Geosyntec consultants

12802 Tampa Oaks Blvd, Suite 151
Tampa, Florida 33637
PH 813.558.0990
www.geosyntec.com

3 May 2024

Ms. Amy Normin
Engineering Specialist I
Florida Department of Environmental Protection
Permitting & Waste Cleanup Programs
Southwest District

Subject: **Response to First Request for Additional Information**
Facility Name: Lakeland Electric C.D. McIntosh (Site)
Facility ID: 0030976
DEP Application No.: 53-0030976-001-EM

Dear Ms. Normin:

Geosyntec Consultants, Inc. (Geosyntec) has reviewed the Florida Department of Environmental Protection (FDEP) First Request for Additional Information (RAI #1) dated 15 February 2024 regarding the "Environmental Resource Permit Application for C.D. McIntosh Power Plant Demolition" submitted on behalf of Lakeland Electric ("Lakeland"). We note that the C.D. McIntosh Power Plant Units 3 and 5 are certified under the Florida Electrical Power Plant Siting Act (PPSA), section 403.501 et seq., Florida Statutes (PA 74-06). All activities that are the subject of this submittal are within the certified site boundaries. As such, Lakeland is not required or permitted to obtain separate permits or approvals, including separate environmental resource permits. § 403.511(1), Fla. Stat. We recognize that there has been some confusion regarding the nature of and appropriate review process for our 12 January 2024, submittal. Based on our discussions with the FDEP Office of Siting Coordination, we now believe that all agree that our requested revisions to the existing stormwater management system on the certified plant site should be reviewed as a post-certification submittal pursuant to section 403.5113(2), Florida Statutes; Rule 62-17.191, Florida Administrative Code; and PA 74-06, Conditions of Certification A.XX. and B.XXIX.A. We have provided the following responses to facilitate FDEP's review of our postcertification submittal relative to revisions to the McIntosh stormwater management system to facilitate demolition of Units 1, 2, and 3.

To facilitate review, each FDEP comment is provided in underlined italics with Geosyntec's response following the comment in boldface type.

FDEP Comment 1: Due to the size of modifications proposed to the existing permitted structures, the requested construction does not qualify for a major modification under 62-330.315, F.A.C., and requires regulatory authorization in the form of an Environmental Resource Individual Permit.

Therefore, please provide the following items needed to determine the proper form of authorization required. [Pursuant to the ERP Applicant's Handbook Vol. I Section 5.5]

Geosyntec Response to Comment 1: As explained above and discussed with the FDEP Office of Siting Coordination, the requested revisions to the existing stormwater management system on the certified plant site should be reviewed as a post-certification submittal pursuant to section 403.5113(2), Florida Statutes; Rule 62-17.191, Florida Administrative Code; and PA 74-06, Conditions of Certification A.XX. and B.XXIX.A. Separate, individual approvals/permits are not authorized under the PPSA.

FDEP Comment 2: The correct application fee for an Individual Permit submitted through the business portal with less than 40 acres of work within wetlands is $1500.00. Please provide the Department with the application fee of $1500.00. [Pursuant to the ERP Applicant's Handbook Volume I, Section 4.3]

Geosyntec Response to Comment 2: The proposed SWMS updates will be authorized through a post-certification submittal; therefore, an application fee for an Individual Permit is not applicable to this application.

FDEP Comment 3: An application for an ERP Individual Permit shall be made on Form 62-330.060(1), including the information required in the applicable Sections A, B, C, D, F, G, H, and I, incorporated by reference in subsection 62-330.060(1), F.A.C., and be signed by a person having sufficient real property interest. Please provide a completed Section A signature page on the current Form 62- 330.060(1), F.A.C. and include the required signature/s therein. [Pursuant to the ERP Applicant's Handbook Volume I, Section 4.2.3]

Geosyntec Response to Comment 3: The proposed SWMS updates will be authorized through a post-certification submittal; therefore, an application fee for an Individual Permit is not applicable to this application. For informational purposes, the application package that was submitted to the FDEP on 12 January 2024 included a completed Section A signature page on the current Form 62-330.060(1), F.A.C. The signature page with the required signatures is included in Attachment A.

FDEP Comment 4: The submitted Section C states "XX-acres of permanent impact" and the impact table is not complete to show those impacts. Please provide a completed Section C on the current Form 62- 330.060(1), F.A.C. [Pursuant to the ERP Applicant's Handbook Volume I, Section 4.2.3]

Geosyntec Response to Comment 4: A completed Section C, which includes the impact table, on the current Form 62-330.060(1), F.A.C is included in Attachment B. Attachment B also includes an Environmental Narrative, which describes the project, wetland impacts, avoidance and minimization, and proposed mitigation.

FDEP Comment 5: The application did not indicate what type(s) of "best management practices" (BMP's) will be employed throughout the construction process. Please describe what type(s) of BMP's and/or construction methodologies will be used during construction to prevent water quality violations. [Pursuant to the ERP Applicant's Handbook Volume I, Section 10.2.4]

Geosyntec Response to Comment 5: The application submitted to the FDEP on 12 January 2024 included signed and sealed engineering plans. The plans included sediment and erosion control notes on sheet 2; stormwater pollution prevention plans on sheets 19 and 20; and sediment and erosion control plans on sheets 21-23. All of these details should be considered as "Best Management Practices". The anticipated construction methodologies will include open excavation and grading activities using wheeled and tracked equipment. No equipment or materials will be delivered by barge. The contractor will be responsible for the installation and maintenance of all sediment and erosion control measures specified in the engineering plans, which are included in Attachment C.

FDEP Comment 6: A geotechnical report was not submitted with the application. An Individual Environmental Resource Permit (ERP) involving the construction of a stormwater management system must provide drainage calculations that include the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions. Please submit a geotechnical report that identifies the wet season high water table elevations, soil profiles, and hydraulic conductivity, including dates, datum, and methods used to determine these soil parameters. Please submit a geotechnical report that is signed, sealed, and dated by a registered professional. [Pursuant to Section E of Form 62-330.060, F.A.C, Section Part 1.1.b]

Geosyntec Response to Comment 6: The proposed SWMS updates will be authorized through a post-certification submittal; an Individual Environmental Resource Permit is not being sought. The stormwater management system design calculations that were included in Appendix E of the application submitted to the FDEP on 12 January 2024. These calculations used soils data and the estimated seasonal high ground water table (SHWT) from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS), [USDA, 2018a]. Additionally, the SHWT was compared to those used for previously approved stormwater management systems at the Site. The Stormwater Design Calculations are included in Attachment D for reference.

FDEP Comment 7: Project drawings were not submitted with the ERP application. An application must provide sufficient construction plans, drawings, calculations, and other supporting documents that depict and describe all of the proposed activities. Please ensure that all pertinent information, i.e., project limits, wetland and/or surface water line boundaries, proposed wetland/surface water impacts, the acreage and percentages of impervious surfaces, buildings, pervious surfaces, stormwater design including cross-sections, implementation of Best Management Practices (BMPs),

etc., are depicted on the drawings. Please provide drawings that are signed and sealed by a professional engineer and registered in the State of Florida. [Pursuant to the ERP Applicant's Handbook Volume II, Section 2.2, and Chapter 62-330.060(1), F.A.C.]

Geosyntec Response to Comment 7: The engineering drawings (signed and sealed by a professional engineer registered in the State of Florida) were submitted to the FDEP under separate cover on 12 February 2024. The Office of Siting Coordination confirmed receipt during a call on 23 February 2024. A copy is included in Attachment C.

FDEP Comment 8: The application does not appear to provide calculations that provide the required and proposed treatment volumes for all drainage areas within the project boundaries. The proposed stormwater management system must be capable of treating 1-inch of runoff over the contributing area for a wet detention system. Please provide calculations and/or additional documentation, as necessary, to provide reasonable assurance the system will be capable of treating the required volume for each associated drainage area, specifically, please ensure all basins listed in Figure 1A will be provided with their required treatment volumes. [Pursuant to the ERP Applicant's Handbook Volume II, Section 4.1]

Geosyntec Response to Comment 8: Please refer to Attachment 3 of Stormwater Design Calculations, which was included in the 12 January 2024 submittal. It is included in Attachment D of the RAI Response.

FDEP Comment 9: The submitted application material does not provide a complete description of existing and proposed structures. Construction plans, drawings, calculations, and other supporting documents that depict and describe the proposed activities may be requested in order to process and evaluate whether the application meets the standards and criteria for issuance. Specifically, the submitted O&M Plan lists operation and maintenance conditions for dry retention areas and hydraulic conveyances that are not listed elsewhere in the application material/stormwater report. Please provide clarification on the scope of the O&M plan, as well as all existing and proposed structures. [Pursuant to ERP Applicant's Handbook Volume I, Section 4.2.3, Chapter 62- 330.301(1), F.A.C., and Parts III, IV, and IV of the SWFWMD ERP Applicant's Handbook, Volume II]

> *Please note: Coordination with the DEP Siting Coordination Office may be necessary to certify regulatory and operational conditions previously authorized for the site and shall be complied with, or superseded, for the issuance of the ERP permit.*

Geosyntec Response to Comment 9: The engineering drawings included in Attachment C show the existing conditions, structures and pavement to be removed and the proposed grading, including the enlarged zero discharge pond and new stormwater ponds. Calculations for the Stormwater ponds are included in Attachment D.

The O&M Plan has been revised to remove all references to the operations and maintenance

conditions for dry detention areas. The revised O&M Plan is included in Attachment E.

FDEP Comment 10: The submitted stormwater report depicts the proposed stormwater management system as producing zero offsite discharge after construction. Please provide clarification that all listed drainage areas - 1, 2, 3A, 3A-1, 3B, 3B-1, 3C, 3C-1, 3C-1, 3D, 4, Half Coal Yard, Half Boal Yard 2, and BSA Landfill – are proposed to have zero offsite discharge, and reasonable assurance that the system will be capable of providing water quantity storage and water quality treatment as a zero discharge system. [Pursuant to the ERP Applicant's Handbook Volume II, Part III]

Geosyntec Response to Comment 10: The proposed stormwater management plan utilizes the Zero Discharge Pond, Fish Lake, and Lake Parker as the receiving water bodies for the stormwater. The Zero Discharge Pond currently functions as a zero discharge feature, but does have a valve that allows the water to be discharged after inspection into Lake Parker. The same operational function will remain after the proposed SWMS is installed; however, the Zero Discharge Pond will be enlarged to achieve the capacity required to the additional drainage areas. The proposed admin pond will outfall into Lake Parker as shown on the Engineering Plans, Attachment C. Fish Lake will not be altered from its current footprint and will receive the stormwater from the former Coal Yard area. The Stormwater Design Calculations provide the calculations for each of these features and are included in Attachment D.

CLOSING

We appreciate the opportunity to provide these clarifications regarding our 12 January 2024 postcertification submittal. If you have any questions or concerns, please do not hesitate to contact the undersigned.

If you have any questions or concerns, please do not hesitate to contact either of the undersigned.

Regards,

Todd D. Anderson, P.E.
Principal Engineer

Geosyntec consultants

Michael H. Scott, PE
Digitally signed by Michael H. Scott, PE
Date: 2024.05.13 16:52:58 -04'00'

Michael H. Scott, PMP, P.E.
Florida Professional Engineer No. 72475
Geosyntec Consultants, Inc.
Certification of Authorization No. 4321

Attachments: Attachment A – Signature Page, Section A
Attachment B – Section C and Environmental Narrative
Attachment C – Engineering Drawings
Attachment D – Stormwater Design Calculations
Attachment E – O&M Plan (REV 1)

Copies to:

ATTACHMENT A
Signature Page, Section A

Part 4: Signatures and Authorization to Access Property

Instructions: For multiple applicants please provide a separate Part 4 for each applicant. For corporations, the application must be signed by a person authorized to bind the corporation. A person who has sufficient real property interest (see Section 4.2.3(d) of Applicant's Handbook Volume I) is required in (B) to authorize access to the property, except when the applicant has the power of eminent domain.

A. By signing this application form, I am applying for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, and that work prior to approval is a violation. I understand that this application and any permit issued or proprietary authorization issued pursuant thereto does not relieve me of any obligation for obtaining any other required federal, state, water management district, or local permit prior to commencement of construction. I agree to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a different responsible operation and maintenance entity. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Miles Dentler Typed/Printed Name of Applicant or Applicant's Authorized Agent	Signature of Applicant or Applicant's Authorized Agent	01/10/2024 Date

(Corporate Title if applicable)

B. Certification of Sufficient Real Property Interest And Authorization For Staff To Access The Property:

I certify that:

☒ **I possess sufficient real property interest in or control, as defined in Section 4.2.3 (d) of Applicant's Handbook Volume I,** over the land upon which the activities described in this application are proposed and I have legal authority to grant permission to access those lands. I hereby grant permission, evidenced by my signature below, for staff of the Agency to access, inspect, and sample the lands and waters of the property as necessary for the review of the proposed works and other activities specified in this application, upon advance notice. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review, inspection, and/ or sampling. Further, if a permit is granted, upon advance notice, I agree to provide entry to the project site for such agents or personnel with proper identification to determine compliance with permit conditions and permitted plans and specifications.

OR

☐ I represent an entity having **the power of eminent domain and condemnation authority**, and I/we shall make appropriate arrangements to enable staff of the Agency to legally access, inspect, and sample the property as described above.

Miles Dentler Typed/Printed Name	Signature	01/10/2024 Date

(Corporate Title if applicable)

C. Designation of Authorized Agent (If Applicable):

I hereby designate and authorize Michael Scott to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirements which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S., and 18 U.S.C. Section 1001.

Miles Dentler		01/10/2024
Typed/Printed Name of Applicant	Signature of Applicant	Date

(Corporate Title if applicable)

ATTACHMENT B
Section C and Environmental Narrative

Section C: Supplemental Information for Works or Other Activities In, On, or Over Wetlands and/or Other Surface Waters

Instructions: **This section is for applications that do not involve activities associated with an individual single-family residence, duplex, triplex, or quadruplex. For those activities, please use Section B.** This form is to be completed if the proposed work or activity will occur in, on, over, or within 25 feet of a wetland or other surface water. The supplemental information required by this section is in addition to the information required by Section A of the application.

Part 1: Wetland or Other Surface Water Impact Summary

1. Describe the basic purpose of the project or activity: **The purpose of this project is to conduct demolition activities at Units 1, 2, and 3 and the Coal Yard at the McIntosh Power Plant. The project includes removal of infrastructure, site grading, and construction of a new stormwater management system for the site. Existing surface waters ponds within the project area will be altered, new outfalls will be installed, and riprap revetments will be installed to ensure no scouring or erosion will occur.**

2. Total area of work (dredging, filling, construction, alteration, or removal) in, on, or over wetlands or other surface waters: sq. ft.; **1.22 ac.**

3. Total volume of material to be dredged or filled in wetlands or other surface waters:
   a. to be dredged: **3,581** cubic yards,
   b. to be filled: **2,804** cubic yards.

4. Identify the seasonal high water level (SHWL) and wetland normal pool elevations for each wetland or surface water within the project site. For tidal wetlands and/or surface waters provide the elevation of mean high and mean low water. Include an aerial photograph showing the location of each sampling location, dates, datum, and methods used to determine these elevations. **Please refer to the Drainage Report.**

5. Name of waterbody(ies) (if applicable & if known) in which work will occur? **Fish Lake, Lake Parker**

6. Is the activity proposed in an Outstanding Florida Water or Aquatic Preserve?
   ☐ yes, name: ☒ no ☐ I don't know

7. Has there ever been a formal or informal wetland determination for the project site? If yes, provide the identifying number and/or a copy of the jurisdictional map. **No.**

8. Provide a map(s) of the project area and vicinity delineating USDA/NRCS soil types. **Please see the enclosed Soil Map.**

9. Provide recent aerials legible for photointerpretation (no photocopies) with a scale of 1" = 400 ft, or more detailed, with project boundaries and wetland boundaries delineated on the aerial. **Please see the enclosed Aerial Map.**

10. Provide maps accurately portraying the existing and proposed natural vegetative community types and land cover classifications using recognized classification schemes. Suggested sources include: the Florida Natural Areas Inventory Guide to the Natural Communities of Florida (2010) available at http://www.fnai.org/naturalcommguide.cfm, or the Florida Land Use and Cover Classification System (FLUCCS) (FDOT 1999, available at http://www.dot.state.fl.us/surveyingandmapping/documentsandpubs/fluccmanual1999.pdf). For vegetated areas dominated by exotic vegetation, use the descriptors representative of the native community type that was present prior to exotic infestation. **Please see the enclosed Land Use Map.**

11. Impact Summary Tables (located at the end of this section):
    a. For all projects, complete Table 1, 2 and 3 as applicable. **Please see below.**
    b. For shoreline stabilization projects, provide the information requested in Table 4. **Not applicable.**

12. If the activity is located on state owned submerged lands and requires a lease or easement, provide a list of names and addresses from the latest county tax assessment roll of all property owners located within a 500 ft. radius of the proposed lease or easement boundary in mailing label format, or you may elect to send notice to those persons by certified mail, with the return-receipt card addressed to the DEP or water management district, as applicable, in accordance with subsection 18-21.005(3), F.A.C., and Section 253.115, F.S. Attach additional sheets if necessary.
    1. Name: **N/A**
       Mailing Address: **N/A**
       City, State, Zip Code: **N/A**

Part 2: Environmental Considerations

Note: for many questions, a state statute/Applicant's Handbook Volume I (AH I)/State 404 Program Applicant's Handbook section is cited to assist the applicant in addressing these questions.

1. Elimination or Reduction of Impacts (Avoidance and Minimization). Describe measures taken to eliminate or reduce impacts to wetlands and other surface waters (*Refer to AH I Section 10.2.1*). **The applicant has reduced and eliminated impacts to the greatest extent possible. The purpose of this Lakeland Electric McIntosh Power Plant application is to demolish power plant amenities that are no longer under operation. The demolition activities proposed require grading and reconfiguration of existing stormwater management features. Minor impacts to Wetlands A and C are proposed for the construction of three new stormwater outfalls totaling 0.08 acre of wetland impacts. The project also proposes elimination of the power plant canal (Surface Water 11). This will result in a total of 1.22-acre of alteration of wetlands and surface waters. The power plant cooling water canal (Surface Water 11) is upland cut and was authorized under the siting permit.**

2. Fish, Wildlife, Listed Species, and their Habitats. Provide results of any wildlife assessments that have been conducted on the project site and provide any comments, biological opinions, formal or informal consultation decisions, or recommended actions you have received pertaining to the project from the Florida Fish and Wildlife Conservation Commission, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. (*Refer to AH I Section 10.2.2*). **On June 9, 2023, January 5, 2024, and January 16, 2024, Flatwoods, Flatwoods conducted the listed species survey in accordance with the Florida Fish and Wildlife Conservation Commission (FWC) Florida Wildlife Conservation Guide. The purpose of the listed species survey was to identify presence and relative abundance of species considered Endangered, Threatened, or of Special Concern by the U.S.**

Fish and Wildlife Service (FWS) under 50 Code of Federal Regulations (CFR) 11-12 and the FWC under Chapter 68A-27, F.A.C. In addition, Flatwoods conducted a 100-percent survey to locate all gopher tortoise (*Gopherus polyphemus*) burrows and estimate the density of gopher tortoises within the project boundary. The tortoise survey was conducted in accordance with the FWC methodology as outlined in the Gopher Tortoise Permitting Guidelines April 2008 (revised April 2023). An Authorized Gopher Tortoise Agent supervised the gopher tortoise survey.

Two protected species were observed during the survey, Osprey (*Pandion haliaetus*) and Bald Eagle (*Haliaeetus leucocephalus*) (Ecological Survey Map). No listed plants were observed, and none of the listed plants are likely to occur. There are four known bald eagle nests within one mile of the project boundary, and nest PO278 is within 660 feet of the project area according to the FWC Eagle Nest Locator and the Audubon's Eagle Nest Locator, which is current through the 2022-2023 nesting season (FWC/Florida Natural Areas Inventory [FNAI] Map). According to the 1999 FWC wading bird colony database, one wading bird colony is located within one mile of the project boundary, however it was last known to be active in 1980. The project boundary is located within the Core Foraging Area (CFA) of four known wood stork (*Mycteria americana*) colonies: Lake Somerset, Little Gator Creek, Lone Palm, and Mulberry Northeast. This project will not result in greater than 0.5-acre of Suitable Foraging Habitat for the wood stork. According to the Florida Effect Determination Key for the Wood Stork, this project is not likely to adversely affect the wood stork.

FWS or FWC approvals regarding bald eagles will not be required as long as the work is conducted in accordance with the FWC Bald Eagle Management Plan (2008) and the FWS Bald Eagle Monitoring Guidelines. In accordance with the FWC and FWS guidelines, work should be conducted outside the nesting season (October 1 - May 15) or with nest monitoring in accordance with the Bald Eagle Monitoring Guidelines, if conducted during the nesting season within the 660-foot and 330-foot buffer. Any work within the 330-foot nest buffer would need to take place outside of the nesting season.

3. Water quantity impacts to wetlands and other surface waters (*Refer to AH I Section 10.2.2.4 and AH II*).

   a. Does the activity include a proposed surface water management system with a control elevation different than the wetland normal pool elevation(s) of existing or proposed created wetlands or other surface waters? **No.**

   b. If yes to (a), provide documentation (e.g. drawdown assessment or other methods) that shows the proposed surface water management system will not change the hydroperiod of the existing or created wetland or other surface water. **No.**

4. Public Interest Test. Please describe how the proposed activity will ***not be contrary*** to the public interest, OR if such an activity significantly degrades or is located within an Outstanding Florida Water (OFW), that the regulated activity will be ***clearly in*** the public interest (*Refer to AH I Section 10.2.3*).

   a. Please describe how the project will be designed to avoid adverse effects to public health, safety, or the welfare or the property of others. **Overall, this project is a net benefit to the public health, safety and welfare of the property of others. Proper demolition of the power plant should be conducted as the plant is no longer operational. By providing the required engineering and planning for proper demolition, and stormwater management, no public health or safety issues will remain.**

b. Please describe how the project will be designed to avoid adverse effects to the conservation of fish and wildlife, including endangered or threatened species, or their habitats. **On June 9, 2023, January 5, 2024, and January 16, 2024, Flatwoods conducted the listed species survey in accordance with the FWC Florida Wildlife Conservation Guide. The purpose of the listed species survey was to identify presence and relative abundance of species considered Endangered, Threatened, or of Special Concern by the FWS under 50 Code of Federal Regulations (CFR) 11-12 and the FWC under Chapter 68A-27, F.A.C. In addition, Flatwoods conducted a 100-percent survey to locate all gopher tortoise (*Gopherus polyphemus*) burrows and estimate the density of gopher tortoises within the project boundary. The tortoise survey was conducted in accordance with the FWC methodology as outlined in the Gopher Tortoise Permitting Guidelines April 2008 (revised April 2023). An Authorized Gopher Tortoise Agent supervised the gopher tortoise survey. Two protected species were observed, the osprey and bald eagle. No activities are proposed that will impact these species. Grading activities will be conducted with a small portion of the 660-foot protected nest buffer of Nest No. PO278.**

c. Please describe how the project will be designed to avoid adverse effects to navigation or the flow of water or cause harmful erosion or shoaling. **Two proposed activities will occur within Lake Parker which is the only area of the project where navigable waters are present. One stormwater outfall located at the southeast corner of the property (0.02-acre) will extend into wetlands associated with Lake Parker. This area is not a navigable section of the lake. The power plant cooling water canal (Surface Water 11) will be filled in as part of the demolition activities and results in 0.90-acre fill. Although the canal is contiguous with the lake, navigation activities do not occur within the limits of the power plant property. This canal was historically cut from uplands and is associated with the power plant siting permit. No other activities occur within navigable areas. No erosion or shoaling is anticipated. Please see the enclosed engineering plans for locations of erosion and sedimentation control devices. Controls will be installed prior to construction, maintained throughout, and removed upon achievement of adequate site stabilization.**

d. Please describe how the project will be designed to avoid adverse effects to the fishing or recreational values or marine productivity in the vicinity of the activity. **No impacts will occur to fishing or recreational values in the vicinity of the project. Proposed work consists of demolition of an existing power plant infrastructure located adjacent to Lake Parker. No activities will occur within navigable areas of the lake. Fish Lake is located entirely within the limits of the power plant property, no navigation or recreational activities occur here.**

e. Will the project be of a temporary or permanent nature? **This project will be permanent in nature.**

f. Please describe how the project will be designed to avoid adverse impacts to significant historical and archaeological resources, under the provisions of section 267.061, F.S. **Impacts to historical or archaeological resources are not anticipated. All proposed work will be conducted within an existing power plant property and consist of demolishing power plant infrastructure.**

g. Please describe how the project will be designed to avoid adverse effects to the current condition and relative value of functions being performed by areas affected by the proposed regulated activity. **Lakeland Electric has minimized direct impacts to the greatest extent practicable. Adverse effects to the current condition and relative value of function are not anticipated. Impacts to the wetlands and surface waters are unavoidable but were reduced to the furthest extent possible. Sedimentation and erosion control devices will be installed and maintained**

during construction to prevent impacts to adjacent wetlands and surface waters. The project area today consists of a power plant. Demolishing these facilities changes the current power plant condition of the property to a less industrialized state, which is an overall improvement to the current condition.

5. Water Quality.
   Provide a description of how water quality will be maintained in wetlands and other surface waters that will be preserved or will remain undisturbed, both on and offsite. Please address both short-term (such as during construction) and long-term water quality considerations (*Refer to AH I Section 10.2.4*). **To address short term water quality considerations, Lakeland Electric will be installing erosion and sedimentation control Best Management Practices (BMPs) around areas of construction prior to construction commencement. These controls will be maintained and remain in place until construction completion and final stabilization has occurred onsite. To address long term water quality considerations, Lakeland Electric will ensure all disturbed areas are permanently stabilized following construction completion.**

6. Class II Waters; Waters approved for shellfish harvesting *(Refer to AH I Section 10.2.5)*.

   a. Will the project occur in Class II that are NOT approved for shellfish harvesting? If yes, please provide a plan or procedure detailing the measures to be taken to meet the requirements of *AH I Section 10.2.5(a)*. **No.**

   b. Is the project located adjacent to or in close proximity to Class II waters? If yes, please provide a plan or procedure detailing the measures to be taken to meet the requirements of *AH I Section 10.2.5(b)*. **No.**

   c. Is the project located in Class II or Class III waters that are classified as “approved”, “restricted”, “conditionally approved”, or “conditionally restricted”? If yes, demonstrate that the project meets the requirements of *AH I Section 10.2.5(c)*. **No.**

7. Vertical seawalls. Are vertical seawalls proposed in an estuary or lagoon as part of the project? If yes, please describe how the project meets the requirements of *AH I Section 10.2.6*. **Not applicable.**

8. Secondary Impacts (*AH I Section 10.2.7*).

   a. Will an upland buffer, with a minimum width of 15' and an average width of 25', be provided between the proposed activities and existing wetlands or wetlands to be preserved, enhanced, restored, or created? Provide the location and dimension of all buffers on the plans. **No.** If not, demonstrate that secondary impacts will not occur or describe how they will be offset. **A 25-foot or greater setback is maintained throughout the majority of the proposed work, with the exception of the proposed stormwater outfalls. The demolition activities proposed will result in reconfiguration of existing stormwater management ponds and ditches. Impacts to Wetlands A and C are proposed for the construction of three new stormwater outfalls (0.08 acre of impact) and demolition of the power plant canal (Surface Water 11) will result in 0.90-acre of fill. Total impacts to wetlands and surface waters for the project is 1.22 acres. The power plant cooling water canal (Surface Water 11) is upland cut and was authorized under the siting permit. Mitigation is not proposed. No mitigation is required for alteration of the onsite surface waters as they are exempt pursuant to 62-340.700, F.A.C.**

b. If listed species are present or may be present, then coordination with wildlife agencies is needed. Have you coordinated with the FFWCC and/or USFWS? If so, please provide correspondence from the wildlife agencies indicating concurrence with the species management plan(s). **Impacts to wetland dependent wildlife and/or listed species that use uplands for nesting or denning are not anticipated during this project. Grading activities are proposed within 660-feet of bald eagle nest PO278. FWS or FWC approvals regarding bald eagles will not be required as long as the work is conducted in accordance with the FWC Bald Eagle Management Plan (2008) and the FWS Bald Eagle Monitoring Guidelines. In accordance with the FWC and FWS guidelines, work should be conducted outside the nesting season (October 1 - May 15) or with nest monitoring in accordance with the Bald Eagle Monitoring Guidelines, if conducted during the nesting season within the 660-foot and 330-foot buffer. Any work within the 330-foot nest buffer would need to take place outside of the nesting season.**

c. What measures will be taken to avoid impacts to wetland-dependent wildlife and/or listed species that use uplands for nesting or denning? **FWS or FWC approvals regarding bald eagles will not be required as long as the work is conducted in accordance with the FWC Bald Eagle Management Plan (2008) and the FWS Bald Eagle Monitoring Guidelines. In accordance with the FWC and FWS guidelines, work should be conducted outside the nesting season (October 1 - May 15) or with nest monitoring in accordance with the Bald Eagle Monitoring Guidelines, if conducted during the nesting season within the 660-foot and 330-foot buffer. Any work within the 330-foot nest buffer will take place outside of the nesting season.**

d. Describe whether there are any other relevant activities that are very closely linked and causally related to any proposed dredging or filling in wetlands or other surface waters that have the potential to cause impacts to significant historical and archaeological resources. **Impacts to historical or archaeological resources are not anticipated. All proposed work will be conducted within an existing power plant property and consist of demolishing power plant infrastructure.**

e. Are there additional future phases or extensions of the proposed activities that are not shown? If yes, please describe. **No.**

9. Cumulative Impacts. Is the proposed mitigation located within the same drainage basin (*Refer to AH I Figures 10.2.8.1 – 10.2.8.5)* as the proposed wetland impacts? If not, please submit a Cumulative Impact Evaluation in accordance with *AH I Section 10.2.8*.

10. Mitigation Plan (*Refer to AH I Section 10.3*).

a. If a mitigation bank is proposed to offset wetland/other surface water impacts, provide:

i. the name of the bank: **TBD**. A letter of reservation from the banker will be required once the application has been evaluated.
ii. If the mitigation bank was assessed using UMAM, provide UMAM worksheets for impact area(s). If the bank was assessed using a method other than UMAM, then prepare the impact assessment using the same method.

b. If mitigation is proposed to offset wetland/other surface water impacts, please provide a mitigation plan that includes, at a minimum, the following: N/A

i. ☐ Proposed mitigation narrative:

(1) ☐ Describe the current and proposed condition for each type of mitigation component (restoration, enhancement, creation, preservation), including:
   (a) ☐ Describe current and proposed vegetation
   (b) ☐ Describe current and proposed hydrologic conditions for the proposed mitigation.
   (c) ☐ Describe the soil types from NRCS maps and confirm if actual soil conditions appear to match.
(2) ☐ Provide details of the proposed construction/mitigation activities including phasing and timing, as appropriate.
(3) ☐ Identify measures that will be implemented during and after construction to avoid adverse impacts related to the proposed activities.
(4) ☐ A mitigation implementation and monitoring schedule with dates.
(5) ☐ Identify the success criteria.
(6) ☐ Describe the anticipated site conditions in and around the mitigation area after the mitigation plan is successfully implemented.
(7) ☐ Provide a comparison of current fish and wildlife habitat to expected habitat after the mitigation plan is successfully implemented.

ii. ☐ Provide a Management Plan that includes, as appropriate, aspects of operation and maintenance, including water management practices, vegetation establishment, exotic and nuisance species control, fire management, and control of access.

iii. ☐ Maps:
(1) ☐ Soil map (include soil names/codes, hydrologic soil groups and hydric soil types).
(2) ☐ Topographic map of the mitigation area and adjacent contributing and receiving areas.
(3) ☐ Hydrologic features map of the mitigation area and adjacent contributing and receiving areas.
(4) ☐ Vegetative communities map (using FLUCCS or other appropriate classification system).
(5) ☐ For all maps, identify source.

iv. Provide the necessary supporting information for the application of sections 62-345.400 - .600 (Uniform Mitigation Assessment Method (UMAM)). To meet this requirement, submittal of UMAM worksheets is acceptable for impact and mitigation areas.

v. If onsite and/or offsite applicant-responsible mitigation is proposed, submit a draft Conservation Easement document or other form of restrictive covenant that provides for protection of the mitigation area in perpetuity. Standard forms, as described in subsection 62-330.301(6), F.A.C., are available from the Agency or on its website.

vi. If onsite and/or offsite applicant-responsible mitigation is proposed, submit a cost estimate for completing the mitigation, including monitoring and maintenance.

vii. If onsite and/or offsite applicant-responsible mitigation is proposed and the proposed mitigation exceeds $25,000, please provide a draft financial assurance document. Standard forms, as described in subsection 62-330.301(5), F.A.C., are available from the agency or on its website.

viii. Identify the entity responsible for monitoring, maintenance, and long-term stewardship of the mitigation area (i.e. the landowner or homeowner association, not the consultant or contractor that will do the work).

Note: If your project is in retained waters, it is highly recommended that you coordinate the design of any mitigation plan that also may be required for the Corps permit to meet the requirements of both permits. Pre-application meetings with both the applicable Agency and the Corps can help you to choose a mitigation option that is acceptable to both the applicable Agency and the Corps.

Part 3: Plans

Plans: The information listed in the checklist below represents the typical information required on the submitted project plans. The Plans checklists in each application section are cumulative unless otherwise noted. Separate plans for each application section are not required.

1. ☒ Include the following on the construction plans and cross sections:

   a. ☐ An Existing Conditions sheet showing the entire project and wetland/other surface water boundaries. Include the following: Acreage and type (herbaceous, forested or other surface water) of each wetland/other surface water.
   b. ☒ A Proposed Conditions sheet showing the entire project and wetland/other surface water boundaries with construction plan overlay.
   c. ☐ A Proposed Wetland Impact sheet that includes the following:
      i. ☐ Acreage and type (herbaceous, forested, or other surface water) of each wetland/other surface water to be impacted.
      ii. ☐ Proposed upland buffers with dimensions.
      iii. ☐ Identify the seasonal high water and wetland normal pool elevations on the plans.
   d. ☐ Include wetland boundaries on all construction plan sheets.

2. ☐ If onsite and/or offsite applicant-responsible mitigation is proposed, submit mitigation plans and cross sections including, at a minimum: N/A

   a. ☐ existing conditions plan sheet identifying upland and wetland communities and acreage of each, topography, drainage patterns, and location of cross-section detail.
   b. ☐ proposed conditions plan sheet identifying proposed improvements by type (restoration, enhancement, creation, preservation), acreage of each, topography, drainage patterns, and location of cross-section detail.
   c. ☐ monitoring plan sheet including proposed improvements, monitoring transects, photostations, and mitigation signage (if applicable).
   d. ☐ cross-section and/or profile detail(s) sheet(s) including representative section of each type of mitigation component. Include existing and proposed conditions and representative elevations.
   e. ☐ planting schedule, plant species including common and scientific names divided into three sections (canopy, shrub, herbaceous) by mitigation component, quantity, spacing, size, and elevation range.

Table 1 - Project Wetland (Wl) And Other Surface Water (SW) And Impact Summary

WL & SW ID	UMAM ASSESSMENT AREA NAME(S)	WL & SW TYPE	WL & SW SIZE (acres)	WL & SW NOT IMPACTED (acres)	TEMPORARY WL &SW IMPACT SIZE (acres)	TEMPORARY WL & SW IMPACT TYPE	PERMANENT WL &SW IMPACT SIZE (acres)	PERMANENT WL & SW IMPACT TYPE	MITIGATION ID
A	Wetland A	640	0.63	0.57	-	-	**0.06**	F	**Wetland A Outfalls**
B	Wetland B	640	<0.01	<0.01	-	-	-	-	-
C	Wetland C	640	0.02	0.00			**0.02**	F	**Wetland C Outfall**
1	N/A	510	0.07	0.07	-	-	-	-	-
2	N/A	510	0.01	0.01	-	-	-	-	-
3	N/A	510	<0.01	<0.01	-	-	-	-	-
4	N/A	530	0.01	0.00	-	-	**0.01**	O	N/A
5	N/A	510	0.04	0.00	-	-	**0.04**	O	N/A
6	N/A	530	4.57	4.57	-	-	-	-	-
7	N/A	510	0.04	0.04	-	-	-	-	-
8	N/A	530	0.31	0.20	-	-	**0.11**	O	N/A
9	N/A	510	0.07	0.04	-	-	**0.02**	O	N/A
10	N/A	510	0.04	0.00	-	-	**0.04**	O	N/A
11	N/A	510	0.92	0.02	-	-	**0.90**	F	N/A
12	N/A	530	0.02	0.02	-	-	-	-	-
13	N/A	530	0.05	0.05	-	-	-	-	-
14	N/A	530	0.04	0.00	-	-	**0.04**	O	N/A
15	N/A	530	0.11	0.11	-	-	-	-	-
PROJECT TOTALS:			**6.92**	**5.72**	**-**	**-**	**1.22**		

Comments: **No mitigation is proposed for impacts to Surface Waters 4, 5, 8, 9, 10, 11, or 14. These features are exempt from mitigation pursuant to 62-340.700, F.A.C. Mitigation for impacts to Wetland A and C will be offset by purchasing credits from Horse Creek Mitigation Bank.**

Codes (multiple entries per cell not allowed):

- Wetland & Surface Water ID: Include ID on submitted wetland and surface water impact maps
- Wetland Type: from an established wetland classification system
- Impact Type: D=dredge; F=fill; H=change hydrology; S=shading; C=clearing; O=other

Table 2 - Project On-Site Mitigation Summary

MITIGATION ID	UMAM ASSESSMENT AREA NAME(S)	TARGET TYPE	CREATION AREA (acres)	RESTORATION AREA (acres)	ENHANCEMENT AREA (acres)	WETLANDS PRESERVE AREA (acres)	UPLAND PRESERVE AREA (acres)	OTHER AREA (acres)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PROJECT TOTALS:			N/A	N/A	N/A	N/A	N/A	N/A

COMMENTS: **Not applicable. No onsite mitigation is proposed. Mitigation for impacts to Wetland A and C will be offset by purchasing credits from Horse Creek Mitigation Bank.**

Codes (multiple entries per cell not allowed):

- Target Type or Type=target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

Table 3 - Project Off-Site Mitigation Summary

MITIGATION ID	UMAM ASSESSMENT AREA NAME(S)	TARGET TYPE	CREATION AREA (acres)	RESTORATION AREA (acres)	ENHANCEMENT AREA (acres)	WETLANDS PRESERVE AREA (acres)	UPLAND PRESERVE AREA (acres)	OTHER AREA (acres)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PROJECT TOTALS:			N/A	N/A	N/A	N/A	N/A	N/A

COMMENTS: **Not applicable. Offsite mitigation is not proposed. Mitigation for impacts to Wetland A and C will be offset by purchasing credits from Horse Creek Mitigation Bank.**

Codes (multiple entries per cell not allowed):

- Target Type or Type=target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

Table 4 - Shoreline Stabilization – Not applicable.

Stabilization	Linear Ft. New	Linear Ft. Replaced	Linear Ft. Repaired	Linear Ft. Removed	Slope H: V:	Toe Width (Ft.)
Natural Vegetation (living shoreline)	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Rip Rap + Vegetation	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Rip Rap	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Seawall + Rip Rap	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Vertical Seawall	**N/A**	**N/A**	**N/A**	**N/A**		
Other Shoreline Stabilization Type	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Size of Rip Rap

Type of Rip Rap

LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION
POLK COUNTY, FLORIDA

ENVIRONMENTAL NARRATIVE

1.0 PROJECT LOCATION

The Lakeland Electric McIntosh Power Plant Demolition Project is located at 3030 E Lake Parker Drive, Lakeland, Florida 33805, in Polk County, Florida (Location Map). The project is located in Sections 4 and 5, Township 28 South, and Range 24 East, and Section 32, Township 27 South, and Range 24 East (Quad Map).

2.0 PROJECT DESCRIPTION

Lakeland Electric is proposing to demolish Units 1, 2, and 3 and the Coal Yard at the McIntosh Power Plant which is no longer in operation. The project includes removal of infrastructure, site grading, and construction of a new stormwater management system for the site. Existing stormwater features within the project area will be altered, new outfalls will be installed, and riprap revetments will be installed to ensure no scouring or erosion will occur. Minor impacts to Wetlands A and C are proposed for the construction of three new stormwater outfalls totaling 0.08 acre of wetland impacts. The project also proposes elimination of the power plant canal (Surface Water 11). This will result in a total of 1.22-acre of alteration of wetlands and surface waters. The power plant cooling water canal (Surface Water 11) is upland cut and was authorized under the siting permit. No mitigation is required for alteration of the onsite surface waters as they are exempt pursuant to 62-340.700, Florida Administrative Code (F.A.C.) For impacts to Wetland A and C for the new outfalls, the applicant is proposing to purchase mitigation bank credit from the Horse Creek Mitigation Bank.

3.0 WETLAND DELINEATION

Flatwoods Consulting Group Inc. (Flatwoods) conducted ecological surveys within the project area on May 24, 2023 and January 5, 2024. A total of 6.92 acres of wetland wetlands and surface waters were located within the survey boundary (Ecological Survey Map). Wetland limits were determined in accordance with The Florida Wetlands Delineation Manual (Chapter 62-340, F.A.C.) suitable for submittal to Florida Department of Environmental Protection (FDEP) and with the U.S. Army Corps of Engineers (USACE) 1987 Wetlands Delineation Manual, 2010 Supplement. The methods emphasize that wetland determinations are based on the identification of specific hydrologic requirements, including presence of hydric soils, a dominance of vegetation suited hydric (periodic, continuous, or saturated) soil conditions, and indications of hydrologic conditions such as inundation, moss collars, presence of muck soils, or other hydric indicators.

4.0 WETLAND DESCRIPTION

A total of 6.92 acres of wetlands and surface waters were delineated within the project boundary. A qualitative description of each is summarized below and in Table 1. The qualitative description includes

hydrologic indicators used to determine limits of the wetland and a discussion of the wetland's classification as Section 404 jurisdictional or non-jurisdictional.

Streams and Waterways (FLUCCS 510)

This land use pertains to the linear stormwater management features located within the powerplant property. The dominant vegetation within these features consists of bahiagrass (*Paspalum notatum*) with minor amounts of turkey tangle frog-fruit (*Phyla nodiflora*).

Reservoirs (FLUCCS 530)

This land use pertains to the stormwater ponds within the powerplant property which function as part of the surface water management system. These systems are maintained by mowing and contain mainly bahiagrass along the edge while interspersed with cattail (*Typha latifolia*).

Vegetated Non-Forested Wetlands (*FLUCCS 640*)

This land use pertains to Wetland A, B, and C, which are the wetland fringe of Fish Lake and Lake Parker. These wetland areas contain a variety of vegetation such as common ragweed (*Ambrosia artemisiifolia*), Cuban bulrush (*Cyperus blepharoleptos*), water hyacinth (*Eichhornia crassipes*), marsh pennywort (*Hydrocotyle umbellata*), Peruvian primrosewillow (*Ludwigia peruviana*), water lettuce (*Pistia stratiotes*), and water spangles (*Salvinia minima*).

5.0 WETLAND IMPACT DESCRIPTION

The McIntosh Power Plant Demolition project includes removal of remaining power plant infrastructure, abandonment or alteration to existing stormwater management features, and construction of a new stormwater management system to serve the site. Wetland impacts will occur in association with the new stormwater management system (SWMS) which proposes three (3) new stormwater outfalls. Two outfalls will be installed within Fish Lake for a total of 0.06 acre of impact. Another outfall will be installed in Wetland C which is in Lake Parker and results in 0.02 acre of impact. Surface Water 11 is the power plant canal that was used as part of the wastewater treatment for cooling power plant operations. This canal will be eliminated, and a new stormwater pond will be constructed in this location. This will result in 0.90 acre of impact. Please note, this surface water is exempt from mitigation requirements pursuant to 62-340.700(1)(a), F.A.C. Additionally, the other surface water alterations proposed will occur to permitted stormwater management facilities. These are also exempt from mitigation requirements pursuant to 62-340.700(2), F.A.C. No other dredging or filling is proposed. All fill material used during the demolition and regrading will be clean and free of deleterious substances.

6.0 AVOIDANCE AND MINIMIZATION

Overall, the applicant has designed the project to have a minimal adverse effect on wetland resources. The purpose of this project is to properly demolish the McIntosh Power Plant as it is no longer in operation. The demolition requires grading of the property and a new stormwater management system. With the exception of the need for new stormwater management system outfalls, no other dredging or filling of wetlands will occur. A 25-foot or greater buffer is maintained throughout the majority of the project.

Unavoidable impacts to Wetlands A and C total 0.08 acre for outfalls with the associated riprap for scour protection. The remaining 1.14 acre of surface water alteration will occur within existing stormwater management features and the power plant canal.

7.0 MITIGATION

A Uniform Mitigation Assessment Method (UMAM) analysis was conducted for the proposed outfalls in Wetlands A and C (see attached UMAM sheets). Based on the UMAM analysis of the impact assessment area, the functional loss resulting from 0.08 acres of direct wetland impacts is -0.04 freshwater herbaceous units. Mitigation for wetland impacts is proposed to be completed through purchase of 0.04 freshwater herbaceous credits from the Horse Creek Mitigation Bank. Please note, the subject project and mitigation bank are both located within the Peace River Drainage Basin.

No mitigation is required for alteration to the onsite surface waters, as they are exempt from this requirement pursuant to 62-340.700, F.A.C.

8.0 LISTED SPECIES

Flatwoods conducted the listed species survey in accordance with the Florida Fish and Wildlife Conservation Commission (FWC) Florida Wildlife Conservation Guide. The purpose of the listed species survey was to identify presence and relative abundance of species considered Endangered, Threatened, or of Special Concern by the U.S. Fish and Wildlife Service (FWS) under 50 Code of Federal Regulations (CFR) 11-12 and the FWC under Chapter 68A-27, F.A.C. In addition, Flatwoods conducted a 100-percent survey to locate all gopher tortoise (*Gopherus polyphemus*) burrows and estimate the density of gopher tortoises within the project boundary. The tortoise survey was conducted in accordance with the FWC methodology as outlined in the Gopher Tortoise Permitting Guidelines April 2008 (revised April 2023). An Authorized Gopher Tortoise Agent supervised the gopher tortoise survey.

Two protected species occur within the project limits, Osprey (*Pandion haliaetus*) and Bald Eagle (*Haliaeetus leucocephalus*) (Ecological Survey Map). No listed plants were observed, and none of the listed plants are likely to occur. There are four known bald eagle nests within one mile of the project boundary, and nest PO278 is located within 660 feet of the project area according to the FWC Eagle Nest Locator and the Audubon's Eagle Nest Locator, which is current through the 2022-2023 nesting season (FWC/Florida Natural Areas Inventory [FNAI] Map). According to the 1999 FWC wading bird colony database, one wading bird colony is located within one mile of the project boundary, however it was last known to be active in 1980. The project boundary is located within the Core Foraging Area (CFA) of four known wood stork (*Mycteria americana*) colonies: Lake Somerset, Little Gator Creek, Lone Palm, and Mulberry Northeast. According to the determination key for south Florida, this project will not likely adversely affect wood storks if permanent wetland impacts to Suitable Foraging Habitat (SFH) is less than 0.5 acre. SFH is described as wetlands that typically have shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between 5 to 38 centimeters (2 to 15 inches) deep. FWS approvals concerning wood storks will not be required as impacts to SFH will remain under 0.5 acre. No FWC approvals should be required for the project and the project will likely have no effect on wading birds because nesting habitats will not be impacted. The proposed work within the 60-foot nest buffer of nest PO278 will be conducted in accordance with the FWC Bald Eagle Management Plan (2008) and the FWS Bald Eagle Monitoring Guidelines. In accordance with the FWC and FWS guidelines, work should

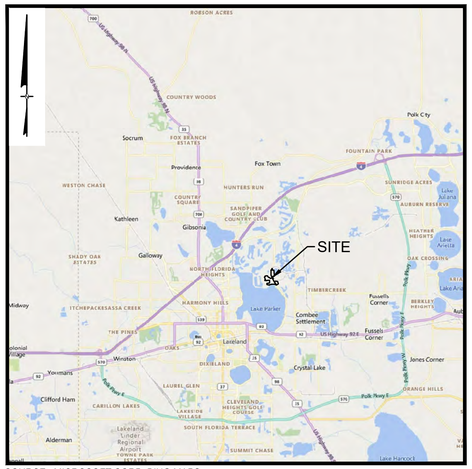
be conducted outside the nesting season (October 1 - May 15) or when nest monitoring, in accordance with the Bald Eagle Monitoring Guidelines, is conducted during construction within the 660-foot buffer.

No additional authorizations are required.

ATTACHMENT C
Engineering Drawings

LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION
3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

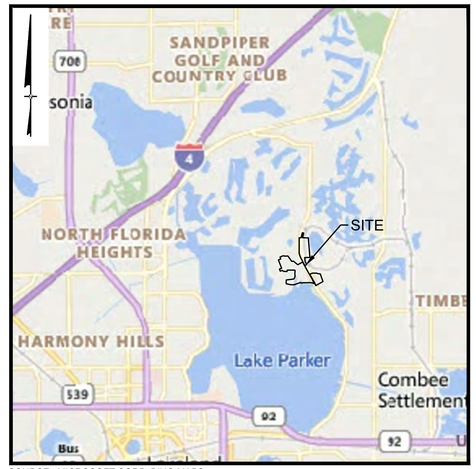
PROJECT NO. FW8287
PERMITTING PLANS
DECEMBER 2023



SOURCE: MICROSOFT CORP. BING MAPS

VICINITY MAP

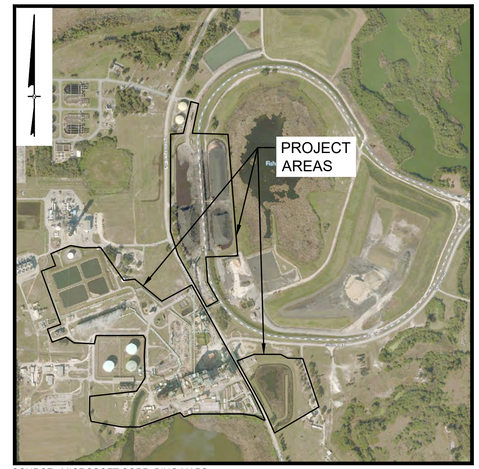
0 3 6
SCALE IN MILES



SOURCE: MICROSOFT CORP. BING MAPS

LOCATION MAP

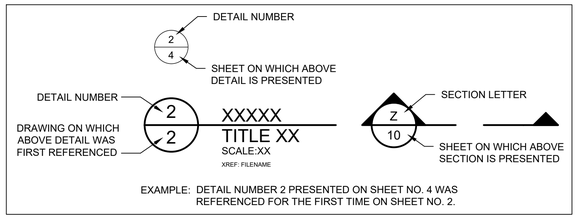
0 5000 10000
SCALE IN FEET



SOURCE: MICROSOFT CORP. BING MAPS

SITE MAP

0 800 1600
SCALE IN FEET



SECTION AND DETAIL IDENTIFICATION LEGEND

DRAWING LIST

DRAWING NO.	DRAWING TITLE
1	COVER SHEET
2	GENERAL NOTES
3	EXISTING CONDTIONS TOPOGRAPHIC SURVEY (1)
4	EXISTING CONDITIONS TOPOGRAPHIC SURVEY (2)
5	GEOMETRIC CONTROL PLAN
6	NORTH COAL YARD AND TRUCK WASH DEMOLITION
7	SOUTH COAL YARD DEMOLITION
8	NORTHWEST PROCESS WATER POND AREA DEMOLITION
9	SOUTH POWER BLOCK AREA DEMOLITION
10	PROPOSED GRADING PLAN - ADMIN AREA
11	PROPOSED GRADING PLAN - COAL YARD
12	PROPOSED GRADING PLAN - ZERO DISCHARGE POND AND ADMINISTRATION POND
13	STORMWATER POND CONTROL POINTS
14	STORMWATER DETAILS I
15	STORMWATER DETAILS II
16	CROSS SECTIONS (1)
17	CROSS SECTIONS (2)
18	CROSS SECTIONS (3)
19	SWPPP PLAN (1)
20	SWPPP PLAN (2)
21	EROSION AND SEDIMENTATION CONTROL PLAN (1)
22	EROSION AND SEDIMENTATION CONTROL PLAN (2)
23	SWPPP AND EROSION AND SEDIMENTATION CONTROL DETAILS
24	CONSTRUCTION SEQUENCING PLAN

PREPARED BY:

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
TELEPHONE: 813.558.0990

PREPARED FOR:

LAKELAND ELECTRIC
501 EAST LEMON STREET LAKELAND,
FLORIDA 33801 USA

PERMIT DRAWING - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: COVER SHEET

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

Digitally signed by Michael H. Scott, PE
Date: 2024.05.13 16:56:05 -04'00'

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C01
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		1 OF 24

I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C01

GENERAL

1. ALL DESIGN AND CONSTRUCTION MUST CONFORM TO THE MINIMUM STANDARDS ESTABLISHED IN THE CITY OF LAKELAND, FLORIDA LAND DEVELOPMENT, ZONING AND/OR RELATED ORDINANCES AND MINIMUM TESTING FREQUENCY REQUIREMENTS.

2. THE STANDARD SPECIFICATIONS LISTED ON THESE CONSTRUCTION PLANS AND SUBSEQUENT DETAILS ARE ALL TO BE CONSIDERED AS PART ON THE CONTRACT DOCUMENTS. INCIDENTAL ITEMS OR ACCESSORIES NECESSARY TO COMPLETE THIS WORK MAY NOT BE SPECIFICALLY NOTED BUT ARE TO BE CONSIDERED A PART OF THE CONTRACT.

3. NO CONSTRUCTION PLANS SHALL BE USED FOR CONSTRUCTION UNLESS SPECIFICALLY MARKED "CONSTRUCTION". PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AFFECTING THEIR WORK WITH THE ACTUAL CONDITIONS AT THE JOB SITE. IF THERE ARE ANY DISCREPANCIES FROM WHAT IS SHOWN ON THE CONSTRUCTION PLANS, HE OR SHE MUST IMMEDIATELY REPORT SAME TO THE ENGINEER BEFORE DOING ANY WORK, OTHERWISE THE CONTRACTOR ASSUMES FULL RESPONSIBILITY. IN THE EVENT OF DISAGREEMENT BETWEEN THE CONSTRUCTION PLANS, STANDARD SPECIFICATIONS AND/OR SPECIAL DETAILS, THE CONTRACTOR SHALL SECURE WRITTEN INSTRUCTIONS FROM THE ENGINEER PRIOR TO PROCEEDING WITH ANY PART OF THE WORK AFFECTED BY OMISSIONS OR DISCREPANCIES. FAILING TO SECURE SUCH INSTRUCTION, THE CONTRACTOR WILL BE CONSIDERED TO HAVE PROCEEDED AT HIS OWN RISK AND EXPENSE. IN THE EVENT OF ANY DOUBT OR QUESTION ARISING WITH RESPECT TO THE TRUE MEANING OF THE CONSTRUCTION PLANS OR SPECIFICATIONS, THE DECISION OF THE ENGINEER SHALL BE FINAL AND CONCLUSIVE.

4. ALL WORK PERFORMED UNDER THIS CONTRACT SHALL BE GUARANTEED AGAINST ALL DEFECTS IN MATERIALS AND WORKMANSHIP OR WHATEVER NATURE BY THE CONTRACTOR AND HIS SURETY FOR A PERIOD OF 12 MONTHS FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE ENGINEER.

5. BEFORE ACCEPTANCE BY THE OWNER AND FINAL PAYMENT, ALL WORK SHALL BE INSPECTED AND APPROVED BY THE OWNER OR HIS REPRESENTATIVE. FINAL PAYMENT WILL BE MADE AFTER ALL OF THE CONTRACTORS' WORK HAS BEEN APPROVED AND ACCEPTED, AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. NO SURFACE WATER IS TO BE DISCHARGED FROM THE SITE. SHOULD THE CONTRACTOR NEED TO DISPOSE OF WATER IT SHALL BE PUMPED INTO A HOLDING TANK AND HAULED TO A WASTEWATER TREATMENT FACILITY AT THE CONTRACTORS EXPENSE.

7. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE FROM THE SITE ANY AND ALL MATERIALS AND DEBRIS WHICH RESULT FROM CONSTRUCTION AND DEMOLITION OPERATIONS.

8. THE CONTRACTOR SHALL COMPLY WITH AND OBSERVE THE RULES AND REGULATIONS OF O.S.H.A. AND APPROPRIATE AUTHORITIES REGARDING SAFETY PROVISIONS.

9. THE ENGINEER AND OWNER ARE NOT RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES, TIME OF PERFORMANCE, PROGRAMS OR FOR ANY SAFETY PRECAUTIONS USED BY THE CONTRACTOR. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR EXECUTION OF HIS WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS.

10. ALL CONTRACTORS AND THEIR SUBCONTRACTORS OR ANY TIER SHALL INDEMNIFY THE OWNER AND ENGINEER FROM ALL LIABILITY RESULTING FROM ANY NEGLIGENT ACT OR OMISSION WITH THEIR CONSTRUCTION, INSTALLATION, AND TESTING OR WORK ON THIS PROJECT AND SHALL NAME THEM AS ADDITIONAL INSURED ON THEIR COMMERCIAL GENERAL LIABILITY POLICIES FOR CLAIMS ARISING OUT OF THE WORK ON THIS PROJECT. A PROPER CERTIFICATE OF INSURANCE SHALL BE ISSUED PRIOR TO THE START OF CONSTRUCTION.

11. ELECTRIC, TELEPHONE, NATURAL GAS, AND OTHER UTILITY COMPANIES MAY HAVE UNDERGROUND AND/OR OVERHEAD SERVICE FACILITIES IN THE VICINITY OF THE PROPOSED WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING THE UTILITY COMPANIES LOCATE THEIR FACILITIES IN THE FIELD PRIOR TO CONSTRUCTION AND SHALL ALSO BE RESPONSIBLE FOR THE MAINTENANCE AND PRESERVATION OF THESE FACILITIES. THE CONTRACTOR SHALL CALL 811 FOR UTILITY LOCATIONS.

12. THE CONTRACTOR SHALL HAVE A COMPETENT SUPERINTENDENT ON THE PROJECT SITE AT ALL TIMES IRRESPECTIVE OF THE AMOUNT OF WORK SUBLET. THE SUPERINTENDENT SHALL BE CAPABLE OF READING AND UNDERSTANDING THE PLANS AND SPECIFICATION, SHALL HAVE FULL AUTHORITY TO EXECUTE ORDERS TO EXPEDITE THE PROJECT, AND SHALL BE RESPONSIBLE FOR SCHEDULING AND HAVE CONTROL OF ALL WORK AS THE AGENT OF THE CONTRACTOR. FAILURE TO COMPLY WITH THIS PROVISION WILL RESULT IN A SUSPENSION OF WORK.

13. THE CONTRACTOR SHALL KEEP A SET OF "APPROVED" CONSTRUCTION PLANS ON THE JOB SITE, AND SHALL MAINTAIN (AS INDICATED HEREIN AND ELSEWHERE WITHIN THESE CONSTRUCTION NOTES, SPECIFICATION, AND PLANS) A LEGIBLE RECORD ON SAID PLANS OF ANY MODIFICATIONS/ALTERATIONS TO ALIGNMENT AND/OR TO PLANS AND SPECIFICATIONS OF PROPOSED IMPROVEMENTS, ETC. UPON COMPLETION OF THE CONTRACTORS' WORK, SAID PLANS AND INFORMATION SHALL BE PROVIDED TO THE ENGINEER. FINAL CONTRACT PAYMENT SHALL NOT COME DUE UNTIL THIS INFORMATION IS RECEIVED BY THE ENGINEER.

14. THESE PLANS ARE NOT SUITABLE FOR MACHINE GUIDANCE USE OR PURPOSES. THE ELEVATIONS AND CONTOURS ON THE PLANS ARE NGVD 1929, U.S. SURVEY FEET.

15. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER AND SEQUENCE THAT EROSION AND AIR AND WATER POLLUTION ARE MINIMIZED AND HELD WITHIN LEGAL LIMITATIONS.

16. THE COMPLETED JOB SHALL CONFORM TO THE LAYOUT, ELEVATIONS, AND SPECIFICATIONS CONTAINED WITHIN THE PLAN SET.

EARTHWORK

1. PRIOR TO ONSET OF GRADING OPERATIONS, THE CONTRACTOR SHALL FAMILIARIZE THE CREW WITH THE SOIL EROSION CONTROL SPECIFICATIONS. THE INITIAL ESTABLISHMENT OF EROSION CONTROL PROCEDURES AND THE PLACEMENT OF SILT FENCING, ETC. TO PROTECT ADJACENT PROPERTY AND ROAD RIGHT OF WAY SHALL OCCUR BEFORE GRADING BEGINS, AND IN ACCORDANCE WITH THE SOIL EROSION CONTROL CONSTRUCTION SCHEDULE.

2. THE GRADING OPERATIONS ARE TO BE CLOSELY SUPERVISED AND INSPECTED, PARTICULARLY DURING THE REMOVAL OF UNSUITABLE MATERIAL AND EXISTING INFRASTRUCTURE, BY THE CONTRACTOR.

3. THE PROPOSED GRADING ELEVATIONS SHOWN ON THE PLANS ARE FINISHED GRADE.

4. THE BACKFILL MATERIAL SHALL BE PLACED IN LEVEL UNIFORM LAYERS. EACH LAYER SHALL BE THOROUGHLY MIXED DURING SPREADING TO INSURE UNIFORMITY.

5. THE WORK AREA SHALL BE CLEARED OF SOD AND RUBBISH.

6. THE PLACING AND SPREADING OF THE FILL MATERIAL SHALL BE STARTED AT THE LOWEST POINT AND THE FILL SHALL BE BROUGHT UP IN APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING 3-INCH LIFTS FOR HAND COMPACTION, 6-INCH LIFTS FOR RUBBER TIRED AND MANUALLY DIRECTED POWER TAMPERS, AND 12-INCH FOR VIBRATORY DRUM ROLLER. EACH LAYER SHALL BE SPREAD, PROCESSED, AND COMPACTED. THE MOISTURE CONTENT OF THE FILL MATERIAL AND FOUNDATIONS SHALL BE SUCH THAT THE REQUIRED COMPACTION CAN BE OBTAINED.

7. DEWATERING IS NOT PERMITTED FOR THIS PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN ADDITIONAL HABITAT MANAGEMENT AND LANDSCAPE PERMIT AND AN FDEP PERMIT IF DEWATERING IS NEEDED.

8. ALL STRUCTURES WITHIN UNIT 3 ARE TO BE DEMOLISHED TO EXISTING GRADE. THE COAL YARD IS TO BE DEMOLISHED TO A MINIMUM OF 15 INCHES BELOW EXISTING GRADE.

MATERIALS

1. MATERIALS REQUIRED SHALL BE AS SPECIFIED ON THE DRAWINGS AND AS WITHIN THIS DOCUMENT. THE CONTRACTOR SHALL CONFORM TO INSTALLATION METHODS.

2. COMPACTED BACKFILL:
   - A.A. COMPACTED BACKFILL SHALL CONSIST OF CLEAN GRANULAR FILL MATERIAL, FREE OF DEBRIS, FOREIGN MATERIALS, ORGANIC MATERIAL AND SATISFY SP OR SP-SM ACCORDING TO THE UNITED STATES SOIL CLASSIFICATION SYSTEM.
   - A.B. BACKFILL TO BE PLACED IN 12-INCH (MAX) LIFTS AND COMPACTED USING MECHANICAL METHODS (E.G. ROLLER). TO ACHIEVE 95 PERCENT STANDARD PROCTOR.

3. TEMPORARY STOCKPILES OF FILL MATERIAL OR OTHER PROJECT MATERIALS ARE NOT ALLOWED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN ADDITIONAL HABITAT MANAGEMENT AND LANDSCAPE PERMIT IF A STOCKPILE IS NEEDED.

SOIL EROSION AND SEDIMENT CONTROL (SESC)

1. SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH NPDES GENERAL PERMIT. ANY SOIL EROSION CONTROL OR SEDIMENT CONTROL MEASURES, IN ADDITION TO THOSE OUTLINED IN THESE PLANS AND WHICH ARE DEEMED NECESSARY BY THE OWNER, ENGINEER AND/OR REGULATORY ENGINEER, SHALL BE IMPLEMENTED IMMEDIATELY BY THE CONTRACTOR.

2. ALL DRAINAGE STRUCTURES, PIPES, SWALES, AND OTHER AREAS ACCUMULATING SEDIMENT ARE TO BE CLEANED AT THE END OF THE PROJECT PRIOR TO FINAL ACCEPTANCE. CLEANING MAY ALSO BE REQUIRED DURING THE COURSE OF THE CONSTRUCTION OF THE PROJECT IF IT IS DETERMINED THAT THE SILT AND DEBRIS TRAPS ARE NOT FUNCTIONING PROPERLY OR EXCESS DEBRIS HAS COLLECTED.

3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE FROM THE SITE ANY AND ALL MATERIALS AND DEBRIS WHICH RESULT FROM CONSTRUCTION/DEMOLITION OPERATIONS.

4. THE DISTURBED AREAS SHALL BE SODDED UPON COMPLETION OF DISTURBANCE.

5. NO AREA SHALL REMAIN UNSODDED LONGER THAN 14 DAYS FROM LAST TIME OF DISTURBANCE.

6. THE CONTRACTOR SHALL PERFORM AND DOCUMENT ROUTINE INSPECTIONS OF THE SOIL EROSION AND SEDIMENT CONTROLS AS REQUIRED BY THE ENVIRONMENTAL RESOURCE PERMIT (ERP). THE INSPECTOR SHALL BE QUALIFIED TO PERFORM THE REQUIRED INSPECTIONS. INSPECTION RECORDS SHALL BE MAINTAINED ON SITE AND PROVIDED TO THE OWNER AT THE END OF THE JOB, OR UPON REQUEST.

SITE RESTORATION AND PLANTING

1. THE DISTURBED AREAS REQUIRE THE PLACEMENT OF SOD FOR FINAL STABILIZATION WITH VEGETATIVE COVER.

2. CONTRACTOR IS RESPONSIBLE FOR ESTABLISHMENT OF SOD.
   ESTABLISHED TURF IS DEFINED AS:
   - A. AN ESTABLISHED ROOT SYSTEM (LEAF BLADES BREAK BEFORE SEEDLINGS OR SOD CAN BE PULLED FROM THE SOIL BY HAND).
   - B. NO BARE SPOTS LARGER THAN ONE SQUARE FOOT.
   - C. NO BARE AREAS COMPRISING MORE THAN 1% OF ANY GIVEN 1,000 SQUARE FOOT AREA.
   - D. NO DEFORMATION OF THE TURF AREAS CAUSED BY MOWING OR OTHER CONTRACTOR EQUIPMENT.
   - E. NO EXPOSED SOD NETTING.
   - F. NO PESTS OR NOXIOUS WEEDS.

SAFETY NOTES

1. PLEASE REFER TO FLORIDA TRENCH SAFETY ACT (553.60-553.64), WHICH IS AS FOLLOWS:

553.60 SHORT TITLE - THIS ACT MAY BE CITED AS THE "TRENCH SAFETY ACT."

553.61 INTENT - THE PURPOSE AND INTENT OF THIS ACT IS TO PROVIDE FOR INCREASED WORKER SAFETY BY REQUIRING COMPLIANCE WITH SUFFICIENT STANDARDS FOR TRENCH SAFETY.

553.62 STATE STANDARD - THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION'S EXCAVATION SAFETY STANDARDS, 29 C.F.R. S. 1926.650 SUBPART P, ARE HEREBY INCORPORATED AS THE STATE STANDARD.

553.63 TRENCH EXCAVATIONS IN EXCESS OF 5 FEET DEEP - REQUIRED INFORMATION ON ALL SPECIFIC CONTRACTS FOR TRENCH EXCAVATION IN WHICH SUCH EXCAVATION WILL EXCEED A DEPTH OF 5 FEET:

(1) THE CONTRACT BID SUBMITTED BY THE CONTRACTOR WHO WILL PERFORM SUCH EXCAVATION SHALL INCLUDE:
- (A) A REFERENCE TO THE TRENCH SAFETY STANDARDS THAT WILL BE IN EFFECT DURING THE PERIOD OF CONSTRUCTION OF THE PROJECT.
- (B) WRITTEN ASSURANCE BY THE CONTRACTOR PERFORMING THE TRENCH EXCAVATION THAT SUCH CONTRACTOR WILL COMPLY WITH THE APPLICABLE TRENCH SAFETY STANDARDS.
- (C) A SEPARATE ITEM IDENTIFYING THE COST OF COMPLIANCE WITH THE APPLICABLE TRENCH SAFETY STANDARDS.

(2) A CONTRACTOR PERFORMING TRENCH EXCAVATION SHALL:
- (A) AS A MINIMUM, COMPLY WITH THE EXCAVATION SAFETY STANDARDS WHICH ARE APPLICABLE TO A PROJECT.
- (B) ADHERE TO ANY SPECIAL SHORING REQUIREMENTS, IF ANY, OF THE STATE OR OTHER POLITICAL SUBDIVISIONS WHICH MAY BE APPLICABLE TO SUCH A PROJECT.
- (C) IF ANY GEOTECHNICAL INFORMATION IS AVAILABLE FROM THE OWNER, THE CONTRACTOR, OR OTHERWISE, THE CONTRACTOR PERFORMING TRENCH EXCAVATION SHALL CONSIDER THIS INFORMATION IN THE CONTRACTOR'S DESIGN OF THE TRENCH SAFETY SYSTEM WHICH IT WILL EMPLOY ON THE PROJECT. THIS PARAGRAPH SHALL NOT REQUIRE THE OWNER TO OBTAIN GEOTECHNICAL INFORMATION.

553.64 CERTAIN REQUIREMENTS FOR CONTRACT BIDS - THE SEPARATE ITEM IDENTIFYING THE COST OF COMPLIANCE WITH TRENCH SAFETY STANDARDS SHALL BE BASED ON THE LINEAR FEET OF TRENCH TO BE EXCAVATED. THE SEPARATE ITEM FOR SPECIAL SHORING
REQUIREMENTS, IF ANY, SHALL BE BASED ON THE SQUARE FEET OF SHORING USED. EVERY SEPARATE ITEM SHALL INDICATE THE SPECIFIC METHOD OF COMPLIANCE AS WELL AS THE COST OF THAT METHOD.

PROJECT SITE AREA DATA

COAL YARD AND TRUCK SCALE DEMOLITION	= 24.9 AC.
UNIT 3 AND PROCESS PONDS DEMOLITION	= 56.0 AC.
PROPOSED RETENTION AREA EXPANSION	= 11.0 AC.
TOTAL AREA	= 91.9 AC.

PERMIT DRAWING - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: GENERAL NOTES

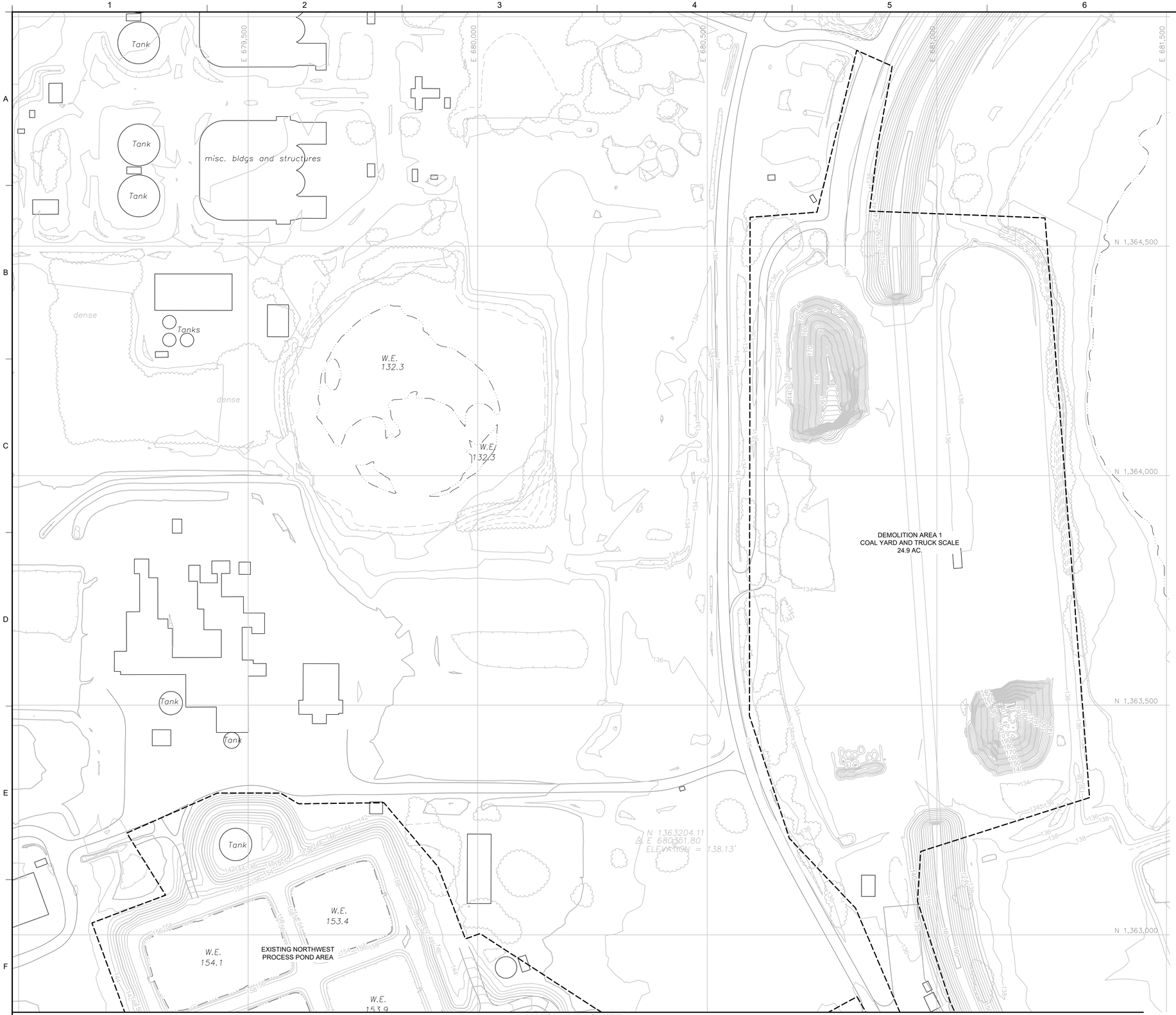
PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C02
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		2 OF 24

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C02



N

0 100 200
SCALE IN FEET

LEGEND

PROJECT LIMITS	EDGE OF GROVE
CONTROL	TREE LINE
UTILITY POLE	SHRUB LINE
LIGHT POLE	CONCRETE SURFACE
TREE	STRUCTURE
CATCH BASIN	EDGE OF WATER
CULVERT	W.E. WATER ELEVATION
MANHOLE	SWAMPLINE
SIGNS	RAILROAD
POST	FENCE
GUARD RAIL	OBSCURED CONTOUR
UNPAVED ROAD	DEPRESSION CONTOUR
PAVED ROAD	

NOTES:

1. NORTH, THE GRID, AND THE COORDINATES SHOWN HEREON ARE REFERENCED TO THE WEST ZONE OF THE FLORIDA STATE PLANE COORDINATE SYSTEM, NAD 83, 1990 ADJUSTMENT BASED ON DATA PROVIDED BY THE CITY OF LAKELAND.
2. ELEVATIONS ARE TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND ARE BASED ON BENCHMARK DATA PROVIDED BY THE CITY OF LAKELAND.
3. THIS TOPOGRAPHIC SURVEY WAS PREPARED BY PHOTOGRAMMETRIC METHODS. SEE THE ATTACHED REPORT FOR MAP ACCURACY AND SURVEYOR'S SIGNATURE AND SEAL. THIS MAP IS LIMITED TO THOSE FEATURES VISIBLE ON AERIAL PHOTOGRAPHY.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: EXISTING CONDTIONS TOPOGRAPHIC SURVEY (1)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C03
REVIEWED BY:	TDA	DRAWING NO.:	3 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH / PLANT DEMO (FW8287)\DWG\FW8287.01-C03

MATCHLINE - SHEET 3

EXISTING NORTHWEST PROCESS POND AREA

DEMOLITION AREA 2
UNIT 3, PROCESS PONDS AND NEW POND
56.5 AC.

POND EXPANSION 3
11.0 AC.

N 1361455.63
E 681602.35
ELEVATION 134.00'

N 1,362,500
N 1,362,000
N 1,361,500

E 679,500
E 680,000
E 680,500
E 681,000
E 681,500
E 682,000

0 100 200
SCALE IN FEET

LEGEND

PROJECT LIMITS	EDGE OF GROVE
CONTROL	TREE LINE
UTILITY POLE	SHRUB LINE
LIGHT POLE	CONCRETE SURFACE
TREE	STRUCTURE
CATCH BASIN	EDGE OF WATER
CULVERT	W.E. WATER ELEVATION
MANHOLE	SWAMPLINE
SIGNS	RAILROAD
POST	FENCE
GUARD RAIL	OBSCURED CONTOUR
UNPAVED ROAD	DEPRESSION CONTOUR
PAVED ROAD	

PERMIT DRAWING - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: EXISTING CONDITIONS TOPOGRAPHIC SURVEY (2)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

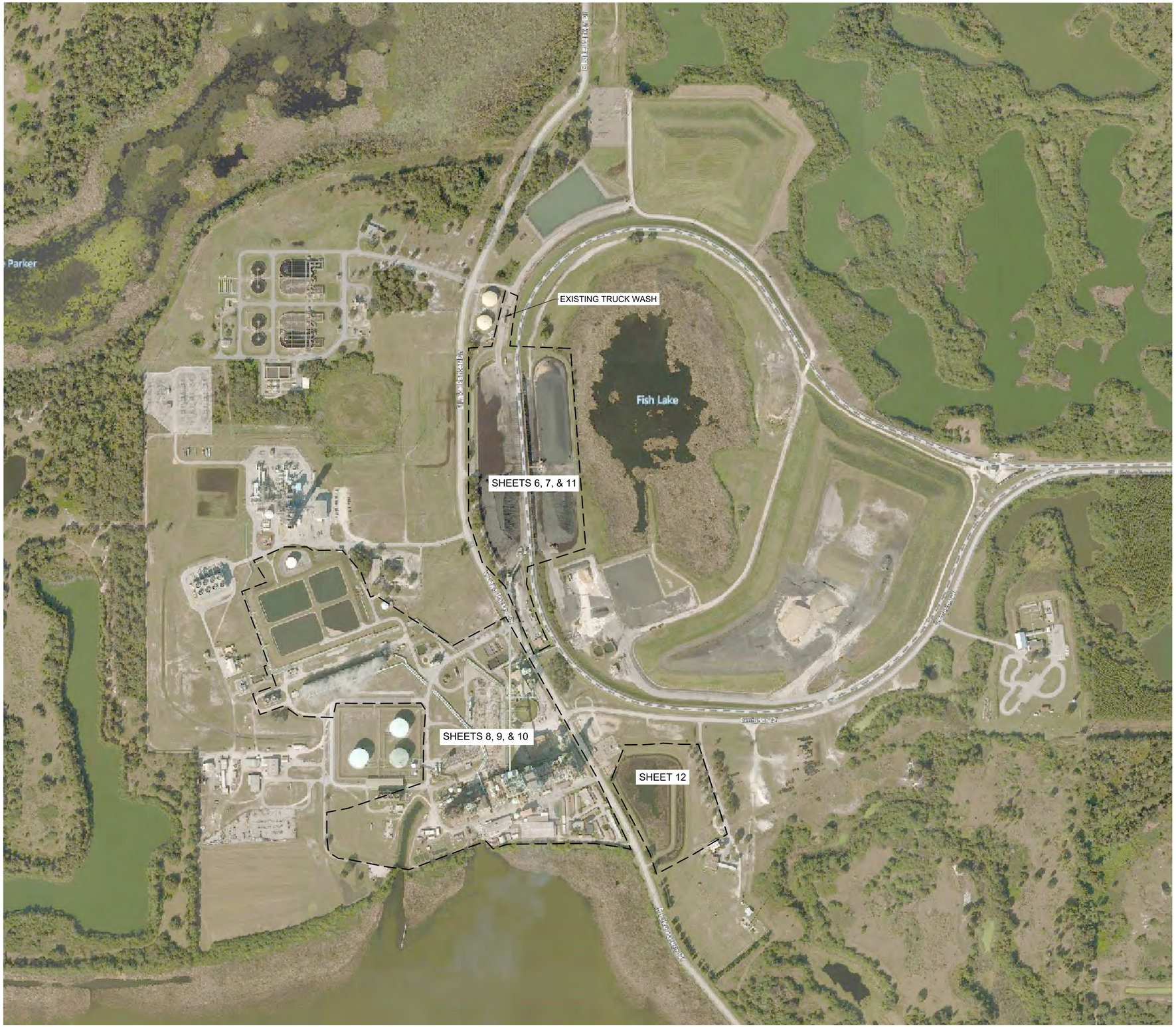
SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C04
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		4 OF 24

I:_CADD \PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO \FW8287\DWG\FW8287.01-C04



N

0 300 600
SCALE IN FEET

LEGEND

PROJECT LIMITS OF WORK

AERIAL IMAGE SOURCE:
LIVE © 2022 MICROSOFT CORPORATION © 2022 MAXAR © CNES (2022)
DISTRIBUTION AIRBUS DS MICROSOFT® BING™ MAPS USING AUTODESK CIVIL 3D.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE:
PLAN SHEET INDEX

PROJECT:
LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

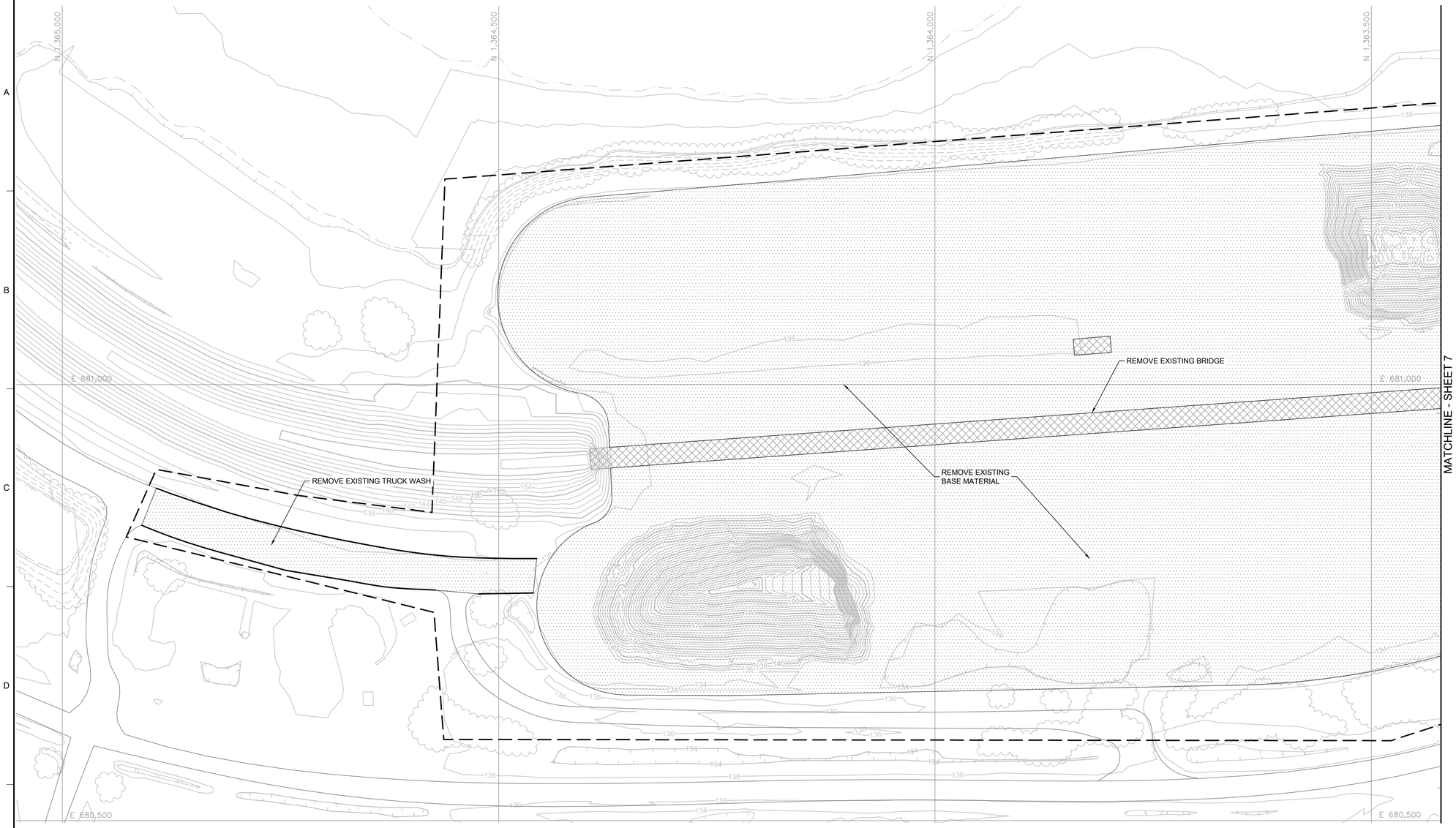
SITE:
3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C07
REVIEWED BY:	TDA	DRAWING NO.:	5 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C07



N

0 60 120
SCALE IN FEET

LEGEND

- PROJECT LIMITS OF WORK
- EXISTING ASPHALT PAVEMENT SECTION TO BE REMOVED
- EXISTING STRUCTURE TO BE REMOVED
- EXISTING CONCRETE TO BE REMOVED

NOTES:

1. ALL UTILITIES DEPICTED HEREON ARE FROM VISIBLE EVIDENCE ONLY. SURVEYOR DID NOT CONTACT SUBSURFACE UTILITY LOCATOR SERVICE.
2. NO UNDERGROUND FOUNDATIONS OR FOOTERS WERE EXCAVATED OR LOCATED FOR THIS SURVEY.
3. THE APPROPRIATE REGULATING AGENCY SHALL BE CONTACTED PRIOR TO DECOMMISSIONING EXISTING ON-SITE UTILITIES. ALL UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO INITIATING ANY ON-SITE EXCAVATION ACTIVITIES.
4. UNLESS NOTED OTHERWISE, ALL BUILDINGS, PLANT AND EQUIPMENT, CONCRETE STRUCTURES / PADS AND ASPHALT PAVEMENT WITHIN THE PROJECT AREA SHALL BE DEMOLISHED, REMOVED AND DISPOSED OF AT AN FDEP-APPROVED FACILITY.
5. MONITORING WELLS WITHIN THE PROJECT AREA SHALL BE ABANDONED IN-PLACE (GROUTED TO TOP OF CASING AND PADS REMOVED) IN ACCORDANCE WITH FDEP STANDARD OPERATING PROCEDURES (SOPS). AS-BUILT DRAWINGS SHALL DOCUMENT ALL MONITORING WELLS ABANDONED IN-PLACE.
6. LAKELAND ELECTRIC SHALL BE CONTACTED PRIOR TO DECOMMISSIONING ANY ON-SITE LIGHT AND POWER POLES. THESE LIGHT AND POWER POLES WILL BE DECOMMISSIONED AND REMOVED IN ACCORDANCE WITH LAKELAND ELECTRIC REQUIREMENTS.
7. ALL UNDERGROUND UTILITIES SHALL BE DECOMMISSIONED AND REMOVED OR DECOMMISSIONED IN-PLACE. AS-BUILT DRAWINGS SHALL DOCUMENT ALL UTILITIES DECOMMISSIONED IN-PLACE.
8. THE SITE SHALL BE CLEARED, GRUBBED AND STRIPPED PRIOR INITIATING EARTHWORK ACTIVITIES IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS FOR THE PROJECT.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE:
NORTH COAL YARD AND TRUCK WASH DEMOLITION

PROJECT:
LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

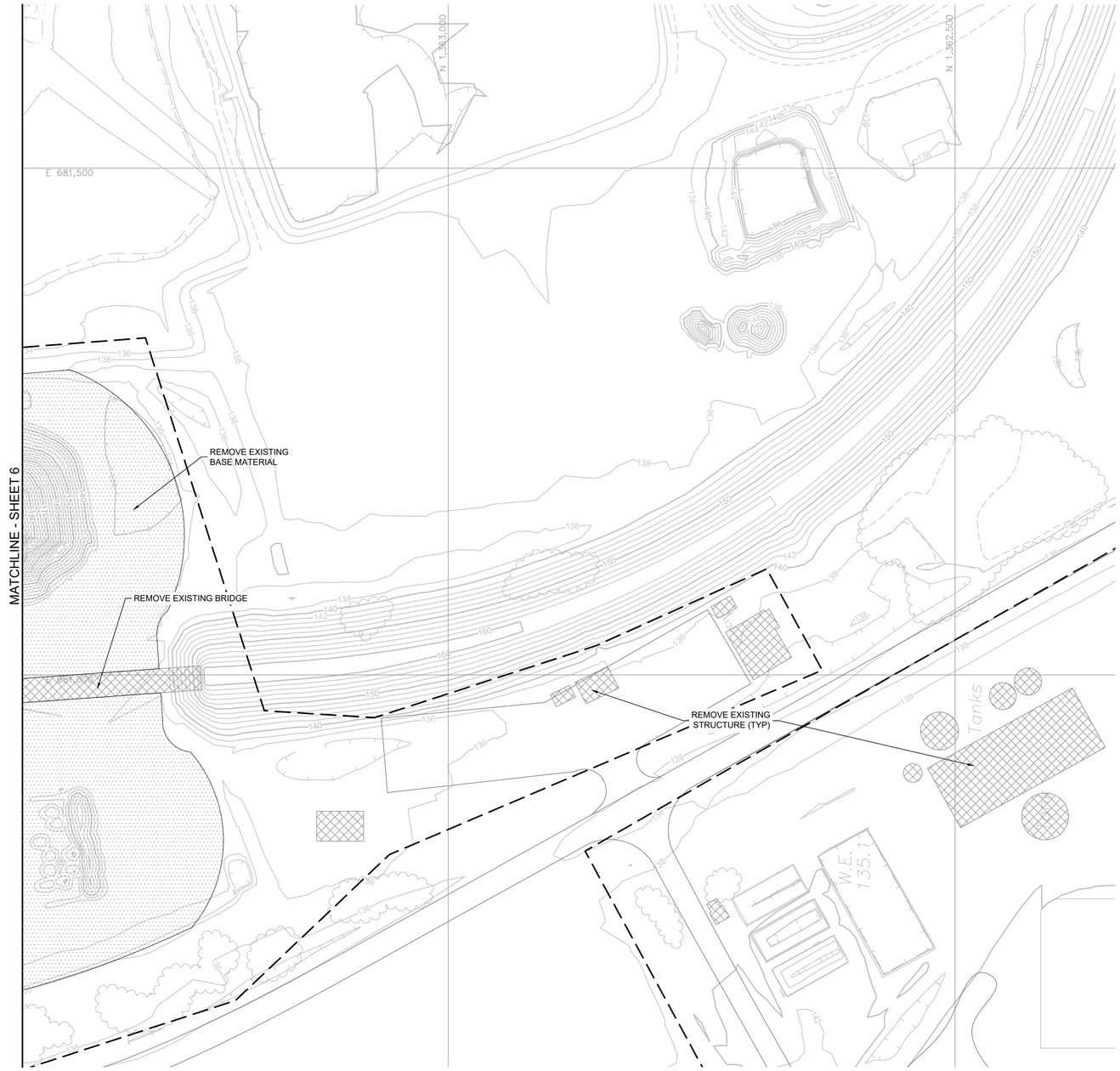
SITE:
3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

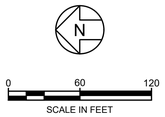
MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C08
REVIEWED BY:	TDA	DRAWING NO.:	6 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C08





LEGEND

- PROJECT LIMITS OF WORK
- EXISTING ASPHALT PAVEMENT SECTION TO BE REMOVED
- EXISTING STRUCTURE TO BE REMOVED
- EXISTING CONCRETE TO BE REMOVED

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: SOUTH COAL YARD DEMOLITION

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

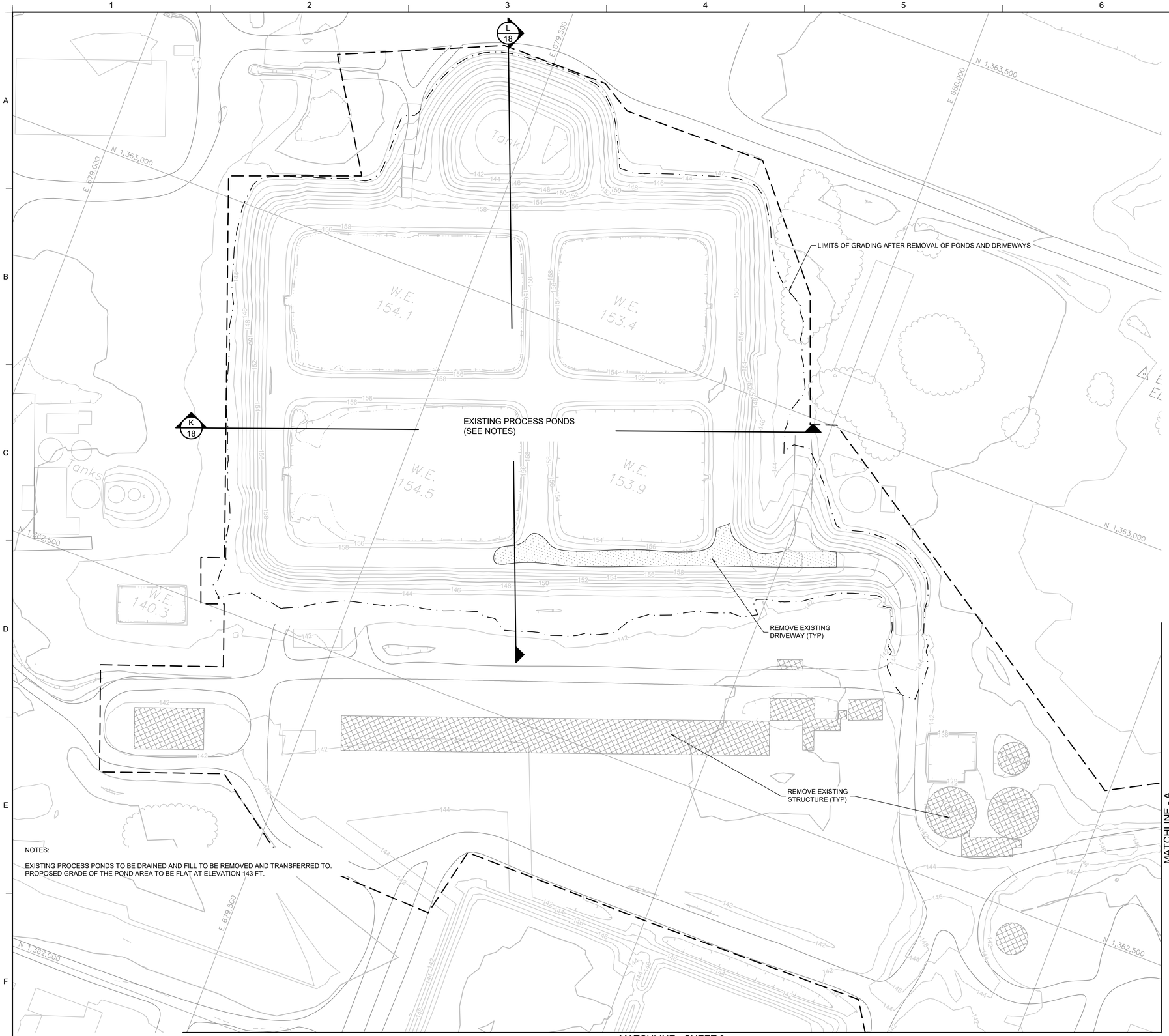
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C09
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		7 OF 24

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C09



NOTES:

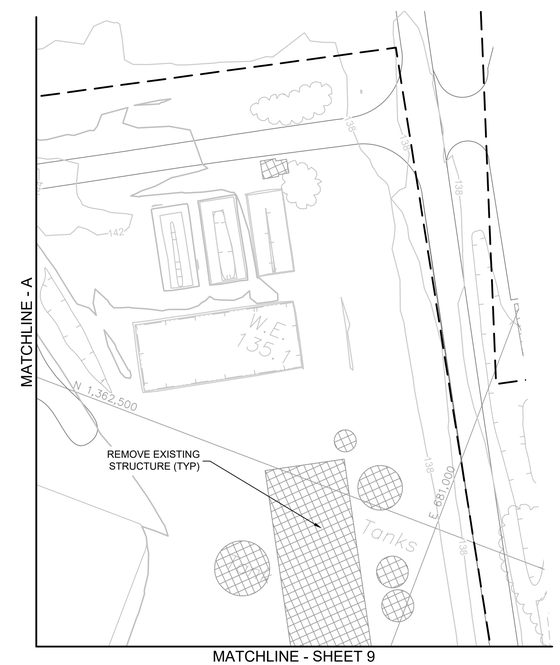
EXISTING PROCESS PONDS TO BE DRAINED AND FILL TO BE REMOVED AND TRANSFERRED TO.
PROPOSED GRADE OF THE POND AREA TO BE FLAT AT ELEVATION 143 FT.

N

0 60 120
SCALE IN FEET

LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- EXISTING ASPHALT PAVEMENT SECTION TO BE REMOVED
- EXISTING STRUCTURE TO BE REMOVED
- EXISTING CONCRETE TO BE REMOVED



REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE:
NORTHWEST PROCESS WATER POND AREA DEMOLITION

PROJECT:
LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE:
3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

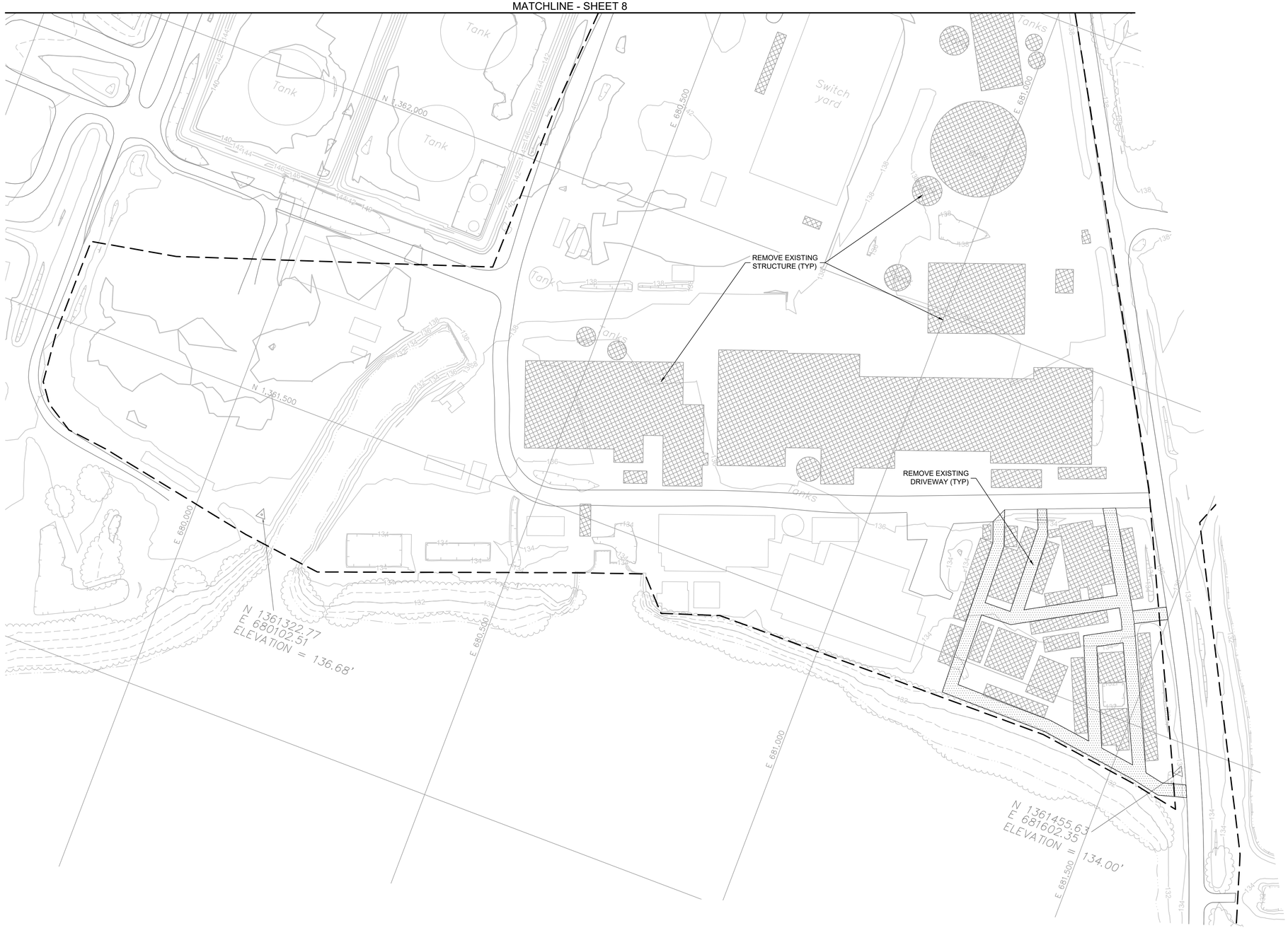
DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C10
REVIEWED BY:	TDA	DRAWING NO.:	8 OF 24
APPROVED BY:	MHS		

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C10

MATCHLINE - SHEET 8



N

0 80 160
SCALE IN FEET

LEGEND

- PROJECT LIMITS OF WORK
- EXISTING ASPHALT PAVEMENT SECTION TO BE REMOVED
- EXISTING STRUCTURE TO BE REMOVED
- EXISTING CONCRETE TO BE REMOVED

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: SOUTH POWER BLOCK AREA DEMOLITION

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

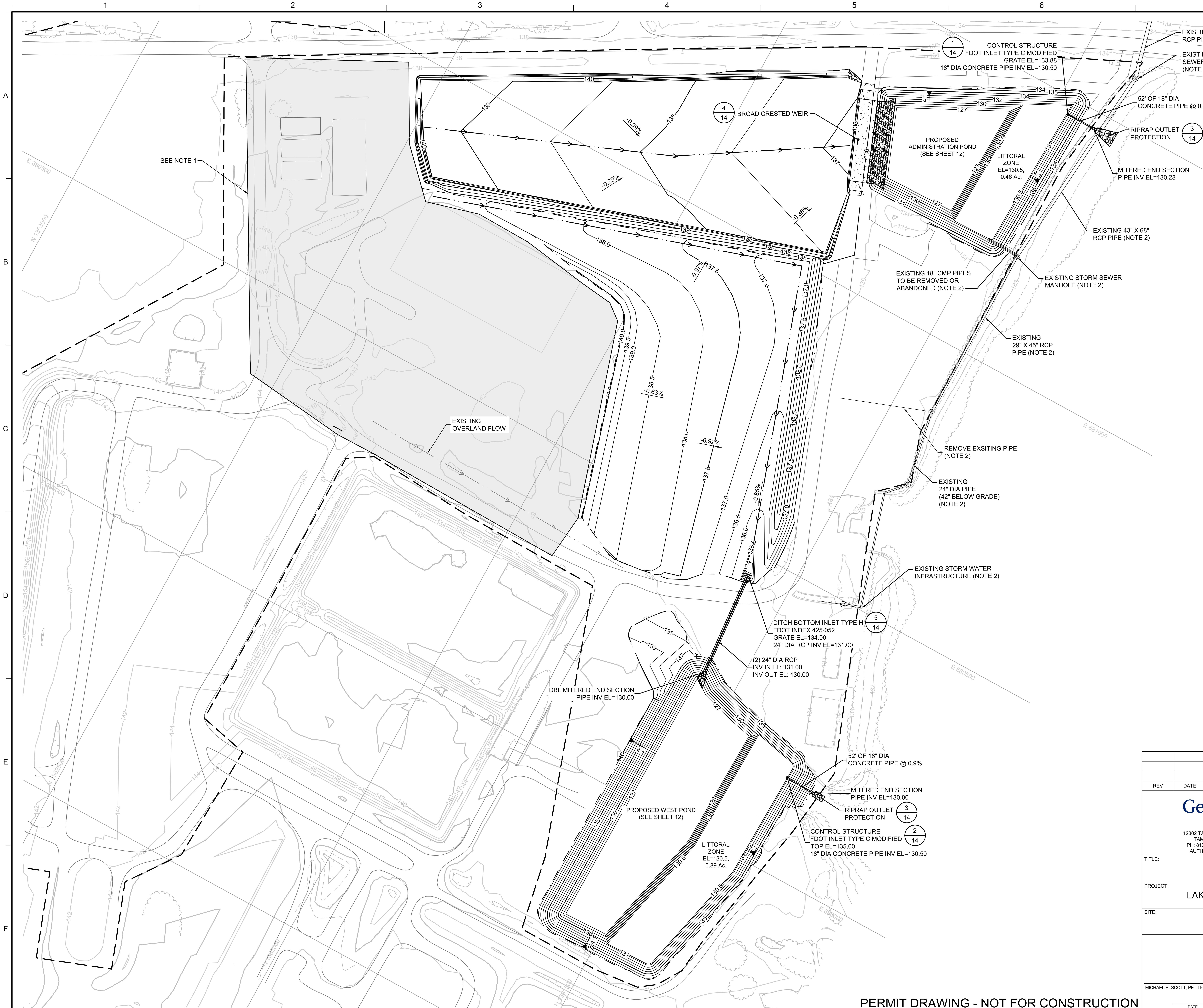
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C11
REVIEWED BY:	TDA	DRAWING NO.:	9 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C11



N

0 80 160
SCALE IN FEET

LEGEND

— — —	PROJECT LIMITS OF WORK
— · — — · —	PROPOSED GRADING LIMIT
— 100 —	EXISTING GROUND ELEVATION CONTOUR (FT)
——	EXISTING SITE ACCESS ROAD
—x—x—x—	EXISTING FENCE
— 130 —	PROPOSED GRADING ELEVATION CONTOUR (FT)
←— · · —	PROPOSED OVERLAND FLOW

NOTES:

1. PER COORDINATION WITH LAKELAND ELECTRIC, NO GRADING IS TO OCCUR IN THE GREY SHADED AREA AT THIS TIME.
2. LAKELAND ELECTRIC AND THE CONSTRUCTION CONTRACTOR ASSUME FULL RESPONSIBILITY FOR LOCATING AND CONFIRMING UNDERGROUND UTILITIES.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE:
PROPOSED GRADING PLAN - ADMIN AREA

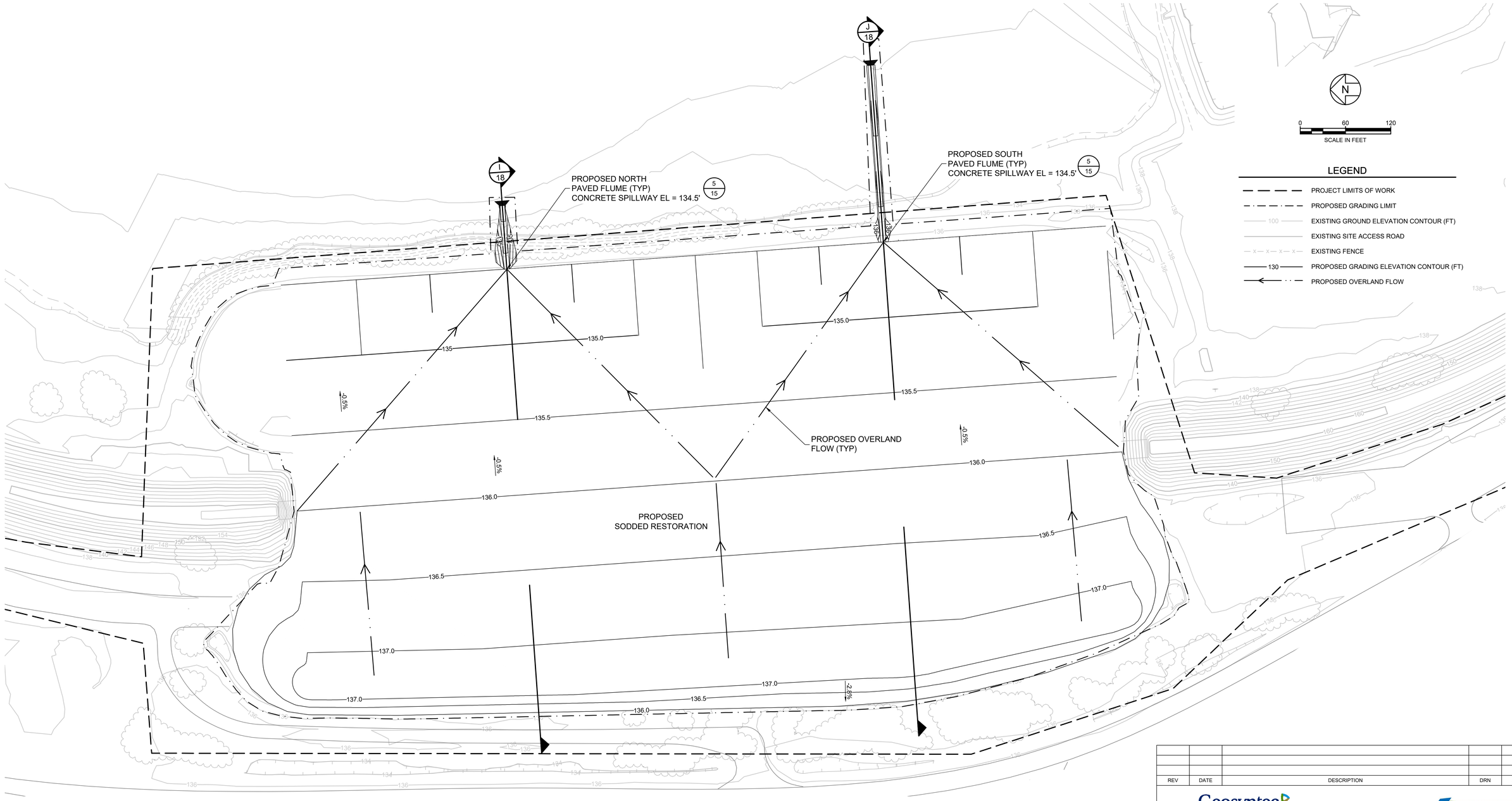
PROJECT:
LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE:
3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C12
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS	10 OF 24	

I:_CADD (PROJECTS)\L\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C12



REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE:
PROPOSED GRADING PLAN - COAL YARD

PROJECT:
LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

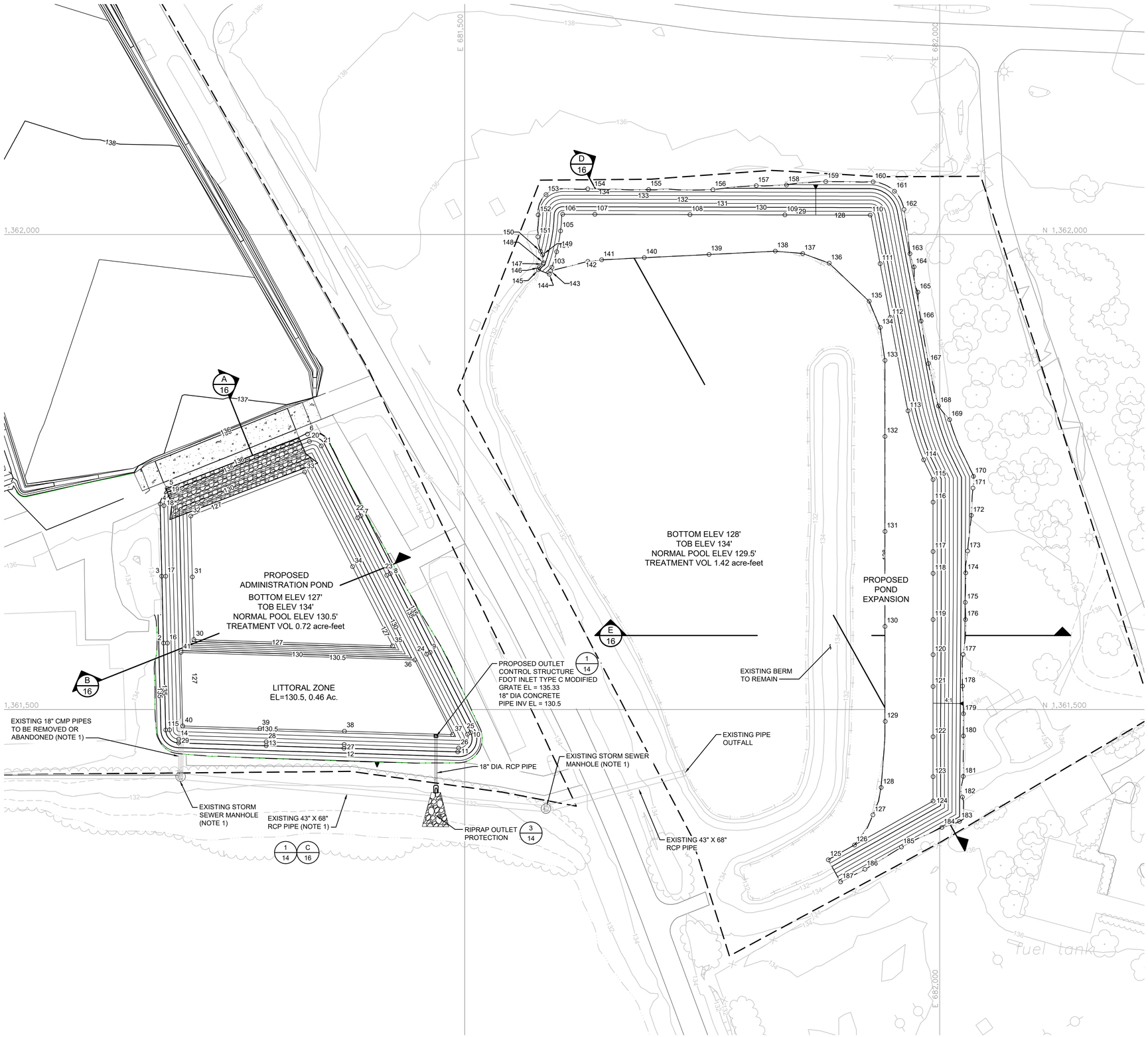
SITE:
3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

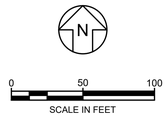
MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C13
REVIEWED BY:	TDA	DRAWING NO.:	11 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C13





LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- 100 — EXISTING GROUND ELEVATION CONTOUR (FT)
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- 130 — PROPOSED GRADING ELEVATION CONTOUR (FT)
- CONTROL POINT

NOTE:

1. LAKELAND ELECTRIC AND THE CONSTRUCTION CONTRACTOR ASSUME FULL RESPONSIBILITY FOR LOCATING AND CONFIRMING UNDERGROUND UTILITIES.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: PROPOSED GRADING PLAN - ZERO DISCHARGE POND AND ADMINISTRATION POND

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C06
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		12 OF 24

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C06

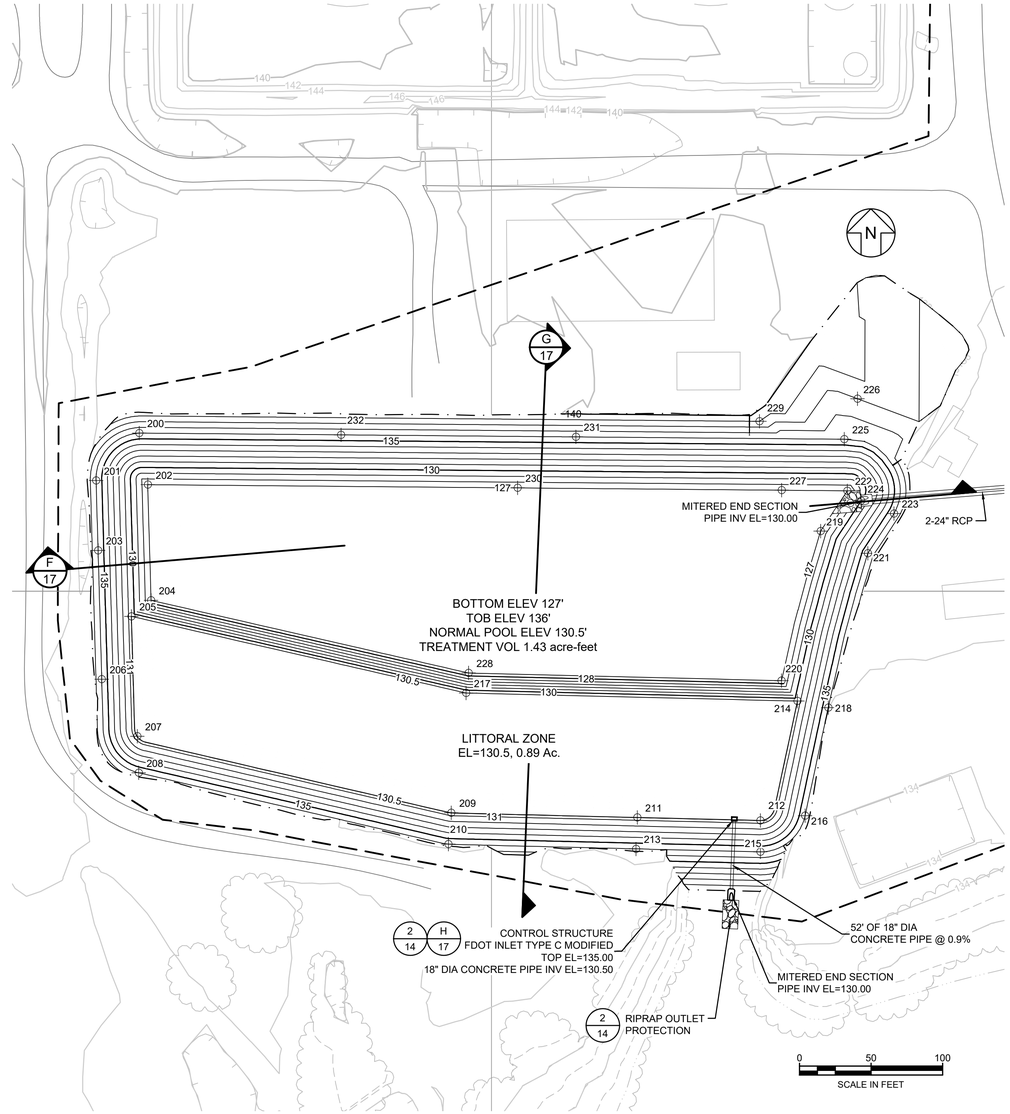
ADMINISTRATION POND

SURVEY CONTROL DATA			
POINT NUMBER	NORTHING	EASTING	ELEVATION
1	1361478.46	681185.16	134.0
2	1361569.87	681182.89	135.0
3	1361640.29	681180.96	134.0
4	1361716.46	681179.28	135.0
5	1361732.83	681186.67	136.0
6	1361789.92	681334.44	135.0
7	1361703.91	681390.66	135.0
8	1361643.08	681421.47	135.0
9	1361560.15	681463.48	135.0
10	1361475.68	681506.27	134.0
11	1361455.38	681492.47	134.0
12	1361459.16	681372.79	134.0
13	1361461.86	681290.91	134.0
14	1361468.82	681198.84	134.0
15	1361478.56	681189.16	134.0
16	1361569.92	681186.89	134.0
17	1361640.30	681185.13	134.0
18	1361714.50	681183.29	134.0
19	1361725.37	681189.56	134.0
20	1361782.15	681336.36	134.0
21	1361777.37	681348.96	134.0
22	1361701.84	681387.22	134.0
23	1361641.26	681417.90	134.0
24	1361558.28	681459.94	134.0
25	1361473.87	681502.70	134.0
26	1361459.36	681493.46	134.0
27	1361463.15	681372.97	134.0
28	1361465.86	681290.91	134.0
29	1361464.82	681198.71	134.0
30	1361573.68	681214.80	127.0
31	1361639.56	681213.16	127.0
32	1361703.63	681211.57	127.0
33	1361749.98	681331.45	127.0
34	1361650.45	681381.86	127.0
35	1361566.96	681423.98	127.0
36	1361552.20	681447.33	130.5
37	1361473.56	681487.16	130.5
38	1361477.22	681373.29	130.5
39	1361480.08	681284.34	130.5
40	1361482.69	681203.06	130.5
41	1361560.11	681201.13	130.5

ZERO DISCHARGE POND

SURVEY CONTROL DATA			
POINT NUMBER	NORTHING	EASTING	ELEVATION
103	1361965.58	681591.74	128.0
104	1361981.85	681596.72	128.0
105	1362003.77	681600.90	128.0
106	1362021.31	681603.08	128.0
107	1362021.23	681637.03	128.0
108	1362020.93	681737.03	128.0
109	1362020.64	681837.03	128.0
110	1362020.37	681926.80	128.0
111	1361969.25	681937.33	128.0
112	1361912.65	681947.96	128.0
113	1361814.42	681966.68	128.0
114	1361762.82	681983.10	128.0
115	1361742.08	681993.07	128.0
116	1361718.34	681993.07	128.0
117	1361666.33	681993.07	128.0
118	1361643.25	681993.07	128.0
119	1361594.62	681993.07	128.0
120	1361557.63	681993.07	128.0
121	1361524.19	681993.07	128.0
122	1361471.35	681993.07	128.0
123	1361429.25	681993.07	128.0
124	1361403.64	681993.07	128.0
125	1361341.85	681882.66	128.0
126	1361357.32	681910.29	128.0
127	1361389.02	681929.68	128.0
128	1361417.93	681938.39	128.0
129	1361487.39	681942.63	128.0
130	1361587.40	681942.38	128.0
131	1361687.40	681942.38	128.0
132	1361787.40	681942.37	128.0
133	1361867.56	681942.37	128.0
134	1361902.10	681937.37	128.0
135	1361929.77	681925.75	128.0
136	1361969.92	681883.68	128.0
137	1361979.94	681855.75	128.0
138	1361982.47	681826.90	128.0
139	1361979.01	681757.22	128.0
140	1361975.62	681688.99	128.0
141	1361973.39	681644.06	128.0
142	1361971.73	681629.54	128.0
143	1361961.79	681590.38	128.0
144	1361958.23	681589.01	128.0
145	1361963.01	681577.66	130.4

SURVEY CONTROL DATA			
POINT NUMBER	NORTHING	EASTING	ELEVATION
146	1361965.27	681578.45	130.4
147	1361968.91	681582.57	130.4
148	1361970.31	681583.03	130.4
149	1361978.60	681581.92	131.3
150	1361982.44	681579.79	132.1
151	1361997.70	681576.99	133.7
152	1362020.60	681577.29	134.2
153	1362042.00	681585.47	134.7
154	1362047.98	681629.46	134.7
155	1362047.22	681693.60	134.5
156	1362047.19	681761.32	134.6
157	1362051.37	681806.87	135.7
158	1362052.06	681838.67	135.9
159	1362055.67	681880.03	136.8
160	1362055.35	681929.94	136.8
161	1362045.50	681952.42	136.9
162	1362026.44	681962.36	136.8
163	1361979.76	681968.70	136.2
164	1361965.92	681973.08	136.6
165	1361939.33	681976.99	136.4
166	1361908.91	681980.39	135.8
167	1361864.18	681988.17	135.6
168	1361819.56	681998.71	136.1
169	1361805.20	682010.45	138.0
170	1361745.39	682035.55	137.9
171	1361733.19	682035.08	137.8
172	1361704.40	682033.29	137.5
173	1361666.76	682029.35	136.6
174	1361643.78	682027.45	136.1
175	1361612.79	682026.90	136.1
176	1361594.70	682027.18	136.2
177	1361557.95	682024.64	135.6
178	1361524.71	682024.05	135.5
179	1361495.48	682024.97	135.8
180	1361472.16	682024.89	135.8
181	1361429.50	682024.82	135.9
182	1361407.80	682023.85	135.7
183	1361382.17	682020.83	136.1
184	1361375.74	682002.26	135.0
185	1361355.11	681959.66	134.5
186	1361331.80	681921.32	134.9
187	1361318.55	681895.73	134.6



LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- 100 EXISTING GROUND ELEVATION CONTOUR (FT)
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- 130 PROPOSED GRADING ELEVATION CONTOUR (FT)
- CONTROL POINT

WEST POND

SURVEY CONTROL DATA			
POINT NUMBER	NORTHING	EASTING	ELEVATION
200	1361610.44	679753.93	136.0
201	1361577.30	679723.73	136.0
202	1361574.45	679759.85	127.0
203	1361528.46	679725.13	136.0
204	1361493.64	679762.15	127.0
205	1361482.41	679748.46	130.5
206	1361438.48	679727.71	136.0
207	1361398.58	679752.48	130.5
208	1361373.09	679753.47	136.0
209	1361345.13	679971.89	130.5
210	1361323.20	679969.89	136.0
211	1361341.90	680101.88	130.5
212	1361339.81	680187.80	130.5
213	1361319.92	680100.96	136.0
214	1361423.19	680213.73	130.5
215	1361317.81	680187.85	136.0
216	1361343.09	680219.04	136.0
217	1361428.86	679982.20	130.5
218	1361418.56	680235.24	136.0
219	1361542.00	680229.97	127.0
220	1361437.47	680202.58	127.0
221	1361526.53	680262.86	136.0
222	1361570.16	680248.48	127.0
223	1361554.28	680281.11	136.0
224	1361563.18	680258.11	130.0
225	1361606.18	680246.47	136.0
226	1361634.48	680255.63	138.0
227	1361570.56	680202.70	127.0
228	1361442.82	679983.95	127.0
229	1361618.70	680187.22	139.0
230	1361572.18	680018.17	127.0
231	1361607.83	680058.95	136.0
232	1361609.27	679894.93	136.0

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: STORMWATER POND CONTROL POINTS

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

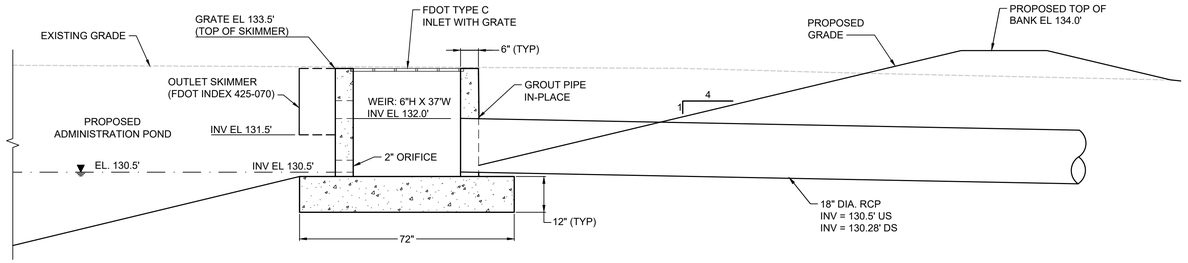
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

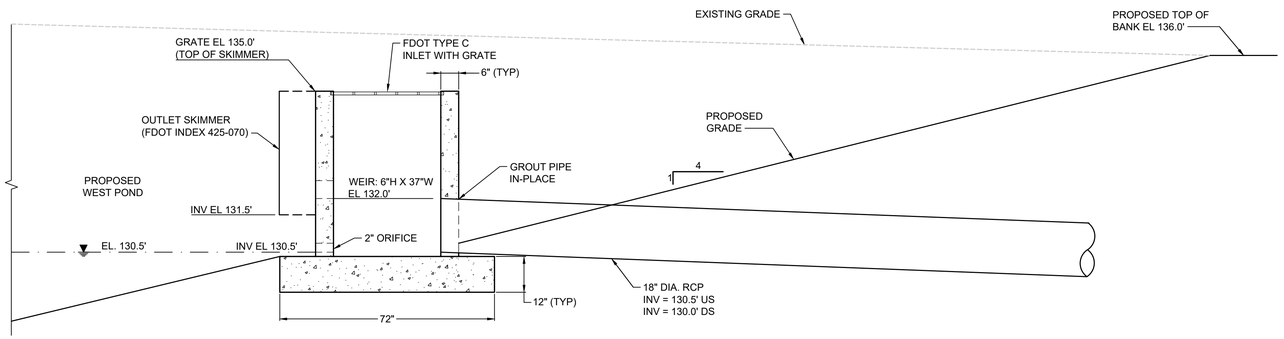
DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C06
REVIEWED BY:	TDA	DRAWING NO.:	13 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

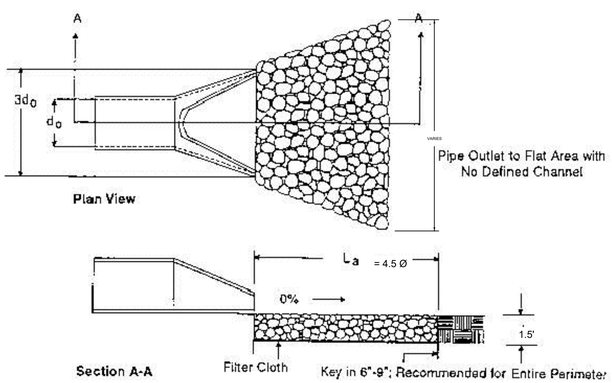
I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C06



1/12 DETAIL
PROPOSED ADMINISTRATION POND OUTLET STRUCTURE
SCALE: 1" = 2'

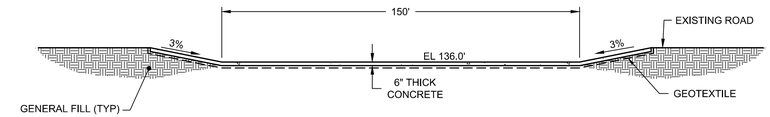


2/12 DETAIL
PROPOSED WEST POND OUTLET STRUCTURE
SCALE: 1" = 2'

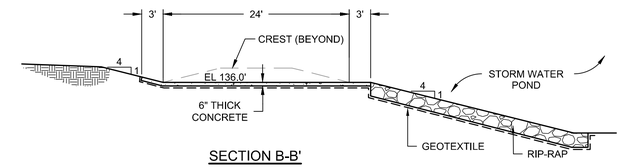


CONVEYANCE ID	UPSTREAM APRON WIDTH (FT)	DOWNSTREAM APRON WIDTH (FT)	RIPRAP LENGTH (FT) (1,2)	D_{50} (CALCULATED) (IN)	D_{MAX} (CALCULATED) (IN)	APRON THICKNESS (FT)
PROPOSED ADIMINISTRATION POND	5	20	15	6	9	1.5
PROPOSED WEST POND	5	20	15	6	9	1.5
(2) 24" RCP (EAST)	15	35	20	6	9	1.5

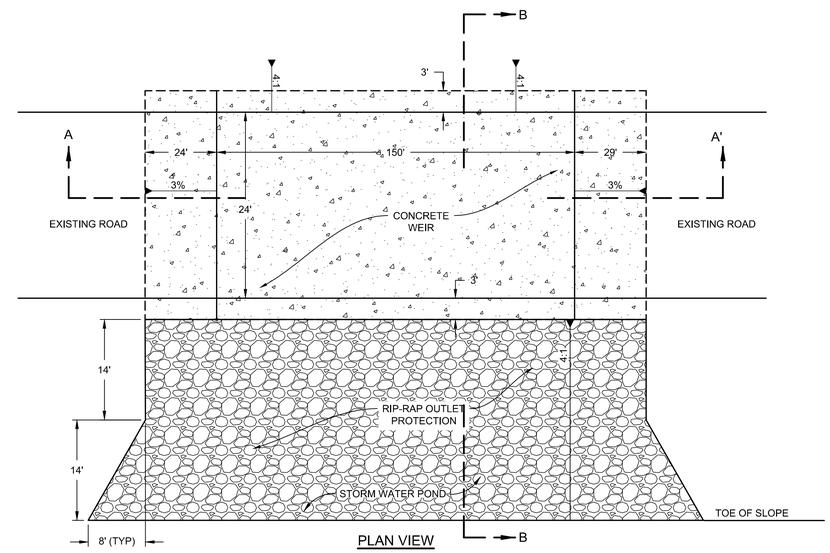
3/10 DETAIL
RIPRAP OUTLET PROTECTION
SCALE: N.T.S.



SECTION A-A'



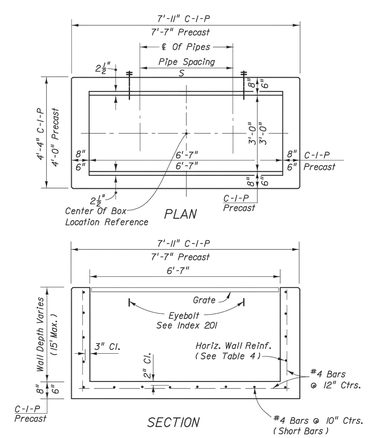
SECTION B-B'



PLAN VIEW

NOTES:
1. RIP-RAP TO MEET FDOT SPECIFICATIONS 530-2.2.2 WITH A MAXIMUM WEIGHT OF 75 LBS, MINIMUM WEIGHT OF 4 LBS, AND 50% GREATER THAN 30 LBS.
2. WOVEN GEOTEXTILE TO MEET FDOT SPECFICATION 530-2.4 CLASS (D-2)

4/10 DETAIL
BROAD CRESTED WEIR
SCALE: N.T.S

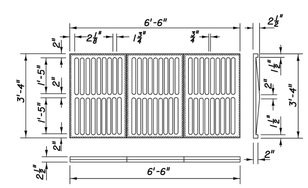


HORIZONTAL WALL REINFORCING SCHEDULES (TABLE 4)

WALL DEPTH	SCHEDULE	AREA (in.²/ft.)	MAX. SPACING BARS	MAX. SPACING WWF
0'-5'	B5.5	0.24	5½"	5"
5'-7'	C6.5	0.37	6½"	6"
7'-15'	D4.5	0.53	4½"	4"

TYPE H (2 & 3-GRATE INLET)

Recommended Maximum Pipe Size:
3'-0" Wall - 24" Pipe
6'-7" Wall - 1-60" Pipe
Or 2-24" Pipe (S=3'-5")



TYPE H (3-GRATE INLET)
Approx. Weight 725 Lbs.

5/10 DETAIL
GRATE INLET TYPE H
SCALE: 1" = 2'

PERMIT DRAWING - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: STORMWATER DETAILS I

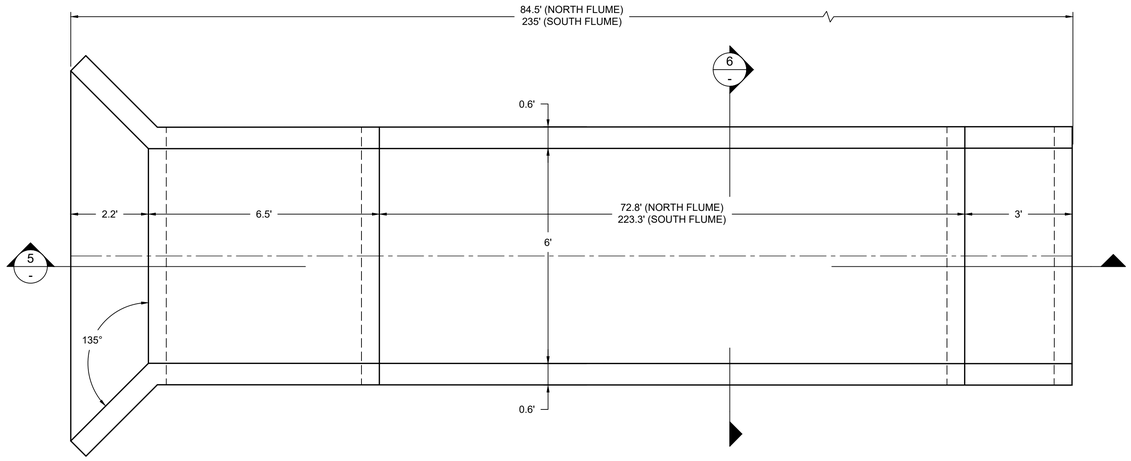
PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

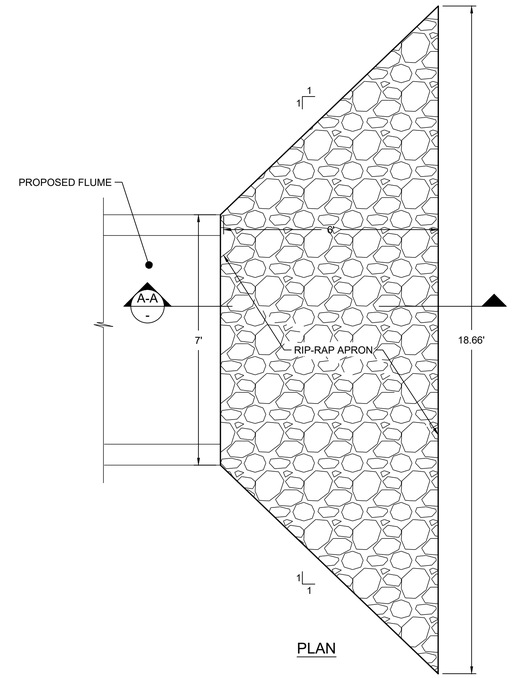
MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C06
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		14 OF 24

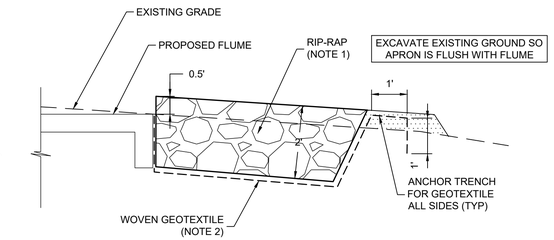
I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH\PLANT DEMO\FW8287\DWG\FW8287.01-C06



5 / 11 DETAIL
TYPICAL CONCRETE FLUME
SCALE: 1" = 2'



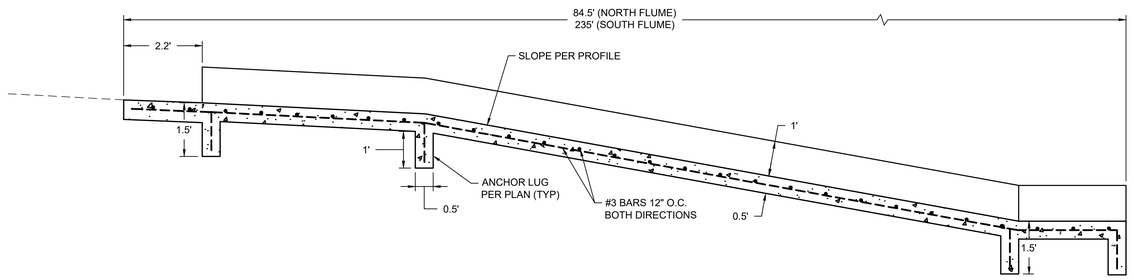
PLAN



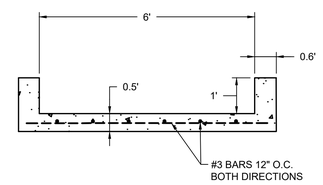
SECTION A-A

NOTE:
1. RIP-RAP TO MEET FDOT SPECIFICATIONS 530-2.2.2 WITH A MAXIMUM WEIGHT OF 75 LBS, MINIMUM WEIGHT OF 4 LBS, AND 50% GREATER THAN 30 LBS.
2. WOVEN GEOTEXTILE TO MEET FDOT SPECFICATION 530-2.4 CLASS (D-2)

8 / - DETAIL
RIPRAP APRON
SCALE: 1" = 2'



6 / - SECTION
CONCRETE FLUME
SCALE: 1" = 2'



7 / - TYPICAL SECTION
FLUME
SCALE: 1" = 2'

PERMIT DRAWING - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: STORMWATER DETAILS II

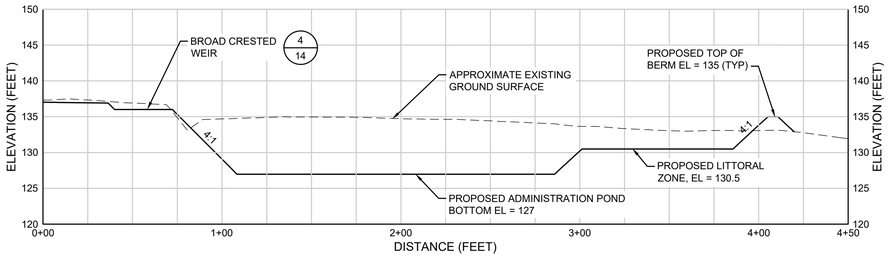
PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

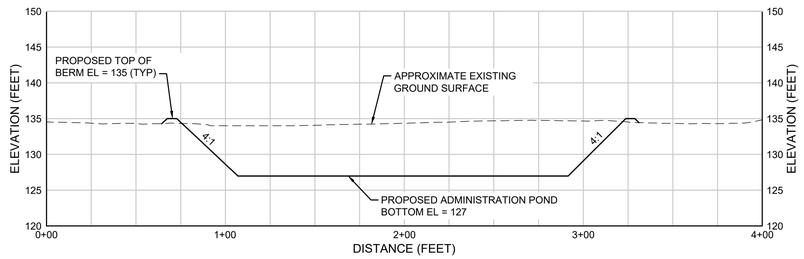
MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C14
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		15 OF 24

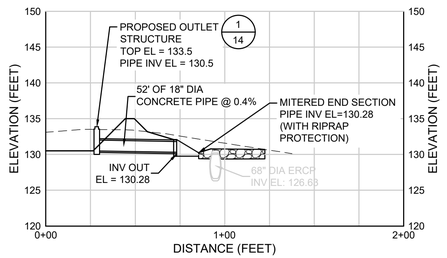
I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C14



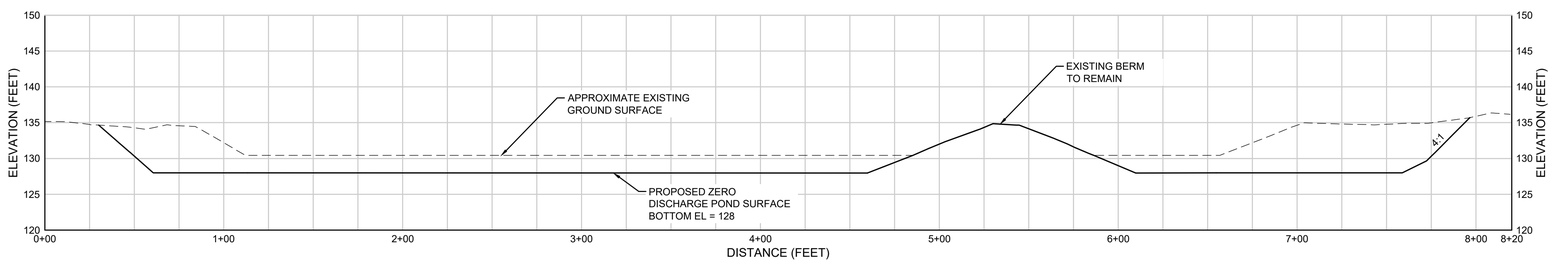
A 12 SECTION
PROPOSED ADMINISTRATION POND
SCALE: 1" = 40' HORIZ. , 1" = 10' VERT.



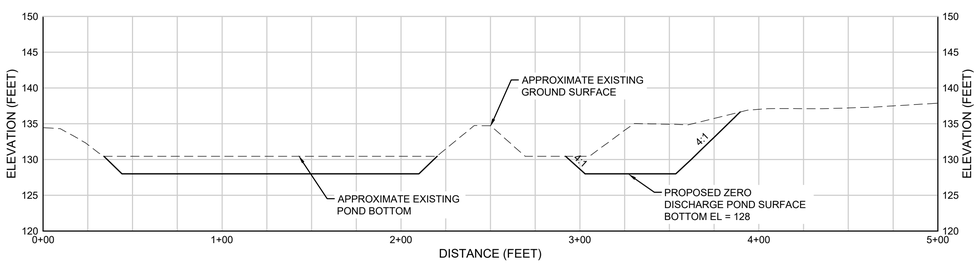
B 12 SECTION
PROPOSED ADMINISTRATION POND
SCALE: 1" = 40' HORIZ. , 1" = 10' VERT.



C 12 SECTION
PROPOSED ADMINISTRATION POND OUTFALL
SCALE: 1" = 40' HORIZ. , 1" = 10' VERT.



D 12 SECTION
ZERO DISCHARGE AREA
SCALE: 1" = 40' HORIZ. , 1" = 10' VERT.



E 12 SECTION
ZERO DISCHARGE AREA
SCALE: 1" = 40' HORIZ. , 1" = 10' VERT.

HORZ: SCALE IN FEET 0 40 80

VERT: SCALE IN FEET 0 10 20

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: CROSS SECTIONS (1)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

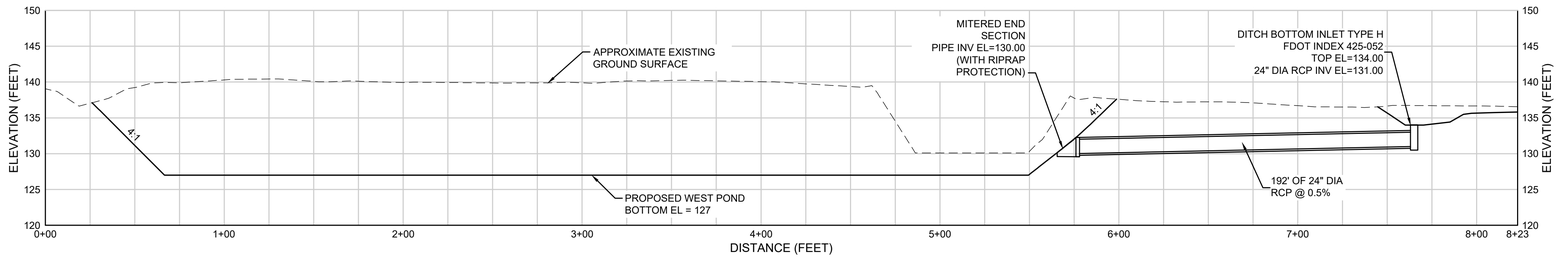
DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C14
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		16 OF 24

MICHAEL H. SCOTT, PE - LICENSE NO. 72475

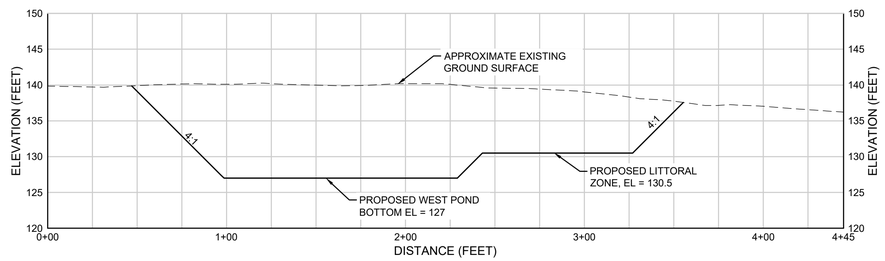
DATE

PERMIT DRAWING - NOT FOR CONSTRUCTION

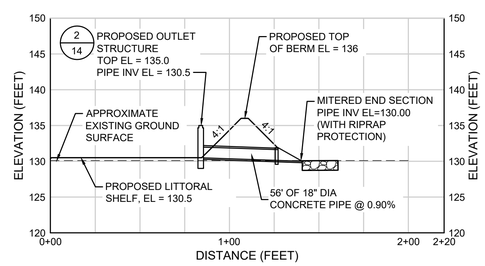
I:_CADD\PROJECTS\LLAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C14



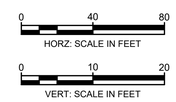
F / 13 SECTION
PROPOSED WEST POND
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.



G / 13 SECTION
PROPOSED WEST POND
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.



H / 13 SECTION
PROPOSED WEST POND
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.



REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: CROSS SECTIONS (2)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

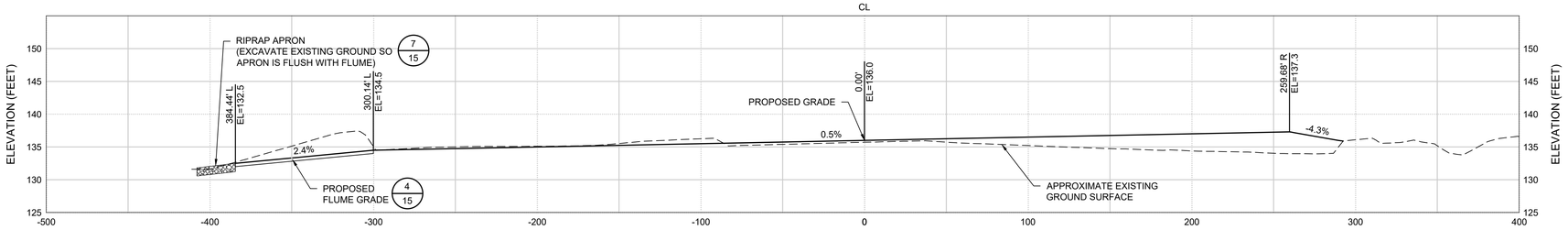
SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C14
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		17 OF 24

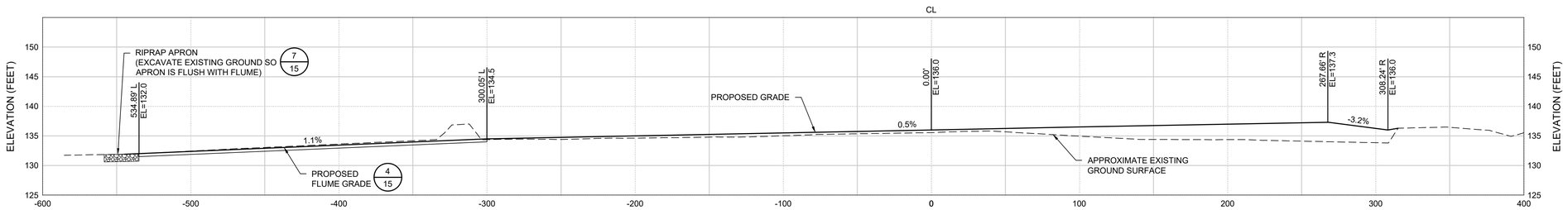
PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD\PROJECTS\LLAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C14



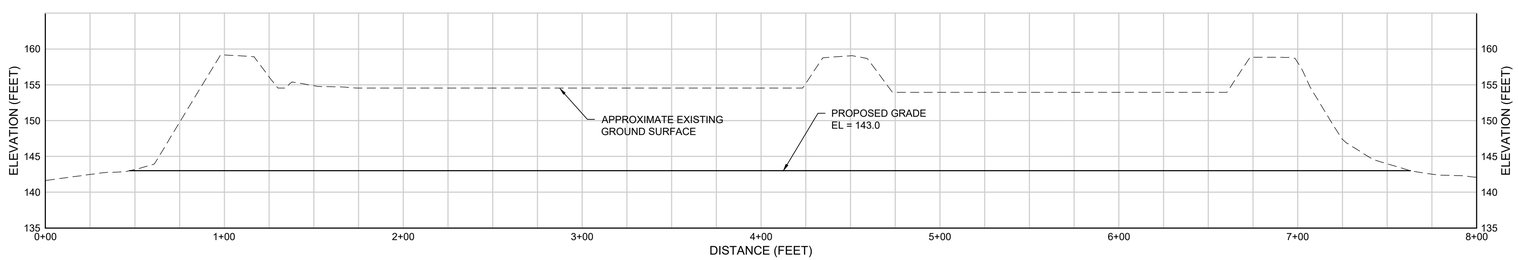
STA 3+50

I / 11 SECTION
COAL YARD GRADING
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.

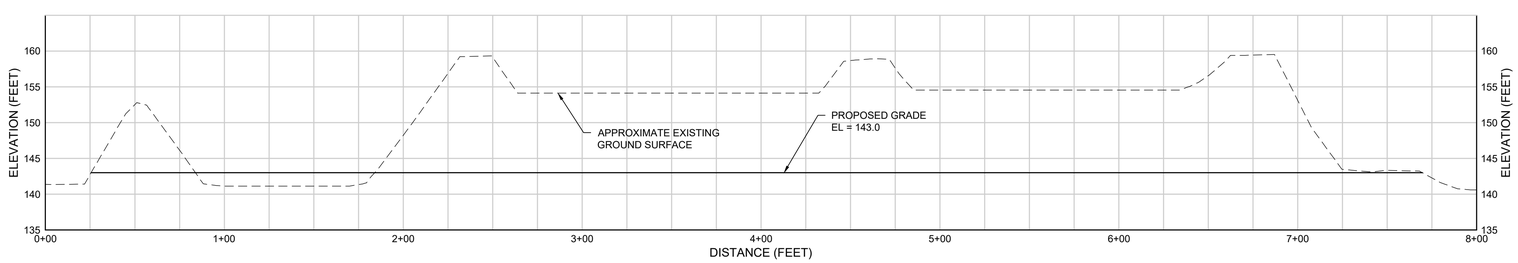


STA 8+50

J / 11 SECTION
COAL YARD GRADING
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.



K / 8 SECTION
PROCESS POND GRADING
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.



L / 8 SECTION
PROCESS POND GRADING
SCALE: 1' = 40' HORIZ. , 1" = 10' VERT.

0 40 80
HORZ: SCALE IN FEET

0 10 20
VERT: SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: CROSS SECTIONS (3)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

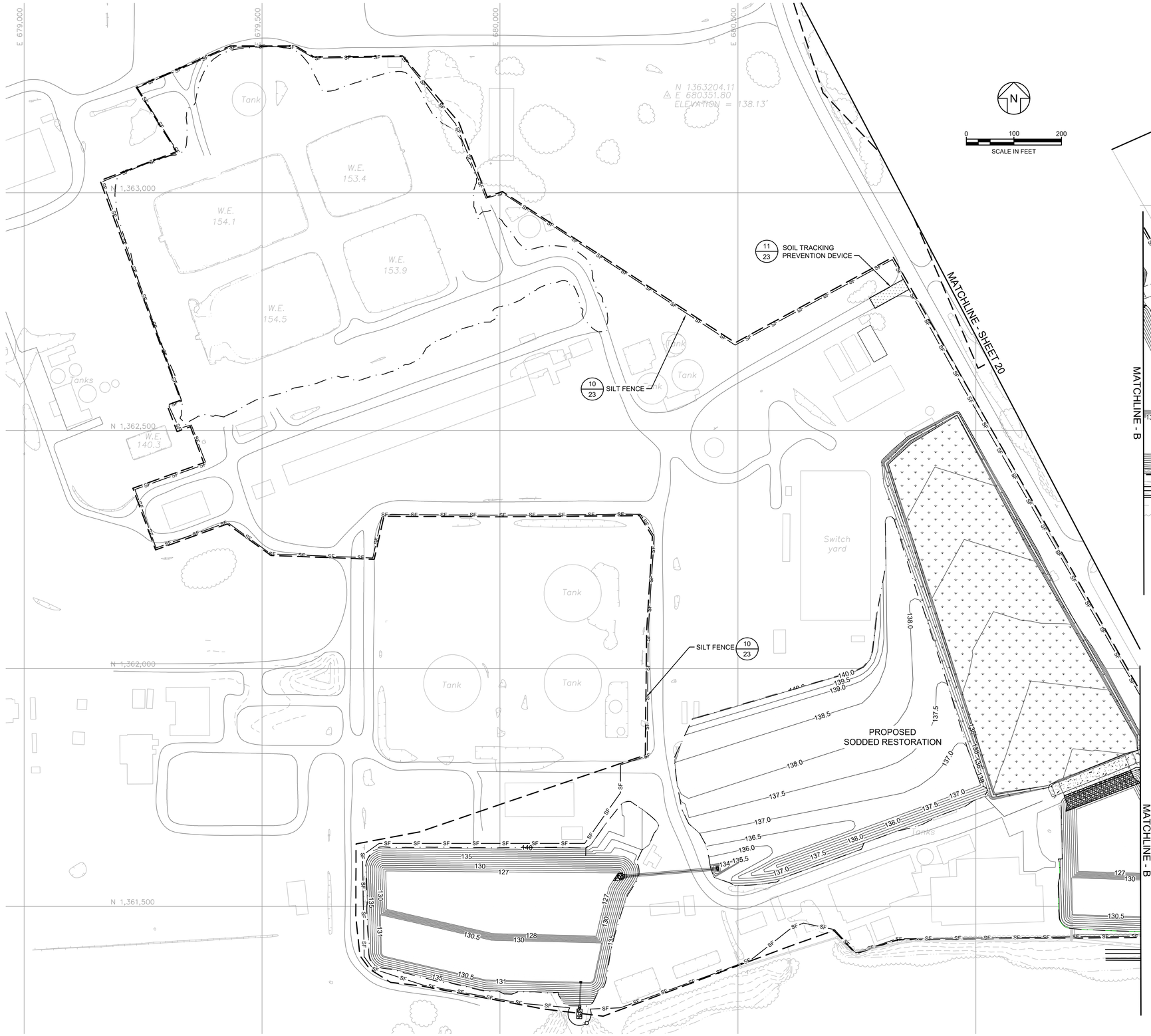
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

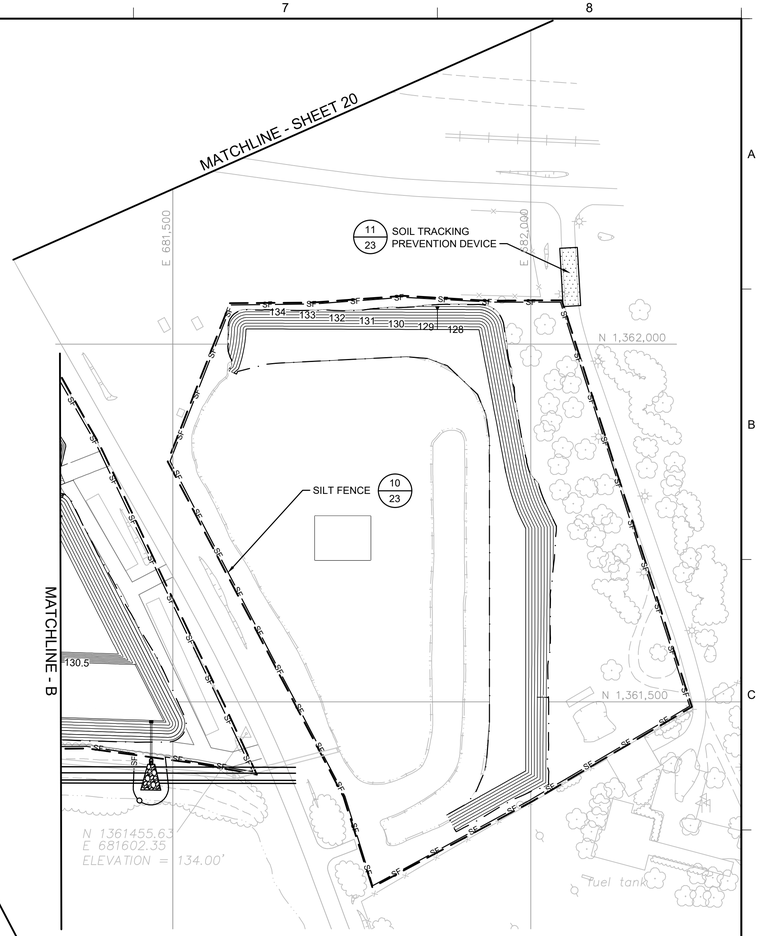
DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C14
REVIEWED BY:	TDA	DRAWING NO.:	18 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD\PROJECTS\LLAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C14





0 100 200
SCALE IN FEET

LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- 100 EXISTING GROUND ELEVATION CONTOUR (FT)
- EXISTING SITE ACCESS ROAD
- 130 PROPOSED GRADING ELEVATION CONTOUR (FT)
- SF PROPOSED SILT FENCE
- PROPOSED TURBIDITY BARRIER
- AREA TO BE SODDED

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: SWPPP PLAN (1)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

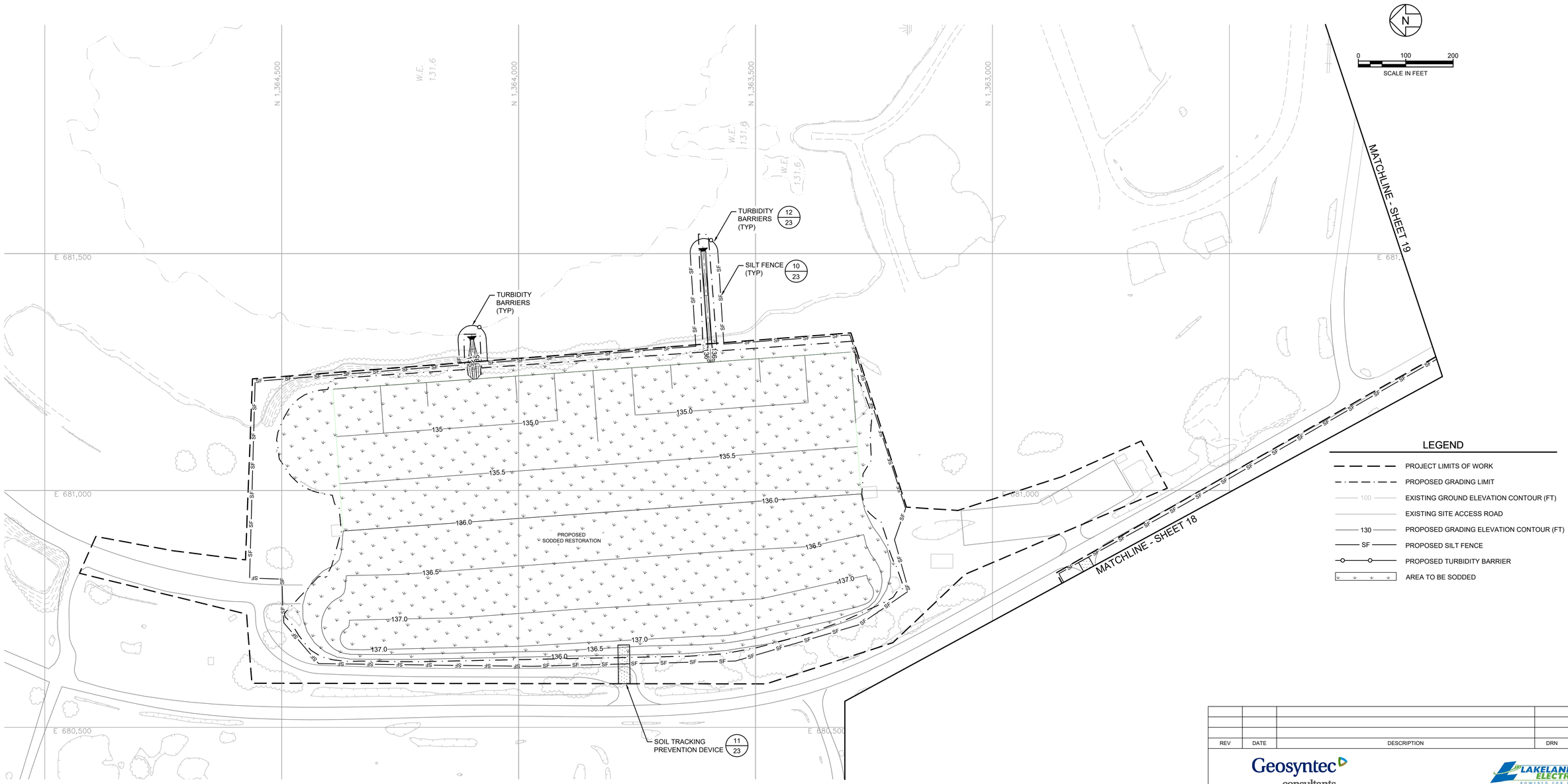
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C15
REVIEWED BY:	TDA	DRAWING NO.:	19 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD \PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO \FW8287\DWG\FW8287.01-C15



LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- 100 — EXISTING GROUND ELEVATION CONTOUR (FT)
- EXISTING SITE ACCESS ROAD
- 130 — PROPOSED GRADING ELEVATION CONTOUR (FT)
- SF — PROPOSED SILT FENCE
- PROPOSED TURBIDITY BARRIER
- AREA TO BE SODDED

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: SWPPP PLAN (2)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

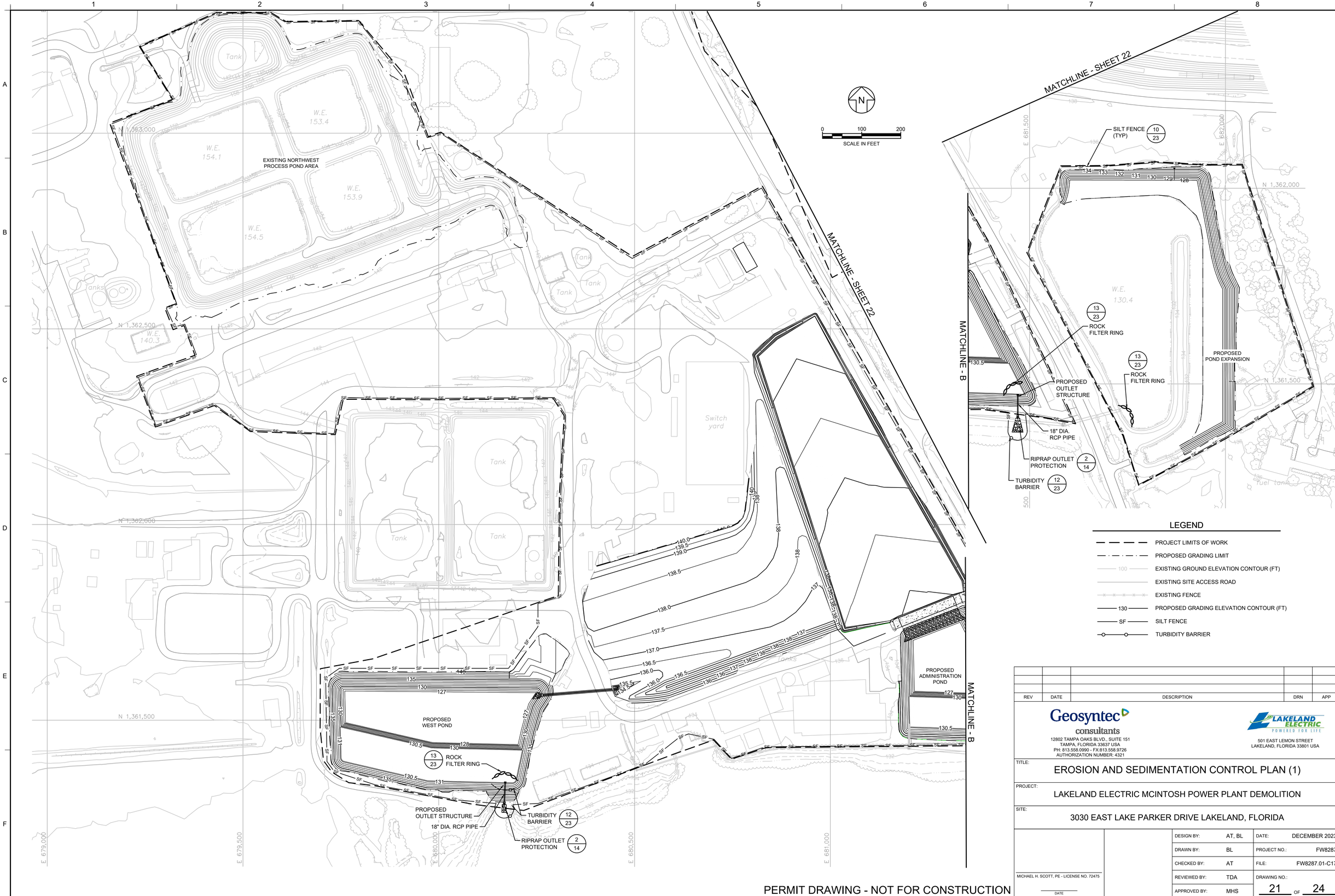
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C15
REVIEWED BY:	TDA	DRAWING NO.:	20 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD \PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO \FW8287\DWG\FW8287.01-C15



PERMIT DRAWING - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: EROSION AND SEDIMENTATION CONTROL PLAN (1)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

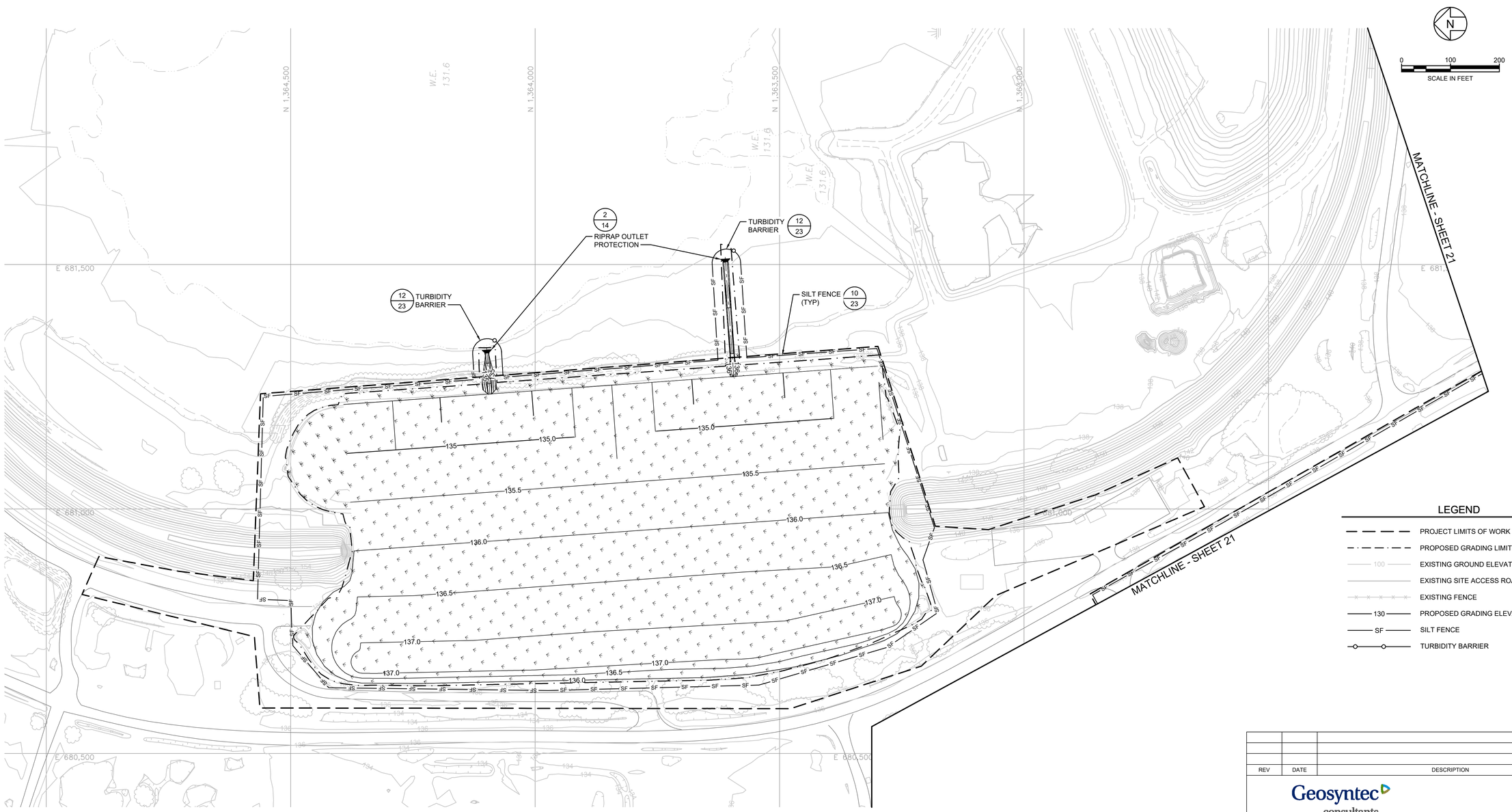
SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C17
REVIEWED BY:	TDA	DRAWING NO.:	
APPROVED BY:	MHS		21 OF 24

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C17



LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- 100 — EXISTING GROUND ELEVATION CONTOUR (FT)
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- 130 — PROPOSED GRADING ELEVATION CONTOUR (FT)
- SF — SILT FENCE
- TURBIDITY BARRIER

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: EROSION AND SEDIMENTATION CONTROL PLAN (2)

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

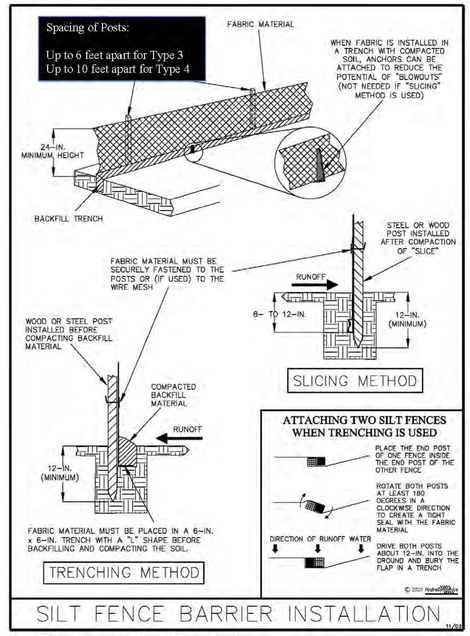
MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

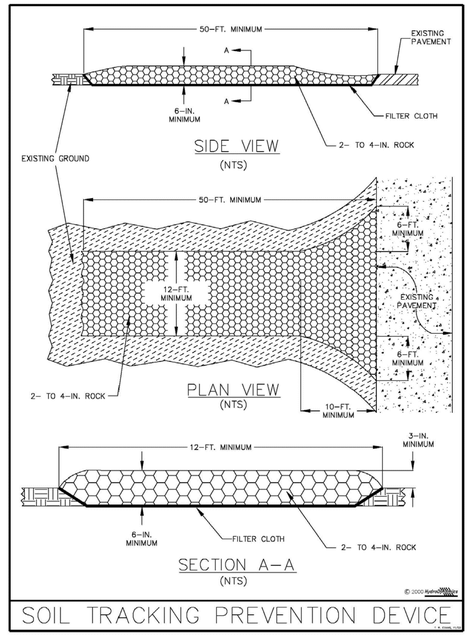
DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C17
REVIEWED BY:	TDA	DRAWING NO.:	22 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

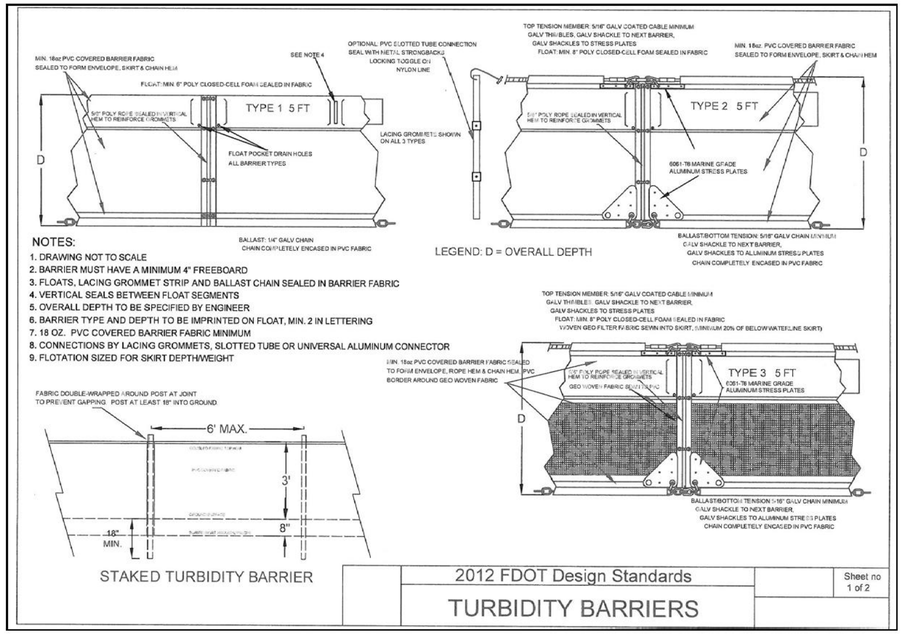
I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C17



10/19 DETAIL
SILT FENCE
SCALE: NTS
XREF: Erosion-Sediment-Control FDOT 2013 146

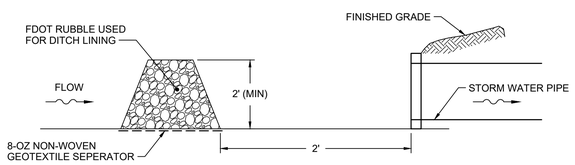


11/19 DETAIL
SOIL TRACKING PREVENTION DEVICE
SCALE: NTS
XREF: Erosion-Sediment-Control FDOT 2013 183

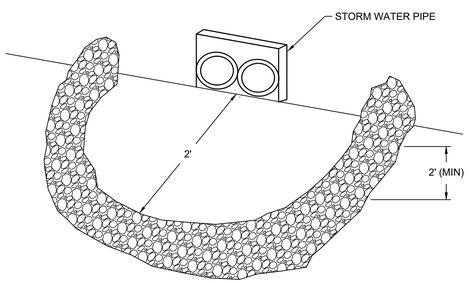


NOTES:
1. DRAWING NOT TO SCALE
2. BARRIER MUST HAVE A MINIMUM 4" FREEBOARD
3. FLOATS, LACING GROMMET STRIP AND BALLAST CHAIN SEALED IN BARRIER FABRIC
4. VERTICAL SEALS BETWEEN FLOAT SEGMENTS
5. OVERALL DEPTH TO BE SPECIFIED BY ENGINEER
6. BARRIER TYPE AND DEPTH TO BE IMPRINTED ON FLOAT, MIN. 2 IN LETTERING
7. 18 OZ. PVC COVERED BARRIER FABRIC MINIMUM
8. CONNECTIONS BY LACING GROMMETS, SLOTTED TUBE OR UNIVERSAL ALUMINUM CONNECTOR
9. FLOTATION SIZED FOR SKIRT DEPTH/WEIGHT

12/19 DETAIL
TURBIDITY BARRIERS
SCALE: NTS
XREF: Erosion-Sediment-Control FDOT 2013 163



PROFILE



PERSPECTIVE

13/21 DETAIL
ROCK FILTER RING
SCALE: NTS

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: SWPPP AND EROSION AND SEDIMENTATION CONTROL DETAILS

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

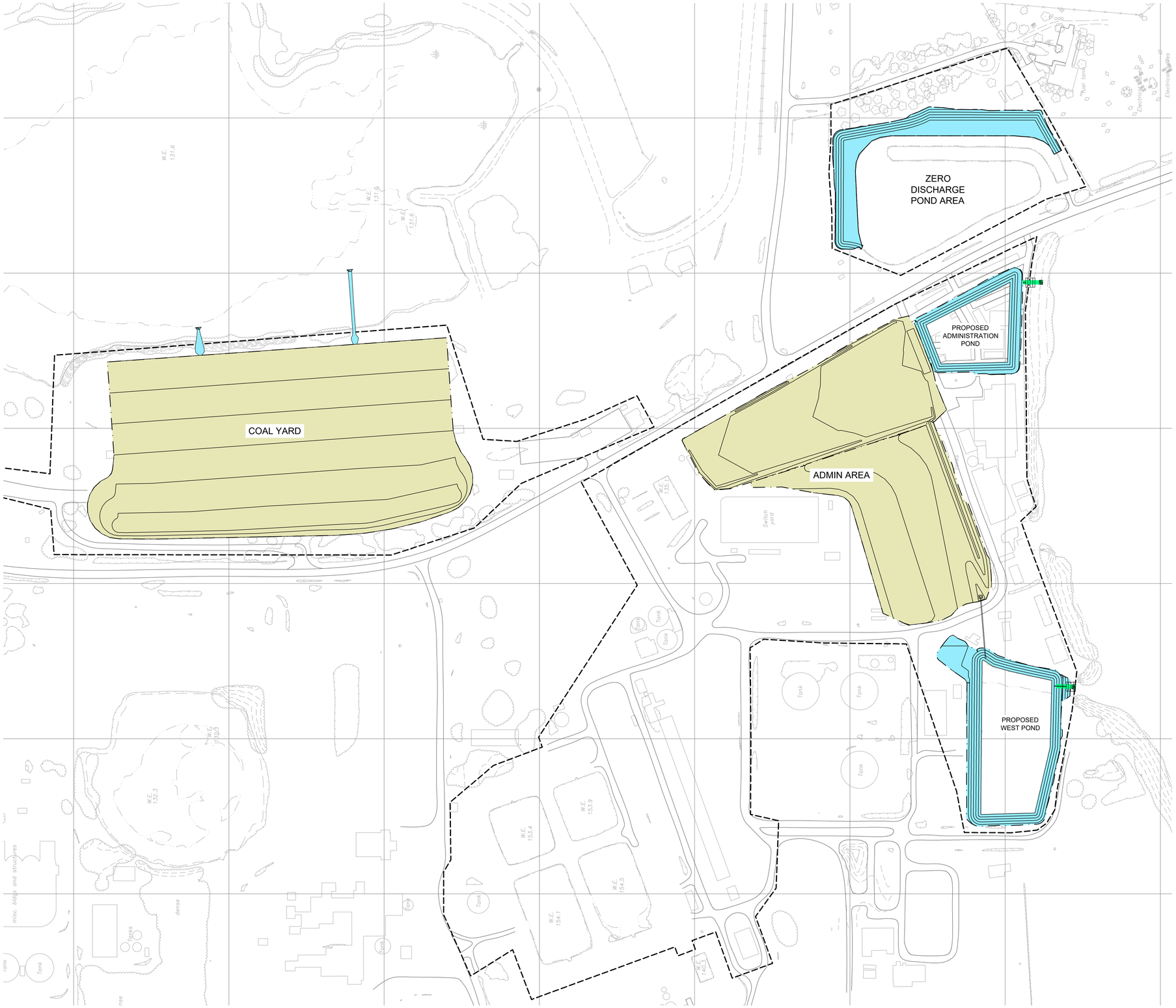
SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

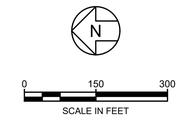
DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C16
REVIEWED BY:	TDA	DRAWING NO.:	23 OF 24
APPROVED BY:	MHS		

MICHAEL H. SCOTT, PE - LICENSE NO. 72475
DATE

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD (PROJECTS)\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO (FW8287)\DWG\FW8287.01-C16





LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- PROPOSED GRADING CONTOUR
- PHASE 1 ACTIVITIES
- PHASE 2 ACTIVITIES
- PHASE 3 ACTIVITIES

SEQUENCE OF WORK

THE SEQUENCE OF WORK IS INTENDED TO DESCRIBE THE OVERALL CONSTRUCTION PROJECT AND GENERAL SEQUENCE OF ACTIVITIES. UNLESS OTHERWISE NOTED, IT IS NOT INTENDED TO ESTABLISH A FIXED OR REQUIRED WORK CONSTRUCTION SEQUENCE. THE CONTRACTOR SHALL DEVELOP AND SUBMIT TO THE ENGINEER A WORK PLAN THAT OUTLINES THE GENERAL CONSTRUCTION SEQUENCING AND PROJECTED SCHEDULE FOR CONSTRUCTION.

ADMIN AREA:

PHASE 1

1. INSTALL APPROPRIATE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS).
2. EXCAVATE ADMINISTRATION AND WEST PONDS AND FILL DISCHARGE CANAL TO THE LIMITS SHOWN ON THE PLAN

PHASE 2

1. GRADE ADMIN AREA AS SHOWN ON THE PLAN

PHASE 3

1. CONSTRUCT OUTLET STRUCTURES
2. RESTORATION AND STABILIZATION OF ALL DISTURBED AREAS TO EXISTING CONDITIONS

COAL YARD AREA:

PHASE 1

1. INSTALL APPROPRIATE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS)
2. INSTALL PAVED FLUMES AS SHOWN ON THE PLAN

PHASE 2

1. GRADE COAL YARD AS SHOWN ON THE PLAN

PHASE 3

1. RESTORATION AND STABILIZATION OF ALL DISTURBED AREAS TO EXISTING CONDITIONS

ZERO DISCHARGE POND AREA:

PHASE 1

1. INSTALL APPROPRIATE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS).
2. EXCAVATE ZERO DISCHARGE POND TO LIMITS SHOWN ON THE PLAN

PHASE 2

3. RESTORATION AND STABILIZATION OF ALL DISTURBED AREAS TO EXISTING CONDITIONS

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: CONSTRUCTION SEQUENCING PLAN

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

MICHAEL H. SCOTT, PE - LICENSE NO. 72475

DATE

DESIGN BY:	AT, BL	DATE:	DECEMBER 2023
DRAWN BY:	BL	PROJECT NO.:	FW8287
CHECKED BY:	AT	FILE:	FW8287.01-C18
REVIEWED BY:	TDA	DRAWING NO.:	24 OF 24
APPROVED BY:	MHS		

PERMIT DRAWING - NOT FOR CONSTRUCTION

I:_CADD\PROJECTS\LAKELAND ELECTRIC\MCINTOSH PLANT DEMO\FW8287\DWG\FW8287.01-C18

ATTACHMENT D
Stormwater Design Calculations

Geosyntec consultants

engineers | scientists | innovators

STORMWATER CALCULATIONS PACKAGE

C.D. MCINTOSH POWER PLANT

Prepared for

Lakeland Electric
501 East Lemon Street
Lakeland, Florida 33801

Prepared by

Geosyntec Consultants, Inc.
12802 Tampa Oaks Boulevard, Suite 151
Tampa, Florida 33637

Project FW8287

January 2024

MICHAEL HUGH SCOTT
LICENSE
No. 72475
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Digitally signed by Michael H. Scott, PE
Date: 2024.05.13 16:57:16 -04'00'

TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 Purpose 1

2. EXISTING CONDITIONS 2

3. DESIGN CRITERIA 3
3.1 Water Quantity 3
3.2 Water Quality – Wet Ponds 3
3.3 Paved Flumes 4
3.4 Drop Inlets 4
3.5 Outlet Protection 4

4. METHODOLOGY AND HYDRAULIC PARAMETERIZATION 5
4.1 Node-Link Network 5
4.2 Nodes 5
4.2.1 Initial Stages 5
4.2.2 Warning Stages 5
4.2.3 Storage 5
4.3 Links 5
4.3.1 Weirs 6
4.3.2 Pipes 6
4.3.3 Drop Structures 6
4.3.4 Channels 6

5. DESIGN PARAMETERS AND CALCULATIONS 7
5.1 Rainfall Distribution and Depths 7
5.2 Drainage Areas 7
5.3 Hydrologic Soil Groups (HSG) 7
5.4 Curve Numbers 7
5.5 Times of Concentrations (TOCs) 7
5.6 Weirs 7
5.7 Paved Flumes 7
5.8 Culverts 8
5.9 Wet Ponds 8
5.9.1 Treatment Volume 8
5.10 Drop Structures 8
5.11 Outlet Protection 8
5.12 Nodes 8
5.13 Runoff Volumes 8

6. RESULTS AND CONCLUSIONS 9

7. REFERENCES 10

LIST OF TABLES

Table 1: Post Development Condition Drainage Areas and Curve Numbers

Table 2: Post Development Time of Concentration

Table 3: Weir Characteristics and Hydraulic Capacity

Table 4: Paved Flume Characteristics and Hydraulic Capacity

Table 5: Pipe Characteristics and Hydraulic Capacity

Table 6: Wet Pond Characteristics and Results

Table 7: Drop Structure Characteristics and Outlet Protection Calculations

Table 8: Node Properties

Table 9: Runoff Comparison (Existing Conditions versus Post Development)

LIST OF FIGURES

Figure 1A: Post Development Drainage Basin Delineations – Unit 3 Area

Figure 1B: Post Development Drainage Basin Delineations – Coal Yard Area

LIST OF ATTACHMENTS

Attachment 1: Existing Conditions Calculations

Attachment 2: Groundwater Contours

Attachment 3: SWFWMD Applicant's Handbook Volume II

Attachment 4: WSS Soils Report

Attachment 5: Pond Design Calculations

Attachment 6: Post Development ICPR Report

ACRONYMS AND ABBREVIATIONS

AMC	Antecedent Moisture Condition
BMP	Best Management Practice
BSA	Byproduct Storage Area
CN	Curve Number
COC	Conditions of Certification
DI	Drop Inlet
ERP	Environmental Resource Permit
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
H&H	Hydrologic and Hydraulic
ICPR	Interconnected Channel and Pond Routing
LE	Lakeland Electric
NRCS	Natural Resources Conservation Service
RCP	Reinforced Concrete Pipe
SCS	Soil Conservation Service
SWFWMD	Southwest Florida Water Management District
TOC	Time of Concentration
TR-55	Technical Release-55
USDA	United States Department of Agriculture
WSS	Web Soil Survey

1. INTRODUCTION

1.1 Purpose

The purpose of this calculation package (Package) is to evaluate the post development conditions at the Lakeland Electric McIntosh Power Plant (Site) in Lakeland, Florida. Lakeland Electric (LE) plans to decommission and demolish the Units 1, 2, and 3 block and Coal Yard area of the Site. As part of a separate project, the Byproduct Storage Area (BSA) along the south side of Fish Lake was closed-in-place. The modeling results for the closure-in-place have been integrated into this project; however full calculations for the BSA closure are not included as part of this Package. The purpose of this Package is to present the hydrologic and hydraulic (H&H) calculations for the proposed stormwater features associated with the demolition and compare the existing conditions peak discharge to the post development peak discharge. The remainder of this Package is organized to present: (i) methodology and hydraulic parameterization; (ii) design parameters and computations; (iii) results and conclusions; (iv) references; and (v) attachments.

2. EXISTING CONDITIONS

As per the environmental resource permit (ERP) requirements, runoff from the proposed stormwater management system must be less than the existing stormwater management system. At the time of the preparation of this report, limited information was available for the existing stormwater management system. Geosyntec requested the stormwater management report referenced in the Conditions of Certification (COC) for the Site, but the report has not been able to be located. Therefore, existing conditions calculations were developed using the limited data available and best engineering judgement. **Attachment 1** details the Existing Conditions calculations.

3. DESIGN CRITERIA

The following surface water management system is designed to meet the criteria identified from the following documents and design considerations based on best engineering practices form industry technical literature:

- Southwest Florida Water Management District (SWFWMD) Environmental Resource Permit (ERP) Applicant's Handbook [2018]
- Florida Erosion and Sediment Control Inspector's Manual and Virginia Department of Highways and Transportation Roads and Bridges Handbook
- Florida Department of Transportation (FDOT) Drainage Manual

Design criteria for each component of the proposed surface water management system are described below.

3.1 Water Quantity

Section 3.1 of the SWFWMD Handbook identifies the following requirements for water quality:

- Offsite discharges and peak stages for the existing and developing conditions shall be computed using the Southwest Florida Water Management District's 24-hour, 25-year rainfall maps and the Natural Resources Conservation Service type II Florida Modified 24-hour rainfall distribution with an antecedent moisture condition II.
- The required retention volume shall be the post development runoff volume less the existing conditions runoff volume computed using the Southwest Florida Water Management District's 24-hour, 100-year rainfall map. The total post development volume leaving the site shall be no more than the total existing conditions volume leaving the site for the design 100-year storm. The rate of runoff leaving the site shall not cause adverse off-site impacts.

3.2 Water Quality – Wet Ponds

The SWFWMD requires stormwater projects to be designed such that "discharges will meet applicable state water quality standards". The volume of runoff to be treated from a site is determined by the type of treatment system. The West Pond and Administration Pond are proposed to be wet detention ponds.

- Criteria for the design of a wet pond from Part 4.1 of the SWFWMD ERP Applicant's Handbook are as follows:
    - A wet detention treatment system shall treat one inch of runoff from the contributing area.
    - The wet detention system's treatment volume shall be discharged in no less than 120 hours (5 days) with no more than one-half the total volume being discharged within the first 60 hours (2.5 days).
    - Manmade wet detention systems shall include a minimum of 35% littoral zone, concentrated at the outfall, for biological assimilation of pollutants. The percentage of littoral zone is based on the ratio of vegetated littoral zone to the surface area of

the pond at the control elevation. The littoral zone shall be no deeper than 3.5 feet below the design overflow elevation. The treatment volume should not cause the pond level to rise more than 18 inches above the control elevation. Mulching and/or planting is desirable but not required, unless the soils in the proposed littoral zone are not capable of supporting wetland vegetation. In this case mulching will be required. Native vegetation that becomes established in the littoral zone must be maintained as part of the operation permit.

- Depth: The depth of the pond shall not be excavated to within two feet of the underlying limestone which is part of a drinking water aquifer. The bottom elevation for a wet detention system must be at least one foot below the control elevation.
- Side Slopes: All retention areas should have stabilized side slopes no steeper than 4:1 (horizontal: vertical) out to a depth of two feet below the control elevation.
- Off-site discharges and peak stages for the existing and developed conditions shall be computed using the SWFWMD's 24-hour, 25-year rainfall maps and the Natural Resources Conservation Service type II Florida Modified 24-hour rainfall distribution with an antecedent moisture condition (AMC) II.

3.3 Paved Flumes

Paved flumes are proposed to convey runoff from the Coal Yard to Fish Lake.

- Criteria for the design of paved flumes from Section 3.16 of the Virginia Department of Highways and Transportation Handbook referenced in the Florida Erosion and Sediment Control Inspector's Manual:
  - Paved flumes shall be capable of passing the peak flow expected from a 10-year frequency storm.
  - Maximum slope of the structure shall be 1.5:1 (67%).

3.4 Drop Inlets

Drop structures are proposed as the outfall structures for the wet ponds and to convey runoff under the road to the West Pond (herein referred to as DI-1). Outfall structures are modified FDOT Type C structures, while DI-1 is an FDOT Type H structure. The outfall structures were designed to drawdown the wet ponds in accordance with the requirements described in Applicant's Handbook for wet ponds. DI-1 was designed to convey the 25-year, 24-hour storm event without overtopping.

3.5 Outlet Protection

Outlet protection was designed for the downstream ends (i.e., outlet) of the pipe components of the drop structures to reduce flow velocities and erosion in downstream conveyance features. Outlet protection was generally designed with riprap lining as a permanent erosion control measure used for stabilizing slopes, channels, and culvert outlets. The dimensions of the riprap lining, such as width, length and apron thickness were designed using the Outlet Protection BMPs in the Florida Erosion and Sediment Control Inspector's Manual (FDEP, 2018).

4. METHODOLOGY AND HYDRAULIC PARAMETERIZATION

The surface water runoff hydrographs, channel capacity, and pond routing for each drainage area were calculated using H&H procedures presented in the *Urban Hydrology for Small Wetlands Technical Release 55 (TR-55)* [Soil Conservation Service (SCS), 1986]; Manning's kinematic equation; channel shear stresses; and other recognized engineering procedures encoded in the ICPR software [ICPR, 2018].

4.1 Node-Link Network

A model network of subbasins, nodes, and links was developed based on the drainage information provided and the model level of detail considered necessary to meet the objectives of the project. The network included the following features:

- Area associated with the Zero Discharge Pond
- Unit 3 area including the existing infrastructure
- Area associated with the Coal Yard
- Area associated with Fish Lake
- BSA Landfill on southern side of Fish Lake

4.2 Nodes

Nodes in the model are typically either defined as Stage/Area or Time/Stage. Stage/Area nodes are used to model storage areas like water bodies/depressions and can also be used as junctions in channels and manholes in pipe networks. Ponds and manholes are modeled as Stage/Area nodes, while boundaries are modeled as Time/Stage.

4.2.1 Initial Stages

The initial stages were set such that the model simulation would begin in static equilibrium. The pond initial stages were set based on water elevations at the time of survey and groundwater well data from the Site (**Attachment 2**).

4.2.2 Warning Stages

Warning stages were set at the elevations at which flooding would be expected to occur. For the ponds, this elevation was the top of bank. For nodes between pipes, at the entrance to pipes, or at the entrance of the broad crested weir, the warning stage is based on surrounding or proposed grades.

4.2.3 Storage

Stage/Area nodes allow for the inclusion of storage information. Storage was calculated using AutoCAD.

4.3 Links

The model analyzed flow in links allowing the evaluation of conveyance effectiveness between nodes. Entrance/exit/head losses were incorporated where appropriate.

4.3.1 Weirs

A broad crested weir link was used to convey runoff over the existing road to the Administration Pond as shown in **Figure 1A**.

4.3.2 Pipes

Pipe links were used to represent culverts throughout the Site. Pipe inverts, dimensions, geometry, and material data were referenced from a combination of project topographic survey data and field site visit data. Roughness coefficients (Manning's n) were based on material as follows:

- Reinforced Concrete Pipe (RCP) - 0.012

Entrance and exit losses were assigned based on literature values, or default values were used where exact conditions were uncertain. In general, the values were applied as follows:

- Entrance Losses – a representative average value of 0.5 was used for all pipes.
- Exit Losses – for discharge into a static water body, an exit loss of 1.0 was used.

4.3.3 Drop Structures

Pond outfall structures for the Administration Pond and the West Pond were modified FDOT Type C structures and consist of one sharp crested circular weir at the water treatment volume elevation, one sharp-crested vertical rectangular weir at the top of the treatment volume, and one horizontal rectangular weir at the top of the riser structure. These weirs convey water to an 18" RCP and to Lake Parker. DI-1 consist of an FDOT Type H drop structure with a horizontal weir at the top of the structure connecting two 24" RCP to convey stormwater under the existing road to the West Pond.

4.3.4 Channels

Paved flumes were modeled as trapezoidal concrete channels.

5. DESIGN PARAMETERS AND CALCULATIONS

5.1 Rainfall Distribution and Depths

The rainfall depths for the site were obtained from the Southwest Florida Water Management District (SWFWMD) "Part D – Project Design Aids" (**Attachment 3**). The SWFWMD developed this document to provide consistency in the parameters used by District Staff in their review for environmental resource permitting of surface water management systems (SWFWMD, 1996).

5.2 Drainage Areas

Figure 1A and **Figure 1B** presents the drainage area delineation for the proposed site development conditions. Areas within Units 1, 2, and 3 are to remain ungraded at the time of these calculations at the request of Lakeland Electric. However, these areas may be graded to the proposed stormwater features in the future. Therefore, these ungraded areas were included in the proposed stormwater feature design though existing flow patterns may not indicate these areas flow to the proposed features. **Table 1** presents the drainage areas and associated assumptions.

5.3 Hydrologic Soil Groups (HSG)

Attachment 4 presents the soil map and descriptions for the different soil classifications near the project area from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS), [USDA, 2018a].

5.4 Curve Numbers

Table 1 presents the selected curve numbers (CNs) for each drainage area that contributes to surface water runoff. Areas within Unit 3 that are currently impervious are assumed to remain impervious based on conversation with Lakeland Electric. The current plan is to leave building foundations and roads in place after demolition, and sod will be placed on top of these areas to grade. Additionally, Lakeland Electric has indicated a desire to potentially utilize these areas in the future. Due to the uncertainty with future land use, a curve number of 98 was conservatively selected for the sodded areas within Units 1, 2, and 3. The CNs for areas outside of the Units 1, 2, and 3 areas were selected from Table 2-2 of Technical Release (TR-55) [SCS, 1986] based on land cover and HSG.

5.5 Times of Concentrations (TOCs)

Table 2 presents the TOC for all drainage areas. TOCs were calculated using the SCS method detailed in TR-55 [SCS, 1986]. A minimum of 10 minutes was used per the FDOT Drainage Manual requirements when calculated TOCs were less than 10 minutes.

5.6 Weirs

Table 3 presents the characteristics and hydraulic capacity of the proposed weirs.

5.7 Paved Flumes

Table 4 presents the characteristics and hydraulic capacity of the proposed paved flumes. The paved flumes were sized using the minimum criteria set forth in the Virginia Department of Highways and Transportation.

5.8 Culverts

Table 5 presents the characteristics and hydraulic capacity of the culverts. Existing culverts are not proposed to be modified.

5.9 Wet Ponds

Table 6 presents the pond characteristics. The Admin Pond and the West Pond were sized using the sizing criteria set forth for wet retention systems in SWFWMD [2018]. The design inflow for the 25-year, 24-hour storm event was used to size the basin surface areas and volumes. The riser outlet structure for the wet ponds were designed to discharge the total treatment volume in no less than 120 hours and half the treatment volume in no less than 60 hours per SWFWMD requirements.

5.9.1 Treatment Volume

Wet ponds with outfall structures were designed to treat stormwater runoff in accordance with the requirements stated in Section 4.1 of the SWFWMD Applicant's Handbook Volume II. **Attachment 5** details the pond treatment calculations and the recovery analysis for the ponds.

5.10 Drop Structures

Drop structures were designed for the wet pond outfalls as well as DI-1. **Table 7** presents the characteristics and hydraulic capacities of the drop structures.

5.11 Outlet Protection

Table 7 presents the outlet protection calculations for the pond outfalls and DI-1. The outlet protection was designed to withstand the 100-year, 24-hour velocities.

5.12 Nodes

Table 8 presents the peak and warning stages for the nodes.

5.13 Runoff Volumes

Table 9 shows the runoff volume for the Post Development Conditions as compared to the Existing Conditions. Existing Conditions calculations can be found in **Attachment 1**.

6. RESULTS AND CONCLUSIONS

The stormwater management system for the Site consists of drop structures, flumes, weirs and stormwater management ponds. The calculations demonstrate that the proposed Site improvements result in no adverse conditions and the calculated and modeled performance of the critical stormwater elements meet or exceed the regulatory requirements referenced herein. ICPR results for this effort are presented in **Attachment 6**.

7. REFERENCES

Interconnected Channel and Pond Routing Model (ICPR). *Technical Reference*. Streamline Technologies, Inc. 2018.

Florida Department of Environmental Protection (FDEP). *Florida Stormwater, Erosion, and Sedimentation Control Inspector Manual (FESCI) Tier II: Manual for Best Management Practice (BMP) Inspectors*. FSESCI TIER II Manual 100218.pdf (state.fl.us). 2018.

Soil Conservation Service (SCS). (1986). *Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55)*, 2nd Ed., United States Department of Agriculture, Soil Conservation Service. Washington, D.C.

Southwest Florida Water Management District (SWFWMD). *Environmental Resource Permit Applicant's Handbook Volume II.* Project Design Aids (state.fl.us). 2018.

Southwest Florida Water Management District (SWFWMD). *Part D – Project Design Aids*. Environmental Resource Permitting Information Manual. Project Design Aids (state.fl.us). 1996.

United States Department of Agriculture (USDA). (2020). *Web Soil Survey*. Natural Resources Conservation Service. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

TABLES

Table 1. Post Development Conditions Drainage Areas and Curve Numbers

Subcatchment ID	Area (sq ft)	Area (acres)	Total Area (acres)	Total Area (%)	Land Use Description	CN	Weighted CN	Assumptions/Description
Basin 1								Area surrounding Zero Discharge Pond.
Zero Discharge Pond	262,307.8	6.02	11.9	51%	Water	98	92	
Grassed	256,227.0	5.88		49%	Open Space, Poor	86		
Basin 2								Area surrounding Fish Lake minus Coal Yard and BSA Landfill.
Fish Lake	2,354,974.7	54.06	68.0	79%	Water	98	96	
Grassed	609,064.0	13.98		21%	Open Space, Poor	86		
Basin 3A								Area graded to Administration Pond.
Admin Pond	72,171.7	1.66	6.6	25%	Water	98	98	
Industrial	215,849.0	4.96		75%	Future Impervious Area	98		
Basin 3A-1								Area not currently proposed to be graded but may be graded to the Administration Pond in the future.
Industrial	86,285.5	1.98	2.0	100%	Future Impervious Area	98	98	
Basin 3B								Area that drains to the existing stormwater pipes along the southern boundary of Site and eventually discharges to Zero Discharge Pond.
Industrial	174,932.1	4.02	4.0	100%	Future Impervious Area	98	98	
Basin 3B-1								Area further downstream of Basin 3B that drains to existing stormwater pipes and to Zero Discharge Pond.
Industrial	46,245.6	1.06	1.1	100%	Future Impervious Area	98	98	
Basin 3C								Area graded to DI-1 (Proposed Pipes) and discharging to the West Pond.
Industrial	504,827.3	11.59	11.6	100%	Future Impervious Area	98	98	
Basin 3C-1								Area not currently proposed to be graded but may be graded to DI-1 and the West Pond.
Industrial	39,670.2	0.91	0.9	100%	Future Impervious Area	98	98	
Basin 3C-2								Area surrounding West Pond.
West Pond	125,664.1	2.88	4.7	62%	Water	98	98	
Industrial	77,850.2	1.79		38%	Future Impervious Area	98		
Basin 3D								Area that drains to Lake Parker.
Industrial	46,551.4	1.07	1.1	100%	Future Impervious Area	98	98	
Basin 4								Area that is pumped to wastewater treatment plant.
Process Ponds	250,297.5	5.75	13.7	42%	Water	98	94	
Impervious	127,922.4	2.94		21%	Existing Impervious Area	98		
Grassed	217,536.8	4.99		37%	Open Space, Poor	86		
Half Coal Yard								
Grassed	295,156.9	6.78	6.8	100%	Open Space, Poor	86	86	
Half Coal Yard 2								
Grassed	290,249.0	6.66	6.7	100%	Open Space, Poor	86	86	
BSA Landfill								From BSA Landfill calculations.
Final Cover	2,141,409.6	49.16	49.2	100%	From BSA Model	90	90	

Table 2. Post Development Conditions Time of Concentration

Basin ID	Time of Concentration										
	Sheet Flow					Shallow Concentrated Flow					
	Surface Description	Manning's n	Flow Length (ft)	2-Year, 24-Hour Rainfall (in.)	Land Slope (ft/ft)	Flow length (ft)	Surface Description	Start EL (ft)	End El (ft)	Land slope (ft/ft)	Time of Concentration (min)
Basin 1	Direct Entry										10
Basin 2	Direct Entry										10
Basin 3A	Direct Entry										10
Basin 3A-1	Direct Entry										10
Basin 3B	Direct Entry										10
Basin 3B-1	Direct Entry										10
Basin 3C	Grass: Short	0.15	100	3.5	0.01	1,332	Grassed Waterway	141	135.5	0.004	35.8
Basin 3C-1	Grass: Short	0.15	100	3.5	0.05	1,531	Grassed Waterway	140	135.5	0.003	37.6
Basin 3C-2	Direct Entry										10
Basin 3D	Direct Entry										10
Basin 4	Direct Entry										10
Half Coal Yard	Direct Entry										10
Half Coal Yard 2	Direct Entry										10
BSA Landfill	Direct Entry[1]										218

[1]Input from BSA Landfill Model

Table 3. Weir Characteristics and Hydraulic Capacity

									25-year, 24-hour				100-year, 24-hour		
Weir ID	**Type/Geometry**	**Invert (ft)**	**Control Elevation (ft)**	**Overflow El (ft)**	**Depth (ft)**	**Bottom Width (ft)**	**Left SS**	**Right SS**	**Q (cfs)**	**Headwater (ft)**	**DS Velocity (fps)**	**Freeboard (ft)**	**Q (cfs)**	**Headwater (ft)**	**Freeboard (ft)**
W001	Broad Crested, Vertical/Trapezoidal	136	136	137	0.75	150	33.3	33.3	38.51	136.2	1.2	0.8	55.03	136.3	0.8

Table 4. Paved Flume Characteristics and Hydraulic Capacity

											10-year, 24-hour				25-year, 24-hour				100-year, 24-hour		
Channel ID	**Type/Geometry**	**Manning's n**	**US Invert (ft)**	**DS Invert (ft)**	**Overtopping El (ft)**	**Length (ft)**	**Depth (ft)**	**Bottom Width (ft)**	**Left SS**	**Right SS**	**Q (cfs)**	**Headwater (ft)**	**Velocity (fps)**	**Freeboard (ft)**	**Q (cfs)**	**Headwater (ft)**	**Velocity (fps)**	**Freeboard (ft)**	**Q (cfs)**	**Headwater (ft)**	**Freeboard (ft)**
North Flume	Trap	0.012	134.5	131	136	84.5	1	6	N/A	N/A	19.45	135.16	10.53	0.84	23.41	135.25	11.28	0.75	36.15	135.48	0.52
South Flume	Trap	0.012	134.5	131	136	235	1	6	N/A	N/A	18.97	135.15	7.55	0.85	22.85	135.24	8.07	0.76	35.35	135.47	0.53

Table 5. Pipe Characteristics and Hydraulic Capacity

Pipe ID	Material	Characteristics					Pipe Profiles			25-year, 24-hour			100-year, 24-hour		
		Manning's n {n}	No. of Pipes	Diameter (ft)	Length (ft)	Overtopping El (Ft)	Inlet Invert El. (ft)	Outlet Invert El. (ft)	Pipe Slope (ft/ft)	Peak Flow Rate (cfs)	Headwater (ft)	Freeboard (ft)	Peak Flow Rate (cfs)	Headwater (ft)	Freeboard (ft)
U3 Pipe	RCP	0.012	1	4.5	148	134	124.3	126.8	-0.017	21.90	131.37	1.03	31.37	132.2	0.20
Existing Pipe	RCP	0.012	1	4.5	384	134	127.4	126.3	0.003	17.18	131.37	2.07	24.45	132.2	1.24

Table 6. Wet Pond Characteristics and Results

ITEM		ADMIN POND			WEST POND		
		DESCRIPTION	PARAMETER VALUE IN UNITS SHOWN		DESCRIPTION	PARAMETER VALUE IN UNITS SHOWN	
POND INVERT ELEVATION		Bottom Elevation of Pond	ELEVATION (FT NGVD29)	127.0	Bottom Elevation of Pond	ELEVATION (FT NGVD29)	127.0
		Permanent Pool Required		130.5	Permanent Pool Required		130.5
RISER OUTLET STRUCTURE	Drawdown Orifice (Invert)	2" Diameter Orifice		130.5	2" Diameter Orifice		130.5
	Control Orifice (invert)	6" x 37" Orifice		132.0	6" x 37" Orifice		132.0
	Principal Spillway Riser (Invert)	24" x 36" Rectangular Horizontal Orifice		133.5	24" x 36" Rectangular Horizontal Orifice		135.0
	Principal Spillway Pipe (U/S Invert)	18" Diameter RCP		130.5	18" Diameter RCP		130.5
	Principal Spillway Riser (D/S Invert)			130.3			130.0
EMBANKMENT CREST		Top of Bank		135.0	Cut and fill from existing surface		136.0
AVAILABLE STORAGE VOLUME		To Top of Bank	VOLUME (ACRE-FT)	9.6	To Top of Bank	VOLUME (ACRE-FT)	21.2
SUBCATCHMENT		Total Upstream Drainage Area	AREA (AC)	8.6	Total Upstream Drainage Area	AREA (AC)	17.2
TREATMENT VOLUME RECOVERY							
TREATMENT VOLUME REQUIRED		1" Over Contributing Drainage Area	VOLUME (ACRE-FT)	0.7	1" Over Contributing Drainage Area	VOLUME (ACRE-FT)	1.4
TREATMENT VOLUME ELEVATION		Lowest Outlet Elevation	ELEVATION (FT NGVD29)	130.5	Lowest Outlet Elevation	ELEVATION (FT NGVD29)	130.5
PERMANENT POOL VOLUME REQUIRED		Treatment Volume plus Permanent Pool Volume based on 14 Day Residence Time	VOLUME (ACRE-FT)	2.5	Treatment Volume plus Permanent Pool Volume based on 14 Day Residence Time	VOLUME (ACRE-FT)	5.0
TREATMENT VOLUME PROVIDED		Volume Measured from Lowest Outlet Elevation	VOLUME (ACRE-FT)	2.7	Volume Measured from Lowest Outlet Elevation	VOLUME (ACRE-FT)	5.3
DOES POND MEET TREATMENT VOLUME REQUIRED?		N/A	N/A	YES	N/A	N/A	YES
TREATMENT VOLUME RECOVERY		Time to drawdown 50% Volume	TIME (HRS)	125.8	Time to drawdown 50% Volume	TIME (HRS)	235.8
		Time to drawdown 100% Volume	TIME (HRS)	360.0	Time to drawdown 100% Volume	TIME (HRS)	360.0
LITTORAL ZONE CALCULATIONS							
CONTROL ELEVATION		Lowest Outlet Elevation	ELEVATION (FT NGVD29)	130.5	Lowest Outlet Elevation	ELEVATION (FT NGVD29)	130.5
SURFACE AREA AT CONTROL ELEVATION		Surface Area at Lowest Outlet Elevation	AREA (AC)	1.3	Surface Area at Lowest Outlet Elevation	AREA (AC)	2.5
LITTORAL ZONE AREA REQUIRED		35% of Surface Area at Lowest Outlet Elevation	AREA (AC)	0.5	35% of Surface Area at Lowest Outlet Elevation	AREA (AC)	0.9
RESULTS							
25-YR, 24-HR STORM EVENT		Peak Water Level	**FT**	132.9	Peak Water Level	**FT**	133.1
100-YR, 24-HR STORM EVENT		Peak Water Level	**FT**	133.7	Peak Water Level	**FT**	134.2

Table 7. Drop Structure Characteristics and Outlet Protection Calculations

			Weir Characteristics							Pipe Characteristics								Outlet Protection – 100 year, 24-hour Storm Event					
ID	FDOT Type	Modified (Y/N)	Weir ID	Type	Geometry	Invert (ft)	Control El (ft)	Max Depth (ft)	Max Width (ft)	Pipe ID	Pipe Count	Length (ft)	Material	Manning's n	US Invert (ft)	DS Invert (ft)	Max Depth (ft)	Peak Flow Rate (cfs)	Maximum Outlet Velocity (fps)	Min Apron Length (ft)	Riprap Headwall Width (ft)	D50 (ft)	Apron Thickness (ft)
Admin Pond Outfall	C	Y	1	Sharp Crested, Vertical	Circular	131	131	0.167	-	1	1	72	RCP	0.012	130.5	130.28	1.5	12.0	7.3	11	5	0.5	1.5
			2	Horizontal	Rectangular	133.5	133.5	2	3														
			3	Sharp Crested, Vertical	Rectangular	132	132	0.5	3														
West Pond Outfall	C	Y	1	Sharp Crested, Vertical	Circular	131.5	131.5	0.167	-	1	1	112	RCP	0.012	130.5	130	1.5	9.3	6.3	10	5	0.5	1.5
			2	Horizontal	Rectangular	135	135	2	3														
			3	Sharp Crested, Vertical	Rectangular	132.5	132.5	0.5	3														
DI-1	H	N	1	Horizontal	Rectangular	134	134	3	6.5	1	2	207	RCP	0.012	132	131	2	43.4	6.9	15	15	0.6	1.5

Table 8. Node Properties

					25-year, 24-hour Storm Event		100-year, 24-hour Storm Event	
Node ID	**Type**	**Initial Stage (ft)**	**Warning Stage (ft)**	**Node Description**	**Peak Elevation (ft, NAVD88)**	**Depth below Warning Stage (ft)**	**Peak Elevation (ft, NAVD88)**	**Depth below Warning Stage (ft)**
Fish Lake	Stage/Area	131.6	134	Existing Fish Lake; zero discharge pond	133.1	0.9	133.8	0.3
Zero Discharge Pond	Stage/Area	129.5	134	Existing Zero Discharge Pond expanded	131.4	2.6	132.2	1.8
Admin Pond	Stage/Area	130.5	135	Proposed pond on southeast corner of Unit 3	132.9	2.1	133.7	1.3
West Pond	Stage/Area	130	136	Proposed pond on western side of existing drainage canal	133.1	2.4	134.2	1.5
Lake Parker	Time/Stage	130	134	Existing Lake Parker	130.0	4.0	130.0	4.0
NZA-0030	Stage/Area	124.25	134	Connection between existing pipe and U3 pipe	131.4	2.6	132.2	1.8
NZA-0190	Stage/Area	134.5	136	Entrance to North Flume	135.3	0.7	135.5	0.5
NZA-0200	Stage/Area	134.5	136	Entrance to South Flume	135.3	0.7	135.5	0.5
NZA-0340	Stage/Area	136	137	Entrance to W001	136.2	0.8	136.3	0.8
NZA-0035	Stage/Area	134	137	Entrance to proposed pipes	135.5	1.5	135.8	1.2
NZA-0360	Stage/Area	127.4	134	Upstream of Existing Pipe	131.4	2.6	132.2	1.8
To WWTP	Time/Stage	0	0	-	0.0	0.0	0.0	0.0

Table 9. Runoff Comparison (Existing Conditions versus Proposed Conditions)

Storm Event	Rainfall (in)	Offsite		Lake Parker		TOTAL SITE		
		Pre Discharge (cfs)	Post Discharge (cfs)	Pre Discharge (cfs)	Post Discharge (cfs)	Pre Discharge (cfs)	Post Discharge (cfs)	Is PRE>POST
25YR-24HR	7.5	95	0	38	13	132	13	YES
100YR-24HR	10.7	135	0	55	19	191	19	YES

FIGURES

YARD

HALF COAL YARD 2

BASIN 1
11.9 AC

W0001

U3 PIPE

BASIN 3A-1
2.0 AC

PROPOSED OVERLAND FLOW (TYP)

BASIN 3A
6.6 AC

PROPOSED SODDED RESTORATION

PROPOSED ADMINISTRATION POND (SEE SHEET 12)

BASIN 3B-1
1.1 AC

BASIN 3C-1
0.9 AC

BASIN 3C
11.6 AC

PROPOSED SODDED RESTORATION

BASIN 3B
4.0 AC

EXISTING PIPE

BASIN 4
13.7 AC

PUMPED TO WWTP

DI-1

BASIN 3D
1.1 AC

PROPOSED WEST POND (SEE SHEET 12)

56' OF 18" DIA
CONCRETE PIPE @ 0.9%

BASIN 3C-2
4.7 AC

CONTROL STRUCTURE
FDOT INLET TYPE C MODIFIED
TOP EL=135.00
18" DIA CONCRETE PIPE INV EL=130.50

N. 136,214.11
E. 638,325.80
ELEVATION = 138.13'

N. 136,214.11
E. 638,325.80
ELEVATION = 138.13'

N. 136,145.65
E. 638,602.35
ELEVATION = 134.00'

N. 136,227.71
E. 638,102.51
ELEVATION = 1.

N

0 80 160
SCALE IN FEET

LEGEND

- PROJECT LIMITS OF WORK
- PROPOSED GRADING LIMIT
- 100 EXISTING GROUND ELEVATION CONTOUR (FT)
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- 130 PROPOSED GRADING ELEVATION CONTOUR (FT)
- PROPOSED OVERLAND FLOW
- DRAINAGE BASIN

FOR REVIEW PURPOSES ONLY
DRAFT DESIGN DRAWING - NOT FOR CONSTRUCTION

Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: POST DEVELOPMENT DRAINAGE BASIN DELINEATIONS

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

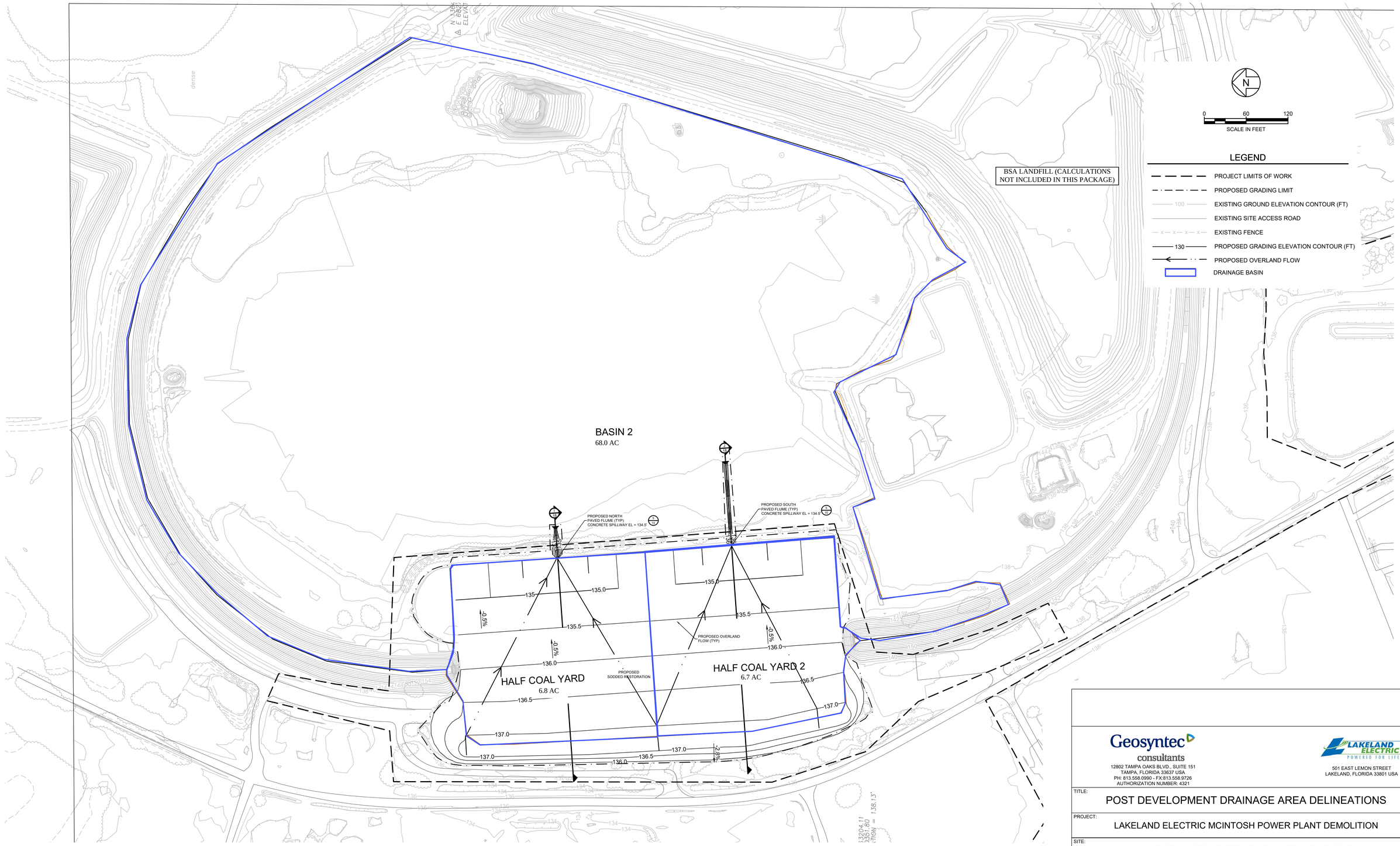
DATE: JANUARY 2024

PROJECT NO.: FW8287

FILE: FW8287.01-C12_AT

DRAWING NO.: FIGURE 1A

\\TAMPA-S1\PN\1_GEAS\PROJECTS\CITY OF LAKELAND\FW8287 LE UNIT 3 DEMO\600 CALCULATIONS\2_PROPOSED CONDITIONS\PROPOSED CONDITIONS CALCULATIONS PACKAGE\FW8287.01-C12_AT



Geosyntec consultants
12802 TAMPA OAKS BLVD., SUITE 151
TAMPA, FLORIDA 33637 USA
PH: 813.558.0990 - FX:813.558.9726
AUTHORIZATION NUMBER: 4321

LAKELAND ELECTRIC
POWERED FOR LIFE
501 EAST LEMON STREET
LAKELAND, FLORIDA 33801 USA

TITLE: POST DEVELOPMENT DRAINAGE AREA DELINEATIONS

PROJECT: LAKELAND ELECTRIC MCINTOSH POWER PLANT DEMOLITION

SITE: 3030 EAST LAKE PARKER DRIVE LAKELAND, FLORIDA

DATE:	JANUARY 2024
PROJECT NO.:	FW8287
FILE:	FW8287.01-C13_AT
DRAWING NO.:	FIGURE 1B

FOR REVIEW PURPOSES ONLY
DRAFT DESIGN DRAWING - NOT FOR CONSTRUCTION

\\TAMPA-FS1\PN\L_GEAS\PROJECTS\LCITY OF LAKELAND\FW8287 LE UNIT 3 DEMO\600 CALCULATIONS\2_PROPOSED CONDITIONS\PROPOSED CONDITIONS CALCULATIONS PACKAGE\FW8287.01-C13_AT

ATTACHMENT 1
Existing Conditions Calculations

EXISTING CONDITIONS CALCULATIONS

TABLE OF CONTENTS

1 INTRODUCTION 2

2 METHODOLOGY AND HYDRAULIC PARAMETERIZATION 3
- 2.1 Node-Link Network 3
- 2.2 Nodes 3
- 2.2.1 Initial Stages 3
- 2.2.2 Warning Stages 3
- 2.3 Links 3
- 2.3.1 Pipes 3

3 DESIGN PARAMETERS 5
- 3.1 Rainfall Distribution and Depths 5
- 3.2 Drainage Areas 5
- 3.3 Hydrologic Soil Group (HSG) 5
- 3.4 Curve Numbers 5

4 RESULTS AND CONCLUSIONS 6
- 4.1 Times of Concentration (TOCs) 6
- 4.2 Runoff 6
- 4.3 Conclusions 6

5 REFERENCES 7

1 INTRODUCTION

This calculation package (Package) was prepared to evaluate existing conditions at the Lakeland Electric McIntosh Power Plant (Site) in Lakeland, Florida. Lakeland Electric (LE) plans to decommission and demolish the Unit 3 block and Coal Yard area of the Site. The Byproduct Storage Area (BSA) landfill south of Fish Lake has been closed-in-place under a separate project. Results of the calculations for that project have been integrated into this calculation package; however full calculations for the BSA closure are not included as part of this Package. At the time of the preparation of this Package, limited information was available for the existing stormwater management system. Therefore existing conditions calculations were developed using the limited data available and best engineering judgement.

The purpose of this Package is to present the hydrologic and hydraulic (H&H) calculations for the existing conditions for comparison to the proposed conditions. The remainder of this Package is organized to present: (i) methodology; (ii) design parameters; (iii) computations; (iv) results and conclusions; (v) references; and (vi) attachments.

2 METHODOLOGY AND HYDRAULIC PARAMETERIZATION

The surface water runoff hydrographs, channel capacity, and pond routing for each drainage area were calculated using hydrologic and hydraulic procedures presented in the *Urban Hydrology for Small Wetlands Technical Release 55 (TR-55)* [Soil Conservation Service (SCS), 1986]; Manning's kinematic equation; channel shear stresses; and other recognized engineering procedures encoded in the ICPR software [ICPR, 2018].

2.1 Node-Link Network

A model network of subbasins, nodes, and links was developed based on the drainage information provided and the model level of detail considered necessary to meet the objectives of the project. The network included the following features:

- Area associated with the Zero Discharge Pond
- Unit 3 area including the existing infrastructure
- Area associated with the Coal Yard
- Area associated with Fish Lake
- Area associated with Process Ponds

2.2 Nodes

Nodes in the model are typically either defined as Stage/Area or Time/Stage. Stage/Area nodes are used to model storage areas like water bodies/depressions and can also be used as junctions in channels and manholes in pipe networks. Ponds and manholes are modeled as Stage/Area nodes, while boundaries are modeled as Time/Stage.

2.2.1 Initial Stages

The initial stages were set such that the model simulation would begin in static equilibrium. The pond initial stages were set based on water elevations at the time of survey and groundwater well data from the site (**Attachment 1**).

2.2.2 Warning Stages

Warning stages were set at the elevations at which flooding would be expected to occur. For the ponds, this elevation was the top of bank.

2.3 Links

The model analyzed flow in links allowing the evaluation of conveyance effectiveness between nodes. Entrance/exit/bend/head losses were incorporated where appropriate.

2.3.1 Pipes

Pipe links were used to represent culverts throughout the Site. Pipes are depicted in **Figure 1**. Pipe inverts, dimensions, geometry, and material data were referenced from a combination of project

topographic survey data and field site visit data. Roughness coefficients (Manning's n) were based on material as follows:

- Corrugated metal pipe, smooth interior (CMP) – 0.025
- Reinforced concrete pipe (RCP) – 0.012

Entrance and exit losses were assigned based on literature values, or default values were used where exact conditions were uncertain. In general, the values were applied as follows:

- Entrance Losses – a representative average value of 0.5 was used for all pipes.
- Exit Losses – for discharge into a static water body, an exit loss of 1.0 was used.

3 DESIGN PARAMETERS

3.1 Rainfall Distribution and Depths

The rainfall depths for the site were obtained from the Southwest Florida Water Management District (SWFWMD) "Part D – Project Design Aids" (**Attachment 2**). The SWFWMD developed this document to provide consistency in the parameters used by District Staff in their review for environmental resource permitting of surface water management systems (SWFWMD, 1996).

3.2 Drainage Areas

Figure 1 presents the drainage area delineation for the existing conditions. Topographic data was obtained from Lakeland Electric and was performed by Pickett & Associates dated January 2004.

3.3 Hydrologic Soil Group (HSG)

The site is characterized by both HSG A and HSG D soils as shown in **Attachment 3**.

3.4 Curve Numbers

Table 1 presents the selected curve numbers (CNs) for each drainage area that contributes to surface water runoff.

4 RESULTS AND CONCLUSIONS

Calculations and results for the existing conditions are shown below.

4.1 Times of Concentration (TOCs)

Table 2 presents the calculated TOC for all drainage areas, based on recommendations from TR-55. A minimum of 10 minutes was used per the FDOT Drainage Manual requirements.

4.2 Runoff

Below shows the peak runoff leaving the Site based on existing conditions.

Node	25-year/24-hour Peak Runoff (CFS)	100-year/24-hour Peak Runoff (CFS)
Offsite	95	135
Lake Parker	38	55

4.3 Conclusions

This calculation package provides results of the existing conditions modeling effort. ICPR results are presented in **Attachment 4**.

5 REFERENCES

Interconnected Channel and Pond Routing Model (ICPR). *Technical Reference*. Streamline Technologies, Inc. 2018.

Soil Conservation Service (SCS). (1986). *Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55*), 2nd Ed., United States Department of Agriculture, Soil Conservation Service. Washington, D.C.

Southwest Florida Water Management District (SWFWMD). *Part D – Project Design Aids*. Environmental Resource Permitting Information Manual. Project Design Aids (state.fl.us). 1996.

United States Department of Agriculture (USDA). (2020). *Web Soil Survey*. Natural Resources Conservation Service. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

EXISTING CONDITIONS CALCULATIONS TABLES

Table 1. Existing Conditions Drainage Areas and Curve Numbers

Subcatchment ID	Area (sq ft)	Area (acres)	Total Area (acres)	Total Area (%)	Land Use Description	CN	Weighted CN
Basin 1							
Zero Discharge Pond	227804.9	5.23	11.9	44%	Water	98	91
Grassed	178070.3	6.67		56%	Open, Poor	86	
Basin 2							
Fish Lake	1921657.7	44.12	126.2	35%	Water	98	92
BSA Landfill	2173078.0	49.89		40%	From BSA Model	91	
Drainage Area	1400593.7	32.15		25%	Open, Poor	86	
Basin 3A							
Impervious	490050	11.25	11.25	100%	Impervious	98	98
Basin 3B							
Impervious	405979.2	9.32	9.32	100%	Impervious	98	98
Basin 3C							
Impervious	236966.4	5.44	5.44	100%	Impervious	98	98
Basin 3D							
Impervious	76230	1.75	1.75	100%	Impervious	98	98
Basin 4							
Impervious	512748.7	11.77	11.8	100%	Impervious	98	98
Basin 5							
Process Ponds	171075.4	3.93	18.9	21%	Water	98	92
Impervious	171448.4	3.94		21%	Impervious	98	
Grassed	480645.5	11.03		58%	Industrial	88	
Basin 6							
Impervious	30867.6	0.71	7.2	10%	Water	98	89
Grassed	284070.4	6.52		90%	Industrial	88	

Table 2. Existing Conditions Time of Concentration

Basin ID	Time of Concentration					
	Surface Description	Manning's n	Flow Length (ft)	2-Year, 24-Hour Rainfall (in.)	Land Slope (ft/ft)	Time of Concentration (min)
Basin 1	Direct Entry					10
Basin 2	Direct Entry from BSA model + 10 minutes					106.68
Basin 3A	Direct Entry					10
Basin 3B	Direct Entry					10
Basin 3C	Direct Entry					10
Basin 3D	Direct Entry					10
Basin 4	Direct Entry					10
Basin 5	Direct Entry					10
Basin 6	Direct Entry					10

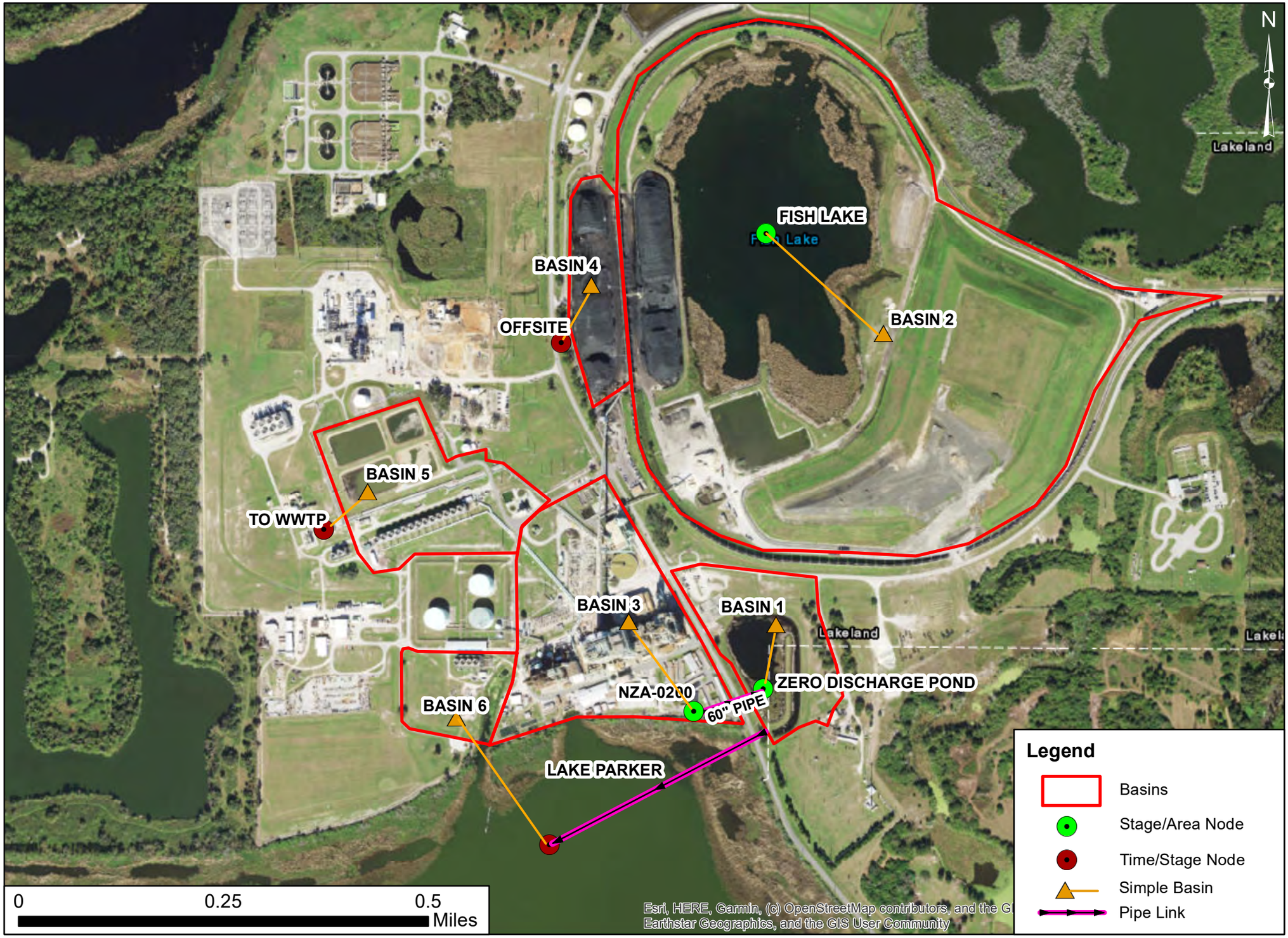
Table 3. Pipe Characteristics and Hydraulic Capacity

Pipe ID	Material	Characteristics					Pipe Profiles			25-year, 24-hour			100-year, 24-hour		
		Manning's n {n}	No. of Pipes	Pipe Diameter {D} (ft)	Length (ft)	Overtopping EL (ft)	Inlet Invert El. (ft)	Outlet Invert El. (ft)	Pipe Slope (ft/ft)	Q (CFS)	Headwater (ft)	Freeboard (ft)	Q (CFS)	Headwater (ft)	Freeboard (ft)
U3 Pipe	RCP	0.012	1	4.5	148	134	127.4	126.3	0.003	49.91	132.64	1.36	71.24	133.93	0.07
Existing Pipe	RCP	0.012	1	4.5	384	134	124.3	126.8	-0.017	50.16	132.64	1.36	71.62	133.93	0.07

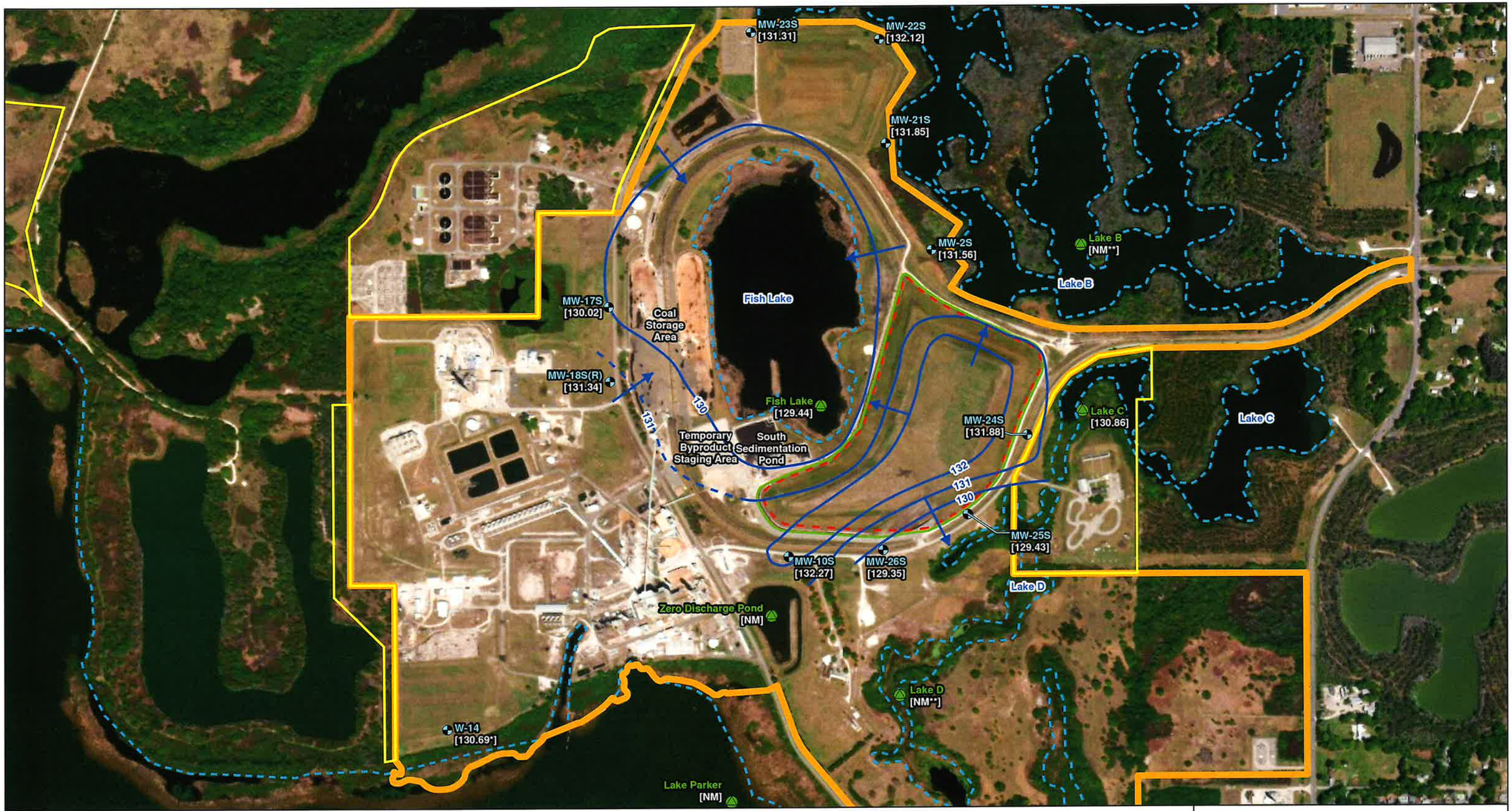
Table 4. Node Properties and Results

					25-year, 24-hour		100-year, 24-hour	
Node ID	**Type**	**Initial Stage (ft)**	**Warning Stage (ft)**	**Node Description**	**Peak Elevation (ft, NAVD88)**	**Freeboard (ft)**	**Peak Elevation (ft, NAVD88)**	**Freeboard (ft)**
Zero Discharge Pond	Stage/Area	129.5	134	Pond	132.6	1.4	133.9	0.1
Fish Lake	Stage/Area	131.6	134	Lake	133.1	0.9	133.7	0.3
Lake Parker	Time/Stage	130	134	Lake	130.0	4.1	130.0	4.1
NZA-0200	Stage/Area	124.35	134	Connection between Unit 3 Pipe and Zero Discharge Pond	132.6	1.4	133.9	0.1
Offsite	Time/Stage	0	0	Offsite	0.0	0.0	0.0	0.0
To WWTP	Time/Stage	0	0	To WWTP	0.0	0.0	0.0	0.0
NZA-0250	Stage/Area	127.4	134	Connection between Existing Pipe and Unit 3 Pipe	132.6	1.4	133.9	0.1

EXISTING CONDITIONS CALCULATIONS FIGURES


N
FISH LAKE
BASIN 4
OFFSITE
BASIN 2
BASIN 5
TO WWTP
BASIN 3
BASIN 1
ZERO DISCHARGE POND
NZA-0200
60" PIPE
BASIN 6
LAKE PARKER
Lakeland
Legend
Basins
Stage/Area Node
Time/Stage Node
Simple Basin
Pipe Link
0
0.25
0.5
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the G
Earthstar Geographics, and the GIS User Community

EXISTING CONDITIONS CALCULATIONS ATTACHMENT 1 Groundwater Contours



Legend

- Surficial COC Monitoring Well
- Surface Water Gauge
- Groundwater Elevation Contour (Dashed where Inferred)
- Groundwater Flow Direction
- [131.34] Groundwater Elevation (ft NAVD 88)
- BSA Boundary
- Approximate BSA Perimeter Ditch
- City of Lakeland Property
- C.D. McIntosh Power Plant Boundary
- Approximate Lake Boundary

LANE DORMAN
LICENSE
No. PG2861
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

Notes:
1. * indicates measurement not used for contouring purposes.
2. BSA indicates byproduct storage area.
3. ft NAVD88 indicates an elevation in feet relative to the North American Vertical Datum of 1988.
4. COC indicates Conditions of Certification.
5. NM indicates not measured.
6. "**" indicates staff gauge suspected to be compromised. Field measurement not utilized. Lakeland Electric is evaluating staff gauge reliability to determine if replacement is necessary.
7. Well locations were obtained from the Golder 2019 Assessment of Corrective Measures Report.
8. 2020 ESRI World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

N

0 700 Feet

Surficial Aquifer Groundwater Contour Map
5 February 2024

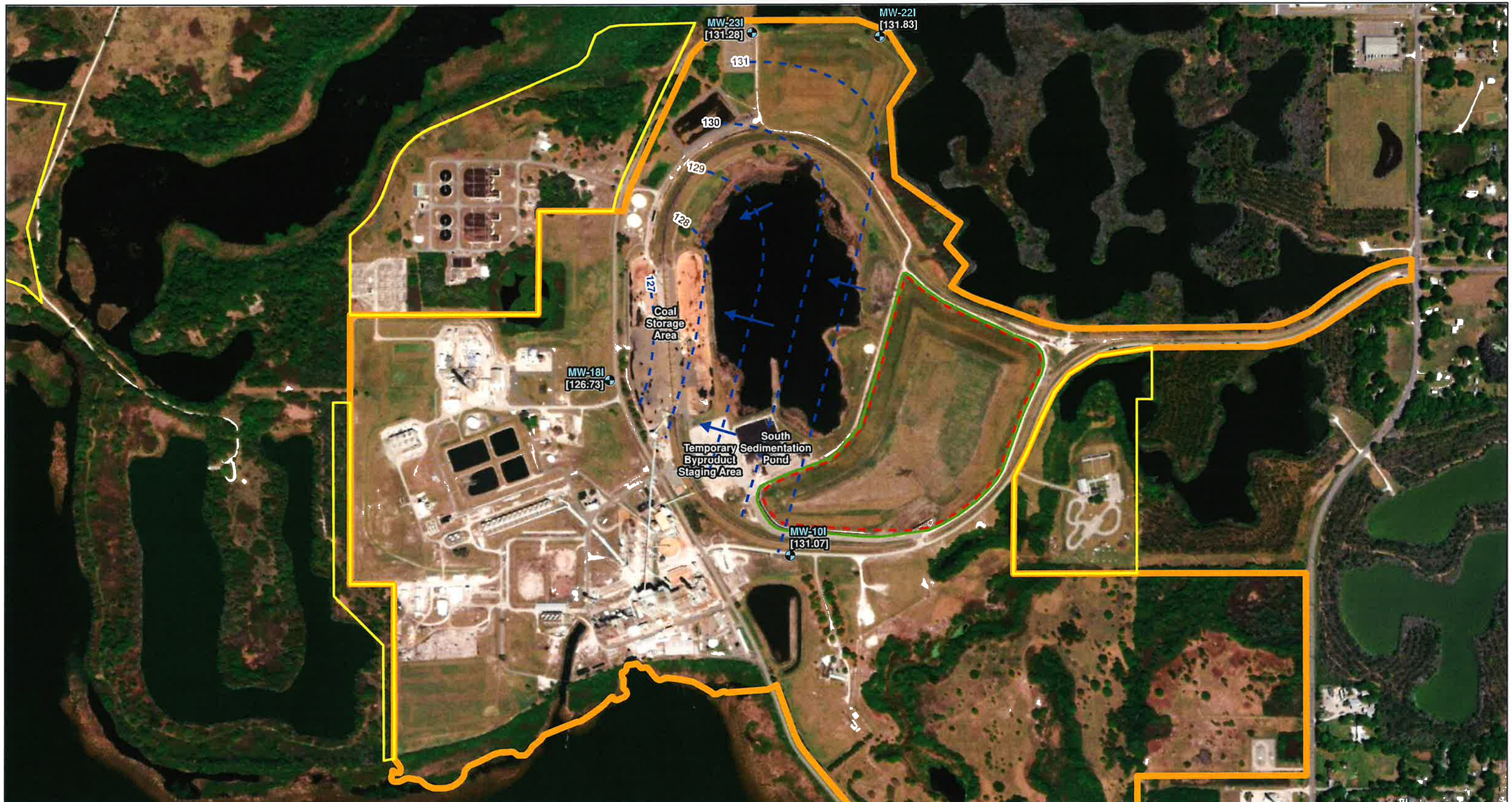
C.D. McIntosh Power Plant
Lakeland, Polk County, Florida

Geosyntec consultants

Tampa, FL | March 2024

Figure 1

Path: (Tiusville-01\DATA) T:\0GIS\FR3715_Lakeland_Electric\MXDs\202402\GW_COCelev_S_Feb2024.mxd 29 March 2024 Last Edited by: MHensley



Legend

- Intermediate COC Monitoring Well
- Inferrred Groundwater Elevation Contour
- Groundwater Flow Direction
- [126.73] Groundwater Elevation (ft NAVD 88)
- BSA Boundary
- Approximate BSA Perimeter Ditch
- City of Lakeland Property
- C.D. McIntosh Power Plant Boundary

LANE DORMAN
LICENSE
No. PG2861
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

Notes:
1. BSA indicates byproduct storage area.
2. ft NAVD88 indicates an elevation in feet relative to the North American Vertical Datum of 1988.
3. COC indicates Conditions of Certification.
4. Well locations were obtained from the Golder 2019 Assessment of Corrective Measures Report.
5. 2020 ESRI World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

N

0 700 Feet

Intermediate Groundwater Contour Map
5 February 2024

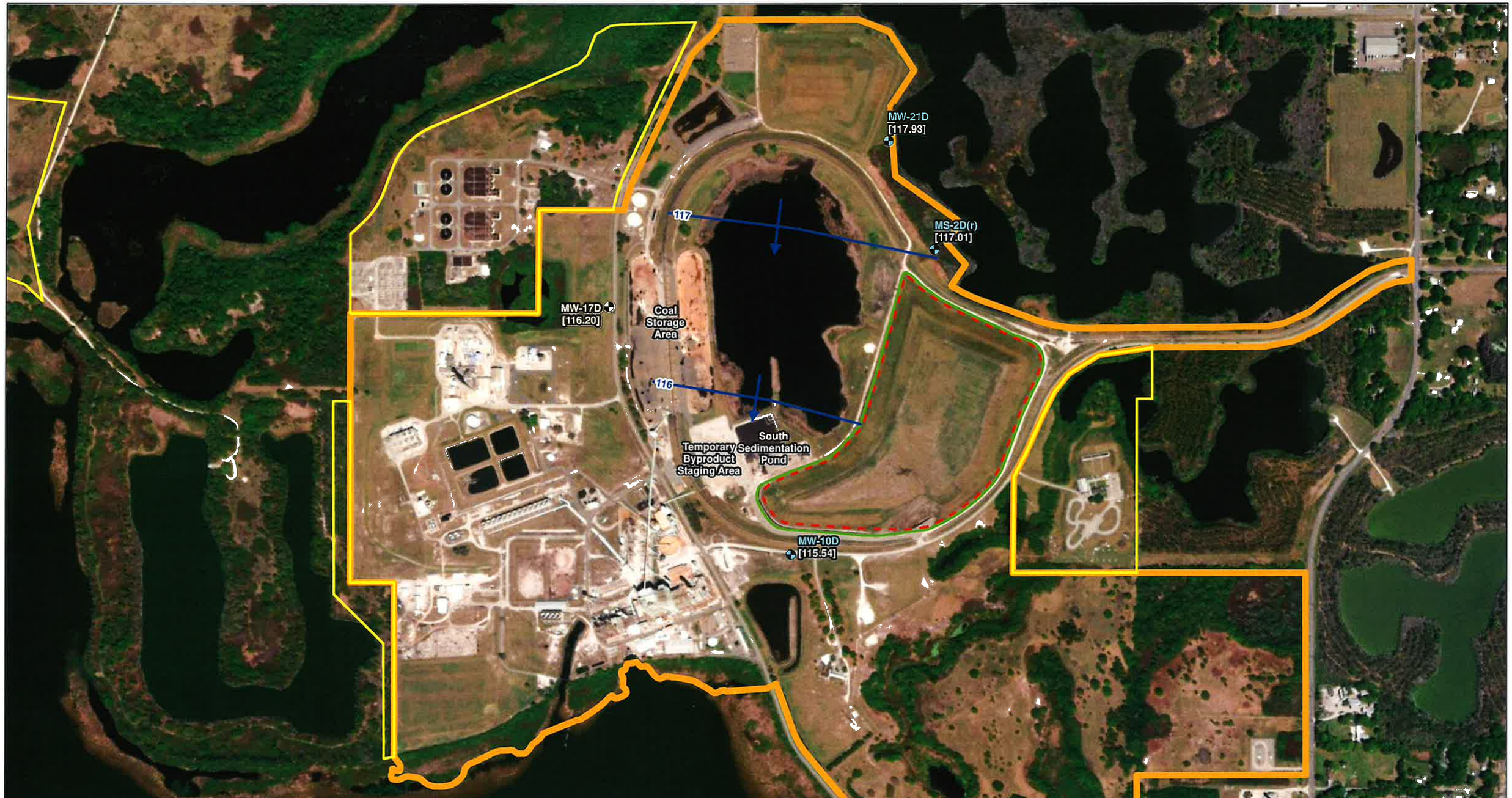
C.D. McIntosh Power Plant
Lakeland, Polk County, Florida

Geosyntec consultants

Tampa, FL | March 2024

Figure 2

Path: (Tilusville-01\DATA) T:\GIS\FR3715_Lakeland_Electric\MXDs\202402\GW_COCelev_I_Feb2024.mxd 26 March 2024, Last Edited by: MHensley



Legend

- Deep COC Monitoring Well
- Groundwater Elevation Contour (Dashed where Inferred)
- Groundwater Flow Direction
- [116.20] Groundwater Elevation (ft NAVD 88)
- BSA Boundary
- Approximate BSA Perimeter Ditch
- City of Lakeland Property
- C.D. McIntosh Power Plant Boundary

LANE DORMAN LICENSE No. PG2861 STATE OF FLORIDA PROFESSIONAL GEOLOGIST

Notes:
1. BSA indicates byproduct storage area.
2. ft NAVD88 indicates an elevation in feet relative to the North American Vertical Datum of 1988.
3. COC indicates Conditions of Certification.
4. Well locations were obtained from the Golder 2019 Assessment of Corrective Measures Report.
5. 2020 ESRI World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

N

0 700 Feet

Deep Groundwater Contour Map
5 February 2024

C.D. McIntosh Power Plant
Lakeland, Polk County, Florida

Geosyntec consultants

Tampa, FL | March 2024

Figure 3

Path: (Tilusville-01\DATA) T:\GIS\FR3715_Lakeland_Electric\MXDs\202402\GW_COCelev_D_Feb2024.mxd 26 March 2024. Last Edited by: MHensley

EXISTING CONDITIONS CALCULATIONS ATTACHMENT 2 SWFWMD Design Aids- Rainfall Data

Figure D-5
Twenty-Four-Hour Twenty-Five-Year Return Period Rainfall Map

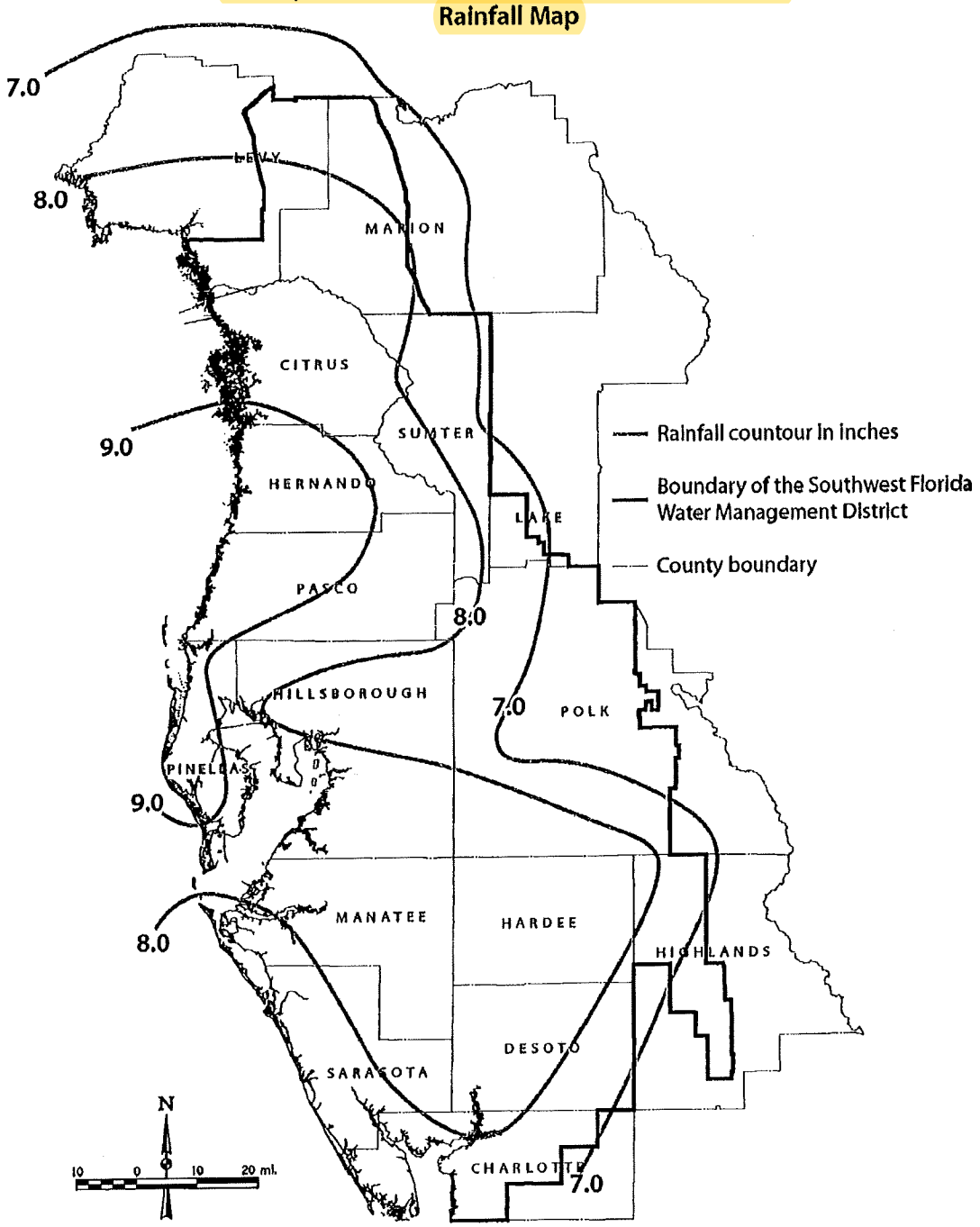
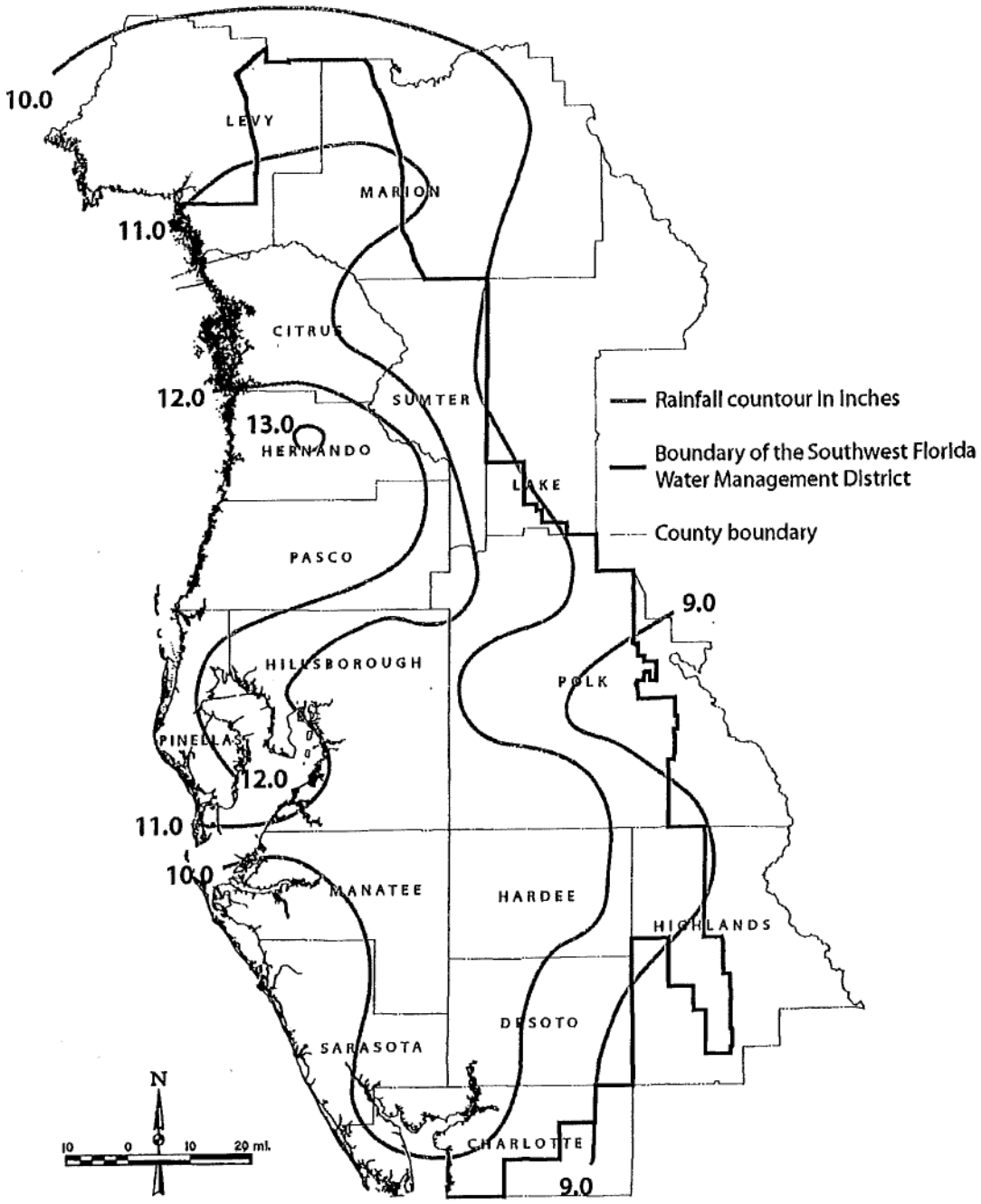
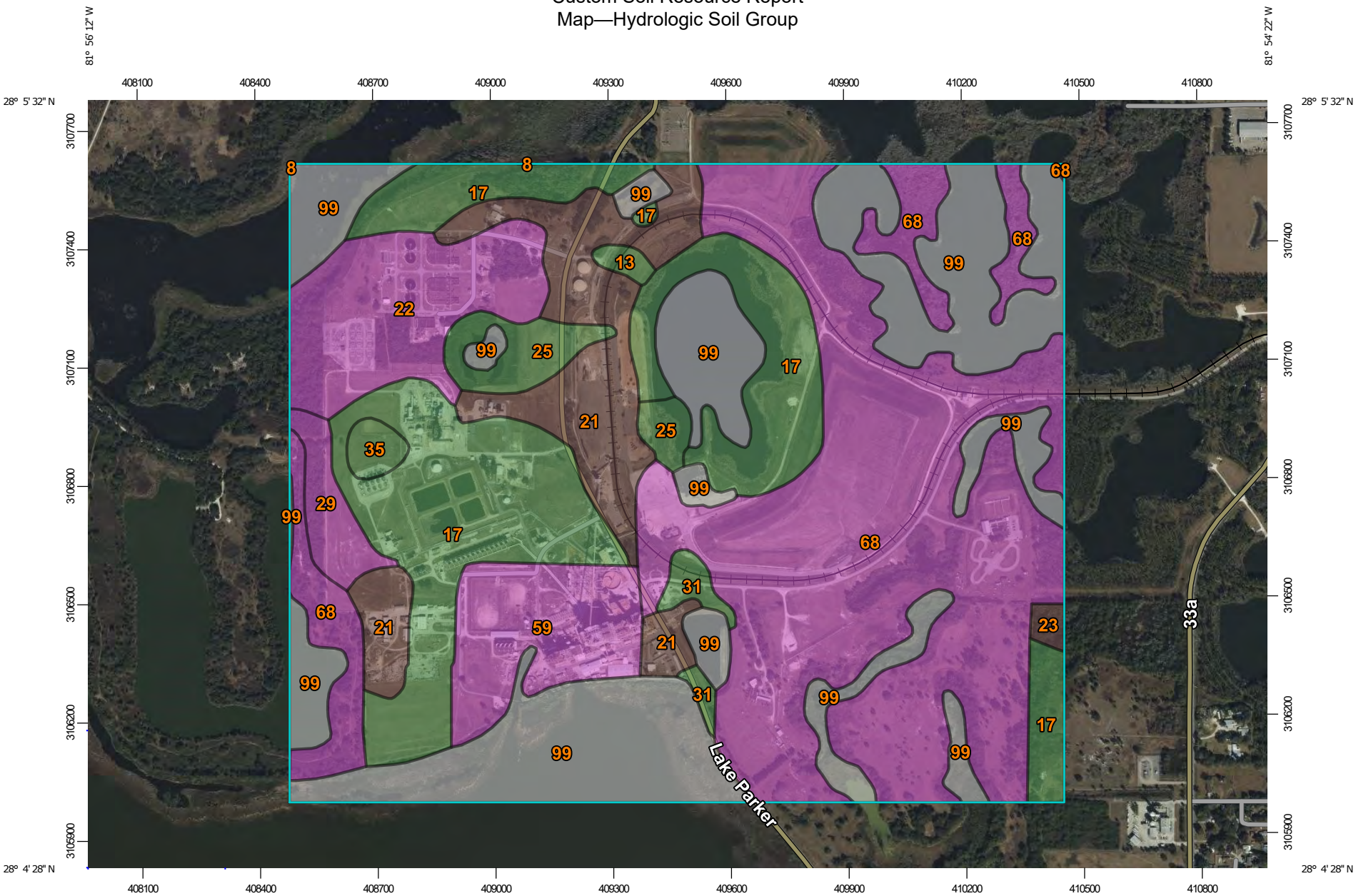


Figure D-7
Twenty-Four-Hour One-Hundred-Year Return Period Rainfall Map



EXISTING CONDITIONS CALCULATIONS ATTACHMENT 3
Soils Map

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:13,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 21, Sep 6, 2023

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

Date(s) aerial images were photographed: Jan 6, 2022—Mar 21, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Hydraquents, clayey	D	0.1	0.0%
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	A/D	2.4	0.3%
17	Smyrna and Myakka fine sands	A/D	143.6	18.1%
21	Immokalee sand	B/D	69.1	8.7%
22	Pomello fine sand	A	52.5	6.6%
23	Ona-Ona, wet, fine sand, 0 to 2 percent slopes	B/D	2.2	0.3%
25	Placid and Myakka fine sands, depressional	A/D	17.6	2.2%
29	St. Lucie fine sand, 0 to 5 percent slopes	A	12.0	1.5%
31	Adamsville fine sand, 0 to 2 percent slopes	A/D	6.0	0.8%
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	A/D	4.5	0.6%
59	Arents-Urban land complex, 0 to 5 percent slopes	A	39.5	5.0%
68	Arents, 0 to 5 percent slopes	A	262.5	33.1%
99	Water		181.2	22.8%
Totals for Area of Interest			**793.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

EXISTING CONDITIONS CALCULATIONS
ATTACHMENT 4
Existing Conditions ICPR Report

Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 1	100-24	74.13	12.0500	10.70	9.59	11.9000	91.0	0.00	0.00
Basin 1	25-24	50.74	12.0500	7.50	6.42	11.9000	91.0	0.00	0.00
Basin 2	100-24	790.74	12.0500	10.70	9.71	126.2000	92.0	0.00	0.00
Basin 2	25-24	543.59	12.0500	7.50	6.54	126.2000	92.0	0.00	0.00
Basin 3A	100-24	72.01	12.0500	10.70	10.45	11.2500	98.0	0.00	0.00
Basin 3A	25-24	50.40	12.0500	7.50	7.25	11.2500	98.0	0.00	0.00
Basin 3B	100-24	59.65	12.0500	10.70	10.45	9.3200	98.0	0.00	0.00
Basin 3B	25-24	41.75	12.0500	7.50	7.25	9.3200	98.0	0.00	0.00
Basin 3C	100-24	34.82	12.0500	10.70	10.45	5.4400	98.0	0.00	0.00
Basin 3C	25-24	24.37	12.0500	7.50	7.25	5.4400	98.0	0.00	0.00
Basin 3D	100-24	11.20	12.0500	10.70	10.45	1.7500	98.0	0.00	0.00
Basin 3D	25-24	7.84	12.0500	7.50	7.25	1.7500	98.0	0.00	0.00
Basin 4	100-24	75.53	12.0500	10.70	10.45	11.8000	98.0	0.00	0.00
Basin 4	25-24	52.86	12.0500	7.50	7.25	11.8000	98.0	0.00	0.00
Basin 5	100-24	118.42	12.0500	10.70	9.71	18.9000	92.0	0.00	0.00
Basin 5	25-24	81.41	12.0500	7.50	6.54	18.9000	92.0	0.00	0.00
Basin 6	100-24	44.26	12.0500	10.70	9.34	7.2000	89.0	0.00	0.00
Basin 6	25-24	29.99	12.0500	7.50	6.19	7.2000	89.0	0.00	0.00

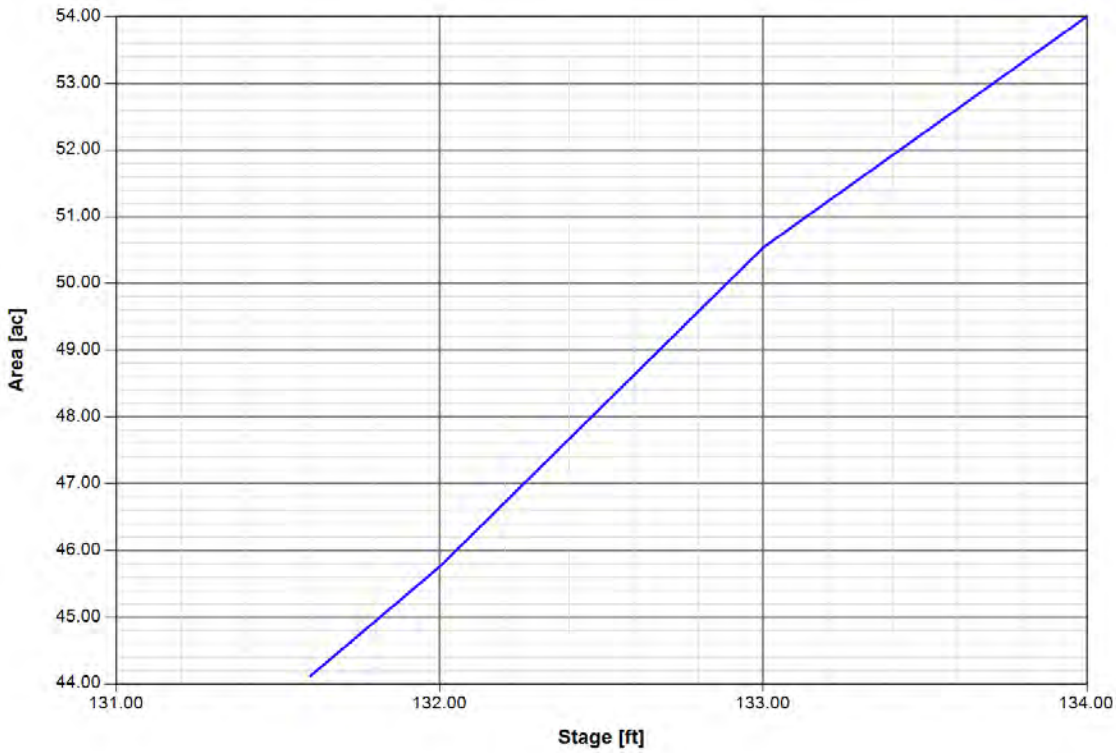
Node: Fish Lake

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 131.60 ft
Warning Stage: 134.00 ft

Stage [ft]	Area [ac]	Area [ft2]
131.60	44.1200	1921867
132.00	45.7600	1993306
133.00	50.5400	2201522
134.00	54.0000	2352240

Comment:

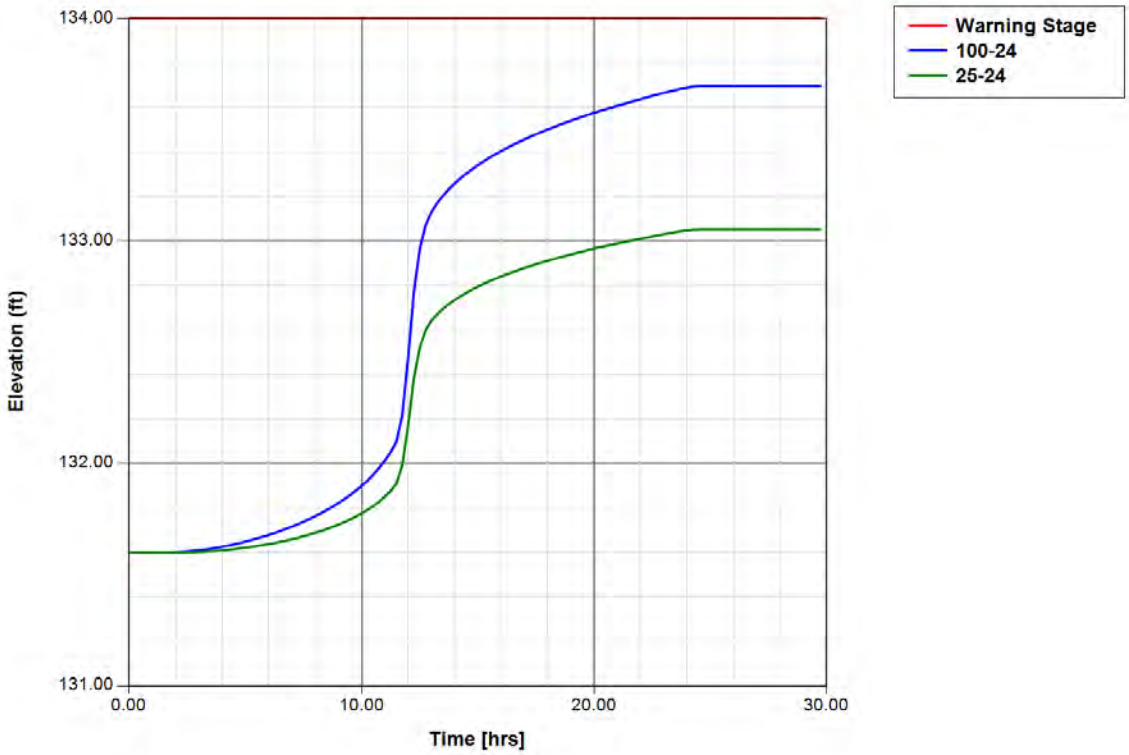
Node: Fish Lake Scenario: Scenario1



Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Fish Lake	100-24	134.00	133.70	0.0005	790.73	0.00	2306409
Fish Lake	25-24	134.00	133.05	0.0005	543.58	0.00	2209460

Node Stage w/Warning Stage: Fish Lake [Scenario1]



Node: Lake Parker

Scenario:	Scenario1
Type:	Time/Stage
Base Flow:	0.00 cfs
Initial Stage:	130.00 ft
Warning Stage:	134.00 ft
Boundary Stage:	

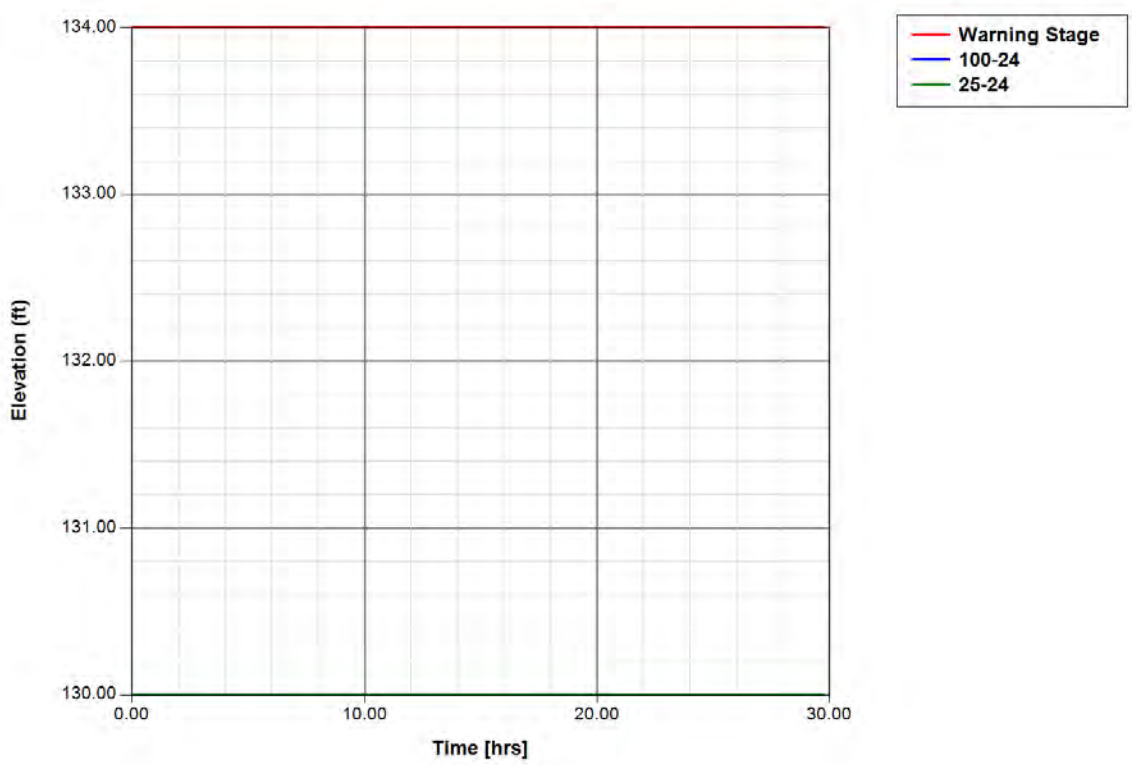
Comment:

Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning	Max Stage	Min/Max	Max Total	Max Total	Max Surface

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Lake Parker	100-24	134.00	130.00	0.0000	55.46	0.00	0
Lake Parker	25-24	134.00	130.00	0.0000	37.83	0.00	0

Node Stage w/Warning Stage: Lake Parker [Scenario1]



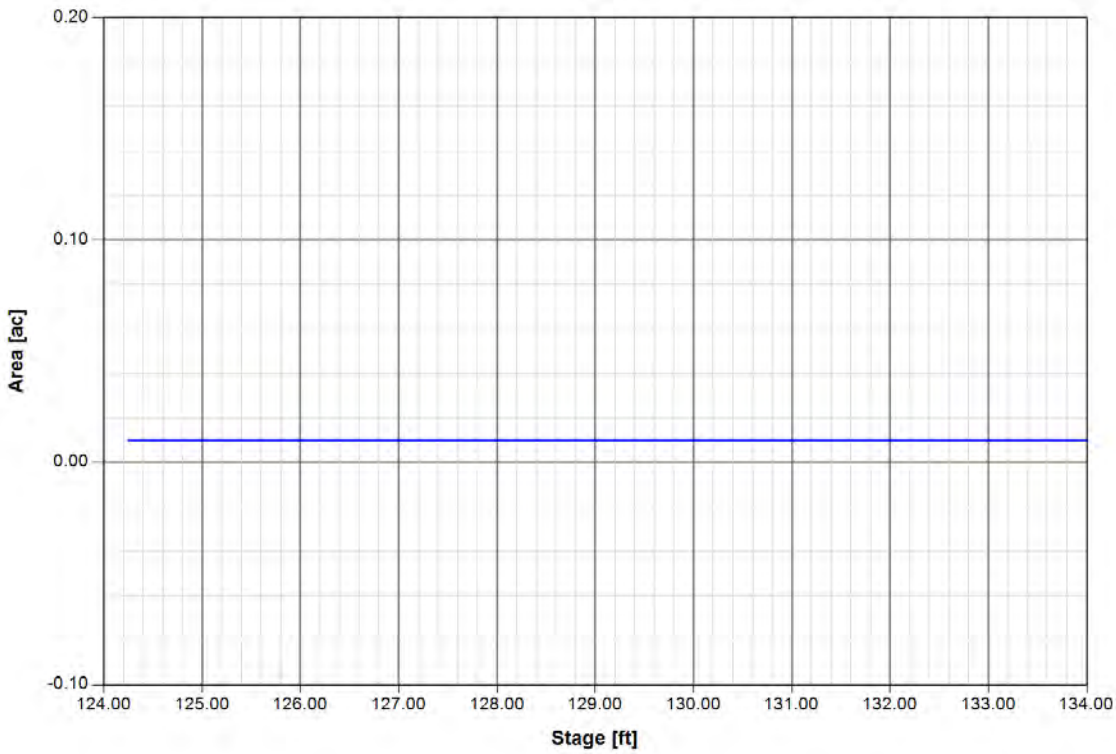
Node: NZA-0200

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 124.25 ft
Warning Stage: 134.00 ft

Stage [ft]	Area [ac]	Area [ft2]
124.25	0.0100	436
134.00	0.0100	436

Comment:

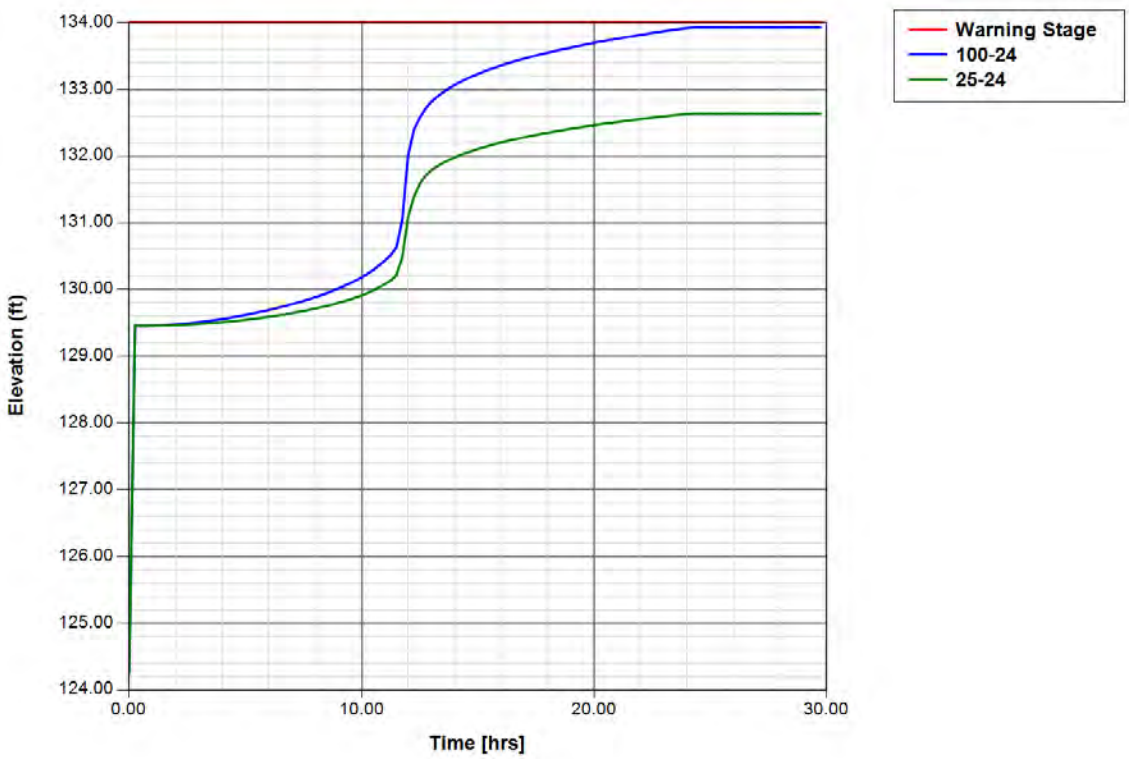
Node: NZA-0200 Scenario: Scenario1



Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0200	100-24	134.00	133.93	0.0060	71.62	71.24	1706
NZA-0200	25-24	134.00	132.64	0.0060	50.16	49.91	1706

Node Stage w/Warning Stage: NZA-0200 [Scenario1]



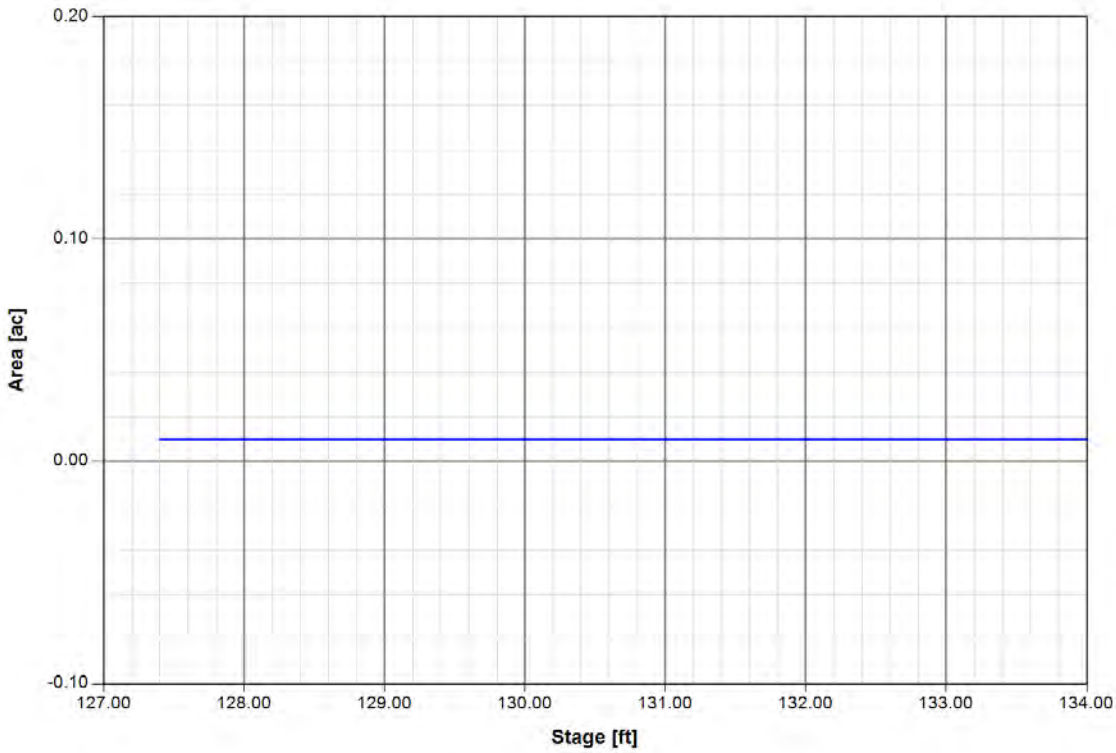
Node: NZA-0250

Scenario:	Scenario1
Type:	Stage/Area
Base Flow:	0.00 cfs
Initial Stage:	127.40 ft
Warning Stage:	134.00 ft

Stage [ft]	Area [ac]	Area [ft2]
127.40	0.0100	436
134.00	0.0100	436

Comment:

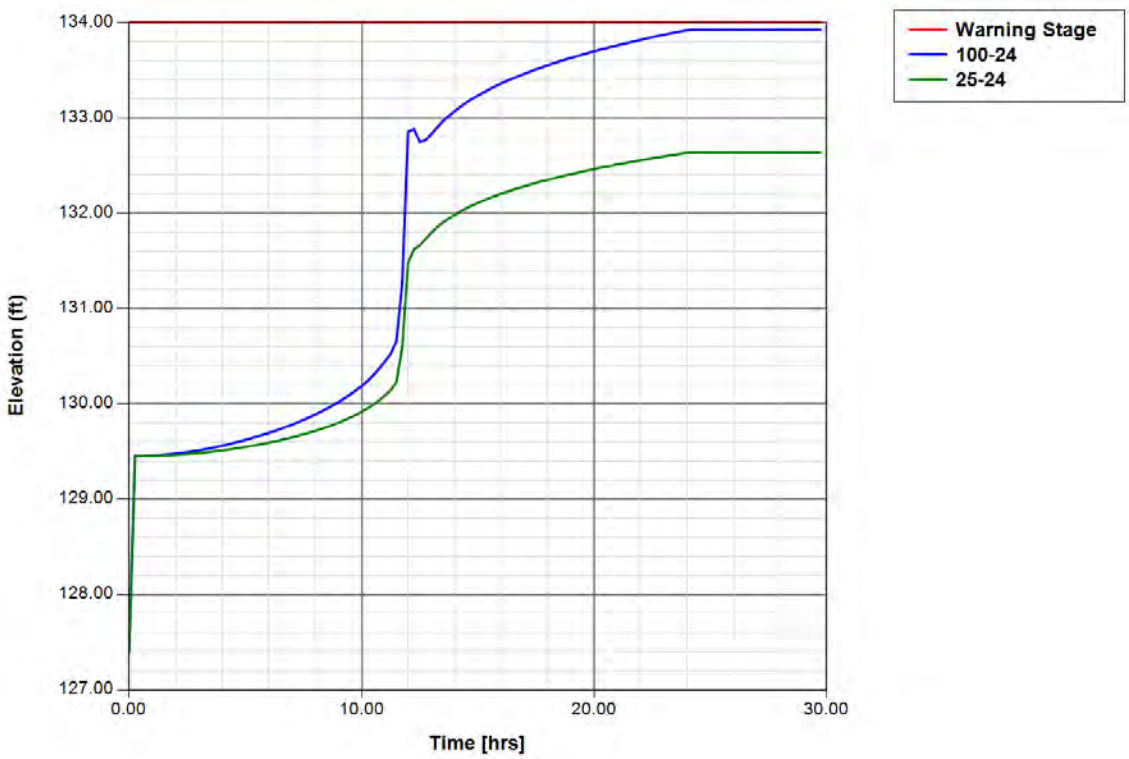
Node: NZA-0250 Scenario: Scenario1



Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0250	100-24	134.00	133.93	0.0014	72.01	71.62	1293
NZA-0250	25-24	134.00	132.64	0.0014	50.40	50.16	1293

Node Stage w/Warning Stage: NZA-0250 [Scenario1]



Node: Offsite

Scenario:	Scenario1
Type:	Time/Stage
Base Flow:	0.00 cfs
Initial Stage:	0.00 ft
Warning Stage:	0.00 ft
Boundary Stage:	

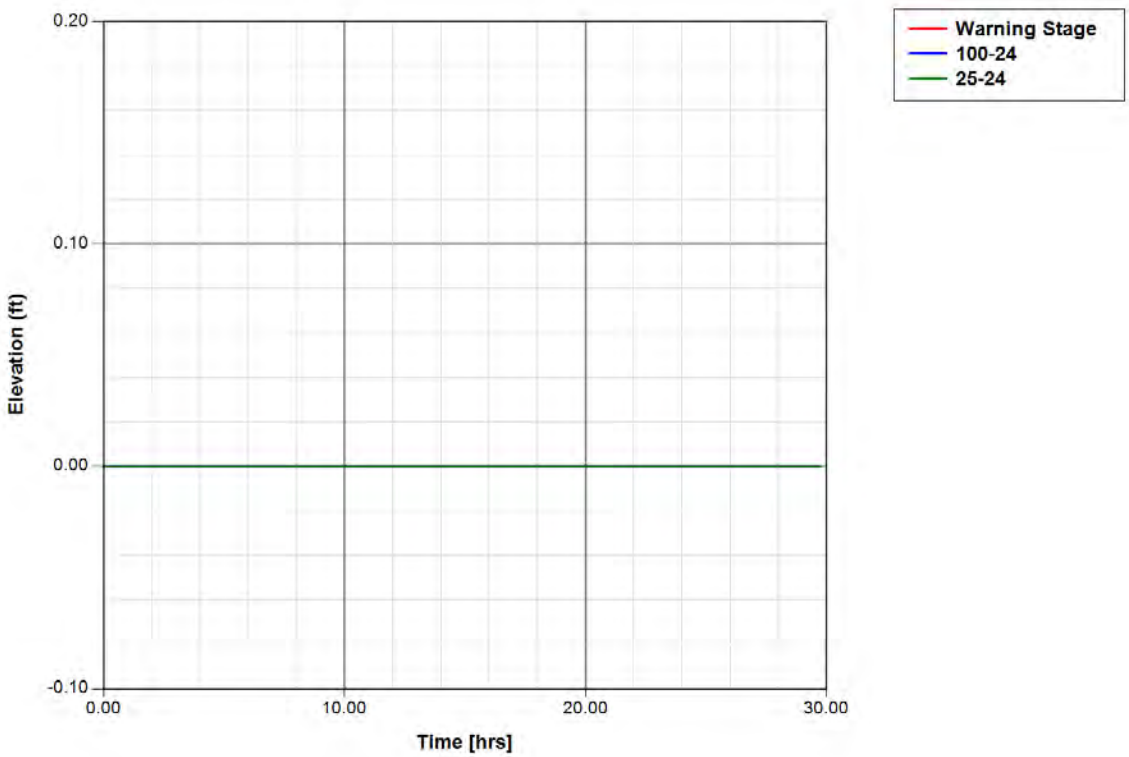
Comment:

Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning	Max Stage	Min/Max	Max Total	Max Total	Max Surface

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Offsite	100-24	0.00	0.00	0.0000	135.18	0.00	0
Offsite	25-24	0.00	0.00	0.0000	94.61	0.00	0

Node Stage w/Warning Stage: Offsite [Scenario1]



Node: To WWTP

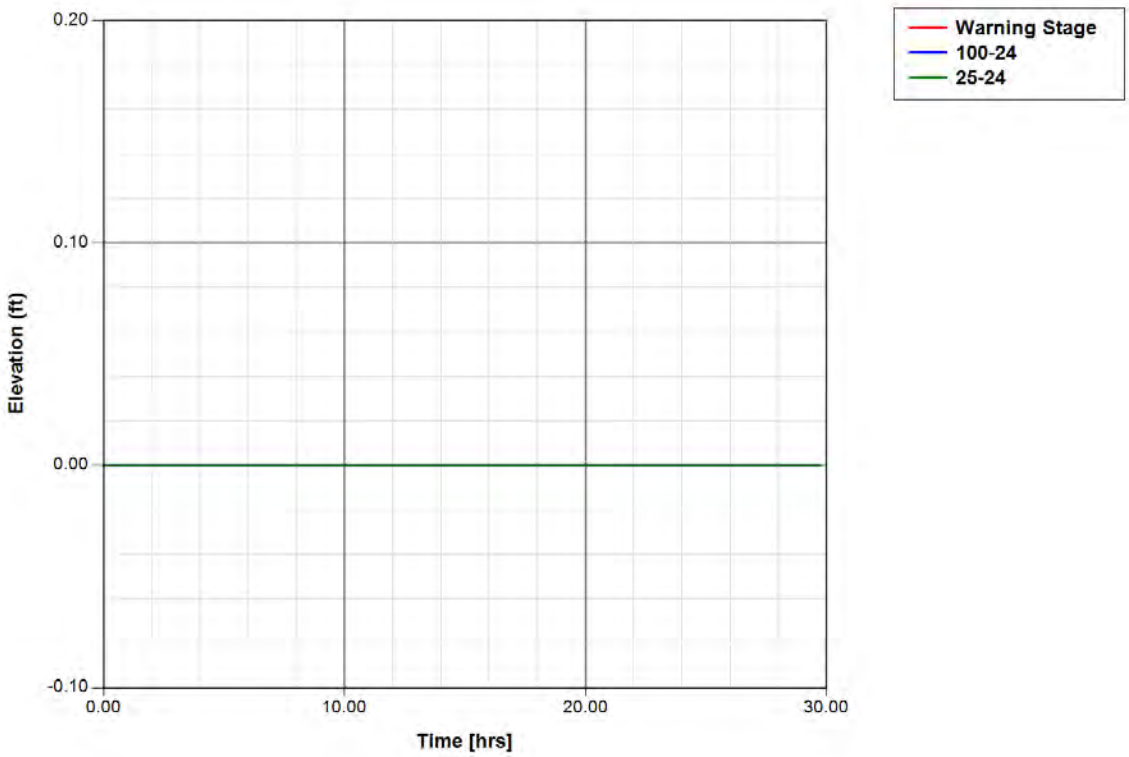
Scenario: Scenario1
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 0.00 ft
Warning Stage: 0.00 ft
Boundary Stage:

Comment:

Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
To WWTP	100-24	0.00	0.00	0.0000	153.24	0.00	0
To WWTP	25-24	0.00	0.00	0.0000	105.78	0.00	0

Node Stage w/Warning Stage: To WWTP [Scenario1]



Node: Zero Discharge Pond

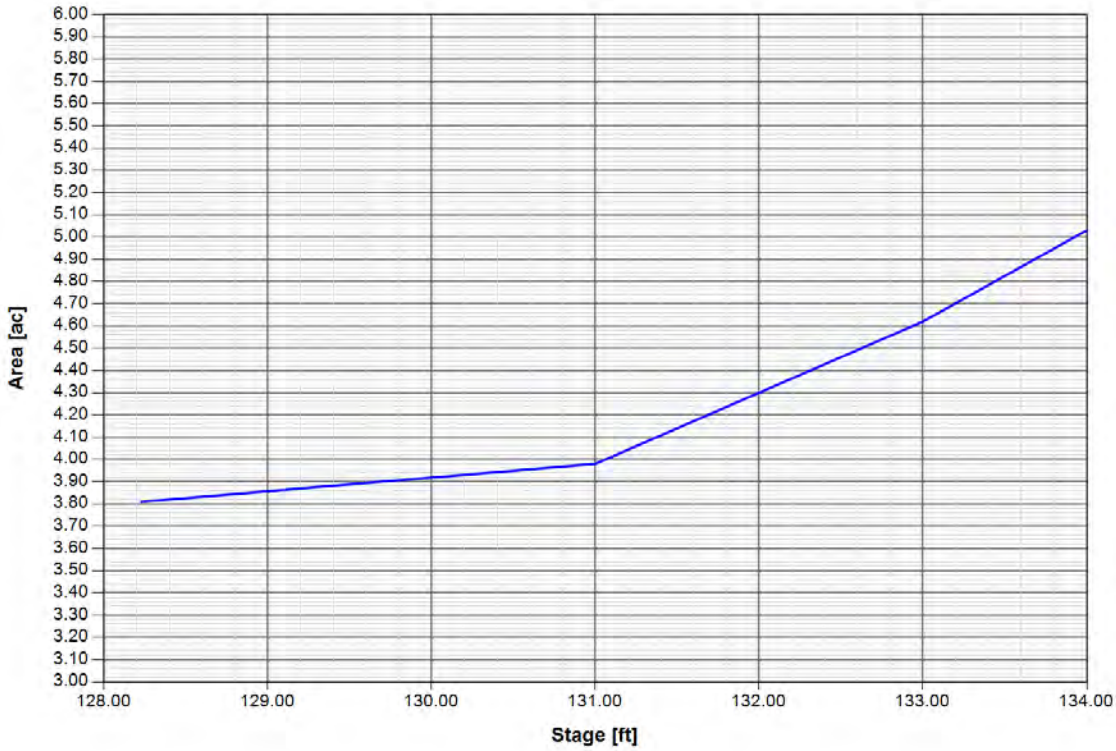
Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 129.50 ft
Warning Stage: 134.00 ft

Stage [ft]	Area [ac]	Area [ft2]
128.23	3.8100	165964
131.00	3.9800	173369

Stage [ft]	Area [ac]	Area [ft2]
132.00	4.3000	187308
133.00	4.6200	201247
134.00	5.0300	219107

Comment:

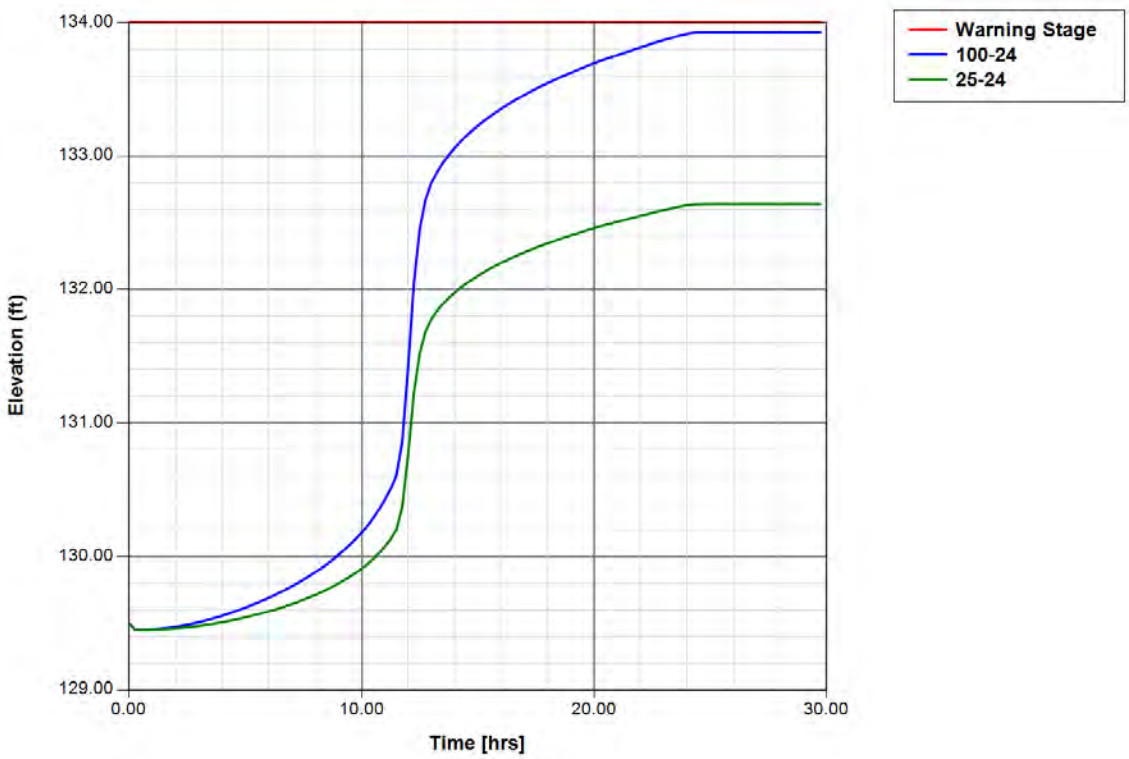
Node: Zero Discharge Pond Scenario: Scenario1



Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Zero Discharge Pond	100-24	134.00	133.93	0.0010	145.36	45.03	217817
Zero Discharge Pond	25-24	134.00	132.64	0.0010	100.64	45.03	196230

Node Stage w/Warning Stage: Zero Discharge Pond [Scenario1]



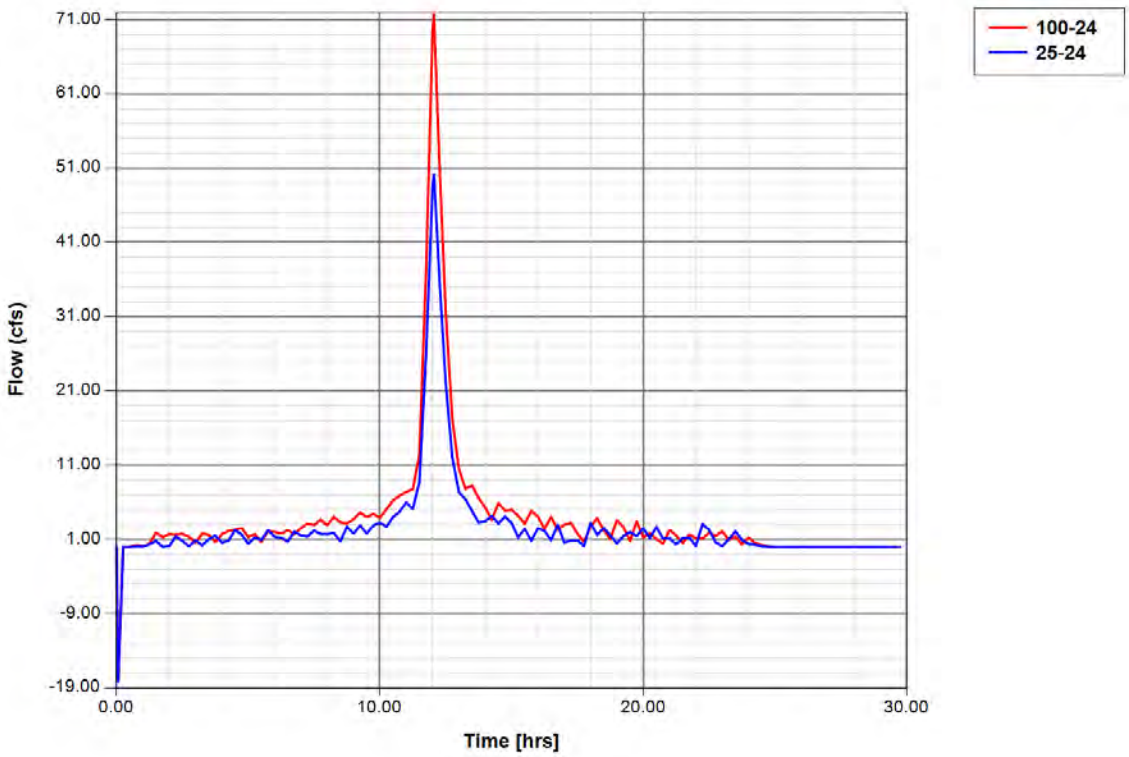
Pipe Link: Existing Pipe		Upstream		Downstream	
Scenario:	Scenario1	Invert:	127.40 ft	Invert:	126.30 ft
From Node:	NZA-0250	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	NZA-0200	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.50 ft	Max Depth:	4.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	384.00 ft	Op Table:		Op Table:	
FHWA Code:	3	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 dec	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

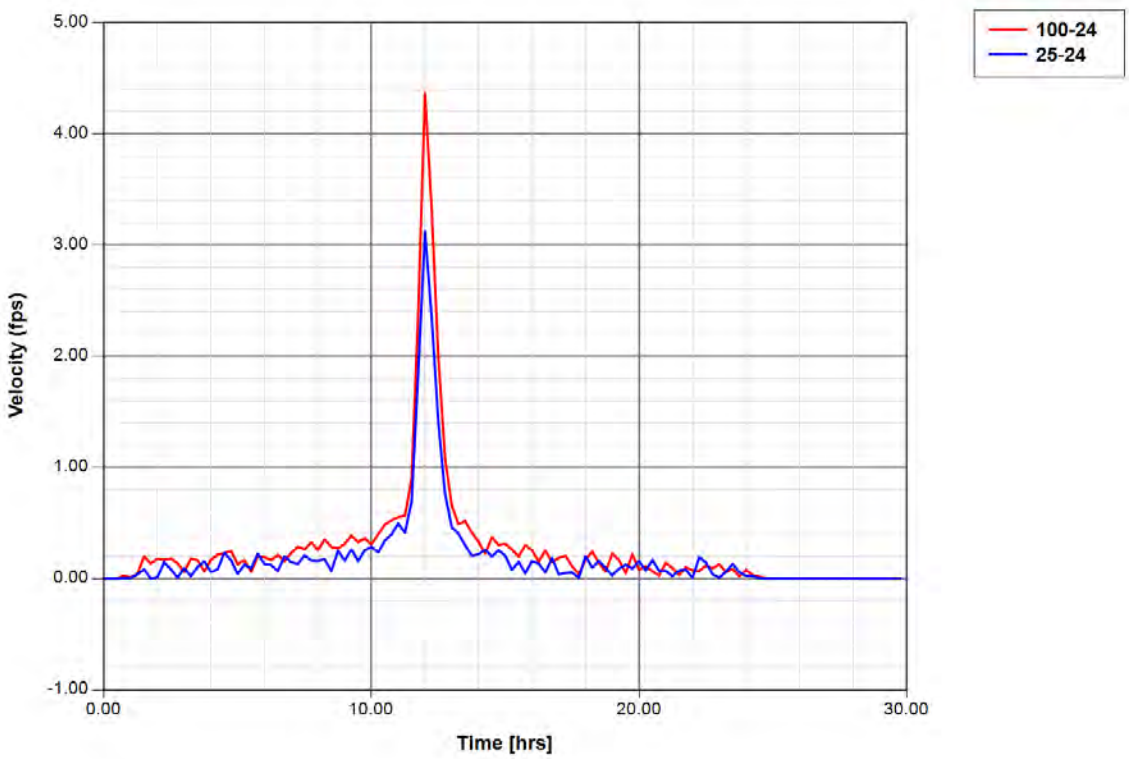
Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Existing Pipe	100-24	71.62	-18.10	-4.40	4.50	-5.15	4.50
Existing Pipe	25-24	50.16	-18.10	-4.31	3.24	-5.15	-3.28

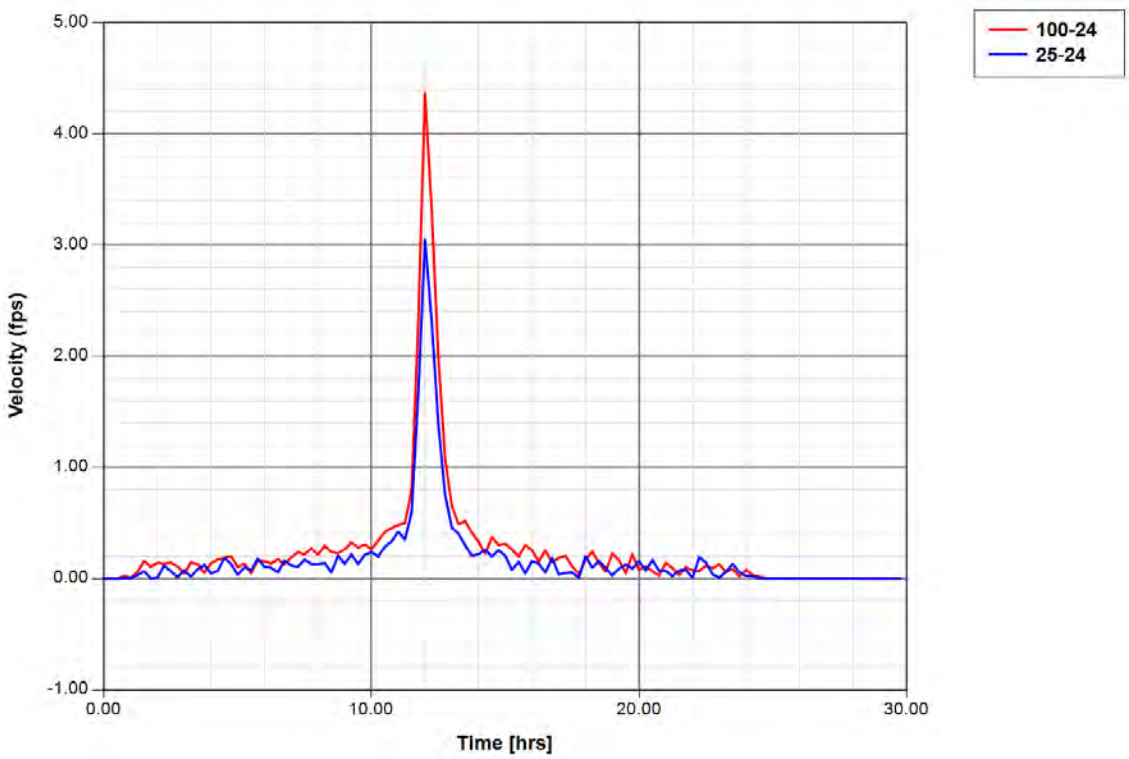
Link Flow: Existing Pipe [Scenario1]



Link Average Velocity: Existing Pipe [Scenario1]



Link Downstream Velocity: Existing Pipe [Scenario1]



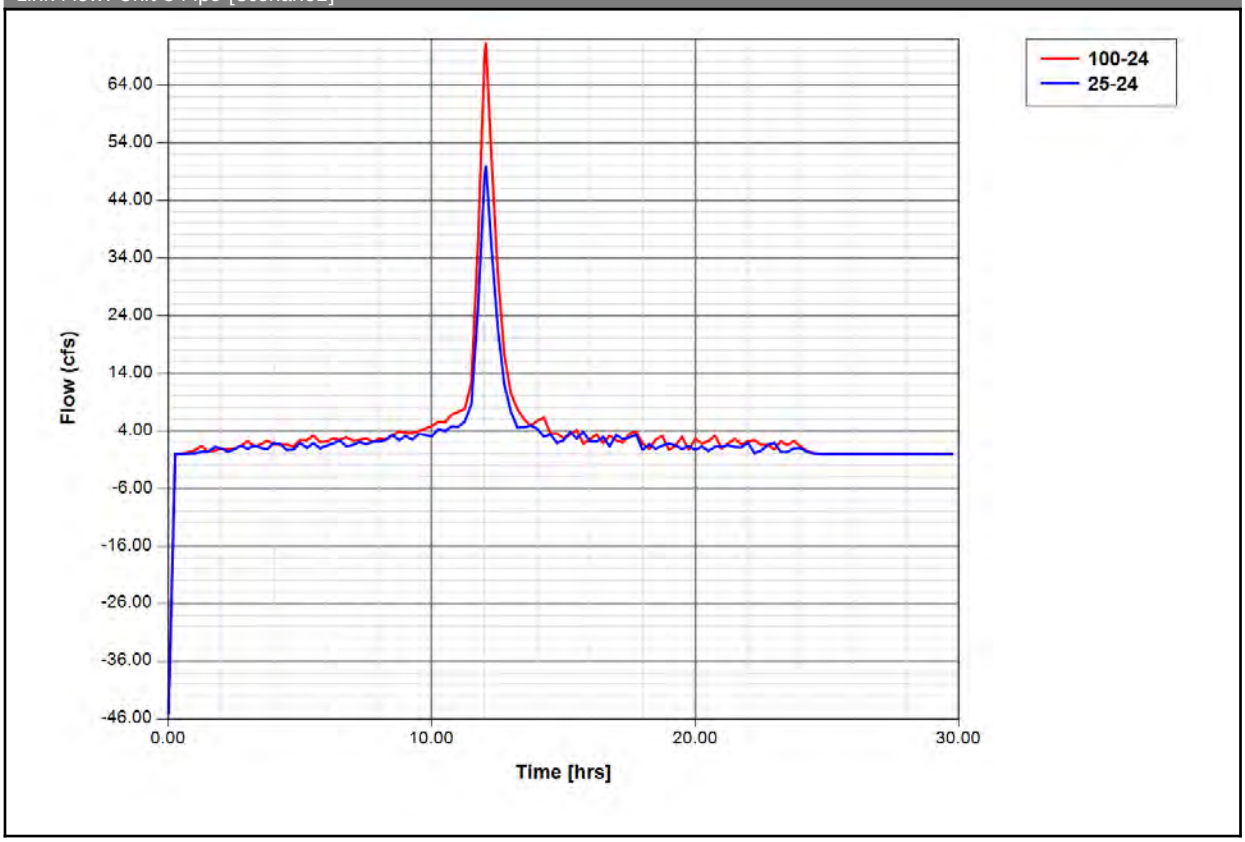
Pipe Link: Unit 3 Pipe		Upstream		Downstream	
Scenario:	Scenario1	Invert:	124.30 ft	Invert:	126.80 ft
From Node:	NZA-0200	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Zero Discharge	Geometry: Circular		Geometry: Circular	
	Pond	Max Depth:	4.50 ft	Max Depth:	4.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	148.00 ft	Ref Node:		Ref Node:	
FHWA Code:	3	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.50	Top Clip			
Exit Loss Coef:	1.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 dec	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

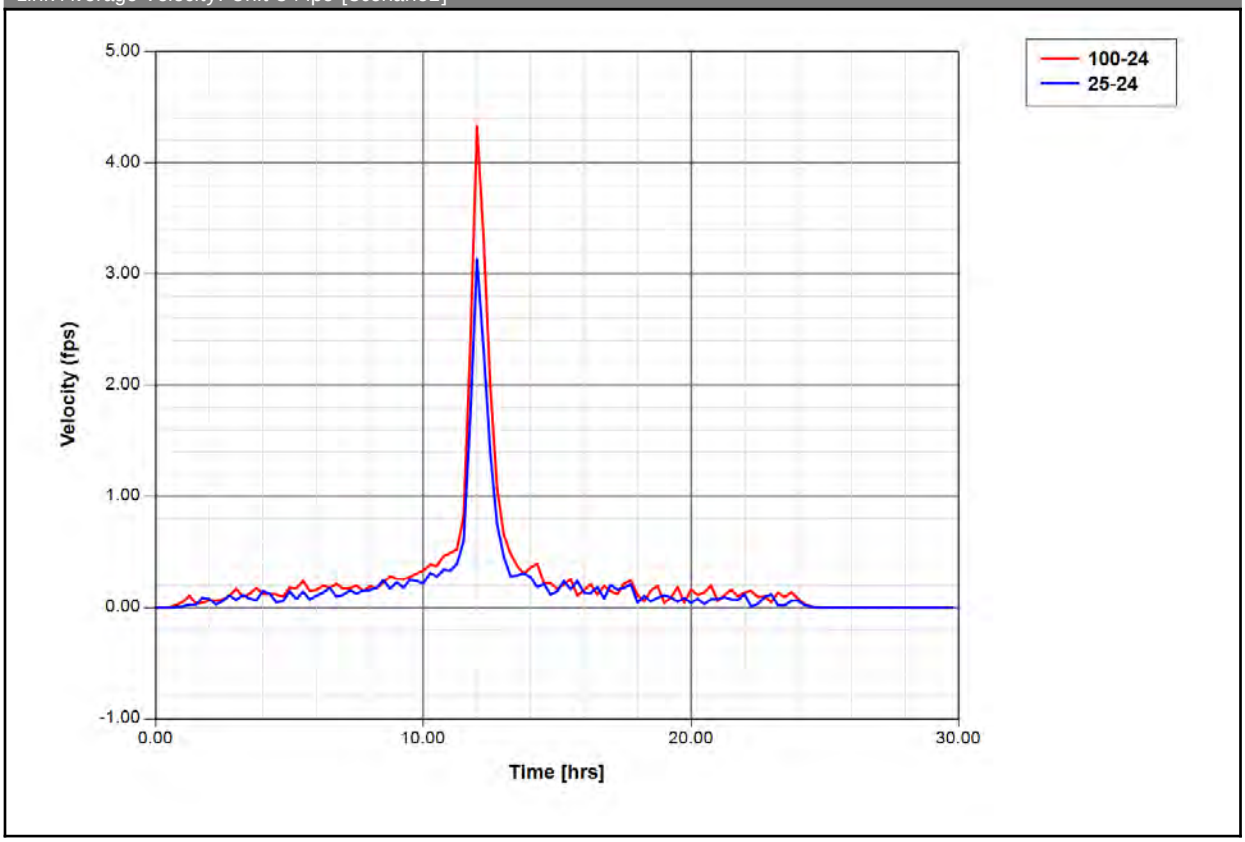
Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Unit 3 Pipe	100-24	71.24	-45.03	39.90	-4.52	-12.82	-8.67
Unit 3 Pipe	25-24	49.91	-45.03	39.90	-4.52	-12.82	-8.67

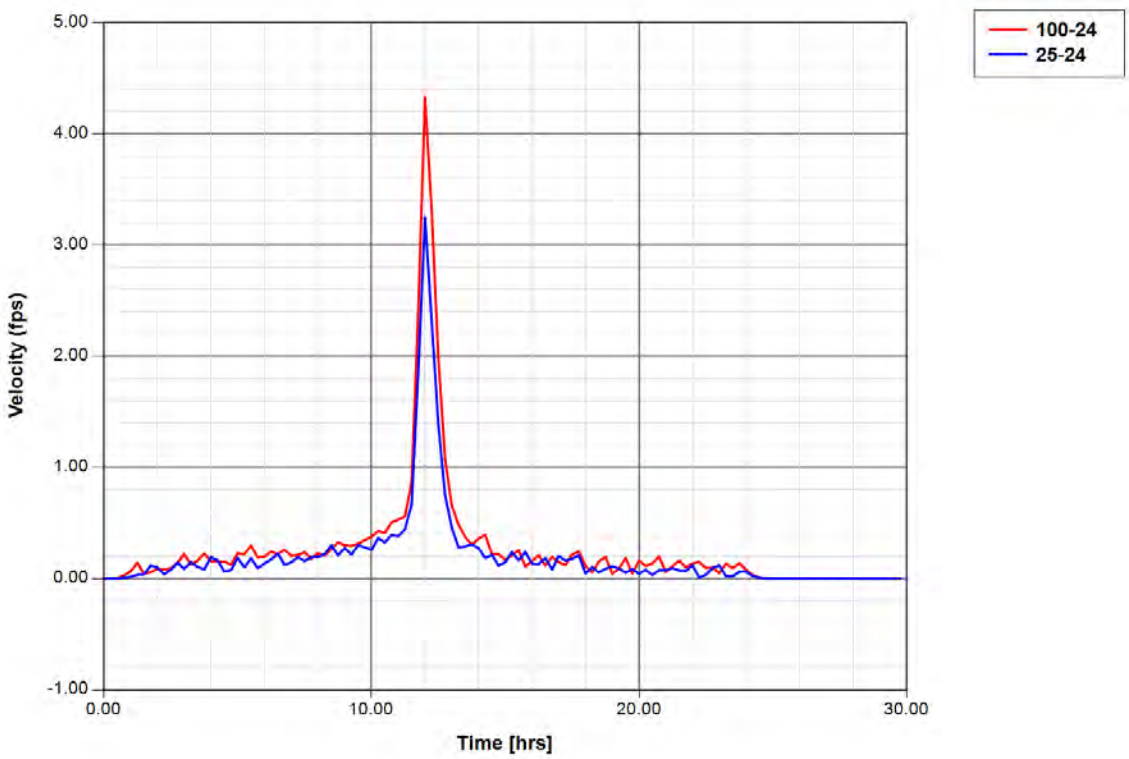
Link Flow: Unit 3 Pipe [Scenario1]



Link Average Velocity: Unit 3 Pipe [Scenario1]



Link Downstream Velocity: Unit 3 Pipe [Scenario1]



Simulation: 100-24

Scenario:	Scenario1
Run Date/Time:	12/29/2023 10:17:36 AM
Program Version:	ICPR4 4.07.01

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder: Sim1
Reference ET Folder:
Unit Hydrograph Folder: Sim1

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic
Dflt Damping (2D): 0.0050 ft
Min Node Srf Area (2D): 100 ft2

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: Global
OF Region Rain Opt: Global
Rainfall Name: Flmod
Rainfall Amount: 10.70 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2

Energy Switch (2D): Energy

Energy Switch (1D): Energy

Comment:

Simulation: 25-24

Scenario: Scenario1
Run Date/Time: 12/29/2023 10:18:06 AM
Program Version: ICPR4 4.07.01

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder: Sim1
Reference ET Folder:
Unit Hydrograph Sim1

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:

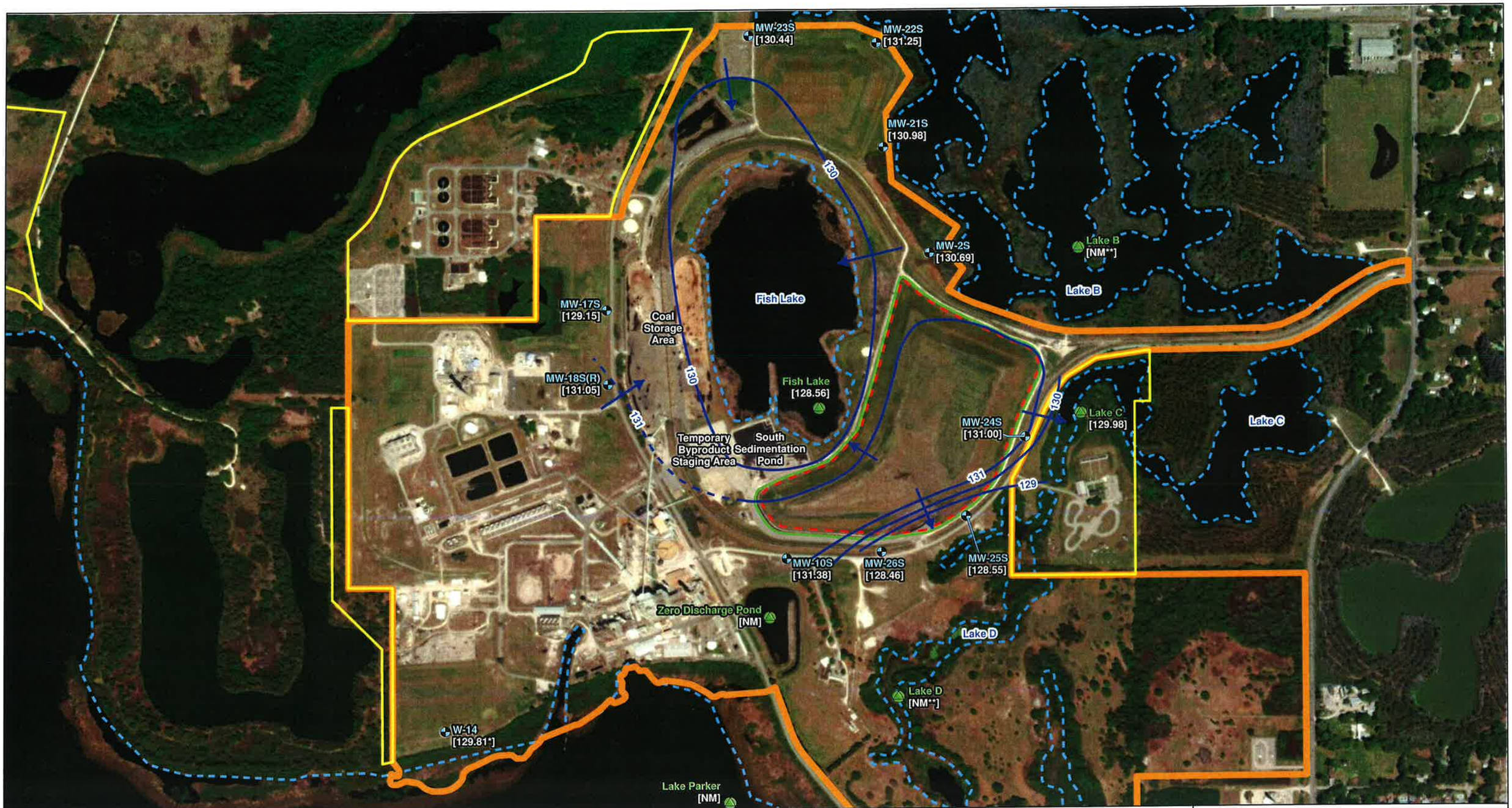
Folder:			
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	
		Roughness Set:	
		Crop Coef Set:	
		Fillable Porosity Set:	
		Conductivity Set:	
		Leakage Set:	

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6	ET for Manual Basins:	False
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft	OF Region Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	Flmod
		Rainfall Amount:	7.50 in
Edge Length Option:	Automatic	Storm Duration:	24.0000 hr
Dflt Damping (2D):	0.0050 ft	Dflt Damping (1D):	0.0050 ft
Min Node Srf Area (2D):	100 ft2	Min Node Srf Area (1D):	100 ft2
Energy Switch (2D):	Energy	Energy Switch (1D):	Energy

Comment:

ATTACHMENT 2
Groundwater Contours



Legend

- Surficial COC Monitoring Well
- Surface Water Gauge
- Groundwater Elevation Contour (Dashed where Inferred)
- Groundwater Flow Direction
- [130.69] Groundwater Elevation (ft NAVD 88)
- BSA Boundary
- Approximate BSA Perimeter Ditch
- City of Lakeland Property
- C.D. McIntosh Power Plant Boundary
- Approximate Lake Boundary

LANE DORMAN
LICENSE
No. PG2861
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST
5/30/24

Notes:
1. * indicates measurement not used for contouring purposes.
2. BSA indicates byproduct storage area.
3. ft NAVD88 indicates an elevation in feet relative to the North American Vertical Datum of 1988.
4. COC indicates Conditions of Certification.
5. NM indicates not measured.
6. "**" indicates staff gauge suspected to be compromised. Field measurement not utilized. Lakeland Electric is evaluating staff gauge reliability to determine if replacement is necessary.
7. Well locations were obtained from the Golder 2019 Assessment of Corrective Measures Report.
8. 2020 ESRI World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

N

0 700 Feet

Surficial Aquifer Groundwater Contour Map
5 February 2024

C.D. McIntosh Power Plant
Lakeland, Polk County, Florida

Geosyntec consultants

Tampa, FL | May 2024

Figure 1

Path: {Tilusville 01\DATA} T:\GIS\FR3715_Lakeland_Electric\MXDs\202402\GW_COCelev_S_Feb2024r.mxd 02 May 2024 Last Edited by Gabrielle Mommers

Legend

- Intermediate COC Monitoring Well
- Inferrred Groundwater Elevation Contour
- Groundwater Flow Direction
- [129.71] Groundwater Elevation (ft NAVD 88)
- BSA Boundary
- Approximate BSA Perimeter Ditch
- City of Lakeland Property
- C.D. McIntosh Power Plant Boundary

LANE DORMAN
LICENSE
No. PG2861
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

5/31/24

Notes:
1. BSA indicates byproduct storage area.
2. ft NAVD88 indicates an elevation in feet relative to the North American Vertical Datum of 1988.
3. COC indicates Conditions of Certification.
4. Well locations were obtained from the Golder 2019 Assessment of Corrective Measures Report.
5. 2020 ESRI World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

N

0 700 Feet

Intermediate Groundwater Contour Map
5 February 2024

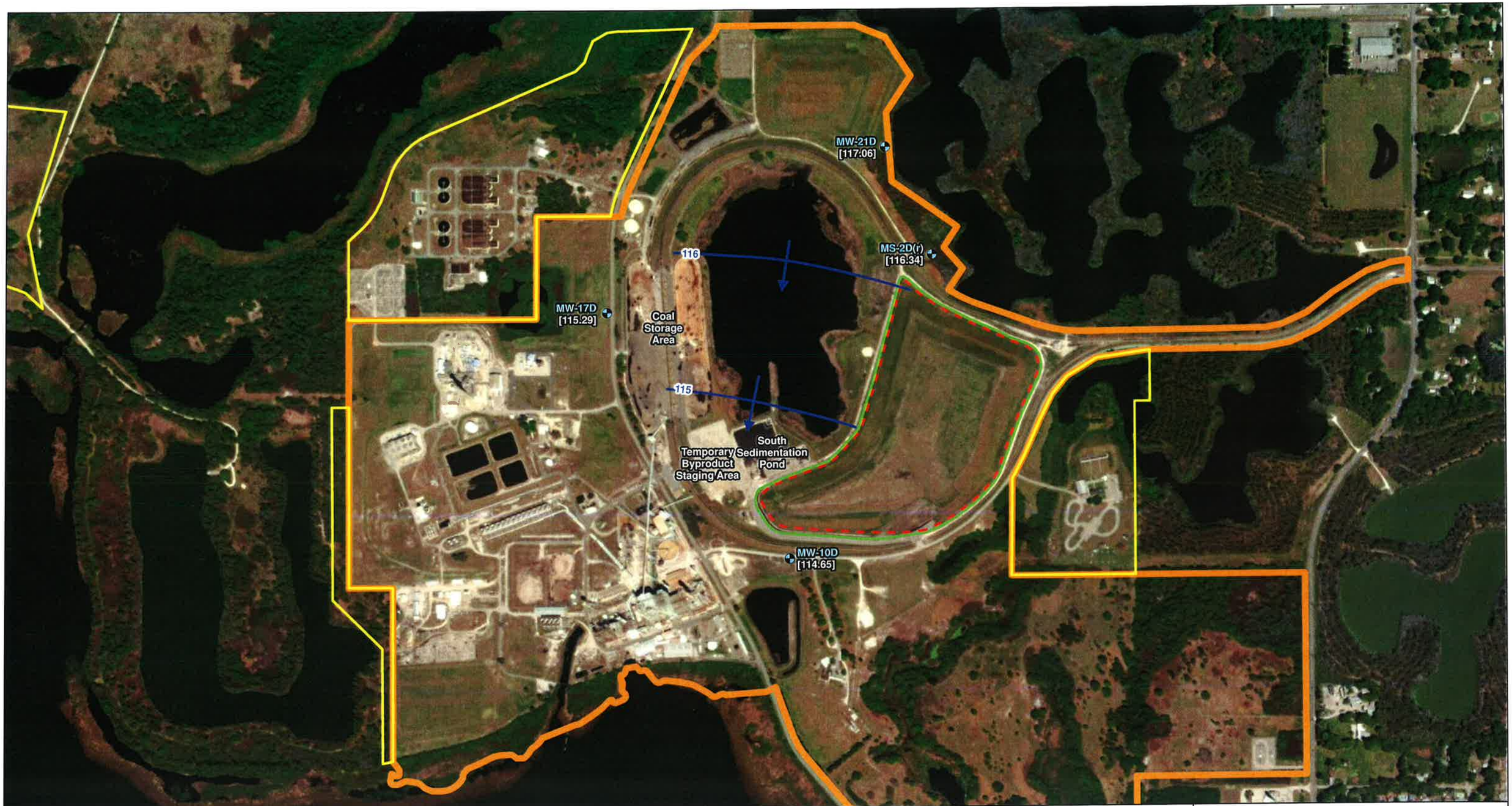
C.D. McIntosh Power Plant
Lakeland, Polk County, Florida

Geosyntec consultants

Tampa, FL | May 2024

Figure 2

Path: (Titusville 01\DATA) T:\0GIS\FR3715_Lakeland_Electric\MXDs\202402 GW_COCelev_I_Feb2024r.mxd 02 May 2024 Last Edited by Gabrielle Mommers



Legend

- Deep COC Monitoring Well
- Groundwater Elevation Contour (Dashed where Inferred)
- Groundwater Flow Direction
- [114.65] Groundwater Elevation (ft NAVD 88)
- BSA Boundary
- Approximate BSA Perimeter Ditch
- City of Lakeland Property
- C.D. McIntosh Power Plant Boundary

LANE DORMAN
LICENSE
No. PG2861
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

Notes:
1. BSA indicates byproduct storage area.
2. ft NAVD88 indicates an elevation in feet relative to the North American Vertical Datum of 1988.
3. COC indicates Conditions of Certification.
4. Well locations were obtained from the Golder 2019 Assessment of Corrective Measures Report.
5. 2020 ESRI World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

N

0 700 Feet

Deep Groundwater Contour Map
5 February 2024

C.D. McIntosh Power Plant
Lakeland, Polk County, Florida

Geosyntec consultants

Tampa, FL | May 2024

Figure 3

Path: (Tilusville 01\DATA) T:\GIS\FR3715_Lakeland_Electric\MXDs\202402\GW_COCelev_D_Feb2024r.mxd 02 May 2024 Last Edited by Gabrielle Mommers

ATTACHMENT 3

SWFWMD Applicant's Handbook Volume II Rainfall Information

Figure D-5
Twenty-Four-Hour Twenty-Five-Year Return Period Rainfall Map

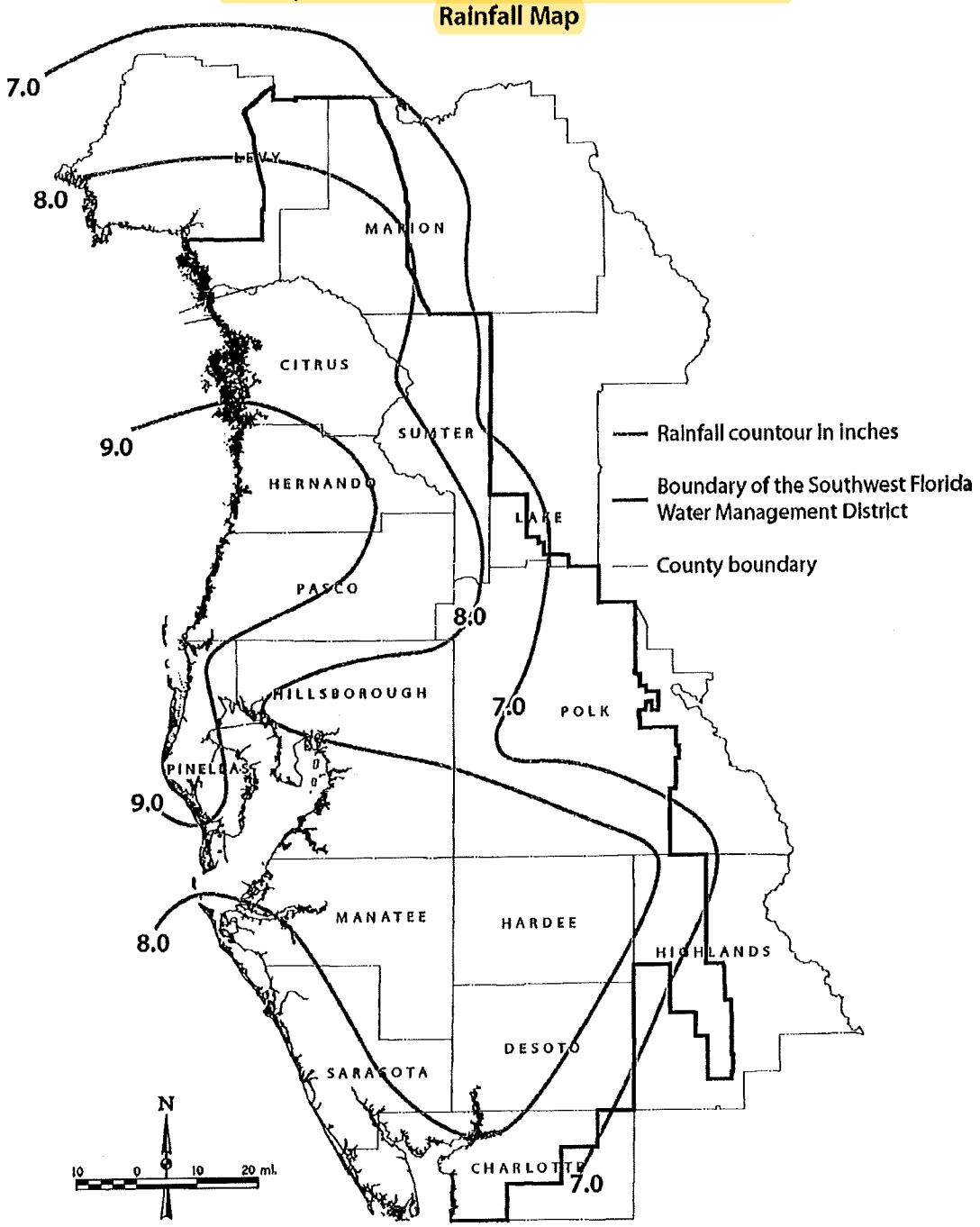
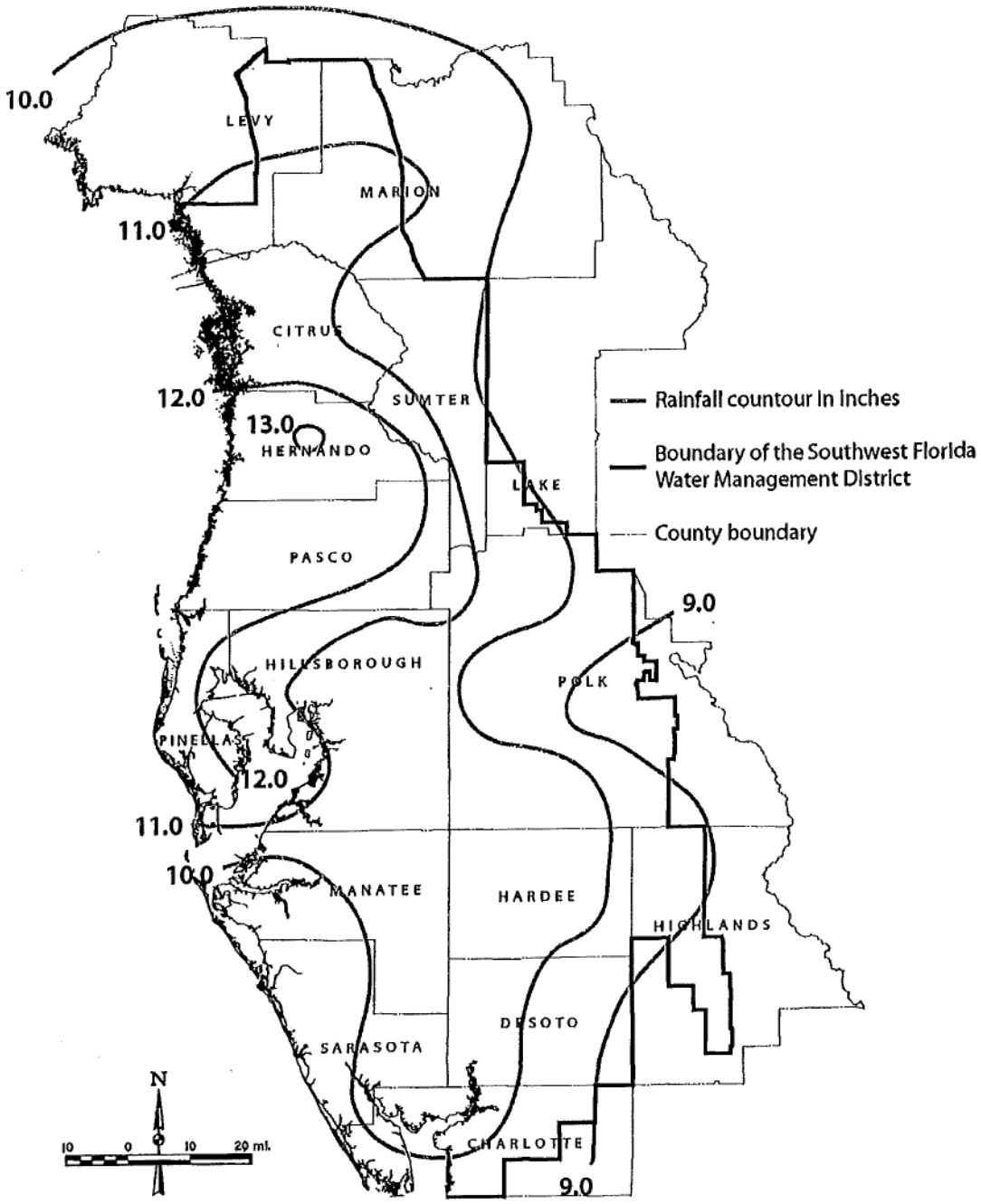


Figure D-7
Twenty-Four-Hour One-Hundred-Year Return Period Rainfall Map



ATTACHMENT 4
WSS Soils Report

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Polk County, Florida

December 29, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Polk County, Florida.....14
8—Hydraquents, clayey.....14
13—Samsula muck, frequently ponded, 0 to 1 percent slopes.....15
17—Smyrna and Myakka fine sands.....17
21—Immokalee sand.....21
22—Pomello fine sand.....23
23—Ona-Ona, wet, fine sand, 0 to 2 percent slopes.....25
25—Placid and Myakka fine sands, depressional.....28
29—St. Lucie fine sand, 0 to 5 percent slopes.....30
31—Adamsville fine sand, 0 to 2 percent slopes.....32
35—Hontoon muck, frequently ponded, 0 to 1 percent slopes.....34
59—Arents-Urban land complex, 0 to 5 percent slopes.....35
68—Arents, 0 to 5 percent slopes.....37
99—Water.....38
Soil Information for All Uses.....39
Soil Properties and Qualities.....39
Soil Qualities and Features.....39
Hydrologic Soil Group.....39
References.....44

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:13,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 21, Sep 6, 2023

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

Date(s) aerial images were photographed: Jan 6, 2022—Mar 21, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Hydraquents, clayey	0.1	0.0%
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	2.4	0.3%
17	Smyrna and Myakka fine sands	143.6	18.1%
21	Immokalee sand	69.1	8.7%
22	Pomello fine sand	52.5	6.6%
23	Ona-Ona, wet, fine sand, 0 to 2 percent slopes	2.2	0.3%
25	Placid and Myakka fine sands, depressional	17.6	2.2%
29	St. Lucie fine sand, 0 to 5 percent slopes	12.0	1.5%
31	Adamsville fine sand, 0 to 2 percent slopes	6.0	0.8%
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	4.5	0.6%
59	Arents-Urban land complex, 0 to 5 percent slopes	39.5	5.0%
68	Arents, 0 to 5 percent slopes	262.5	33.1%
99	Water	181.2	22.8%
Totals for Area of Interest		**793.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Polk County, Florida

8—Hydraquents, clayey

Map Unit Setting

National map unit symbol: 1jttr
Elevation: 50 to 250 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Hydraquents, clayey and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hydraquents, Clayey

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Altered marine deposits

Typical profile

Cg - 0 to 80 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: Yes

Minor Components

Neilhurst

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve, side slope, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: No

13—Samsula muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzw9
Elevation: 0 to 250 feet
Mean annual precipitation: 44 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Samsula and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Samsula

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 32 inches: muck
Cg1 - 32 to 35 inches: sand
Cg2 - 35 to 44 inches: sand
Cg3 - 44 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 13.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Kaliga

Percent of map unit: 3 percent
Landform: Depressions on flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Sanibel

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

17—Smyrna and Myakka fine sands

Map Unit Setting

National map unit symbol: 1jtv1
Elevation: 20 to 260 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Smyrna, non-hydric, and similar soils: 41 percent
Myakka and similar soils: 39 percent

Smyrna, hydric, and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna, Non-hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 12 inches: fine sand
Bh - 12 to 25 inches: fine sand
E' - 25 to 42 inches: fine sand
B'h - 42 to 48 inches: fine sand
C - 48 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Myakka

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

E - 7 to 25 inches: fine sand
Bh - 25 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Smyrna, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 12 inches: fine sand
Bh - 12 to 25 inches: fine sand
E' - 25 to 42 inches: fine sand
B'h - 42 to 48 inches: fine sand
C - 48 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Basinger
Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Pomona, non-hydric
Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Ona, non-hydric
Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Immokalee, non-hydric
Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

21—Immokalee sand

Map Unit Setting

National map unit symbol: 1jtv4
Elevation: 50 to 260 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee, non-hydric, and similar soils: 75 percent
Immokalee, hydric, and similar soils: 10 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: sand
E - 7 to 39 inches: sand
Bh - 39 to 58 inches: sand
E' - 58 to 66 inches: sand
B'h - 66 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Immokalee, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: sand
E - 7 to 39 inches: sand
Bh - 39 to 58 inches: sand
E' - 58 to 66 inches: sand
B'h - 66 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Smyrna, non-hydric

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Myakka

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

22—Pomello fine sand

Map Unit Setting

National map unit symbol: 1jtv5
Elevation: 10 to 260 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomello and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomello

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 48 inches: fine sand
Bh - 48 to 63 inches: fine sand
BC - 63 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F155XY150FL - Sandy Upland Mesic Flatwoods and Hammocks on Rises and Knolls
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

Minor Components

Archbold

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

Immokalee, non-hydric

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Duette

Percent of map unit: 5 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Sand Pine Scrub (R154XY001FL), Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

Satellite

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

23—Ona-Ona, wet, fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w4gx
Elevation: 10 to 130 feet
Mean annual precipitation: 46 to 56 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 325 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ona and similar soils: 75 percent
Ona, wet, and similar soils: 12 percent

Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ona

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: fine sand
Bh - 9 to 16 inches: fine sand
C - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Ona, Wet

Setting

Landform: Sloughs on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: fine sand
Bh - 9 to 16 inches: fine sand
C - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Basinger, hydric

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

25—Placid and Myakka fine sands, depressional

Map Unit Setting

National map unit symbol: 1jtv8
Elevation: 20 to 250 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Placid, depressional, and similar soils: 60 percent
Myakka, depressional, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Placid, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 18 inches: fine sand
Cg - 18 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Description of Myakka, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 25 inches: fine sand
Bh - 25 to 35 inches: fine sand
Cg - 35 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Minor Components

Basinger, depressional

Percent of map unit: 3 percent
Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Ona, hydric
Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

St. johns, hydric
Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Cutthroat Seeps (R154XY007FL)
Hydric soil rating: Yes

Pomona, hydric
Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

29—St. Lucie fine sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2v17s
Elevation: 80 to 160 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 300 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

St. lucie and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Lucie

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
C - 4 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

Minor Components

Archbold

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Sand Pine Scrub (R154XY001FL)

Hydric soil rating: No

Myakka

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL), Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Hydric soil rating: No

Cassia

Percent of map unit: 3 percent
Landform: Rises on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)
Hydric soil rating: No

31—Adamsville fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2r8h8
Elevation: 10 to 100 feet
Mean annual precipitation: 47 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Adamsville and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adamsville

Setting

Landform: Flats on marine terraces, rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

Ap - 0 to 7 inches: fine sand

C1 - 7 to 20 inches: fine sand
C2 - 20 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL), Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Myakka

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Basinger

Percent of map unit: 2 percent
Landform: Drainageways
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, convex
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), Slough (R155XY011FL)
Hydric soil rating: Yes

35—Hontoon muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2vbpg
Elevation: 0 to 250 feet
Mean annual precipitation: 43 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Hontoon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hontoon

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material

Typical profile

Oa - 0 to 75 inches: muck
AC - 75 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G154XB645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)

Hydric soil rating: Yes

Minor Components

Samsula

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Hontoon, drained

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

59—Arents-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1jtw7
Elevation: 50 to 210 feet
Mean annual precipitation: 46 to 54 inches

Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 55 percent
Urban land: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

C - 0 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G154XB999FL)

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: Unranked

68—Arents, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1jtwh
Elevation: 50 to 360 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

C - 0 to 80 inches: sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Forage suitability group: Forage suitability group not assigned (G154XB999FL)

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

Hydric soil rating: Unranked

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

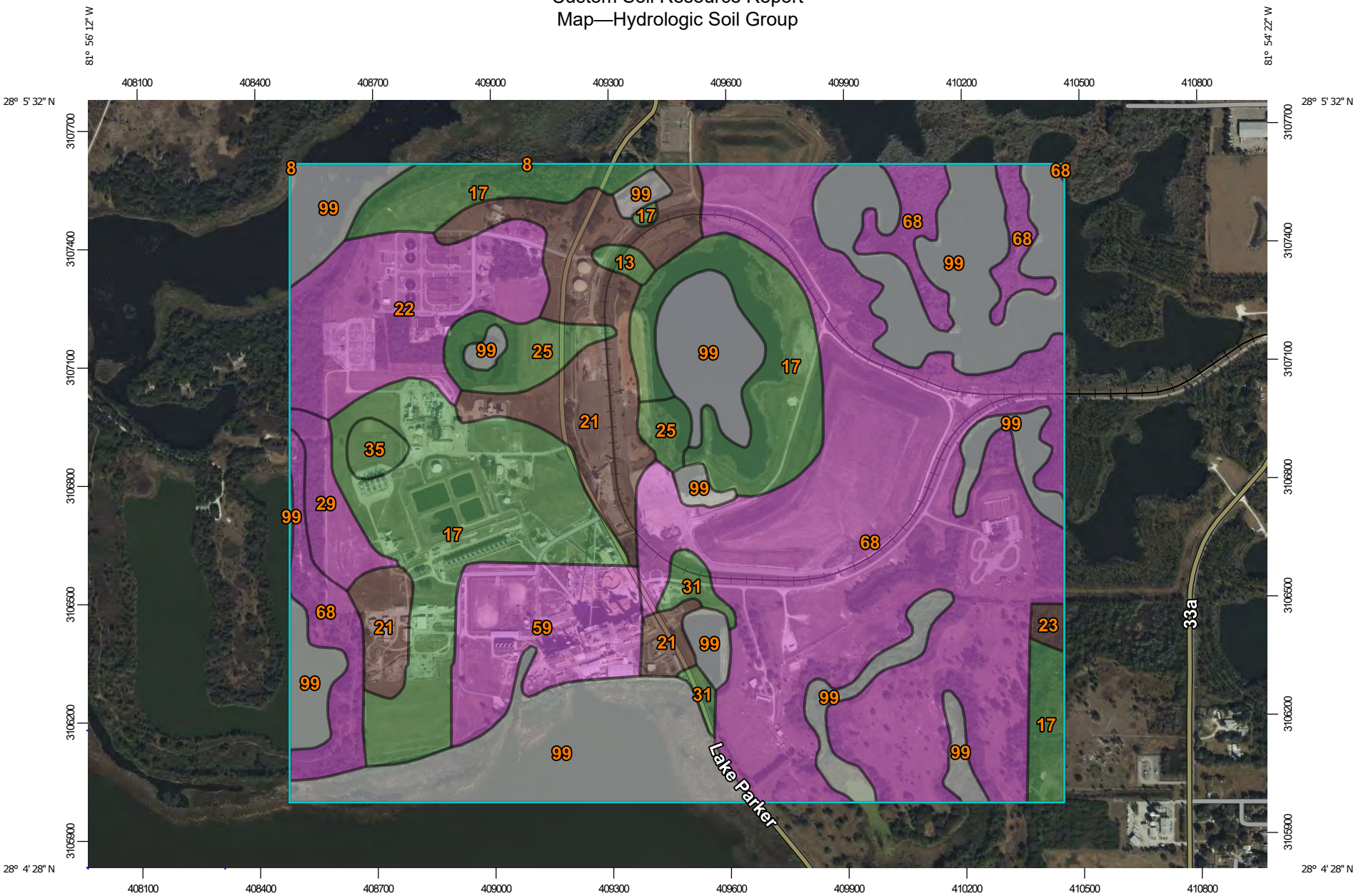
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:13,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 21, Sep 6, 2023

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

Date(s) aerial images were photographed: Jan 6, 2022—Mar 21, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Hydraquents, clayey	D	0.1	0.0%
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	A/D	2.4	0.3%
17	Smyrna and Myakka fine sands	A/D	143.6	18.1%
21	Immokalee sand	B/D	69.1	8.7%
22	Pomello fine sand	A	52.5	6.6%
23	Ona-Ona, wet, fine sand, 0 to 2 percent slopes	B/D	2.2	0.3%
25	Placid and Myakka fine sands, depressional	A/D	17.6	2.2%
29	St. Lucie fine sand, 0 to 5 percent slopes	A	12.0	1.5%
31	Adamsville fine sand, 0 to 2 percent slopes	A/D	6.0	0.8%
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	A/D	4.5	0.6%
59	Arents-Urban land complex, 0 to 5 percent slopes	A	39.5	5.0%
68	Arents, 0 to 5 percent slopes	A	262.5	33.1%
99	Water		181.2	22.8%
Totals for Area of Interest			**793.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

ATTACHMENT 5
Pond Design Calculations

Administration Pond

Criteria:

- Treatment Volume: 1" from contributing drainage area
- Treatment Discharge: 100% in no less than 120 hours, 50% in no less than 60 hours
- Side slopes: 4:1 or shallower
- Depth: minimum 1-foot below control elevation
- Rainfall: 25-year, 24-hour storm AMCII

Calculations:

- Contributing drainage area: 8.6 acres
- Rational runoff C: 0.7 – Industrial

Treatment Volume:

$$V = A \times 1in \times (\frac{1ft}{12in})$$

V = Treatment Volume, acre-feet (AF)

A = Drainage Area, acres (AC)

V= (8.6 acres) * 1 in * 1in/12ft = **0.717 AF**

Permanent Pool Volume:
(a) Based on 14 day residence time

$$V = A \times C \times P \times R \times (\frac{1in}{12ft})$$

V = Permanent Pool Wet Volume, acre-feet (AF)

C = Rational Runoff Coefficient

R = Historic Average Rainfall, 31.04in/122 days

R = Residence time, days

V = (8.6 acres) * (0.7) * (31.04in/122day) * (14 day) * (1in/12ft) = 1.79 AF

(b) As 0.667 inch of runoff

$$V = A \times 0.667in \times (\frac{1in}{12ft})$$

V = (8.6 acres) * (0.667in) * (1in/12ft) = 0.478 AF

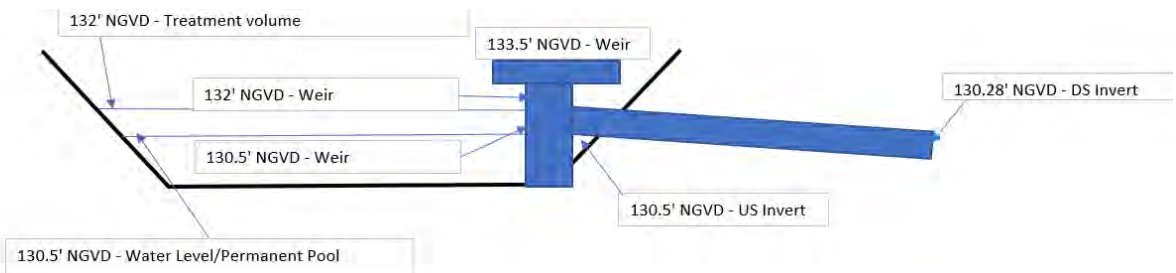
Use larger of (a) and (b): **1.79 AF**

Wet Detention Pond Pool Volume: 0.717AF + 1.79AF = **2.50 AF**

Administration Pond Stage-Storage

Elevation (ft)	Surface Area (ac)	Cumulative Storage (AF)	Notes
127	0.61	0.00	
128	0.68	0.65	
129	0.74	1.36	
130	0.81	2.14	
130.5	1.32	2.67	Existing Water Level/Permanent Pool Req'd
131	1.37	3.34	
132	1.46	4.75	Top of treatment volume
133	1.56	6.26	
134	1.66	7.87	
135	1.76	9.58	

Outlet Structure



West Pond

Criteria and Equations same as Administration Pond

- Contributing drainage area: 17.2 acres
- Rational runoff C: 0.7 – Industrial

Treatment Volume: **1.43 AF**

Permanent Pool Volume:

(a) Based on 14 day residence time: 3.57 AF

(b) As 0.667 in of runoff: 0.96 AF

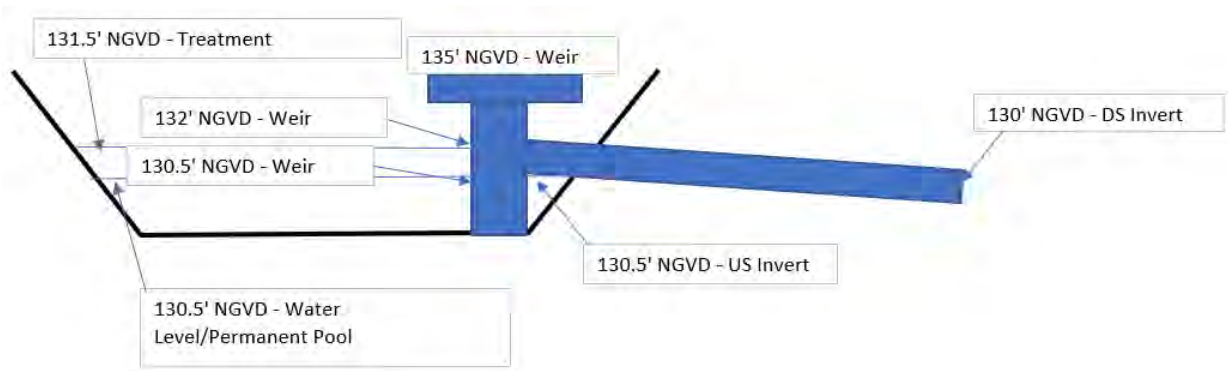
Use larger of (a) and (b): **3.57 AF**

Pond Pool Volume: 1.43 AF + 3.57AF = **5.00 AF**

West Pond Stage-Storage

Elevation (ft)	Surface Area (ac)	Cumulative Storage (AF)	Notes
127	1.25	0.00	
128	1.36	1.31	
129	1.47	2.72	
130	1.58	4.25	
130.5	2.53	5.28	Existing Water Level/Permanent Pool Req'd
131	2.59	6.56	
132	2.72	9.21	Top of treatment
133	2.86	12.00	
134	2.99	14.93	
135	3.13	17.99	
136	3.27	21.19	

Outlet Structure



Node: Admin Pond

Scenario: DRAWDOWN
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 132.00 ft
Warning Stage: 135.00 ft

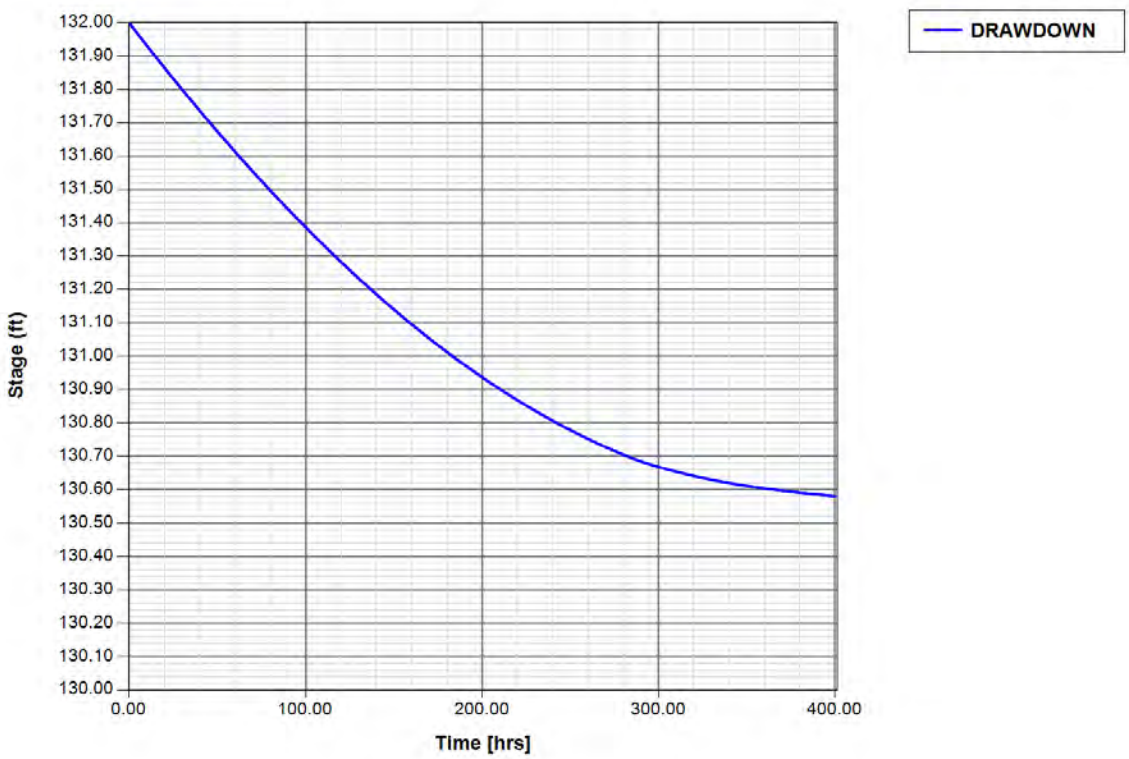
Stage [ft]	Area [ac]	Area [ft2]
128.00	0.6770	29490
129.00	0.7440	32409
130.00	0.8130	35414
131.00	1.3660	59503
132.00	1.4610	63641
133.00	1.5580	67866
134.00	1.6570	72179
127.00	0.6140	26746
130.50	1.3200	57499
135.00	1.7580	76578

Comment:

Node Max Conditions [DRAWDOWN]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Admin Pond	DRAWDOWN	135.00	132.00	0.0001	0.00	0.12	63641

Stage [Node: Admin Pond]



Node: Lake Parker

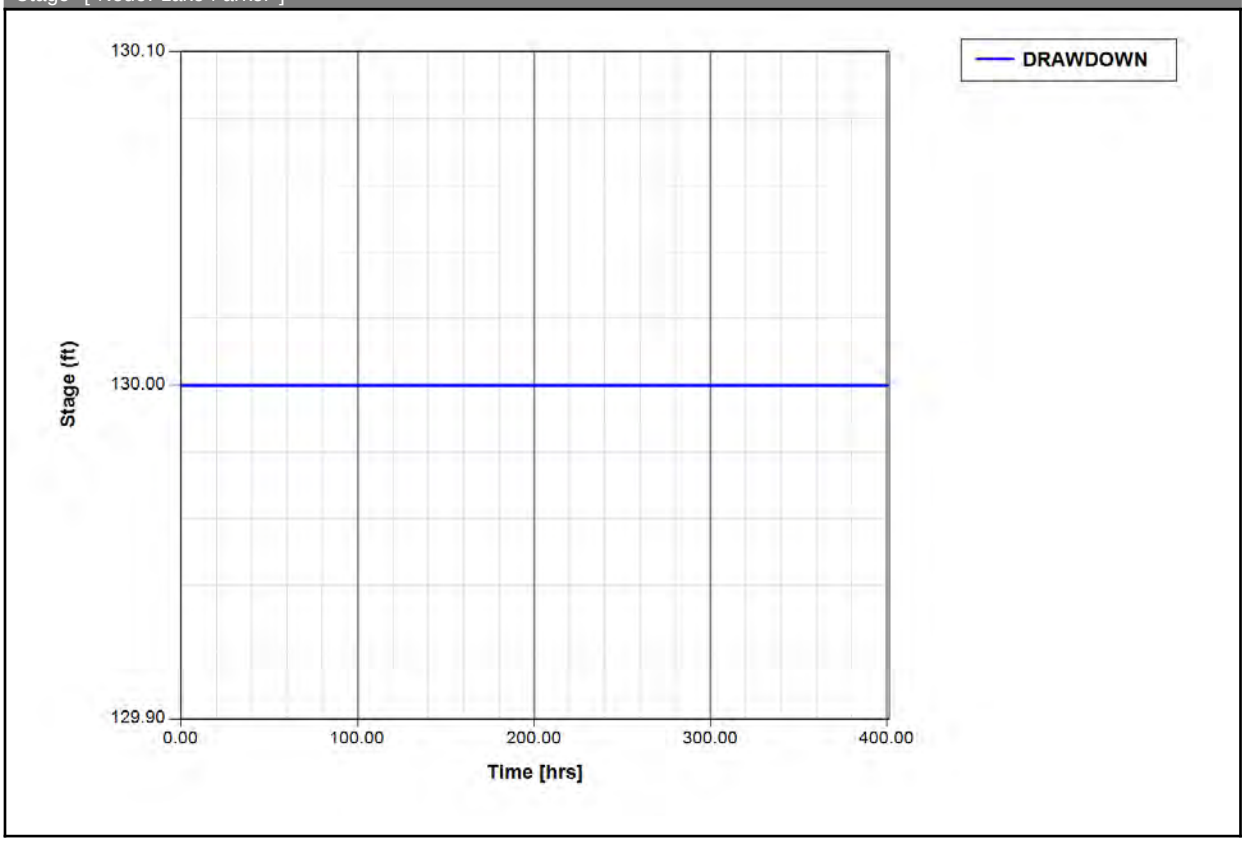
Scenario:	DRAWDOWN
Type:	Time/Stage
Base Flow:	0.00 cfs
Initial Stage:	130.00 ft
Warning Stage:	134.00 ft
Boundary Stage:	

Comment:

Node Max Conditions [DRAWDOWN]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Lake Parker	DRAWDOWN	134.00	130.00	0.0000	0.24	0.00	0

Stage [Node: Lake Parker]



Node: West Pond

Scenario: DRAWDOWN
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 132.00 ft
Warning Stage: 136.00 ft

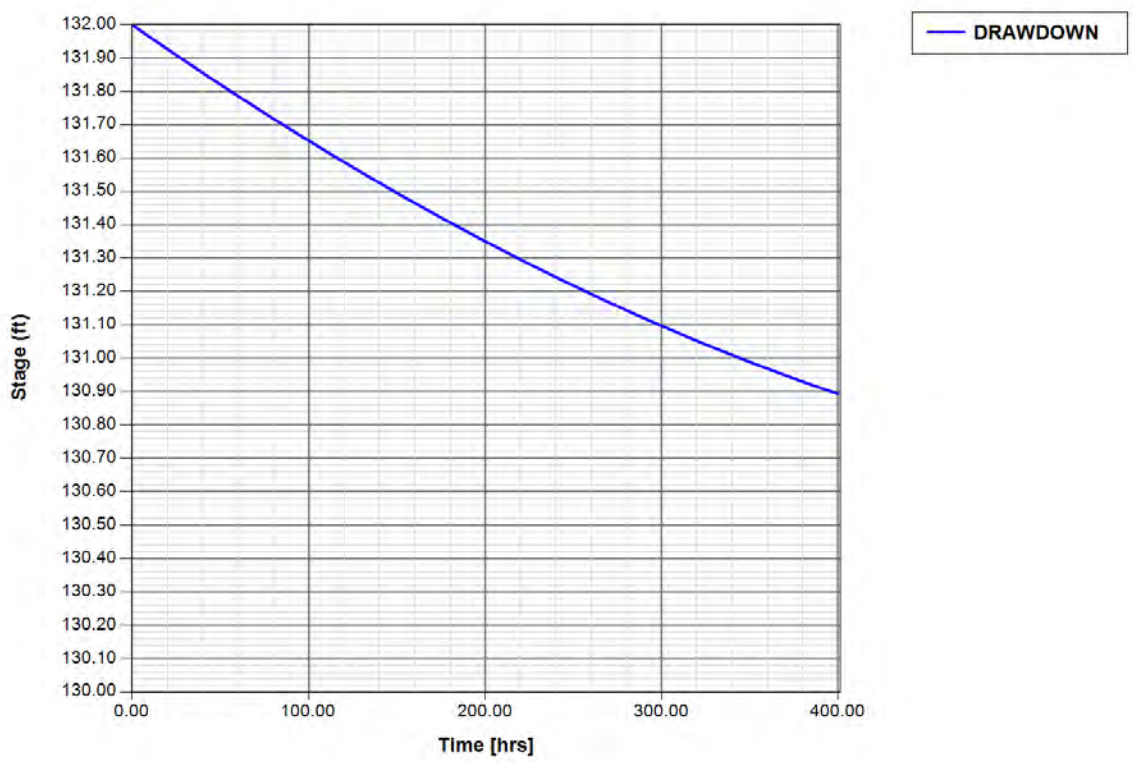
Stage [ft]	Area [ac]	Area [ft2]
128.00	1.3600	59242
129.00	1.4700	64033
130.00	1.5800	68825
131.00	2.5900	112820
132.00	2.7200	118483
133.00	2.8600	124582
134.00	2.9900	130244
135.00	3.1300	136343
136.00	3.2700	142441
127.00	1.2500	54450
130.50	2.5300	110207

Comment:

Node Max Conditions [DRAWDOWN]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
West Pond	DRAWDOWN	136.00	132.00	0.0000	0.00	0.12	118483

Stage [Node: West Pond]



Drop Structure Link: Admin Pond Outfall		Upstream Pipe		Downstream Pipe	
Scenario:	DRAWDOWN	Invert:	130.50 ft	Invert:	130.28 ft
From Node:	Admin Pond	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Lake Parker	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft

Flow Direction:	Both	Bottom Clip			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	0	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	72.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component			
Weir:	1	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	Top Clip	
Geometry Type:	Circular	Default:	0.00 ft
Invert:	130.50 ft	Op Table:	
Control Elevation:	130.50 ft	Ref Node:	
Max Depth:	0.17 ft	Discharge Coefficients	
		Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component			
Weir:	2	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Horizontal	Top Clip	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	133.50 ft	Op Table:	
Control Elevation:	133.50 ft	Ref Node:	
Max Depth:	2.00 ft	Discharge Coefficients	
Max Width:	3.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component			
Weir:	3	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	

Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	132.00 ft
Control Elevation:	132.00 ft
Max Depth:	0.50 ft
Max Width:	3.00 ft
Fillet:	0.00 ft

Ref Node:	
Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Discharge Coefficients	
Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

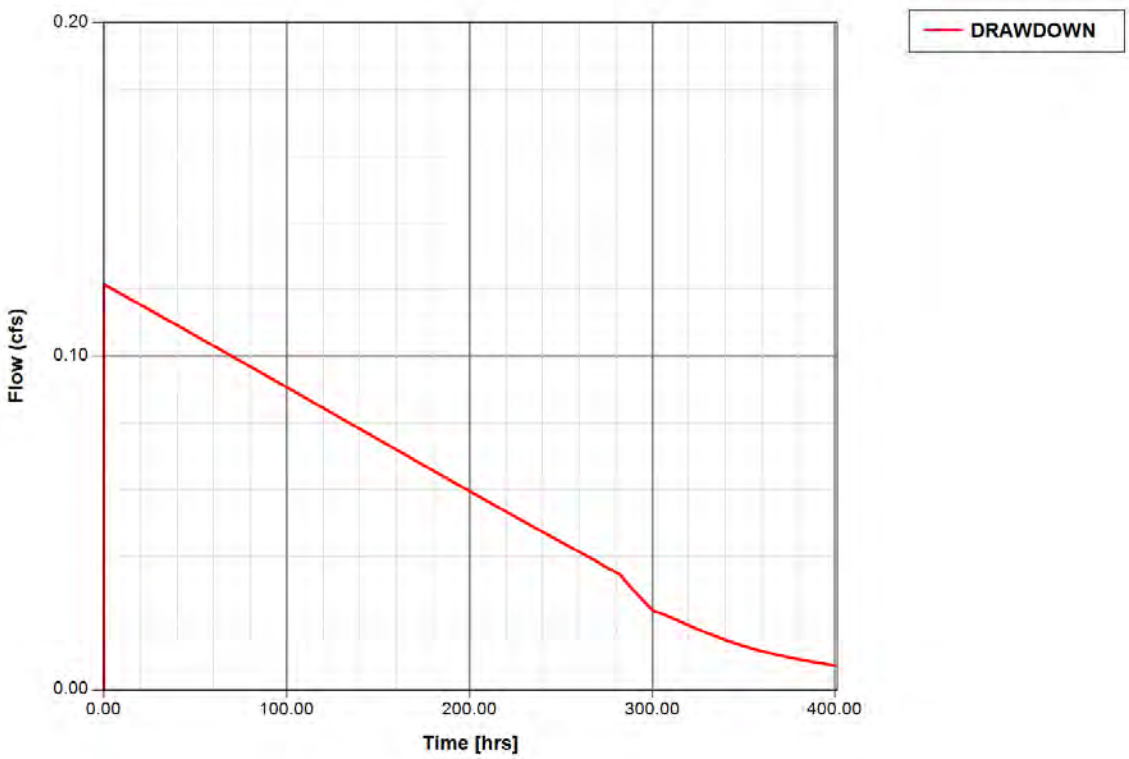
Weir Comment:

Drop Structure Comment:

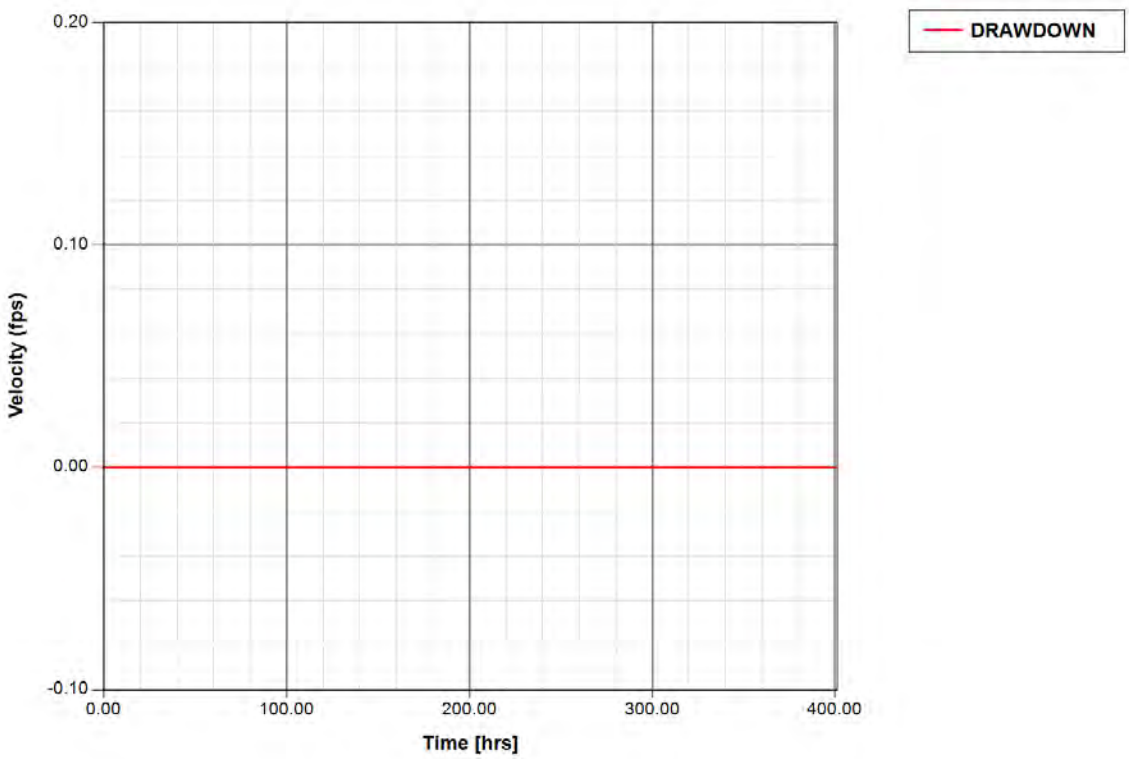
Link Min/Max Conditions [DRAWDOWN]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Admin Pond Outfall - Pipe	DRAWDOWN	0.12	0.00	0.12	0.00	0.00	0.00
Admin Pond Outfall - Weir: 1	DRAWDOWN	0.12	0.00	0.00	0.00	0.00	0.00
Admin Pond Outfall - Weir: 2	DRAWDOWN	0.00	0.00	0.00	0.00	0.00	0.00
Admin Pond Outfall - Weir: 3	DRAWDOWN	0.00	0.00	0.00	0.00	0.00	0.00

Link Flow: Admin Pond Outfall [DRAWDOWN]



Link Downstream Velocity: Admin Pond Outfall [DRAWDOWN]



Drop Structure Link: West Pond Outfall		Upstream Pipe		Downstream Pipe	
Scenario:	DRAWDOWN	Invert:	130.50 ft	Invert:	130.00 ft
From Node:	West Pond	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Lake Parker	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	0	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0120	Manning's N:	0.0120
Length:	112.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0120	Manning's N:	0.0120
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component			
Weir:	1	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	**Top Clip**	
Geometry Type:	Circular	Default:	0.00 ft
Invert:	130.50 ft	Op Table:	
Control Elevation:	130.50 ft	Ref Node:	
Max Depth:	0.17 ft	**Discharge Coefficients**	
		Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component			
Weir:	2	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Horizontal	**Top Clip**	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	135.00 ft	Op Table:	
Control Elevation:	135.00 ft	Ref Node:	
Max Depth:	2.00 ft	**Discharge Coefficients**	
Max Width:	3.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component			
Weir:	3	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	**Top Clip**	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	132.50 ft	Op Table:	
Control Elevation:	132.50 ft	Ref Node:	
Max Depth:	0.50 ft	**Discharge Coefficients**	
Max Width:	3.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

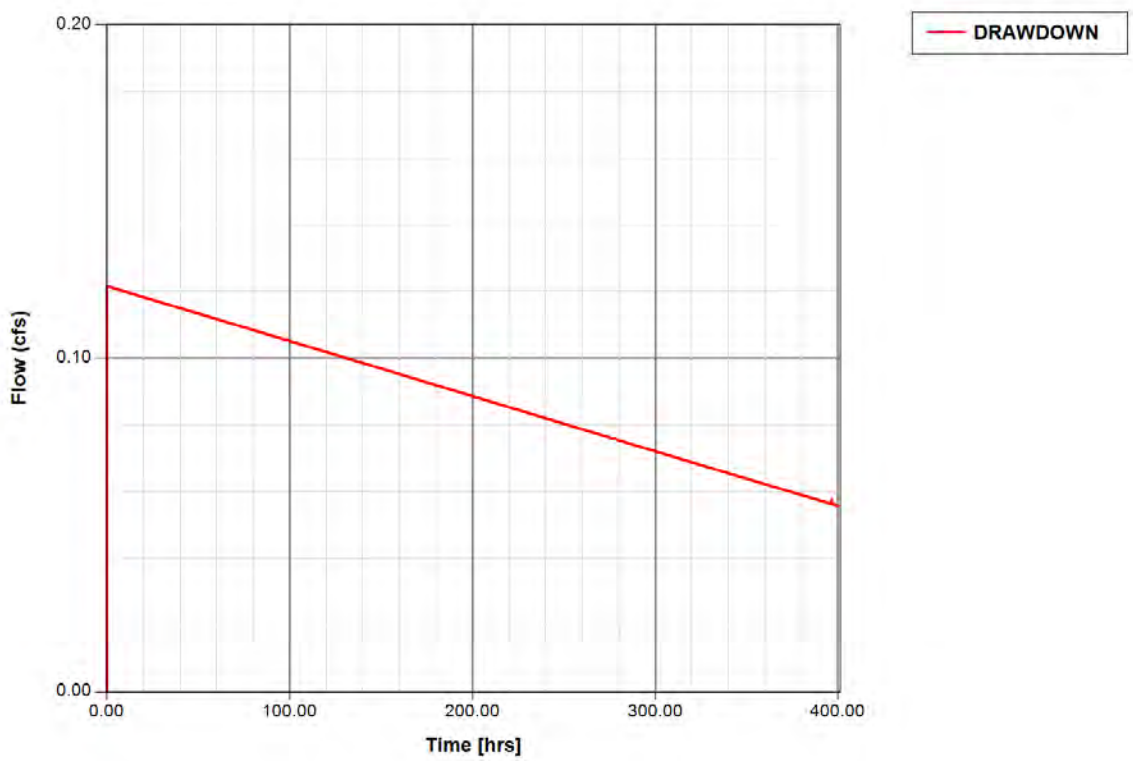
Weir Comment:

Drop Structure Comment:

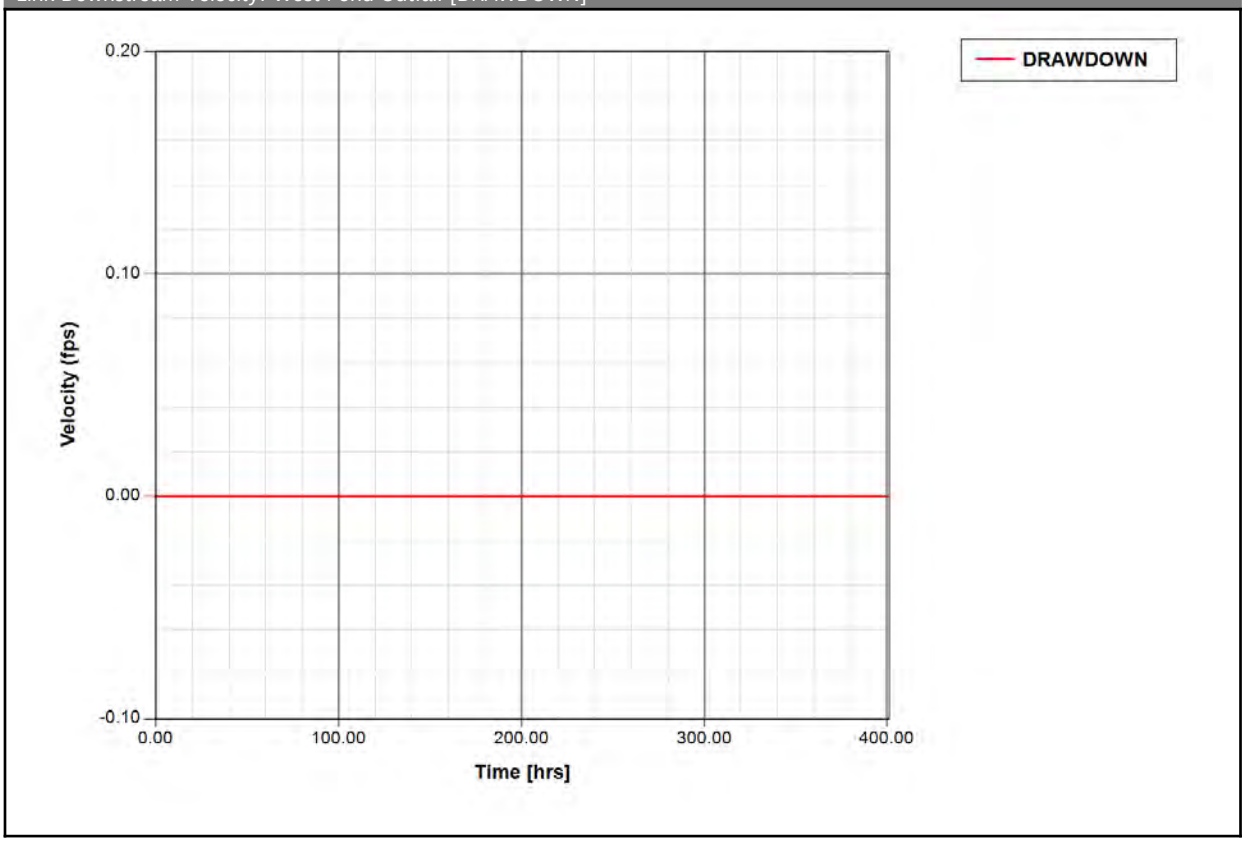
Link Min/Max Conditions [DRAWDOWN]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
West Pond Outfall - Pipe	DRAWDOWN	0.12	0.00	0.12	0.00	0.00	0.00
West Pond Outfall - Weir: 1	DRAWDOWN	0.12	0.00	0.00	0.00	0.00	0.00
West Pond Outfall - Weir: 2	DRAWDOWN	0.00	0.00	0.00	0.00	0.00	0.00
West Pond Outfall - Weir: 3	DRAWDOWN	0.00	0.00	0.00	0.00	0.00	0.00

Link Flow: West Pond Outfall [DRAWDOWN]



Link Downstream Velocity: West Pond Outfall [DRAWDOWN]



Simulation: DRAWDOWN

Scenario:	DRAWDOWN
Run Date/Time:	1/2/2024 10:45:30 AM
Program Version:	ICPR4 4.07.01

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	400.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder: Sim1
Reference ET Folder:
Unit Hydrograph Folder: Sim1

Lookup Tables

Boundary Stage Set: DRAWDOWN
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic
Dflt Damping (2D): 0.0050 ft
Min Node Srf Area (2D): 100 ft2

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: No Rainfall
OF Region Rain Opt: No Rainfall
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2

Energy Switch (2D): Energy

Energy Switch (1D): Energy

Comment:

ATTACHMENT 6
Post Development ICPR Report

Simple Basin: BSA Landfill

Scenario:	Sc 1 no Slotted Pipe
Node:	Fish Lake
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	218.0000 min
Max Allowable Q:	99999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	49.2000 ac
Curve Number:	90.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
BSA Landfill	100 yr - 24 hr	49.07	14.5667	10.70	9.11	49.2000	90.0	0.00	0.00
BSA Landfill	25 yr- 24 hr	32.92	14.5833	7.50	6.06	49.2000	90.0	0.00	0.00

Simple Basin: Basin 1

Scenario:	Sc 1 no Slotted Pipe
Node:	Zero Discharge Pond
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	99999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	11.9000 ac
Curve Number:	92.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 1	100 yr - 24 hr	74.56	12.0500	10.70	9.71	11.9000	92.0	0.00	0.00
Basin 1	25 yr- 24 hr	51.26	12.0500	7.50	6.54	11.9000	92.0	0.00	0.00

Simple Basin: Basin 2

Scenario:	Sc 1 no Slotted Pipe
Node:	Fish Lake
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	99999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	68.0000 ac
Curve Number:	96.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 2	100 yr - 24 hr	433.32	12.0500	10.70	10.20	68.0000	96.0	0.00	0.00
Basin 2	25 yr- 24 hr	302.05	12.0500	7.50	7.01	68.0000	96.0	0.00	0.00

Simple Basin: Basin 3A

Scenario:	Sc 1 no Slotted Pipe
Node:	NZA-0340
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	99999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	6.6000 ac
Curve Number:	98.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3A	100 yr - 24 hr	42.24	12.0500	10.70	10.45	6.6000	98.0	0.00	0.00
Basin 3A	25 yr- 24 hr	29.57	12.0500	7.50	7.25	6.6000	98.0	0.00	0.00

Simple Basin: Basin 3A-1

Scenario:	Sc 1 no Slotted Pipe
Node:	NZA-0340
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	99999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	2.0000 ac
Curve Number:	98.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3A-1	100 yr - 24 hr	12.80	12.0500	10.70	10.45	2.0000	98.0	0.00	0.00
Basin 3A-1	25 yr- 24 hr	8.96	12.0500	7.50	7.25	2.0000	98.0	0.00	0.00

Simple Basin: Basin 3B

Scenario: Sc 1 no Slotted Pipe
Node: NZA-0360
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.0000 ac
Curve Number: 98.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3B	100 yr - 24 hr	25.60	12.0500	10.70	10.45	4.0000	98.0	0.00	0.00
Basin 3B	25 yr- 24 hr	17.92	12.0500	7.50	7.25	4.0000	98.0	0.00	0.00

Simple Basin: Basin 3B-1

Scenario: Sc 1 no Slotted Pipe
Node: NZA-0030
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number

Time of Concentration: 10.0000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.1000 ac
Curve Number: 98.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3B-1	100 yr - 24 hr	7.04	12.0500	10.70	10.45	1.1000	98.0	0.00	0.00
Basin 3B-1	25 yr- 24 hr	4.93	12.0500	7.50	7.25	1.1000	98.0	0.00	0.00

Simple Basin: Basin 3C

Scenario: Sc 1 no Slotted Pipe
Node: NZA-0350
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 35.8000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 11.6000 ac
Curve Number: 98.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3C	100 yr - 24 hr	41.23	12.3333	10.70	10.46	11.6000	98.0	0.00	0.00
Basin 3C	25 yr- 24 hr	28.84	12.3333	7.50	7.26	11.6000	98.0	0.00	0.00

Simple Basin: Basin 3C-1

Scenario: Sc 1 no Slotted Pipe
Node: NZA-0350
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 37.6000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 0.9000 ac
Curve Number: 98.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3C-1	100 yr - 24 hr	3.11	12.3667	10.70	10.46	0.9000	98.0	0.00	0.00
Basin 3C-1	25 yr- 24 hr	2.18	12.3667	7.50	7.26	0.9000	98.0	0.00	0.00

Simple Basin: Basin 3C-2

Scenario: Sc 1 no Slotted Pipe
Node: West Pond
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number

Time of Concentration: 10.0000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.7000 ac
Curve Number: 98.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3C-2	100 yr - 24 hr	30.08	12.0500	10.70	10.45	4.7000	98.0	0.00	0.00
Basin 3C-2	25 yr- 24 hr	21.05	12.0500	7.50	7.25	4.7000	98.0	0.00	0.00

Simple Basin: Basin 3D

Scenario: Sc 1 no Slotted Pipe
Node: Lake Parker
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.1000 ac
Curve Number: 98.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 3D	100 yr - 24 hr	7.04	12.0500	10.70	10.45	1.1000	98.0	0.00	0.00
Basin 3D	25 yr- 24 hr	4.93	12.0500	7.50	7.25	1.1000	98.0	0.00	0.00

Simple Basin: Basin 4

Scenario:	Sc 1 no Slotted Pipe
Node:	To WWTP
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	99999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	13.7000 ac
Curve Number:	94.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Basin 4	100 yr - 24 hr	86.68	12.0500	10.70	9.96	13.7000	94.0	0.00	0.00
Basin 4	25 yr- 24 hr	60.05	12.0500	7.50	6.78	13.7000	94.0	0.00	0.00

Simple Basin: Half Coal Yard

Scenario:	Sc 1 no Slotted Pipe
Node:	NZA-0190
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number

Time of Concentration: 10.0000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 6.8000 ac
Curve Number: 86.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Half Coal Yard	100 yr - 24 hr	40.79	12.0500	10.70	8.96	6.8000	86.0	0.00	0.00
Half Coal Yard	25 yr- 24 hr	27.19	12.0500	7.50	5.84	6.8000	86.0	0.00	0.00

Simple Basin: Half Coal Yard 2

Scenario: Sc 1 no Slotted Pipe
Node: NZA-0200
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 99999.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 6.7000 ac
Curve Number: 86.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name: Flmod

Comment:

Simple Basin Runoff Summary [Sc 1 no Slotted Pipe]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Half Coal Yard 2	100 yr - 24 hr	40.19	12.0500	10.70	8.96	6.7000	86.0	0.00	0.00
Half Coal Yard 2	25 yr- 24 hr	26.79	12.0500	7.50	5.84	6.7000	86.0	0.00	0.00

Node: Admin Pond

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 130.50 ft
Warning Stage: 135.00 ft

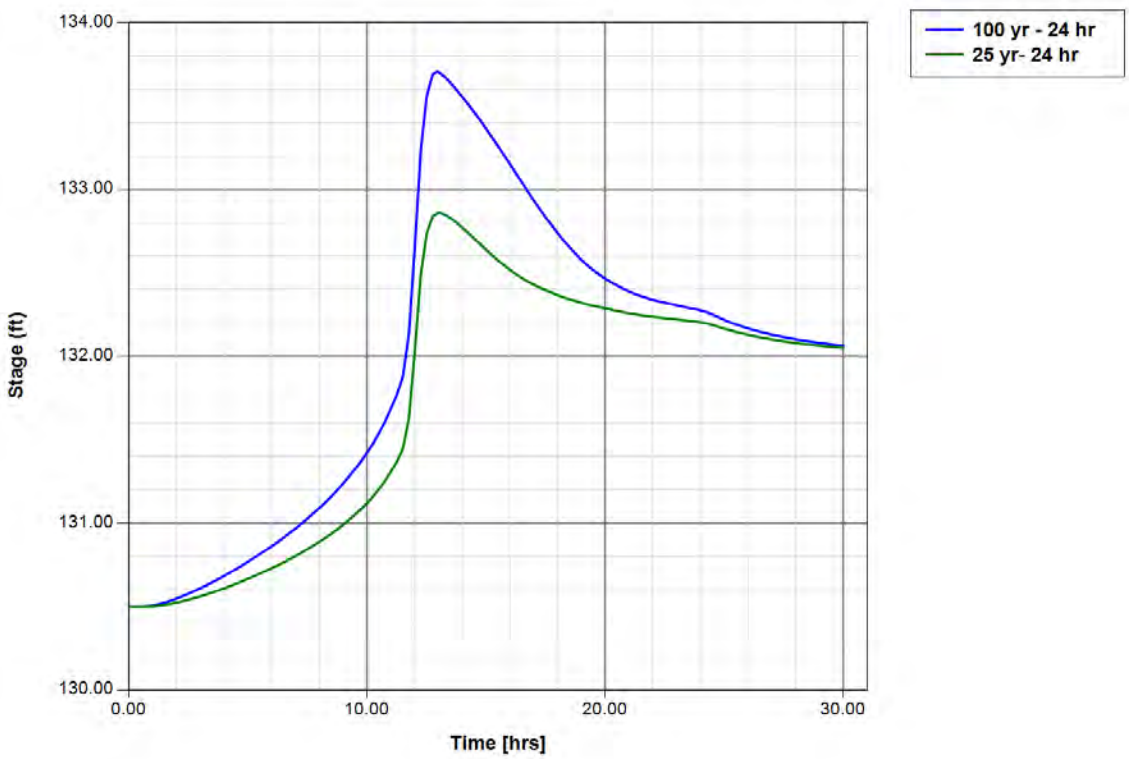
Stage [ft]	Area [ac]	Area [ft2]
128.00	0.6770	29490
129.00	0.7440	32409
130.00	0.8130	35414
131.00	1.3660	59503
132.00	1.4610	63641
133.00	1.5580	67866
134.00	1.6570	72179
127.00	0.6140	26746
130.50	1.3200	57499
135.00	1.7580	76578

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Admin Pond	100 yr - 24 hr	135.00	133.71	0.0008	55.03	9.32	70913
Admin Pond	25 yr- 24 hr	135.00	132.86	0.0007	38.51	5.73	67279

Stage [Node: Admin Pond]



Node: Fish Lake

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 131.60 ft
Warning Stage: 134.00 ft

Stage [ft]	Area [ac]	Area [ft2]
131.60	44.1200	1921867
132.00	45.7600	1993306
133.00	50.5400	2201522
134.00	54.0000	2352240

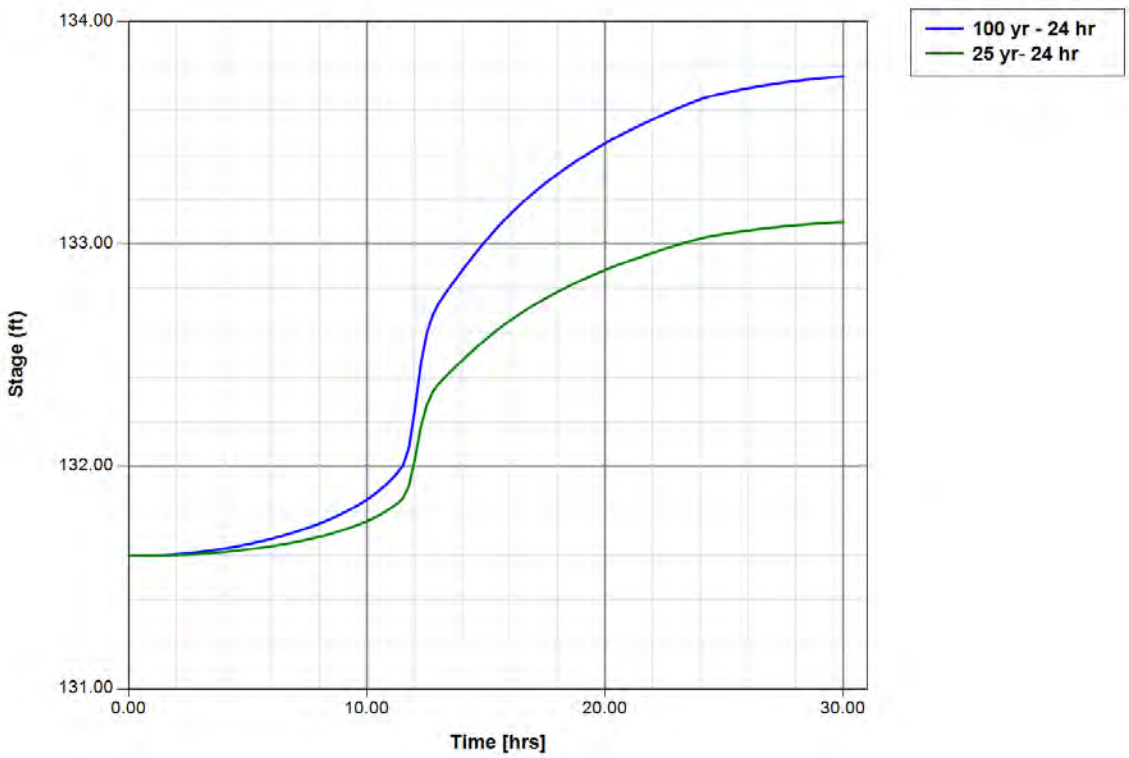
Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning	Max Stage	Min/Max	Max Total	Max Total	Max Surface

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Fish Lake	100 yr - 24 hr	134.00	133.75	0.0003	523.45	0.00	2315610
Fish Lake	25 yr- 24 hr	134.00	133.10	0.0002	360.56	0.00	2217376

Stage [Node: Fish Lake]



Node: Lake Parker

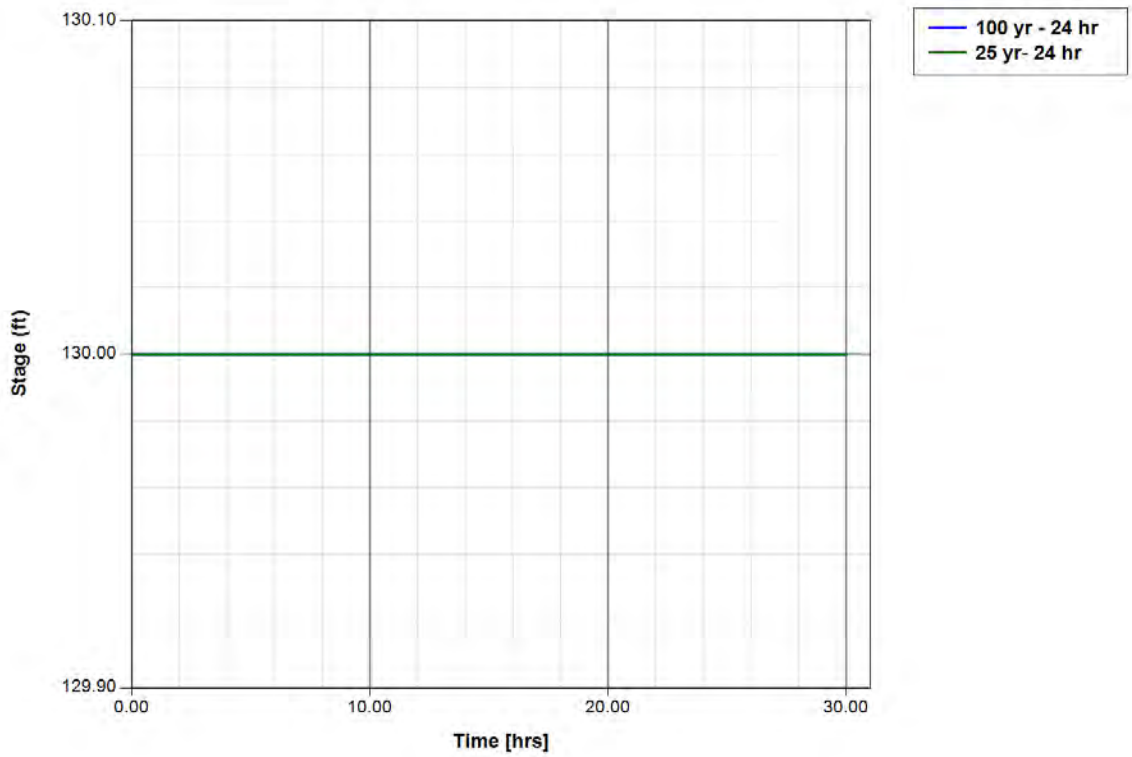
Scenario: Sc 1 no Slotted Pipe
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 130.00 ft
Warning Stage: 134.00 ft
Boundary Stage:

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Lake Parker	100 yr - 24 hr	134.00	130.00	0.0000	18.08	0.00	0
Lake Parker	25 yr- 24 hr	134.00	130.00	0.0000	12.25	0.00	0

Stage [Node: Lake Parker]



Node: NZA-0030

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 127.40 ft
Warning Stage: 134.00 ft

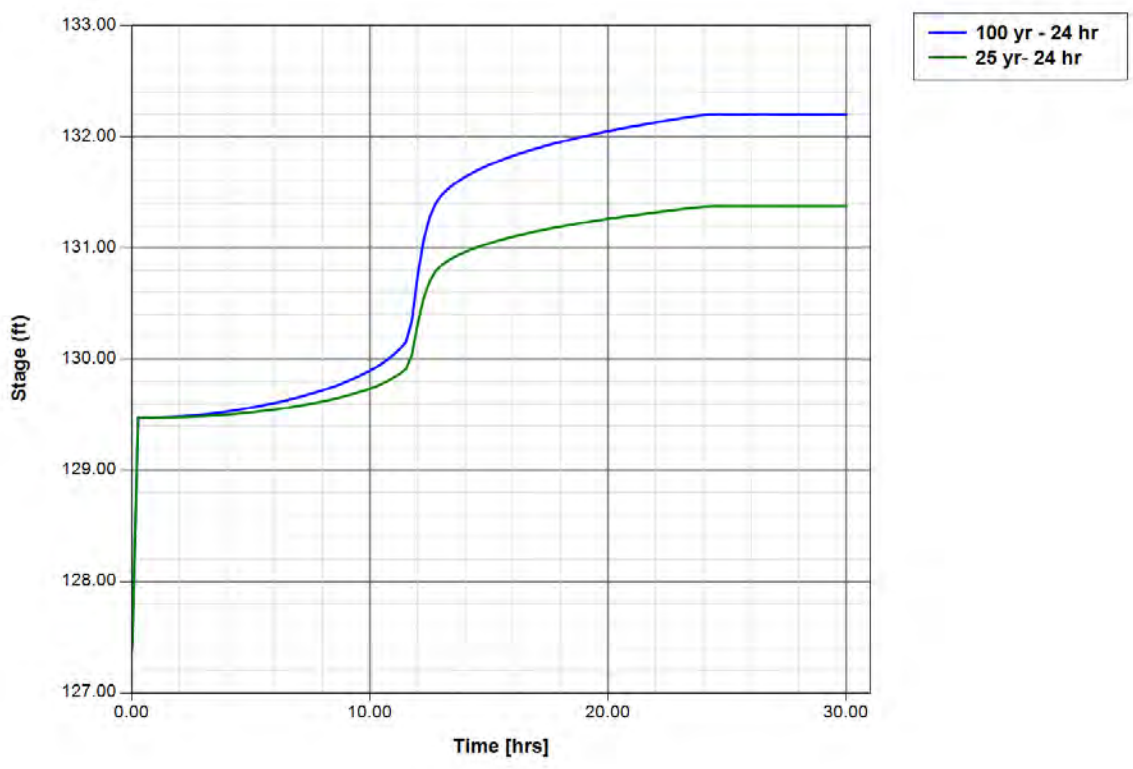
Stage [ft]	Area [ac]	Area [ft2]
127.40	0.0003	13
134.00	0.0003	13

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0030	100 yr - 24 hr	134.00	132.20	0.0039	43.28	31.37	1639
NZA-0030	25 yr- 24 hr	134.00	131.37	0.0039	43.28	21.90	1639

Stage [Node: NZA-0030]



Node: NZA-0190

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs

Initial Stage: 134.50 ft
Warning Stage: 137.00 ft

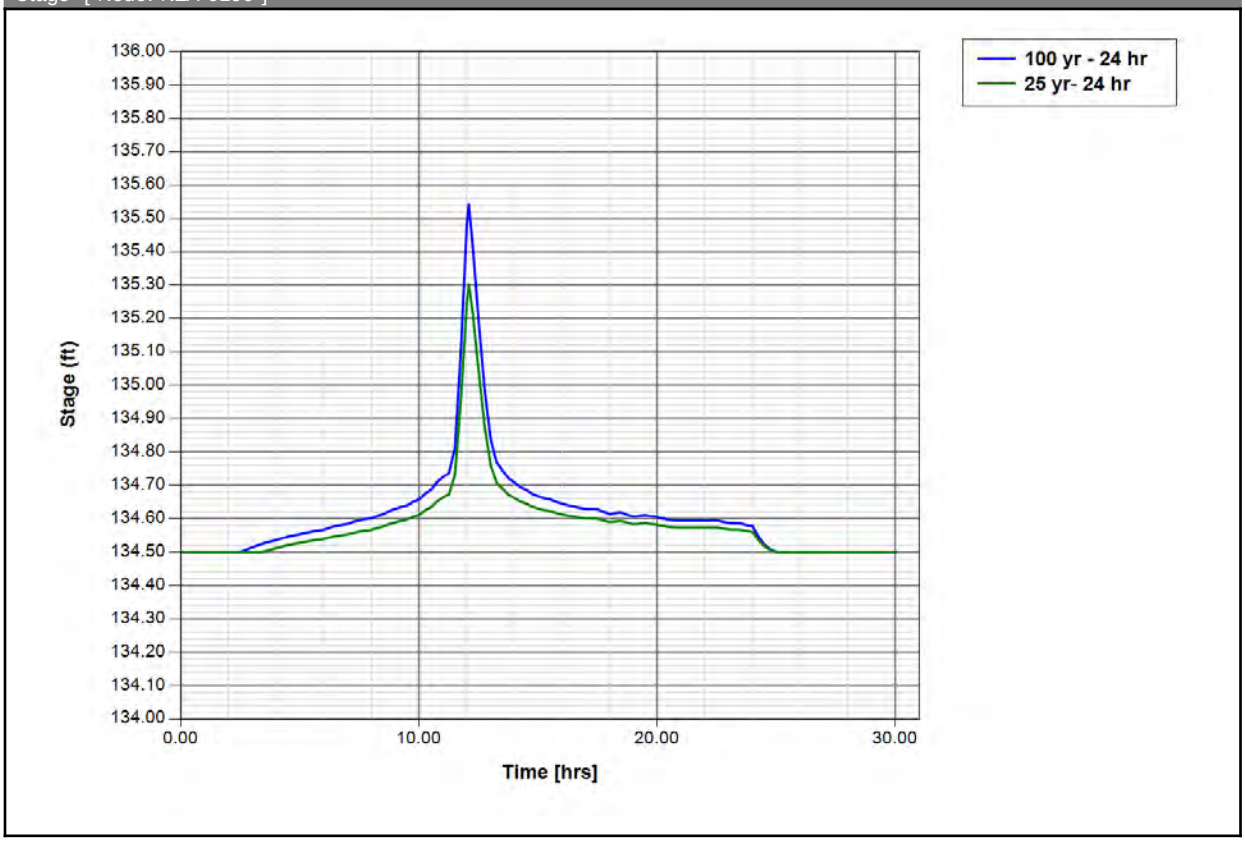
Stage [ft]	Area [ac]	Area [ft2]
134.50	0.0000	0
135.00	0.2200	9583

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0190	100 yr - 24 hr	137.00	135.54	0.0010	40.79	39.66	9922
NZA-0190	25 yr- 24 hr	137.00	135.30	0.0010	27.19	26.16	9905

Stage [Node: NZA-0190]



Node: NZA-0200

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 134.50 ft
Warning Stage: 137.00 ft

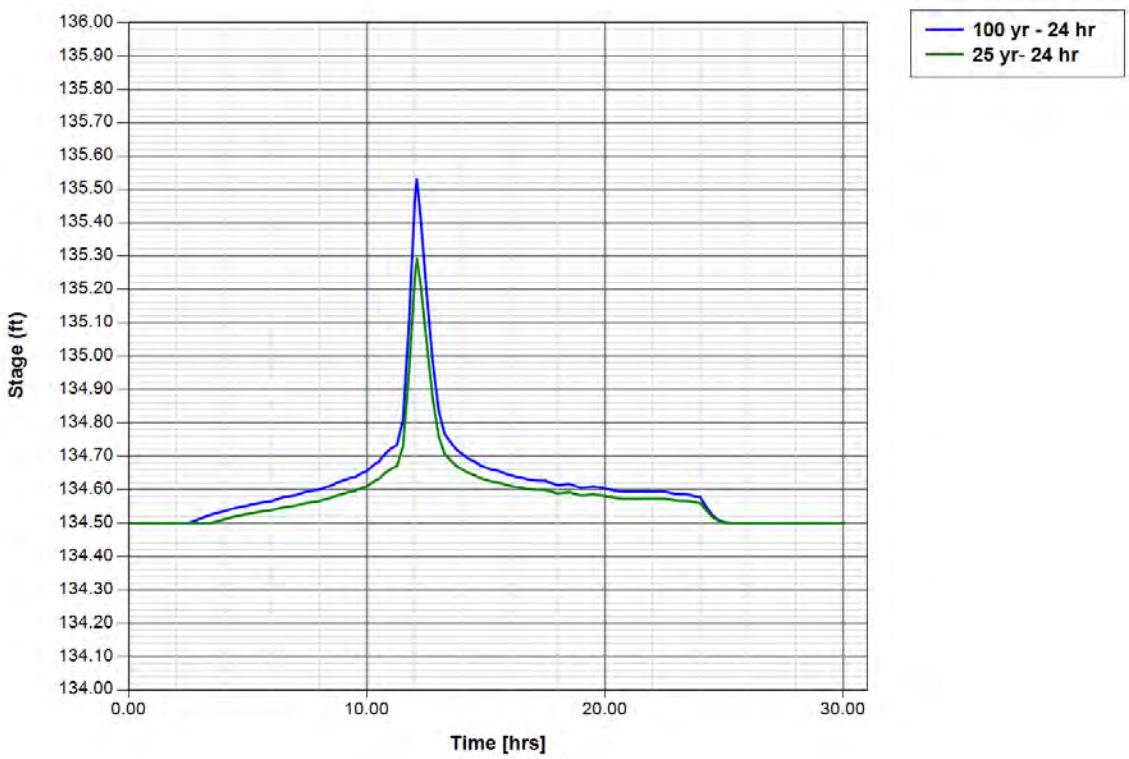
Stage [ft]	Area [ac]	Area [ft2]
134.50	0.0000	0
135.00	0.2200	9583

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0200	100 yr - 24 hr	137.00	135.53	0.0010	40.19	38.95	10540
NZA-0200	25 yr- 24 hr	137.00	135.29	0.0009	26.79	25.67	10489

Stage [Node: NZA-0200]



Node: NZA-0340

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 136.00 ft
Warning Stage: 137.00 ft

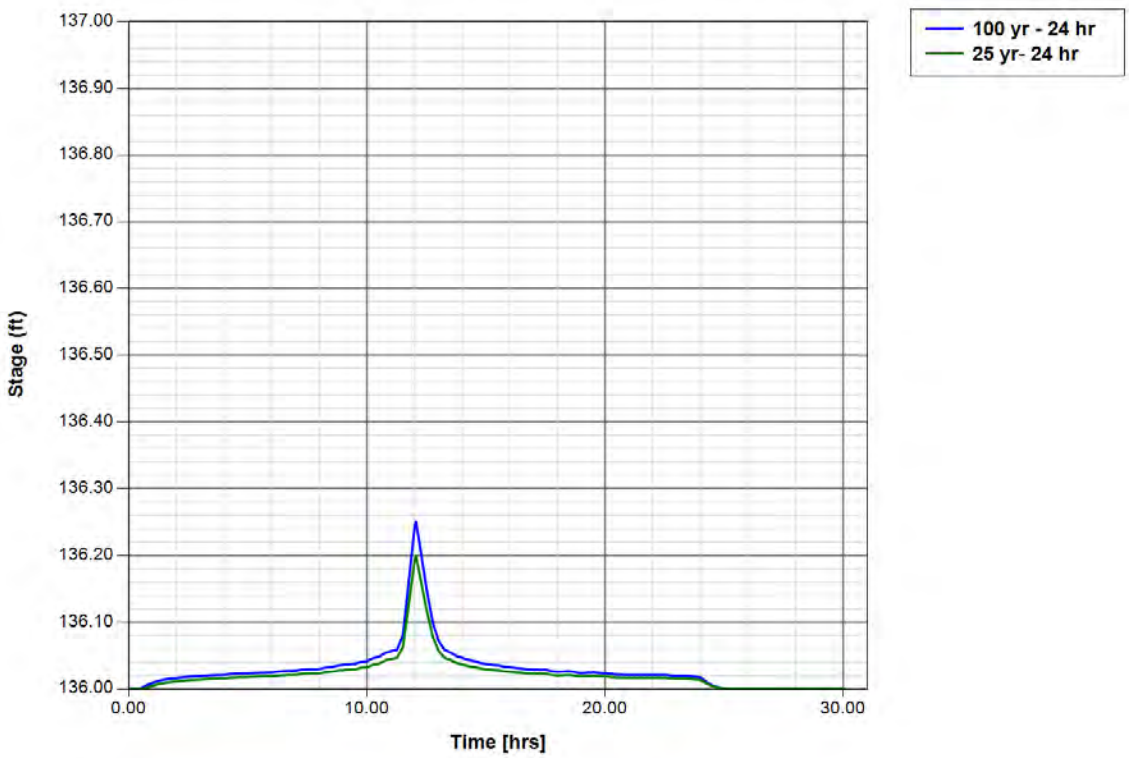
Stage [ft]	Area [ac]	Area [ft2]
137.00	0.1780	7754
136.00	0.1510	6578

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0340	100 yr - 24 hr	137.00	136.25	0.0004	55.05	55.03	6872
NZA-0340	25 yr- 24 hr	137.00	136.20	0.0003	38.53	38.51	6811

Stage [Node: NZA-0340]



Node: NZA-0350

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 135.50 ft
Warning Stage: 136.65 ft

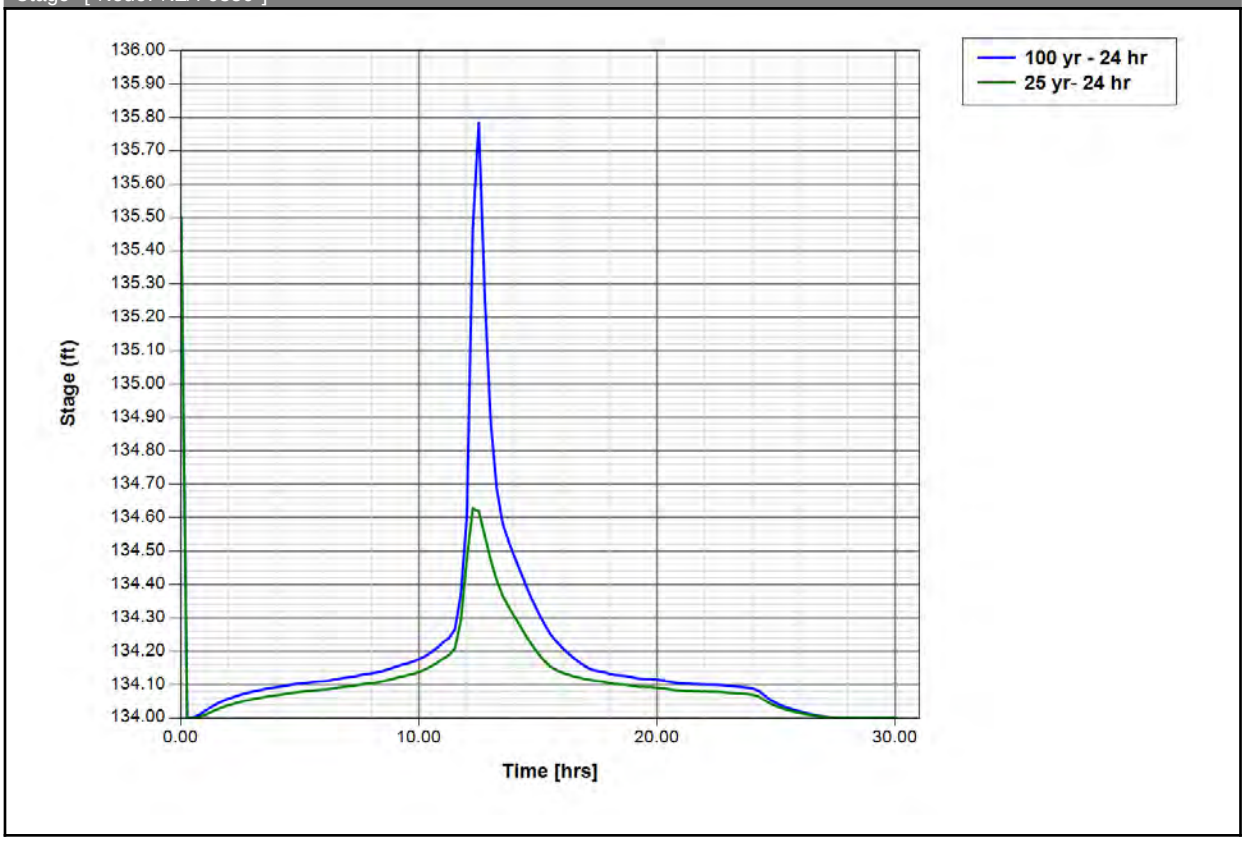
Stage [ft]	Area [ac]	Area [ft2]
135.50	0.0216	941
136.00	0.1530	6665
136.50	0.4320	18818

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0350	100 yr - 24 hr	136.65	135.78	0.1058	44.33	110.71	4179
NZA-0350	25 yr- 24 hr	136.65	135.50	0.1058	31.02	110.71	100

Stage [Node: NZA-0350]



Node: NZA-0360

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs

Initial Stage: 127.30 ft
Warning Stage: 134.00 ft

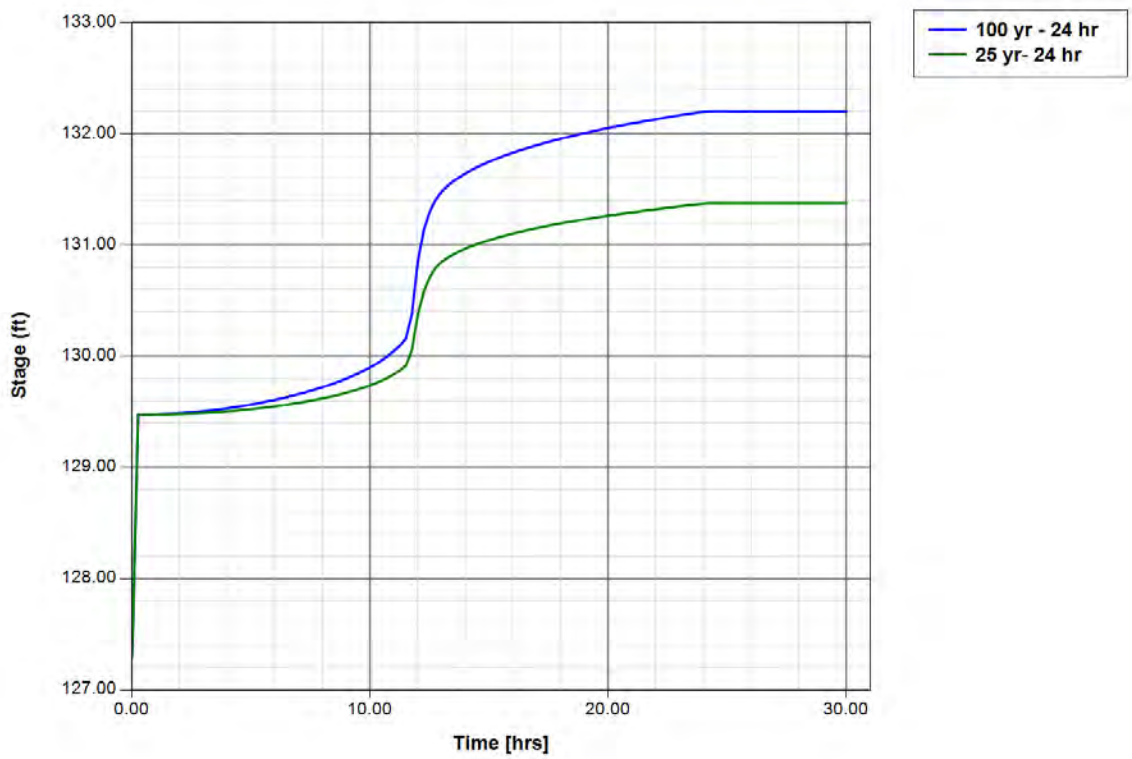
Stage [ft]	Area [ac]	Area [ft2]
127.30	0.0000	0
134.00	0.0740	3223

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NZA-0360	100 yr - 24 hr	134.00	132.20	0.0016	25.60	24.45	2380
NZA-0360	25 yr- 24 hr	134.00	131.37	0.0016	18.42	17.18	2368

Stage [Node: NZA-0360]



Node: To WWTP

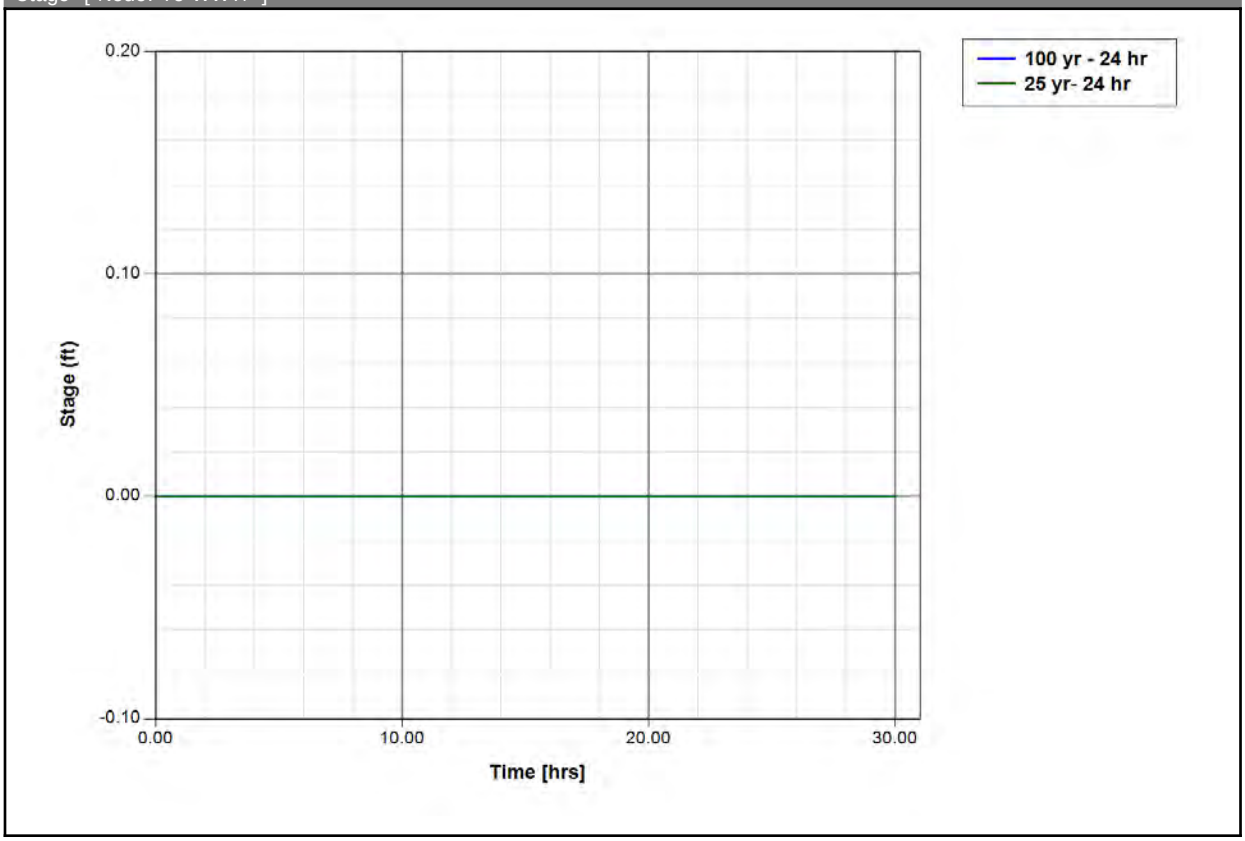
Scenario: Sc 1 no Slotted Pipe
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 0.00 ft
Warning Stage: 0.00 ft
Boundary Stage:

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
To WWTP	100 yr - 24 hr	0.00	0.00	0.0000	86.68	0.00	0
To WWTP	25 yr- 24 hr	0.00	0.00	0.0000	60.05	0.00	0

Stage [Node: To WWTP]



Node: West Pond

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 130.50 ft
Warning Stage: 136.00 ft

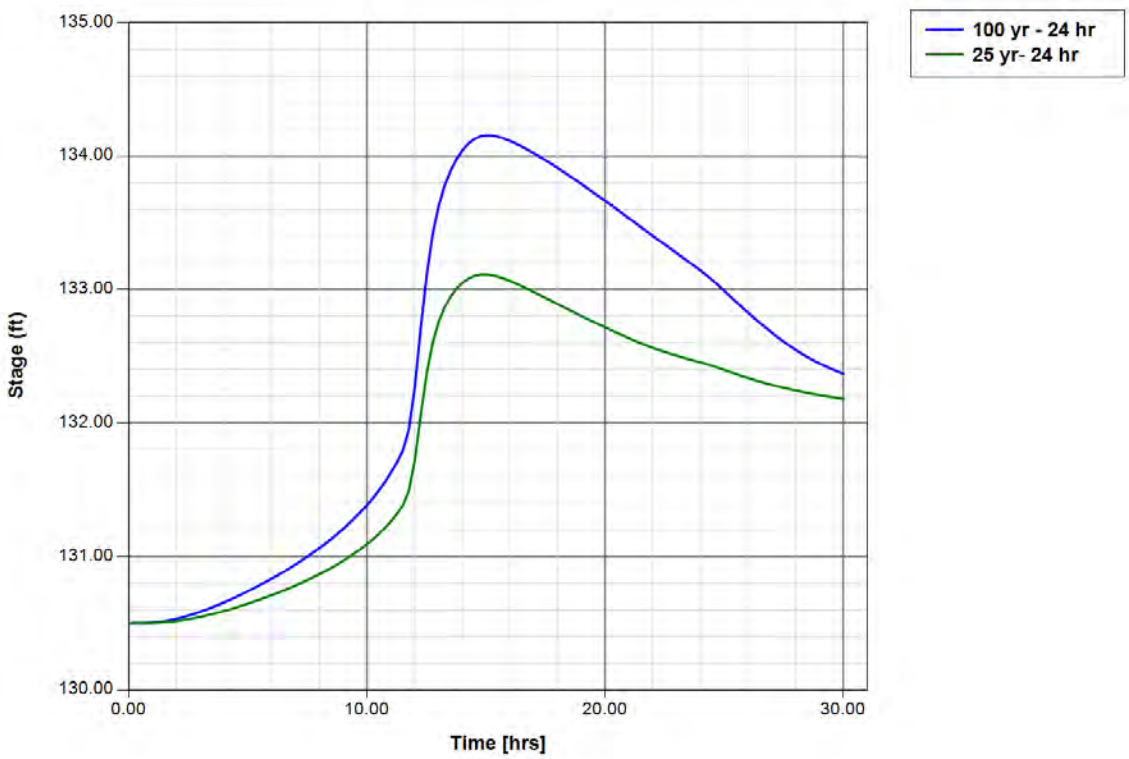
Stage [ft]	Area [ac]	Area [ft2]
128.00	1.3600	59242
129.00	1.4700	64033
130.00	1.5800	68825
131.00	2.5900	112820
132.00	2.7200	118483
133.00	2.8600	124582
134.00	2.9900	130244
135.00	3.1300	136343
136.00	3.2700	142441
127.00	1.2500	54450
130.50	2.5300	110207

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
West Pond	100 yr - 24 hr	136.00	134.16	0.0008	64.97	8.57	131205
West Pond	25 yr- 24 hr	136.00	133.11	0.0005	45.58	6.66	125234

Stage [Node: West Pond]



Node: Zero Discharge Pond

Scenario: Sc 1 no Slotted Pipe
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 129.50 ft
Warning Stage: 134.00 ft

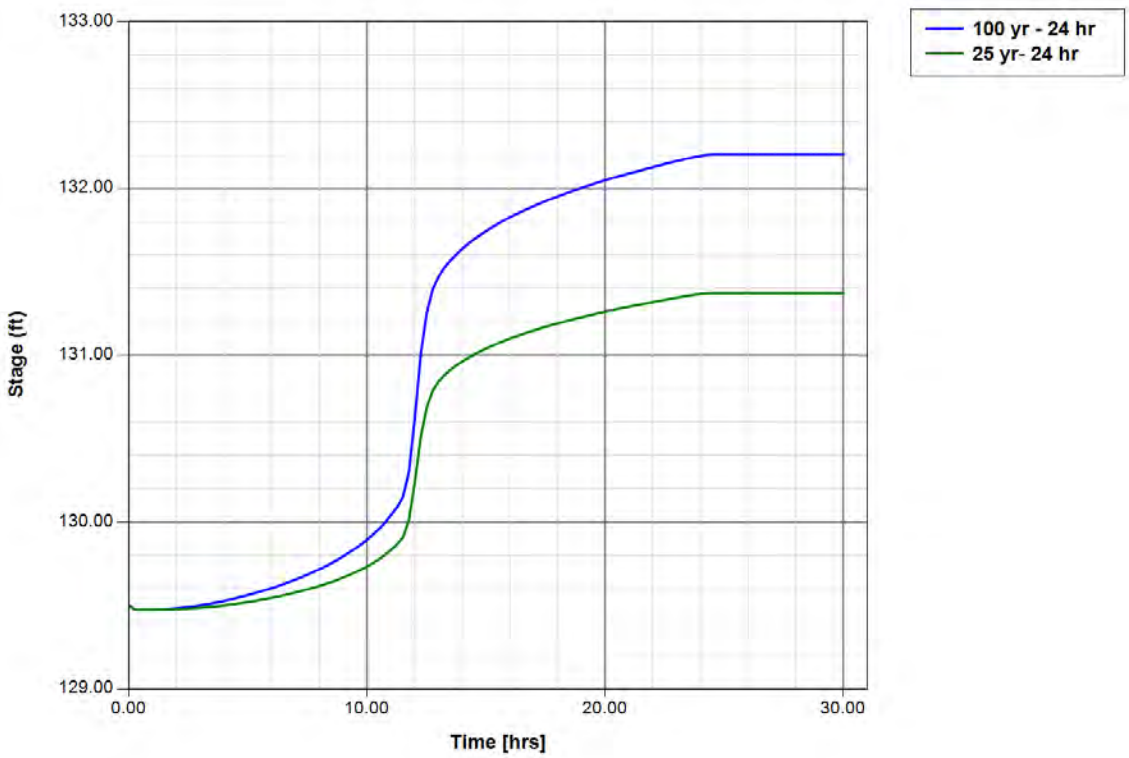
Stage [ft]	Area [ac]	Area [ft2]
128.00	4.2700	186001
129.00	4.5600	198634
130.00	4.8500	211266
131.00	5.1400	223898
132.00	5.4400	236966
133.00	5.7600	250906
134.00	6.0900	265280

Comment:

Node Max Conditions [Sc 1 no Slotted Pipe]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Zero Discharge Pond	100 yr - 24 hr	134.00	132.20	0.0006	105.93	43.28	239800
Zero Discharge Pond	25 yr- 24 hr	134.00	131.37	0.0004	73.16	43.28	228789

Stage [Node: Zero Discharge Pond]



Drop Structure Link: Admin Pond Outfall		Upstream Pipe		Downstream Pipe	
Scenario:	Sc 1 no Slotted Pipe	Invert:	130.50 ft	Invert:	130.28 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	Admin Pond	Geometry: Circular		Geometry: Circular	
To Node:	Lake Parker	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			

Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Solution:	Split	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	72.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component		Bottom Clip	
Weir:	1	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	Top Clip	
Weir Type:	Sharp Crested Vertical	Default:	0.00 ft
Geometry Type:	Circular	Op Table:	
Invert:	130.50 ft	Ref Node:	
Control Elevation:	130.50 ft	Discharge Coefficients	
Max Depth:	0.17 ft	Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component		Bottom Clip	
Weir:	2	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	Top Clip	
Weir Type:	Horizontal	Default:	0.00 ft
Geometry Type:	Rectangular	Op Table:	
Invert:	133.50 ft	Ref Node:	
Control Elevation:	133.50 ft	Discharge Coefficients	
Max Depth:	2.00 ft	Weir Default:	3.200
Max Width:	3.00 ft	Weir Table:	
Fillet:	0.00 ft	Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component		Bottom Clip	
Weir:	3	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft		

Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	132.00 ft
Control Elevation:	132.00 ft
Max Depth:	0.50 ft
Max Width:	3.00 ft
Fillet:	0.00 ft

Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients	
Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

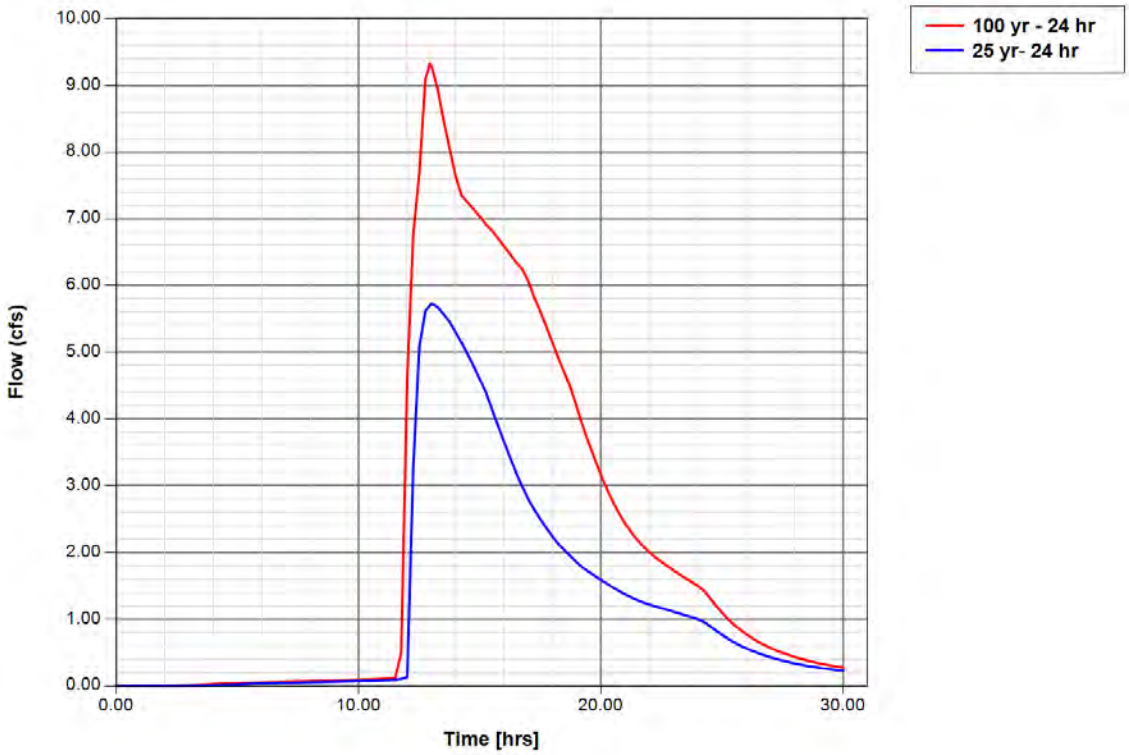
Weir Comment:

Drop Structure Comment:

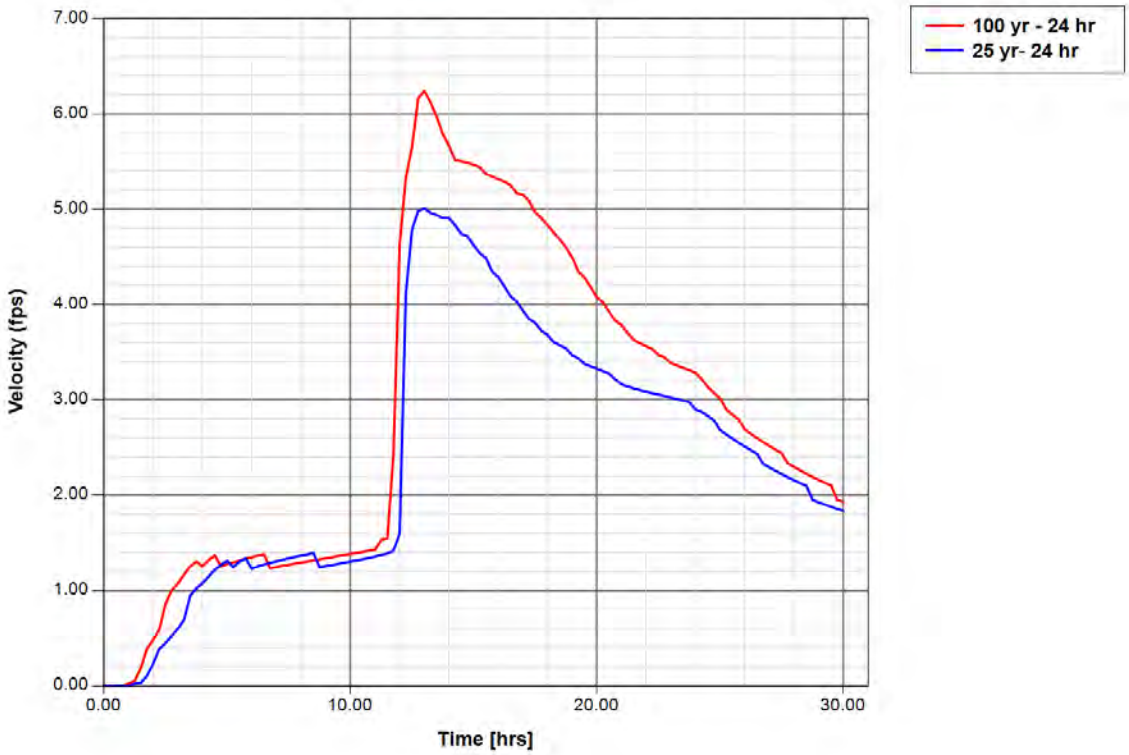
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Admin Pond Outfall - Pipe	100 yr - 24 hr	9.32	0.00	0.03	5.27	6.26	5.76
Admin Pond Outfall - Weir: 1	100 yr - 24 hr	0.12	0.00	0.00	0.00	0.00	0.00
Admin Pond Outfall - Weir: 2	100 yr - 24 hr	3.00	0.00	0.00	1.45	1.45	1.45
Admin Pond Outfall - Weir: 3	100 yr - 24 hr	7.24	0.00	0.00	4.82	4.82	4.82
Admin Pond Outfall - Pipe	25 yr- 24 hr	5.73	0.00	-0.03	3.24	5.03	4.13
Admin Pond Outfall - Weir: 1	25 yr- 24 hr	0.12	0.00	0.00	0.00	0.00	0.00
Admin Pond Outfall - Weir: 2	25 yr- 24 hr	0.00	0.00	0.00	0.00	0.00	0.00
Admin Pond Outfall - Weir: 3	25 yr- 24 hr	5.64	0.00	0.00	3.76	3.76	3.76

Link Flow: Admin Pond Outfall [Sc 1 no Slotted Pipe]



Link Downstream Velocity: Admin Pond Outfall [Sc 1 no Slotted Pipe]



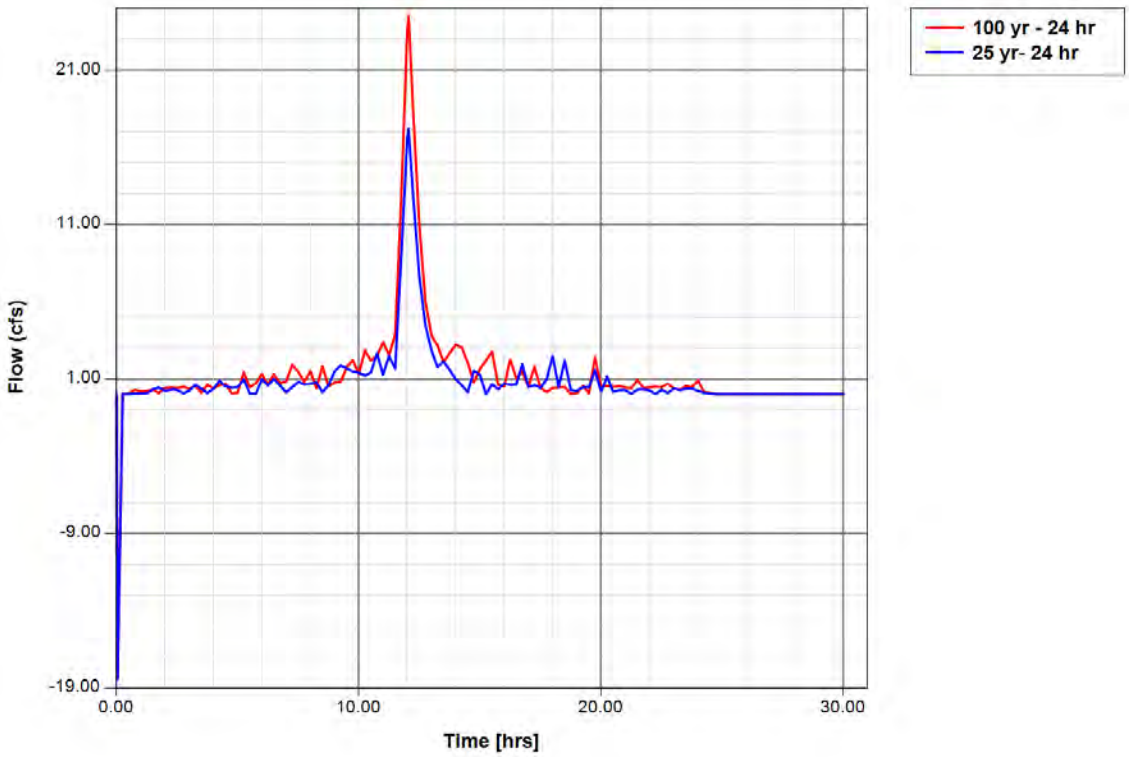
Pipe Link: Existing Pipe		Upstream		Downstream	
Scenario:	Sc 1 no Slotted Pipe	Invert:	127.40 ft	Invert:	126.36 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	NZA-0360	Geometry: Circular		Geometry: Circular	
To Node:	NZA-0030	Max Depth:	4.50 ft	Max Depth:	4.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	384.00 ft	Ref Node:		Ref Node:	
FHWA Code:	30	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.50	Top Clip			
Exit Loss Coef:	1.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 dec	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

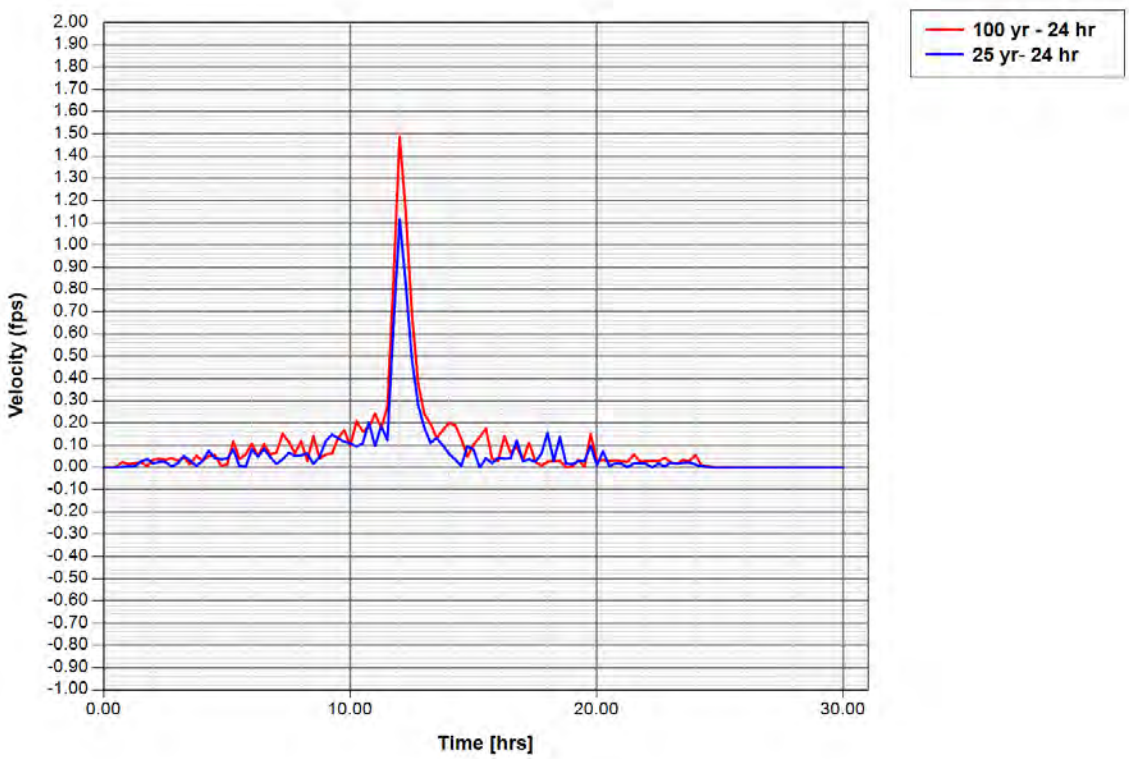
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Existing Pipe	100 yr - 24 hr	24.45	-18.42	-3.94	1.82	-5.18	-3.32
Existing Pipe	25 yr- 24 hr	17.18	-18.42	-3.59	-1.58	-5.18	-3.32

Link Flow: Existing Pipe [Sc 1 no Slotted Pipe]



Link Downstream Velocity: Existing Pipe [Sc 1 no Slotted Pipe]



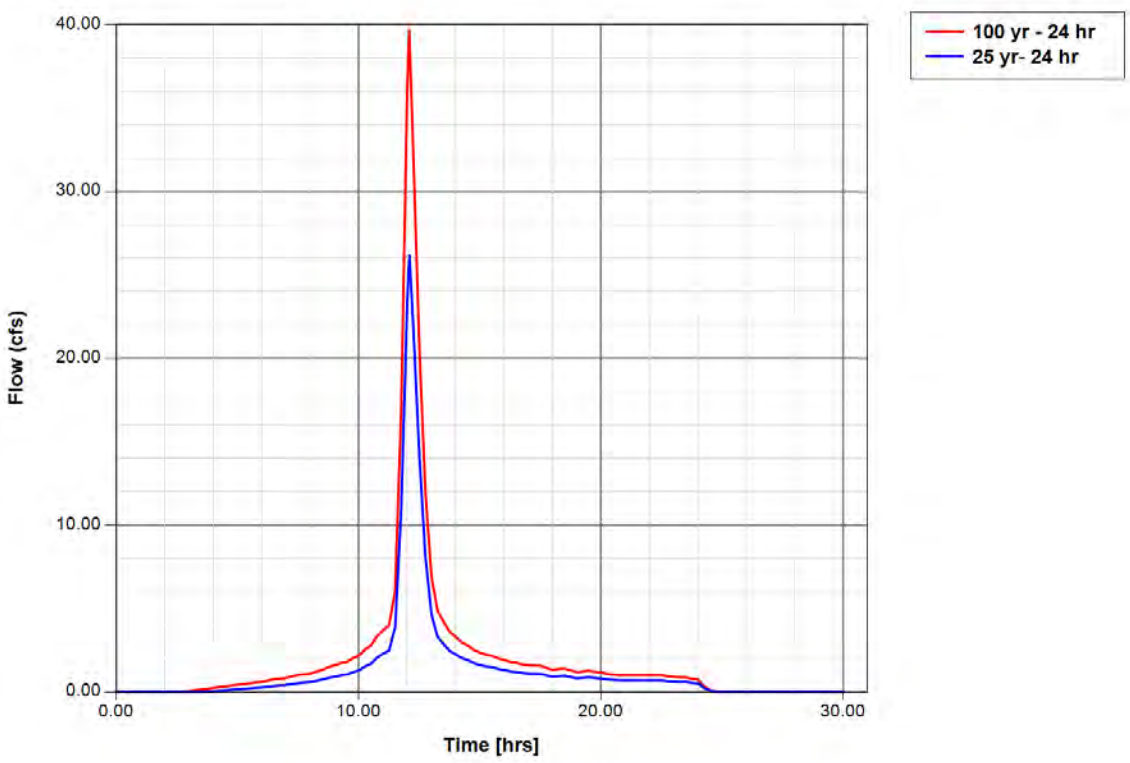
Channel Link: North Flume		Upstream		Downstream	
Scenario:	Sc 1 no Slotted Pipe	Invert:	134.50 ft	Invert:	131.00 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	NZA-0190	Geometry: Trapezoidal		Geometry: Trapezoidal	
To Node:	Fish Lake	Max Depth:	1.00 ft	Max Depth:	1.00 ft
Link Count:	1	Extrapolation:	Normal	Extrapolation:	Normal
Flow Direction:	Both	Bottom Width:	6.00 ft	Bottom Width:	6.00 ft
Damping:	0.0000 ft	Left Slope:	1.000 (h:v)	Left Slope:	1.000 (h:v)
Length:	84.50 ft	Right Slope:	1.000 (h:v)	Right Slope:	1.000 (h:v)
Contraction Coef:	0.00	Bottom Clip			
Expansion Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec	Top Clip			
Energy Switch:	Energy	Default:	0.00 ft	Default:	0.00 ft
		Op Table:		Op Table:	
		Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

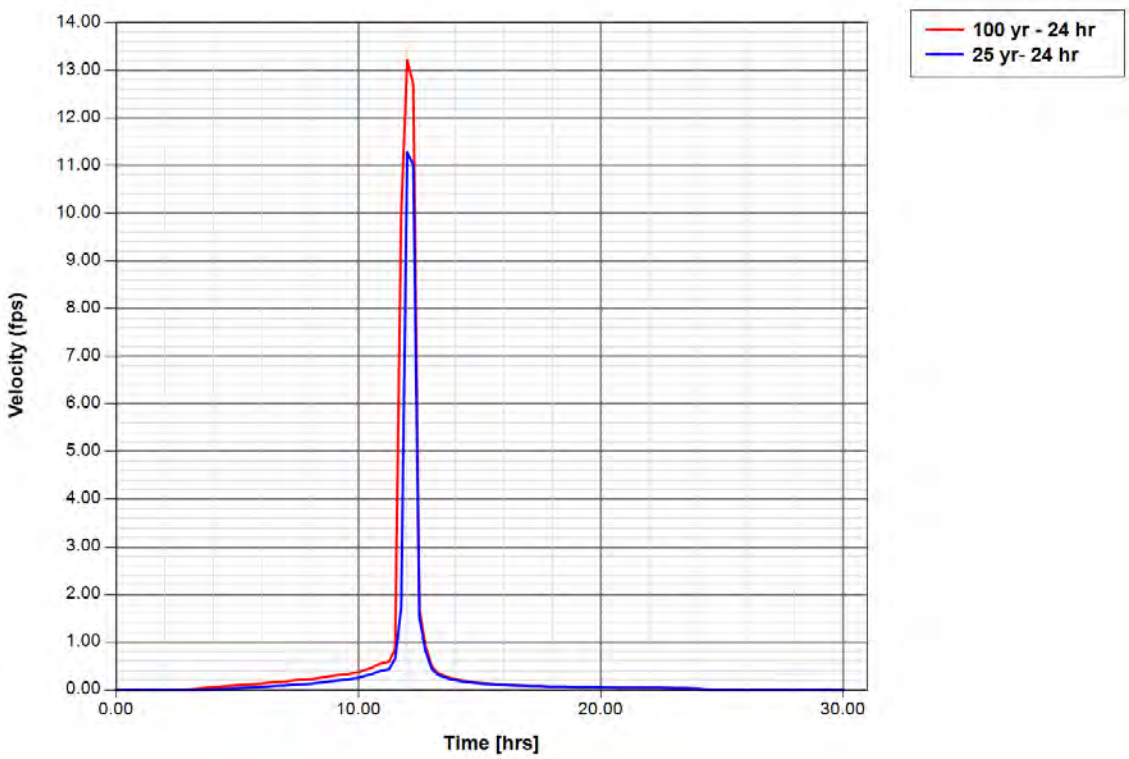
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
North Flume	100 yr - 24 hr	39.66	0.00	0.05	5.40	13.66	9.53
North Flume	25 yr- 24 hr	26.16	0.00	0.04	4.80	11.75	8.28

Link Flow: North Flume [Sc 1 no Slotted Pipe]



Link Downstream Velocity: North Flume [Sc 1 no Slotted Pipe]



Drop Structure Link: Proposed Pipes		Upstream Pipe		Downstream Pipe	
Scenario:	Sc 1 no Slotted Pipe	Invert:	131.00 ft	Invert:	130.00 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	NZA-0350	Geometry: Circular		Geometry: Circular	
To Node:	West Pond	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Solution:	Split	Op Table:		Op Table:	
Pipe Count:	2	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	190.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component	
Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Horizontal
Geometry Type:	Rectangular
Invert:	134.00 ft
Control Elevation:	134.00 ft
Max Depth:	3.00 ft
Max Width:	6.50 ft
Fillet:	0.00 ft

Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients	
Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

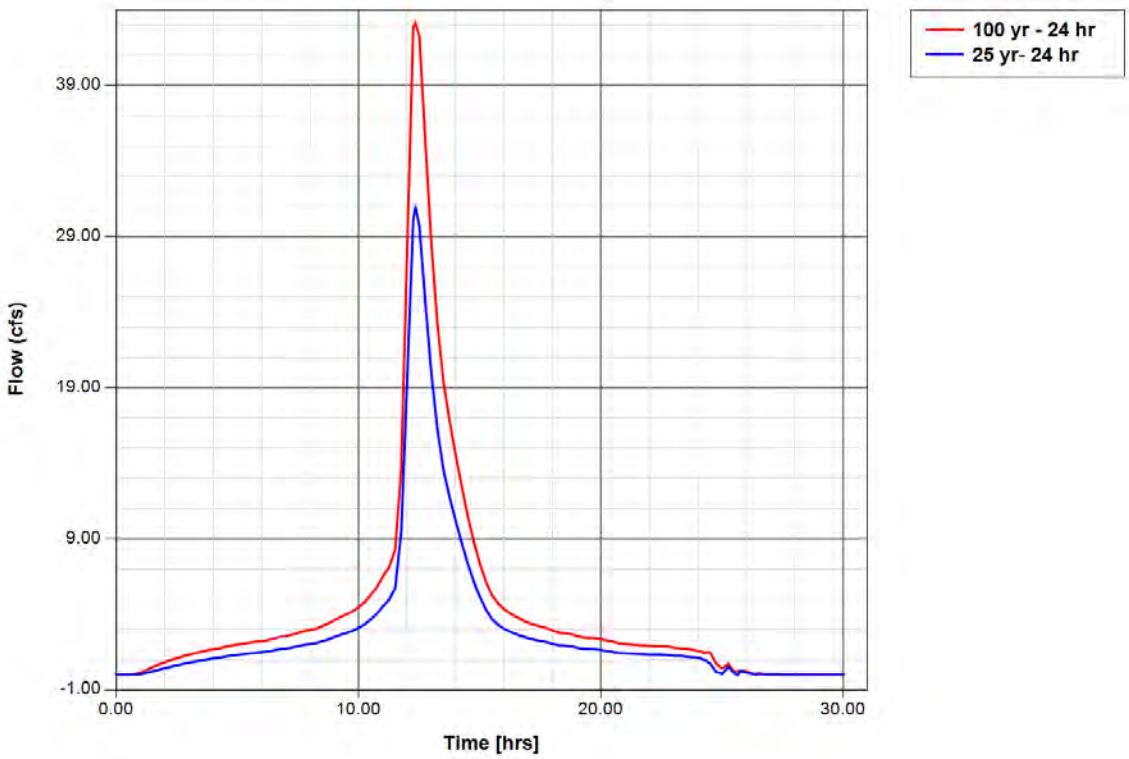
Weir Comment:

Drop Structure Comment:

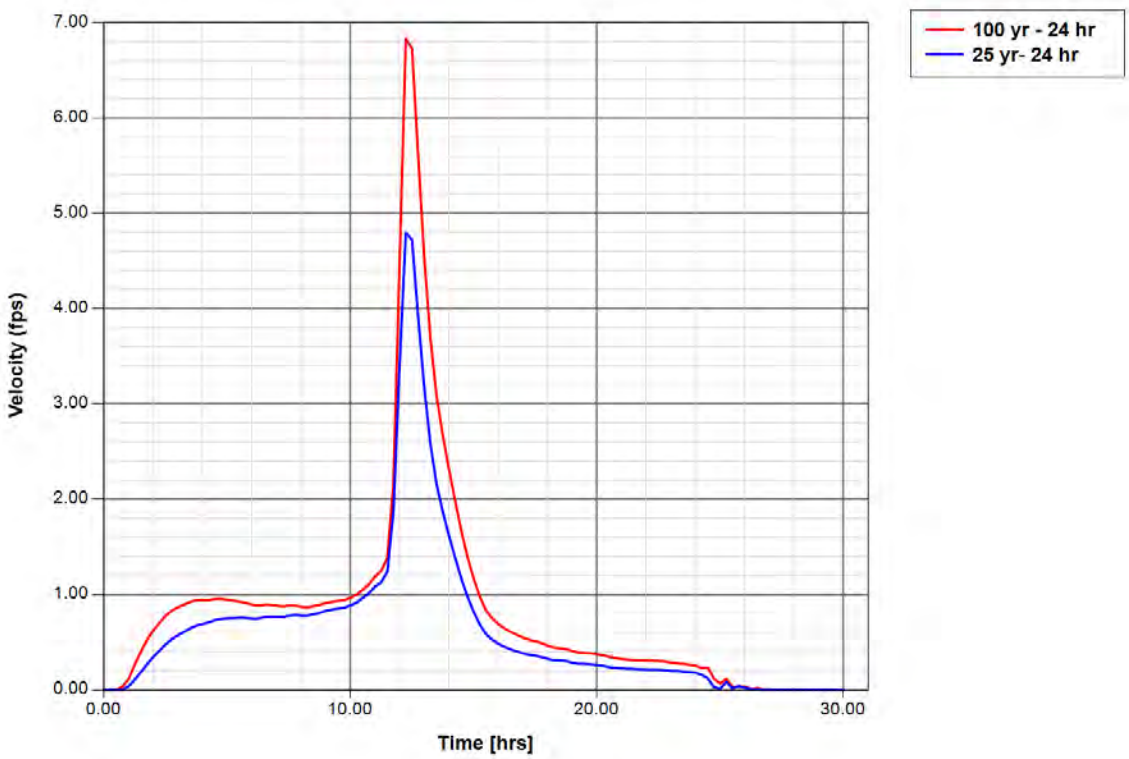
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Proposed Pipes - Pipe	100 yr - 24 hr	43.14	-0.03	-1.21	6.87	6.87	6.87
Proposed Pipes - Weir: 1	100 yr - 24 hr	110.71	0.00	-11.18	3.91	3.91	3.91
Proposed Pipes - Pipe	25 yr- 24 hr	30.98	-0.03	-0.81	4.93	4.93	4.93
Proposed Pipes - Weir: 1	25 yr- 24 hr	110.71	0.00	-11.18	3.91	3.91	3.91

Link Flow: Proposed Pipes [Sc 1 no Slotted Pipe]



Link Downstream Velocity: Proposed Pipes [Sc 1 no Slotted Pipe]



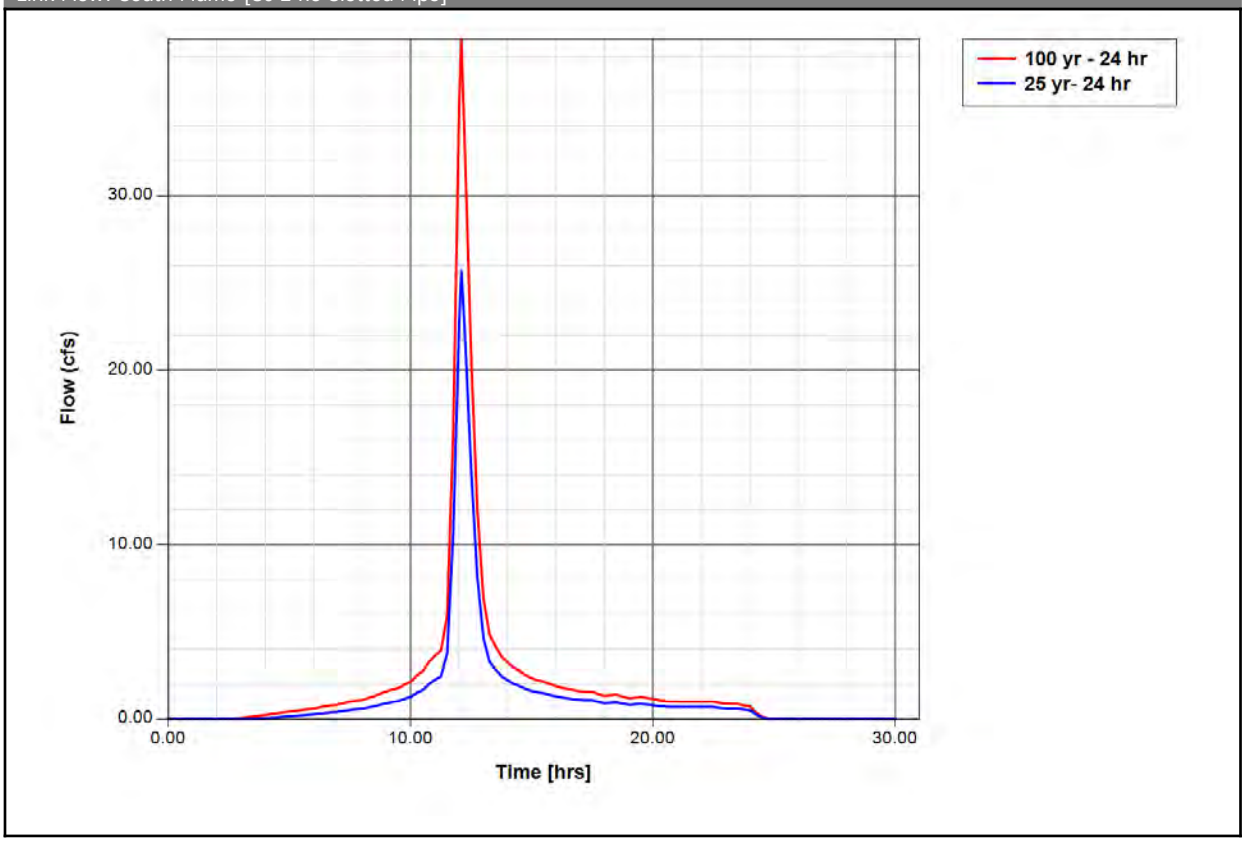
Channel Link: South Flume		Upstream		Downstream	
Scenario:	Sc 1 no Slotted Pipe	Invert:	134.50 ft	Invert:	131.00 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	NZA-0200	Geometry: Trapezoidal		Geometry: Trapezoidal	
To Node:	Fish Lake	Max Depth:	1.00 ft	Max Depth:	1.00 ft
Link Count:	1	Extrapolation:	Normal	Extrapolation:	Normal
Flow Direction:	Both	Bottom Width:	6.00 ft	Bottom Width:	6.00 ft
Damping:	0.0000 ft	Left Slope:	1.000 (h:v)	Left Slope:	1.000 (h:v)
Length:	235.00 ft	Right Slope:	1.000 (h:v)	Right Slope:	1.000 (h:v)
Contraction Coef:	0.00	Bottom Clip			
Expansion Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec	Top Clip			
Energy Switch:	Energy	Default:	0.00 ft	Default:	0.00 ft
		Op Table:		Op Table:	
		Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

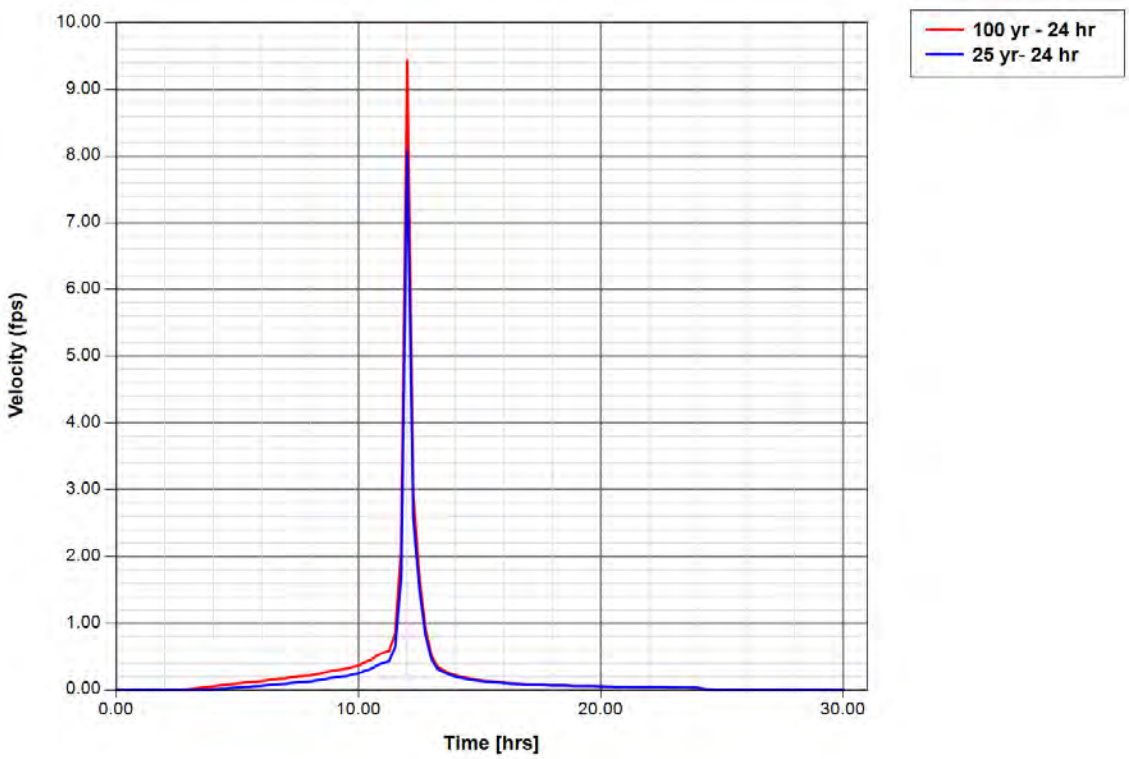
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
South Flume	100 yr - 24 hr	38.95	0.00	0.05	5.38	9.75	7.56
South Flume	25 yr- 24 hr	25.67	0.00	0.04	4.77	8.42	6.60

Link Flow: South Flume [Sc 1 no Slotted Pipe]



Link Downstream Velocity: South Flume [Sc 1 no Slotted Pipe]



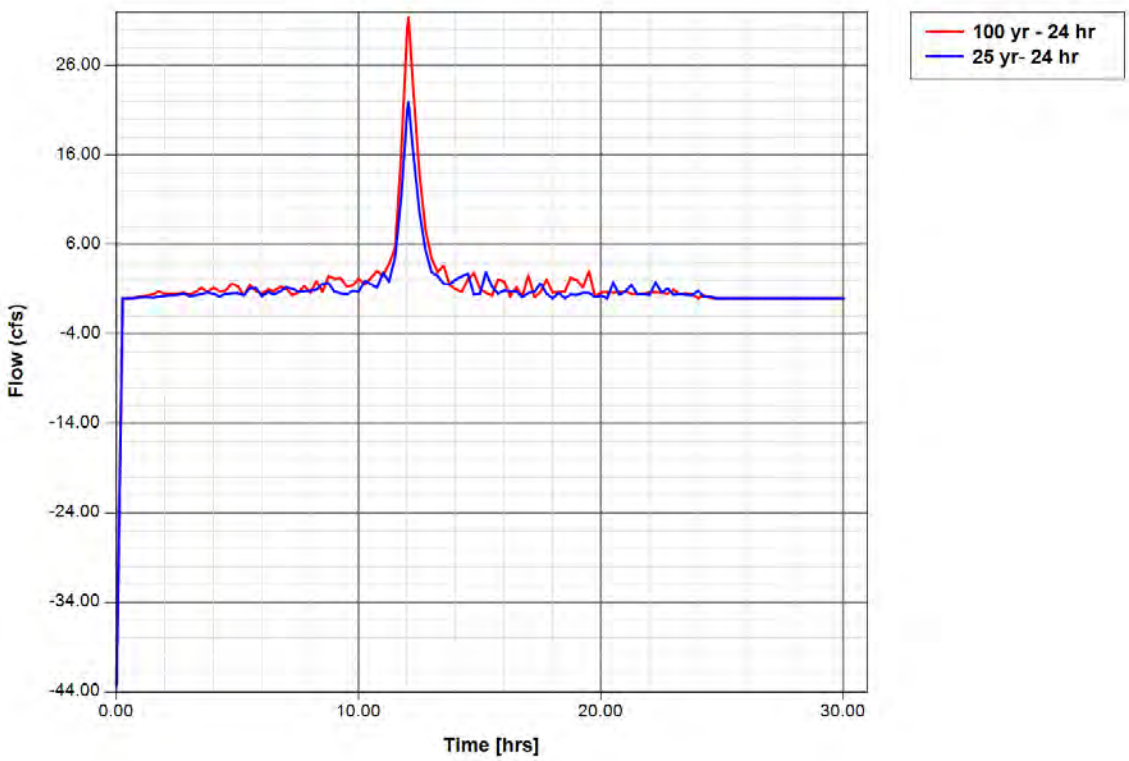
Pipe Link: U3 Pipe		Upstream		Downstream	
Scenario:	Sc 1 no Slotted Pipe	Invert:	124.25 ft	Invert:	126.82 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	NZA-0030	Geometry: Circular		Geometry: Circular	
To Node:	Zero Discharge Pond	Max Depth:	4.50 ft	Max Depth:	4.50 ft
		Bottom Clip			
Link Count:	1	Default:	0.00 ft	Default:	0.00 ft
Flow Direction:	Both	Op Table:		Op Table:	
Damping:	0.0000 ft	Ref Node:		Ref Node:	
Length:	148.00 ft	Manning's N:	0.0000	Manning's N:	0.0000
FHWA Code:	30	Top Clip			
Entr Loss Coef:	0.50	Default:	0.00 ft	Default:	0.00 ft
Exit Loss Coef:	1.00	Op Table:		Op Table:	
Bend Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Location:	0.00 dec	Manning's N:	0.0000	Manning's N:	0.0000
Energy Switch:	Energy				

Comment:

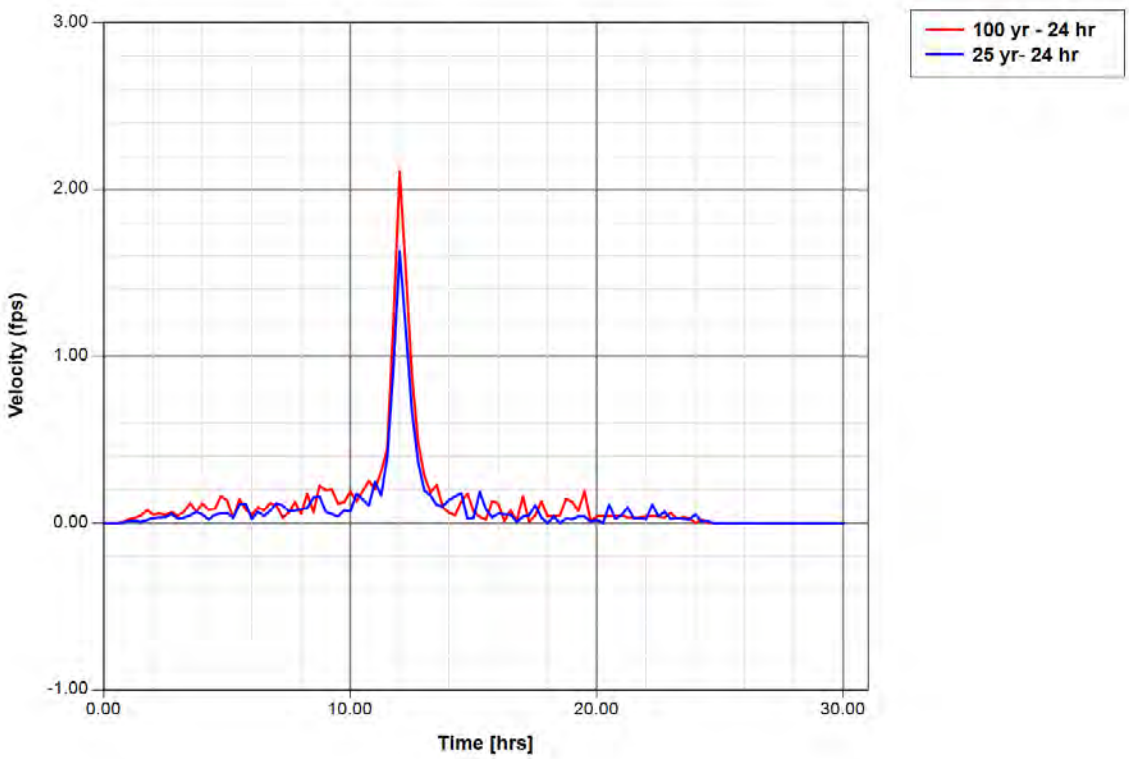
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
U3 Pipe	100 yr - 24 hr	31.37	-43.28	40.46	-4.38	-3.64	-4.01
U3 Pipe	25 yr- 24 hr	21.90	-43.28	40.46	-4.38	-3.64	-4.01

Link Flow: U3 Pipe [Sc 1 no Slotted Pipe]



Link Downstream Velocity: U3 Pipe [Sc 1 no Slotted Pipe]



Weir Link: W001

Scenario:	Sc 1 no Slotted Pipe
From Node:	NZA-0340
To Node:	Admin Pond
Link Count:	1
Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Broad Crested Vertical
Geometry Type:	Trapezoidal
Invert:	136.00 ft
Control Elevation:	136.00 ft
Max Depth:	0.75 ft
Extrapolation Method:	Normal Projection
Bottom Width:	150.00 ft
Left Slope:	33.300 (h:v)
Right Slope:	33.300 (h:v)

Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

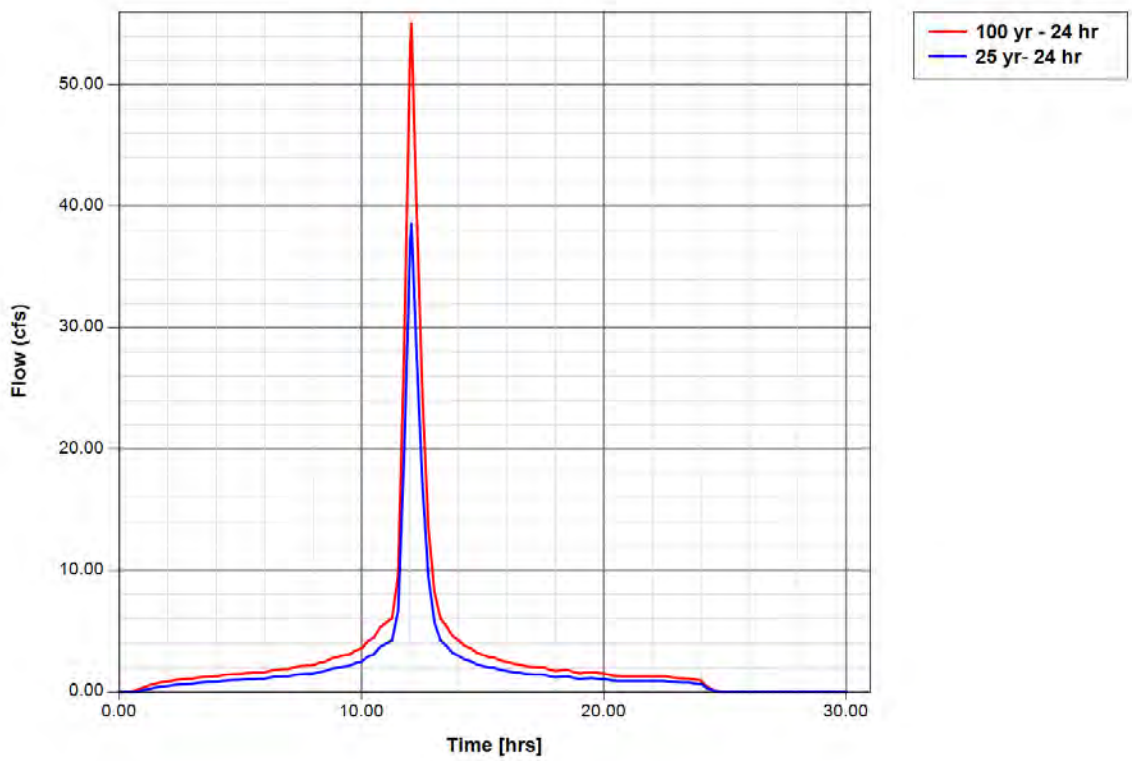
Discharge Coefficients	
Weir Default:	2.800
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

Comment:

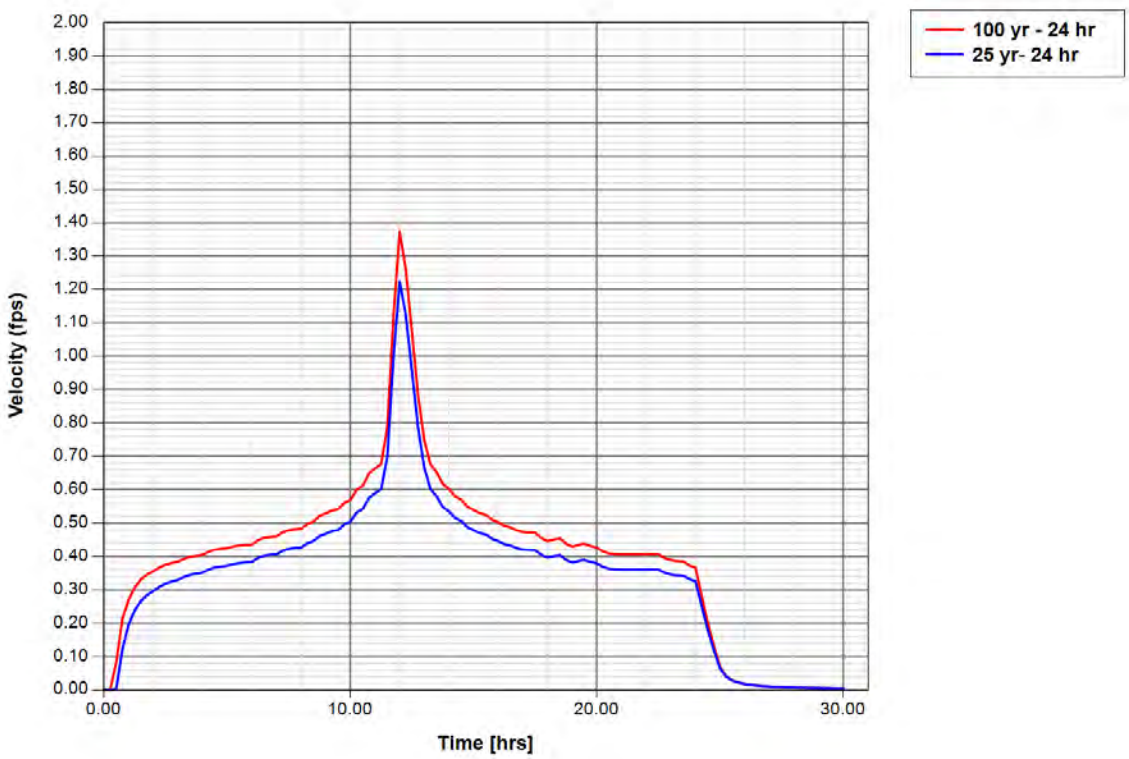
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
W001	100 yr - 24 hr	55.03	0.00	0.08	1.39	1.39	1.39
W001	25 yr- 24 hr	38.51	0.00	0.06	1.24	1.24	1.24

Link Flow: W001 [Sc 1 no Slotted Pipe]



Link Downstream Velocity: W001 [Sc 1 no Slotted Pipe]



Drop Structure Link: West Pond Outfall		Upstream Pipe		Downstream Pipe	
Scenario:	Sc 1 no Slotted Pipe	Invert:	130.50 ft	Invert:	130.04 ft
		Manning's N:	0.0120	Manning's N:	0.0120
From Node:	West Pond	Geometry: Circular		Geometry: Circular	
To Node:	Lake Parker	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Solution:	Split	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0120	Manning's N:	0.0120
Length:	112.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0120	Manning's N:	0.0120
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component			
Weir:	1	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	**Top Clip**	
Geometry Type:	Circular	Default:	0.00 ft
Invert:	130.50 ft	Op Table:	
Control Elevation:	130.50 ft	Ref Node:	
Max Depth:	0.17 ft	**Discharge Coefficients**	
		Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component			
Weir:	2	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Horizontal	**Top Clip**	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	135.00 ft	Op Table:	
Control Elevation:	135.00 ft	Ref Node:	
Max Depth:	2.00 ft	**Discharge Coefficients**	
Max Width:	3.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component			
Weir:	3	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	**Top Clip**	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	132.00 ft	Op Table:	
Control Elevation:	132.00 ft	Ref Node:	
Max Depth:	0.50 ft	**Discharge Coefficients**	
Max Width:	3.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

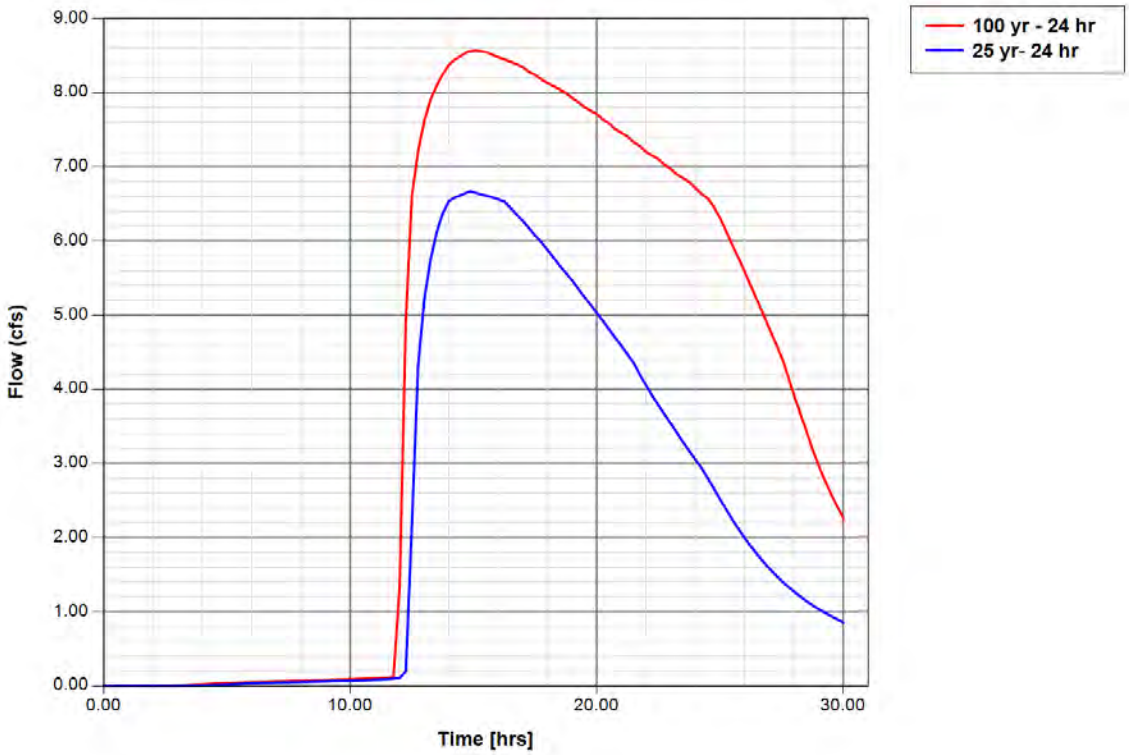
Weir Comment:

Drop Structure Comment:

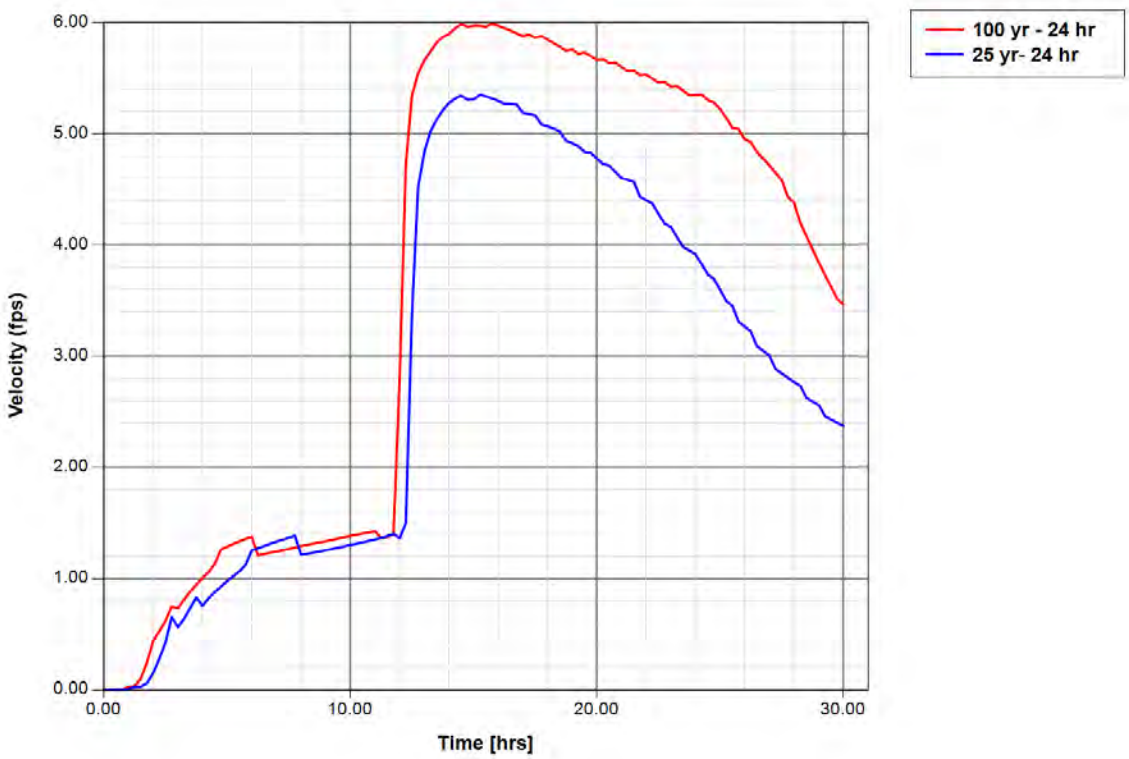
Link Min/Max Conditions [Sc 1 no Slotted Pipe]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
West Pond Outfall - Pipe	100 yr - 24 hr	8.57	0.00	0.03	4.85	6.02	5.43
West Pond Outfall - Weir: 1	100 yr - 24 hr	0.12	0.00	0.00	0.00	0.00	0.00
West Pond Outfall - Weir: 2	100 yr - 24 hr	0.00	0.00	0.00	0.00	0.00	0.00
West Pond Outfall - Weir: 3	100 yr - 24 hr	8.44	0.00	-0.01	5.63	5.63	5.63
West Pond Outfall - Pipe	25 yr- 24 hr	6.67	0.00	0.03	3.78	5.38	4.58
West Pond Outfall - Weir: 1	25 yr- 24 hr	0.12	0.00	0.00	0.00	0.00	0.00
West Pond Outfall - Weir: 2	25 yr- 24 hr	0.00	0.00	0.00	0.00	0.00	0.00
West Pond Outfall - Weir: 3	25 yr- 24 hr	6.56	0.00	0.01	4.37	4.37	4.37

Link Flow: West Pond Outfall [Sc 1 no Slotted Pipe]



Link Downstream Velocity: West Pond Outfall [Sc 1 no Slotted Pipe]



Simulation: 100 yr - 24 hr

Scenario:	Sc 1 no Slotted Pipe
Run Date/Time:	1/3/2024 8:22:53 AM
Program Version:	ICPR4 4.07.01

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder: Sim1
Reference ET Folder:
Unit Hydrograph Folder: Sim1

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic
Dflt Damping (2D): 0.0050 ft
Min Node Srf Area (2D): 100 ft2

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: Global
OF Region Rain Opt: Global
Rainfall Name: ~FLMOD
Rainfall Amount: 10.70 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2

Energy Switch (2D): Energy

Energy Switch (1D): Energy

Comment:

Simulation: 25 yr- 24 hr

Scenario: Sc 1 no Slotted Pipe
Run Date/Time: 1/3/2024 8:25:30 AM
Program Version: ICPR4 4.07.01

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder: Sim1
Reference ET Folder:
Unit Hydrograph Sim1

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:

Folder:			
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	
		Roughness Set:	
		Crop Coef Set:	
		Fillable Porosity Set:	
		Conductivity Set:	
		Leakage Set:	

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6	ET for Manual Basins:	False
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft	OF Region Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FLMOD
		Rainfall Amount:	7.50 in
Edge Length Option:	Automatic	Storm Duration:	24.0000 hr
Dflt Damping (2D):	0.0050 ft	Dflt Damping (1D):	0.0050 ft
Min Node Srf Area (2D):	100 ft2	Min Node Srf Area (1D):	100 ft2
Energy Switch (2D):	Energy	Energy Switch (1D):	Energy

Comment:

ATTACHMENT E
O&M Plan (REV 1)

Date: April 18, 2024

Subject: Stormwater Management System Operation and Maintenance Plan (Rev0)
Lakeland Electric
C.D. McIntosh Power Plant – Unit 3 Demolition Project
Lakeland, Florida **(REV 1)**

This Operation and Maintenance (O&M) Plan describes the guidelines and procedures for the proper operation, inspection, and maintenance of the stormwater management system (SWMS) for the referenced project. The continuous and proper operation of the system is vital in preserving the water quality discharged to the environment and preventing flooding at the site during storm events. As long as the SWMS components were constructed properly and are maintained to function properly, state water quality standards are presumed to be met. The O&M recommendations, restrictions, inspection, and maintenance items are described below.

GENERAL MAINTENANCE

1. Have all stormwater pipes, inlets, catch basins, pond outflow structures (including oil skimmers), and discharge pipes inspected regularly (quarterly or semi-annually) and after major rainfalls. They should be maintained by removing built-up debris and vegetation and repairing deteriorating structures.

2. Do not dispose of chemicals, oil, greases, or similar wastes directly into the stormwater facility or through storm sewers. Instead, dispose of these potentially dangerous materials at approved disposal or recycling facilities.

3. Periodically remove sediments that accumulate in the SWMS and dispose of them in a permitted solid waste landfill in accordance with applicable regulations.

4. During any repair or maintenance activity, use care to avoid causing erosion or siltation to adjacent or off-site areas.

5. Alterations (filling, enlarging, etc.) of any part of the SWMS are not permitted without prior approval from all applicable governing agencies.

6. Keep copies of the approved permit and as-built drawings at the plant where they will be readily available for reviewing additional restrictions, instructions, and conditions.

HYDRAULIC CONVEYANCES

1. Mow frequently enough to prevent thatch buildup. The mowing frequency will likely vary seasonally, but it should be expected to mow the vegetated areas no less than once per

month. Pick up excess grass clippings after cutting. Limit fertilizer use around the pond. Do not fertilize grass in the pond area.

2. Spraying of herbicide is not allowed. This may harm or kill the grass that protects the bank and slopes from erosion and sediment built-up.

3. Re-sod any areas (side or bottom) where grass or sod has been removed or eroded.

WET RETENTION AREAS

1. Mow pond embankments frequently enough to prevent thatch buildup. The mowing frequency will likely vary seasonally, but it should be expected to mow the vegetated areas no less than once per month. Pick up excess grass clippings after cutting. Limit fertilizer use around the pond. Do not fertilize grass in the pond area.

2. Spraying of herbicide is not allowed. This may harm or kill the grass that protects the bank and slopes from erosion and sediment built-up.

3. Re-sod any areas of the embankment where grass or sod has been removed or eroded.

4. Keep the outfall structure clear of debris and vegetation. Periodically remove sediment accumulated in the discharge control structures and culverts.

5. Inspect the skimmer and the bleed down orifice on the outfall structure regularly (quarterly or semi-annually) and after major rainfalls. Maintain it by removing built-up debris and vegetation and repairing deteriorating structures.

6. The littoral shelf will be initially vegetated and maintained by natural recruitment. No herbicides shall be used on the littoral shelf vegetation.

INSPECTIONS

The SWMS should be inspected routinely to ensure proper functioning. Inspections should be scheduled quarterly or semi-annually and following any major rain event. More frequent inspections may be necessary during the rainy season. Each stormwater system and related equipment will be inspected for cracks or structural failures, deterioration of the unit, stains, stressed or overgrown vegetation, and the need for cleaning the unit. Regular inspections of the SWMS should record observations on the following items:

1. Bank stability for any indication of erosion;

2. Evidence of sinkholes;

3. Sod condition and any distress or coloration in vegetation;

4. Presence of wastes, debris, or pollutants; and

5. Cracks or structure failure for discharge control structure, culvert, and/or pollutant-retardant baffles.

Maintenance items identified during routine inspections should be reported and corrective actions should be initiated in a timely manner, but in no case later than seven calendar days following the identification of the problem. Vegetation that is no longer providing erosion control shall be replaced as deemed necessary. Copies of inspection records, including documentation of any required corrective actions, should be kept together with the permit and as-built drawings.