in need of immediate remedial action were observed.

1.3.1.6 Conclusions Regarding Adequacy of Maintenance and Methods of Operation

Current maintenance and operation procedures appear to be adequate. There was no evidence of previous spills and release of impounded coal ash slurry outside of the impoundments.

1.3.1.7 Conclusions Regarding Adequacy of Surveillance and Monitoring Program

The impoundments at the Deerhaven plant function as a zero-discharge facility; wastewater is treated on-site and is reused in the plant process. Therefore, there is no National Pollutant Discharge Elimination System (NPDES) Permit from the Florida Department of Environmental Protection (FDEP)

that requires a continuing surveillance and monitoring program. Saturated areas at the toe of slope of the embankments were observed, which indicates that potential seepage may be occurring. The GRU representative indicated several monitoring wells are installed around the site to monitor for water levels and water quality. One monitoring well was observed, southeast of the Pump Back Cell #1. Well data were not provided to CDM Smith.

The limited amount of data available documenting the maintenance and operation procedures for the management unit is not sufficient to allow CDM Smith to make an evaluation of the adequacy of the maintenance and operations for the impoundment. The lack of regular documentation for current maintenance and methods of operation of this management unit makes these practices inadequate.

1.3.1.8 Conclusions Regarding Suitability for Continued Safe and Reliable Operation

The primary embankments do not show evidence of unsafe conditions requiring immediate remedial efforts, although maintenance to correct deficiencies noted above is required.

1.3.2 Recommendations

Based on CDM Smith visual assessment of the Process Water Ponds and a review of documentation provided by GRU, the following recommendations are provided.

1.3.2.1 Recommendations Regarding the Hydrologic/Hydraulic Safety

It is recommended that a qualified professional engineer assist GRU in evaluating the hydrologic and hydraulic capacity of the CCW impoundments to withstand design storm events, without overtopping.

1.3.2.2 Recommendations Regarding the Technical Documentation for Structural Stability

A complete set of record drawings and/or as-built drawings should be developed or made readily available for future reference. It is recommended that a qualified professional engineer assist GRU in the evaluation of the Process Water Ponds embankment stability, including liquefaction analyses.

1.3.2.3 Recommendations Regarding Field Observations

Erosion rills and scarps were observed on the interior slopes of the Ash Cell #1 and Ash Cell #2, primarily on the northwest embankment. These areas should be repaired with compacted structural fill and regraded to match adjacent existing contours. After slope restoration, it is recommended that the exposed surface of the embankment be stabilized with riprap consisting of a heterogeneous mixture of irregular-shaped rocks placed over the compacted fill and a geotextile fabric to match existing riprap stabilization.

Animal burrows were observed on the southeast and northwest embankments exterior slopes. Although not seen in other areas, high vegetation cover on the embankments may have hidden other animal burrows. CDM Smith recommends documenting areas disturbed by animal activity, removing the animals and backfilling the burrows with compacted structural fill to protect the integrity of the embankments. Vegetation should be maintained at a height that potential animal burrows can be readily observed.

1.3.2.4 Recommendations Regarding Surveillance and Monitoring Program

CDM Smith recommends an instrumentation monitoring program to monitor potential areas of seepage along the southeast, southwest and northwest embankments of Ash Cell #1 and Ash Cell #2 and Pump Back Cell #1.

1.3.2.5 Recommendations Regarding Continued Safe and Reliable Operation

Inspections should be made following periods of heavy and/or prolonged rainfall, and the occurrence of these events should be documented. Inspection records should be retained at the facility for a minimum of three years.

Major repairs and slope restoration should be designed by a registered professional engineer experienced with earthen dam design.

None of the conditions observed requires immediate attention or remediation. However, the above recommendations should be implemented during a reasonable time frame to maintain continued safe and reliable operation of the CCW impoundments.

1.4 Participants and Acknowledgment

1.4.1 List of Participants

CDM Smith representatives William L. Fox, P.E. and Eduardo Gutiérrez-Pacheco, P.E. were accompanied during visual assessment by Regina Embry, Principal Engineer, representative from GRU.

1.4.2 Acknowledgement and Signature

CDM Smith acknowledges that the Process Water Ponds referenced herein were assessed by William L. Fox, P.E. and Eduardo Gutiérrez-Pacheco, P.E. Based on the limited documentation provided, the Process Water Ponds are rated **POOR**. The facility lacks static, hydrologic and seismic engineering studies following best professional engineering practice to support safety factors under normal loading conditions (static, hydrologic, seismic) in accordance with the applicable safety regulatory criteria. Minor deficiencies exist that require remedial measures.

We certify that the management units referenced herein were assessed on August 28 and 29, 2012.

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E. Woody Lingo, P.E.
Senior Geotechnical Engineer
Florida Registration No. 9326

Section 2
Description of the Coal Combustion Waste Impoundments

2.1 Location and General Description

The Deerhaven Plant is located in Alachua County, Florida, northwest of the City of Gainesville. The site is on the east side of U.S. Route 441/SR20, as shown on **Figure 1.** Critical infrastructure located within approximately five miles downgradient of the Deerhaven Plant is shown on **Figure 2.**

Deerhaven Plant's coal combustion waste (CCW) impoundments consist of the Process Water Ponds (formerly known as Ash Ponds), which are divided into four cells that are hydraulically connected: Ash Cell #1, Ash Cell #2, Pump Back Cell #1, and Pump Back Cell #2. Ash Cells #1 and #2 outlets discharge decant water to Pump Back Cells #1 and #2, respectively. Decant water is pumped from Pump Back Cells #1 and #2 to the plant for reuse in plant operations. As described in Section 1, there are additional impoundments that are not classified as CCW impoundments: Lime Sludge Ponds, Coal Stockpile Runoff Collection Pond, and Stormwater Ponds

An aerial view of the Deerhaven Plant including the Process Water Ponds, is shown on **Figure 3.** The total perimeter of the embankments for the Process Water Ponds is approximately 1,950 feet; these ponds have an approximate surface area of 6.7 acres. **Table 1** provides a summary of the approximate size and dimensions of the Process Water Ponds.

Table 1 – Summary of Process Water Ponds Cells Approximate Dimensions and Size

	Process Water Ponds			
	Ash Cell #1	Ash Cell #2	Pump Back Cell #1	Pump Back Cell #2
Embankment Height (ft)	14	14	9	9
Typical Crest Width (ft)	25	25	25	25
Length (ft)	730	360	500	360
Interior Slopes H:V	3:1	3:1	3:1	3:1
Exterior Slopes H:V	4:1	4:1	4:1	4:1

Divider embankments between the four cells of the Process Water Ponds are about 1,200 feet long.

2.1.1 Horizontal and Vertical Datum

Site survey provided by GRU to CDM Smith used the horizontal and vertical control network established by the National Geodetic Survey (NGS). Horizontal survey data in this study reference the North Zone of the Florida State Plane Coordinate System based on North American Datum (NAD) of 1983, 2007 adjustment. Elevations noted herein are in feet and are referenced to North American Vertical Datum of 1988 (NAVD 88) unless otherwise noted.

2.1.2 Site Geology

The Deerhaven Plant is located east of U.S. 441/SR 20 in Alachua County, Florida. Based on review of the Alachua 7.5-Minute USGS Topographic Quadrangle Map, ground surface elevations in the area of the management units range from about El. 180 to El. 185. According to the Geologic Map of the Eastern Portion of the USGS, 1:100,000 Scale Gainesville Quadrangle, Northern Florida, the Deerhaven Plant is located in the Coosawhatchie Formation of the Hawthorn Group that consists of soils deposited in ancient marine and fluvio-deltaic depositional environments. The Deerhaven Plant is located in an area composed of a complex sequence of Tertiary-aged carbonate and siliclastic sediments. The overlying surficial deposits are lithologically variable, pinching out and inter-fingering both laterally and vertically. They consist of gray to bluish-gray sandy clay or clayey sand with phosphate grains, and limestone to dolostone. Lenses of relatively pure quartz sands, clays, or carbonate are uncommon. Numerous karst features are present in the area, which include springs and sinkholes.

Boring logs available provided by GRU indicate that existing soils present within the area of the embankments consist of loose to medium dense silty and clayey sand, underlain by soft to stiff clay and sandy clay. Subsurface information, boring location and boring logs that were provided by GRU are included in **Appendix A.**

2.2 Coal Combustion Residue Handling

The Process Water Ponds receive residual sluiced ash and waste water from the plant process before being treated in the on-site water treatment plant for re-use in the plant process. The Process Water Ponds are part of the zero-discharge water treatment plan, which treats water effluent from both of the coal-fired units.

2.2.1 Fly Ash

Limited amounts of fly ash are discharged during annual maintenance outage activities and transported by pipeline to Ash Cells #1 and #2.

2.2.2 Bottom Ash

Bottom ash is transported by pipeline to the Ash Cells in slurry form. The CCW impoundments are used as settling ponds for CCW. GRU periodically dredges the CCW from the Ash Cells and disposes of it in the on-site Ash Landfill.

2.2.3 Boiler Slag

The GRU Deerhaven plant is not a slag-production type furnace, however a small amount of Boiler Slag is typically found in bottom ash.

2.2.4 Flue Gas Desulfurization Gypsum

The GRU plant has not produced flue gas desulfurization gypsum.

2.3 Size and Hazard Classification

According to the United States Army Corps of Engineers (USACE) Guidelines for Safety Inspection of Dams (1979), the impoundments may be placed in the size classification per **Table 2.**

Table 2 – USACE ER 1110-2-106 Size Classification

Category	Impoundment	
	Storage (Ac-ft)	Height (Ft)
Small	50 to < 1000	25 to < 40
Intermediate	1000 to < 50,000	40 to < 100
Large	> 50,000	> 100

Based on storage capacity and embankments height, the Deerhaven Plant impoundments are considered SMALL impoundments.

It is not known if the Deerhaven Plant impoundments currently have a Hazard Potential Classification. Based on the USEPA classification system as presented on Page 2 of the USEPA checklist (**Appendix B**) and our review of the site and downstream areas, recommended hazard ratings have been assigned to the impoundments as summarized in **Table 3**:

Table 3 – Recommended Impoundment Hazard Classification Rating

Impoundment	Recommended Hazard Rating	Basis
Process Water Ponds	Low Hazard	▪ Failure or misoperation could result in economic loss and environmental damage to plant infrastructure, operations, and utilities. ▪ Loss of human life as a result of failure is not anticipated.

2.4 Amount and Type of Residuals Currently Contained in the Unit(s) and Maximum Capacity

At the time of the assessments, CDM Smith did not have information on the amounts of residuals currently stored in the units. The pool area of the Process Water Ponds is approximately 6.7 acres. These cells receive process water from plant operations, including cooling tower blow down, plant drains, industrial process water, and sluiced bottom ash. Limited amounts of fly ash are discharged during annual maintenance outage activities and transported by pipeline to Ash Cells #1 and #2. Limited amounts of fly ash are discharged during annual maintenance outage activities and transported by pipeline to Ash Cells #1 and #2.

2.5 Principal Project Structures

The primary components of the Process Water Ponds include the following:

- A set of two, 15-inch-diameter steel inlet pipes located near the east corner of Ash Cell #1 and near the south corner of Ash Cell #2.
- Earthen perimeter embankments composed of compacted soil.
- Four concrete outlet riser-type with stop logs structures, one at each ash cell and lime sludge cell.
- A pump house located near the east corner of Pump Back Cell #1.

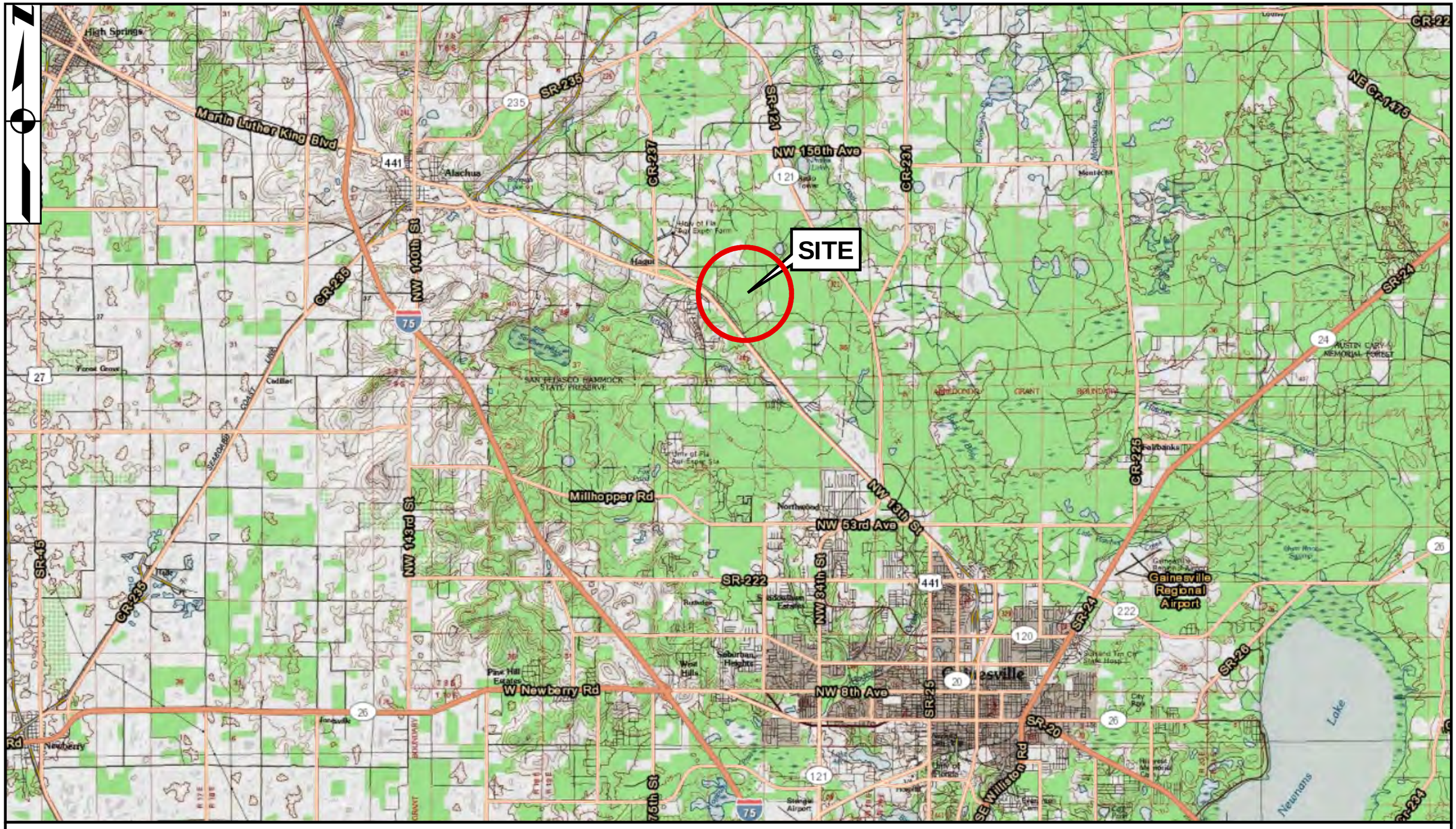
2.6 Critical Infrastructure within Five Miles Downgradient

Based on available topographic maps, surface drainage in the vicinity of the Deerhaven Plant does not appear to have a preferred drainage direction, since the surrounding topography is relatively uniform. Critical infrastructure, including schools, hospitals, waterways, roadways and bridges, and other major facilities, identified within five miles downgradient of the Deerhaven Plant includes the following:

- U.S. Highway 441/SR 20/25 (southwest)
- William S. Talbot Elementary School
- Trinity United Methodist Church
- Dove World Outreach Center
- Country Crossroads Baptist Church
- Hague Baptist Church
- Pleasant Hill Baptist Church

The Gainesville Municipal Airport is located approximately 8 miles from the Deerhaven Plant.

A breach of the impoundment embankments would most likely impact GPU property only and is not expected to result in loss of human life.



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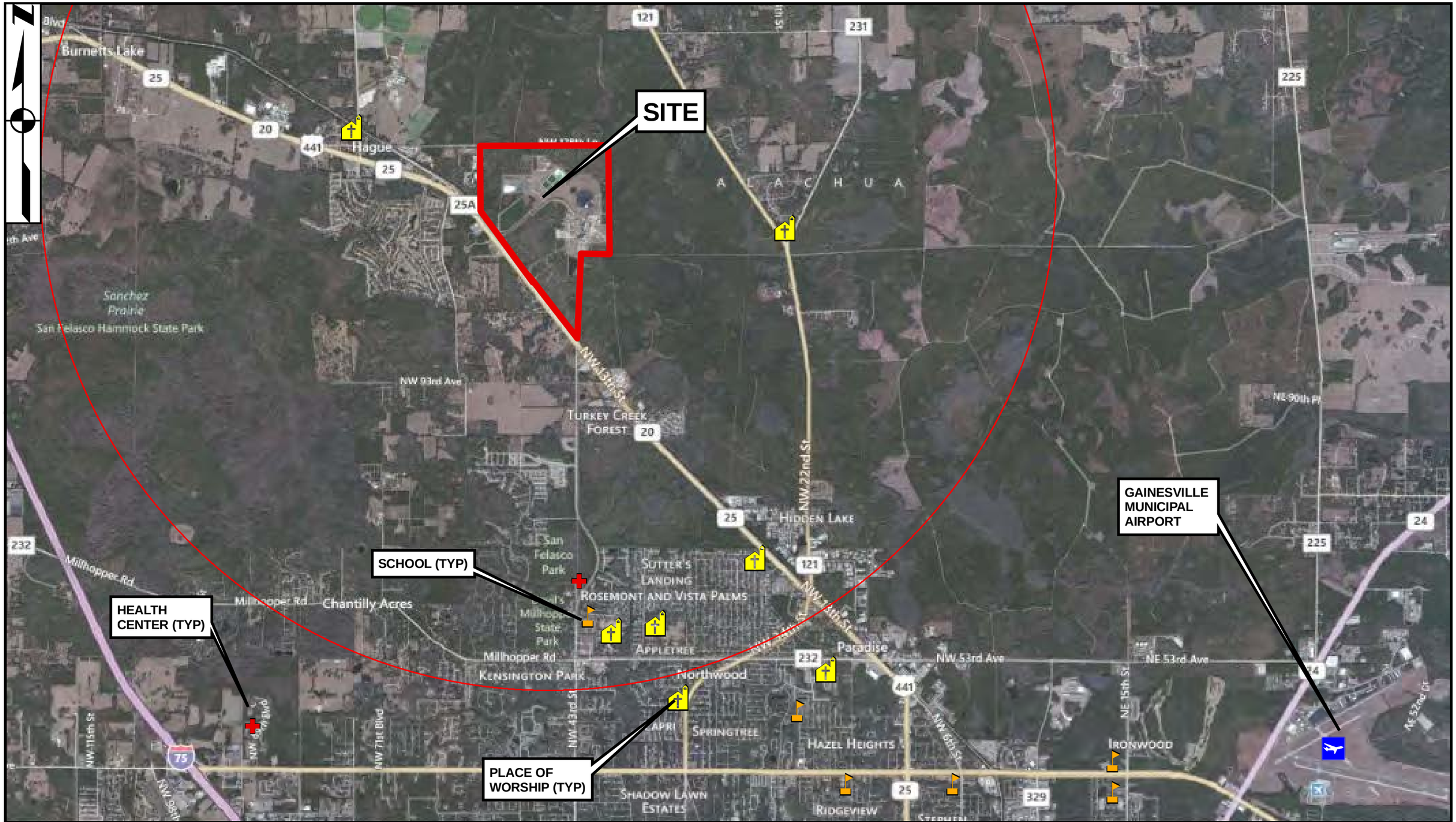
0 5,000 10,000 20,000 30,000 40,000 Feet

FIGURE-1
LOCUS PLAN
GAINESVILLE REGIONAL UTILITIES - DEERHAVEN POWER PLANT
GAINESVILLE, FLORIDA



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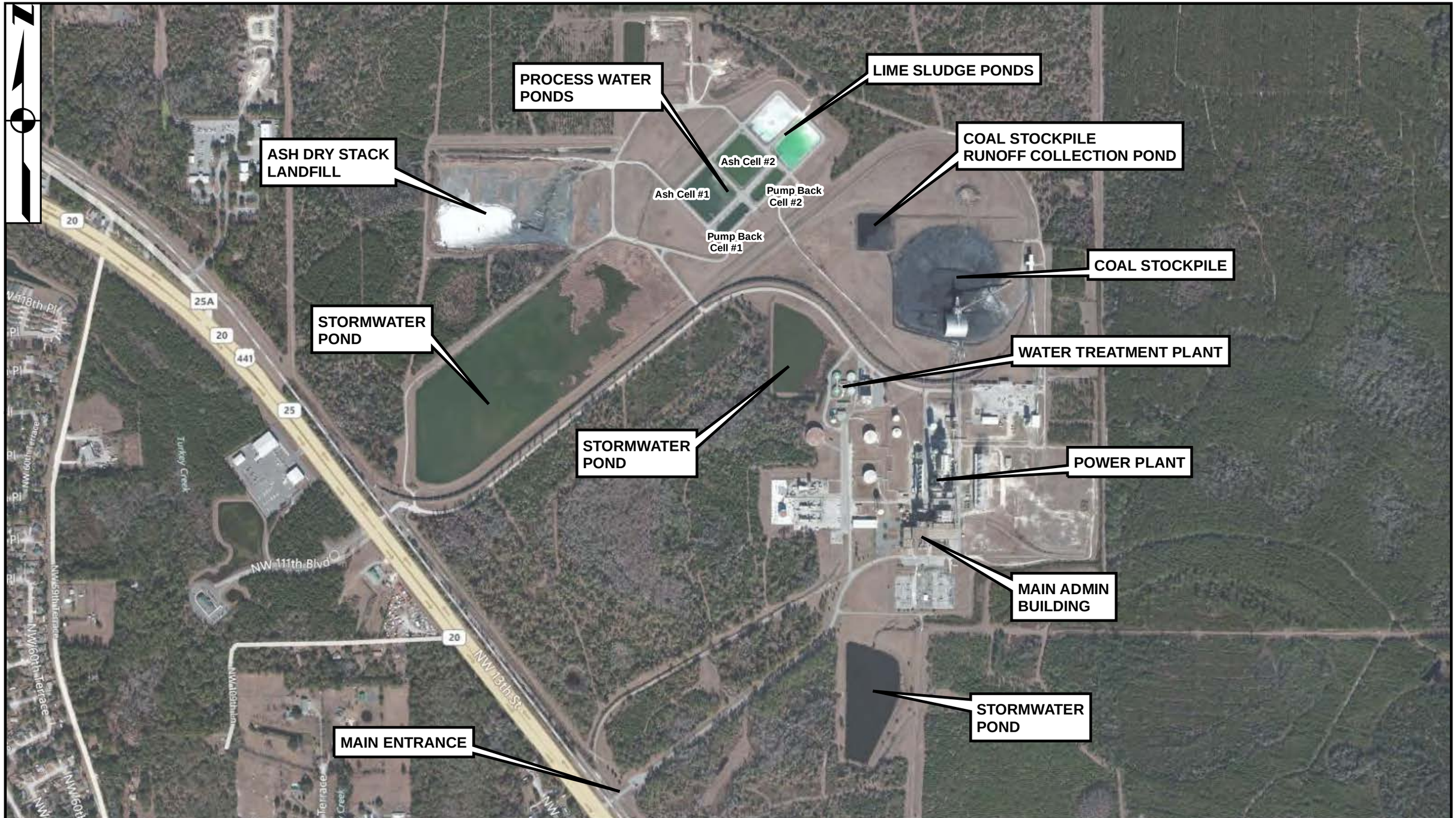
LEGEND

5 Miles Radius from Ash Impoundment

0 2,500 5,000 10,000 15,000 20,000 Feet

FIGURE-2
CRITICAL INFRASTRUCTURE PLAN
GAINESVILLE REGIONAL UTILITIES - DEERHAVEN POWER PLANT
GAINESVILLE, FLORIDA



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0 400 800 1,600 2,400 3,200 Feet

FIGURE-3
AERIAL PLAN
GAINESVILLE REGIONAL UTILITIES - DEERHAVEN POWER PLANT
GAINESVILLE, FLORIDA

Section 3
Summary of Relevant Reports, Permits and Incidents

3.1 Summary of Reports on the Safety of the CCW Impoundments

At the time of CDM Smith's on-site assessment, no safety reports on the CCW impoundments were available. According to plant representatives, there have been no known structural or operational problems associated with the impoundments, however no documentation was available to confirm or disprove this statement.

3.2 Summary of Local, State, and Federal Environment Permits

Currently, the CCW impoundments are regulated by Florida Department of Environmental Protection (FDEP).

The Deerhaven Plant has not been issued a permit under the National Pollutant Discharge Elimination System (NPDES) authorizing discharge to the surrounding streams in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit because it is considered a zero-discharge facility, which reuses all processed water.

3.3 Summary of Spill/Release Incidents

According to plant representatives, there have been no known spills or releases related to the impoundments. No documentation was available to confirm or disprove this statement.

Section 4
Summary of History of Construction and Operation

4.1 Summary of Construction History

4.1.1 Impoundment Construction and Historical Information

The Deerhaven Plant began operation in 1972 with one unit and a second unit was added in 1981. The two coal-fired generating units can each produce up to 232 megawatts of power.

Historical information on the Process Water Ponds was not readily available in the documentation provided by GRU. Based on our understanding and the limited available data, it appears that the Process Water Ponds were constructed in 1981 with the addition of the second unit to the Deerhaven Plant. The Process Water Ponds were constructed by the placement of dikes around the perimeter to form the impoundments. The dike perimeter crest elevation of the Process Water Ponds (Ash Cell #1 and Ash Cell#2) is about 195 feet.

Based on the limited drawings that were provided, the interior slopes of each cell were constructed at 3 horizontal to 1 vertical (3H:1V), and exterior slopes were constructed at 4H:1V. Design drawings for the Process Water Ponds were developed by Burns & McDonnell. A complete set of drawings was not available. Based on information provided by GRU and CDM Smith visual observations, the Process Water Ponds perimeter embankments have a crest width of 25 feet.

Information regarding the soils that were used for the embankment construction was not available. A cutoff slurry wall was shown on f drawings furnished by GRU to be constructed within the perimeter embankments and keyed into the existing natural clay layer. The top of the slurry wall was shown to be at approximately El. 184 feet. A compacted clay cut-off blanket was placed on the interior slopes of the perimeter embankments and it intersects the top of the slurry wall. Details regarding the design, materials used and methods of constructing the slurry walls were not provided.

Drawings provided by GRU showing typical cross sections of the embankments are presented in **Appendix A-1.**

4.1.2 Significant Changes/Modifications in Design since Original Construction

The GRU representative indicated that there have not been significant changes or modifications to the design. There was no documentation provided that indicates any changes or modifications to the original design.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

Information regarding major repairs or rehabilitation to the embankments of the Process Water Ponds was not provided. No evidence of prior releases, failures or remedial work was observed on the embankments during the CDM Smith visual assessment. There was no documentation provided that indicates any repairs or rehabilitation has occurred since the original construction.

4.2 Summary of Operational Procedures

4.2.1 Original Operating Procedures

The Process Water Ponds at the Deerhaven Plant have historically been used as settling ponds for plant wastes including:

- Industrial process water including sluiced bottom ash
- Limited amounts of fly ash are discharged during annual maintenance outage activities
- Limited amounts of boiler slag are generated with bottom ash.
- Cooling tower blow down water
- Plant drains
- Plant runoff

4.2.2 Significant Changes in Operational Procedures and Original Startup

No significant changes in the operational procedures appear to have been made to the Process Water Ponds. There was no documentation provided that indicates there have been any changes in operation procedures since start-up.

4.2.3 Current CCW Impoundment Configuration

Current operational procedures of the Process Water Ponds are consistent with the original operating procedures. The Process Water Ponds are currently divided into four cells as previously described and as shown on **Figure 3.** The approximate crest elevations of the embankments and impoundment areas are shown in **Table 4.**

During normal plant operations, most of the residual ash sedimentation occurs in Ash Cell #1. Ash sluice water is discharged to Ash Cell #1. Ash Cell #1 and Ash Cell #2 are hydraulically connected by a corrugated HDPE pipe, approximately 12 inches in diameter. The outlet structures for Ash Cells #1 and #2 consist of concrete drop structures with stop logs. Ash Cells #1 and #2 outlets discharge decant water to Pump Back Cells #1 and #2, respectively. Decant water is pumped from Pump Back Cells #1 and #2 to the plant for reuse in plant operations.

Table 4 – Approximate Crest Elevations and Surface Areas

Ash Pond	Approximate Crest Elevation (Feet)	Approximate Pond Surface Area (Acres)
Ash Cell # 1	195	2.75
Ash Cell #2	195	2.75
Pump Back Cell #1	188	0.6
Pump Back Cell #2	188	0.6

4.2.4 Other Notable Events since Original Startup

No additional information was provided to CDM Smith regarding other notable events, which have impacted operations and /or regular maintenance and inspection of the Process Water Ponds.

Section 5
Field Observations

5.1 Project Overview and Significant Findings (Visual Observations)

CDM Smith performed visual assessments of the CCW impoundments at the GRU Deerhaven Plant. The CCW impoundments assessed included the Process Water Ponds (formerly known as Ash Ponds). The Process Water Ponds are comprised of Ash Cell #1, Ash Cell #2, Pump Back Cell #1, and Pump Back Cell #2. The assessments were completed following the general procedures and considerations contained in the Federal Emergency Management Agency (FEMA) Federal Guidelines for Dam Safety (April 2004). These guidelines require that observations of embankment settlement, movement, erosion, seepage, leakage, cracking, and deterioration be performed. A Coal Combustion Dam Inspection Checklist and Coal Combustion Waste (CCW) Impoundment Inspection Form, developed by the USEPA, were completed for the impoundments. Copies of the completed forms are included in **Appendix B**. The locations of photographs that were taken during our field assessments are shown on **Figures 4A and 4B**, and these photographs are included in **Appendix C**. The locations of the photographs were logged using a handheld GPS device, and the coordinates are also listed in Appendix C.

CDM Smith visited the plant on August 28 and 29, 2012, to conduct visual assessments of the CCW impoundments. The weather was generally cloudy with daytime high temperatures up to 80 degrees Fahrenheit. The daily precipitation for one week and total precipitation for one month immediately prior to our site visit are shown in **Table 5**. These data were recorded at the St. Johns River Water Management District, Station 00260033, at the Alachua County Fairgrounds in Gainesville, Florida, which is approximately 8.25 miles southeast of the Deerhaven Plant.

Table 5 – Approximate Precipitation Prior to Site Visit

Dates of Site Visit – August 28 and 29, 2012		
Day	**Date**	**Precipitation (inches)**
Monday	August 27	0.82
Sunday	August 26	0.22
Saturday	August 25	0.00
Friday	August 24	0.01
Thursday	August 23	0.03
Wednesday	August 22	0.00
Tuesday	August 21	1.65
Total	**Month Prior to Site Visit (July 28 to August 27, 2012)**	**10.91**

Note: Precipitation data from www.webapub.sjrwmd.com. Station Location: Alachua County Fairgrounds (00260033) at Gainesville, Florida. Lat. 29.682856; Lon.-82.284769; EL. 158 feet

5.2 Process Water Ponds

At the time of the assessment, Ash Cell #1 and Ash Cell #2 contained residual ash and water with approximately 1 foot and 4 feet of freeboard, respectively. It was indicated by plant personnel that Ash Cell #1 has been dredged once or twice to remove accumulated ash. It is not currently known if the other cell had been dredged. It was not readily visible if Pump Back Cell #1 and Pump Back Cell #2 contain residual ash. Each cell had approximately 3 feet of freeboard.

5.2.1 Crest

The crest of the perimeter embankments and divider embankments appeared to be in **FAIR** condition (Photographs 13-15, 22-25 and 38). Signs of previously repaired scarps and erosion areas were observed at the crest of the northwest embankment of the Ash Cell #2. The crest widths were typically 25 feet wide. The crest of the embankments has paved surfaces with exposure to limited vehicle traffic during normal operations. In general, no major cracks or evidence of settlement were observed on the crests of any of the embankments. Minor depression and areas of erosion were observed near Ash Cell #2 on the northwest embankment (Photographs 26 and 27).

A concrete u-shape channel structure and metal grates located on the northeast side of the divider embankment between Ash Cell #1 and Ash Cell #2 protect the inlet pipes that extend from the plant (Photographs 41 and 42). A small cave-in of the pavement behind Ash Cell #2 inlet pipe concrete structure (Photographs 34 and 35) was observed. A pump house and pump system is located near the east corner of the southeast embankment of Pump Back Cell #1 (Photographs 8 and 9). Inlet pipes are located at the divider embankment between Ash Cells #1 and #2 (Photographs 40 and 43).

5.2.2 Interior Slopes

The interior slopes of the cells appear to be in FAIR condition with riprap armoring (Photographs 38, 42, 46 and 47) and sparse vegetative cover. The interior slopes appeared to have a slope of approximately 3H: 1V. Discontinuities and eroded areas (Photographs 28, 29, and 31) were observed along the interior slopes of the northwest embankment at Ash Cell #2.

5.2.3 Exterior Slopes

The exterior slopes appear to be in **SATISFACTORY** condition. The exterior slopes of the embankments are approximately 4H:1V. They have a grass cover that was approximately 6 to 8 inches high at the time of the visual assessment (Photographs 1, 3, 7, 76, 77, and 79). At some areas on the northwest embankment, the grass cover was somewhat higher (Photographs 83, 84 and 86). Some saturated areas were observed along the toe of the slope of the southwest embankment (Photograph 2 and 78) and the northwest embankment (Photographs 82 and 85). A runoff swale is located at the toe of slope of the southeast embankment of Pump Back Cells #1 and #2 (Photographs 3, 10 and 11). It was difficult to determine if these wet areas were caused by seepage or the relatively heavy rainfall prior to our assessments. Based on the embankment height, embankment geometry and surface water elevation, these areas could potentially be due to seepage. Based on review of drawings the perimeter embankments were constructed with a cutoff slurry wall, keyed into the existing natural clay layer (as discussed in Section 4). It is noted however that the top of slurry wall was shown to be at elevation 184 and the observed water level in Ash Cell #1 was about elevation 194 during the condition assessment.

Minor erosion rills were observed on the exterior slope of the southeast embankment of Pump Back Cell #1 (Photographs 5 and 6). An animal burrow was observed on the northwest embankment of Ash Cell #1 (Photograph 80).

5.2.4 Outlet Structures

The outlet structures for the Ash Cells #1 and #2 consist of a concrete drop structure with stop logs (Photographs 30, 32 and 33). We understand that these cells are hydraulically connected to Pump Back Cells #1 and #2 and then the decant water is pumped back into the plant for reuse. Other details about the outlet structures are not known. The Process Water Ponds are a zero-discharge facility; therefore, there is not a general outlet/discharge structure.

5.3 Additional Unit Observations

Additional units including a coal stockpile runoff collection pond, three stormwater ponds and two lime sludge ponds were identified during our visual assessments at the plant. The GRU representative indicated that these units are not part of the coal combustion waste impoundments and are not used to store CCW.

Another unit observed was the Ash Dry Stack Landfill Area that receives and stores the ash that results from the plant operation. Reportedly, the landfill receives boiler ash, bottom ash, and fly ash.

5.3.1 Coal Stockpile Runoff Collection Pond

The coal stockpile runoff collection pond receives all runoff collected in a swale located north of the coal stockpile and from ditches that extend along the east, south and west sides of the coal stockpile (Photographs 50, 53 and 55). The crest of the perimeter embankments appears to be in fair condition, and they are grass covered with some tire ruts (Photographs 49, 56, 57, 63 and 64).

The interior slopes are riprap armored and appear to have 3H:1V slopes (Photograph 51 and 52). A pump station is located near the southwest corner of the impoundment (Photograph 58).

Exterior slopes appear to be approximately 4H:1V and are covered with grass that is about 6 to 12 inches high. No signs of depressions, cracks, bulging or discontinuities were observed. Animal burrows were not observed along the embankments.

Two, 24-inch-diameter corrugated metal outlet pipes (Photographs 59, 61 and 62) are located on the west embankment. Water was not flowing from these outlet pipes at the time of our visual assessment and they appeared to be blocked.

Surrounding areas to the west and southwest of the Coal Stockpile Runoff Collection Pond had relatively low and standing water (Photograph 66).

5.3.2 Stormwater Ponds

The stormwater ponds were observed when driving along the perimeter embankments and the embankments appeared to be in good condition. No signs of depressions, scarps, erosion or cracks were readily observed on these embankments. General photographs were taken as part of the visual assessment (Photographs 67 to 71). The northeastern portion (Photograph 98) of the pond located southwest of the Process Water Ponds and south of the Ash Dry Stack Landfill Area, is covered by high dense vegetation (i.e. cattails).

5.3.3 Ash Dry Stack Landfill Area

The Ash Dry Stack Landfill Area, located west of the Process Water Ponds, receives the ash produced by the Deerhaven Plant operations. At the time of the assessment the Ash Dry Stack Landfill Area was under construction. Based on visual observations the landfill area appears to be in fair condition. The south embankment of the landfill appears to have a 4H:1V slope (Photograph 72). Small ash stockpiles were observed within the landfill area (Photographs 73 to 74).

5.3.4 Lime Sludge Ponds

The Lime Sludge Ponds are situated northwest of the Process Water Ponds. Lime Sludge Cells #1 and #2 share the southwest divider embankment with Ash Cell #2 and Pump Back Cell #2. The Lime Sludge Ponds contained standing water and accumulated lime from the water treatment plant at the time of this assessment, and they had approximately 2 feet of freeboard.

The crest of the Lime Sludge Ponds appears to be in fair condition. The typically crest width is approximately 25 feet (Photographs 14, 17, 19, 92 and 93). No evidence of settlement or major cracks was observed on the crests. The interior slopes appear to be in fair condition and they appear to be approximately 3H:1V. These slopes are riprap armored with sparse vegetation cover (Photograph 18 and 93). A concrete valve box for the inlet pipes was observed at the northwest embankment at each Sludge Cell (Photograph 20). Dry lime sludge piles near the east corner of Sludge Cell #1 (Photograph 94) were observed. The exterior slopes appear to be in satisfactory condition and they are approximately 4H:1V. They are covered with grass that was approximately 6 to 8 inches high at the time of the visual assessment (Photographs 87 to 91). Lime sludge pipes are located at the toe of slope of the northeast embankment exterior slope of Sludge Cell #2 (Photographs 96 and 97). An animal burrow was observed on the southeast embankment exterior slope of Sludge Cell #2 (Photograph 16).

CDM Smith

0 100 200 400 600 800 Feet

FIGURE-4A
PHOTOGRAPH LOCATION PLAN
GAINESVILLE REGIONAL UTILITIES - DEERHAVEN POWER PLANT
GAINESVILLE, FLORIDA

CDM Smith

0 100 200 400 600 800 Feet

FIGURE-4B
PHOTOGRAPH LOCATION PLAN
GAINESVILLE REGIONAL UTILITIES - DEERHAVEN POWER PLANT
GAINESVILLE, FLORIDA

Section 6
Hydrologic/Hydraulic Safety

6.1 Impoundment Hydraulic Analysis

The State of Florida does not currently have requirements related to the hydrologic or hydraulic design of CCW impoundments. FEMA standards require impoundments to have the capacity to store some percentage of the Probable Maximum Precipitation (PMP) for a 6-hour storm event over a 10 square-mile area in the vicinity of the site. Low hazard structures are required to store precipitation of a 100-year storm event. The 100-year storm event in the vicinity of the site over a 6 -hour period is approximately 8.6 inches. The drainage area contributing to the impoundments at this site appears to be limited to the storage area within the impoundments. Preliminary evaluations indicate that there is enough storage capacity and freeboard in the impoundments at the current operating pools to safely store a 100-year storm event without being overtopped.

6.2 Adequacy of Supporting Technical Documentation

Hydrologic and hydraulic documentation and/or PMP analyses were not provided by GRU for CDM Smith to review.

6.3 Assessment of Hydrologic/Hydraulic Safety

Hydrologic and hydraulic safety of the management units appears to be FAIR based on the following:

- Reportedly, overtopping of the embankments has never occurred. During our visual observations and site assessments, no signs of plugged, collapsed or blocked pipes, or other detrimental hydrologic/hydraulic conditions were observed at the Process Water Ponds.
- No signs of recent cracks, major scarps and erosion were observed on the perimeter embankments, or the divider embankments. Signs of previously repaired scarps and erosion areas were observed at the crest of the northwest embankment of the Ash Cell #2.
- At least 1 foot of freeboard at Ash Cell #1, 4 feet at Ash Cell #2, and 3 feet at Pump Back Cells were observed at the time of the assessments.

Hydrologic/hydraulic documentation or PMP analyses were not provided therefore the Process Water Ponds are rated as **POOR**. EPA requirements state that "if a facility has not conducted hydrologic, static and seismic engineering studies following best professional engineering practice to support factors of safety, the facility must be rated POOR".

Section 7
Structural Stability

7.1 Supporting Technical Documentation

The Gainesville Regional Utilities did not provide CDM Smith with slope stability analyses or technical documentation to support the embankments' structural stability.

7.1.1 Stability Analyses and Load Cases Analyzed

Currently the State of Florida does not have regulations regarding CCW impoundments. Procedures established by the United States Army Corps of Engineers (USACE), the United States Bureau of Reclamation, the Federal Energy Regulatory Commission, and the Natural Resources Conservation Service are generally accepted engineering practice. Minimum required factors of safety outlined by the USACE in EM 1110-2-1902, Table 3-1 and seismic factors of safety by FEMA Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams (pgs. 31, 32 and 38, May 2005) are provided in **Table 6**.

Table 6 - Minimum Safety Factors

Load Case	Minimum Required Factor of Safety
Steady-State Condition at Normal Pool or Maximum Storage Pool Elevation	1.5
Rapid Drawdown Condition from Normal Pool Elevation	1.3
Maximum Surcharge Pool (Flood) Condition	1.4
Seismic Condition at Normal Pool Elevation	1.1
Liquefaction	1.3

Notes: Above safety factors are based on requirements established by the USACE. Required safety factors have not been established by the State of Florida for CCW impoundments.

7.1.2 Design Parameters and Dam Materials

General soil properties and soil parameters used for the slope stability or design of the embankments were not provided to CDM Smith for review.

7.1.3 Uplift and/or Phreatic Surface Assumptions

Since no stability analyses were provided, uplift and/or phreatic surface assumptions were not available.

7.1.4 Factors of Safety and Base Stresses

Factors of safety and base stresses were not available for review.

7.1.5 Liquefaction Potential

Documentation provided by GRU did not include evaluation of liquefaction potential.

7.1.6 Critical Geological Conditions

Based on the U. S. Geological Survey Map, *Sinkhole Type, Development, and Distribution in Florida,* 1985, prepared in cooperation with the Florida Department of Environmental Regulation, Bureau of Water Resources Management and the Florida Department of Natural Resources, Bureau of Geology, there are four generalized areas of different types of sinkhole occurrence in Florida. The Deerhaven Plant is located near the boundary of two of these types of sinkholes. Area I has a bare or thinly covered limestone formation. Sinkholes in these areas are few, generally shallow and broad, and develop gradually. In these areas solution sinkholes dominate. Area III has a cover over the limestone that is generally between 30 to 200 feet thick and it consists mainly of cohesive clayey sediments of low permeability. Sinkholes are most numerous; they vary in size, and can develop abruptly. Cover collapse sinkholes are predominant in the area.

Based on the 2008 USGS National Seismic Hazard Map, a Peak Ground Acceleration (PGA) of 2% probability of exceedance in 50 years indicates that Florida is in the lowest hazard potential area for seismic activity.

7.2 Adequacy of Supporting Technical Documentation

Structural stability and liquefaction documentation has not been provided.

7.3 Assessment of Structural Stability

Existing conditions and visual observations yield a poor rating for structural stability of Process Water Ponds based on the following:

- It is not known if critical studies or investigations have been performed to confirm that potential safety deficiencies do not exist.

Stability analyses on different cross sections representing the typical embankments and liquefaction analyses are required in order to obtain a FAIR rating for structural stability. These types of analyses were not provided.

Because of the lack of documentation and analyses the assessed rating is **POOR**. A poor rating is assigned when a dam safety deficiency is recognized for loading conditions that may realistically occur and remedial action is necessary. Also, if a facility has not conducted static and seismic engineering studies following the best professional engineering practice to support Factors of Safety, the facility must be rated as **POOR**.

Section 8
Adequacy of Maintenance and Methods of Operation

8.1 Operating Procedures

As described in Section 2, the Process Water Ponds (formerly known as the Ash Ponds) are divided into four cells: Ash Cell #1, Ash Cell #2, Pump Back Cell #1 and Pump Back Cell #2. Wastewater enters Ash Cell #1 and #2 through 15-inch-diameter steel pipes. Decant water then flows to the Pump Back cells and is then pumped back to the plant for reuse.

8.2 Maintenance of the Dam and Project Facilities

GRU provided no documentation on procedures or records of maintenance operations for the Process Water Ponds. According to a plant representative inspections occur on a daily basis during the regular plant operation walk–around. Records of these daily inspections were not provided.

8.3 Assessment of Maintenance and Methods of Operations

8.3.1 Adequacy of Operating Procedures

Based on CDM Smith's visual observations and the verbal information provided by GRU, the operating procedures are considered to be **INADEQUATE** because written documentation is lacking.

8.3.2 Adequacy of Maintenance

No major maintenance issues that compromise the structural stability and operation of the Process Water Ponds were identified. However, based on the lack of documentation provided and minor deficiencies described in Section 4, maintenance procedures are rated as **INADEQUATE.**

Section 9
Adequacy of Surveillance and Monitoring Program

9.1 Surveillance Procedures

According to a plant representative inspections occur on a daily basis during the regular plant operation walk–around. CDM Smith was not provided with inspection logs or inspection reports which support this statement.

9.2 Instrumentation Monitoring

According to Regina Embry, representative of GRU, several monitoring wells are installed around the site and groundwater monitoring is recorded on a regular basis. CDM Smith observed one monitoring well on the southeast embankment of the Process Water Ponds; however no written documentation confirming the frequency of monitoring well observations was provided to CDM Smith.

The Process Water Pond embankments do not have an instrumentation monitoring system to monitor structural stability, seepage or ground displacement.

9.3 Assessment of Surveillance and Monitoring Program

9.3.1 Adequacy of Inspection Programs

Based on our visual observations and verbal information provided by GRU during the site assessment, the inspection program appears to be inadequate due to the lack of written documentation on regular maintenance issues and surveillance of the Process Water Ponds. No condition that needs immediate remedial action was observed.

9.3.2 Adequacy of Instrumentation Monitoring Program

GRU representative's indicated several monitoring wells are installed around the site to monitor for water levels and water quality. One monitoring well was observed, southeast of the Pump Back Cell #1. Well data were not provided to CDM Smith. Saturated areas at the toe of Ash Cell #1's northwest and southwest embankments were observed. This condition indicates potential seepage may be occurring, however conditions or indications of potential failure of the embankments were not observed during CDM Smith's visual assessment.

An earth embankment that is safe under current conditions may not be safe in the future if conditions change. Conditions that may change include changes in the phreatic surface, embankment deformation, or changes in seepage patterns. Therefore, an instrumentation monitoring program to monitor structural stability, seepage, or ground movement is recommended.

Section 10
Reports and References

The following is a list of reports and drawings that were provided by Gainesville Regional Utilities that were used during the preparation of this report and the development of the conclusions and recommendations presented herein.

1. Subsurface Information for Deerhaven Generation Station Site, prepared by Burns & McDonnell, 1978

2. Deerhaven Generation Station Topography (CAD File 331F2-5.DWG), prepared by Applied Technology & Management, October 06, 1993

3. Deerhaven Generation Station, Unit 2, Construction Drawings, Grading Sections 1, Drawing No. Y80, by Burns & McDonnell, July 1, 1981

4. Deerhaven Generation Station, Unit 2, Construction Drawings, Grading Sections 2, Drawing No. Y81, by Burns & McDonnell, July 1, 1981

5. Deerhaven Generation Station, Unit 2, Construction Drawings, Grading Sections 3, Drawing No. Y82, by Burns & McDonnell, July 1, 1981

6. Deerhaven Generation Station, Unit 2, Construction Drawings, Grading Sections 4, Drawing No. Y83, by Burns & McDonnell, July 1, 1981

Appendix A

Geotechnical Data

Subsurface Information

for the

Deerhaven Generating Station Site

Near

Hague, Florida

for the

City of Gainesville, Florida

Deerhaven Unit 2

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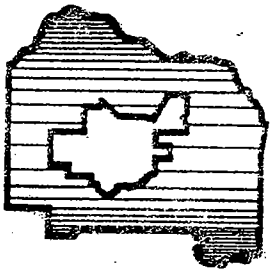
1978

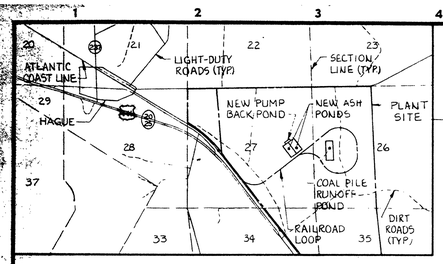
76-077-1

10



Gainesville
Alachua County
Regional Electric
Water & Sewer
Utilities Board

904-374-2910



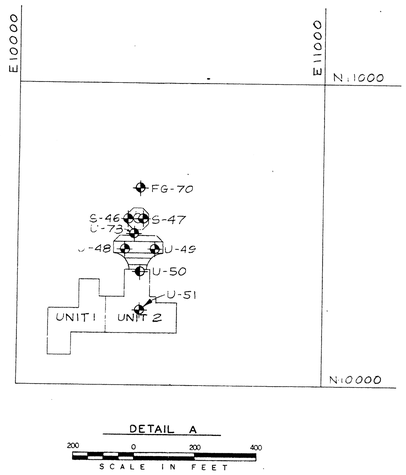
VICINITY MAP

LEGEND

EXISTING		THIS CONTRACT
180	CONTOURS	
	ROADS	
	STRUCTURES	
	FENCES	
	PROPERTY LINE	
	TRAIL	
	RAILROAD	
	SAMPLE BORING	
	SAMPLE BORING WITH PIEZOMETER	

BORING COORDINATES			
BORING NO.	N. COORD.	E. COORD.	ELEV.
L-1	N14000	E 6425	179
L-2	N13100	E6440	180
L-3	N12100	E6430	180
L-4	N14100	E7380	182
L-5	N13100	E 7400	183
L-6	N14050	E8350	185
L-7	N13150	E8380	185
AP-8	N12725	E8400	183
AP-9	N12550	E8800	182
AP-10	N12300	E8830	181
AP-11	N12000	E8450	182
AP-12	N12350	E8200	182
AP-13	N12380	E8500	183
RR-14	N10550	E6900	177
RR-15	N10950	E7730	177
RR-16	N11320	E7800	178
RR-17	N11700	E8200	180
RR-18	N12060	E8700	181
RR-19	N12460	E9200	182
RR-20	N12900	E9750	182
RR-21	N13180	E10375	187
RR-22	N12770	E10980	188
RR-23	N11620	E10900	187
RR-24	N11340	E10420	186
RR-25	N12050	E9100	178
TH-26	N12160	E11040	189
TH-27	N12220	E11080	189
TH-28	N12340	E11080	189
TH-29	N12280	E11065	189
SH-30	N12000	E10700	187
CS-31	N12220	E10470	187
CS-32	N12000	E10500	187
CS-33	N11800	E10500	187
CS-34	N11600	E10500	187
CH-35	N11200	E10500	186
CC-36	N11000	E10500	184
CC-37	N10800	E10500	184
CC-38	N10600	E10500	184
CC-39	N10400	E10500	184
CT-40	N11080	E10590	185
CT-41	N11000	E10650	185
CT-42	N10920	E10590	185
CT-43	N10840	E10650	185
CT-44	N10760	E10590	185
CT-45	N10680	E10650	185
S-46	N10550	E10360	184
S-47	N10550	E10410	184
U-48	N10450	E10350	184
U-49	N10450	E10450	184
U-50	N10375	E10400	184
U-51	N10250	E10400	184
U-52	N10100	E10450	184
U-53	N10100	E10350	184
CP-54	NOT	DRILLED	
CP-55	N12600	E10100	188
CP-56	N12400	E10020	187
CP-57	N12400	E9800	185
CP-58	N12150	E10000	186

CP-59	N12150	E9800	185
CP-60	N11900	E9850	185
CP-61	N11900	E10000	186
RP-62	NOT	DRILLED	
RP-63	NOT	DRILLED	
RP-64	N11680	E8930	176
RP-65	N11150	E9100	178
FS-66	N11350	E9670	186
LH-67	N11150	E9680	182
C-68	N11140	E10250	184
WW-69	N11140	E10400	184
FG-70	N10650	E10400	184
FG-71	N10800	E10400	184
FG-72	N10950	E10400	184
U-73	N10500	E10380	184



DETAIL A

SCALE IN FEET

NO.	DATE	BY	REVISION
1			

DEERHAVEN GENERATING STATION UNIT 2

CITY OF GAINESVILLE/ GAINESVILLE-ALACHUA COUNTY REGIONAL UTILITIES BOARD

FLORIDA

BORING LOCATION PLAN

Burns & McDonnell
Engineers - Architects - Consultants
KANSAS CITY, MISSOURI

DATE	1-31-78	DRAWING NO.	REV.
DESIGNED	J.J.Z.	1	—
DETAILED	S.M.K.	PROJECT	
CHECKED		SHEET OF	SHEETS

Subsurface Information

for the

Deerhaven Generating Station Site

Near

Hague, Florida

for the

City of Gainesville, Florida

Deerhaven Unit 2

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1978

76-077-1

Burns & McDonnell
Engineers - Architects - Consultants
KANSAS CITY, MISSOURI

LOG OF BORING NO. L-5 SHEET 1 OF 2

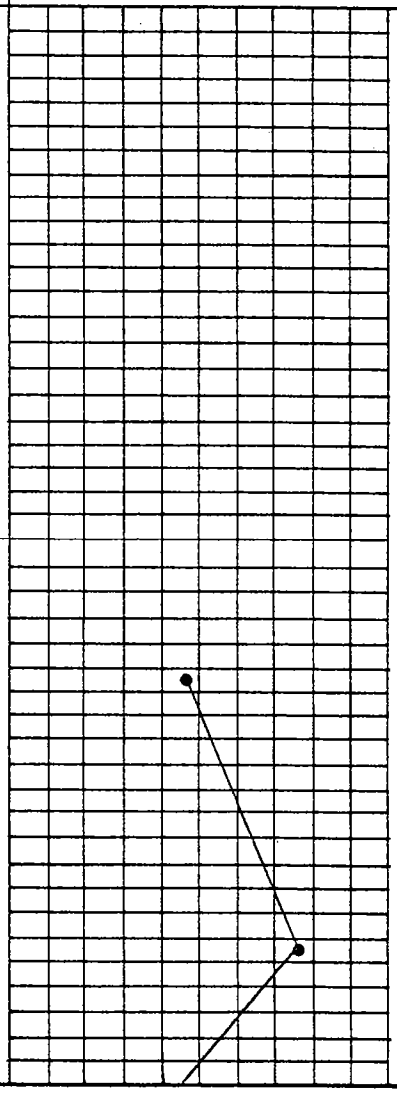
CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 13100, E 7400
GROUND ELEVATION: 183 MSL
DEPTH TO WATER IN BORING: 3.2 Ft.
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/3/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: 12/10/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Brown silty sand, very loose, fine grained, poorly graded, wet	2/2/2	
5		SS-2	-becomes medium dense below 7'	1/1/2	
		SS-3		5/7/9	
10					
		ST-4	Gray sandy clay with interbedded green silty clay, soft, friable, moist, some caliche fragments		
15			-with thin sand lenses throughout		
		ST-5	-with thin seams of very stiff clay below 18'		
20					

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



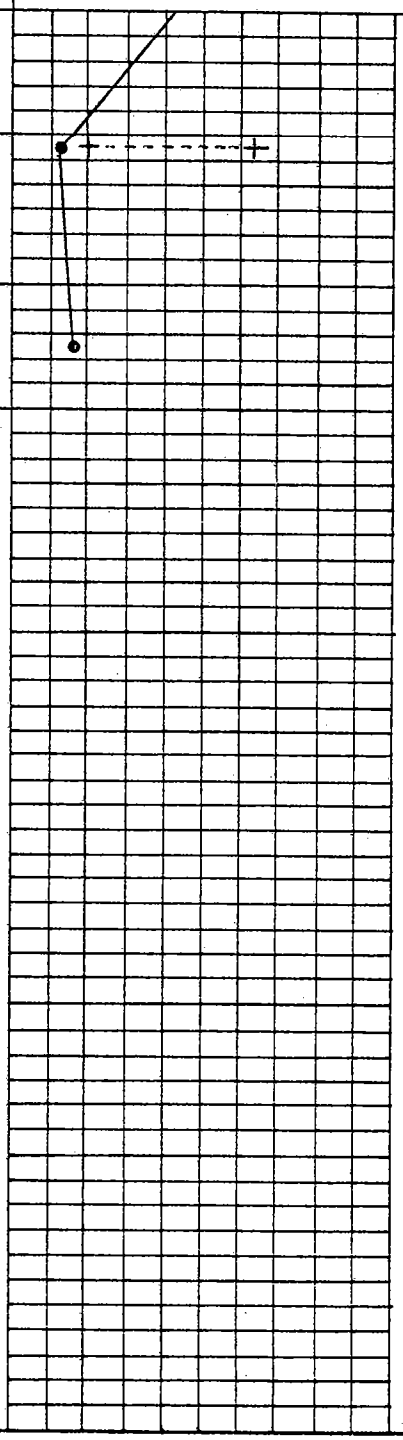
Burns & McDonnell
Engineers-Architects-Consultants

LOG OF BORING NO. L-5 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		ST-6			
25			Gray green silty clay, hard, damp, trace of sand		
		ST-7	Lt. gray and tan sandy clay, hard, damp, medium plasticity		113
30		TD			

COHESION. KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



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Engineers-Architects-Consultants

LOG OF BORING NO. L-7 SHEET 1 OF 2

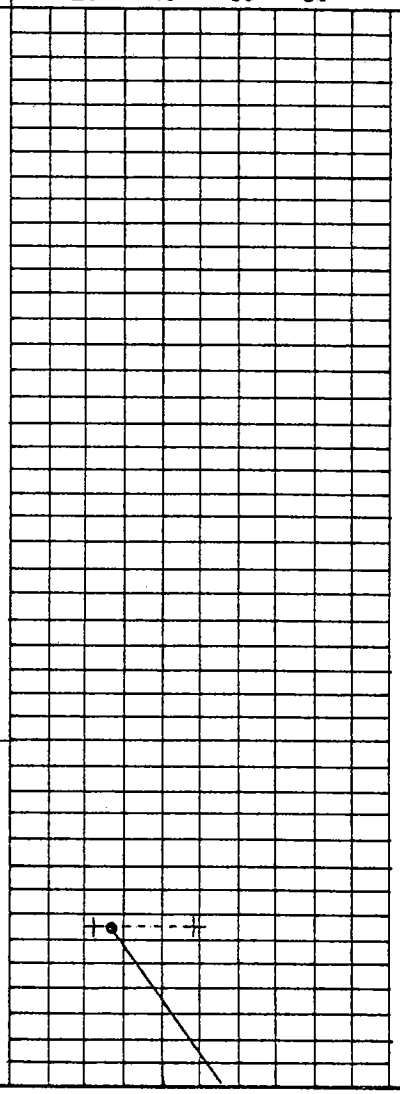
CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 13150, E 8380
GROUND ELEVATION: 185 MSL
DEPTH TO WATER IN BORING: 2.5 Ft.
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/4/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: 12/10/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Brown silty sand, loose, fine to medium grained, poorly graded, wet	3/2/3	
5		SS-2		2/1/3	
		SS-3	-becomes dark brown and med. dense below 8.5'	3/5/7	
10					
		SS-4	-dense with lower silt content below 13'	14/21/22	
15			Blue gray sandy clay, stiff, moist, friable some caliche nodules		
		ST-5			100
20					

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



Burns & McDonnell
Engineers-Architects-Consultants

LOG OF BORING NO. L-7 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
25		ST-6			55
			-hard cemented seams ½' to 1' thick 25' to 26'		
		ST-7	Lt. gray sandy silt, damp, chalky, friable		79
30	TD				

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80

LOG OF BORING NO. AP-8 SHEET 1 OF 2

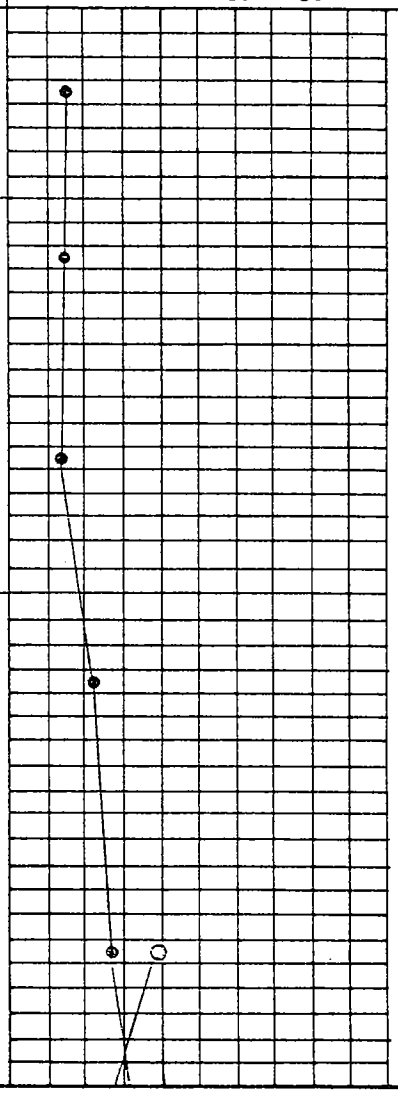
CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 12725 , E 8400
GROUND ELEVATION: 183 MSL
DEPTH TO WATER IN BORING: N.D.
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 1500
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/13/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: Not Measured
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		ST-1	Brown silty sand, loose fine grained, poorly graded, wet		98
5		SS-2	Lt. tan clayey sand, medium dense, fine to medium grained, poorly graded, moist	3/4/7	
		ST-3	-with lower clay content below 8.5'		115
10					
		ST-4	Blue green silty clay, some sand, very stiff, moist, medium plasticity		102
15			-with sand seams throughout		
		ST-5	-with some caliche nodules below 18'		97
20					

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



Burns & McDonnell
Engineers-Architects-Consultants

LOG OF BORING NO. AP-8 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
25		ST-6	White clayey silt with caliche nodules, soft, moist, trace plasticity		82
		ST-7			85
30	TD				

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80

LOG OF BORING NO. AP-9 SHEET 1 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 12550, E 8800
GROUND ELEVATION: 182 MSL
DEPTH TO WATER IN BORING: 0.6 Ft.
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/8/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: 12/12/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Brown silty sand, loose, poorly graded, fine grained, wet	2/4/1	
5		SS-2		1/3/7	
		SS-3	-becomes dark brown with trace of medium sand below 8.5'	1/1/6	
10					
		SS-4	-Lt. tan and medium dense with increasing clay content below 13'	6/7/11	
15					
		SS-5	-gray below 15'	8/9/10	
20					

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80

LOG OF BORING NO. AP-9 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIP/SQ FT (1 2 3 4) / PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT (20 40 60 80)
25		ST-6	Olive green and tan silty clay very stiff, damp, blocky structure, friable		51	
		ST-7	-with blue green silty clay seams and caliche nodules below 28'		74	
30						
	TD					

LOG OF BORING NO. AP-10 SHEET 1 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 12300 , E 8830
GROUND ELEVATION: 181 MSL
DEPTH TO WATER IN BORING: Surface
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/8/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: 12/10/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Lt. Gray silty sand, very loose, fine grained, poorly graded, wet	1/1/1	
5		SS-2	-medium dense with some clay 5' to 8'	2/4/7	
		SS-3	-dense with clay seams below 8'	8/14/17	
10					
		SS-4		8/17/24	
15					
		SS-5		14/12/14	
20			Blue green silty clay, very stiff, damp, trace of sand		

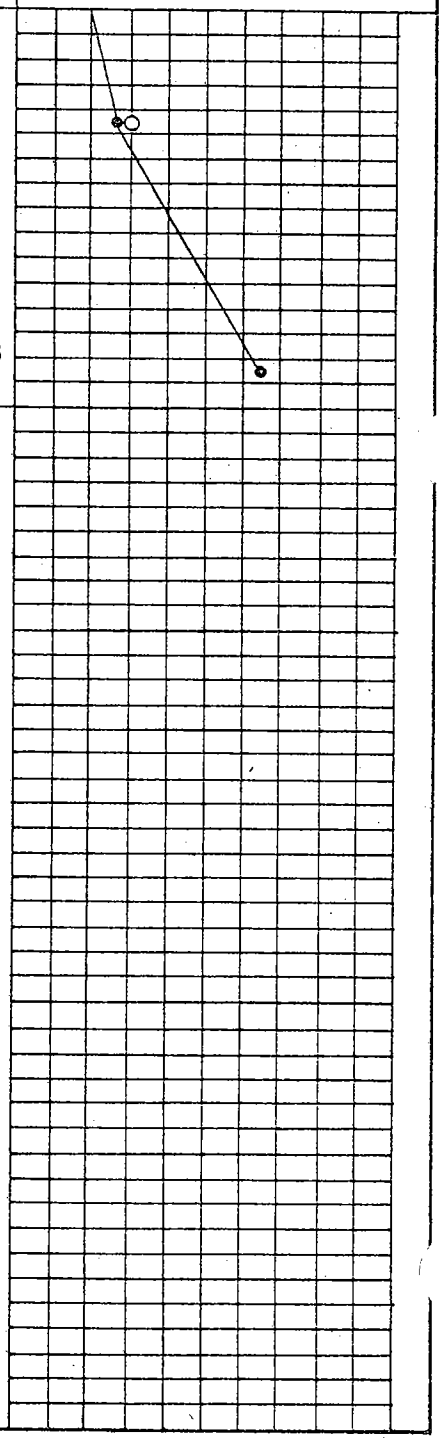
COHESION. KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80

LOG OF BORING NO. AP-10 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
25		ST-6	Lt. Brown silty clay, hard, damp, with caliche nodules		95
		ST-7	-with 6" dark brown organic seam 29' - 29.5'		63
30	TD				

COHESION. KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



Burns & McDonnell
Engineers—Architects—Consultants

LOG OF BORING NO. AP-11 SHEET 1 OF 2

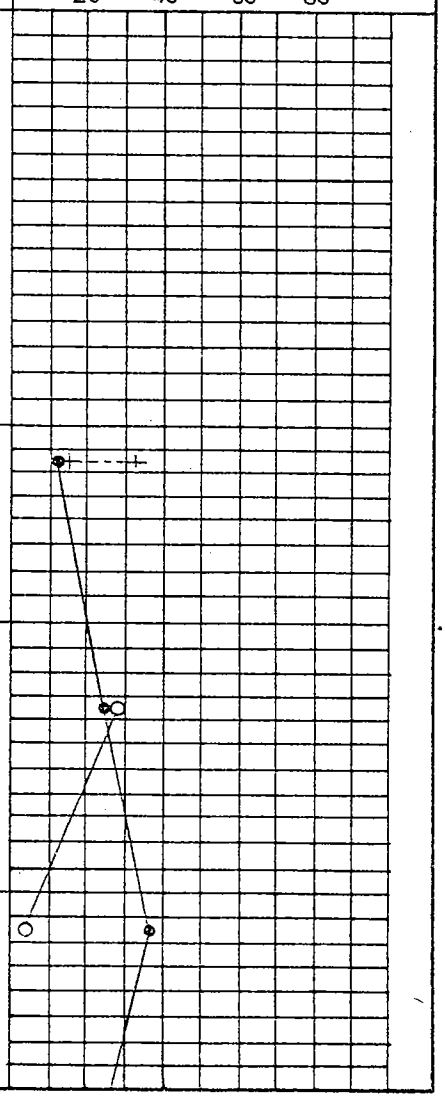
CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 12000, E 8450
GROUND ELEVATION: 182 MSL
DEPTH TO WATER IN BORING: 2.7 Ft.
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/6/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: 12/10/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Brown silty sand, loose, poorly graded, fine grained, wet	2/3/2	
5		SS-2	-medium dense and gray with a trace of clay below 4.5'	3/5/8	
10		SS-3	Gray clayey sand, medium dense, moist trace plasticity	6/9/11	
15		ST-4	Blue gray sandy clay, very stiff, moist, with caliche nodules and ½" - 1" sand seams		101
20		ST-5	Gray green clayey silt, soft, wet, with fine sand and caliche, some marine shells and chert gravel		88

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



Burns & McDonnell
Engineers-Architects-Consultants

LOG OF BORING NO. AP-11 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIP/SQ FT (1 2 3 4) / PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT (20 40 60 80)
25		SS-6	Badly weathered limestone, with interbedded soft caliche, moderately hard with well cemented seams, trace of gravel and marine shells	13/28/25 (3)		
		SS-7		8/16/37		
30	TD					

LOG OF BORING NO. AP-12 SHEET 1 OF 2

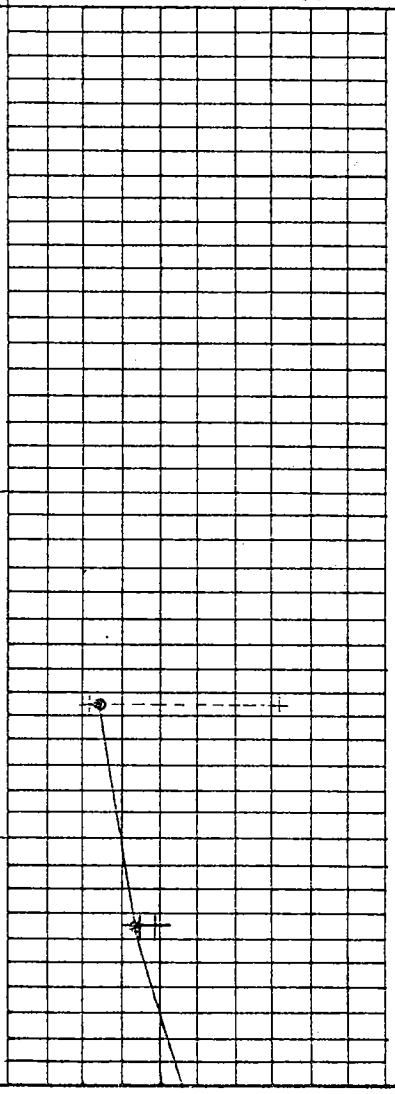
CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 12350, E 8200
GROUND ELEVATION: 182 MSL
DEPTH TO WATER IN BORING: 2.6 Ft.
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/4 TO 12/5/77
COMPLETION DEPTH: 30.5 FT.
DATE WATER MEASURED: 12/10/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Gray silty sand, very loose, poorly graded, fine grained, wet	1/1/1	
5		SS-2		2/2/3	
		SS-3	-becomes dense with trace of clay below 8'	6/10/15	
10					
		ST-4	Lt. gray silty clay, stiff, moist, with caliche nodules		103
15					
		ST-5	Lt. gray sandy silt, soft, damp, with some caliche and gravel		90
20					

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



Burns & McDonnell
Engineers-Architects-Consultants

LOG OF BORING NO. AP-12 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
25		ST-6	-hard cemented seam 26' to 27'		77
		ST-7	Blue gray silty clay, stiff, moist, medium plasticity		
30		SS-8	Badly weathered limestone, hard friable, chalky	9/50(11)	

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80

LOG OF BORING NO. AP-13 SHEET 1 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

LOCATION: N 12380, E 8500
GROUND ELEVATION: 183 MSL
DEPTH TO WATER IN BORING: Surface
DRILLING COMPANY: WARE LIND ENGRS.
DRILLING RIG: FAILING - 750
DRILLING TYPE: WASH BORE

DRILLING DATE: 12/6/77 TO
COMPLETION DEPTH: 30 FT.
DATE WATER MEASURED: 12/10/77
DRILLERS: POWELL, BREWER
ENGINEERS: DURYEE, ZEY
HOLE SIZE: 4-INCH

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		SS-1	Brown and gray silty sand, med. dense, poorly graded, fine to medium grained, wet	4/5/10	
5		SS-2		7/9/20	
		SS-3	-with thin green silty clay seams below 8.5'	3/6/10	
10					
		SS-4	-dense below 13'	7/12/22	
15					
		SS-5	-with increasing number of clay seams below 18.5'	11/11/11	
20			Gray green silty clay, some sand, very stiff, moist, some sand seams		

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80

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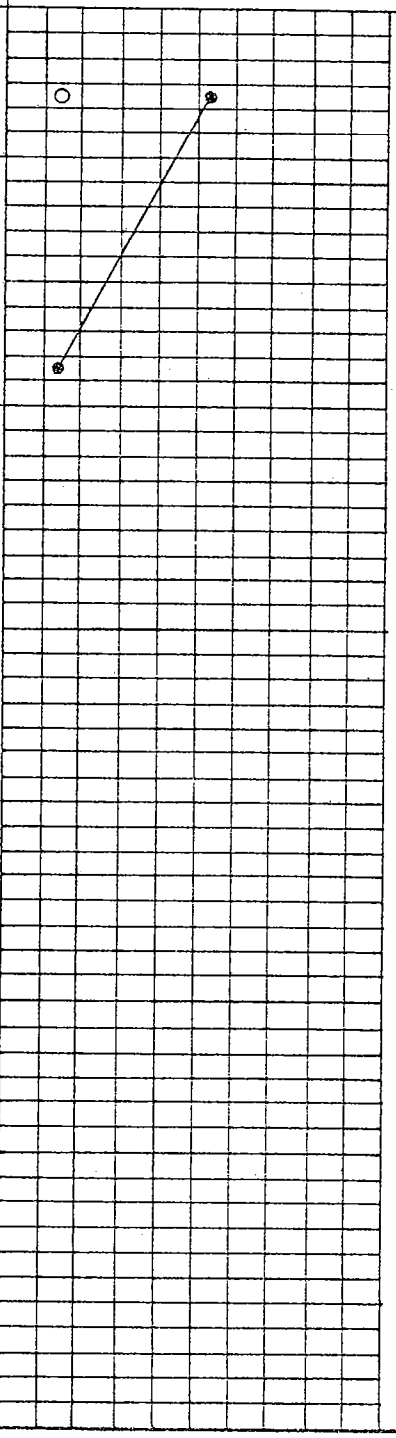
LOG OF BORING NO. AP-13 SHEET 2 OF 2

CITY OF GAINESVILLE, FLORIDA
DEERHAVEN UNIT NO. 2
PROJECT NO. 76-077-1

DEPTH, FT.	SYMBOL	SAMPLE NO.	DESCRIPTION OF MATERIAL	BLOW COUNT	UNIT DRY WEIGHT LB/CU FT
		ST-6	-brown and gray 23 - 25'		70
25		ST-7	Badly weathered limestone, broken hard seams interbedded with soft limey silt seams, some marine fossils		
30	T.D.				

COHESION, KIP/SQ FT
1 2 3 4
PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
20 40 60 80



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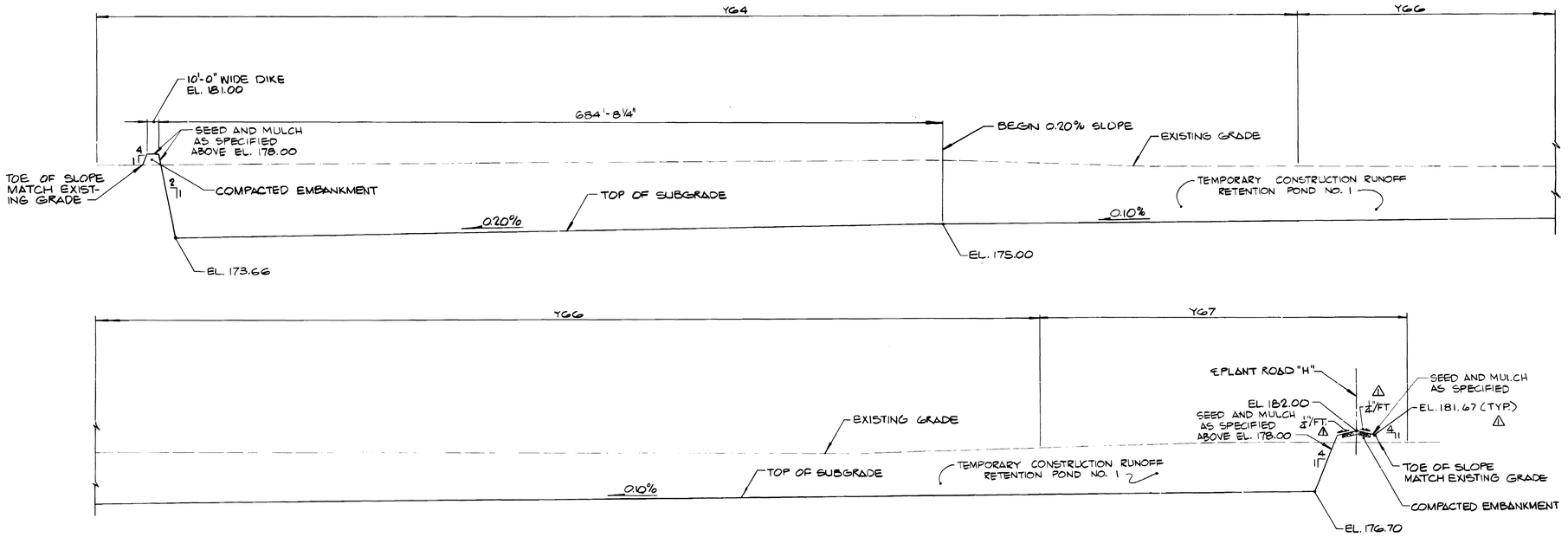
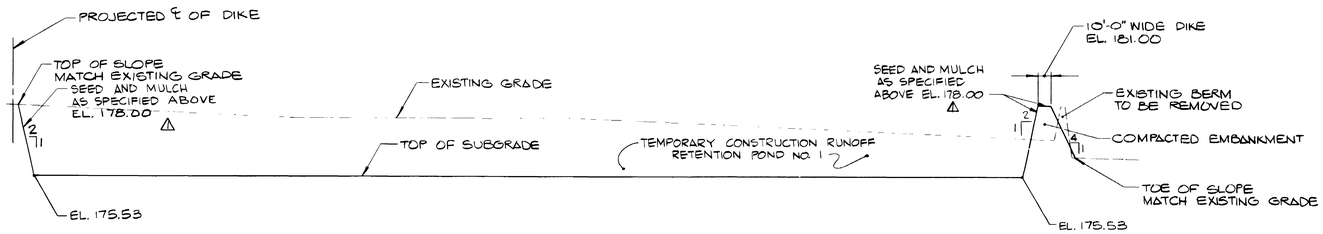
Appendix A-1

Drawings



SECTION 64-A-80
NOT TO SCALE



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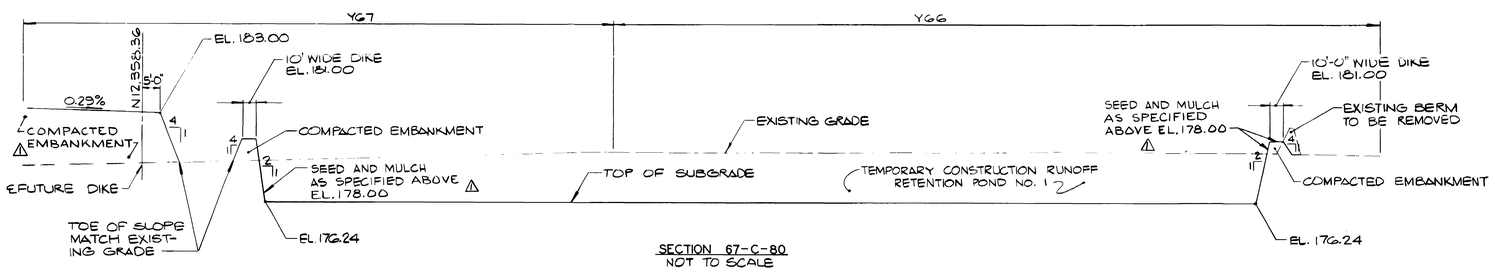
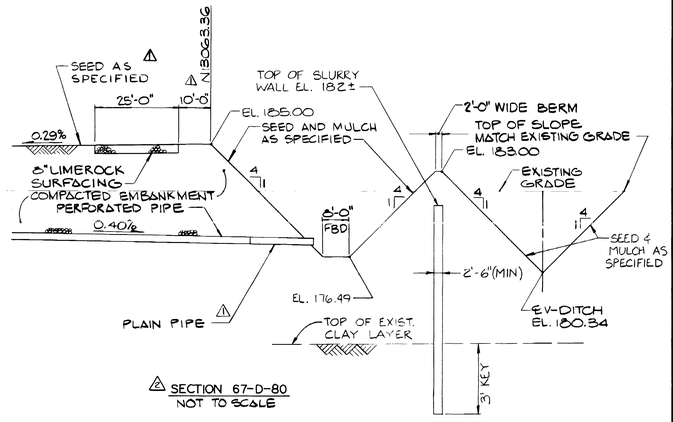
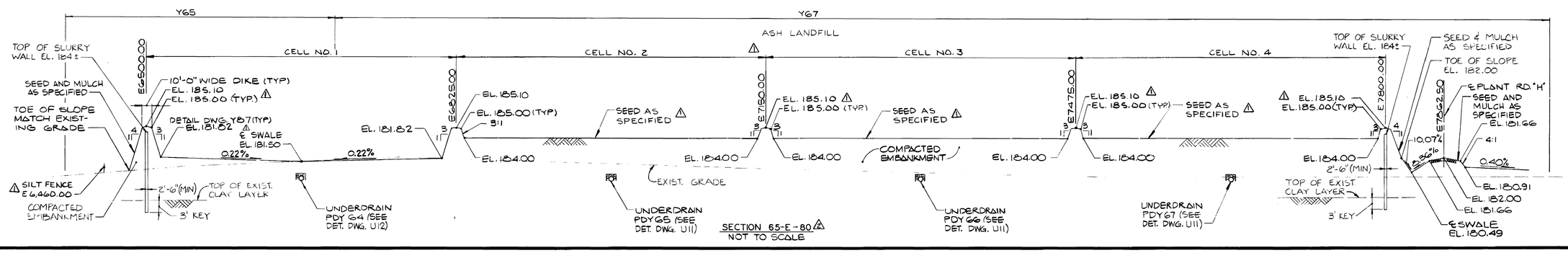


SECTION 67-C-80
NOT TO SCALE



SECTION 67-D-80
NOT TO SCALE



SECTION 65-E-80
NOT TO SCALE

NO.	DATE	BY	REVISION
1	4-3-80	MBB	REVISED PER ADDENDUM NO. 2 & 3
	4-7-80	MBB	REVISED FOR CLARIFICATION COORD. LINE.
	4-22-80	DMZ	ISSUED AS BID
2	6-13-80	GWB	REVISED PER ALTERNATE BIDS NO. 3 & NO. 4
	6-24-80	DMZ	ISSUED
	7-1-81	DJB	CONFORMING TO CONSTRUCTION RECORDS

CONTRACT NO. 29C
YARD STRUCTURES III

DEERHAVEN GENERATING STATION UNIT 2

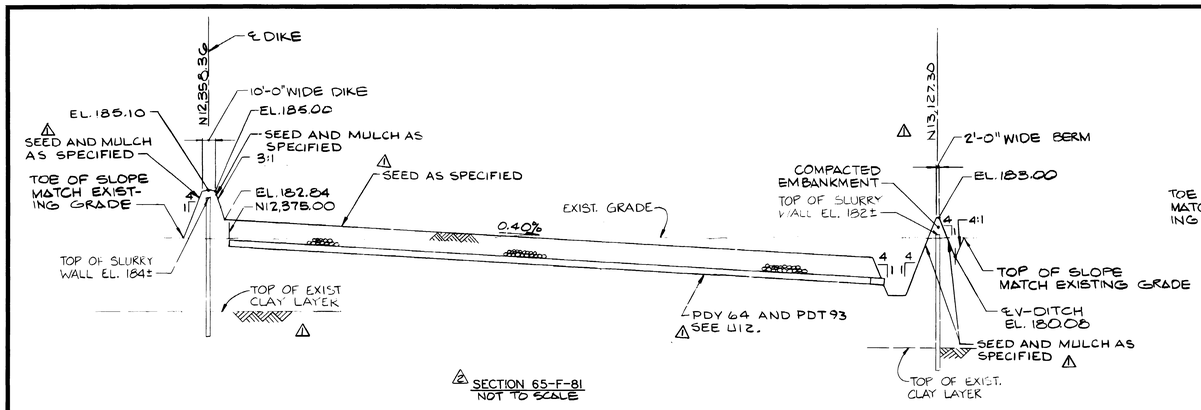
CITY OF GAINESVILLE/ GAINESVILLE-ALACHUA COUNTY REGIONAL UTILITIES BOARD

FLORIDA

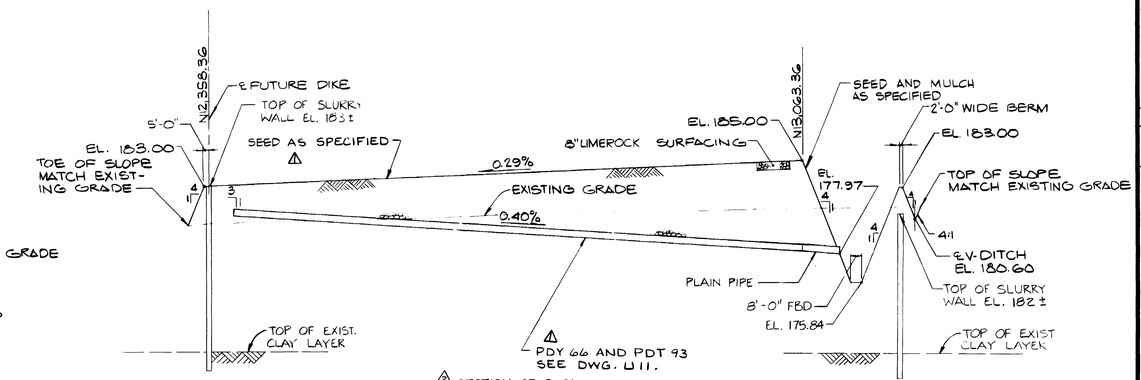
GRADING SECTIONS 1

Burns & McDonnell
Engineers - Architects - Consultants
KANSAS CITY, MISSOURI

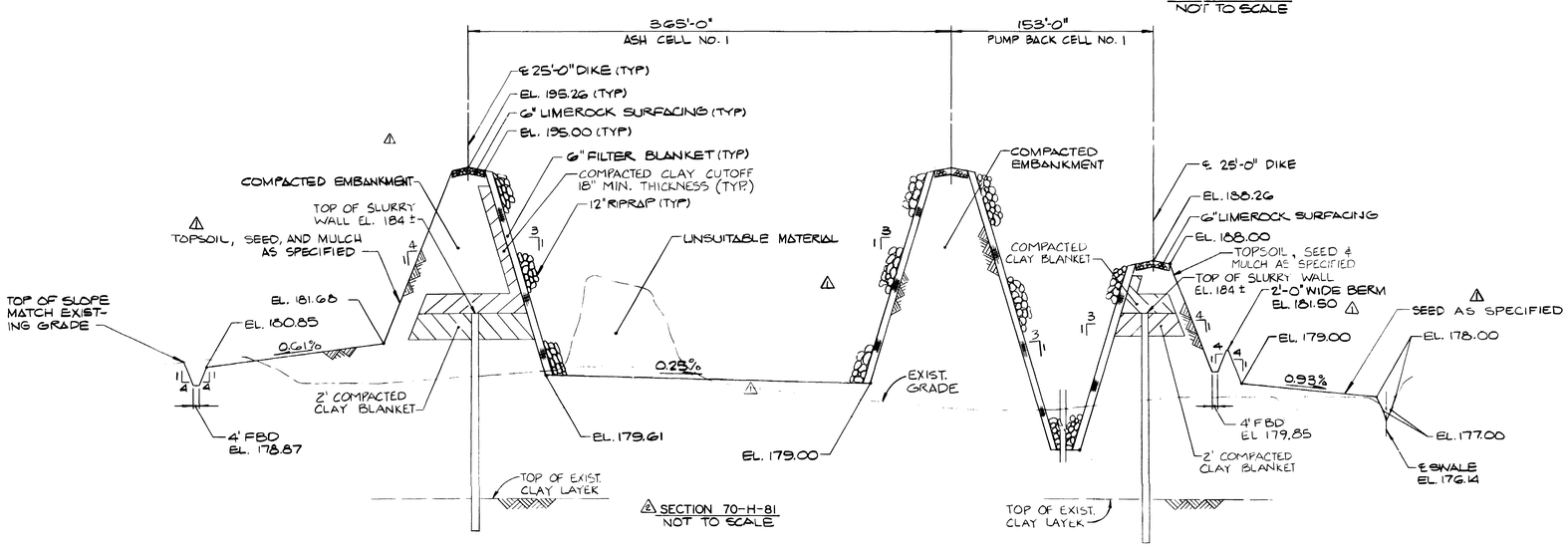
DATE FEB. 18, 1980	DRAWING NO. Y80 — 2 REV.
DESIGNED HUTCHESON	
DETAILED MADDOCK	PROJECT 76-077-1
CHECKED DJMZ	SHEET OF SHEETS



SECTION 65-F-81
NOT TO SCALE



SECTION 67-G-81
NOT TO SCALE



SECTION 70-H-81
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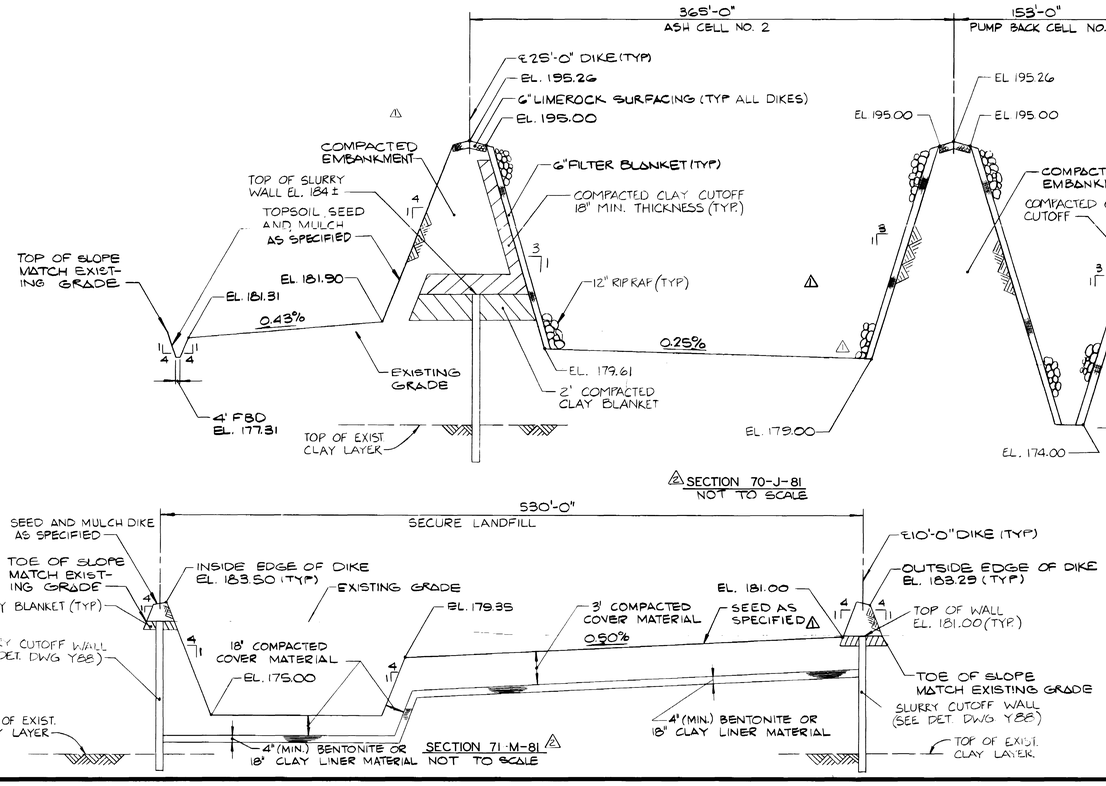
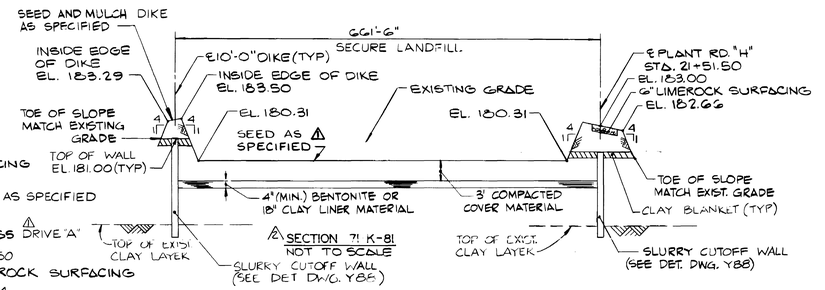
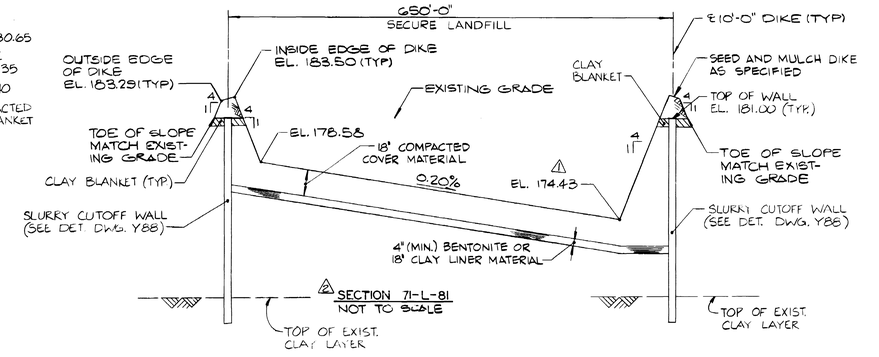


SECTION 70-J-81
NOT TO SCALE

SECTION 71-M-81
NOT TO SCALE



SECTION 71-K-81
NOT TO SCALE



SECTION 71-L-81
NOT TO SCALE

NO.	DATE	BY	REVISION
1	3-10-80	DJB	REVISED & ADDED NOTES FOR CLARIFI-CATION.
	3-12-80	TDW	(F-9, J-6) REVISED TIMBER POLE LINER PROTECTION
	3-21-80	DMZ	ISSUED WITH ADDENDUM NO. 3
	4-22-80	DMZ	ISSUED AS BID
2	6-13-80	GWB	REVISED PER ALTERNATE BIDS NO. 3 & NO. 4
	6-24-80	DMZ	ISSUED
	7-1-81	DJB	CONFORMING TO CONSTRUCTION RECORDS

CONTRACT NO. 29C
YARD STRUCTURES III

DEERHAVEN GENERATING STATION UNIT 2

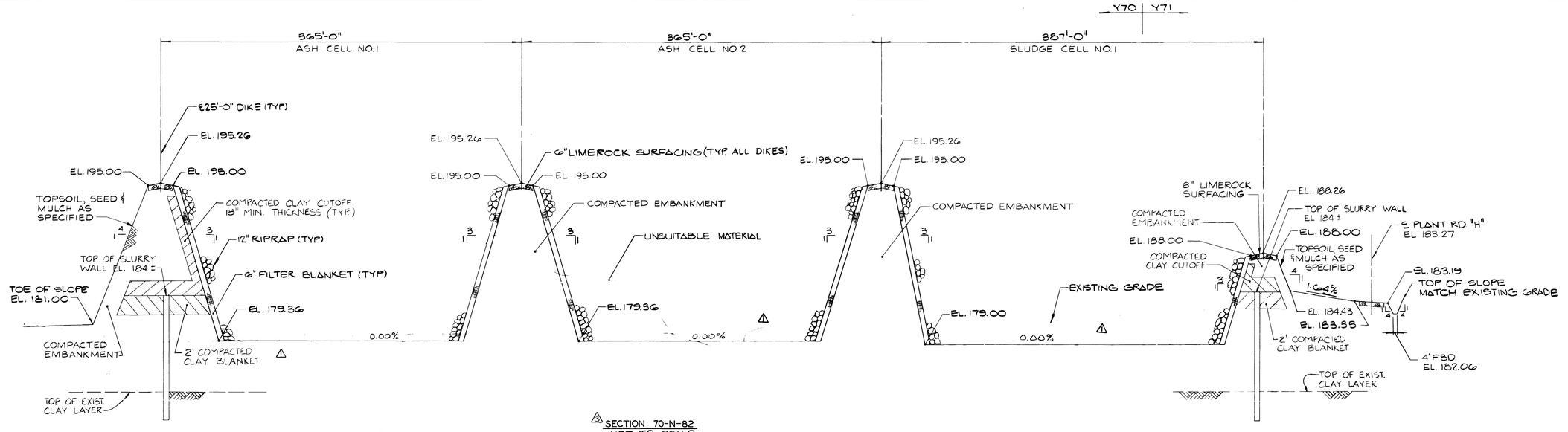
CITY OF GAINESVILLE/ GAINESVILLE-ALACHUA COUNTY REGIONAL UTILITIES BOARD

FLORIDA

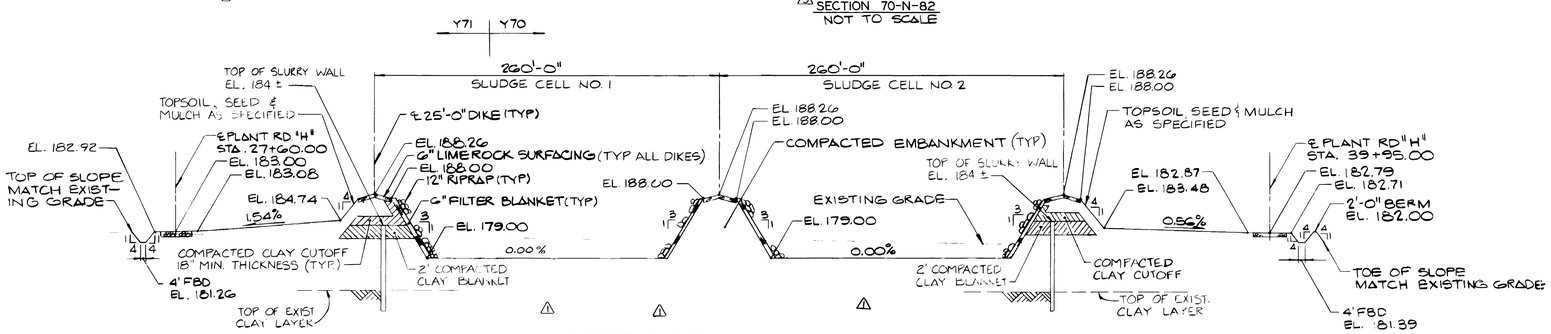
GRADING SECTIONS 2

Burns & McDonnell
Engineers - Architects - Consultants
KANSAS CITY, MISSOURI

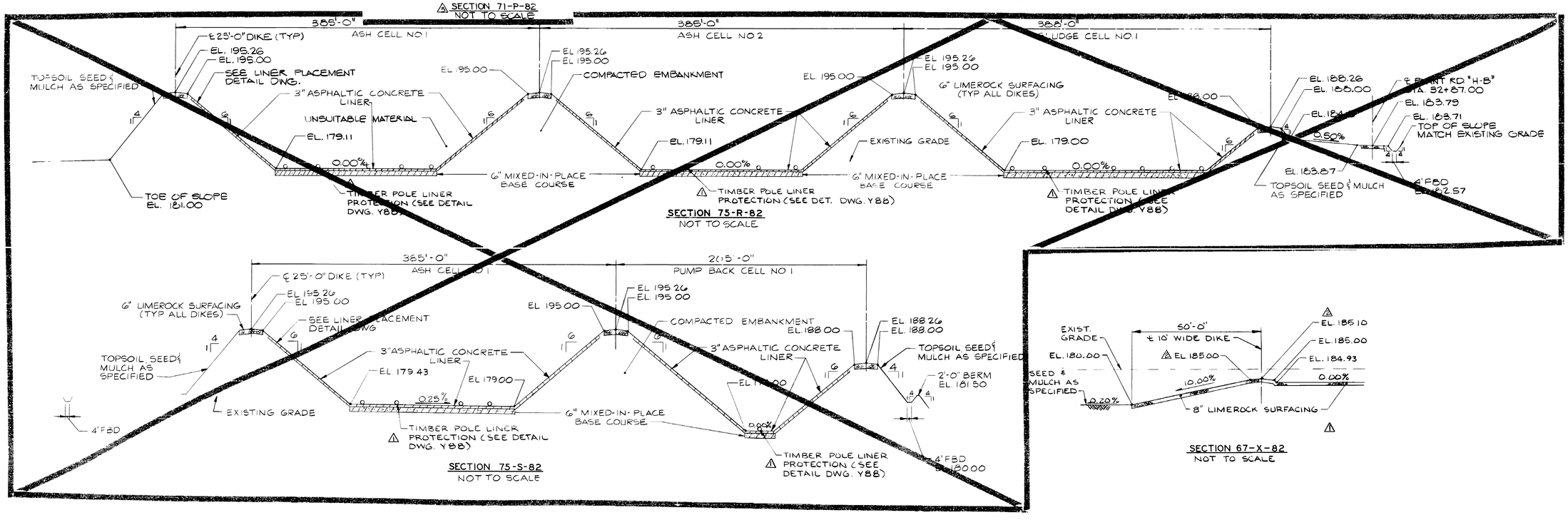
DATE FEB. 8, 1980	DRAWING NO. Y81 — 2 REV.
DESIGNED HUTCHESON	
DETAILED MADDOCK	PROJECT 76-077-1
CHECKED DMZ	SHEET OF SHEETS



⚠2 SECTION 70-N-82
NOT TO SCALE



⚠2 SECTION 71-P-82
NOT TO SCALE



⚠2 SECTION 75-R-82
NOT TO SCALE

⚠2 SECTION 75-S-82
NOT TO SCALE

⚠2 SECTION 67-X-82
NOT TO SCALE

NO.	DATE	BY	REVISION
⚠1	3-11-80	DJB	ADDED TIMBER POLE LINER PROTECTION & NOTE TO SECTIONS 70-N-82, 70-P-82, 75-R-82, & 75-S-82, (K-14) ADDED SECTION 67-X-82
	3-21-80	DMZ	ISSUED WITH ADDENDUM NO.3
⚠2	4-7-80	MBB	REVISED EL. FOR CLARIFICATION
	4-22-80	DMZ	ISSUED AS BID
⚠3	6-12-80	GWB	REVISED PER ALTERNATE BIDS NO 3 & NO.4
	6-24-80	DMZ	ISSUED
	7-1-81	DJB	CONFORMING TO CONSTRUCTION RECORDS

CONTRACT NO. 29C
YARD STRUCTURES III

DEERHAVEN GENERATING STATION UNIT 2

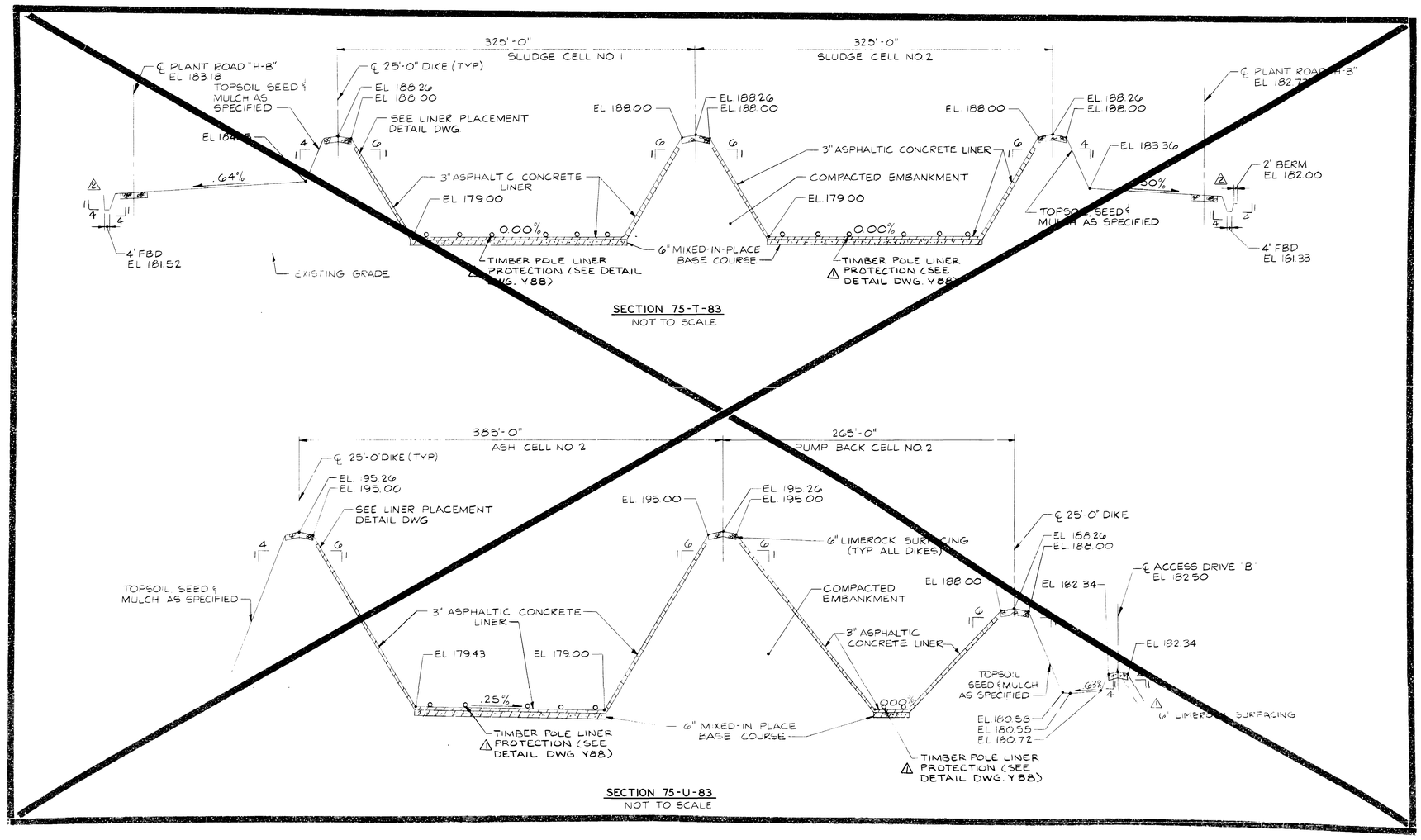
CITY OF GAINESVILLE/ GAINESVILLE-ALACHUA COUNTY REGIONAL UTILITIES BOARD

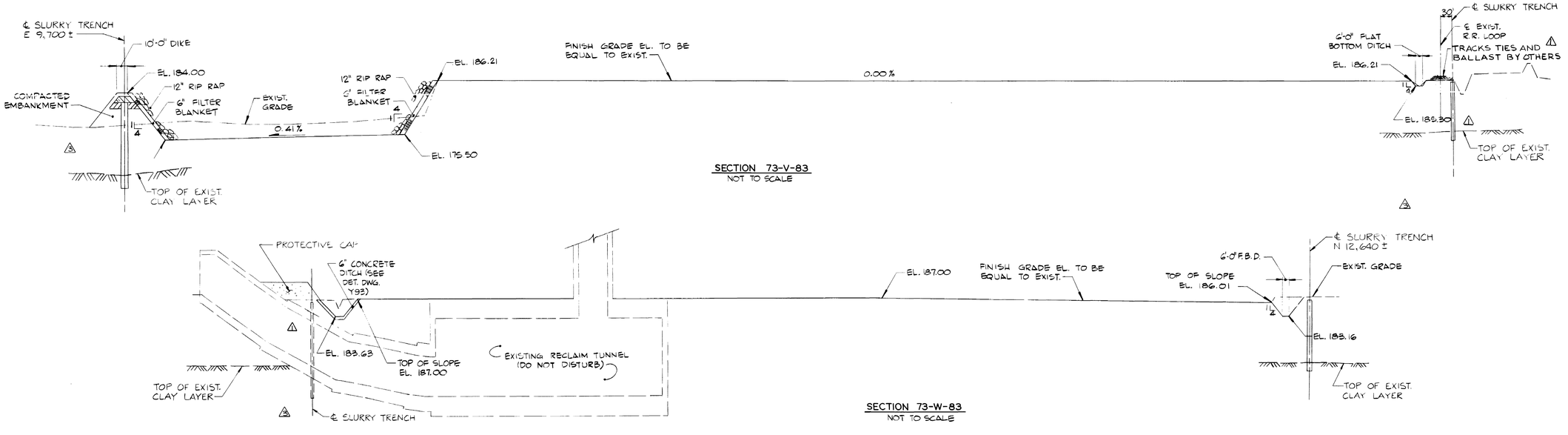
FLORIDA

GRADING SECTIONS 3

Burns & McDonnell
Engineers - Architects - Consultants
KANSAS CITY, MISSOURI

DATE FEB. 18, 1980	DRAWING NO. Y82 – 3 REV.
DESIGNED HUTCHESON	
DETAILED MADDOCK	PROJECT 76-077-1
CHECKED DMZ	SHEET OF SHEETS





NO.	DATE	BY	REVISION
1	3-10-80	DJB	(C-7, C-10, G-7, G-11) ADDED TIMBER POLE LINER PROTECTION. (L-5) REVISED LINER MATERIAL LOCATION. (I-17, J-17) ADDED NOTES FOR CLARIFICATION.
	3-12-80	TDW	(G-13) ADD 6" LIMEROCK SURFACING
	3-21-80	DMZ	ISSUED WITH ADDENDUM NO.3
2	4-7-80	MBB	REVISED NOTES FOR CLARIFICATION
	4-22-80	DMZ	ISSUED AS BID
3	5-28-80	GWB	REVISED SECTIONS 73-V-83 AND 73-W-83
	5-30-80	DMZ	ISSUED
	7-1-81	DJB	

CONFORMING TO CONSTRUCTION RECORDS

CONTRACT NO. 29C
YARD STRUCTURES III

DEERHAVEN GENERATING STATION UNIT 2

CITY OF GAINESVILLE/ GAINESVILLE-ALACHUA COUNTY REGIONAL UTILITIES BOARD

FLORIDA

GRADING SECTIONS 4

Burns & McDonnell
Engineers - Architects - Consultants
KANSAS CITY, MISSOURI

DATE FEB. 18, 1980	DRAWING NO. Y83 — 3 REV.
DESIGNED HUTCHESON	
DETAILED BAKER	PROJECT 76-077-1
CHECKED DMZ	SHEET OF SHEETS

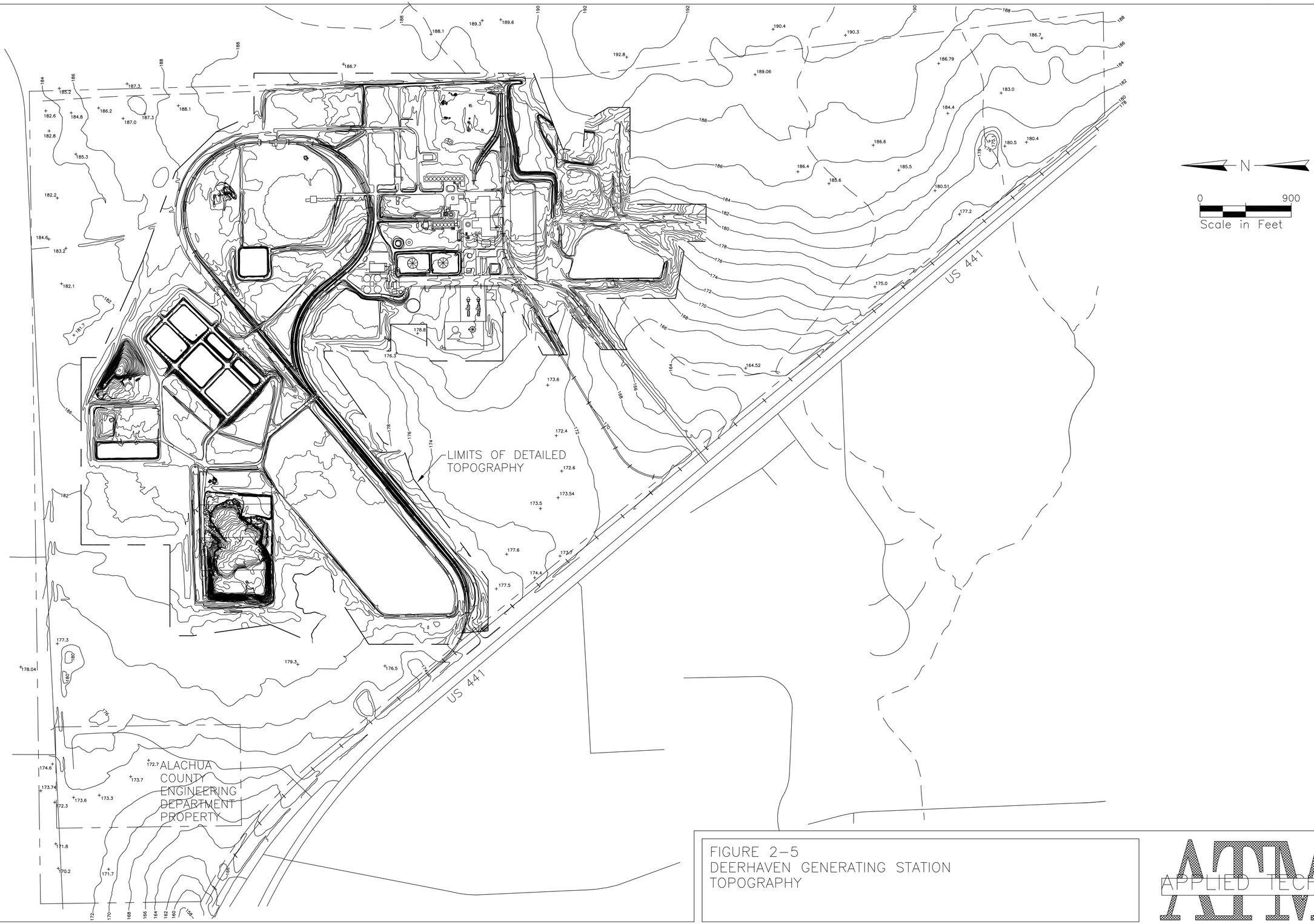


FIGURE 2-5
DEERHAVEN GENERATING STATION
TOPOGRAPHY

ATM
APPLIED TECHNOLOGY

331F2-5.DWG 10/06/93

Appendix B

USEPA Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Gainesville Regional Utilities (GRU)- Deerhaven Plant	Date:	August 29, 2012
Unit Name:	Process Water Ponds	Operator's Name:	GRU
Unit I.D.:		Hazard Potential Classification:	High Significant (Low)
Inspector's Name:	William Fox/ Eduardo Gutierrez		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	190;193		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	DNA		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	DNA		Is water entering inlet, but not exiting outlet?	X	
5. Lowest dam crest elevation (operator records)?	195.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?		DNA
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		N/A	From underdrain?		DNA
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?	X	
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	DNA		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?	DNA		Around the outside of the decant pipe?		DNA
15. Are spillway or ditch linings deteriorated?	DNA		22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?	DNA		23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
1.	Daily by plant personnel during regular operation walk-arounds.
2.	Pool elevation for cell 1= 193.0 and Pool elevation for cell 2= 190.0; Elevation varies on demand of plant operations. Water levels are adjusted by pumping depending on operation.
21.	Wet areas and areas of standing water were observed along the embankment toes of slope.

N/A = Not Available
DNA = Does Not Apply

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # Not Applicable (Deerhaven Plant is a Zero-discharge Facility) INSPECTOR William Fox and Eduardo Gutierrez

Date August 29, 2012

Impoundment Name Process Water Ponds

Impoundment Company Gainesville Regional Utilities

EPA Region 4

State Agency (Field Office) Addresss 61 Forsyth Street, SW
Atlanta, Ga 30303-8960

Name of Impoundment Process Water Ponds

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	X	_____

IMPOUNDMENT FUNCTION: Receive process water (cooling tower blow down, plant drains, industrial process water including sluiced bottom ash, etc.) from generating station for reuse to generating station

Nearest Downstream Town : Name Gainesville, Florida

Distance from the impoundment 3 miles

Impoundment Location:
Longitude 82 Degrees 23 Minutes 32.72W Seconds
Latitude 29 Degrees 45 Minutes 55.03N Seconds
State Florida County Alachua County

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? Florida Department of Environmental Protection

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

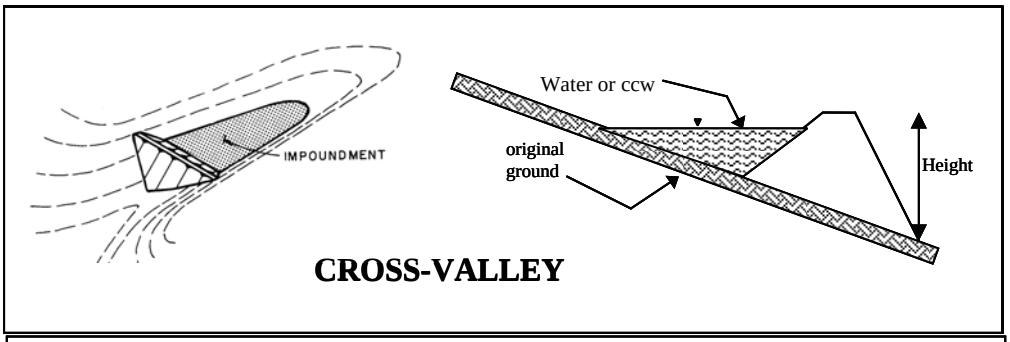
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

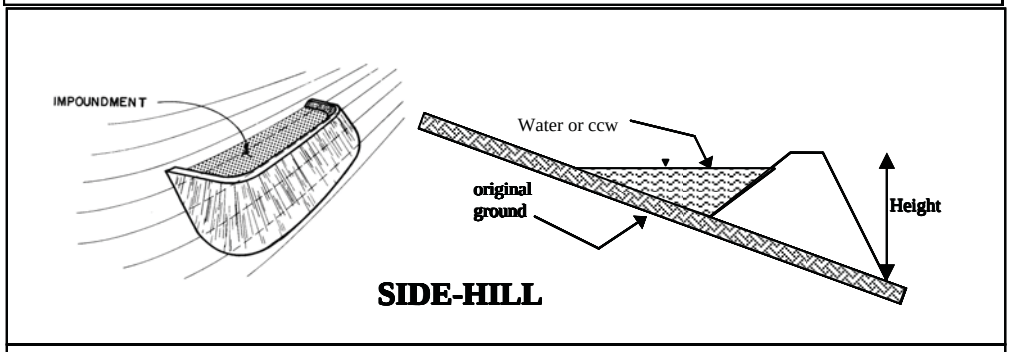
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

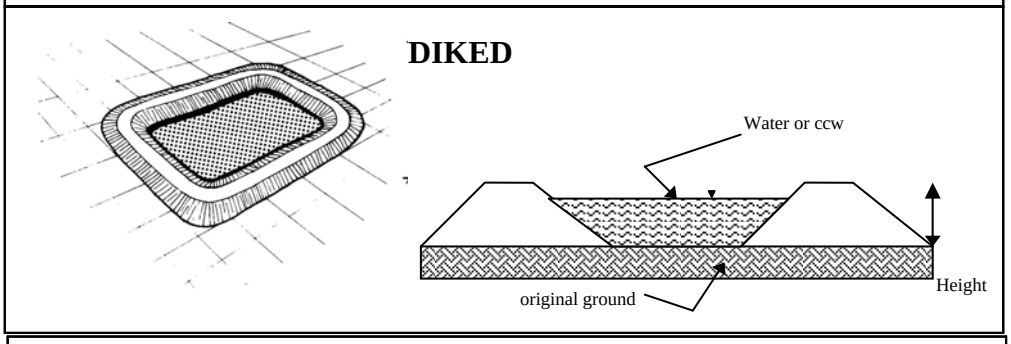
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

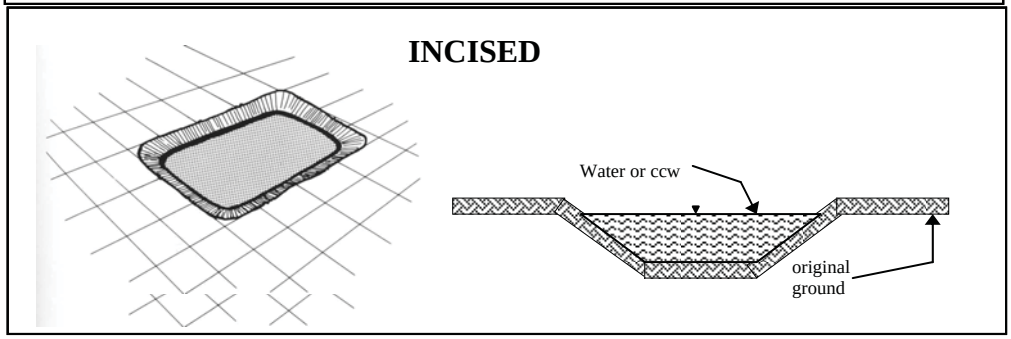
Failure or misoperation could result in environmental damage and economic loss and damage to plant infrastructure, operations and utilities. Loss of human life as a result of failure or misoperation is not anticipated.

CONFIGURATION:









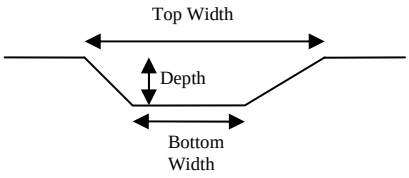
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height ___14___ feet Embankment Material ___Soil___
Pool Area ___6.7___ acres Liner ___No Liner___
Current Freeboard ___2___ feet Liner Permeability ___Not Applicable___

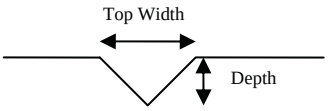
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

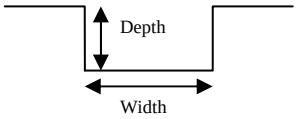


TRIANGULAR

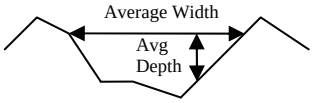


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

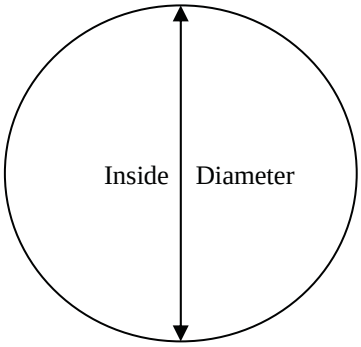


IRREGULAR



_____ **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO _____

X
_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Burns and McDonnell
_____

Has there ever been a failure at this site? YES _____ NO ____X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Based on review Burns & McDonnell report titled "Subsurface Information for the Deerhaven Generation Station Site Near Hague, Florida", dated 1978 and Burns & McDonnell Drawings Y80, Y81, Y82 and Y-83, titled Grading Sections, dated February 18, 1980, all provided by GRU during CDM Smith's site assessment, it appears the embankment foundations were not constructed over wet ash, slag, or other unsuitable materials.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

The assessor did not meet with, or have documentation from the design Engineer of Record concerning foundation preparation.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

There was no indication of prior releases, failures or patchwork on the embankments.

Appendix C

Photographs

Appendix C
Photographs GPS Locations

Site: Gainesville Regional Utilities - Deerhaven Plant
Datum: NAD83
Coordinate Units: Decimal Degrees

Photograph No.	Latitude	Longitude
1	29.764210	-82.393005
2	29.764076	-82.392968
3	29.764219	-82.392763
4	29.764518	-82.392581
5	29.764699	-82.392218
6	29.764812	-82.392206
7	29.764661	-82.392305
8	29.764837	-82.392278
9	29.764892	-82.392189
10	29.764887	-82.392037
11	29.765395	-82.391435
12	29.765446	-82.391360
13	29.765647	-82.391329
14	29.765744	-82.391314
15	29.765725	-82.391224
16	29.765733	-82.391102
17	29.766402	-82.390441
18	29.766451	-82.390487
19	29.766491	-82.390420
20	29.766680	-82.390698
21	29.764705	-82.393349
22	29.764608	-82.393214
23	29.765269	-82.393935
24	29.765315	-82.394045
25	29.765361	-82.393990
26	29.766289	-82.392950
27	29.766214	-82.392961
28	29.766341	-82.392838
29	29.766242	-82.392868
30	29.766538	-82.392627
31	29.766682	-82.392350
32	29.766158	-82.391814
33	29.766091	-82.391733
34	29.765335	-82.392289
35	29.765411	-82.392386
36	29.765388	-82.392471
37	29.765334	-82.392515
38	29.765265	-82.392514
39	29.765425	-82.392567
40	29.765249	-82.392406
41	29.765306	-82.392377
42	29.765481	-82.392314
43,44	29.765777	-82.392948
46	29.765732	-82.391800
47	29.765822	-82.391891
48	29.764079	-82.388891
49	29.764089	-82.388976
50	29.764036	-82.388799
51	29.764145	-82.388680

Appendix C
Photographs GPS Locations

Site: Gainesville Regional Utilities - Deerhaven Plant
Datum: NAD83
Coordinate Units: Decimal Degrees

Photograph No.	Latitude	Longitude
52	29.764102	-82.388814
53	29.764212	-82.388598
54	29.764796	-82.388617
55	29.764799	-82.388532
56	29.764081	-82.389677
57	29.764192	-82.389771
58	29.764168	-82.389681
59	29.764635	-82.389690
60	29.764635	-82.389768
61	29.764704	-82.389767
62	29.764704	-82.389690
63	29.764899	-82.389720
64	29.764965	-82.389641
65	29.764904	-82.389642
66	29.763995	-82.389664
67	29.759175	-82.400006
68	29.759197	-82.400079
69	29.759215	-82.400166
70	29.763282	-82.397423
71	29.763233	-82.397486
72	29.764272	-82.397535
73	29.764341	-82.397467
74	29.764328	-82.397238
75	29.764312	-82.397368
76	29.764769	-82.393614
77	29.764689	-82.393542
78	29.764839	-82.393757
79	29.765310	-82.394221
80	29.765485	-82.393949
81	29.765537	-82.393887
82	29.766072	-82.393494
83	29.765964	-82.393467
84	29.766074	-82.393360
85	29.766266	-82.393185
86	29.766735	-82.392532
87	29.766800	-82.392438
88	29.767162	-82.392011
89	29.767221	-82.391947
90	29.767502	-82.391589
91	29.767513	-82.391477
92	29.767414	-82.391479
93	29.767435	-82.391566
94	29.766999	-82.391014
95	29.766951	-82.390962
96	29.766675	-82.390517
97	29.766625	-82.390471
98	29.763166	-82.393699

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 1: Pump Back Cell No. 1 – Southwest embankment exterior slope, looking northwest.

Photo 2: Pump Back Cell No. 1 – Southwest embankment exterior slope, runoff swale culvert pipe under road, looking northeast.

Photo 3: Pump Back Cell No. 1 – Southeast embankment exterior slope, runoff swale looking northeast.

Photo 4: Pump Back Cell No. 1 - Southeast embankment exterior slope, monitoring well, looking southeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

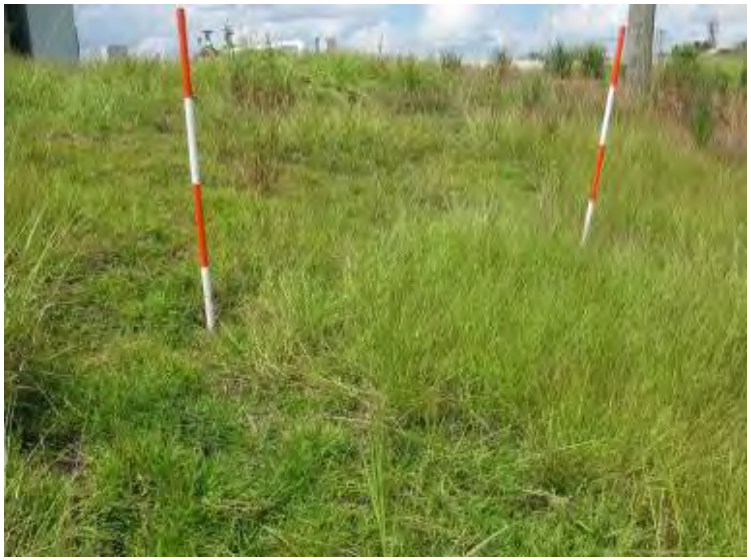


Photo 5: Pump Back Cell No. 1 – Southeast embankment exterior slope, minor surficial erosion rills looking northeast.

Photo 6: Pump Back Cell No. 1 – Southeast embankment exterior slope, minor erosion rills looking southeast.

Photo 7: Pump Back Cell No. 1 – Southeast embankment exterior slope, general view looking southwest.

Photo 8: Pump Back Cell No. 1 – Crest of southeast embankment, general view of pump house, looking northwest.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 9: Pump Back Cell No. 1 – Crest of southeast embankment, general view of pump house looking north.

Photo 10: Pump Back Cell No. 1 – Southeast embankment exterior slope, runoff swale looking south.

Photo 11: Pump Back Cell No. 2 – Southeast embankment exterior slope, runoff swale located along toe of slope, looking southwest.

Photo 12: Pump Back Cell No. 2 – Southeast embankment exterior slope, 24-inch dia. corrugated culvert pipe below access road between Pump Back Cell No. 2 and Lime Sludge Cell No. 2, looking northeast. Note lime sludge pipes.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 13: Pump Back Cell No. 2 – Paved crest of southeast embankment, looking southwest.

Photo 14: Paved crest of divider embankment between Pump Back Cell No. 2 and Lime Sludge Cell No.2, looking northwest.

Photo 15: Lime Sludge Cell No. 2 – Paved crest of southeast embankment, looking northeast.

Photo 16: Lime Sludge Cell No. 2 – Animal burrow, southeast embankment exterior slope, looking northwest.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 17: Lime Sludge Cell No. 2 – Paved crest of southeast embankment Near east corner, looking southwest.

Photo 18: Lime Sludge Cell No. 2 – Southeast embankment east corner, view of pond surface looking west.

Photo 19: Lime Sludge Cell No. 2 – Paved crest of northeast embankment near east corner, looking northwest.

Photo 20: Lime Sludge Cell No. 2 – Northeast embankment interior slope, Concrete box for inlet pipe and view of pond surface, looking southwest.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 21: Ash Cell No. 1 – Southwest embankment interior slope, view of pond surface showing 1-foot of freeboard looking northeast.

Photo 22: Paved crest of divider embankment between Ash Cell No. 1 and Pump Back Cell No. 1, looking northeast.

Photo 23: Ash Cell No. 1 – Southwest embankment west corner, view of pond surface looking east. Note access for dredging.

Photo 24: Ash Cell No. 1 – Paved crest of southwest embankment interior slope, looking southeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 25: Ash Cell No. 1 – Paved crest of northwest embankment interior slope, looking northeast.

Photo 26: Ash Cell No. 2 – Northwest embankment exterior slope, erosion along top of slope, looking north. Note pavement distress.

Photo 27: Ash Cell No. 2 – Northwest embankment interior slope, erosion along top of slope looking southeast. Note pavement distress.

Photo 28: Ash Cell No. 2 – Northwest embankment interior slope, erosion rill looking southeast. (typical of several)

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 29: Ash Cell No. 2 – Northwest embankment interior slope, erosion rills looking southeast. (typical of several)

Photo 30: Ash Cell No. 2 – Northwest embankment, outlet structure with stop logs southeast divider embankment interior slope, looking southeast.

Photo 31: Ash Cell No. 2 – Northwest embankment interior slope, erosion along edge of crest looking south.

Photo 32: Ash Cell No. 2 – Outlet structure/stop logs and staff gage, looking southwest.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 33: Ash Cell No. 2 – Outlet structure/stop logs looking southwest.

Photo 34: Ash Cell No. 2 – Southwest divider embankment interior slope, metal inlet pipe (15-inch diameter) and splash pad, looking northwest.

Photo 35: Ash Cell No. 2 – Erosion of slope pavement behind inlet pipe shown in previous photo.

Photo 36: Ash Cell No. 2 – Close up of splash pad looking north. Note rusted end of inlet pipe and eroded concrete.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 37: Ash Cell No. 1 – Metal inlet pipe (15-inch diameter) & submerged Splash pad, looking west.

Photo 38: Ash Cell No. 1 – Paved crest of southeast divider embankment interior slope between Ash Cell No. 1 and Pump Back Cell No. 1, looking southwest.

Photo 39: Ash Cell No. 1 – General view of pond surface looking west.

Photo 40: Ash Cell No. 1 – Crest of divider embankment between Ash Cell No. 1 and Ash Cell No. 2, looking northwest.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 41: Ash Cell No. 2 – General view of pond looking north. Note concrete U-shaped channel and metal grate to protect sluice ash pipelines.

Photo 42: Ash Cell No. 2 - Paved crest and interior slope of southeast divider embankment, between Ash Cell No. 2 and Pump Back Cell No. 2, looking northeast.

Photo 43: Ash Cell No. 1 – Inlet pipe and northeast divider embankment Interior slope, looking southeast. Note abandoned HDPE pipe.

Photo 44: Ash Cell No. 1 – Ash delta, northeast divider embankment interior slope, looking southwest.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 45: Ash Cell No. 1 – Inlet metal pipe (15-inch diameter), looking northwest. Note discharge water turbidity.

Photo 46: Pump Back Cell No. 2 – Northwest divider embankment interior slope, riprap armoring looking southwest.

Photo 47: Ash Cell No. 2 – Northwest divider embankment interior slope, rip-rap slope treatment looking southwest.

Photo 48: Coal Stockpile Runoff Collection Pond – south embankment interior slope, rusted corrugated inlet metal pipe looking north.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 49: Coal Stockpile Runoff Collection Pond – Crest of south embankment, looking west.

Photo 50: Coal Stockpile Runoff Collection Pond – Runoff ditch west of coal stockpile near southeast corner of pond, looking south.

Photo 51: Coal Stockpile Runoff Collection Pond – General view of surface looking northwest.

Photo 52: Coal Stockpile Runoff Collection Pond – East embankment interior slope, looking northeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 53: Coal Stockpile Runoff Collection Pond – East embankment runoff swale, looking west.

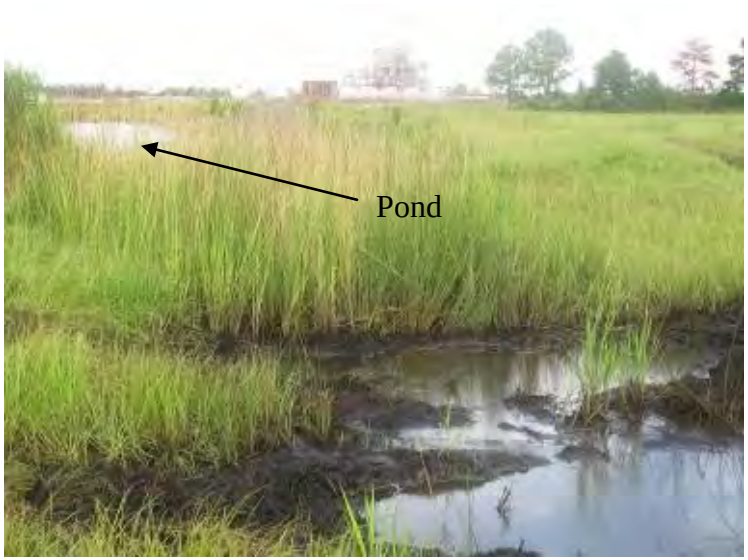


Photo 54: Coal Stockpile Runoff Collection Pond – Runoff swale at toe of north embankment, looking west.

Photo 55: Coal Stockpile Collection Pond – Runoff swale north of coal stockpile, looking east.

Photo 56: Coal Stockpile Runoff Collection Pond – Crest and exterior slope of south embankment, looking east.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 57: Coal Stockpile Runoff Collection Pond – Crest and exterior slope of west embankment, looking north.

Photo 58: Coal Stockpile Runoff Collection Pond – West embankment Interior slope, pump station located at southwest corner looking north.

Photo 59: Coal Stockpile Collection Pond – West embankment interior slope upstream side of 24-inch diameter metal outlet pipe, looking east. Pipes are partially crushed and blocked. No flow was observed.

Photo 60: Coal Stockpile Collection Pond – West embankment exterior slope, downstream side of 24-inch diameter metal outlet pipes, looking west. Pipes are partially crushed and blocked. No flow was observed.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 61: Coal Stockpile Runoff Collection Pond – West embankment exterior slope, downstream side of 24-inch diameter metal outlet pipes, looking west. Pipes are partially crushed and blocked. No flow was observed.

Photo 62: Coal Stockpile Runoff Collection Pond – West embankment interior slope, upstream side of 24-inch diameter metal outlet pipes, looking east. Pipes are partially crushed and blocked. No flow was observed.

Photo 63: Coal Stockpile Runoff Collection Pond – Crest of west embankment, looking south.

Photo 64: Coal Stockpile Runoff Collection Pond – Crest of north embankment, looking east. Note tire ruts.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 65: Coal Stockpile Runoff Collection Pond – General view of pond surface looking southeast.

Photo 66: Coal Stockpile Runoff Collection Pond – General view of standing water in surrounding low areas to the west and southwest of pond, looking west.

Photo 67: Stormwater Pond – General view of pond from south embankment, looking northeast.

Photo 68: Stormwater Pond – Crest of southeast embankment, looking northeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 69: Stormwater Pond – Southwest embankment interior slope, general view of pond looking north.

Photo 70: Stormwater Pond – General view of pond from northwest embankment, looking east.

Photo 71: Stormwater Pond – Northwest embankment interior slope, looking southwest.

Photo 72: Ash Dry Stack Landfill Area – Crest of south embankment showing landfill area currently under construction, looking west.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 73: Ash Dry Stack Landfill Area – General view of landfill area currently under construction, looking north.

Photo 74: Ash Dry Stack Landfill Area – General view of landfill area currently under construction, looking northwest.

Photo 75: Ash Dry Stack Landfill Area – General view of landfill area currently under construction, looking north.

Photo 76: Ash Cell No. 1 – Southwest embankment exterior slope, looking northwest.

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Photo 77: Ash Cell No. 1 – Southwest embankment exterior slope, looking southeast.

Photo 78: Ash Cell No. 1 – Southwest embankment exterior slope, saturated area along exterior toe of slope (typical), looking northeast.

Photo 79: Ash Cell No. 1 – Southwest embankment exterior slope, looking southeast.

Photo 80: Ash Cell No. 1 – Animal burrow, northwest embankment exterior slope, looking southeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 81: Ash Cell No. 1 – Northwest embankment exterior slope, edge of temporary parking lot for construction workers looking northeast.

Photo 82: Ash Cell No. 1 – Northwest embankment exterior slope, ponded water and saturation along toe of slope, looking northwest.

Photo 83: Ash Cell No. 1 – Northwest embankment exterior slope, edge of temporary parking lot for construction workers looking southwest.

Photo 84: Ash Cell No. 2 – Northwest embankment exterior slope, looking northeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 85: Ash Cell No. 2 – Northwest embankment exterior slope, saturated area along toe of slope, looking southeast.

Photo 86: Ash Cell No. 2 – Northwest embankment exterior slope, looking southwest.

Photo 87: Lime Sludge Pond No. 1 – Northwest embankment exterior slope, looking northeast.

Photo 88: Lime Sludge Pond No. 1 – Northwest embankment exterior slope, looking southwest.

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Photo 89: Lime Sludge Pond No. 1 – Northwest embankment exterior slope, looking northeast.

Photo 90: Lime Sludge Pond No. 1 – Northwest embankment exterior slope, looking southwest.

Photo 91: Lime Sludge Pond No. 1 – Northeast embankment exterior slope, looking southeast.

Photo 92: Lime Sludge Pond No. 1 – Paved crest of northeast embankment, looking southeast.

EPA Assessment GRU - Deerhaven Plant Photos August 28 and 29, 2012

Photo 93: Lime Sludge Cell No. 1 – Paved crest of northwest embankment, looking southwest.

Photo 94: Lime Sludge Pond No. 1 – Southeast divider embankment interior slope, view of dry lime sludge piles and pond surface, looking southwest.

Photo 95: Lime Sludge Pond No. 2 – General view of pond, looking south.

Photo 96: Lime Sludge Pond No. 2 – Northeast embankment exterior slope, looking northwest. Note lime sludge pipes on ground.

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Photo 97: Lime Sludge Pond No. 2 – Northeast embankment exterior slope, looking southeast. Note lime sludge pipes.

Photo 98: Stormwater Pond – Northeast embankment interior slope, looking west. Note areas of dense vegetation (i.e. – cattails).