

December 7, 2021

19-118453

**Mr. Robert Stafford**

Duke Energy Florida  
299 1st Avenue North  
St. Petersburg, FL 33701

**RE: REVISED SOLID WASTE MATERIALS OPERATIONS PLAN  
ASH STORAGE/DISPOSAL AREA  
CRYSTAL RIVER ENERGY COMPLEX  
CRYSTAL RIVER, FLORIDA**

Dear Mr. Stafford:

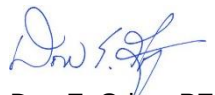
In conjunction with Duke Energy Florida, Inc., Golder Associates USA Inc. has prepared this revised Operations Plan for the ash storage/disposal area (AS/DA) at Crystal River Energy Complex (CREC). This revised Operations Plan is intended to comply with the applicable requirements of Chapter 62-701.500(2), FAC and provide operation guidance for the AS/DA.

Should you have any questions or comments, please contact me the undersigned.

Sincerely,

**Golder Associates USA Inc.**

Samuel F. Stafford, PE  
*Florida Professional Engineer No. 78648*  
*Authorization No. 35291*

  
Don E. Grigg, PE  
*Senior Engineer*

SFS/DEG/ams

[https://golderassociates.sharepoint.com/sites/105153/Project Files/6 Deliverables/Operations Plan/Final/Ops Plan\\_Cover Letter.docx](https://golderassociates.sharepoint.com/sites/105153/Project%20Files/6%20Deliverables/Operations%20Plan/Final/Ops%20Plan_Cover%20Letter.docx)

# **ASH STORAGE/DISPOSAL AREA SOLID WASTE MATERIALS OPERATIONS PLAN**

---



## **DUKE ENERGY - FLORIDA CRYSTAL RIVER ENERGY COMPLEX CRYSTAL RIVER, FLORIDA**

DECEMBER 2021

(REVISION 0 - FEBRUARY 2012)  
(REVISION 1 - DECEMBER 2013)  
(REVISION 2 - AUGUST 2019)  
(REVISION 3 - SEPTEMBER 2019)  
(REVISION 4 - DECEMBER 2021)

# Table of Contents

## COVER LETTER

|         |                                              |    |
|---------|----------------------------------------------|----|
| 1.0     | INTRODUCTION.....                            | 1  |
| 1.1     | Purpose .....                                | 1  |
| 1.2     | Facility Description .....                   | 2  |
| 2.0     | OPERATIONS.....                              | 3  |
| 2.1     | Organization .....                           | 3  |
| 2.2     | Material Loading and Hauling Operations..... | 3  |
| 2.2.1   | Fly Ash .....                                | 3  |
| 2.2.2   | Bottom Ash.....                              | 3  |
| 2.2.3   | Gypsum .....                                 | 4  |
| 2.2.4   | Other Approved Materials .....               | 4  |
| 2.2.5   | Material Quantities .....                    | 4  |
| 2.2.6   | Vehicle Traffic and Control.....             | 4  |
| 2.2.7   | Dust Control .....                           | 4  |
| 2.3     | Ash Storage/Disposal Area Operations .....   | 5  |
| 2.3.1   | Placement and Compaction .....               | 5  |
| 2.3.2   | Reclamation for Beneficial Use.....          | 5  |
| 2.3.3   | Fill Sequence and Closure .....              | 6  |
| 2.3.3.1 | Reclamation in Closed Areas.....             | 6  |
| 2.3.3.2 | Closure Plans .....                          | 6  |
| 2.3.3.3 | Post Closure Care .....                      | 7  |
| 2.3.4   | Dust Control .....                           | 7  |
| 2.3.5   | Stormwater Control .....                     | 7  |
| 2.3.6   | Final Cover .....                            | 8  |
| 2.4     | Work Schedule and Coordination .....         | 10 |
| 2.5     | Contingency Operations.....                  | 10 |
| 2.6     | Sub-Surface Instability .....                | 11 |
| 3.0     | MAINTENANCE .....                            | 12 |
| 3.1     | General.....                                 | 12 |
| 3.2     | Roads .....                                  | 12 |
| 3.3     | Stormwater Management System.....            | 12 |
| 3.4     | Vegetated Areas .....                        | 12 |
| 4.0     | WATER QUALITY MONITORING .....               | 13 |
| 4.1     | Groundwater Monitoring.....                  | 13 |
| 4.2     | Surface Water Monitoring .....               | 13 |
| 5.0     | SAFETY AND SECURITY .....                    | 14 |
| 5.1     | General Safety .....                         | 14 |
| 5.2     | Site Security .....                          | 14 |

**List of Figures**

|          |                                                          |
|----------|----------------------------------------------------------|
| Figure 1 | Crystal River Energy Complex Operations Plan Site Plan   |
| Figure 2 | Ash Storage/Disposal Area Existing Conditions (May 2021) |
| Figure 3 | Ash Storage/Disposal Area Final Cover Plan               |
| Figure 4 | Ash Storage/Disposal Area Closure Sequence Layout Plan   |
| Figure 5 | Ash Storage/Disposal Area Details                        |

**List of Appendices**

|            |                    |
|------------|--------------------|
| Appendix A | Organization Chart |
|------------|--------------------|

## 1.0 INTRODUCTION

### 1.1 Purpose

This Operations Plan is intended to be a reference for the personnel who operate and supervise the Ash Storage/Disposal Area (AS/DA) at the Crystal River Energy Complex (CREC) operated by Duke Energy Florida, Inc. (DEF) and generally complies with applicable sections of Chapter 62-701.500(2), Florida Administrative Code (FAC). As the operations of the AS/DA vary from that of a Class I or Class III landfill, some of the components of Chapter 62-701.500(2) are not applicable. The following presents the requirements for an Operations Plan developed under the applicable requirements of Chapter 62-701.500(2) with references to the sections within this plan where those requirements are addressed (or in some cases if those requirements are not applicable (NA) to AS/DA operations):

**Operation Plan.** *Each landfill owner or operator shall have an operational plan that provides written, detailed instructions for the daily operation of the landfill. The operation plan shall be kept at or near the landfill facility and shall be accessible to landfill operators. The operation plan shall be substantially complied with at all times and shall be revised if operational procedures change. The plan shall include procedures for:*

- a. *Designation of persons responsible for operation and maintenance of the facility; [see Section 1.1]*
- b. *Emergency preparedness and response, as required in subsection 62-701.320(16), FAC; [see Section 2.5]*
- c. *Controlling the type of waste received at the site. The plan shall specify inspection procedures, number and location of spotters for each working face, and procedures to be followed if unauthorized waste is discovered; [NA – only wastes generated at the plant and approved by the Florida Department of Environmental Protection (FDEP) are placed in the AS/DA, as identified in the Site-Wide Coal Combustion Products (CCP)/ Solid Waste Management Plan]*
- d. *Weighing incoming waste, if required under paragraph 62-701.500(4)(a), FAC; [see Section 2.2 – Truck Weighing and Counts are tracked]*
- e. *Vehicle traffic control and unloading; [see Section 2.2]*
- f. *Method and sequence of filling waste; [see Section 2.3]*
- g. *Waste compaction and application of cover; [see Section 2.3]*
- h. *Operations of gas [NA], leachate [NA], and stormwater controls; [see Section 2.3.5]*
- i. *Water quality monitoring; and [see Section 4.0]*
- j. *Maintaining and cleaning the leachate collection system. [NA]*

The AS/DA is permitted under the plant's Conditions of Certification (PA 77-09). It is primarily used for the storage and disposal of fly ash, bottom ash, and gypsum referred to as CCPs produced at CREC. This plan presents background information on the facility and describes the hauling and placement of CCPs; operation and maintenance of the AS/DA; monitoring; and sequencing and closure of the AS/DA.

The designated responsible person for the CREC AS/DA should be the Site Operator:

Contact Name: Mr. Kerem Esin, PE – System Owner  
Crystal River Energy Complex  
Telephone Number: (352) 501-5024 (office)

## 1.2 Facility Description

The CREC is located near the Gulf of Mexico in Citrus County, Florida. The main entrance of the facility is located at 15760 West Powerline Street, Crystal River, Florida. The CREC consists of two operating electrical generating units. Units 4, and 5 are the two operating coal-fired steam units, located on the northern portion of the plant area. Unit 3 is a retired nuclear unit and is not covered by this plan. Units 1 and 2 are retired coal-fired steam units located on the southern portion of the plant area. A site plan of CREC is presented on Figure 1.

The AS/DA is located in the northeast corner of the property and currently receives CCPs generated by Units 4 and 5. In the past, the AS/DA also received CCPs generated by Units 1 and 2, which were retired at the end of 2018 and thus, no longer produce CCPs. The AS/DA has an overall footprint of 62 acres and provides an estimated 6 million cubic yards of airspace for CCPs<sup>1</sup>. The current (based on May 2021 topography) and final cover configuration of the AS/DA is presented in Figures 2 and 3, respectively.

CCPs are typically transported to the AS/DA using dump trucks and less frequently by vacuum trucks. Figure 1 presents the loading areas and haul routes for the various CCPs produced at the site. Fly ash generated by Units 4 and 5 is pneumatically conveyed from each unit's electrostatic precipitators (ESPs) to individual storage silos. Bottom ash generated by Units 4 and 5 is sluiced to individual dewatering bins and associated handling tanks. Overflow gypsum from the temporary gypsum storage pad is loaded in dump trucks for transport to off-site beneficial use or infrequently to the AS/DA for temporary storage or disposal.

---

<sup>1</sup> Based on a 120-foot height 3H:1V sideslope configuration that has been approved by the Florida Department of Environmental Protection (FDEP).

## 2.0 OPERATIONS

### 2.1 Organization

The CREC AS/DA typically operates on a 5-day per week, 10-hour per day schedule, but extended hours may occur periodically to support beneficial use and also to accommodate plant outage schedules as needed. The AS/DA and associated daily operations typically occur between 7:00 am and 5:00 pm.

DEF has a contract with a Primary CCP Contractor who is responsible for marketing CCPs generated at CREC for off-site beneficial use, hauling unsold CCPs to the AS/DA, and disposal operations at the AS/DA. The Primary CCP Contractor has subcontracted a hauling and disposal vendor. DEF also has a contract with a Reclamation Contractor who is responsible for marketing and reclaiming CCPs from the AS/DA for off-site beneficial use. An organization chart is provided in **Appendix A**.

### 2.2 Material Loading and Hauling Operations

#### 2.2.1 Fly Ash

Fly ash is an industrial byproduct that is produced during the coal combustion process and is captured from the furnace flue gas and collected in the ESPs. Unit 4 and 5 fly ash is collected in each unit's ESP collection hoppers and pneumatically conveyed to the Unit 4 and 5 Storage Silos, located east of the power block. The storage silos act as transfer point between the collection hoppers and the hauling operations. The Storage Silos are capable of unloading dry fly ash into pressure-differential trucks or conditioned fly ash into rear dump trucks. The fly ash is conditioned using the mixer loaders which mix dry fly ash with water. Fly ash loading operations are controlled and performed by CRN Materials Handling Operators. The locations of the Unit 4 and 5 Fly Ash Storage Silos and associated haul routes are shown on Figure 1.



Unit 4 Bottom Ash Silos



Unit 4 Fly Ash Loading for On-Site Disposal (foreground)



Unit 4 Bottom Ash Dewatering Bin (foreground)  
Unit 5 Fly Ash Silo and Dewatering Bins (background)

#### 2.2.2 Bottom Ash

Bottom ash is an industrial byproduct that is produced during the coal combustion process. Units 4 and 5 use wet systems for bottom ash handling. Bottom ash from each boiler falls into a hopper and is sluiced with water into a transfer tank. An ash slurry pump transfers the bottom ash/water mixture to a dewatering bin where solids are allowed to settle. Each unit is fitted with two bottom ash dewatering bins. The wet bottom ash from each dewatering bin is loaded into dump trucks for transport. Bottom ash loading operations are controlled and performed by CRN Materials Handling Operators.

### **2.2.3 Gypsum**

The Units 4 and 5 flue gas desulfurization system produces synthetic gypsum (calcium sulfate). The gypsum slurry from the flue gas desulfurization system is dewatered in vacuum filter beds at the gypsum dewatering facility. The dewatered gypsum cake (approximately 90% solids content by weight) is transported via conveyor to a gypsum beneficial use marketer located north and adjacent of the plant's property, or to the gypsum storage pad. The short-term temporary gypsum storage pad is sized to contain approximately 32,000 tons of gypsum. From the temporary storage pad, gypsum is managed as follows: it is transported directly off-site for beneficial use; or trucked to the AS/DA for on-site storage awaiting beneficial use, or on/off-site disposal.

### **2.2.4 Other Approved Materials**

Miscellaneous solid wastes generated by plant operations are at times transported by trucks to the AS/DA. These wastes are subject to FDEP approval and in the past have generally been limited to settled solids from various stormwater ditches, ponds/basins, outage derived wastes (i.e. ESP and plant sump cleanouts), cooling tower solids, and FGD wastewater treatment plant filter cake. Additional detail on approved waste materials is provided in the current revision of the facility's CCP and Solid Waste Materials Management Plan.

### **2.2.5 Material Quantities**

Trucks hauling CCPs are weighed on certified scales to track the quantity of materials stored, disposed, or reclaimed from the AS/DA. For other miscellaneous wastes disposed of within the AS/DA a truck count system is typically used for estimating the quantity of materials. Generally, a haul truck is weighed empty and loaded periodically to determine a representative load weight and a truck count is kept estimating the daily disposal tonnage.

### **2.2.6 Vehicle Traffic and Control**

Generally, truck traffic is controlled by first in – first out, as directed by the landfill operator, who directs each truck where and when to dump. Vehicle traffic is controlled by traffic control signage. The speed limit within the plant is 10 miles per hour.

### **2.2.7 Dust Control**

The CCP handling/transportation operations are performed to minimize the generation of fugitive dust using one or more of the following techniques:

- Moisture conditioning of the solid prior to loading in trucks;
- Fabric truck covers;
- Watering of haul routes; and
- Washing of trucks to minimize carry-over of CCPs.

Water for dust control is applied using a water truck. The water truck obtains water from AS/DA perimeter ditches or ash settling basin truck fill station. Coal pile run-off treatment pond water is also approved for

dust suppression purposes under site NPDES permit. Well water or plant service water is only used as a last resort during dry periods. Fugitive dust control measures are outlined in the Coal Combustion Residual (CCR) Fugitive Dust Control Plan (Revision 2, October 19, 2021)<sup>2</sup>.

## 2.3 Ash Storage/Disposal Area Operations

### 2.3.1 Placement and Compaction

Fly ash and bottom ash are transported to the AS/DA by dump trucks and placed within the active disposal or active reclamation areas of the AS/DA. Fly ash and bottom ash placed in the active disposal area are spread and compacted by a bulldozer. Overflow gypsum from the temporary storage pad is transported to the AS/DA by dump trucks where the material may be stored for beneficial use, stored pending off-site disposal, or permanently disposed in the AS/DA. The material is spread and compacted by a bulldozer.

The active disposal areas of the AS/DA should be minimized to reduce fugitive dust development, erosion potential, and infiltration. The overall development of the fill should be based on a progressive placement of CCPs in 6- to 18-inch-thick lifts while maintaining a maximum fill slope of 3H:1V. During wet weather, thinner lifts should be used to provide more rapid compaction of the solids. Relatively wet materials (i.e. from stormwater ditches/basins, truck wash basins, catch basins, or plant sumps) disposed of within the AS/DA are to be decanted of free water prior to hauling to the AS/DA and/or blended with sand, ash or gypsum to improve consistency. Relatively wet materials may also be temporarily stockpiled and worked with a bulldozer periodically to allow some moisture reduction prior to blending, spreading, and compaction. The wet materials are worked into the current lift in the active disposal areas in thin lifts and mixed with fly ash, bottom ash, or gypsum prior to compaction. Following placement, the CCPs should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D698 (standard Proctor compaction test). The minimum compaction test frequency is 1 test per 8,000 CY (or tons) of material disposed.



Fly Ash Placement



Spreading Fly Ash



Water Wagon and Dozer  
Active Disposal Area

### 2.3.2 Reclamation for Beneficial Use

CCP materials (including fly ash, bottom ash, and gypsum) may be reclaimed from the AS/DA for off-site beneficial use by the Reclamation Contractor. Beneficial use and management of CCPs are elaborated in the plant's site wide CCP Management Plan. CCPs for beneficial use are primarily excavated using

<sup>2</sup> Coal Combustion Residual (CCR) Fugitive Dust Control Plan, Revision 2, Crystal River Energy Complex, Duke Energy Florida, Inc., dated October 19, 2021.

bulldozers, front-end loaders, and/or excavators. Reclaimed ash is transported off-site for beneficial use in covered trucks. The reclamation activities will be conducted in such way to minimize the requirement for maintenance and potential of fugitive dust emissions. Records of the beneficial use sales from reclamation activities will be maintained by Duke.

### **2.3.3 Fill Sequence and Closure**

Within the AS/DA footprint, approximately 17 acres have received final cover on the eastern slope, northern slope and southern tip. Other areas (mostly on the western slope and top area) have received temporary cover in the form of soil with sod, stormwater ditch sediment with incidental vegetation, or hydroseed (grass). Filling and reclamation operations are to continue in the south-central portion of the footprint.

A majority of the CCPs from the southern and central portions of the footprint have already been reclaimed and removed for beneficial use. Active disposal and reclamation areas will maintain a grade sloping to the south and west, thus keeping run-off diverted from closed slopes and towards the ditch and ponds on the western perimeter of the AS/DA footprint. After reclamation activities are completed or terminated, the final stage of filling will consist of bringing the crown and western slopes to final grade and capping them in increments of 5 to 6 acres. The filling rate will be dictated by plant operations and CCP production rates. A layout of the AS/DA closure sequencing is provided on Figure 4.

#### **2.3.3.1 Reclamation in Closed Areas**

Future reclamation operations may encroach on previously closed areas of the AS/DA. The previously closed areas are limited to slopes along the north and east sides and southern tip of the AS/DA. The final cover cap in these areas will have to be removed in order to access and reclaim marketable CCPs underlying the cap. Prior to removal of any final cover material, DEF will submit to FDEP a plan for reclamation in previously closed areas. This reclamation plan will document the areas of proposed cap removal, stormwater control details, liner removal/repair details, final grading and stabilization of the affected areas, and proposed timelines for completing the reclamation. Following completion of the reclamation activities in previously closed areas, DEF will submit to FDEP a construction completion report documenting the final cover removal and reclamation details including revised as-built drawings. This report will also document any repairs and modifications of the previously installed and certified closure/lining system.

#### **2.3.3.2 Closure Plans**

As areas (generally in increments of 5 to 6 acres) of the AS/DA achieve their proposed final subgrade elevations (see Figure 3) final cover construction will be performed using materials described in Section 2.3.6 and shown on Detail 6, Figure 5. Note that closure may be delayed in the event that ash material is removed from the AS/DA designated for closure thus, creating additional storage/disposal capacity. After closure of the segment is complete, DEF will certify that the closure has been completed in

accordance with the Closure Plan<sup>3</sup>. This certification will be signed by an independent, professional engineer, registered in the State of Florida and submitted to FDEP.

The groundwater monitoring wells located adjacent to the AS/DA will remain active following closure of sections of the AS/DA as sectionalized closure occurs. Post closure monitoring planning will be discussed with the FDEP after the AS/DA is taken out of service.

#### **2.3.3.3 Post Closure Care**

Post-closure care activities consist of monitoring and maintaining the AS/DA and monitoring groundwater in accordance with the site's groundwater monitoring plan and the Post-Closure Care Plan<sup>4</sup> developed pursuant to the CCR Rule. The post-closure care period will be in accordance with the applicable requirements of Chapter 62-701 FAC to ensure the closed facility is not contributing to adverse environmental impacts. Specifically, the post-closure care requirements will include assurance that the final cover system remains effective and groundwater monitoring is conducted in accordance with the site's groundwater monitoring plan.

#### **2.3.4 Dust Control**

The AS/DA operations are to be managed in such a way as to minimize the generation of fugitive dust using one or more of the following techniques:

- Watering of all active or exposed faces of AS/DA using water trucks;
- Intermediate cover of CCPs with soil and vegetation;
- Vegetation of CCPs using hydroseed;
- Application of a dust control agent/soil stabilizer on exposed CCP surfaces; and
- Development of AS/DA to minimize size of active disposal area.

Water for dust control is applied using a water truck. The water truck will obtain water from AS/DA perimeter ditches or from the plant service water distribution system. Coal pile run-off treatment pond water is also approved for dust suppression purposes under site NPDES permit.

#### **2.3.5 Stormwater Control**

Stormwater runoff from the AS/DA flows into the plant's permitted stormwater management system ditches and basins surrounding the AS/DA. The stormwater management ponds are designed to contain the runoff from a 10-year, 24-hour storm event. The closed portions of the ASDA use bench drainage ditches, catch basins and downcomer pipes to route runoff to the perimeter stormwater management system. Stormwater is eventually discharged via infiltration/evaporation or (under peak storm conditions) through the NPDES

---

<sup>3</sup> Closure Plan, Ash Storage/Disposal Area, Crystal River Energy Complex, Golder Associates Inc., dated October 11, 2016.

<sup>4</sup> Post-Closure Care Plan, Ash Storage/Disposal Area, Crystal River Energy Complex, Golder Associates Inc., dated October 11, 2016.

Internal Outfall I-CHO and eventually into the site discharge canal and the Gulf of Mexico via the NPDES permitted discharge (Surface Water Discharge D-001).

Temporary sediment traps and filter check dams will be constructed near active operations areas to detain sediment-laden runoff to allow sediment to settle out before discharging to the sedimentation basin and perimeter stormwater management system. Temporary cover in the form of soil with sod, stormwater ditch sediment with incidental vegetation, hydroseed (grass), erosion control matting (not currently used), or geosynthetic rain covers (not currently used) may be implemented to reduce erosion from the AS/DA.

In 2021, a project was completed to line the sedimentation basin and west ditch. The sedimentation basin was lined with a geosynthetic clay liner (GCL), high-density polyethylene (HDPE), and concrete to allow for cleanout of the basin and minimize solids contact with groundwater. The west ditch upgradient of the sedimentation basin was also lined GCL, HDPE geomembrane and synthetic turf with cementitious infill. The west ditch and sedimentation basin receive contact stormwater from the active areas of the AS/DA interior; this runoff is conveyed an outlet structure and overflow spillway that connect to the existing southwest drainage basin and ultimately to the south, east, and north ditches around the AS/DA perimeter.

Drainage structures, ditches, and diversion berms are regularly cleaned of debris and accumulated sediments as required to maintain the hydraulic capacity of the stormwater management system. The sedimentation basin will be inspected for solids accumulation on a regular basis (quarterly), particularly in advance of the rainy season, and sediment removal will be planned and implemented as needed to ensure adequate sediment storage capacity. The design capacity of the sedimentation basin is at least 134 cubic yards per acre of drainage area, as measured from the bottom of the basin to the crest of the principal spillway (outlet riser). Sediment should be removed from the basin when the sediment storage volume of the basin has been reduced to 55 cubic yards per acre of drainage area. Routine inspection and maintenance of the stormwater management system are performed to repair erosion problems, remove eroded materials, and maintain temporary culverts clear of debris. Sediment excavated from the basins and ditches are removed with rubber-tired equipment where needed to protect the liner system are placed in the active disposal areas of the AS/DA using the placement/compaction methods described in this plan. The excavated sediment is typically relatively wet and temporarily stockpiled and worked with a bulldozer; worked into the current lift in the active disposal areas in thin lifts; and if necessary mixed with fly ash, bottom ash, or gypsum prior to compaction.

### **2.3.6 Final Cover**

The final cover system for the AS/DA consists of the following from top to bottom:

- 6-inch-thick vegetative support layer (topsoil);
- 18-inch-thick protective cover soil;
- GCL; and
- Compacted CCPs or intermediate soil cover.

According to the Conditions of Certification (COC), “the final cover shall be in compliance with Chapter 62-701 FAC, and at least 12 inches of clay or sufficient suitable liner material shall be placed on the top and exposed sides of each finished landfill cell. Sufficient topsoil to support vegetation shall be placed over the top and side clay liner. The top and exposed sides of the ash landfill shall be vegetated to control erosion”.

According to the Modification to the COC (Mod Q), DEF “shall provide an ash storage/disposal area operations plan that describes the procedures for filling, compacting, and final closure of the ash storage/disposal area for Department approval”.

DEF recognizes that future technologies may offer opportunities to employ alternative closure measures and procedures which would still comply with the intent and spirit of the COC and be environmentally acceptable.

Therefore, in an effort to meet the intent of the aforementioned requirements, areas that are completed to the final top of CCP design grades should be covered with the approved final cover system as addressed in the plant’s COC. However, consistent with prior Department authorization for an approximate two-acre area located in the southeast part of the AS/DA that was closed with a GCL, future final cover systems for new areas planned for closure may also consist of a GCL placed directly over the CCPs in a technically consistent manner as previously engineered, designed, and approved by the Department. Alternatively, if the facility proposes to permanently close an area of the AS/DA with material that is not mentioned in the COC (e.g. clay or suitable liner material) or with a GCL as described above, DEF will obtain Department approval for the proposed alternative material in advance of closure.

At approximately 30-foot (vertical) intervals, 2-foot deep, 10-foot-wide benches (backwardly inclined channels) are constructed on the side-slopes, with approximately 0.5 percent longitudinal slopes that outlet via downcomer pipes (18-inch diameter) spaced approximately 500 feet apart. On the top area (crown), the subgrade should be graded to a slope of approximately 2 percent towards the edges and a rim ditch/berm. The rim ditch/berm will have approximately 0.5 percent longitudinal slopes that will outlet via downcomer pipes (12-inch diameter), spaced approximately 500 feet apart.

The cover will be reseeded or re-sodded if insufficient vegetation exists to stabilize the surface, including repair or replacement of erosion control material on the side-slopes, bench drainage, downcomers, and rim ditch. Depressions or uneven surfaces which may develop over time should be re-graded if possible since they can lead to the development of erosion. Routine weekly inspections will be performed while the AS/DA is active. Following final closure of the AS/DA, quarterly inspections will be performed for the first two years and semi-annually thereafter for the remainder of the post-closure care period. Inspections are to be performed to detect the potential erosion problems and routine maintenance of cover soil, vegetation, and ditch/channel linings will provide erosion control for closed portions of the AS/DA.

## 2.4 Work Schedule and Coordination

During periods of normal plant operations, CCPs hauling and disposal operations as well as removal operations are conducted eight hours per day each weekday using on-site equipment. The CCPs handling operations are typically flexible enough to accommodate variations in the plant operations and the other factors that may occur, which can influence the rate of byproduct and coal ash production. Storage within the existing coal ash and byproduct silos/bin are sufficient to handle short term surges in the ash production. However, weekend operations are also performed when necessary to accommodate inclement weather forecasts, outage projects, or emergencies. Ash silo level readings are normally monitored by plant operators and Primary CCP Contractor personnel on a daily basis to coordinate CCP removal operations. Coordination between the plant personnel and Primary CCP Contractors is conducted daily to maintain efficient disposal operations.

## 2.5 Contingency Operations

During emergency conditions normal CCP disposal acceptance procedures will continue, if possible. The following procedures are to be initiated at the onset of a site emergency or major storm:

1. All personnel have been trained to understand their role in an emergency. At least one employee is to monitor the telephone. Radio communications are provided between offices and all operating areas of the AS/DA at all times.
2. All lightweight signs and equipment are to be collected and stored in a secure area.
3. All depressed and eroded areas are to be protected and the stormwater management system is to be inspected, maintained, and repaired, as necessary.
4. If CCP disposal acceptance is discontinued, work is to resume in dry areas only; at no time are CCP materials to be deposited in standing water.
5. The following emergency phone numbers are provided:
  - Site Emergency Contact – (352) 501-5555
  - Emergency Police/Fire/Medical – Site Emergency Contact (see above)
  - Crystal River Fire Department – (352) 795-1928
  - Seven Rivers Regional Medical Center – (352) 795-6560

The stormwater management system should allow for disposal operations to continue during periods of inclement weather. Temporary berms, ditches, and grading are to be used to drain stormwater away from the active face of the AS/DA.

Operational hours of the AS/DA may be extended to meet the needs of the plant. Should violent weather (such as a hurricane) be approaching the facility, DEF may elect to increase hauling and disposal activities in order to maintain as low a level as possible in the on-site storage silos in preparation for times when hauling may be delayed.

The following actions should be taken at the AS/DA following a severe storm, hurricane, or other natural disaster requiring implementation of emergency operations:

- The FDEP Southwest District Office Solid Waste Program is to be notified within 24 hours by telephone if a need for emergency and contingency operations are warranted. The phone number for FDEP is (813) 470-5700.
- Necessary additional equipment, if required, should be mobilized.
- If required, additional equipment operators and/or other personnel should be contracted.
- Contacts with local governmental bodies and local emergency agencies such as fire and rescue will be established to coordinate emergency activities.
- Installation of siltation booms, rock filter check dams and sediment traps upstream of the sedimentation basin and overflow weirs to reduce the potential for solids carryover.
- Site personnel will monitor weir systems so that proper notifications can be made, and samples of water can be obtained during the overflow event as required by the facility NPDES permit.

## **2.6 Sub-Surface Instability**

In accordance with the CREC Conditions of Certification, if surface depressions, or other occurrences which may be indicative of sinkhole activity, or sub-surface instability are discovered on site, or within 500 feet of the AS/DA, the FDEP will be notified verbally within 24 hours of the discovery. Written notification will be submitted within seven days of the discovery. The written notification will include a description of the depression, the location and size of the depression, and a corrective action plan which describes the action necessary to prevent the unimpeded discharge of waste, leachate or CCPs into ground or surface waters. If the depression or subsurface collapse occurs within the AS/DA, additional materials will not be stored or disposed in the affected area until subsurface disturbance has been fully investigated and remediated, if necessary.

### **3.0 MAINTENANCE**

#### **3.1 General**

Formal weekly and annual inspections of each active and reclaimed area of the AS/DA are performed. Remedial measures for any deficiencies noted during the inspections should be carried out promptly.

#### **3.2 Roads**

The haul roads to the disposal site will be maintained for smooth traffic flow. In the event that rutting, or potholes develop, or the road edges give way, the affected areas should be repaired. Dust control should be performed on the haul road as described in Section 2.2.8. The haul road shoulders should be maintained in good condition and free from excessive buildup of ash materials and all culverts under the road should be kept clear of silt and debris as much as practical.

#### **3.3 Stormwater Management System**

The AS/DA stormwater management system is designed to detain run-off generated by a 10-year, 24-hour storm event and control run-off generated by a 25-year, 24-hour storm event. All drainage structures, pipes, culverts, ditches, and basins will be maintained such that accumulation of silt and debris do not compromise the proper flow and collection of stormwater. When a significant amount of sediment has accumulated in run-off basins, the sediment should be removed and spread in a thin layer (three inches maximum) over the area where CCP disposal is taking place at the time, allowed to dry, and then compacted along with CCPs as usual. Records of sediment removal will be kept that will include date of removal, location of removal, amount of sediment removed, location sediment is removed to, and the contractor utilized (if applicable).

The AS/DA stormwater management system is covered under the Crystal River Units 4 and 5 NPDES permit and is therefore also covered by the Stormwater Pollution Prevention Plan (SWPPP) requirements. This Plan includes maintenance and inspection of stormwater system equipment and facilities to ensure proper operation. The SWPPP requirements also include annual training for DEF personnel and contractors involved in the proper management of stormwater systems.

#### **3.4 Vegetated Areas**

Special care should be taken to maintain a good vegetative cover and prevent erosion of cover material on both intermediate and final cover areas at the AS/DA. Any areas of erosion should be filled, stabilized, and re-seeded (or re-sodded) as soon as weather permits. Final cover areas are mowed as needed to allow visual inspections (typically four to six times per year).

## **4.0 WATER QUALITY MONITORING**

### **4.1 Groundwater Monitoring**

Monitoring of groundwater quality is performed at the facility in accordance with requirements contained in the facility's the Groundwater Monitoring Plan as authorized by the FDEP. The monitoring wells associated with the AS/DA include TWI-1R, TWI-2R (piezometer – water level only), TWI-3R, TWI-4, TWI-5, MWI-2R2, and MWC-12R. Groundwater monitoring is performed by DEF on a quarterly basis and analyzed for the constituents listed in the approved Groundwater Monitoring Plan. Groundwater monitoring well locations in the vicinity of the AS/DA are shown on Figure 2.

### **4.2 Surface Water Monitoring**

Surface water monitoring for the AS/DA is conducted by DEF per discharge event at the internal overflow weir (designated C40) prior to prior to co-mingling with the remainder of the facility's run-off collection system in accordance NPDES Industrial Wastewater Permit (IWWP) FL0036366. Surface water samples are analyzed for the constituents listed in the permit.

## **5.0 SAFETY AND SECURITY**

### **5.1 General Safety**

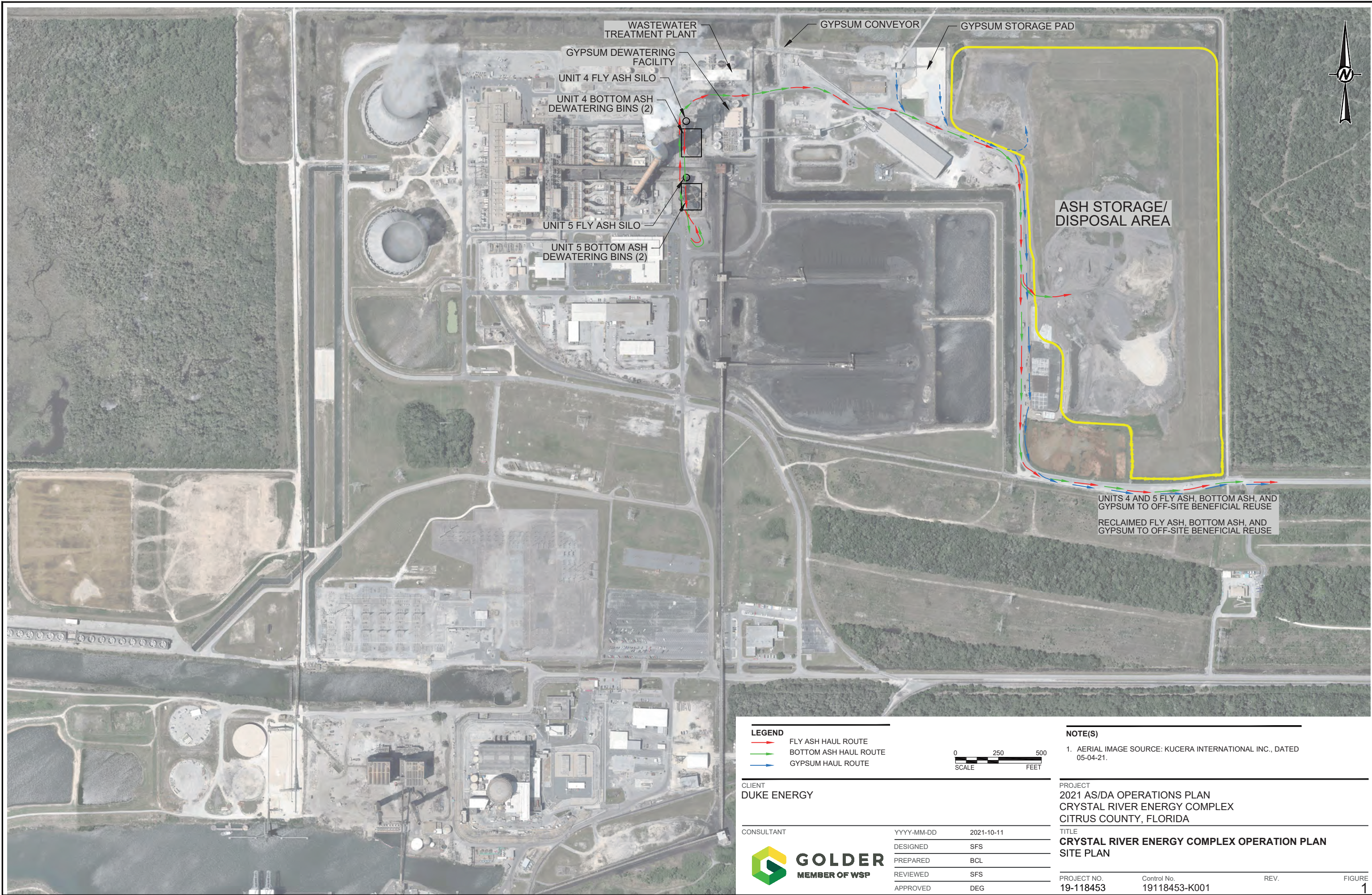
The Primary CCP Contractor and Reclamation Contractor (including their customers and vendors) shall perform their work in a safe manner. In addition, contractors shall adhere to all applicable federal, state and local laws, orders, rules and regulations, including those relating to hazardous substances. The contractors shall be solely responsible for the safety of all persons performing work, hereunder, as well as others, including members of the public, affected by that work. The contractors will supply the necessary safety and protective equipment required (i.e., hard hats, safety glasses, gloves, rain suits, coveralls, etc.) to perform the work safely. The Contractors shall be familiar with all safety rules and applicable regulations associated with the CREC. All such safety rules and regulations must be followed.

### **5.2 Site Security**

The AS/DA area is secured from off-site entry by an 8-foot-high fence and gate across the north access road. Entry into the plant area is controlled by security personnel at the Access Control Point on West Power Line Street. Security guards are posted at both locations to monitor traffic entering and leaving the plant and the AS/DA area. No personnel without proper authorization from DEF will be allowed to enter CREC.

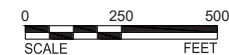
## FIGURES

Path: \\golder-goldcorp\data\Office\Jacksonville\Drawings\19118453 Duke Energy Crystal River ROROK - 2021 AS DA Operations Plans\Active Drawings\19118453-K001.dwg



LEGEND

- FLY ASH HAUL ROUTE
- BOTTOM ASH HAUL ROUTE
- GYPSUM HAUL ROUTE



CLIENT  
DUKE ENERGY

CONSULTANT



**GOLDER**  
MEMBER OF WSP

|            |            |
|------------|------------|
| YYYY-MM-DD | 2021-10-11 |
| DESIGNED   | SFS        |
| PREPARED   | BCL        |
| REVIEWED   | SFS        |
| APPROVED   | DEG        |

NOTE(S)

- AERIAL IMAGE SOURCE: KUCERA INTERNATIONAL INC., DATED 05-04-21.

PROJECT  
2021 AS/DA OPERATIONS PLAN  
CRYSTAL RIVER ENERGY COMPLEX  
CITRUS COUNTY, FLORIDA

TITLE  
**CRYSTAL RIVER ENERGY COMPLEX OPERATION PLAN  
SITE PLAN**

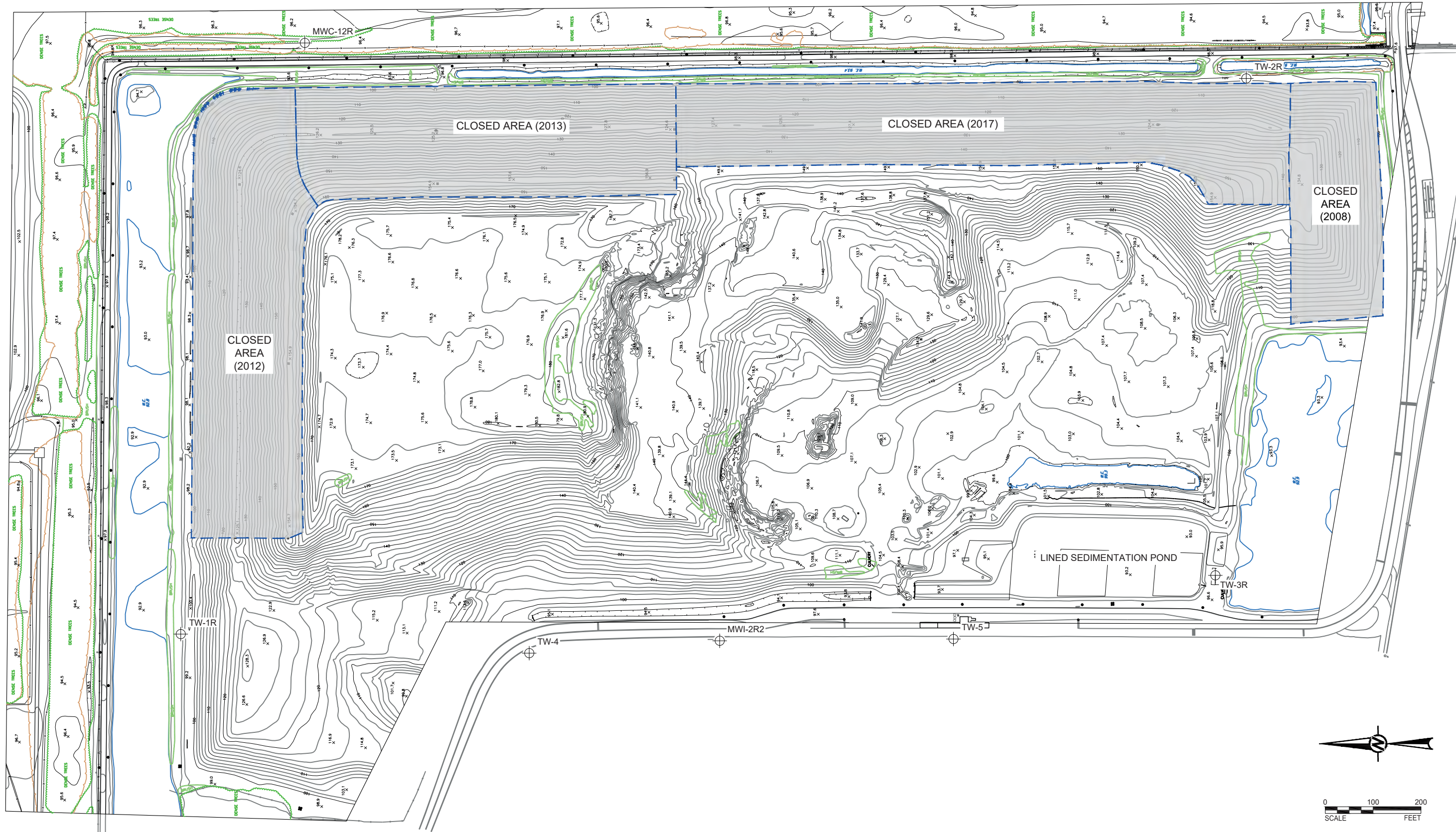
PROJECT NO.  
19-118453

Control No.  
19118453-K001

REV.

FIGURE  
1

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



LEGEND



GROUNDWATER MONITORING WELL LOCATION

REFERENCE(S)

1. EXISTING CONTOURS BASED ON MAY 04, 2021 TOPOGRAPHIC SURVEY BY KUCERA INTERNATIONAL INC.

CLIENT  
DUKE ENERGY

CONSULTANT



**GOLDER**  
MEMBER OF WSP

|            |            |
|------------|------------|
| YYYY-MM-DD | 2021-10-11 |
| DESIGNED   | SFS        |
| PREPARED   | BCL        |
| REVIEWED   | SFS        |
| APPROVED   | DEG        |

PROJECT  
2021 AS/DA OPERATIONS PLAN  
CRYSTAL RIVER ENERGY COMPLEX  
CITRUS COUNTY, FLORIDA

TITLE  
**ASH STORAGE/DISPOSAL AREA  
EXISTING CONDITIONS**  
- MAY 04, 2021 -

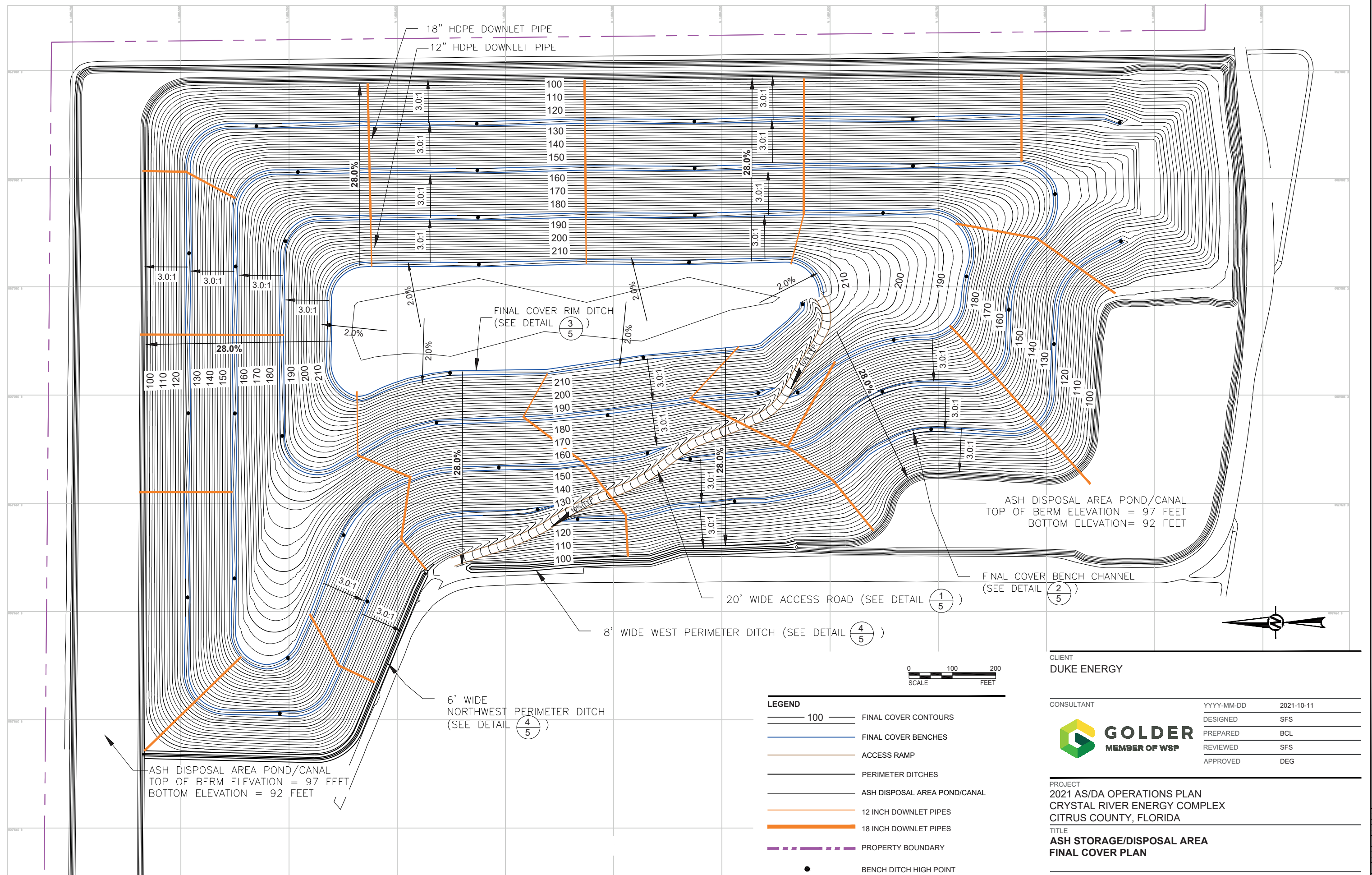
PROJECT NO.  
19-118453

Control No.  
19118453-K002

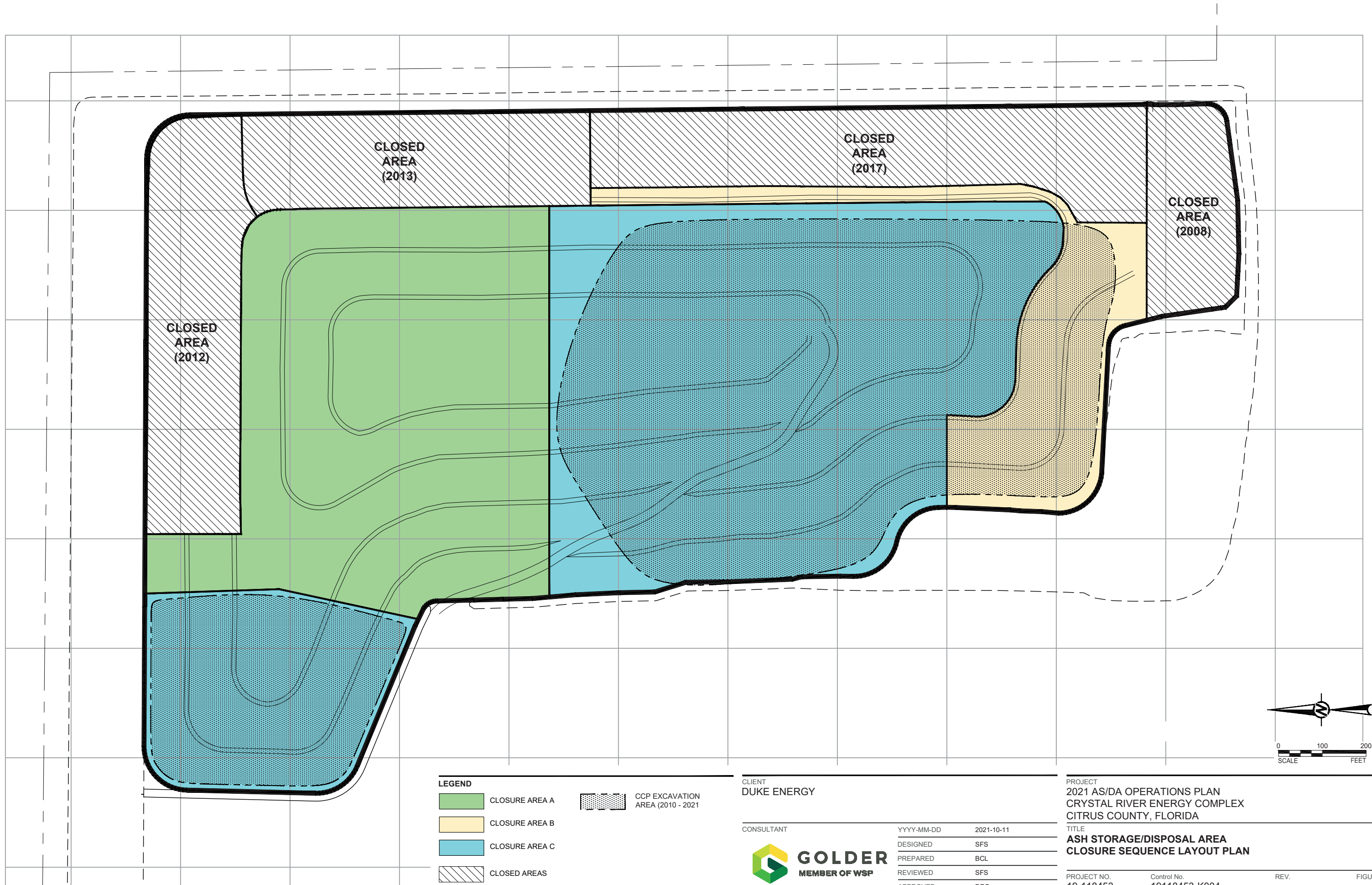
REV.

FIGURE

2



Path: \\golder-goldcorp\data\Office\Jacksonville\Drawings\19118453 Duke Energy Crystal River ROROK - 2021 AS DA Operations Plans\Active Drawings\19118453-K004.dwg | File Name: 19118453-K004.dwg



| LEGEND                                                                                |                                   |
|---------------------------------------------------------------------------------------|-----------------------------------|
|  | CLOSURE AREA A                    |
|  | CLOSURE AREA B                    |
|  | CLOSURE AREA C                    |
|  | CLOSED AREAS                      |
|  | CCP EXCAVATION AREA (2010 - 2021) |

CLIENT  
DUKE ENERGY

CONSULTANT



|            |            |
|------------|------------|
| YYYY-MM-DD | 2021-10-11 |
| DESIGNED   | SFS        |
| PREPARED   | BCL        |
| REVIEWED   | SFS        |
| APPROVED   | DEG        |

PROJECT  
2021 AS/DA OPERATIONS PLAN  
CRYSTAL RIVER ENERGY COMPLEX  
CITRUS COUNTY, FLORIDA

TITLE  
**ASH STORAGE/DISPOSAL AREA  
CLOSURE SEQUENCE LAYOUT PLAN**

PROJECT NO.  
19-118453

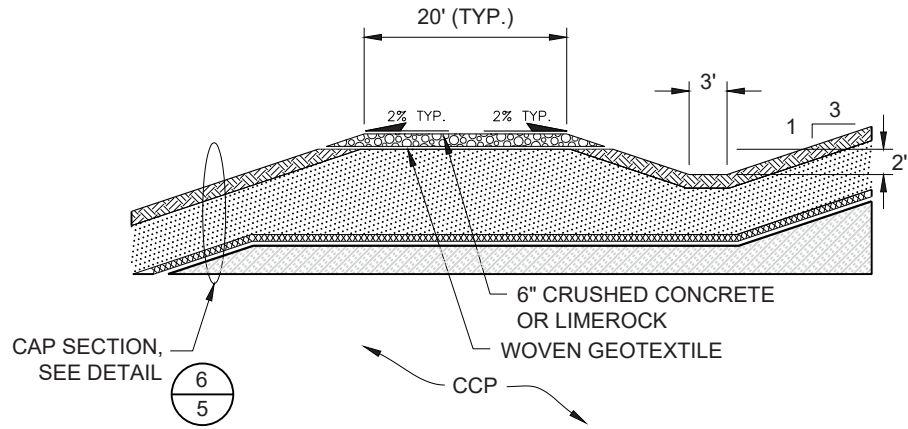
Control No.  
19118453-K004

REV.

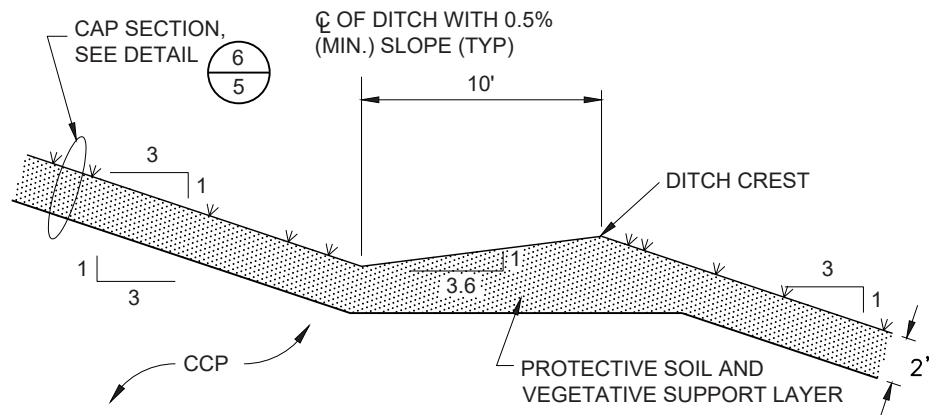
FIGURE  
4

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

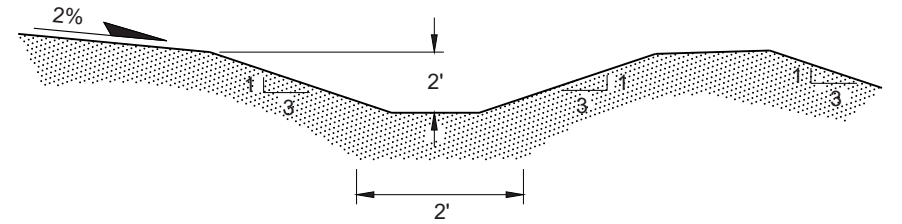
Path: \\golder-gis\compledata\Office\Jacksonville\Drawings\19-118453 Duke Energy Crystal River RORCOK - 2021 AS/DA Operations Plan\Active Drawings\19-118453-K005.dwg



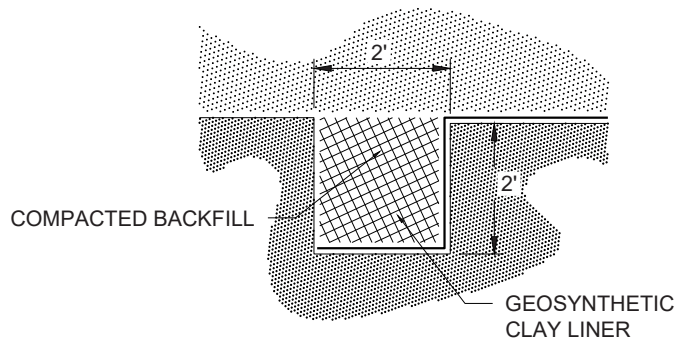
**1**  
**5** **ACCESS ROAD ON FINAL COVER**  
NOT TO SCALE



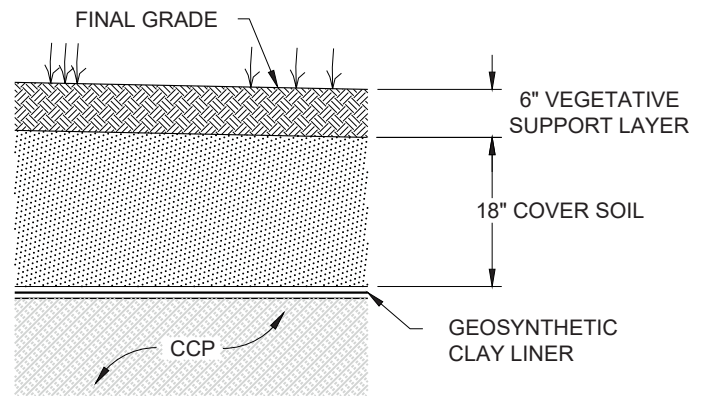
**2**  
**5** **FINAL COVER BENCH CHANNEL**  
NOT TO SCALE



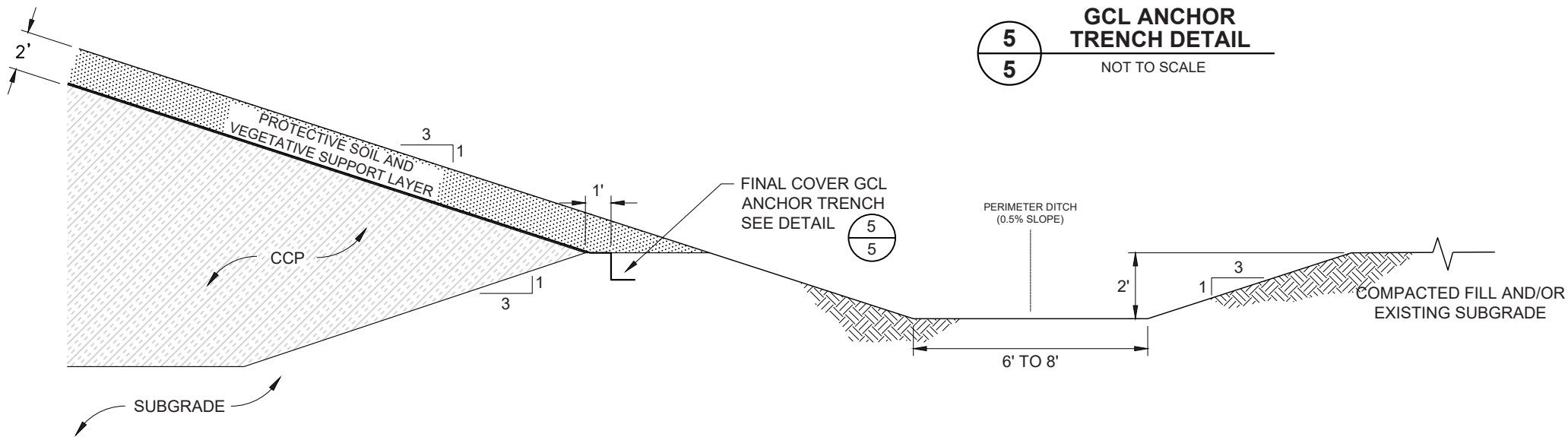
**3**  
**5** **FINAL COVER RIM DITCH**  
NOT TO SCALE



**5**  
**5** **GCL ANCHOR TRENCH DETAIL**  
NOT TO SCALE



**6**  
**5** **FINAL COVER SECTION**  
NOT TO SCALE



**4**  
**5** **PERIMETER DITCH DETAIL**  
NOT TO SCALE

CLIENT  
DUKE ENERGY

CONSULTANT



|            |            |
|------------|------------|
| YYYY-MM-DD | 2021-10-11 |
| DESIGNED   | SFS        |
| PREPARED   | BCL        |
| REVIEWED   | SFS        |
| APPROVED   | DEG        |

PROJECT  
2021 AS/DA OPERATIONS PLAN  
CRYSTAL RIVER ENERGY COMPLEX  
CITRUS COUNTY, FLORIDA

TITLE  
**ASH STORAGE/DISPOSAL AREA  
DETAILS**

PROJECT NO.  
19-118453

Control No.  
19118453-K005

REV.

FIGURE  
**5**

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

APPENDIX A

# ORGANIZATION CHART

**ORGANIZATION CHART**

