

Wade Murphy

From: Chris Strupp <Chris.Strupp@ohm-advisors.com>
Sent: Wednesday, September 21, 2022 4:08 PM
To: Water Permits; Brad Harris; Wade Murphy
Cc: Dudley Fox; Jason Griffin; Bruce Parola; timoud@bellsouth.net; Clay Underdown; buckoud@yahoo.com; jasonfarmertn@gmail.com; Landbased Systems; Angela Jones; Timothy Hill; Robert Odette; Jennifer Innes; Jason Dees
Subject: [EXTERNAL] RE: Graywood Farms North State Operating Permit Application_SOP-22022_Ocoee Utility District
Attachments: Graywood Farms North SOP Application Rev. 1 20220921_s.pdf

Brad, Wade: Please find attached the updated SOP-22022 Application for your review and consideration. The following changes have been made following our meeting last week Thursday:

1. 10 drip zones (an increase from original 8 drip zones) are proposed with a total of approximately 100,000 SF of drip area. A revised WWTP and drip zone layout is provided in the figures tab. The peak system design flow remains at 20,000 GPD resulting in a drip loading rate of 0.20 GPD/SF. Page 4 of the SOP application was updated.
2. The average system design flow has been updated to 14,000 GPD (up from 12,000 GPD) to reflect the approximate 250 GPD/ERU. This results in an average drip loading rate of 0.14 GPD/SF with 10 drip zones and a total of approximately 100,000 SF of drip area.
3. The PDF in the figures tab has been updated to reflect additional design details.

Please let me know if there are any further questions – thank you to your team’s effort on this.

Sincerely,

CHRIS STRUPP, PE | **OHM Advisors®** | est. 1962
PROJECT MANAGER

D (615) 610-5250 **C** (260) 515-2548 **O** (615) 649-5264

chris.strupp@ohm-advisors.com | OHM-Advisors.com

From: Wade Murphy <Wade.Murphy@tn.gov> **On Behalf Of** Water Permits
Sent: Tuesday, September 6, 2022 11:00 AM
To: Bruce Parola <Bruce.Parola@ohm-advisors.com>
Cc: Chris Strupp <Chris.Strupp@ohm-advisors.com>; Dudley Fox <dudney@foxpe.com>; Jason Griffin <Jason.Griffin@ohm-advisors.com>; timoud@bellsouth.net; jasonfarmertn@gmail.com; buckoud@yahoo.com; Landbased Systems <Landbased.Systems@tn.gov>; Angela Jones <Angela.Jones@tn.gov>; Timothy Hill <Timothy.Hill@tn.gov>; Robert Odette <Robert.Odette@tn.gov>; Jennifer Innes <Jennifer.Innes@tn.gov>; Jason Dees <Jason.Dees@tn.gov>
Subject: RE: Graywood Farms North State Operating Permit Application_SOP-22022_Ocoee Utility District

This Message originated outside your organization.

Mr. Parola, this email is to acknowledge receipt on September 2, 2022, of the application for a new SOP and the preliminary engineering information for a proposed decentralized wastewater treatment system in Bradley County to serve the Graywood Farms North SD. This email is a notification of receipt only and

does not confirm or imply any decisions on the part of Division of Water Resources staff members. This document has been uploaded to Waterlog. Correspondence received by TDEC becomes part of the public record and can be viewed here: <https://prod-dataviewers.tdec.tn.gov/dataviewers/f?p=9034:34001> The Division assigned the permit tracking number SOP-22022. The preliminary engineering information may be tracked via a separate plans review number.

Kind regards,



Wade D. Murphy | E.I.

Division of Water Resources, Water-Based Systems Unit
William R. Snodgrass TN Tower, 11th Fl
312 Rosa L. Parks Ave 37243
p. 615-532-0666
wade.murphy@tn.gov
tn.gov/environment

Internal Customers: We value your feedback! Please complete our [customer satisfaction survey](#).

External Customers: We value your feedback! Please complete our [customer satisfaction survey](#).

From: Bruce Parola <Bruce.Parola@ohm-advisors.com>

Sent: Friday, September 2, 2022 4:55 PM

To: Water Permits <Water.Permits@tn.gov>

Cc: Chris Strupp <chris.strupp@ohm-advisors.com>; Dudney Fox <dudney@foxpe.com>; Jason Griffin <Jason.Griffin@ohm-advisors.com>; timoud@bellsouth.net; jasonfarmertn@gmail.com; buckoud@yahoo.com

Subject: [EXTERNAL] Graywood Farms North State Operating Permit Application

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Good afternoon. Attached is the state operating permit application for a proposed decentralized sewer system. The proposed system will provide service to 57 proposed single-family homes located at 738 Old Charleston Road in Cleveland, TN. Please let me know if any additional information is needed thanks.

BRUCE PAROLA, EIT
ENGINEER

OHM Advisors®

D (615) 610-5237 O (615) 649-5264

OHM-Advisors.com | [twitter](#) | [facebook](#) | [vimeo](#) | [linkedin](#)

Award Winning By Design: [Engineering News-Record \(ENR\)'s Top 500 Design Firms, 2021](#) | [Gallup Exceptional Workplace Award 2021](#) | [Zweig Group Hot Firm List, 2021](#) | [Zweig Group Best Firms to Work For, 2021](#)

The information transmitted, including attachments, is intended only for the person(s) or entity to which it is addressed and may contain confidential and/or privileged material. Any review, retransmission, dissemination or other use of, or taking of any action in reliance upon this information by persons or entities other than the intended recipient is prohibited. If you received this in error, please contact the sender and destroy any copies of this information.



September 2, 2022

Tennessee Department of Environment & Conservation
Division of Water Resources
c/o Brad Harris, P.E
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

RE: Bradley County, Tennessee
State Operating Permit – Graywood Farms North
Bradley County, TN
OHM Project Number: 0563220150

Dear Mr. Harris:

Ocoee Utility District (the District) is pleased to submit a State Operating Permit (SOP) application for the Graywood Farms North Residential Subdivision for review by TDEC. The proposed application seeks to provide sewer service to 57-single family homes with the District serving as operator of the collection and treatment system.

Project Description

The project consists of the installation of a STEP system with a low-pressure force main collector discharging to a 20,000 gpd drip-dispersal wastewater treatment plant. Approximately 2,750 LF of 2-inch force main will be installed and each of the 57 homes will be equipped with a 1,500-gallon STEP system.

Conclusion

The attachments for review and approval will include: Application for a State Operating Permit (SOP) (CN 1251, Rev. 03-19), Soils Map and Pedon Descriptions, General System Layout, and Engineering Report. By separate cover from Ocoee UD, a fee payment in the amount of \$750 per TAC Fund Fee Rule 0400-40-11-.02 for a 20,000 GPD Treatment Facility was mailed (copy of the check attached).

Thank you for your review and consideration of this project.

Sincerely,
OHM Advisors



Bruce Parola, E.I.T.

Encl: SOP Application



Tennessee Department of Environment and Conservation
 Division of Water Resources
 William R. Snodgrass - Tennessee Tower
 312 Rosa L. Parks Avenue, 11th Floor
 Nashville, Tennessee 37243-1102
 (615) 532-0625

APPLICATION FOR A STATE OPERATION PERMIT (SOP)

Type of application: New Permit Permit Reissuance Permit Modification

Permittee Identification: (Name of city, town, industry, corporation, individual, etc., applying, according to the provisions of Tennessee Code Annotated Section 69-3-108 and Regulations of the Tennessee Water Quality Control Board.)

Permittee Name: Ocoee Utility District (applicant):

Permittee Address: 5631 Waterlevel Highway S.E. Cleveland, TN 37323-8758

Official Contact: Tim Lawson (Ocoee UD)	Title or Position: General Manager		
Mailing Address: P.O. Box 305	City: Cleveland	State: TN	Zip: 37361-0305
Phone number(s): (423) 559-8505	E-mail: Tim Lawson (timoud@bellsouth.net)		

Optional Contact: OHM Advisors	Title or Position: Engineer		
Address: 209 10th Avenue South, Suite 154	City: Nashville	State: TN	Zip: 37203
Phone number(s): (615) 649-5250	E-mail: Chris Strupp (chris.strupp@ohm-advisors.com)		

Application Certification (must be signed in accordance with the requirements of Rule 0400-40-05-.05)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Name and title; print or type Tim Lawson	Signature 	Date 08/30/2022
---	---------------	--------------------

Facility Identification:			Existing Permit No.
Facility Name:	Graywood Farms North Residential Subdivision		County: Bradley
Facility Address or Location:	738 Old Charleston Road Cleveland, TN 37312		Latitude: 35.2274402
			Longitude: -084.7941318
Name and distance to nearest receiving waters: Rattlesnake Branch; 500 Feet			
If any other State or Federal Water/Wastewater Permits have been obtained for this site, list their permit numbers: N/A			
Name of company or governmental entity that will operate the permitted system: Ocoee Utility District			
Operator address: 5631 Waterlevel Highway, Cleveland, TN 37203			
Has the owner/operator filed for a Certificate of Convenience & Necessity (CCN), or an amended CCN, with the Tennessee Regulatory Authority (TRA) (may be required for collection systems and land application treatment systems)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
If the applicant listed above does not yet own the facility/site or if the applicant will not be the operator, explain how and when the ownership will be transferred or describe the contractual arrangement and renewal terms of the contract for operations. Applicant will own and maintain WWTP and permit upon completion and acceptance.			
Complete the following information explaining the entity type, number of design units, and daily design wastewater flow:			
<u>Entity Type</u>	<u>Number of Design Units</u>		<u>Flow (gpd)</u>
<input type="checkbox"/> City, town or county	No. of connections:		
<input checked="" type="checkbox"/> Subdivision	No. of homes: 57	Avg. No. bedrooms per home: 4	350 gpd/home (0.02 MGD)
<input type="checkbox"/> School	No. of students:	Size of cafeteria(s): No. of showers:	
<input type="checkbox"/> Apartment	No. of units:	No. units with Washer/Dryer hookups: No. units without W/D hookups:	
<input type="checkbox"/> Commercial Business	No. of employees:	Type of business:	
<input type="checkbox"/> Industry	No. of employees:	Product(s) manufactured:	
<input type="checkbox"/> Resort	No. of units:		
<input type="checkbox"/> Camp	No. of hookups:		
<input type="checkbox"/> RV Park	No. of hookups:	No. of dump stations:	
<input type="checkbox"/> Car Wash	No. of bays:		
<input type="checkbox"/> Other			
Describe the type and frequency of activities that result in wastewater generation.			

Engineering Report (required for collection systems and/or land application treatment systems):	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Prepared in accordance with Rule 0400-40-05-.03 and Section 1.2 of the State of Tennessee Design Criteria for Sewage Works	
<input checked="" type="checkbox"/> Attached, or	
<input type="checkbox"/> Previously submitted and entitled:	Approved? <input type="checkbox"/> Yes. Date: <input type="checkbox"/> No
Operation and Maintenance Inspection Schedule Submitted:	Approved? <input type="checkbox"/> Yes. Date: <input checked="" type="checkbox"/> No

Wastewater Collection System:	<input type="checkbox"/> N/A
System type (i.e., gravity, low pressure, vacuum, combination, etc.): STEP	
System Description: STEP system with low pressure force main collector discharging to a drip-dispersal WWTP	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): <small>Min. 24-hours storage. Power failure will not allow the STEP pumps to transfer the effluent to the WWTP. OUD will be alerted by remote alarm.</small>	
In the event of a system failure describe means of operator notification: SCADA	
List the emergency contact(s) (name/phone): Buck Owen; (423) 331-4970	
For low-pressure systems, who is responsible for maintenance of STEP/STEG tanks and pumps or grinder pumps (list all contact information)? Buck Owen; buckoud@yahoo.com; (423) 331-4970 Clay Underdown; clayunderdown@yahoo.com; (423) 716-1653	
Approximate length of sewer (excluding private service lateral): 2,750 Linear Feet	
Number/hp of lift stations: N/A / Number/hp of lift pumps 57 / 0.5 hp	
Number/volume of low pressure and or grinder pump tanks /	
Number/volume septic tanks 57 / 1,500 Gallons	
Attach a schematic of the collection system. <input checked="" type="checkbox"/> Attached	
If this is a satellite sewer and you are tying in to another sewer system complete the following section, listing tie-in points to the sewer system and their location (attach additional sheets as necessary):	
<u>Tie-in Point</u>	<u>Latitude (xx.xxxx°)</u>
<u>Longitude (xx.xxxx°)</u>	

Land Application Treatment System:	<input type="checkbox"/> N/A
Type of Land Application Treatment System: <input checked="" type="checkbox"/> Drip <input type="checkbox"/> Spray <input type="checkbox"/> Other, explain:	
Type of treatment facility preceding land application (recirculating media filters, lagoons, other, etc.): Recirculating media filter	
Attach a treatment schematic. <input checked="" type="checkbox"/> Attached	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): <small>Min. 24-hours storage. Power failure will not allow the STEP pumps to transfer the effluent to the WWTP. OUD will be alerted by remote alarm.</small>	
For New or Modified Projects: Name of Developer for the project:	Riverstone Construction, LLC
Developer address and phone number:	9018 Ooltewah Georgetown Rd Ste 126, Ooltewah, TN 37363 (423) 954-7550
For land application, list: Proposed acreage involved: Drip: 100,000 SF (2.29 Ac.) Total: 170,000 SF (3.90 Ac.) Inches/week gpd/sq.ft loading rate to be applied: 0.20 gpd/sf	
Is wastewater disinfection proposed? UV Treatment	
<input checked="" type="checkbox"/> Yes Describe land application area access: WWTP/Land Application driveway access off residential street	
<input type="checkbox"/> No Describe how access to the land application area will be restricted: Fencing	
Attach required additional Engineering Report Information (see website for more information)	
<input checked="" type="checkbox"/> Topographic map (1:24,000 scale presented at a six inch by six inch minimum size) showing the location of the project including quadrangle(s) name(s) GPS coordinates, and latitude and longitude in decimal degrees should also be included.	
<input checked="" type="checkbox"/> Scaled layout of facility showing the following: lots, buildings, etc. being served, the wastewater collection system routes, the pretreatment system location, the proposed land application area(s), roads, property boundaries, and sensitive areas such as streams, lakes, springs, wells, wellhead protection areas, sinkholes and wetlands.	
<input checked="" type="checkbox"/> Soils information for the proposed land disposal area in the form of a Water Resources Soils Map per Chapter 16 and 17 State of Tennessee Design Criteria for Sewage Work. The soils information should include soil depth (borings to a minimum of 4 feet or refusal) and soil profile description for each soil mapped.	
<input checked="" type="checkbox"/> Topographic map of the area where the wastewater is to be land applied with no greater than ten foot contours presented at a minimum size of 24 inches by 24 inches.	
<input checked="" type="checkbox"/> Describe alternative application methods based on the following priority rating: (1) connection to a municipal/public sewer system, (2) connection to a conventional subsurface disposal system as regulated by the Division of Groundwater Protection, and/or (3) land application.	

<p>For Drip Dispersal Systems Only: Unless otherwise determined by the Department, sewage treatment effluent wells, i.e, large capacity treatment/drip dispersal systems after approval of the SOP Application, will be issued an UIC tracking number and will be authorized as Permit by Rule per UIC Rule 0400-45-06-.14(2) and upon issue of a State Operating Permit and Sewage System Construction Approval by the Department. Describe the following:</p>	<input checked="" type="checkbox"/> N/A
--	---

The area of review (AOR) for each Drip Dispersal System shall, unless otherwise specified by the Department, consist of the area lying within a one mile radius or an area defined by using calculations under 0400-45-06-.09 of the Drip Dispersal System site or facility, and shall include, but not be limited to general surface geographic features, general subsurface geology, and general demographic and cultural features within the area. Attach to this part of the application a general characterization of the AOR, including the following: (This can be in narrative form)

- A general description of all past and present groundwater uses as well as the general groundwater flow direction and general water quality.
- A general description of the population and cultural development within the AOR (i.e. agricultural, commercial, residential or mixed)
- Nature of injected fluid to include physical, chemical, biological or radiological characteristics.
- If groundwater is used for drinking water within the area of review, then identify and locate on a topographic map all groundwater withdrawal points within the AOR, which supply public or private drinking water systems. Or supply map showing general location of publicly supplied water for the area (this can be obtained from the water provider)
- If the proposed system is located within a wellhead protection area or source water protection area designated by Rule 0400-45-01-.34, show the boundary of the protection area on the facility site plan.
- Description of system, Volume of injected fluid in gallons per day based upon design flow, including any monitoring wells
- Nature and type of system, including installed dimensions of wells and construction materials

<p>Pump and Haul:</p>	<input checked="" type="checkbox"/> N/A
------------------------------	---

Reason system cannot be served by public sewer:

Distance to the nearest manhole where public sewer service is available:

When sewer service will be available:

Volume of holding tank: _____ gal.

Tennessee licensed septage hauler (attach copy of agreement):

Facility accepting the septage (attach copy of acceptance letter):

Latitude and Longitude (in decimal degrees) of approved manhole for discharge of septage:

Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.):

Holding Ponds (for non-domestic wastewater only):	<input checked="" type="checkbox"/> N/A
Pond use: <input type="checkbox"/> Recirculation <input type="checkbox"/> Sedimentation <input type="checkbox"/> Cooling <input type="checkbox"/> Other (describe):	
Describe pond use and operation:	
If the pond(s) are existing pond(s), what was the previous use?	
Have you prepared a plan to dispose of rainfall in excess of evaporation? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If so, describe disposal plan:	
Is the pond ever dewatered? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If so, describe the purpose for dewatering and procedures for disposal of wastewater and/or sludge:	
Is(are) the pond(s) aerated? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Volume of pond(s): _____ gal. Dimensions: _____	
Is the pond lined (Note if this is a new pond system it must be lined for SOP coverage. Otherwise, you must apply for an Underground Injection Control permit.)? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Describe the liner material (if soil liner is used give the compaction specifications):	
Is there an emergency overflow structure? <input type="checkbox"/> Yes <input type="checkbox"/> No	
<i>If so, provide a design drawing of structure.</i>	
Are monitoring wells or lysimeters installed near or around the pond(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No	
<i>If so, provide location information and describe monitoring protocols (attach additional sheets as necessary):</i>	

Mobile Wash Operations:		<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Individual Operator		<input type="checkbox"/> Fleet Operation Operator
Indicate the type of equipment, vehicle, or structure to be washed during normal operations (check all that apply):		
<input type="checkbox"/> Cars	<input type="checkbox"/> Parking Lot(s):	sq. ft.
<input type="checkbox"/> Trucks	<input type="checkbox"/> Windows:	sq. ft.
<input type="checkbox"/> Trailers (Interior washing of dump-trailers, or tanks, is prohibited.)	<input type="checkbox"/> Structures (describe):	
<input type="checkbox"/> Other (describe):		
Wash operations take place at (check all that apply):		
<input type="checkbox"/> Car sales lot(s)	<input type="checkbox"/> Public parking lot(s)	
<input type="checkbox"/> Private industry lot(s)	<input type="checkbox"/> Private property(ies)	
<input type="checkbox"/> County(ies), list:	<input type="checkbox"/> Statewide	
Wash equipment description:		
<input type="checkbox"/> Truck mounted	<input type="checkbox"/> Trailer mounted	
<input type="checkbox"/> Rinse tank size(s) (gal.):	<input type="checkbox"/> Mixed tanks size(s) (gal.):	
<input type="checkbox"/> Collection tank size(s) (gal.):	Number of tanks per vehicle:	
Pressure washer:	psi (rated)	gpm (rated)
<input type="checkbox"/> gas powered	<input type="checkbox"/> electric	
Vacuum system manufacturer/model:	Vacuum system capacity:	inches Hg
Describe any other method or system used to contain and collect wastewater:		
List the public sewer system where you are permitted or have written permission to discharge waste wash water (include a copy of the permit or permission letter):		
Are chemicals pre-mixed, prior to arriving at wash location? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Describe all soaps, detergents, or other chemicals used in the wash operation (attach additional sheets as necessary):		
Chemical name:	Manufacturer:	Primary CAS No. or Product No.

**APPLICATION FOR A STATE OPERATION PERMIT (SOP)
INSTRUCTIONS**

Purpose of this form A completed SOP application must be submitted to obtain SOP coverage. This permit is required to operate a sewage, industrial waste or other waste collection and/or treatment system that does not have a point source discharge to any surface or subsurface waters. This form must be submitted at least 180 days before starting any new activity, before an existing permit expires, or when renewing a permit.

Complete the form Type or print clearly, using black or blue ink; not markers or pencil. Answer each item or enter "N/A," for not applicable. If you need additional space, attach a separate piece of paper to the SOP application. Applicants may be required to submit engineering reports, plans and specifications. Contact the division for the applicable items, or refer to Appendix 1-D of the state [Design Criteria for Sewage Works](#) for more information. **The application will be considered incomplete without supplying all of the required information, Engineering Reports, and an original signature.**

Permittee Identification/Facility Identification Describe and locate the project, use the legal or official name of the facility or site. Provide the latitude and longitude (expressed in decimal degrees) of the center of the site, which can be located on USGS quadrangle maps. The quadrangle maps can be obtained at 1-800-USA-MAPS, or at the Census Bureau world wide web site: <http://www.census.gov/cgi-bin/gazetteer>. Attach a copy of a portion of a 7.5 minute quad map, showing location of site, with boundaries at least one mile outside the site boundaries. If business is mobile give the owner of operations' home, or business office address, and list all current areas of operation by city and county.

Wastewater Collection System These types of systems require engineering reports, refer to Appendix 1-D of the state [Design Criteria for Sewage Works](#) for more information.

Land Application Treatment System These types of systems require engineering reports, refer to Appendix 1-D of the state [Design Criteria for Sewage Works](#) for more information. Public access to the treatment area must be restricted, if disinfection is not part of the treatment. Applicants completing this section of the application must also complete the Wastewater Collection System section.

Pump and Haul These types of systems may require engineering reports, refer to Appendix 1-D of the state [Design Criteria for Sewage Works](#) for more information.

Holding Ponds Given that annual rainfall onto open ponds exceeds annual evaporation (in Tennessee), the permittee must develop a written plan (to be retained on site and be available to the division upon request) that addresses how excess rainfall will be disposed of in compliance with the no discharge requirement of this permit. Treatment ponds are not to be used for stormwater treatment or storage. All new and existing point source industrial stormwater discharges associated with industrial activity require coverage under the

**APPLICATION FOR A STATE OPERATION PERMIT (SOP)
INSTRUCTIONS - CONTINUED**

Tennessee industrial stormwater multi-sector general permit TMSP, refer to the [website](#) for more information. Describe the system for re-routing surface runoff away from ponds in the rainfall disposal plan.

Mobile Wash Operations Indicate whether the operation is run by an individual or a corporation with a fleet of vehicles equipped to wash and collect waste waters. If a corporation, indicate the home office as the "Official Contact". Indicate if operations take place at specific sites and list those counties that apply. Note that this permit covers operations for all of Tennessee. Operations indicated as "statewide" generally apply as a fleet type operation and each office location shall be individually permitted. Equipment may be truck or trailer-mounted, or both, indicate all that applies. Soaps, detergents, and other chemicals used should be non-toxic and biodegradable. All "chemically enhanced" (soaps, detergents, and other chemicals) waste-wash waters must be collected for proper disposal. If no chemically enhanced washwaters are used, clear-wash waters may travel by sheet flow to a gravel or grassy area where there is no opportunity to enter waters of the state. There should be no discharge to a storm water inlet, ditch, conveyance, stream, etc. If you are unsure of your wash area drainage, contact the area Environmental Field Office (EFO) prior to setting up your wash operation.

Fees Refer to the TDEC-DWR Environmental Protection Fund Fee Rule 0400-40-11-.02. Links to publications are available on Department of Environment and Conservation, Division of Water Resources webpage and the webpage for the Tennessee Secretary of State.

Submitting the form and obtaining more information Note that this form must be signed by the chief executive officer, owner, or highest ranking elected official. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit a complete application electronically to water.permits@tn.gov (preferred) or to the appropriate EFO for the county(ies) where the facility is located, addressed to **Attention: DWR, Permit Section**. Please keep a copy for your records.

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett	38133	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Dr	38305- 4316	Chattanooga	1301 Riverfront Parkway Suite 206	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

APPLICATION FOR A STATE OPERATION PERMIT (SOP)
INSTRUCTIONS - CONTINUED

Upon receipt of the required items, the division conducts a review of the material, and the applicant is notified of any deficiencies. When all the deficiencies have been corrected, the division makes a determination of whether to publish a draft permit. When a draft permit is generated, a public notice is issued and published in a local newspaper. The draft permit is then reviewed by the applicant, and division field staff. The general public also has an opportunity to review the permit. Based on public response, a public hearing may be held. After considering public comments and a final review, the permit may be issued. The entire process normally takes from five (5) to nine (9) months. Permits are normally valid for five (5) years, except those for pump and haul systems, which are generally valid for one (1) year.

The division has the right to inspect a facility when deemed necessary. In addition, the division has the right to revoke or suspend any permit for violation of permit conditions or any other provisions of the Tennessee Water Quality Control Act and other water pollution control rules.

The division is responsible for regulating any activity, which involves a potential discharge in order to protect waters of the State from pollution and to maintain the highest possible standards in water quality.

Appendix

A – Design Memorandum

B – Preliminary Plans

C – Soil Map

D – Pedon Descriptions

E – Fee Payment

Appendix A
Design Memorandum



To: TN Department of Environment and Conservation

From: Dudley Fox, P.E.

Date: September 20, 2022

Subject: Ocoee UD – Graywood Farms North Subdivision
Collection System, WWTP & Drip Dispersal Facilities Design Memo

Summary

The proposed Graywood Farms North subdivision, via the Ocoee Utility District (OUD), desires to construct a STEP sewer collection, treatment, and drip dispersal system. 57 single family residences are proposed. The collection, treatment, and drip dispersal system will be owned and operated by the OUD following construction. A STEP collection system and decentralized WWTP and drip dispersal facilities are the only option for the proposed development. Cleveland Utilities has denied connection to their sanitary sewer system, see the attached letter in the Appendix. Traditional on-site disposal is also not an option with the proposed density of development and soil conditions for the proposed building lots.

STEP Collection System Proposed Construction & Basis of Design

Watertight septic tanks and effluent pumps are proposed for the 57 single-family residential lots. PVC pipe, fittings, and valves are proposed for both service line and force main material to prevent corrosion. The minimum force main size has been established as 2-inches.

Watertight joints and connections will be utilized to prevent inflow and infiltration. The force main piping will be installed with bedding (minimum 6-inch below, 12-inch above) via open cut construction. The force mains and service connections will be hydrostatically tested to standards described in the latest TDEC Design Criteria for Sewage Works. The minimum test pressure will be 100 psi.

Valves will be used at strategic intersections and intervals to allow isolation of portions of the system for maintenance and repair. Cleanouts will be installed at dead ends. Air release valves will be installed at high points throughout the collection system. Force mains are proposed on opposite sides of the road from



potable water mains. Where force mains must cross existing utilities, the sewer force main will cross under the existing utility with an 18-inch minimum clearance.

The size of the STEP tank is 1,500 gallons. The tanks will be constructed from HDPE and will be installed in accordance with the manufacturer's recommendations, including backfill and anti-buoyancy requirements. The tank manufacturer will supply the watertight plastic risers and lids. Watertight piping connections will be provided. All newly installed tanks will be tested for watertightness in accordance with ASTM C1227. All tanks will be installed a minimum of 18-inches below grade.

TDEC Design Criteria Chapter 2, Collections Systems was referenced along with a hydraulic model in the design of the proposed collection system. A C factor of 130 was used. Design flows were calculated using TDEC design criteria's Chapter 2.13.2.1 formula: $Q=0.5N+20$ where N is the number of equivalent dwelling units in the respective zone. The highest total dynamic head (TDH) in the system at the design flow was calculated to be 126 ft (55 psi), well within a standard 1/2 HP effluent pump's operational range. Velocities in force mains range from 2.2 ft/sec to 4.6 ft/sec at the design flow.

Each STEP installation will include an UL listed control panel and float type level instrumentation. The control panel will be installed a minimum of 2-feet above grade and located near the pump units. The control panel enclosure will be constructed with FRP and rated NEMA 4X. Each control panel will include an audible and visual alarm with a silence feature as well as an elapsed time meter (ETM).

The hydraulic calculation spreadsheet, zone map, and an Orenco 1/2 HP STEP effluent pump curve are included in the Appendix to this memorandum. The HGL chart is included in the Figures section.

WWTP Proposed Construction & Basis of Design

The proposed wastewater treatment plant (WWTP) consists of a pre-anoxic and recirculation tank, fixed growth biological treatment units, disinfection facilities, a dosing system and subsurface effluent drip dispersal facilities. The design average and peak daily flows for the proposed subdivision are 14,000 and 20,000 gpd respectively. A design peak daily flow rate of 350 gpd per single family residence has been utilized. The design flows, concentrations, and loads are provided in the table following this narrative. Other characteristics of the wastewater including alkalinity, temperatures, and site data along with the effluent objectives are also included in the table.



The average and peak daily flow is utilized to determine the organic and nitrogen loading requirements for the fixed growth biological treatment units sizing criteria. Peak daily flows are utilized to size hydraulic capacities, pumping requirements, disinfection, and to determine the land area required for the drip dispersal facilities.

The proposed WWTP utilizes fixed biological growth to remove the influent carbonaceous and nitrogen constituents. The Orenco Advantex AX100 system is proposed for the biological treatment units. Orenco is a well-established company in the decentralized WWTP market and has an extensive installation base in Tennessee. A process flow diagram for the proposed treatment and drip dispersal system is included.

A 15,000-gallon pre-anoxic and recirculation tank with four (4) 50 GPM pumps is proposed. All electrical devices in this tank are rated for Class 1 Division 1 service in accordance with NFPA 820. This tank is also passively vented to an odor control mulch bed. Provisions for alkalinity adjustment with chemical storage and feed will be provided along with on-line pH measurement for feedback and automatic control.

The Advantex AX100 system is a packaged version of a recirculating textile-based media system. The performance of these systems is also well established, and Orenco has provided design criteria based on their numerous operating installations. The Orenco design criteria noted for this project are included in the Appendix. The sizing criteria for BOD5 and TKN loading is as follows:

- BOD5 Average 0.04 pounds per square foot per day, Maximum 0.08 pounds per square foot per day
- TKN Average 0.014 pounds per square foot per day, Maximum 0.028 pounds per square foot per day

The typical effluent quality for the Advantex system is less than 10 mg/l BOD5, 90% NH3 removal, and Total Nitrogen removal more than 60%. Four (4) Advantex AX100 units in series are proposed. The table following this narrative provides detailed calculations of the sizing for the AX100 system.

Following the fixed growth treatment system is a 5,000-gallon dosing tank. The dosing tank contains two (2) 50 GPM dosing pumps, one duty and an installed spare. A summary of the total treatment and storage volume is provided below.

- Orenco Advantex: 15,000 gallons recirculation and 5,000 gallons dosing for a total volume of 20,000 gallons

Buoyancy has been considered in the design. Anti-flotation measures including concrete ballast and soil cover are provided to counter high-groundwater



conditions for the recirculation and dosing tanks. The groundwater elevation used for the calculations is the existing grade. A minimum safety factor of 1.2 was used.

Following the 5,000-gallon dosing tank are two (2) ultraviolet (UV) disinfection units. There are two trains of a single stage of enclosed vessel UV units, each capable of a maximum of 55 GPM capacity. The design dosing rate is 50 GPM therefore redundancy is provided. Provisions for measurement of the flow rate to the drip dispersal system and for the flushing return flows will be provided.

Ten (10) zones of drip dispersal are proposed. The dripper line spacing is on 2-foot centers. A total of approximately 100,000 square feet of drip dispersal is proposed, equating to a peak design hydraulic loading rate of 0.20 GPD/square foot. The average design hydraulic loading rate is 0.14 GPD/square foot. Up to two zones can be dosed at a time. Each zone features an electric solenoid valve, a pressure regulating valve, and a combination air and vacuum relief valve.

The drip dispersal system is designed for a maximum of 18 hours per day of dosing, thus allowing for 6 hours of relaxation per day. Details of the drip dispersal sizing and calculations are provided in the table following this narrative. A description of the site soils proposed for drip dispersal have been previously described in the SOP permit application.

Automatic controls for the needed plant functions are provided. These include the recirculation tank pumps, chemical feed system, fixed growth treatment units, the dosing tank pumps, and the drip dispersal facilities. A dosing and flushing magnetic type flow meter is provided. All control panel alarm functions as well as the dosing and return flow meters are connected to a cellular based RTU for remote notification.

Preliminary plans for the overall system layout and the WWTP and drip dispersal facilities are provided as a separate attachment to this design memorandum. The TDEC checklist provided in Chapter 1 is included in the Appendix.



TABLES

**OOD - Graywood Farms N Subdivision
 WWTP Design Loadings & Effluent Requirements**

Design Flow, ADF (MGD) 0.014
Design Flow, Peak Day (MGD) 0.020
 Design Flow, Peak Hour (GPM) 49
 # ERUs 57

Average Day Influent

Constituent	(mg/l)	(lb/day)
BOD	135	16
TSS	30	4
Total P	16	2
TKN	70	8
NH3	42	5

Peak Day Influent

Constituent	(mg/l)	(lb/day)
BOD	135	23
TSS	30	5
Total P	16	3
TKN	70	12
NH3	42	7

Alkalinity (mg/l): 170 *from OUD WTP*
 WW Temp-Design Avg (deg C): 18
 WW Temp-Min (deg C): 12
 WW Temp-Max (deg C): 25
 Site Elevation (ft MSL): 830

Average Influent Ratios:

BODsol/BOD 0.71
 COD/BOD 1.93
 CODsol/COD 0.83

Influent to WWTP is STEP effluent
Water quality data from Bounds (Orenco) 1997/2004 & Crites-Tchobanoglous 1998

Effluent Criteria (mg/l)	Average	Max
TSS	30	45
BOD	30	45
NH3	3	5
TN	20	23

**OU D - Graywood Farms N Subdivision
 WWTP Design**

Parameter	Orenco AX100
Qavg (MGD)	0.014
Qpeak (MGD) DESIGN	0.020
BOD (mg/l)	135
BOD _{peak} (lb/d)	23
BOD _{avg} (lb/d)	16
TKN (mg/l)	70
TKN _{peak} (lb/d)	12
TKN _{avg} (lb/d)	8
NH ₃ (mg/l)	42
NH _{3peak} (lb/d)	7
NH _{3avg} (lb/d)	5
BOD	
	<i>Area</i>
Treatment Volume/Area per Unit (mcf/ft ²)	100
Design Loading Rate, BOD (lb/mcf or lb/ft ²)	0.08
Treatment Volume/Area Required (mcf/ft ²)	281
# Treatment Units, Calculated	2.8
# Treatment Units, Provided	4
Actual BOD Loading Rate, Peak (lb/mcf/d or lb/ft ² /d)	0.056
Actual BOD Loading Rate, Avg (lb/mcf/d or lb/ft ² /d)	0.039
TKN	
	<i>Area</i>
Actual Loading Rate, Peak (g/m ² /d or lb/ft ² /d)	0.029
Actual Loading Rate, Avg (g/m ² /d or lb/ft ² /d)	0.020
Hydraulics	
Surface Area, Each (ft ²)	100
Surface Area, Total (ft ²)	400
HLR _{maxmo} (gpd/ft ²)	50

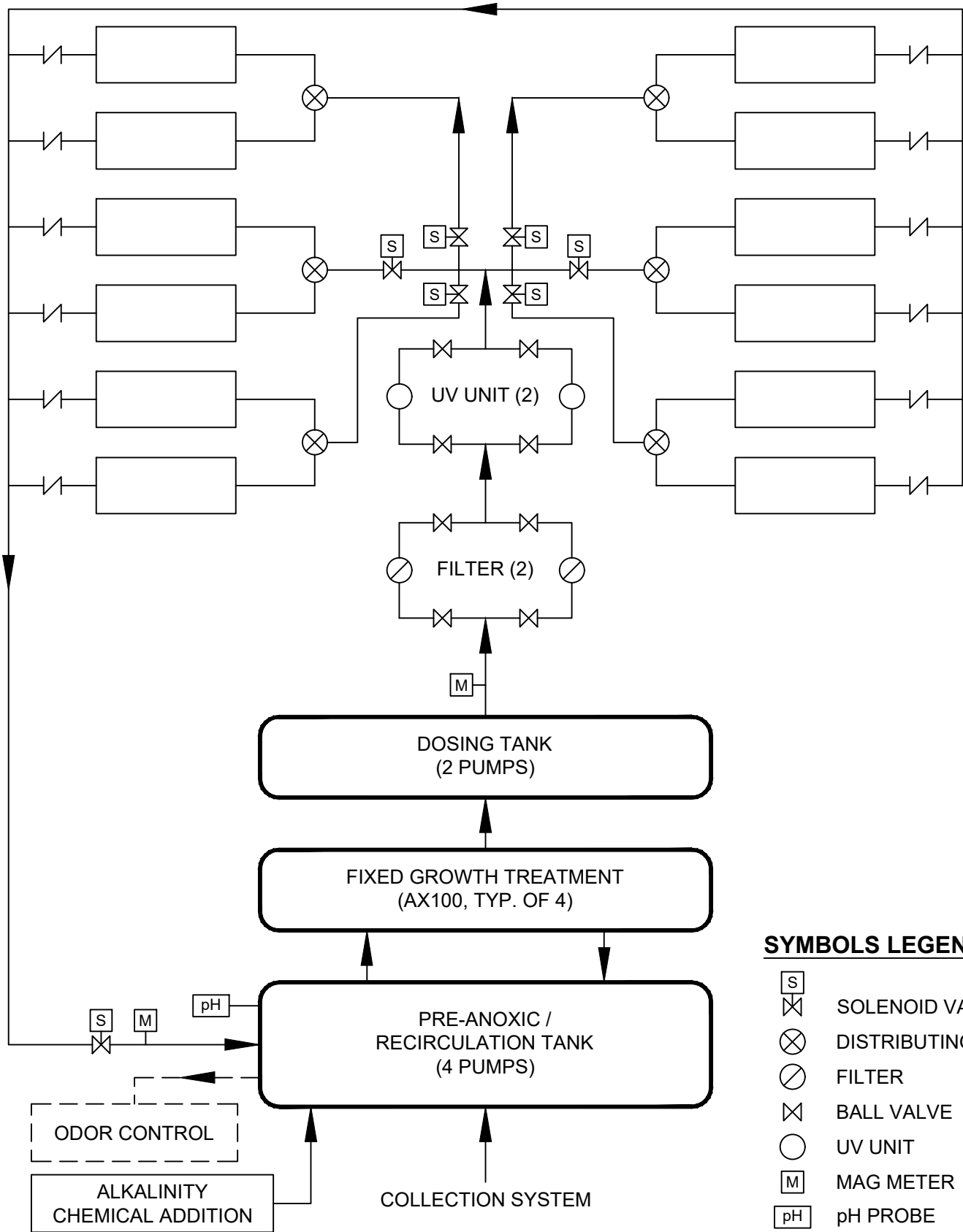
Drip Irrigation Worksheet		
OUD Graywood Farms N Subdivision		
9/20/22		
System Data		
System Design Flow	20,000	gpd
Design Loading Rate	0.200	gal/sq ft/day
Size of Drip Field	100,000	sq ft
Size of Drip Field	2.30	Acres
Lateral Spacing	2	ft
Amount of Drip Pipe	50,000	ft
No. of Zones	10	
Zone Size	10,000	sq ft
Drip Pipe Specifications (Netafim 08WRAM.6-24V)		
Dripper Flow Rate	0.62	gph
Dripper Spacing	24	in
Required Dose Rate for Design Flow		
Irrigation Time per Day	18.00	hours
Required Flow Rate	18.52	gpm
Drip Field Zone Details (Flow)		
Typical Lateral Length	300	ft
Target Zone Flow	50	gpm
Number of Distal Ends	17	
Flow per lateral	1.55	gpm
Actual Flow per Zone	26.35	gpm
Amount of Drip Pipe per Zone	5,100	ft
Drip Field Zone Details (2.0 fps Flushing)		
Number of Laterals / Distal Ends	17	
Typical Lateral Length	300	ft
Additional Flow Per Lateral for Flushing	1.60	gpm
Additional Flow for Flushing	27.20	gpm
Actual Flow per Zone	26.35	gpm
Total Flow During Flushing	53.55	gpm










FIGURES

DRIP DISPERSAL
(ZONES 1-5)

DRIP DISPERSAL
(ZONES 6-10)



SYMBOLS LEGEND

-  SOLENOID VALVE
-  DISTRIBUTING VALVE
-  FILTER
-  BALL VALVE
-  UV UNIT
-  MAG METER
-  pH PROBE

NOT TO SCALE

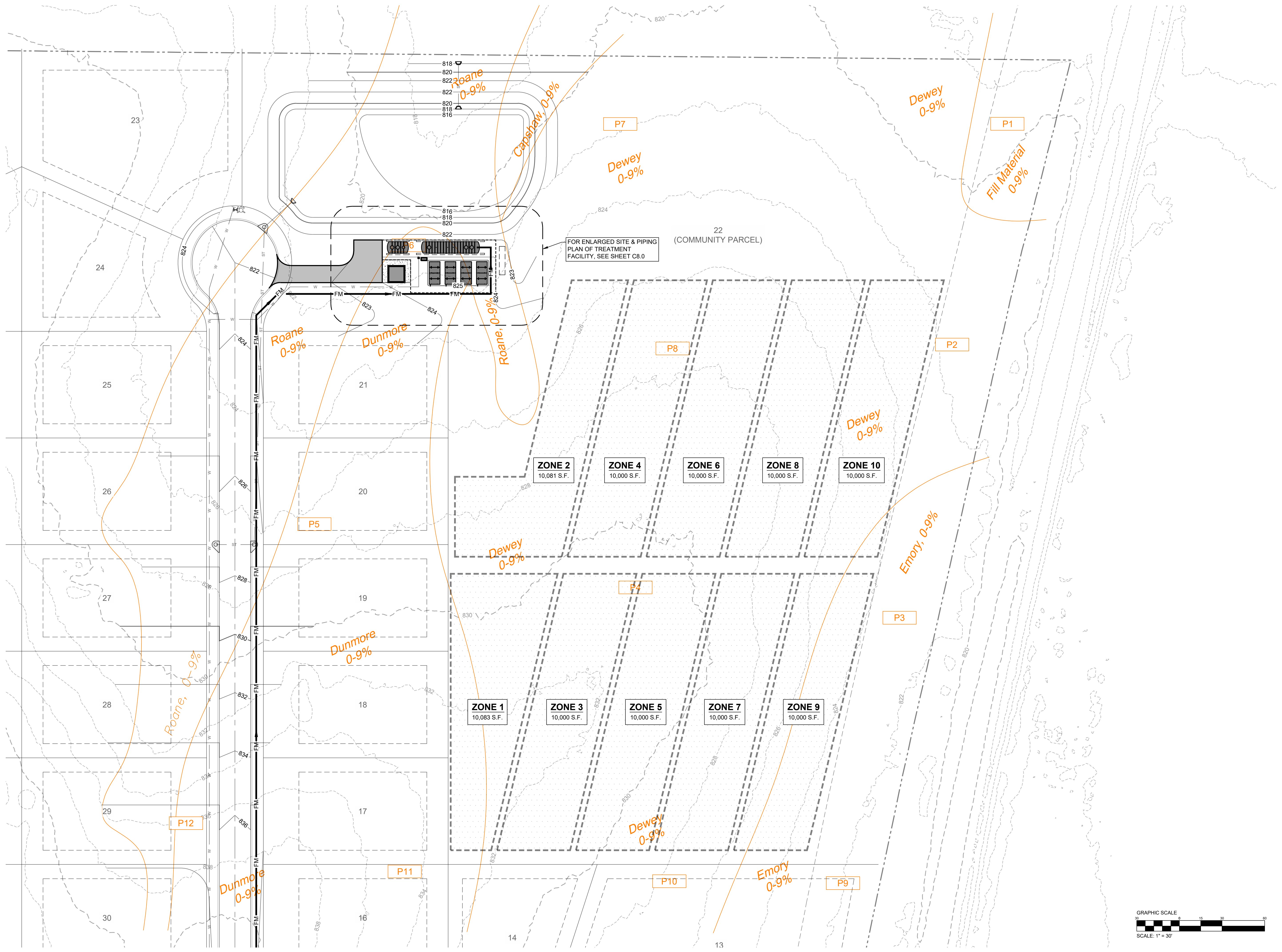


OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH WWTP DESIGN

PROCESS FLOW DIAGRAM



2711 BERRYWOOD DRIVE
NASHVILLE, TENNESSEE 37204
FOXPE.COM



All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

FOXPE
 ENGINEERING FOR THE
 WATER ENVIRONMENT
 2711 BERRYWOOD DRIVE
 NASHVILLE, TENNESSEE 37204
 FOXPE.COM

PRELIMINARY
 NOT FOR
 CONSTRUCTION

OCOEE UTILITY DISTRICT
 GRAYWOOD FARMS NORTH SEWER
 5000-002



NORTH
 DRAWN BY
CAJ
 APPROVED BY
JDF

DATE	REVISION

TITLE
 TREATMENT &
 DRIP DISPERSAL
 SITE PLAN
 DRAWING NO.
C7.0



APPENDIX



www.clevelandutilities.com

May 11, 2022

Mr. Tim Lawson
Ocoee Utility District
P.O. Box 305
Ocoee, TN 37361

RE: Decentralized Sewer System on Old Charleston Road

Dear Tim:

Last month, Cleveland Utilities was contacted by Duston Wong and Ben Berry regarding operating a decentralized sewer system for a proposed development located at 738 Old Charleston Road NE (Map 028, Parcel 046.00). This development is located within Cleveland Utilities' existing water distribution system service area. Cleveland Utilities would like to inform you of our decision not to act as the operator of the proposed decentralized sewer system for this development.

Cleveland Utilities reserves the right to act as the operator for any future development(s) with a decentralized sewer system located within Cleveland Utilities' water service area. Please let us know if you have any questions.

Sincerely,

CLEVELAND UTILITIES

A handwritten signature in blue ink that reads "Craig Mullinax". The signature is written in a cursive, flowing style.

Craig Mullinax
Vice-President, Water & Wastewater Divisions

cc (via email copy):

Mr. Tim Henderson, President/CEO, Cleveland Utilities
Mr. Jon Sparkman, Manager of Engineering, Cleveland Utilities
Mr. Duston Wong, Riverstone Construction, LLC
Mr. Ben Berry, Berry Engineers, LLC

2450 Guthrie Avenue, NW • P.O. Box 2730 • Cleveland, TN 37320-2730 • (423) 472-4521

Ocoee UD Graywood Farms, TN
Collection Design

Graywood Sewer Model w/ TDEC Design Criteria

Q=0.5N+20

Head Loss Calculations from Modified Hazen-Williams Formula:

$$H_f = 2.083 \left[\left(\frac{100}{C} \right)^{1.852} \cdot \frac{q^{1.852}}{d^{4.8655}} \right]$$

C = 120

N = Cumulative Pumps Connected to Zone

Nom Dia (in)	1	1.5	2	2.5	3	4
Act Dia (in)	1.049	1.61	2.067	2.469	3.068	4.029
SA (ft^2)	0.00600	0.01414	0.02330	0.03325	0.05134	0.08854

C = Hazen Williams Roughness Coefficient

q = flow in gpm

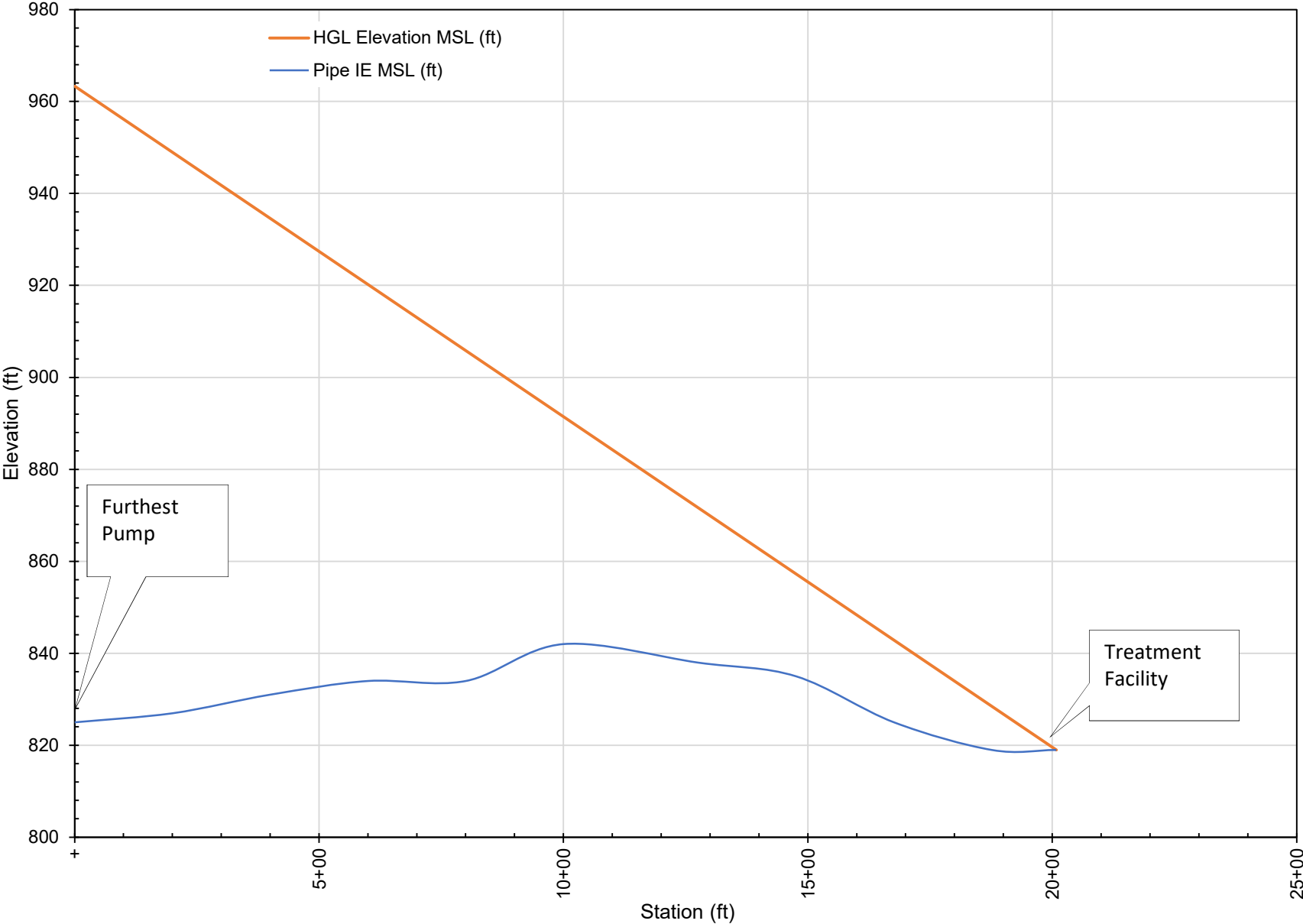
d = I.D. of pipe in inches

H_f = Friction head loss in ft/100ft of pipe

Velocity (fps) (PVC Sch40)

Zone #	Connects to Zone	N	Q (GPM)	Q(CFS)	1"	1.5"	2"	2.5"	3"	4"	Nominal Pipe Size Selection (inches)	Zone Length (ft)	Hf (ft/100ft)	Friction Loss this zone	Accum Friction Loss	Static Head (ft)	TDH (ft)	(Psi)	
1	1	57	48.5	0.11	18.0	7.6	4.6	3.3	2.1	1.2	2.0	1,895.0	5.8	109.0	109.0	17	126.0	54.5	
2	1	18	29	0.06	10.8	4.6	2.8	1.9	1.3	0.7	2.0	666.0	2.2	14.8	14.8	11	25.8	11.2	
3	1	6	23	0.05	8.5	3.6	2.2	1.5	1.0	0.6	2.0	180.0	1.4	2.6	2.6	19	21.6	9.4	
Total Length												2,741.0							

Ocoee UD, Graywood Farms - Hydraulic Grade Line



PF Series Submersible Effluent Pumps: 1-Phase, 60-Hz, 4-inch (100-mm)

Applications

Our PF Series 4-inch (100-mm) Submersible Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic tanks or dosing tanks. They are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics; all are field-serviceable and repairable with common tools; PF Series pumps are CSA certified to the U.S. and Canadian safety standards for effluent pumps, meeting UL requirements.

PF Series pumps are used in a variety of applications, including pressurized drainfields, packed bed filters, mounds, aerobic units, effluent irrigation, effluent sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault or after a secondary treatment system.



Features/Specifications

To specify this pump for your installation, require the following:

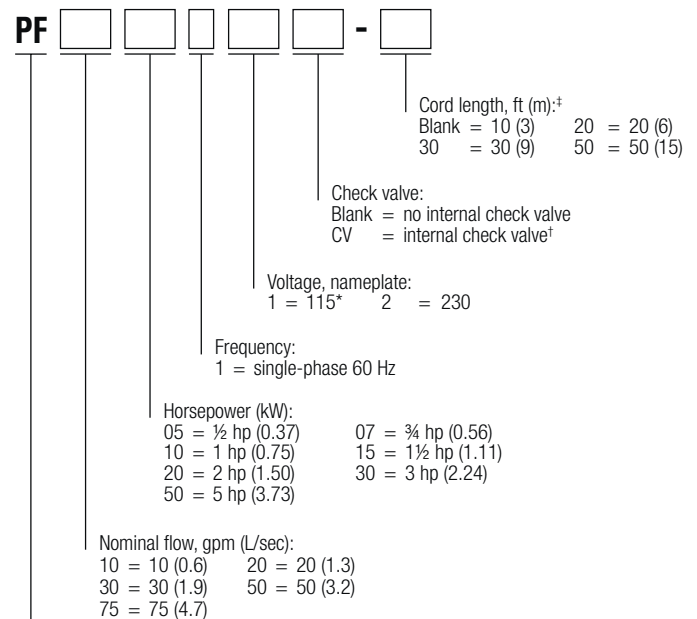
- Minimum 24-hour run-dry capability with no deterioration in pump life or performance*
- Patented 1/8-inch (3-mm) bypass orifice to ensure flow recirculation for motor cooling and to prevent air bind
- Liquid end repair kits available for better long-term cost of ownership
- TRI-SEAL™ floating impeller design on 10, 20, and 30 gpm (0.6, 1.3, and 1.9 L/sec) models; floating stack design on 50 and 75 gpm (3.2 and 4.7 L/sec) models
- Franklin Electric Super Stainless motor, rated for continuous use and frequent cycling
- Type SOOW 600-V motor cable (model PF751512 uses 14 AWG, SJ00W, 300-V cord)

* Not applicable for 5-hp (3.73 kW) models

Standard Models

See specifications chart, pages 2-3, for a list of standard pumps. For a complete list of available pumps, call Orenco.

Product Code Diagram



Pump, PF Series

* ½-hp (0.37kW) only

[†] Available for 10 gpm (0.6 L/sec), 1/2 hp (0.37 kW)

[‡] Note: 20-ft cords are available only for pumps through 1½ hp

Specifications

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Impellers	Discharge size and material ¹	Length, in. (mm)	Min. liquid level, ² in. (mm)	Weight, ³ lb (kg)	Rated cycles/day
PF100511	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF100511CV	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF100512	10 (0.6)	0.50 (0.37)	1	230	240	6.3	6.3	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF100712 ^{4,5}	10 (0.6)	0.75 (0.56)	1	230	240	8.3	8.3	8	1 ¼ in. GFP	25.9 (658)	17 (432)	30 (14)	300
PF101012 ^{5,6}	10 (0.6)	1.00 (0.75)	1	230	240	9.6	9.6	9	1 ¼ in. GFP	27.9 (709)	18 (457)	33 (15)	100
PF102012 ^{5,6,7,8}	10 (0.6)	2.00 (1.49)	1	230	240	12.1	12.1	18	1 ¼ in. SS	39.5 (1003)	22 (559)	48 (22)	100
PF200511	20 (1.3)	0.50 (0.37)	1	115	120	12.3	12.5	4	1 ¼ in. GFP	22.3 (566)	18 (457)	25 (11)	300
PF200512	20 (1.3)	0.50 (0.37)	1	230	240	6.4	6.5	4	1 ¼ in. GFP	22.5 (572)	18 (457)	26 (12)	300
PF201012 ^{4,5}	20 (1.3)	1.00 (0.75)	1	230	240	10.5	10.5	7	1 ¼ in. GFP	28.4 (721)	20 (508)	33 (15)	100
PF201512 ^{4,5}	20 (1.3)	1.50 (1.11)	1	230	240	12.4	12.6	9	1 ¼ in. GFP	34.0 (864)	24 (610)	41 (19)	100
PF300511	30 (1.9)	0.50 (0.37)	1	115	120	11.8	11.8	3	1 ¼ in. GFP	21.3 (541)	20 (508)	28 (13)	300
PF300512	30 (1.9)	0.50 (0.37)	1	230	240	6.2	6.2	3	1 ¼ in. GFP	21.3 (541)	20 (508)	25 (11)	300
PF300712	30 (1.9)	0.75 (0.56)	1	230	240	8.5	8.5	5	1 ¼ in. GFP	24.8 (630)	21 (533)	29 (13)	300
PF301012 ⁴	30 (1.9)	1.00 (0.75)	1	230	240	10.4	10.4	6	1 ¼ in. GFP	27.0 (686)	22 (559)	32 (15)	100
PF301512 ^{4,5}	30 (1.9)	1.50 (1.11)	1	230	240	12.6	12.6	8	1 ¼ in. GFP	32.8 (833)	24 (610)	40 (18)	100
PF302012 ^{5,6,7}	30 (1.9)	2.00 (1.49)	1	230	240	11.0	11.0	10	1 ¼ in. SS	35.5 (902)	26 (660)	44 (20)	100
PF303012 ^{5,6,7,8}	30 (1.9)	3.00 (2.23)	1	230	240	16.8	16.8	14	1 ¼ in. SS	44.5 (1130)	33 (838)	54 (24)	100
PF305012 ^{5,6,7,8}	30 (1.9)	5.00 (3.73)	1	230	240	25.6	25.8	23	1 ¼ in. SS	66.5 (1689)	53 (1346)	82 (37)	100
PF500511	50 (3.2)	0.50 (0.37)	1	115	120	12.1	12.1	2	2 in. SS	20.3 (516)	24 (610)	27 (12)	300
PF500512	50 (3.2)	0.50 (0.37)	1	230	240	6.2	6.2	2	2 in. SS	20.3 (516)	24 (610)	27 (12)	300
PF500712	50 (3.2)	0.75 (0.56)	1	230	240	8.5	8.5	3	2 in. SS	23.7 (602)	25 (635)	31 (14)	300
PF501012	50 (3.2)	1.00 (0.75)	1	230	240	10.1	10.1	4	2 in. SS	27.0 (686)	26 (660)	35 (16)	100
PF501512 ⁴	50 (3.2)	1.50 (1.11)	1	230	240	12.5	12.6	5	2 in. SS	32.5 (826)	30 (762)	41 (19)	100
PF503012 ^{4,5,7,8}	50 (3.2)	3.00 (2.23)	1	230	240	17.7	17.7	8	2 in. SS	43.0 (1092)	37 (940)	55 (25)	100
PF505012 ^{5,6,7,8}	50 (3.2)	5.00 (3.73)	1	230	240	26.2	26.4	13	2 in. SS	65.4 (1661)	55 (1397)	64 (29)	100
PF751012	75 (4.7)	1.00 (0.75)	1	230	240	9.9	10.0	3	2 in. SS	27.0 (686)	27 (686)	34 (15)	100
PF751512	75 (4.7)	1.50 (1.11)	1	230	240	12.1	12.3	4	2 in. SS	33.4 (848)	30 (762)	44 (20)	100

¹ GFP = glass-filled polypropylene; SS = stainless steel. The 1 ¼-in. NPT GFP discharge is 2 7/8 in. octagonal across flats; the 1 ¼-in. NPT SS discharge is 2 1/8 in. octagonal across flats; and the 2-in. NPT SS discharge is 2 7/8 in. hexagonal across flats. Discharge is female NPT threaded, U.S. nominal size, to accommodate Orenco® discharge hose and valve assemblies. Consult your Orenco Distributor about fittings to connect hose and valve assemblies to metric-sized piping.

² Minimum liquid level is for single pumps when installed in an Orenco Biotube® Pump Vault or Universal Flow Inducer. In other applications, minimum liquid level should be top of pump. Consult Orenco for more information.

³ Weight includes carton and 10-ft (3-m) cord.

⁴ High-pressure discharge assembly required.

⁵ Do not use cam-lock option (Q) on discharge assembly.

⁶ Custom discharge assembly required for these pumps. Contact Orenco.

⁷ Capacitor pack (sold separately or installed in a custom control panel) required for this pump. Contact Orenco.

⁸ Torque locks are available for all pumps, and are supplied with 3-hp and 5-hp pumps.

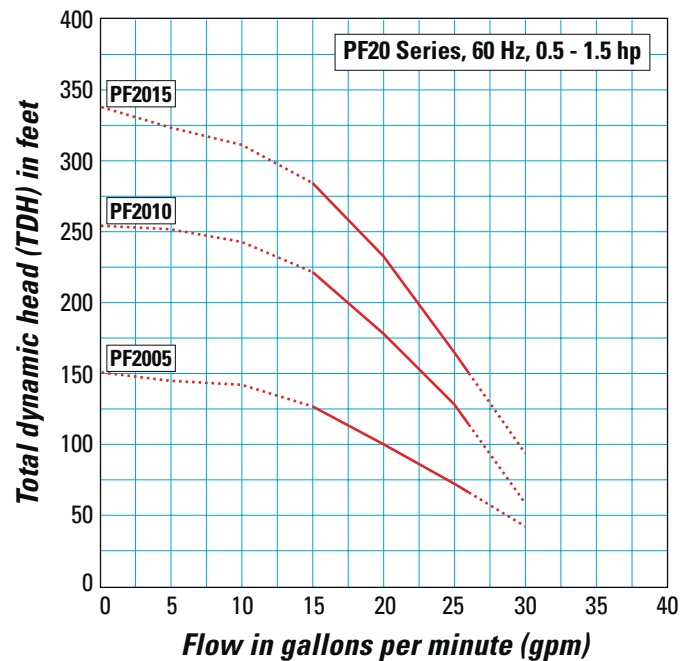
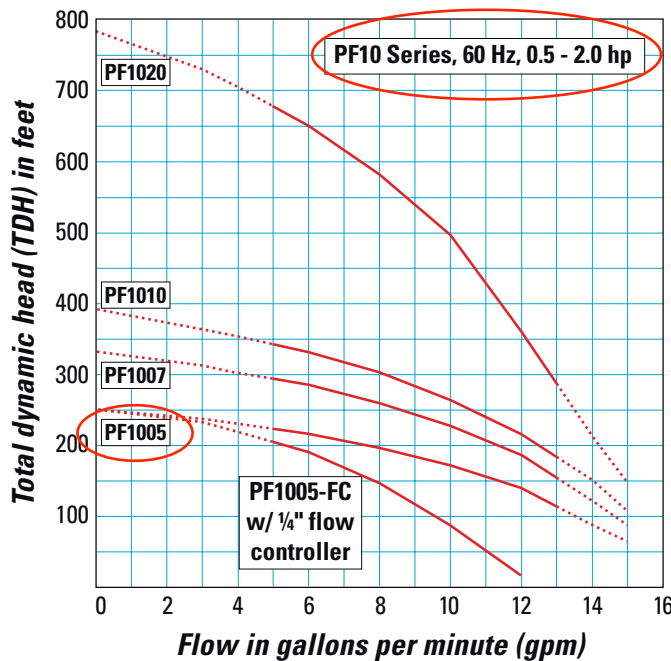
Materials of Construction

Discharge	Glass-filled polypropylene or stainless steel
Discharge bearing	Engineered thermoplastic (PEEK)
Diffusers	Glass-filled PPO (Noryl GFN3)
Impellers	Celcon® acetal copolymer on 10-, 20, and 30-gpm models; 50-gpm impellers are Noryl GFN3
Intake screen	Polypropylene
Suction connection	Stainless steel
Drive shaft	7/16 inch hexagonal stainless steel, 300 series
Coupling	Sintered stainless steel, 300 series
Shell	Stainless steel, 300 series
Motor	Franklin motor exterior constructed of stainless steel. Motor filled with deionized water and propylene glycol for constant lubrication. Hermetically sealed motor housing ensures moisture-free windings. All thrust absorbed by Kingsbury-type thrust bearing. Rated for continuous duty. Single-phase motors are equipped with surge arrestors for added security. Single-phase motors through 1.5 hp (1.11 kW) have built-in thermal over-load protection, which trips at 203-221° F (95-105° C).

Using a Pump Curve

A *pump curve* helps you determine the best pump for your system. Pump curves show the relationship between flow and pressure (total dynamic head, or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their nominal flow rate. These graphs show optimal pump operation ranges with a solid line and show flow rates outside of these ranges with a dashed line. For the most accurate pump specification, use Orenco's PumpSelect™ software.

Pump Curves



AdvanTex® AX100 Textile Filter

Applications

Orenco's AdvanTex® AX100 Treatment System is an innovative technology for onsite treatment of domestic-strength wastewater. The heart of the system is the AdvanTex Filter, a sturdy, watertight fiberglass basin filled with an engineered textile material. This lightweight, highly absorbent textile material treats a tremendous amount of wastewater in a small space. AX100 Treatment Systems are ideal for:

- New construction
- System upgrades and repairs
- Small sites
- Poor soils
- Pretreatment
- Nitrogen reduction
- Price-sensitive markets

For sizing, see AdvanTex® Design Criteria (NDA-ATX-COMM-1-PKG).



The heart of the AdvanTex® AX100 Treatment System is this sturdy, watertight fiberglass basin filled with an engineered textile material.

Features/Specifications

To specify this product, require the following:

- Wastewater treatment to better than secondary treatment standards
- Consistent treatment, even during peak flows
- Timer operation for flow monitoring, flow modulation, and surge control
- Fixed-film, engineered textile media, operated in an unsaturated condition
- Consistent media quality
- Low energy consumption
- Low maintenance requirements
- Complete pre-manufactured package, ready to install
- Watertight construction, corrosion-proof materials, and components
- Foam-core lid provides insulation value of R-6 (RSI-1.1)
- Quiet operation

Standard Model

AX100

Specifications**

Length, in. (mm)	191 (4851)
Width, in. (mm)	94 (2388)
Height, in. (mm)	42 (1067)
Area (footprint), ft ² (m ²)	128 (11.9)
Dry Weight, lb (kg)	1616 (733)

* Covered by U.S. patent numbers 6,540,920; 6,372,137; 5,531,894; 5,480,561; 5,360,556

** Nominal values provided. See AdvanTex® Treatment System drawings for exact dimensions.

AdvanTex[®] Treatment Systems

AX1000

Manufactured by **Orenco Systems[®], Inc.**



Decentralized Wastewater Treatment for Commercial Properties and Communities



814 Airway Avenue, Sutherlin, Oregon, USA 97479 • Toll-Free: 800-348-9843 • +1-541-459-4449 • www.orenco.com

Applications:

- Municipal systems
- Subdivisions, apartments
- Golf course developments, resorts
- Manufactured home parks
- Parks, RV parks, campgrounds
- Schools, churches, businesses
- Rest areas, truck stops

AdvanTex® AX100 Treatment System



Textile Media

The treatment media is a uniform, engineered textile, which is easily serviceable and allows significantly higher loading rates than traditional recirculating gravel or sand filters.



Effluent Distribution

The treatment media is microdosed at regular intervals by high-quality, low horsepower pumps. Proprietary spin nozzles distribute the effluent efficiently, optimizing treatment.



Laterals and Lids

Isolation valves, flushing valves, and hinged lids with gas springs allow easy access and servicing by a single operator.



Telemetry Controls

Orenco's telemetry-enabled control panels use a dedicated phone line, internet connection, or cellular data connectivity for round-the-clock system supervision and real-time remote control.

The Product

Orenco's patented* AdvanTex® Treatment Systems can make raw wastewater up to 98% cleaner¹, meeting stringent regulatory requirements. They can also reduce nitrogen significantly, depending on influent and configuration. Orenco's commercial-sized (AX100) AdvanTex Systems offer all the benefits of Orenco's residential line:

- Consistent, reliable treatment, even under peak flows
- Compact package, small footprint for small sites
- Premanufactured package, including textile media, for quality control
- Low maintenance requirements, low power use (<2 kWh per 1000 treated gallons)²
- Low life-cycle costs
- Production of clear effluent that's ideal for reuse

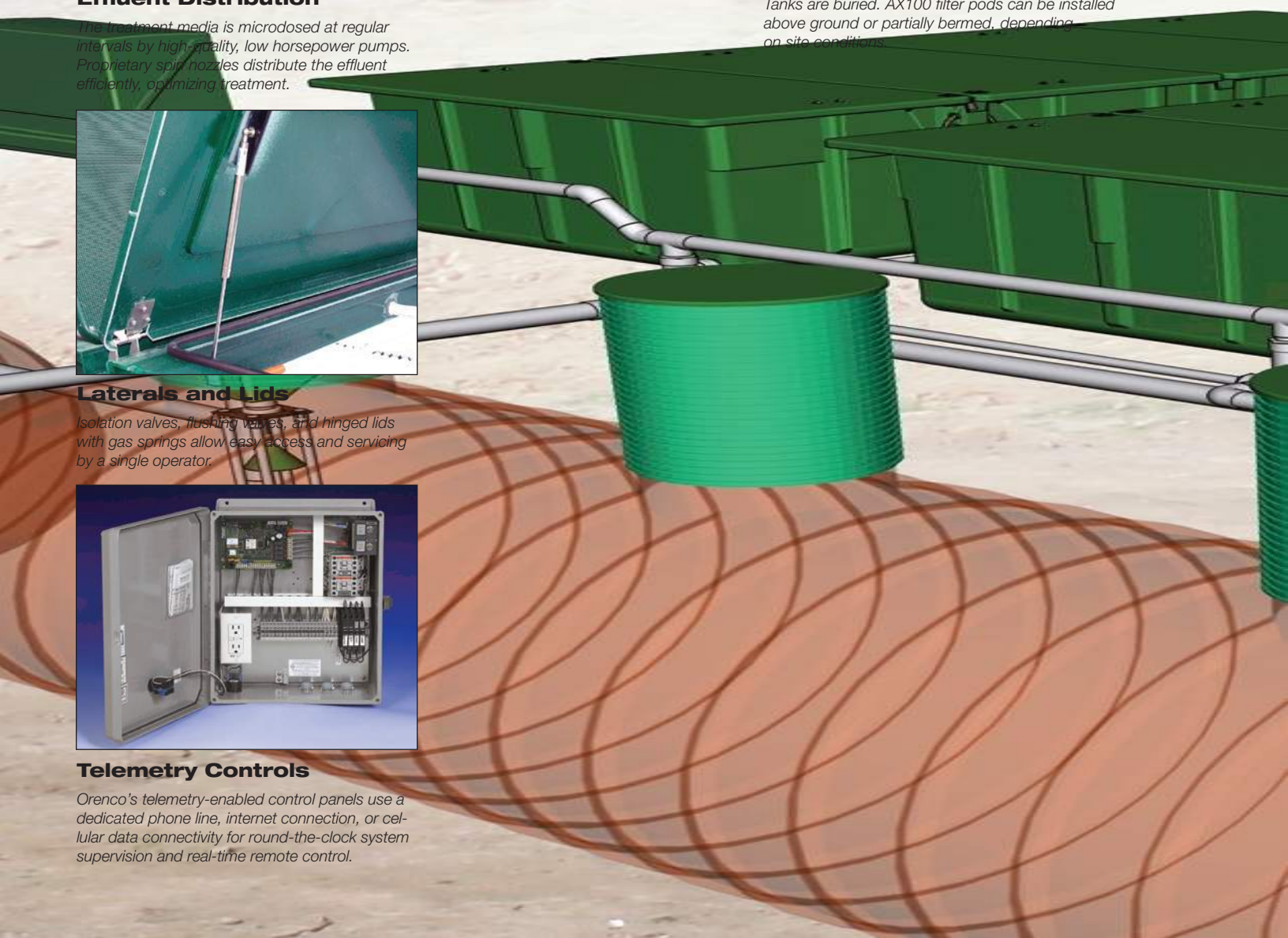
AdvanTex Treatment Systems for supplemental BOD and ammonia reduction are also available. (orenco.com/products/treatment-systems)

¹ NSF® International Standard 40 Evaluation Report, April 2002. (Evaluation performed by NovaTec Consultants, Inc.)

² Internal tests

Sample System Layout:

Tanks are buried. AX100 filter pods can be installed above ground or partially bermed, depending on site conditions.



AdvanTex® AX100 Treatment System

Decades of Research, Thousands of Installations

Orenco's AdvanTex recirculating filter unit is configured like a recirculating sand filter — a packed-bed filter technology that Orenco engineers have helped to perfect since the 1970s. Like recirculating sand filters, AdvanTex is reliable and low-maintenance. It's superior to other packed-bed filters, however, in its serviceability and longevity.

It's also superior in its treatment media. AdvanTex uses a highly efficient, lightweight textile that has a large surface area, lots of void space, and a high degree of water-holding capacity.

Consequently, AdvanTex Treatment Systems can provide treatment equivalent to that of sand filters at loading rates as high as 25-50 gpd/ft² (1000-2000 L/d/m²). That means AdvanTex can treat high-volume commercial and multi-family flows in a very compact space.

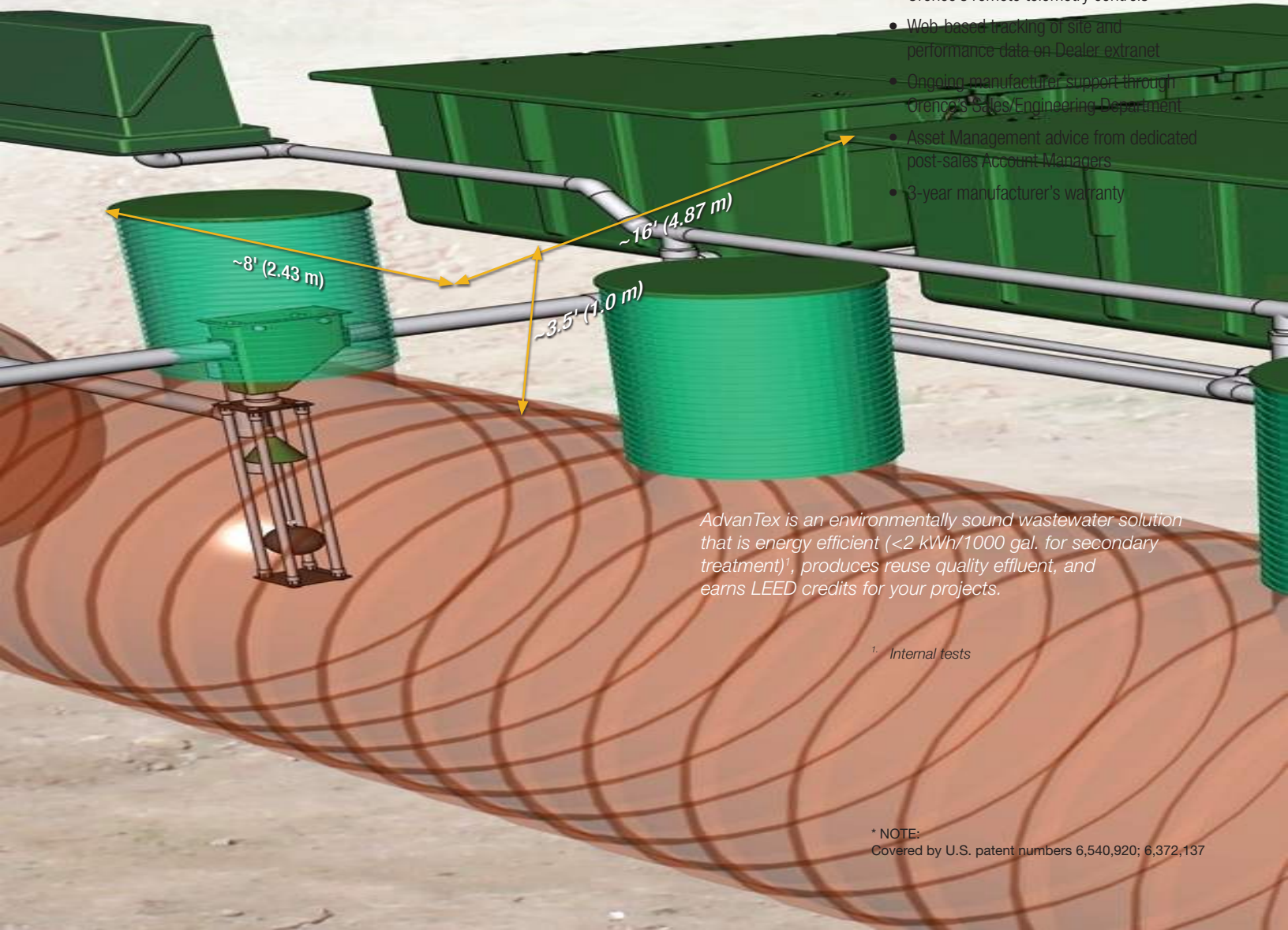
Our textile-based, multi-pass treatment technology has undergone third-party testing and evaluation to ANSI Standards. About 37,500 AdvanTex Treatment Systems have been installed throughout the world. And about 3,400 commercial-sized AX100 units are now in operation, including the installations described on the back page.

The Program

It takes more than a good product to solve on-site wastewater problems. It takes a comprehensive program ... one that ensures a successful project every time and provides support for the life of the system. That's what Orenco Systems® has done. We've engineered a program, not just a product.

Orenco's commercial AdvanTex program includes ...

- Authorized Dealers; trained Installers and Operators
- Training and plan reviews for Designers
- A comprehensive project checklist for successful system design, installation, start-up, and follow-up
- Round-the-clock system supervision via Orenco's remote telemetry controls
- Web-based tracking of site and performance data on Dealer extranet
- Ongoing manufacturer support through Orenco's Sales/Engineering Department
- Asset Management advice from dedicated post-sales Account Managers
- 3-year manufacturer's warranty



AdvanTex is an environmentally sound wastewater solution that is energy efficient (<2 kWh/1000 gal. for secondary treatment)¹, produces reuse quality effluent, and earns LEED credits for your projects.

¹ Internal tests

AdvanTex® AX100 Treatment System

Carefully Engineered by Orenco

Orenco Systems has been researching, designing, manufacturing, and selling leading-edge products for decentralized wastewater treatment systems since 1981. The company has become an industry leader, with about 350 employees and about 330 points of distribution in North and Central America, Australasia, Europe, and Africa. Our systems have been installed in more than 70 countries around the world.

Orenco maintains an environmental lab and employs dozens of civil, electrical, mechanical, and manufacturing engineers, as well as wastewater treatment system operators. Orenco's technologies are based on sound scientific principles of chemistry, biology, mechanical structure, and hydraulics. As a result, our research appears in numerous publications and our engineers are regularly asked to give workshops and trainings.



814 Airway Avenue, Sutherlin, OR 97479 USA

T: 800-348-9843
T: 541-459-4449
F: 541-459-2884

www.orenco.com

ABR-ATX-AX100-1
Rev. 2.5, © 05/18
Orenco Systems®, Inc.



Malibu Restaurant and Residential Development

Ten AX100s at the top of a Malibu bluff are treating high-strength waste from a large (200+ seat) beachfront restaurant, 100 feet (30 m) below. This high-visibility tourist destination requires reliable, odor-free operation. Effluent sampling indicates excellent treatment, including nitrogen reduction. At an adjacent residential community, another system has been installed, consisting of 20 AX100s capable of treating up to 60,000 gpd (227,000 L/d) peak flows.

Mobile, Alabama Utility-Managed Subdivisions

Since 2003, South Alabama Utilities (SAU) in Mobile County, Alabama, has become the subject of nationwide classes, presentations, and tours because of its ambitious and innovative solution for serving nearly 4,000 new customers in 47 new subdivisions in western Mobile County (as well as a number of new schools and commercial properties). How? By installing more than 60 miles (96.5 km) of interconnected Orenco Sewers that are followed by 141 AdvanTex AX100s located at 13 different treatment sites. All told, SAU has the capacity to treat nearly half a million gpd (1.9 million L/d) of effluent, at better than 10 mg/L BOD/TSS.



Champion Hills is one of the many subdivisions in rural Mobile County served by Orenco's effluent sewers and treatment systems.

Under SAU's program, developers, builders, homeowners, and the utility all share the cost of extending wastewater infrastructure. Costs vary by development, but SAU currently charges homeowners about \$35-40/month for service. Overall costs are about half the cost of conventional sewers.



Oregon Riverside Community

Since 2003, twelve AX100s have been providing advanced secondary wastewater treatment in Hebo, Oregon, for a small community collection system that discharges directly into Three Rivers, after UV disinfection. The average annual design flow is 17,000 gpd (64,400 L/d), with a peak daily design flow of 80,000 gpd (303,000 L/d) to account for I&I contributions from the collection system. Effluent cBOD₅ and TSS have averaged 4.2 and 3.3 mg/L, respectively.*

* Samples collected and analyzed by a third party between 1-17-03 and 6-1-11.

To order a complete design/engineering package for Orenco's Commercial AdvanTex Treatment Systems, contact your local Commercial AdvanTex Dealer. To find a Commercial Dealer, go to orenco.com and click on "Distributor Locator." Or call 800-348-9843 and ask for a systems engineer.

APPENDIX I-D-2

PRELIMINARY DESIGN SUBMISSION REVIEW GUIDANCE – ENGINEERING REPORT - CHECKLIST

LEGEND: SEE APPENDIX I-D

II. ENGINEERING REPORT (BASIS OF DESIGN OR DESIGN MEMORANDUM):
 PURPOSE: DEMONSTRATE DUE DILIGENCE WITH RESPECT TO INFLUENT CHARACTERIZATION AND CONFORMANCE TO *CRITERIA* OR JUSTIFICATION FOR DEPARTURES; DEFINE START-UP AND DEMONSTRATION CONDITIONS; RESOLVE ISSUES OF OPERATIONAL AND PERFORMANCE INTENT IN FUTURE YEARS AS PLANT APPROACHES EXPANSION; PROVIDE OWNER-ENGINEER-REGULATOR UNDERSTANDING OF EXPECTATIONS OF PERFORMANCE FOR FINAL DESIGN AND CONSTRUCTED FACILITY; PROVIDE DOCUMENTATION BASIS FOR OPERATOR TRAINING AND OPTIMIZATION.

ITEM	DESCRIPTION	4-step process req'd				4-step process optional				
		Treatment				Non-treatment				
		TF	DC	IW	LA	SLS	FM	GR	RH	RU
	Cover Letter including: Description of the project; utility and design contact persons (name, organization name, address, email, phone number and fax number); project location (county and city); associated NPDES or SOP number and treatment plant name; enclosures, e.g., plan sheets (format), engineering report (format), fee worksheet (format), engineering report check fee. Cover letter must be signed by utility representative or submitted “on behalf of “the utility and an appropriate representative of the utility copied.	X	X	X	X	X	X	X	X	X
	Cover letter continued: linear feet, diameter, and type (force main, gravity sewer, low pressure sewer);		<input checked="" type="checkbox"/>				X	X		
	Cover letter continued: treatment/pumping capacity in MGD	X	X	X	X	X				X
	Cover letter continued: for line rehabilitation: linear feet and size by activity, e.g., replacement, pipe-bursting, cured-in-place, slip-line, TV inspection, smoke testing; number of manhole or service lateral rehabs								X	
A.	Basis for influent flow characterization (e.g. estimates from <i>Design Criteria</i> -Chapter 2, flow monitoring or other current data, sampling, pretreatment program, industrial owner projections, population trends, population predictions, etc.)	X	X	X	X	X	X	X	X	X
B.	Characterization of flow (diurnal patterns, ADDWF, ADF, Design Flow, Peak Flow; organic and industrial inorganic loads (CBOD5, NH3-N, pH, TN, TP, (COD), alkalinity, metals, toxic/hazardous materials); grit and trash loading estimates or data	X	X	X	X	X	X	X	X	X
C.	Unit process design parameters (referenced to <i>Design Criteria</i> chapters 2-17; or pertinent data on systems not covered by Design Criteria); equipment selection rationale should demonstrate appropriateness of capacity and capability throughout range of operation currently (ADDWF-Peak Flow) and existing to 20 year design flow in order to meet discharge permit, land application conditions or reuse conditions. Conformance to manufacturers’ hydraulic or	X	X	X	X	?	?	?	?	?

	nutrient loading parameters. (Life cycle alternative analyses for process or equipment selected if not previously provided in PER or as requested at time of preliminary discussion.)									
D.	Pump hydraulics (System curves superimposed on pump curves for minimum and maximum head conditions and at least C=130 Hazen-Williams friction coefficient); one set of system curves should match hydraulic profile flows and head conditions; others should be defined by extremes.	X	X ☒	X	X	X	X			X
E.	Chemical feed pump selection data demonstrating ability to meet range of target concentrations over process flow rates	?	?	?	?					?
F.	Chemical storage volumes and environments to meet safety and compatibility requirements	?	?	?	?	?				?
G.	Reliability levels for equipment and power supplies; appropriate redundancy and ability to isolate for maintenance and operational conditions	X	X ☒	X	X	X				X
H.	Energy saving solutions considered (e.g., variable speed drives on pumps and blowers, denitrification capability, timers on blowers based on DO or ORP instrumentation, power factor correction, pump soft start controls)	X			X	X				?
I.	Odor control consideration	X			?	X	X		?	?
J.	Corrosion control consideration	X			?	X	X		?	?
K.	Velocities in gravity sewers and mitigation if required						X	X		
L.	Calculations for nutrient and hydraulic loading for land application areas; emergency storage for spray application systems, crop management				X					X
M.	Flow data (from temporary or permanent flow meters, pump run-times, pump power consumption, overflows as a function of rainfall events, influent flow meters at pump stations or wastewater treatment plant versus rainfall events) in existing collection system	X			X	X				X
N.	Justification for rehabilitation methodology, scope and site selection; methods to be used to ensure quality control and to reduce failures of rehab pipe at connection to manholes; method to measure reduction in flows								X	
O.	Potential reuse sales; required quality; example reuse contracts; meter locations and sampling plan to determine delivery of appropriate quality reclaimed water.	X								X
P.	Status and coverage of all required/anticipated permits including state, federal, and local, outlined	X	X ☒	X	X	?	?	?	?	?
Q.	Tables demonstrating unit process conformance to the appropriate <i>Design Criteria</i> requirements or justification for systems not addressed or whose performance is outside the <i>Design Criteria</i> accepted performance. (Checklists being developed and included in <i>Design Criteria</i> may be used for this purpose.)	X	X ☒	X	X	X	?	?	?	X
R.	Recommend inclusion of cut sheets for equipment and instrumentation and checklists from Design Criteria (as available) as appendices to ER to expedite reviews	X	X ☒	X	X	X	?	?	?	X

APPENDIX 1-D-3

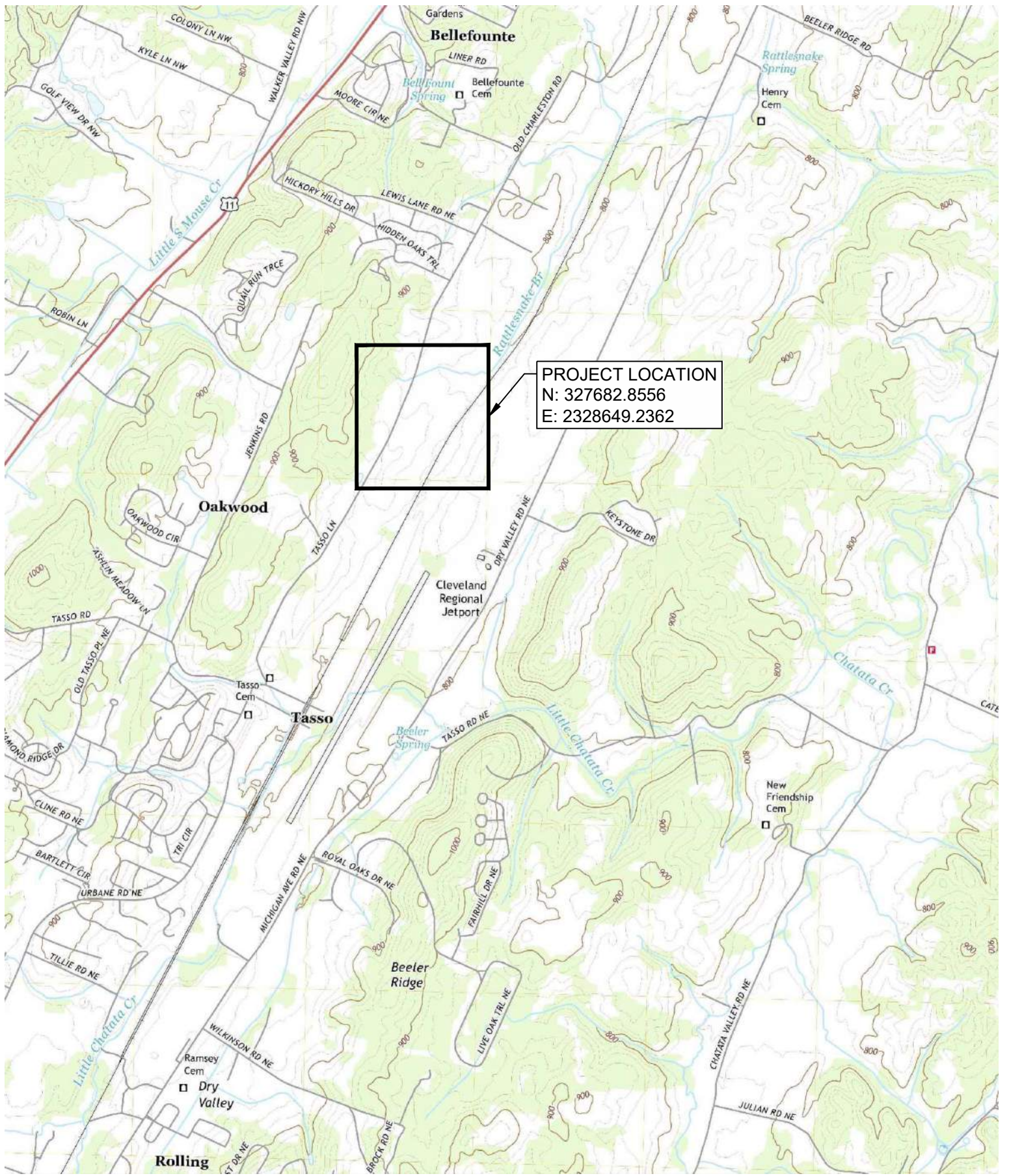
PRELIMINARY DESIGN SUBMISSION REVIEW GUIDANCE – PRELIMINARY PLANS

SEE LEGEND IN APPENDIX 1-D

ITEM	DESCRIPTION	4-step process req'd				4-step process optional				
		Treatment				Non-treatment				
		TF	DC	IW	LA	SLS	FM	GR	RH	RU
I.	PRELIMINARY PLANS (DRAWINGS) SUBMITTAL (All or portions may be included in Engineering Report submitted concurrently). (ENSURE ALL FLOW STREAMS ARE ACCOUNTED FOR IN DESIGN; PROVIDE GUIDELINES FOR REST OF DESIGN PROCEDURE; DEFINE PLANT EXPECTATIONS FOR DETAILED DESIGN; INCLUDE FLEXIBILITY OF THE PROCESS CONTROL AND INSTRUMENTATION TO ACCOMMODATE OPERATOR OPTIMIZATION OF THE PROCESS; DRAWINGS SHOULD PROVIDE SCHEMATIC FOR OPERATOR TRAINING AND OPTIMIZATION.)									
A.	Cover Sheet with site location, project name, permittee signature (submittal approval), design professional seal (indicating preliminary submittal – not for construction), architectural/code standards; seismic design standards; anticipated table of contents indicating preliminary sheets included; local zoning designation of property	X	X	X	X	X	X	X	X	
B.	Existing facilities site plan (collection and/or treatment system); indicating anticipated demolition and renovation, rehabilitation or replacement; topographical features	?	? N/A	X	? ?	? ?	? ?	? ?	X	
C.	Nature and extent of the service area including existing and 20 year projected development; types of wastewater and inherent constituents expected in wastewater; facilities with pretreatment requirements; categorical dischargers	X	X N/A	X	X	X	X	X	X	
D.	Proposed site plan(s) including surveyed property boundaries, plat identification information, adjacent property ownership and plat identification, proposed facility and major pipeline locations, existing and proposed easements; existing wetlands, streams/wet weather conveyances, sinkholes, wooded and open areas, 100 year flood elevation (and 500 year if USDA RDA funding is to be utilized), agreement to transfer property and required accessibility to operational utility; topographical features; provisions for access management and security.	X	X ☒		X	X	X	X	?	
E.	Soil map(s) for proposed disposal areas with contours, pit sites, proposed disposal/drip/spray zones delineated; appropriate scale, legend for soil characterization; soil characteristic pits; geotechnical nature of construction sites				X					X
F.	Process flow diagram (sometimes called schematic design; or Process and Instrumentation Diagrams meeting ANSI/ISA-5.1-2009); include: <ul style="list-style-type: none"> All elements should have a designation number and name to aid in linking to cut sheets; may use P&ID convention or other on legend Piping: type, pressure class, nominal diameter; lines annotated with critical and design flow rates and type of flow (gravity or pressure); chemical compatibility if applicable; name if appropriate (e.g., dosing fields forward flush return); if not continuously shown, provide the destination and key to different drawing; flow direction arrows Inlet and outlets: size, proposed elevation; critical pressures and temperature if a process or hydraulic design characteristic 	X	X ☒	X	X	X				

	<ul style="list-style-type: none"> Processes equipment (indicating critical design parameters required to support design criteria comparison or justification of departure from criteria); manufacturer or performance characteristic; model if sole source Instrumentation equipment and control devices; diagram should differentiate between piping and signal flow paths, between parameter transmission and control signal paths, between local, remote and SCADA control levels, between existing elements and proposed. Pumps: design and critical characteristics (flow and head); type pump; motor size (hp, voltage); number indicated; check valves; isolation valves; air release valves Valves or flow control devices: types; size; operator; control signal or manual Tanks: construction, effective volume, control or setting levels Meters: type; size; models and/or required performance range and accuracy Legend: symbols and abbreviations (For small projects the hydraulic profile requirement may be incorporated into the process flow diagram.) 									
G.	Structure/building footprints with major equipment locations	X	X	X	X	X	X		X	
H.	Plant and yard piping, force main, gravity lines (may be single lines for preliminary submittal)	X	X		X	X	X	X	?	
I.	Hydraulic profile: single straight-through profile and additional side profiles if pumps involved; Hydraulic Head (pressure + elevation; vs distance & elevation) at critical design flow as determined by and defined by designer.	X	X	X	X	X	X			
J.	Pump station and storage basin elevations or cross section with control levels/set points and volumes between control levels indicated	X	X		X	X	?	?		
K.	One line electrical distribution diagram showing normal, secondary and standby power	X	X		X	X			?	
L.	Sewer system annotated with standard or equivalent material conditions and rationale for rehab work extent as derived from flow monitoring/sanitary sewer evaluation study (SSES) investigations.		X						X	

- Included in this design report
N/A - Not applicable for this project



PROJECT LOCATION
 N: 327682.8556
 E: 2328649.2362

MAP SOURCE:
 USGS topoView

<https://ngmdb.usgs.gov/topoview/viewer/#15/35.2290/-84.7911>



OCOEE UTILITY DISTRICT
 GRAYWOOD FARMS NORTH WWTP DESIGN

TOPOGRAPHIC MAP



2711 BERRYWOOD DRIVE
 NASHVILLE, TENNESSEE 37204
 FOXPE.COM

Appendix B
Preliminary Plans

CLIENT LOGO

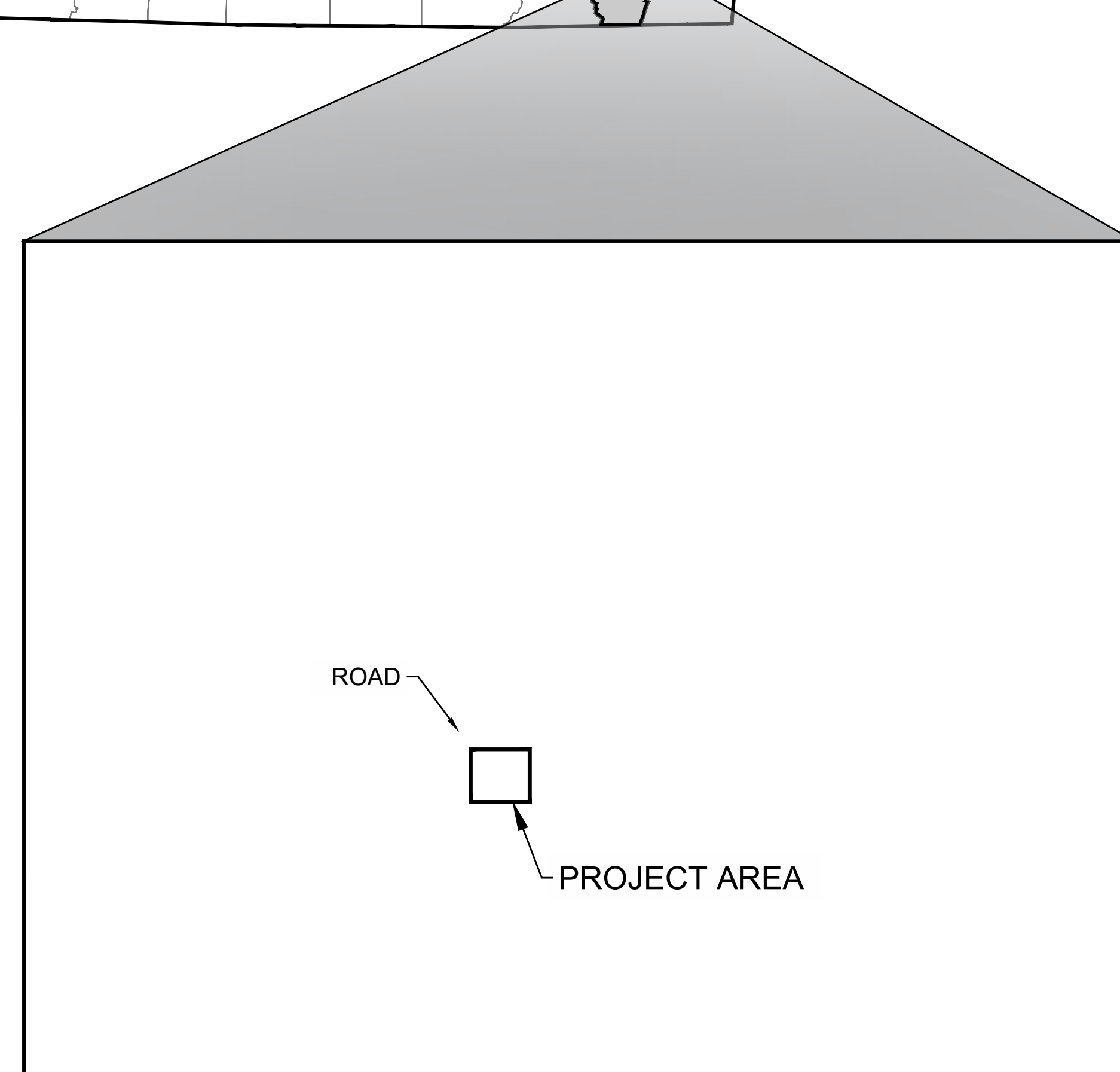
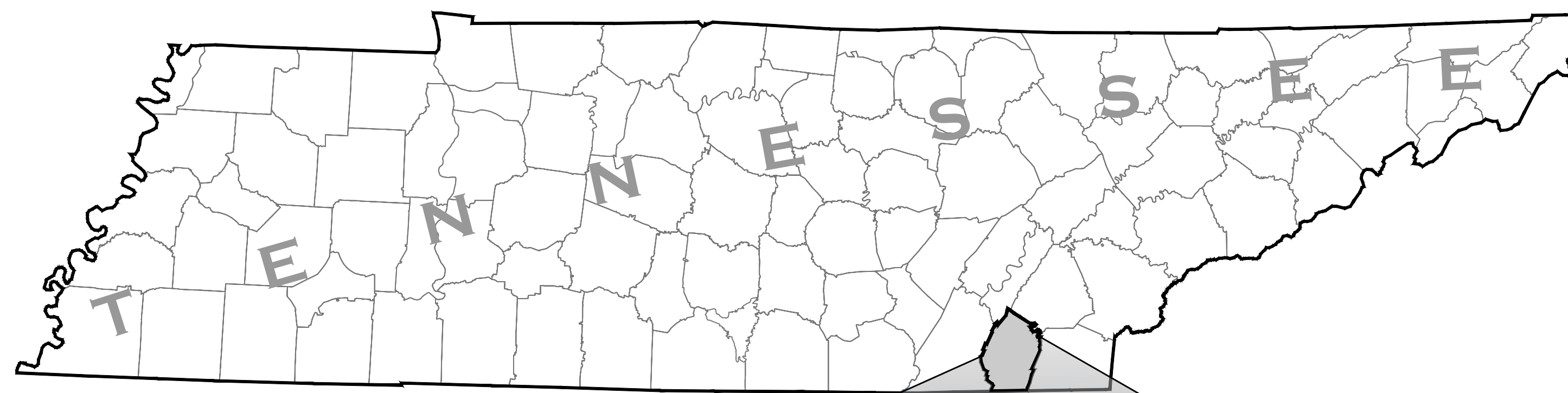
OCOEE UTILITY DISTRICT GRAYWOOD FARMS NORTH SEWER

CLEVELAND, BRADLEY COUNTY, TENNESSEE



DRAWING INDEX

SHEET NUMBER	SHEET TITLE
GENERAL	
G1.0	COVER SHEET
G2.0	GENERAL NOTES
G3.0	LEGEND & SYMBOLOGY
CIVIL: COLLECTION SYSTEM	
C1.0	COLLECTION SYSTEM OVERALL PLAN
C2.0	FORCEMAIN FM-A1 PLAN & PROFILE
C3.0	FORCEMAIN FM-A1 PLAN & PROFILE
C4.0	FORCEMAIN FM-A2 PLAN & PROFILE
C5.0	FORCEMAIN FM-B PLAN & PROFILE
C6.0	FORCEMAIN FM-C PLAN & PROFILE
CIVIL: TREATMENT & DRIP DISPERSAL	
C7.0	TREATMENT & DRIP DISPERSAL SITE PLAN
C8.0	ENLARGED SITE PLAN
C9.0	ENLARGED DRIP DISPERSAL LAYOUT
C10.0	ENLARGED DRIP DISPERSAL LAYOUT & DETAILS
CIVIL: CIVIL DETAILS	
C11.0	CIVIL DETAILS
C12.0	CIVIL DETAILS



VICINITY MAP

NOT TO SCALE

PROJECT TEAM

COLLECTION SYSTEM, TREATMENT & DRIP DISPERSAL
FOXPE, LLC
2711 BERRYWOOD DRIVE
NASHVILLE, TENNESSEE 37204

OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH SEWER

CLIENT LOGO

PRELIMINARY
NOT
FOR BID

GRADING & EXCAVATION

- WHEN SPECIFIC GRADING REQUIREMENTS ARE NOT SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL GRADE ALL AREAS WITHIN THE LIMITS OF CONSTRUCTION, OR OTHERWISE DISTURBED BY CONSTRUCTION.
- THE CONTRACTOR SHALL PERFORM ALL NECESSARY STRIPPING OF EXISTING TOPSOIL ON THE JOBSITE.
- NEWLY GRADED, EARTH AREAS NOT TO BE PAVED, RIP-RAPPED, OR STABILIZED, SHALL BE SEEDED IN ACCORDANCE WITH THE SPECIFICATIONS. PRIOR TO SEEDING, A FOUR INCH LAYER OF TOPSOIL SHALL BE PLACED ON THESE AREAS IN ACCORDANCE WITH SAID SPECIFICATIONS.
- THE CONTRACTOR IS TO LEGALLY DISPOSE OF, AT HIS OWN EXPENSE, ALL UNSUITABLE AND/OR SURPLUS, EXCAVATED MATERIAL.
- EXCAVATION ADJACENT TO EXISTING PAVEMENT SHALL BE MADE TO A NEAT LINE.
- NO TREES SHALL BE REMOVED WITHOUT OWNER'S PERMISSION. ALL TREES THAT ARE CUT OR KNOCKED DOWN WITHIN THE LIMITS OF CONSTRUCTION ARE TO BE REMOVED AND DISPOSED OF OFF-SITE AT THE CONTRACTOR'S EXPENSE. BURNING IS NOT PERMITTED, EXCEPT AS PROVIDED IN THE SPECIFICATIONS.

EROSION & SEDIMENT CONTROL

- ALL LOCAL, STATE, AND FEDERAL EROSION CONTROL REQUIREMENTS SHALL BE FOLLOWED DURING CONSTRUCTION. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO CONTROL EROSION AND WATER POLLUTION THROUGH THE CONSTRUCTION PERIOD. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE IN PLACE BEFORE EARTH MOVING OPERATIONS BEGIN. CLEARING AND GRUBBING SHALL BE HELD TO A MINIMUM WIDTH NECESSARY TO ACCOMMODATE CONSTRUCTION SLOPES. EMBANKMENTS AND EXCAVATED AREAS SHALL BE PROMPTLY STABILIZED TO MINIMIZE EROSION. EROSION CHECKS AND SILT FENCE SHALL BE USED ALONG THE TOE OF FILL SLOPES, IN DITCHES, AND IN OTHER AREAS WHERE EROSION IS A PROBLEM AND SILT-LADEN RUNOFF MAY ENTER A STREAM OR ADJACENT PROPERTY.
- ANY STOCKPILED SOIL OR FILL MATERIAL SHALL BE LOCATED AND TREATED IN A MANNER TO PREVENT SILT ENTERING STREAMS. NO EXCAVATED MATERIAL SHALL BE DISCHARGED INTO DITCHES. THE CONTRACTOR SHALL DISPOSE OF ALL EXCAVATED MATERIAL IN A LOCATION, APPROVED BY THE ENGINEER, ABOVE THE NORMAL HIGH WATER ELEVATION.
- THE CONTRACTOR IS RESPONSIBLE FOR ADHERING TO ALL EROSION CONTROL PROVISIONS AS SET FORTH IN THE EROSION & SEDIMENT CONTROL HANDBOOK AVAILABLE FROM THE TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION.
- THE CONTRACTOR SHALL MAINTAIN THE EROSION CONTROL MEASURES THROUGHOUT THE LENGTH OF THE CONTRACT AS REQUIRED.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY EROSION AND WATER CONTROL MEASURES (SUCH AS BERMS, SEDIMENT BASINS, SLOPE DRAINS, AND SILT FENCES) AS DIRECTED BY THE ENGINEER.
- NO EARTH OR OTHER ERODIBLE MATERIAL SHALL BE USED TO DIVERT STREAM FLOW OR TO CONSTRUCT COFFERDAMS. CLEAN CUT ROCK WITH FINES MAY BE USED, OR, IN THE CASE OF COFFERDAMS, STEEL SHEETING OR SAND BAGS IS PERMISSIBLE. WATER OR SEDIMENT ISOLATED BY COFFERDAMS SHALL BE PUMPED INTO SEDIMENT BASINS ON THE BANK OF THE STREAM.

UTILITIES

- LOCATIONS OF UTILITIES, PUBLIC AND/OR PRIVATE, ARE APPROXIMATE ONLY, AND THE EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD. IT IS POSSIBLE THAT SOME EXISTING FACILITIES ARE NOT SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING ALL UNDERGROUND UTILITY FACILITIES LOCATED AND MARKED PRIOR TO THE BEGINNING OF CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITY OWNERS PRIOR TO INTERRUPTING ANY ELECTRICAL, COMMUNICATIONS, GAS, WATER, OR SEWER SERVICES. THE CONTRACTOR SHALL ALSO NOTIFY AFFECTED UTILITY CUSTOMERS AT LEAST 24 HOURS BEFORE INTERRUPTING THE CUSTOMERS' SERVICE. WHERE INDIVIDUAL SERVICES ARE TO BE DISCONTINUED FOR MORE THAN 8 HOURS, THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR PROVIDING TEMPORARY SERVICE SATISFACTORY TO THE AFFECTED CUSTOMER. THE REPAIR OR REPLACEMENT OF UTILITY COMPONENTS SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF THE UTILITY OWNER. NO SEPARATE PAYMENT SHALL BE MADE FOR THESE ACTIVITIES.
- THE CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTIVE MEASURES TO SAFEGUARD EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION OF THIS PROJECT. SHOULD SPECIAL EQUIPMENT BE REQUIRED TO WORK OVER AND AROUND THE UTILITIES, THE CONTRACTOR SHALL BE REQUIRED TO FURNISH SUCH EQUIPMENT. THE COST OF PROTECTING UTILITIES FROM DAMAGE AND FOR FURNISHING SPECIAL EQUIPMENT SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF CONSTRUCTION.
- ANY EXISTING STORM DRAINAGE PIPING DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED AS RAPIDLY AS POSSIBLE AND THEN BE INSPECTED BY ITS RESPECTIVE OWNER.
- IF ANY UTILITIES ARE DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY'S OWNER. REPAIR OF THE UTILITY SHALL THEN BE ACCORDING TO THE OWNER'S INSTRUCTIONS, AND ALL COST PAID FOR BY CONTRACTOR.

MISCELLANEOUS

- THE ENGINEER SHALL HAVE THE AUTHORITY TO DESIGNATE AND/OR LIMIT AREAS OF CONSTRUCTION.
- THE OWNER MAKES NO REPRESENTATIONS ABOUT SUBSURFACE CONDITIONS THAT MAY BE ENCOUNTERED WITHIN THE LIMITS OF THE PROJECT. THE CONTRACTOR SHOULD SATISFY HIMSELF BY ON-SITE INSPECTIONS, CORE DRILLINGS, OR OTHER METHODS, OF THE SUBSURFACE CONDITIONS THAT MAY BE ENCOUNTERED. THE RISK OF ENCOUNTERING AND CORRECTING UNFAVORABLE SUBSURFACE CONDITIONS SHALL BE BORNE SOLELY BY THE CONTRACTOR.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL FIELD LAYOUTS.
- ALL SALVAGEABLE MATERIAL FROM EXISTING PIPING AND STRUCTURES SHALL REMAIN PROPERTY OF THE OWNER. SAID MATERIAL SHALL BE CLEANED AND THEN DELIVERED TO THE OWNER AT A LOCATION DESIGNATED BY THE ENGINEER.
- ALL UNSUITABLE MATERIAL, AS DETERMINED BY THE ENGINEER OR THROUGH TESTING, IS TO BE REMOVED AND REPLACED WITH SUITABLE MATERIAL.
- THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING AT HIS OWN EXPENSE ANY AND ALL DAMAGE THAT MAY OCCUR INSIDE AND OUTSIDE THE LIMITS OF THIS PROJECT AS A RESULT OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PAYMENT FOR TESTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND ORDERING APPROPRIATE TESTS AS REQUIRED. THE TESTING COMPANIES SHALL BE APPROVED BY OWNER AND ENGINEER.
- THE CONTRACTOR SHALL PROVIDE RECORD DRAWINGS OF THE PROJECT WITHIN THIRTY (30) DAYS AFTER SUBSTANTIAL COMPLETION OF THE WORK. "SUBSTANTIAL COMPLETION" SHALL BE DEFINED BY THE SPECIFICATIONS. THE OWNER RESERVES THE RIGHT TO WITHHOLD RETAINAGE UNTIL RECEIVING A COMPLETE SET OF SAID RECORD DRAWINGS.
- SHOULD THERE BE A CONFLICT BETWEEN THESE GENERAL NOTES, CONTRACT DRAWINGS, AND/OR SPECIFICATIONS, THE MOST RESTRICTIVE INTERPRETATION IN FAVOR OF THE OWNER SHALL PREVAIL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY CLARIFICATION OR INTERPRETATION OF GENERAL NOTES, CONTRACT DRAWINGS, AND/OR SPECIFICATIONS, IN ADVANCE AND IN WRITING, FROM THE ENGINEER.

PROJECT SPECIFIC NOTES

- CONTRACTOR TO VERIFY ELEVATIONS OF EXISTING STRUCTURES PRIOR TO SUBMITTAL OF EQUIPMENT OR MATERIALS.
- REPLACE ALL EXISTING PAVEMENT IN STREETS, DRIVEWAYS, OR PARKING AREAS WHICH IS REMOVED, DESTROYED, OR DAMAGED BY CONSTRUCTION OF IMPROVEMENTS.

ABBREVIATIONS

GENERAL

ABV	ABOVE	GAL	GALLON	R	RISER
AD	AREA DRAIN	GALV	GALVANIZED	RAD	RADIUS
ADJ	ADJUSTABLE	GND	GROUND	RD	ROOF DRAIN
AFF	ABOVE FINISH FLOOR	GV	GATE VALVE	REF	REFERENCE
ALT	ALTERNATE			REINF	REINFORCED
APPROX	APPROXIMATE	HC	HANDICAPPED	REQ	REQUIRED
ARCH	ARCHITECT	HDWR	HARDWARE	RM	ROOM
		HT	HEIGHT	RO	ROUGH OPENING
B&J	BORE AND JACK	HORIZ	HORIZONTAL	S	SOUTH
BET	BETWEEN	HR	HOUR	SC	SERVICE CONNECTION
BGS	BELOW GRADE SURFACE			SCHED	SCHEDULED
BLDG	BUILDING	ID	INNER DIAMETER	SEAL	SEALANT
BLW	BELOW	INSUL	INSULATION	SECT	SECTION
BO	BOTTOM OF	INT	INTERIOR	SF	SQUARE FOOT
BOT	BOTTOM			SHT	SHEET
		KILO	KILOGRAM	SIM	SIMILAR
CLG	CEILING			SPEC	SPECIFICATION
CLR	CLEAR	LB(S)	POUNDS	SQ	SQUARE
CONC	CONCRETE	LDG	LANDING	SS	SANITARY SEWER
CONT	CONTINUOUS	LF	LINEAR FOOT	STD	STANDARD
CTR	CENTER	LT	LIGHT	STOR	STORAGE
		MAX	MAXIMUM	STRUCT	STRUCTURAL
DBL	DOUBLE	MECH	MECHANICAL	SUSP	SUSPENDED
DET	DETAIL	MEMB	MEMBRANE	SYM	SYMMETRICAL
DIA	DIAMETER	MFR	MANUFACTURER		
DIM	DIMENSION	MIN	MINIMUM	TEL	TELEPHONE
DN	DOWN	MISC	MISCELLANEOUS	THK	THICK
DR	DOOR	MJ	MECHANICAL JOINT	THR	THRESHOLD
DS	DOWN SPOUT	MTD	MOUNTED	TO	TOP OF
DWG	DRAWING			Typ	TYPICAL
		N	NORTH	UC	UNDERCUT
E	EAST	NIC	NOT IN CONTRACT	UNFIN	UNFINISHED
EA	EACH	NO	NUMBER	UNO	UNLESS NOTED OTHERWISE
ELECT	ELECTRIC(AL)	NOM	NOMINAL	UTIL	UTILITY
ELEV	ELEVATION	NTS	NOT TO SCALE		
EMER	EMERGENCY			VERT	VERTICAL
ENCL	ENCLOSURE	OA	OVERALL	VIF	VERIFY IN FIELD
EQ	EQUAL	OC	ON CENTER (DIMENSION)		
ETR	EXISTING TO REMAIN	OC	OPEN CUT (METHOD)	W	WEST
EXST	EXISTING	OD	OUTSIDE DIAMETER	WT	WEIGHT
EQUIP	EQUIPMENT	OFF	OFFICE	W/	WITH
		OPG	OPENING	W/O	WITHOUT
FA	FIRE ALARM	OPP	OPOSITE	WP	WATERPROOF
FD	FLOOR DRAIN				
FH	FIRE HYDRANT	PNT	POINT		
FIN	FINISH	PR	PAIR		
FLR	FLOOR	PTD	PAINTED		
FT	FOOT OR FEET				
FO	FACE OF				

PIPE MATERIALS

BSP	BLACK STEEL PIPE
CIP	CAST IRON PIPE
CISP	CAST IRON SOIL PIPE
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE
CPVC	CHLORINATED POLYVINYL CHLORIDE
CSP	CARBON STEEL PIPE (SEAMLESS)
CU	COPPER
DIP	DUCTILE IRON PIPE
FRP	FIBERGLASS REINFORCED PIPE
GIP	GALVANIZED IRON PIPE
GSP	GALVANIZED STEEL PIPE
HDPE	HIGH DENSITY POLYETHYLENE
IP	IRON PIPE
PB	POLYBUTLENE
PCP	PRESTRESSED CONCRETE PRESSURE
PE	POLYETHYLENE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
RH	RUBBER HOSE
SSTL	STAINLESS STEEL
STL	STEEL (FABRICATED)
VCP	VITRIFIED CLAY PIPE

VALVE TYPES

ARV	AIR RELEASE VALVE
BLV	BALL VALVE
BFV	BUTTERFLY VALVE
CNV	CONE VALVE
CV	CHECK VALVE
DV	DIAPHRAGM VALVE
GV	GATE VALVE
GBV	GLOBE VALVE
KV	KNIFE VALVE
MO	MOTOR OPERATED VALVE
MV	MUD VALVE
NV	NEEDLE VALVE
PHV	PINCH VALVE
PV	PLUG VALVE
PRV	PRESSURE REDUCING VALVE

JOINT TYPES

CC	CORRUGATED COUPLING
CPL	COUPLING
FLG	FLANGE
FREJ	FLEXIBLE RUBBER EXPANSION JOINT
MJ	MECHANICAL JOINT
OR	"O" RING
PE	PLAIN END
PCO	PUSH ON
RJ	RESTRAINED JOINT
SW	SOLVENT WELD
SWT	SWEAT
NPT	THREADED



PRELIMINARY
NOT FOR
CONSTRUCTION

OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH SEWER
5000-002



NORTH	DRAWN BY CAJ
	APPROVED BY JDF

DATE	REVISION

TITLE
GENERAL NOTES

DRAWING NO.
G2.0

CIVIL

EXISTING		PROPOSED	
GAS LINE		GAS LINE	
GAS LINE ABANDONED			
WATER LINE		WATER LINE	
WATER LINE ABANDONED			
SANITARY SEWER		SANITARY SEWER	
SANITARY SEWER ABANDONED			
FORCEMAIN		FORCEMAIN	
FORCEMAIN ABANDONED			
STORM SEWER		STORM SEWER	
OVERHEAD ELECTRIC		PERFORATED PIPE	
UNDERGROUND ELECTRIC			
FIBER OPTICS			
BUILDING/STRUCTURE		BUILDING/STRUCTURE	
ROADWAY		ROADWAY	
ROADWAY CENTERLINE		ROADWAY CENTERLINE	
SIDEWALK/CONCRETE		SIDEWALK/CONCRETE	
CONTOUR (MAJOR)		CONTOUR (MAJOR)	
CONTOUR (MINOR)		CONTOUR (MINOR)	
DITCH LINE		DITCH LINE	
STREAM			
PROPERTY LINE			
EASEMENT			
AIR RELEASE VALVE		AIR RELEASE VALVE	
SANITARY SEWER MANHOLE		SANITARY SEWER MANHOLE	
CLEANOUT		CLEANOUT	
CATCH BASIN		CATCH BASIN	
DRAINAGE MANHOLE		DRAINAGE MANHOLE	
HEADWALL		HEADWALL	
WATER METER BOX		WATER METER BOX	
VALVE		VALVE	
HYDRANT		HYDRANT	
CAP		CAP	
POWER POLE		POWER POLE	
LIGHT POLE		LIGHT POLE	
GUY		GUY	
COMMUNICATIONS MANHOLE		COMMUNICATIONS MANHOLE	

PROCESS

PIPING & STRUCTURE		
	EXISTING	NEW
PIPING		
STRUCTURE		

VALVES & FITTINGS		
	SINGLE LINE	DOUBLE LINE
BALL VALVE (BLV)		
BUTTERFLY VALVE (BFV)		
PLUG VALVE (PV)		
CHECK VALVE (CV)		
GATE VALVE (GV)		
KNIFE GATE VALVE (KGV)		
SOLENOID VALVE (SV)		
NEEDLE VALVE (NV)		
FLUSHING CONNECTION W/ QUICK DISCONNECT		
PIPING		
WELDED JOINT		
FLANGED JOINT		
MECHANICAL JOINT		
PUSH-ON		
FLANGE ADAPTER (FA)		
RESTRAINED FLANGE ADAPTER (RFA)		
EXPANSION COUPLING		

PIPE LINE IDENTIFICATION	
12" XX-XXX	<ul style="list-style-type: none"> MATERIAL SERVICE NOMINAL PIPE DIAMETER

MISCELLANEOUS

EROSION CONTROL	
SILT FENCE	
RIP-RAP	
INLET PROTECTION	
CHECK DAM	
EROSION EEL / WATTLE	
CONSTRUCTION ENTRANCE	

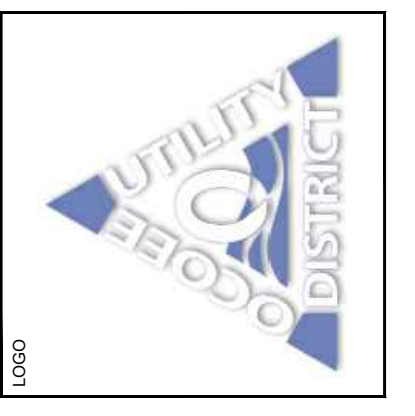
DEMOLITION	
STRUCTURE/EQUIPMENT	
PIPING (SINGLE LINE)	
PIPING (DOUBLE LINE)	

DRAWING ANNOTATION	
DETAIL MARKER	
SECTION MARKER	
ELEVATION MARKER	
EQUIPMENT MARKER	
SHEET SPECIFIC NOTE MARKER	
REVISION CLOUD & MARKER	
CENTERLINE	

FOXPE
ENGINEERING FOR THE WATER ENVIRONMENT
2711 BERRYWOOD DRIVE
NASHVILLE, TENNESSEE 37204
FOXPE.COM

PRELIMINARY
NOT FOR
CONSTRUCTION

OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH SEWER
5000-002



NORTH
DRAWN BY
CAJ
APPROVED BY
JDF

DATE	REVISION

TITLE
LEGEND & SYMBOLOGY
DRAWING NO.
G3.0

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

PRELIMINARY
 NOT FOR
 CONSTRUCTION

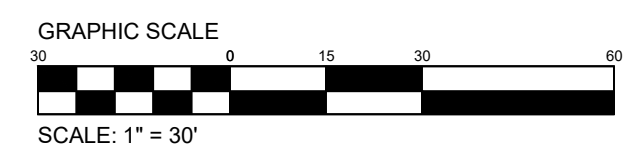
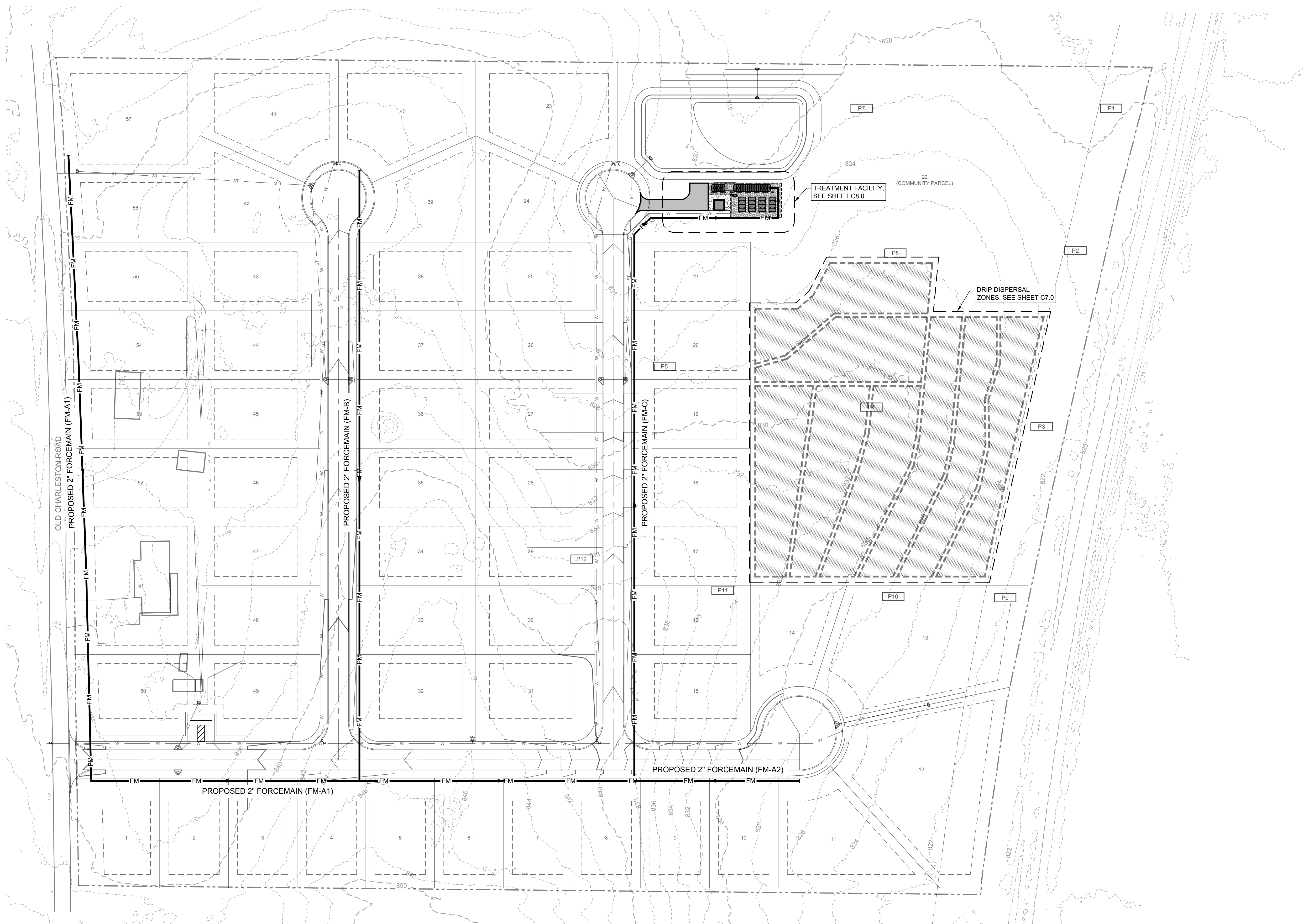
OCOEE UTILITY DISTRICT
 GRAYWOOD FARMS NORTH SEWER
 5000-002



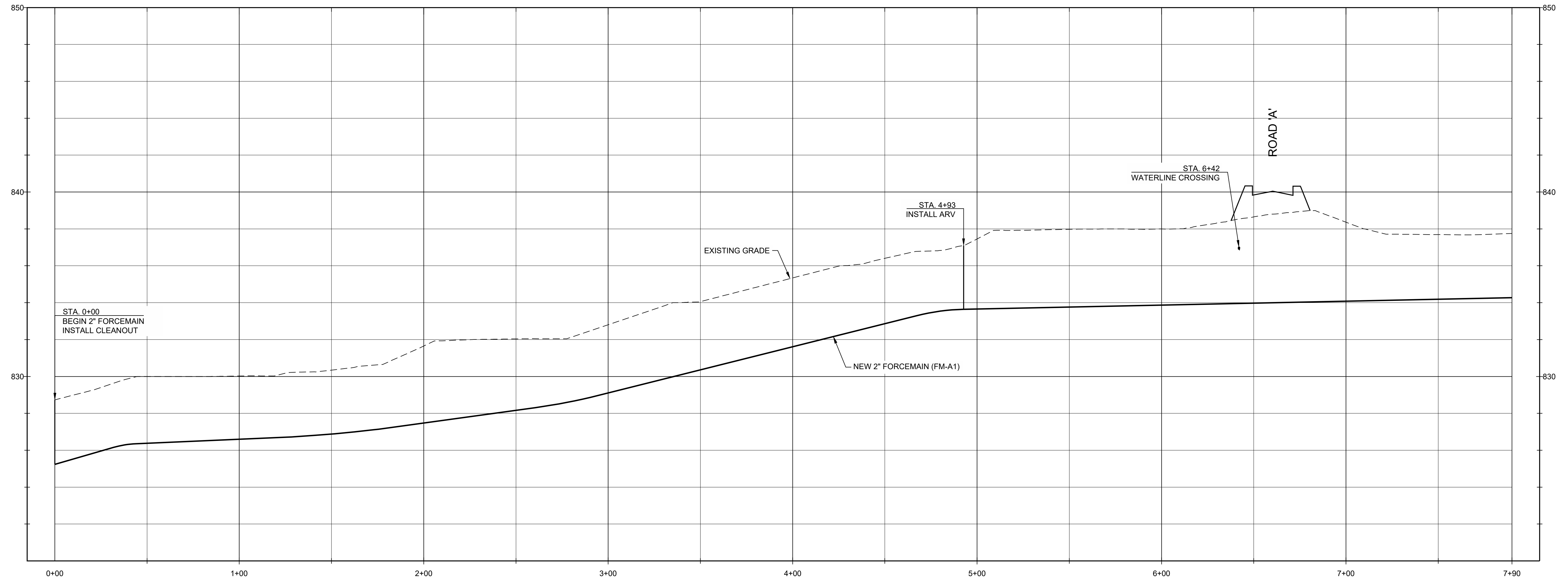
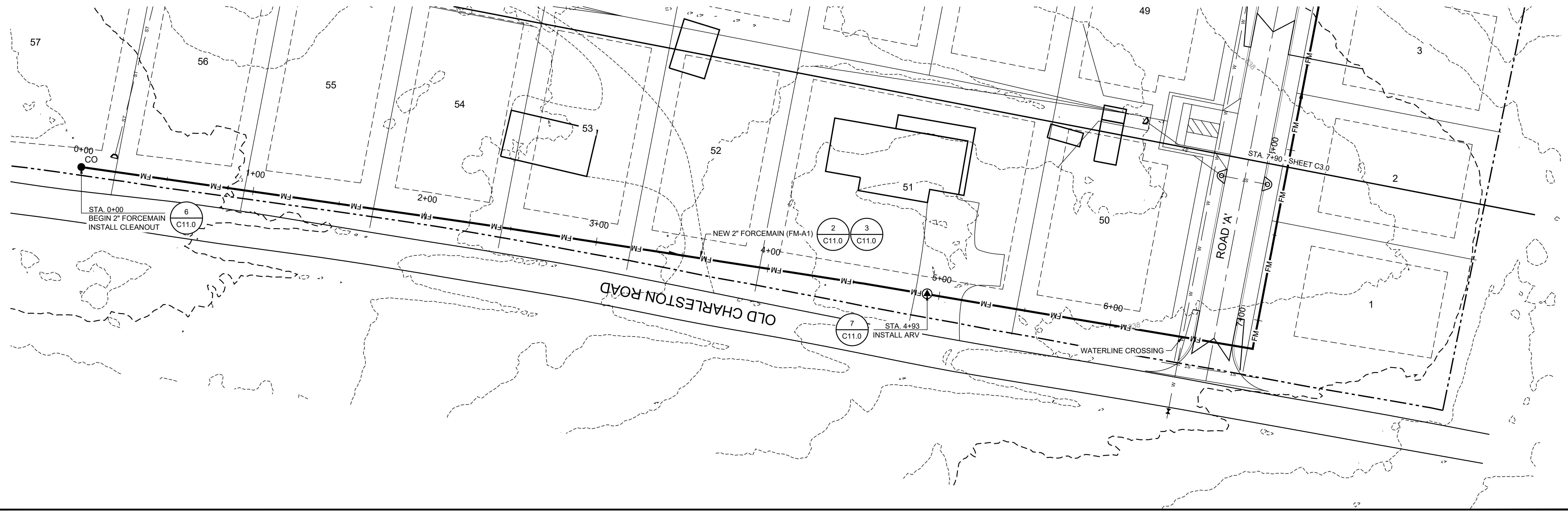
NORTH
 DRAWN BY
CAJ
 APPROVED BY
JDF

DATE	REVISION

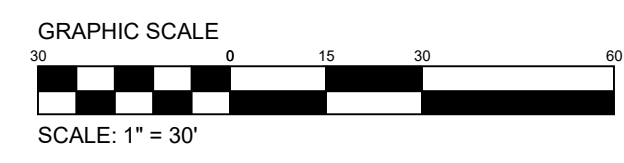
TITLE
**COLLECTION
 SYSTEM OVERALL
 PLAN**
 DRAWING NO.
C1.0



All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.



PROPOSED FORCEMAIN FM-A1 - PROFILE
 0+00 TO 7+90
 HORIZONTAL SCALE: 1" = 30'
 VERTICAL SCALE: 1" = 3'



PRELIMINARY
 NOT FOR
 CONSTRUCTION

OCOEE UTILITY DISTRICT
 GRAYWOOD FARMS NORTH SEWER
 5000-002

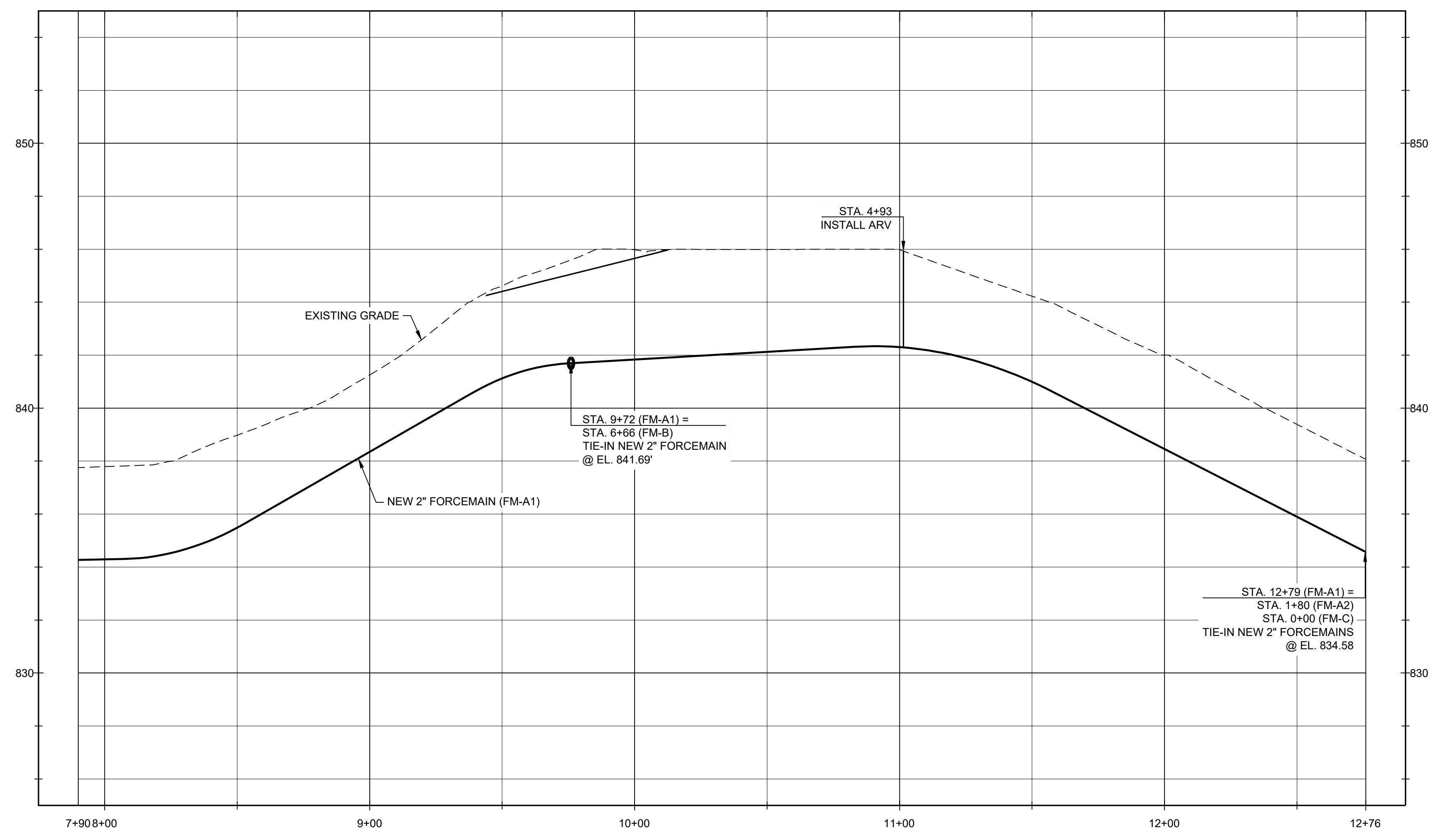
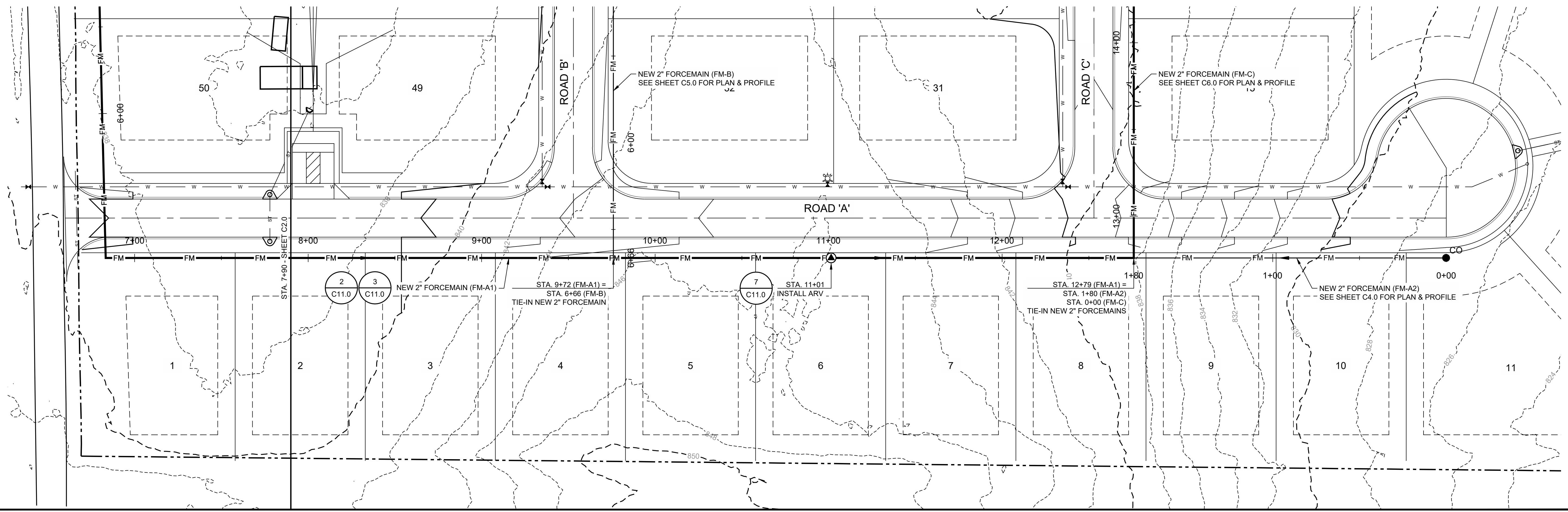


DRAWN BY: CAJ
 APPROVED BY: JDF

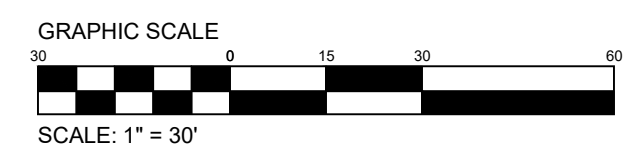
DATE	ISSUE

TITLE
 FORCEMAIN FM-A1
 PLAN & PROFILE
 DRAWING NO.
C2.0

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

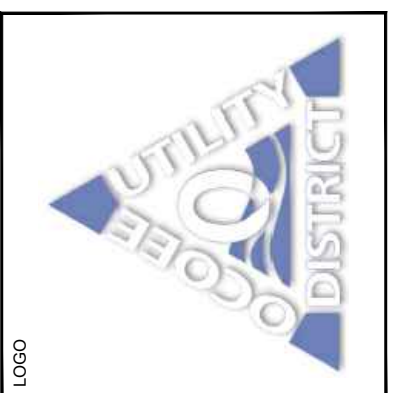


PROPOSED FORCEMAIN FM-A1 - PROFILE
7+90 TO 12+76
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'



PRELIMINARY
NOT FOR
CONSTRUCTION

OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH SEWER
5000-002

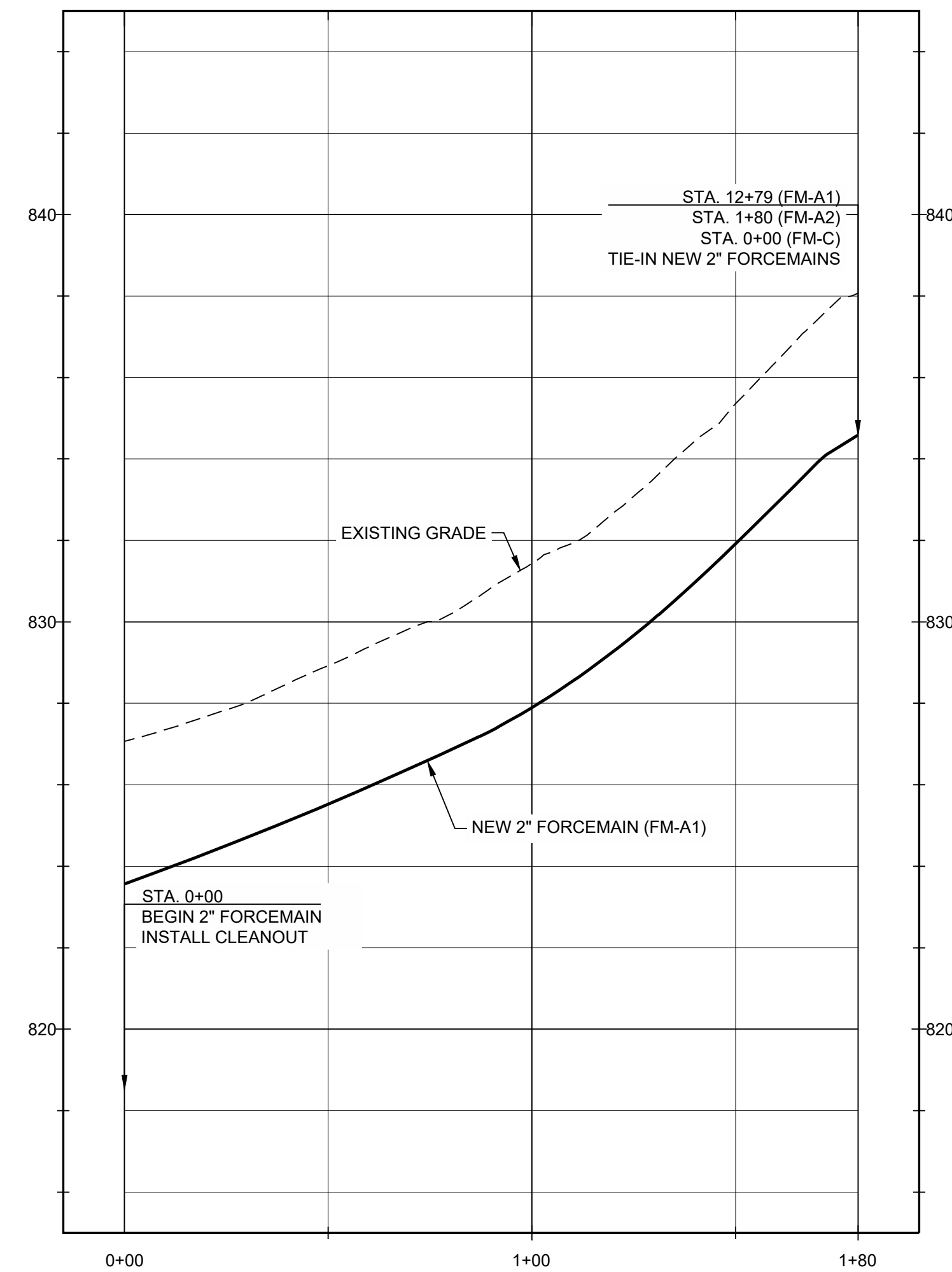
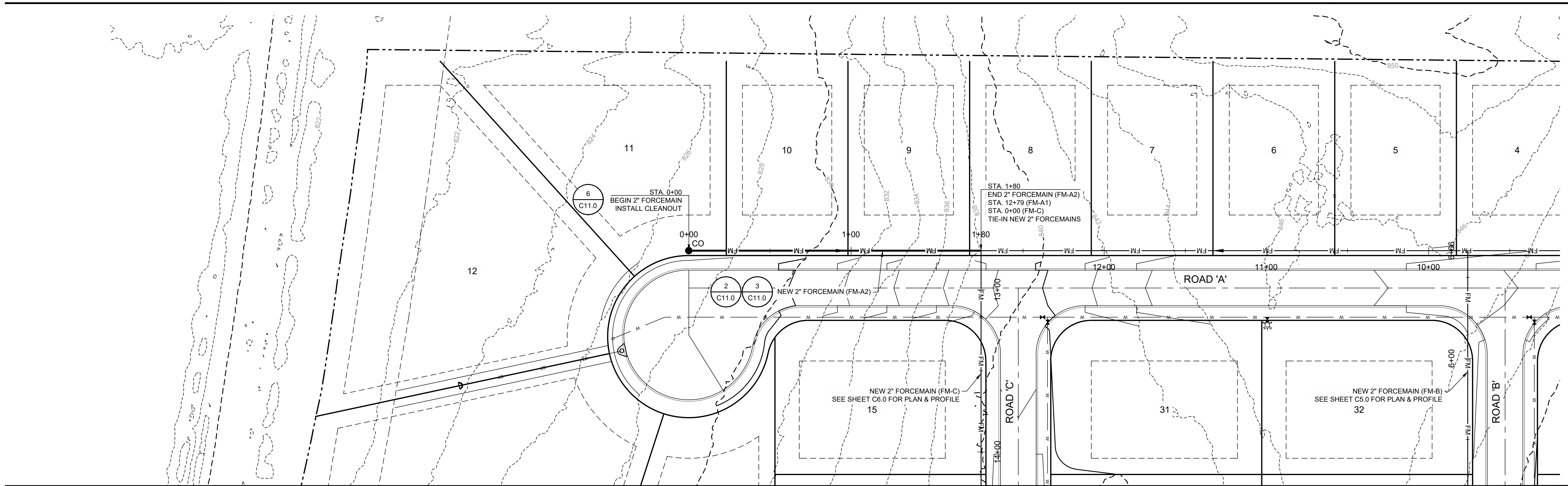


NORTH
DRAWN BY
CAJ
APPROVED BY
JDF

DATE	ISSUE

TITLE
FORCEMAIN FM-A1
PLAN & PROFILE
DRAWING NO.
C3.0

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

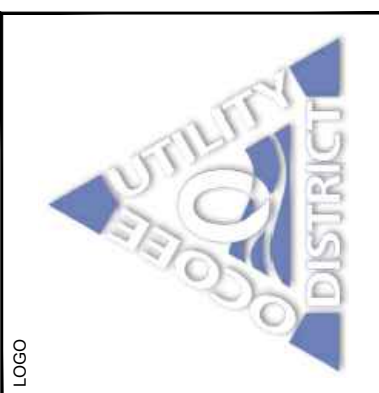


PROPOSED FORCEMAIN FM-A2 - PROFILE
 0+00 TO 1+80
 HORIZONTAL SCALE: 1" = 30'
 VERTICAL SCALE: 1" = 3'



PRELIMINARY
 NOT FOR
 CONSTRUCTION

OCOEE UTILITY DISTRICT
 GRAYWOOD FARMS NORTH SEWER
 5000-002

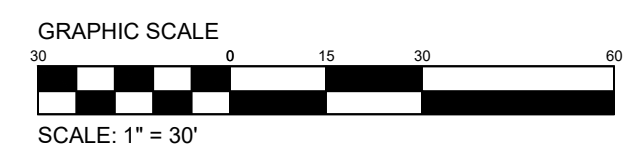
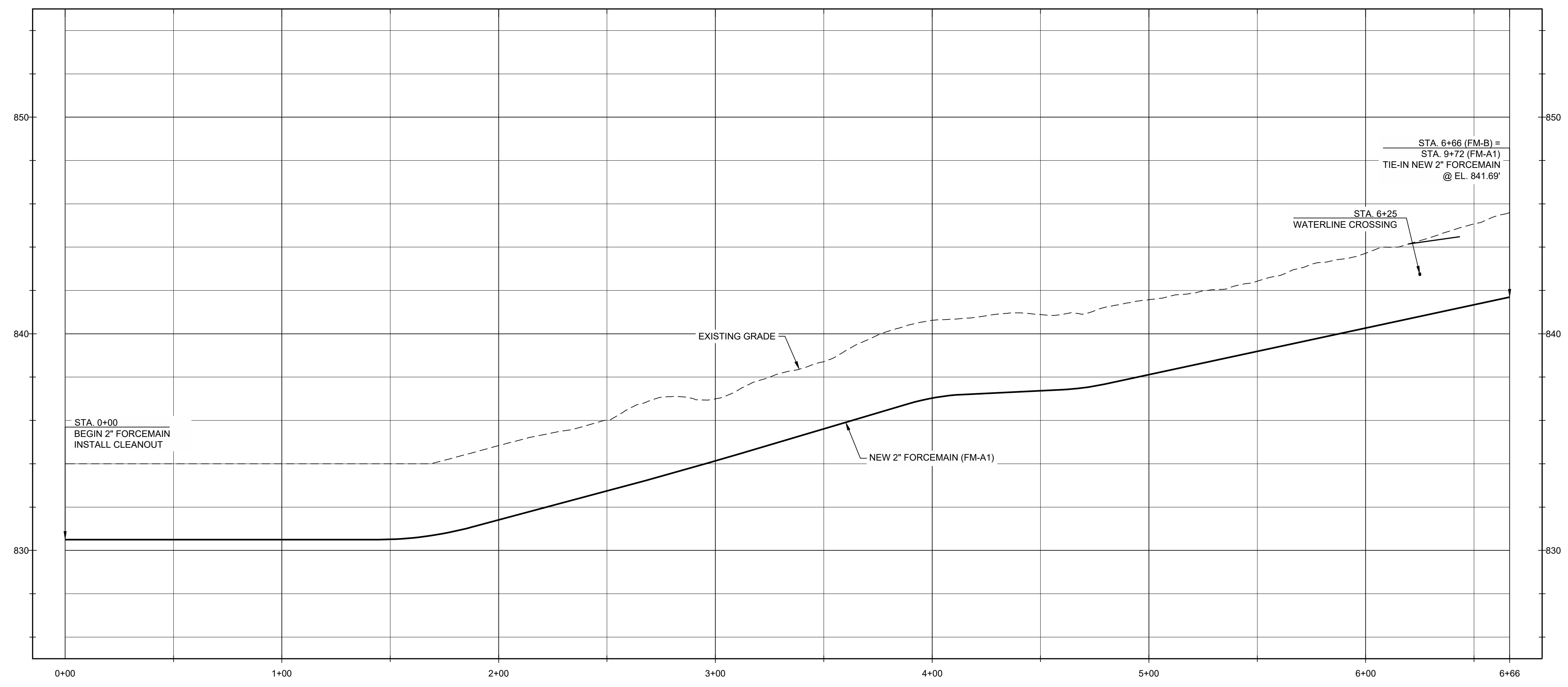
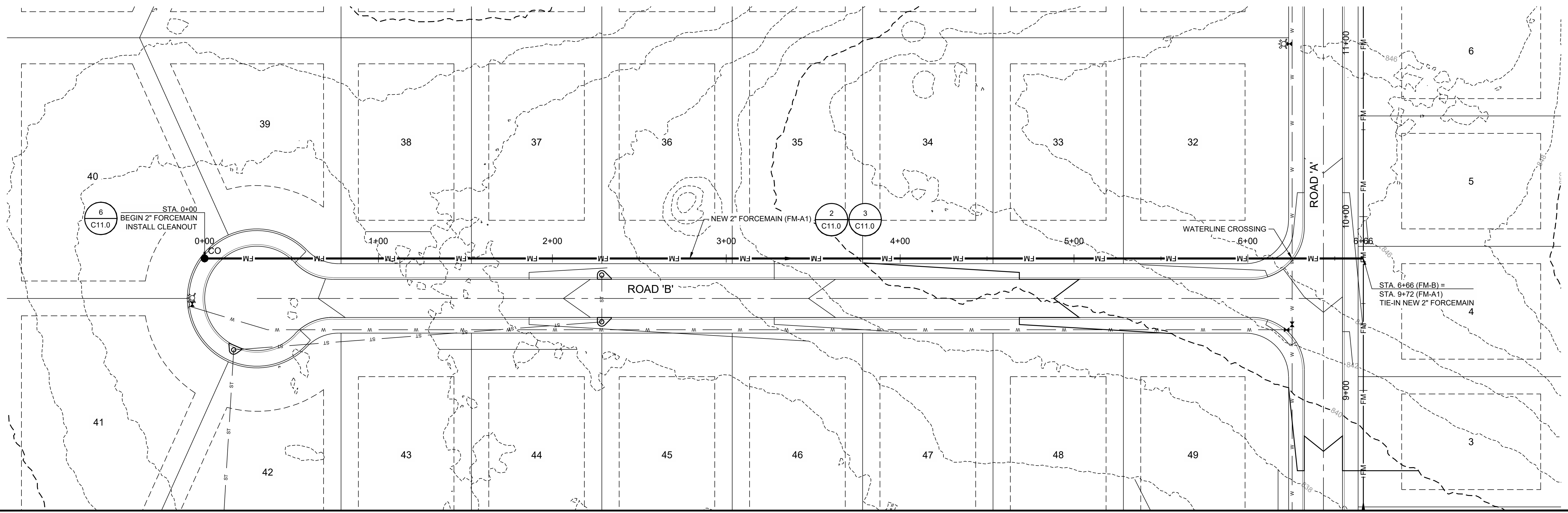


DRAWN BY
CAJ
 APPROVED BY
JDF

DATE	ISSUE

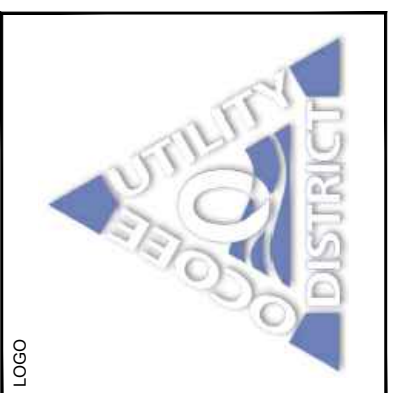
TITLE
**FORCEMAIN FM-A2
 PLAN & PROFILE**
 DRAWING NO.
C4.0

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.



PRELIMINARY
 NOT FOR
 CONSTRUCTION

OCOEE UTILITY DISTRICT
 GRAYWOOD FARMS NORTH SEWER
 5000-002

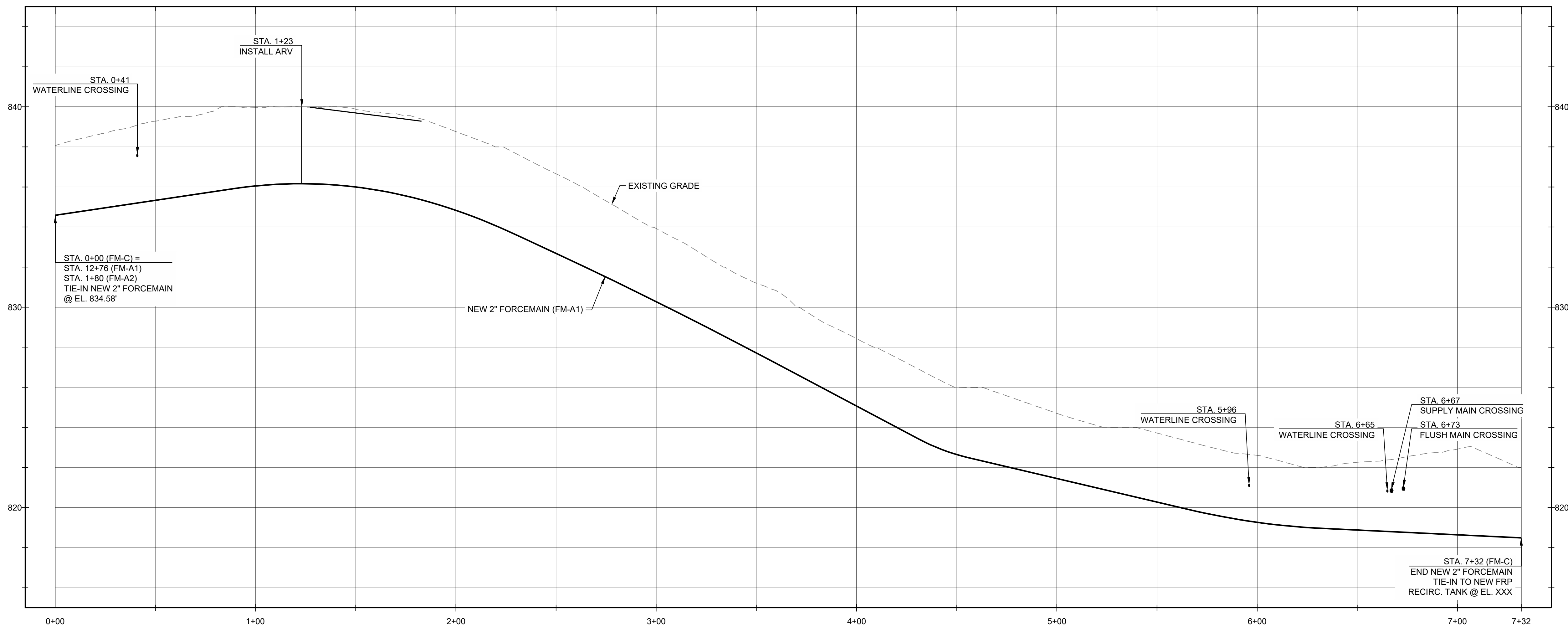
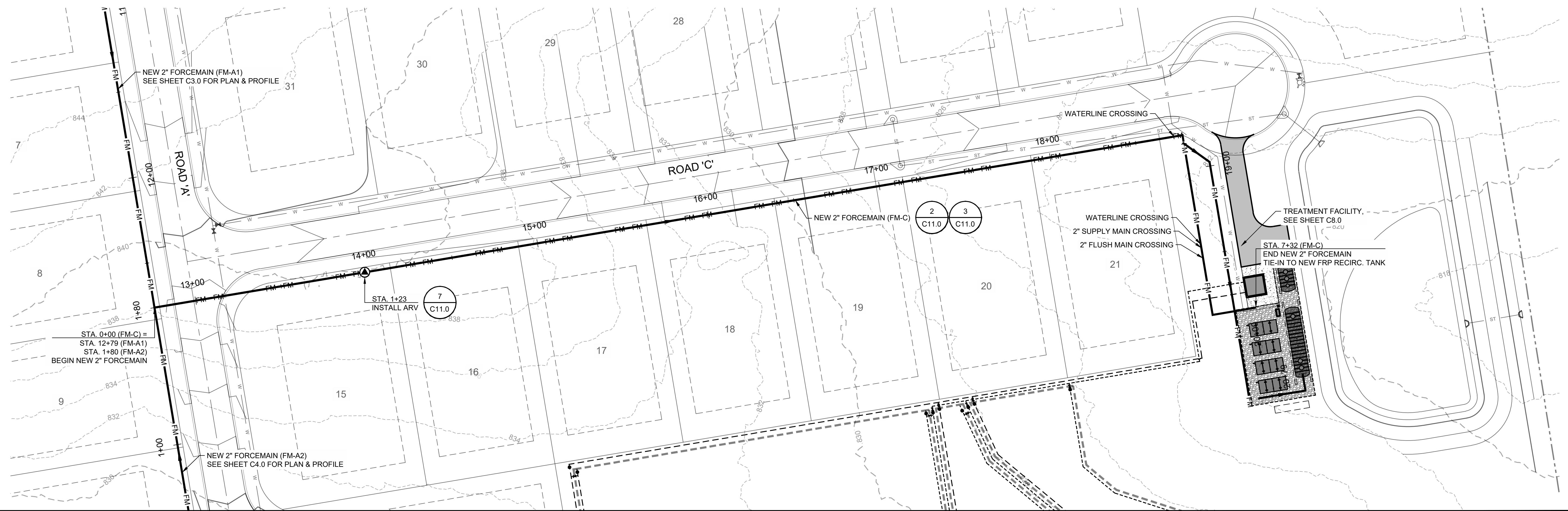


DRAWN BY: CAJ
 APPROVED BY: JDF

DATE	ISSUE

TITLE
 FORCEMAIN FM-B PLAN & PROFILE
 DRAWING NO.
C5.0

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

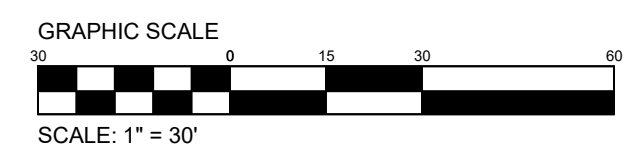
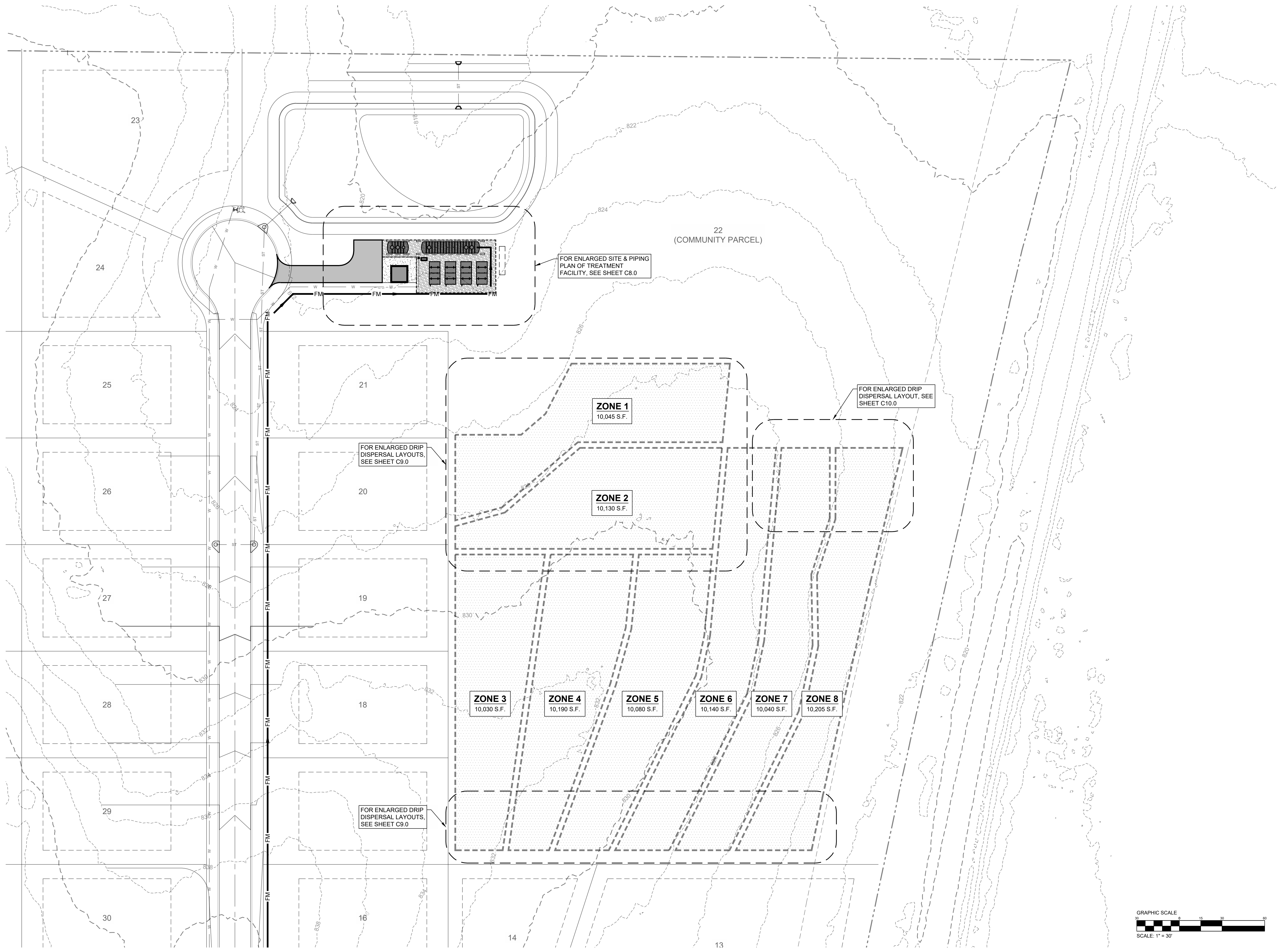


PROPOSED FORCEMAIN FM-C - PROFILE
 0+00 TO 7+32
 HORIZONTAL SCALE: 1" = 30'
 VERTICAL SCALE: 1" = 3'



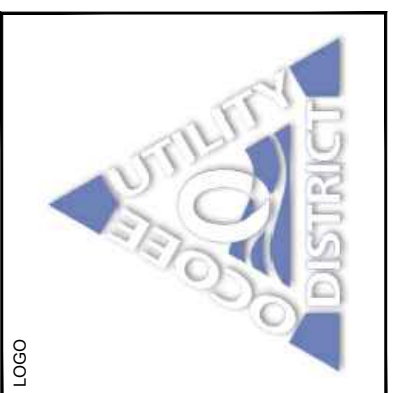
DATE	ISSUE

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.



PRELIMINARY
NOT FOR
CONSTRUCTION

OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH SEWER
5000-002

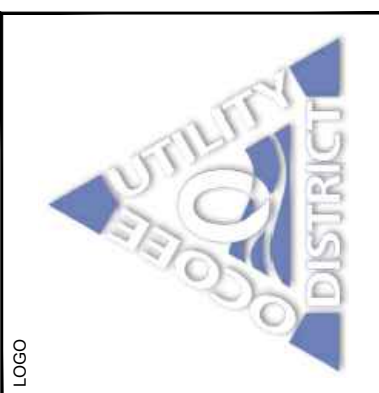


NORTH
DRAWN BY
CAJ
APPROVED BY
JDF

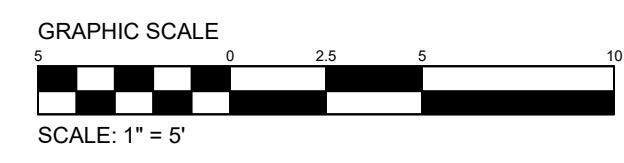
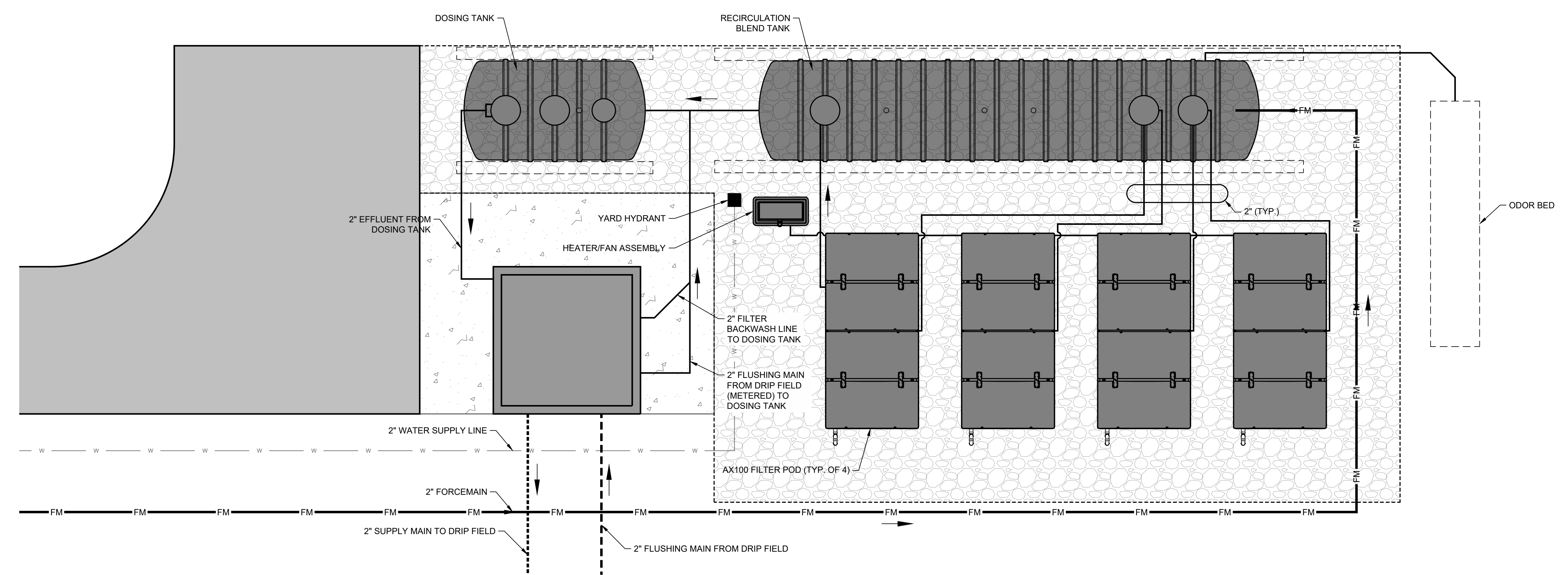
DATE	REVISION

TITLE
TREATMENT &
DRIP DISPERSAL
SITE PLAN
DRAWING NO.
C7.0

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.



DATE	REVISION



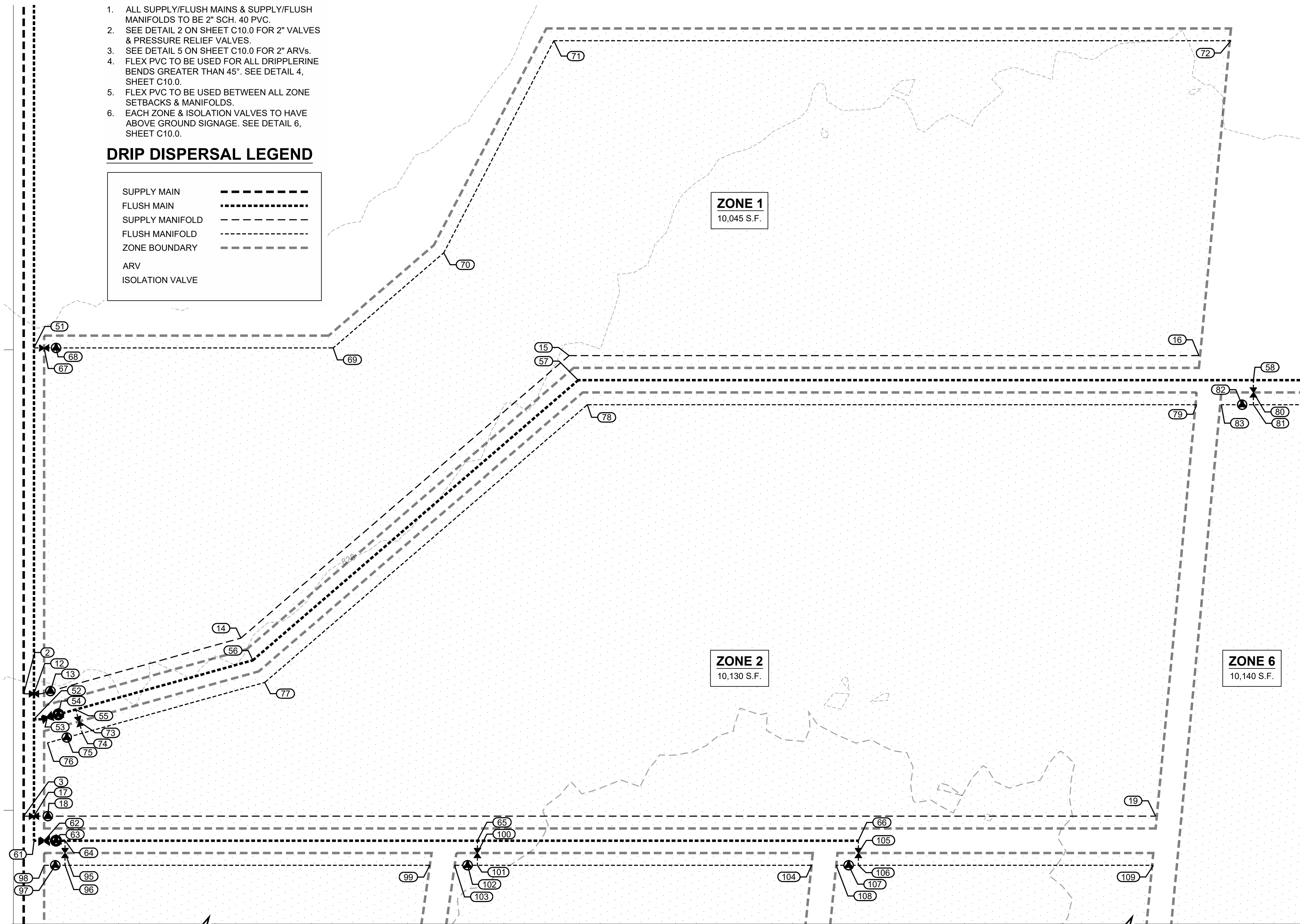
All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

NOTES

1. ALL SUPPLY/FLUSH MAINS & SUPPLY/FLUSH MANIFOLDS TO BE 2" SCH. 40 PVC.
2. SEE DETAIL 2 ON SHEET C10.0 FOR 2" VALVES & PRESSURE RELIEF VALVES.
3. SEE DETAIL 5 ON SHEET C10.0 FOR 2" ARVs.
4. FLEX PVC TO BE USED FOR ALL DRIPPLERINE BENDS GREATER THAN 45°. SEE DETAIL 4, SHEET C10.0.
5. FLEX PVC TO BE USED BETWEEN ALL ZONE SETBACKS & MANIFOLDS.
6. EACH ZONE & ISOLATION VALVES TO HAVE ABOVE GROUND SIGNAGE. SEE DETAIL 6, SHEET C10.0.

DRIP DISPERSAL LEGEND

SUPPLY MAIN	---
FLUSH MAIN	---
SUPPLY MANIFOLD	---
FLUSH MANIFOLD	---
ZONE BOUNDARY	---
ARV	---
ISOLATION VALVE	---

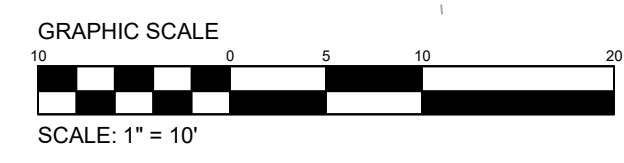
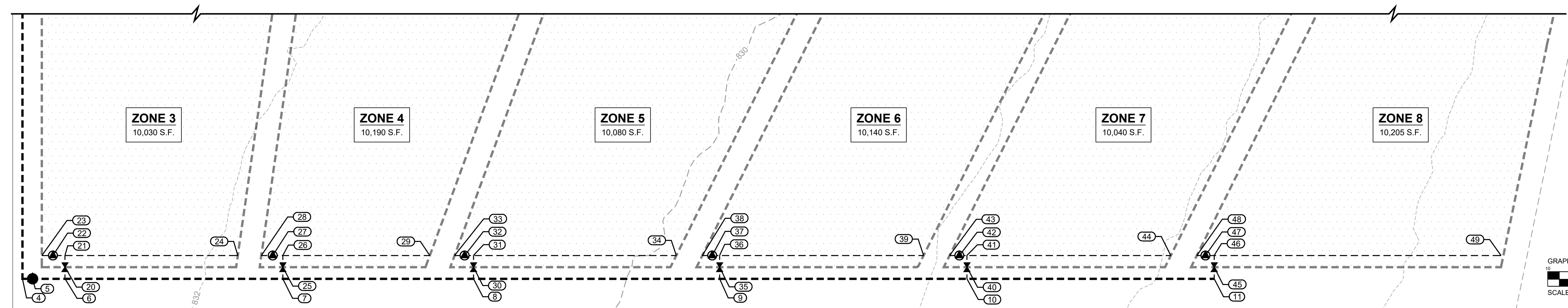


SUPPLY MAIN TABLE			
POINT	DESCRIPTION	NORTHING	EASTING
1	ELBOW	327638.6432	2328699.4237
2	TEE	327515.4594	2328645.7684
3	TEE	327497.2035	2328637.8166
4	ELBOW	327299.1196	2328553.5369
5	ARV	327298.4195	2328553.1441
6	TEE	327296.2018	2328558.2356
7	TEE	327281.2634	2328592.5318
8	TEE	327268.1882	2328622.5502
9	TEE	327251.3019	2328661.3184
10	TEE	327234.3443	2328700.2502
11	ELBOW	327217.3873	2328739.1806

SUPPLY MANIFOLD TABLE			
POINT	DESCRIPTION	NORTHING	EASTING
12	VALVE	327514.8121	2328647.3043
13	ARV	327514.1360	2328649.9438
14	BEND	327509.6666	2328681.8252
15	BEND	327530.5092	2328749.1708
16	END	327489.5815	2328843.1801
17	VALVE	327496.5379	2328639.3446
18	ARV	327495.6300	2328641.4290
19	END	327423.6179	2328806.7567
20	VALVE	327298.0354	2328559.0342
21	TEE	327299.8690	2328559.8329
22	ARV	327300.6951	2328557.9363
23	END	327301.4557	2328556.1902
24	END	327288.0172	2328587.0428
25	VALVE	327283.0970	2328593.3305
26	TEE	327284.9306	2328594.1292
27	ARV	327285.6210	2328592.5441
28	END	327286.4032	2328590.7483
29	END	327274.8502	2328617.2721
30	VALVE	327270.0218	2328623.3489
31	TEE	327271.8554	2328624.1476
32	ARV	327272.4581	2328622.7639
33	END	327273.1480	2328621.1799
34	END	327257.9424	2328656.0894
35	VALVE	327253.1355	2328662.1170
36	TEE	327254.9691	2328662.9157
37	ARV	327255.4791	2328661.7447
38	END	327256.1579	2328660.1864
39	END	327240.9848	2328695.0214
40	VALVE	327236.1779	2328701.0489
41	TEE	327238.0115	2328701.8476
42	ARV	327238.5265	2328700.6651
43	END	327239.1998	2328699.1195
44	END	327224.0279	2328733.9516
45	VALVE	327219.2209	2328739.9793
46	TEE	327221.0545	2328740.7780
47	ARV	327221.6485	2328739.4142
48	END	327222.2436	2328738.0481
49	END	327201.3815	2328785.9440

FLUSH MAIN TABLE			
POINT	DESCRIPTION	NORTHING	EASTING
50	ELBOW	327636.4496	2328700.2862
51	TEE	327566.4383	2328669.7912
52	TEE	327511.0054	2328645.6462
53	VALVE	327510.4028	2328647.7613
54	ARV	327510.1432	2328649.6131
55	TEE	327509.7351	2328652.5243
56	BEND	327505.5814	2328682.1545
57	BEND	327526.2490	2328748.9349
58	TEE	327482.3544	2328849.7095
61	ELBOW	327492.8707	2328637.7473
62	VALVE	327492.2051	2328639.2753
63	ARV	327491.4300	2328641.0548
64	TEE	327490.8466	2328642.3943
65	TEE	327464.0446	2328703.9271
66	ELBOW	327439.2735	2328760.7975

FLUSH MANIFOLD TABLE			
POINT	DESCRIPTION	NORTHING	EASTING
67	VALVE	327565.7727	2328671.3192
68	ARV	327564.9976	2328673.0988
69	BEND	327546.9827	2328714.4580
70	BEND	327554.0086	2328737.1595
71	BEND	327578.5054	2328767.3611
72	END	327534.4861	2328868.4220
73	VALVE	327507.7545	2328652.2467
74	TEE	327505.7738	2328651.9690
75	ARV	327506.1392	2328649.3627
76	END	327506.5928	2328646.1272
77	BEND	327501.4961	2328682.4837
78	BEND	327521.9888	2328748.6990
79	END	327482.3774	2328839.6402
80	VALVE	327480.5208	2328848.9109
81	TEE	327478.6872	2328848.1122
82	ARV	327479.4203	2328846.4292
83	END	327480.7730	2328843.3236
95	VALVE	327489.0129	2328641.5956
96	TEE	327487.1793	2328640.7970
97	ARV	327487.8092	2328639.3509
98	END	327488.5379	2328637.6779
99	END	327463.4640	2328695.2435
100	VALVE	327462.2110	2328703.1285
101	TEE	327460.3774	2328702.3298
102	ARV	327461.0072	2328700.8838
103	END	327461.8500	2328698.9490
104	END	327438.6513	2328752.2093
105	VALVE	327437.4399	2328759.9989
106	TEE	327435.6063	2328759.2002
107	ARV	327436.2361	2328757.7542
108	END	327437.0458	2328755.8953
109	END	327416.4338	2328803.2169



PRELIMINARY
NOT FOR
CONSTRUCTION

OCOEE UTILITY DISTRICT
GRAYWOOD FARMS NORTH SEWER
5000-002



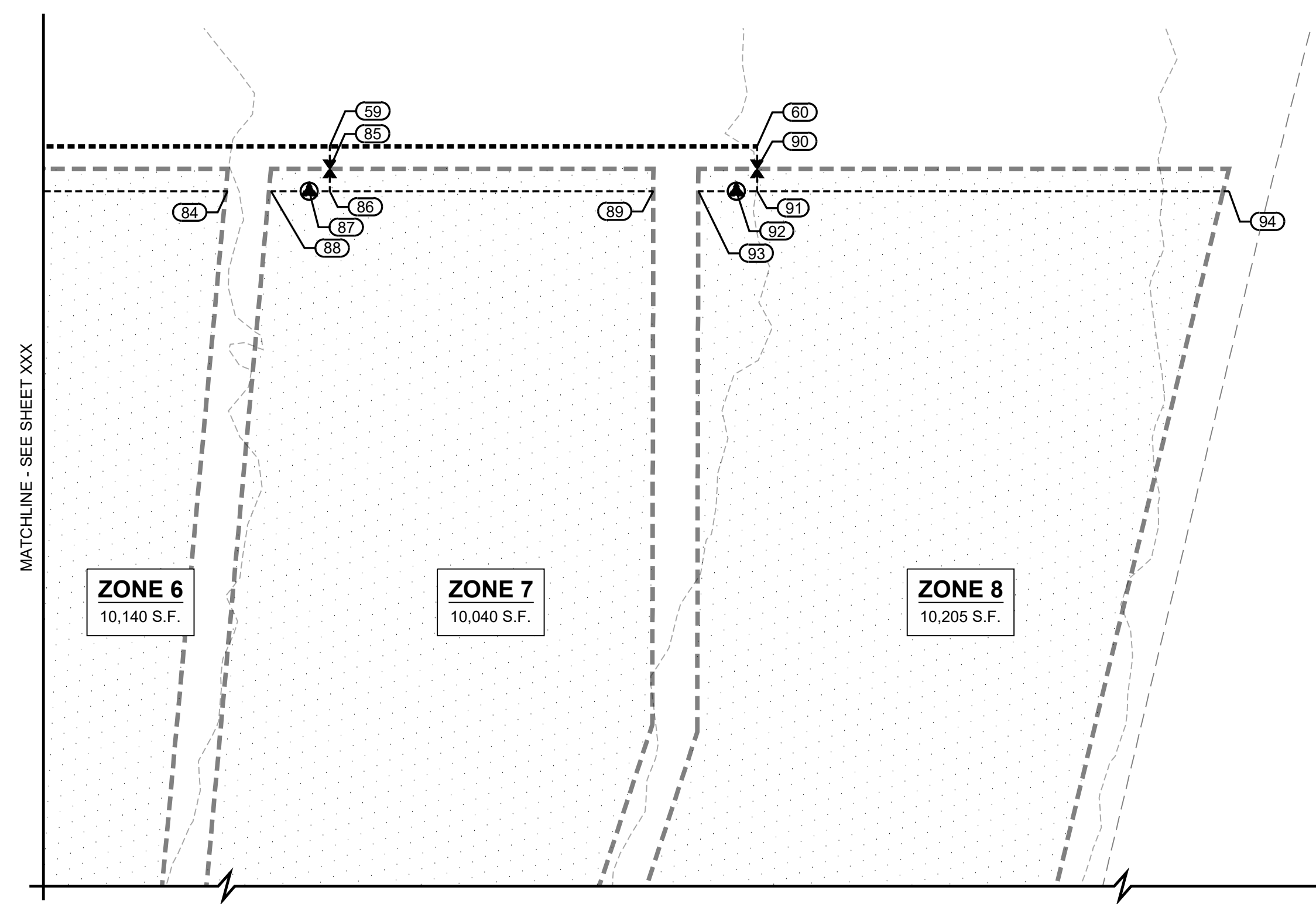
NORTH
DRAWN BY
CAJ
APPROVED BY
JDF

DATE	REVISION

TITLE
ENLARGED DRIP
DISPERSAL
LAYOUT
DRAWING NO.
C9.0

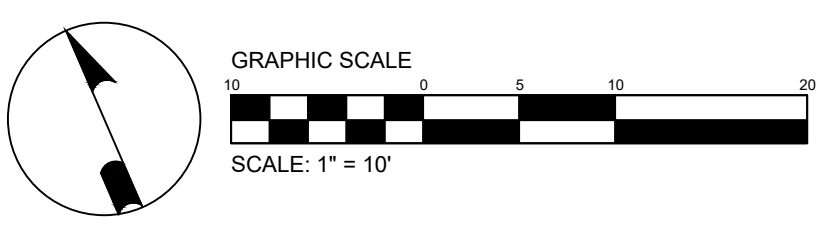
All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

DATE	REVISION

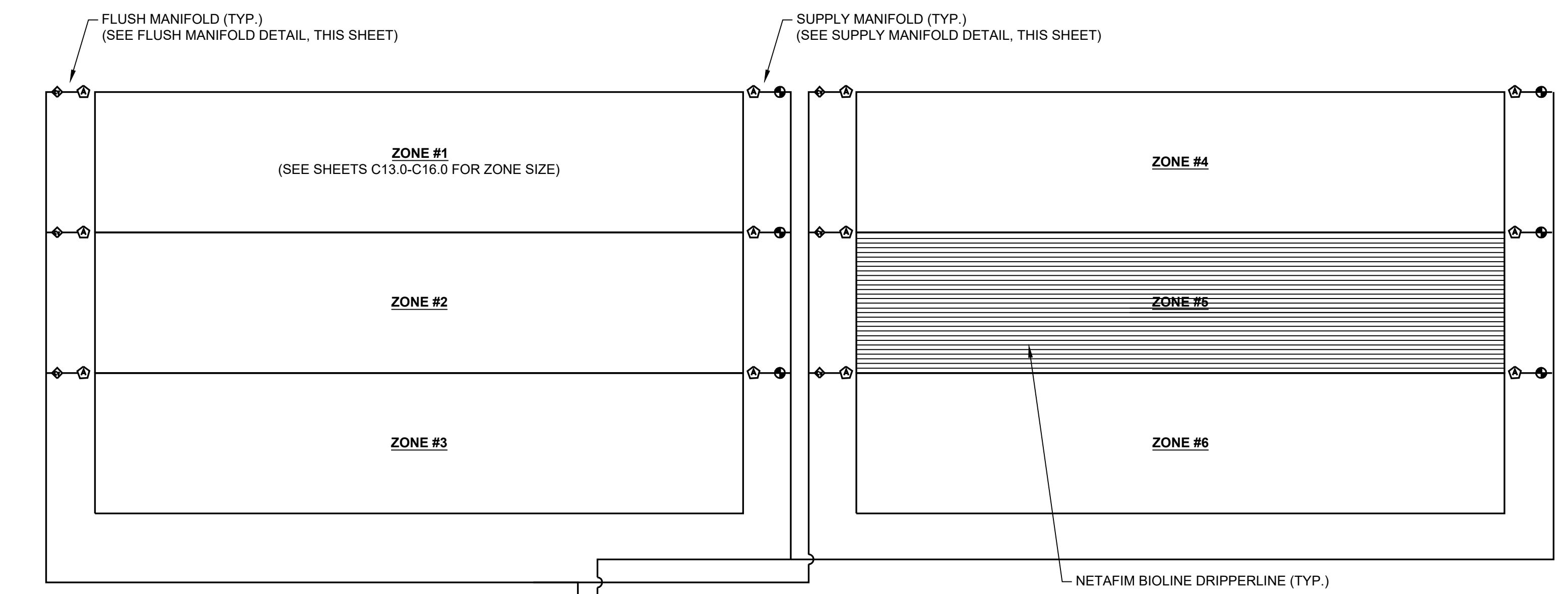


POINT	DESCRIPTION	NORTHING	EASTING
59	TEE	327467.2379	2328884.4145
60	ELBOW	327452.0627	2328919.2543

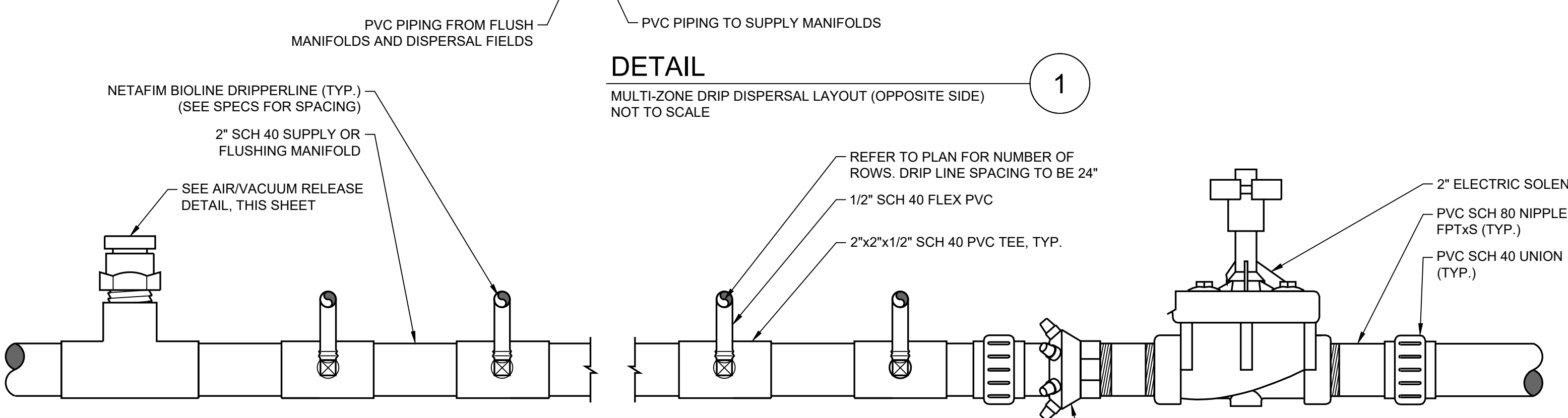
POINT	DESCRIPTION	NORTHING	EASTING
84	END	327467.1958	2328874.4946
85	VALVE	327465.4034	2328883.6155
86	TEE	327463.5698	2328882.8168
87	ARV	327464.3029	2328881.1338
88	END	327465.6556	2328878.0283
89	END	327452.0785	2328909.2012
90	VALVE	327450.2291	2328918.4556
91	TEE	327448.3955	2328917.6570
92	ARV	327449.1286	2328915.9740
93	END	327450.4812	2328912.8684
94	END	327431.6357	2328956.1347



ENLARGED PLAN
DRIP DISPERSAL LAYOUT
SCALE: 1" = 1'-0"



NOTE:
DRIP LINE NOMINAL SPACING TO BE 2'-0"



NOTE:
ALL SOLENOID VALVES & PRESSURE REGULATORS TO BE PLACED INSIDE METER BOX. METER BOX TO BE RECTANGULAR BOX 15" WIDE x 27" LONG. RAVEN PRODUCTS MODEL RMB-15x27x18, OR APPROVED EQUAL.

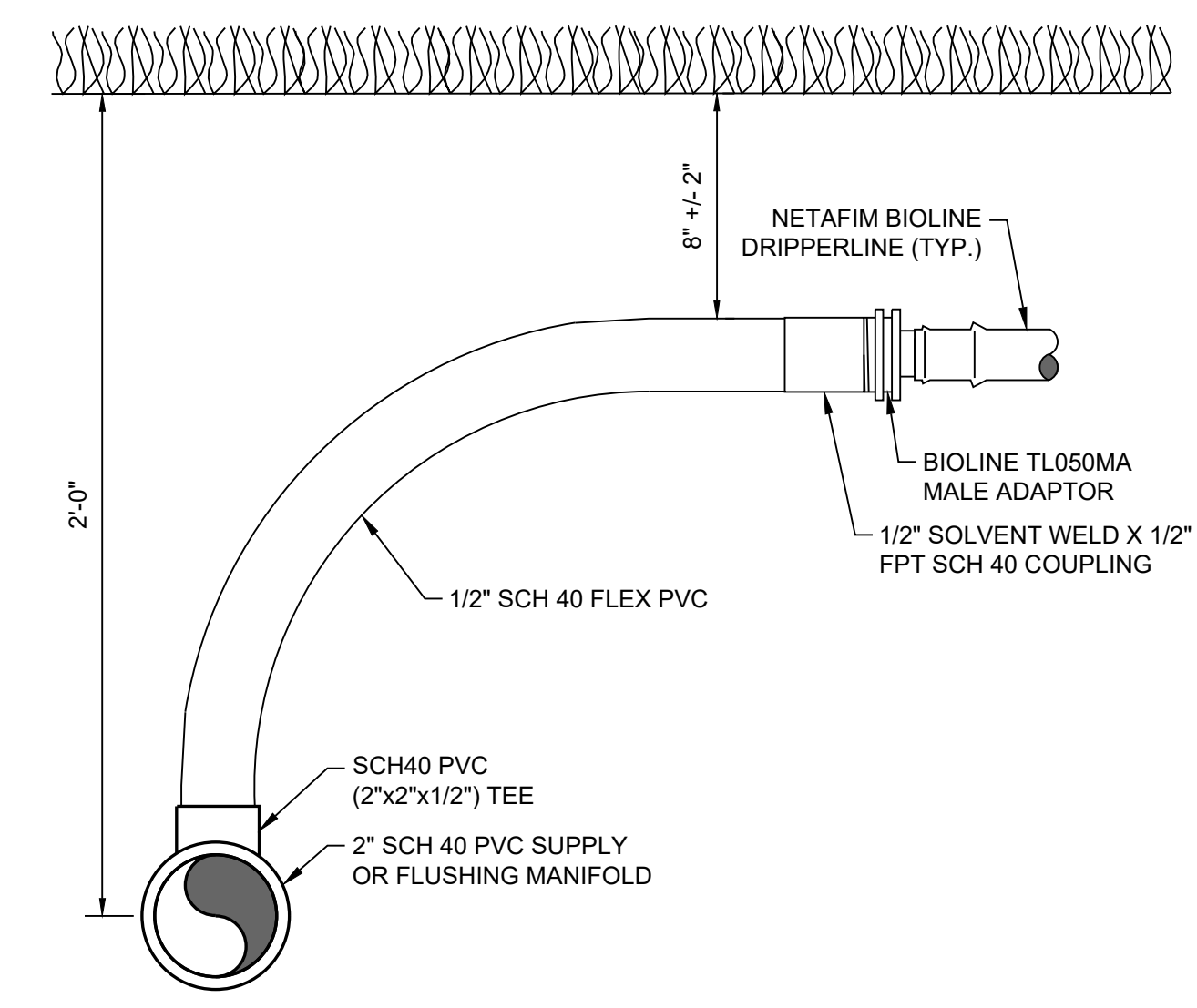
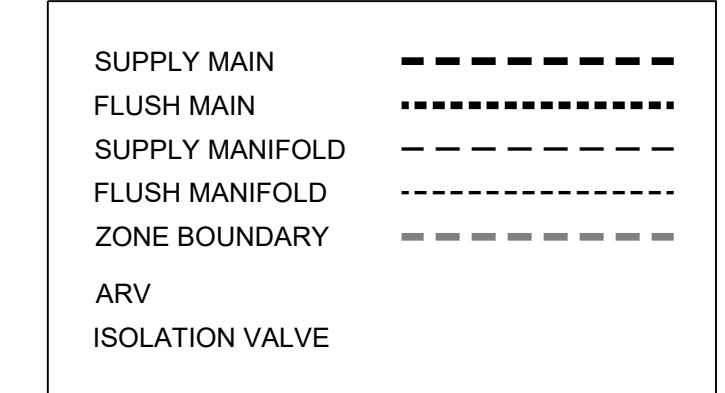
DETAIL 2
NETAFIM BIOLINE SUPPLY & FLUSHING MANIFOLD
NOT TO SCALE

2" x 6 NETAFIM PRESSURE REGULATOR (32PRV2-65TV2K), OR APPROVED EQUAL

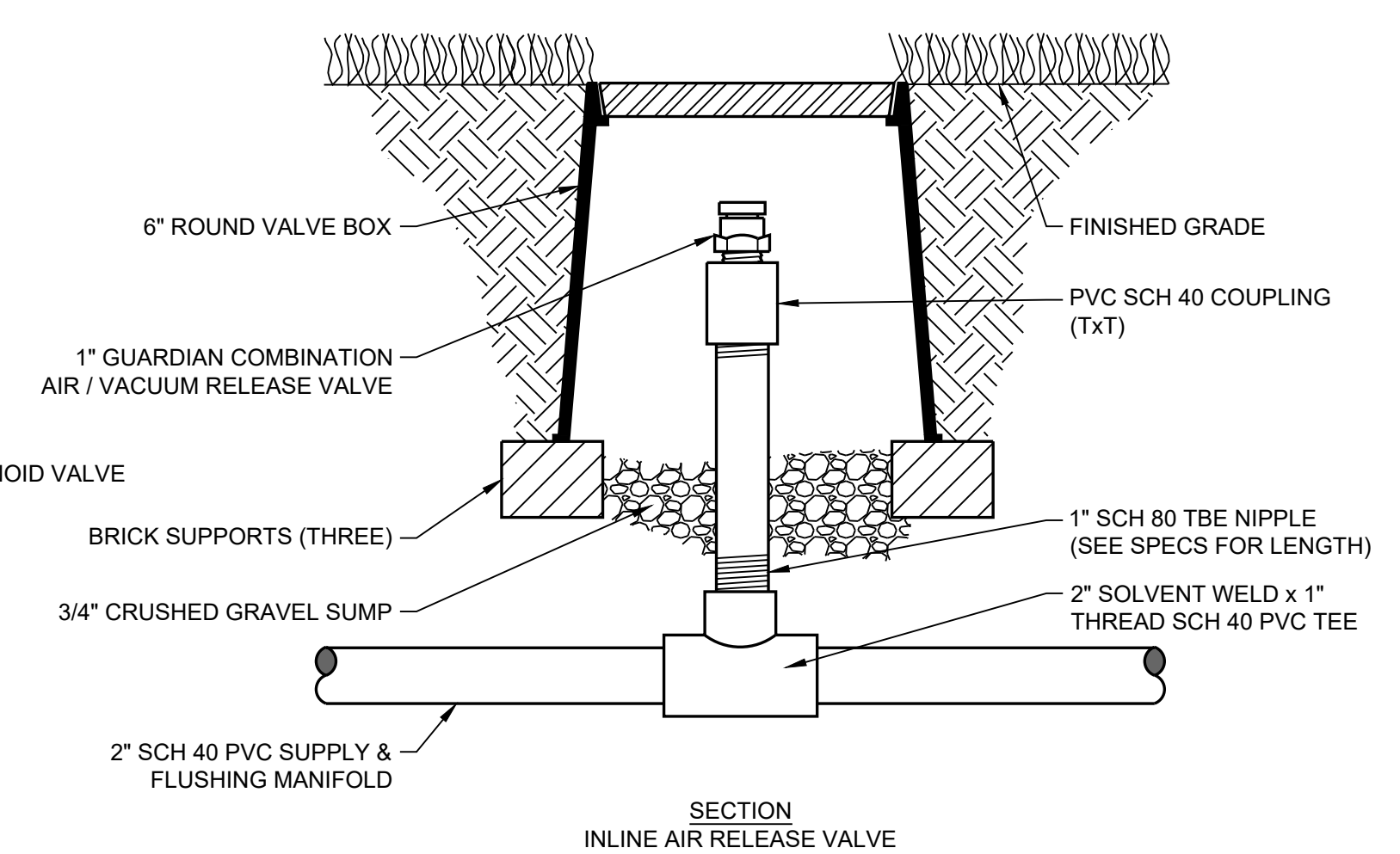
NOTES

- ALL SUPPLY/FLUSH MAINS & SUPPLY/FLUSH MANIFOLDS TO BE 2" SCH. 40 PVC.
- SEE DETAIL 2, THIS SHEET FOR 2" VALVES & PRESSURE RELIEF VALVES.
- SEE DETAIL 5, THIS SHEET FOR 2" ARVs.
- FLEX PVC TO BE USED FOR ALL DRIPPERLINE BENDS GREATER THAN 45°. SEE DETAIL 4, THIS SHEET.
- FLEX PVC TO BE USED BETWEEN ALL ZONE SETBACKS & MANIFOLDS.
- EACH ZONE & ISOLATION VALVES TO HAVE ABOVE GROUND SIGNAGE. SEE DETAIL 6, THIS SHEET.

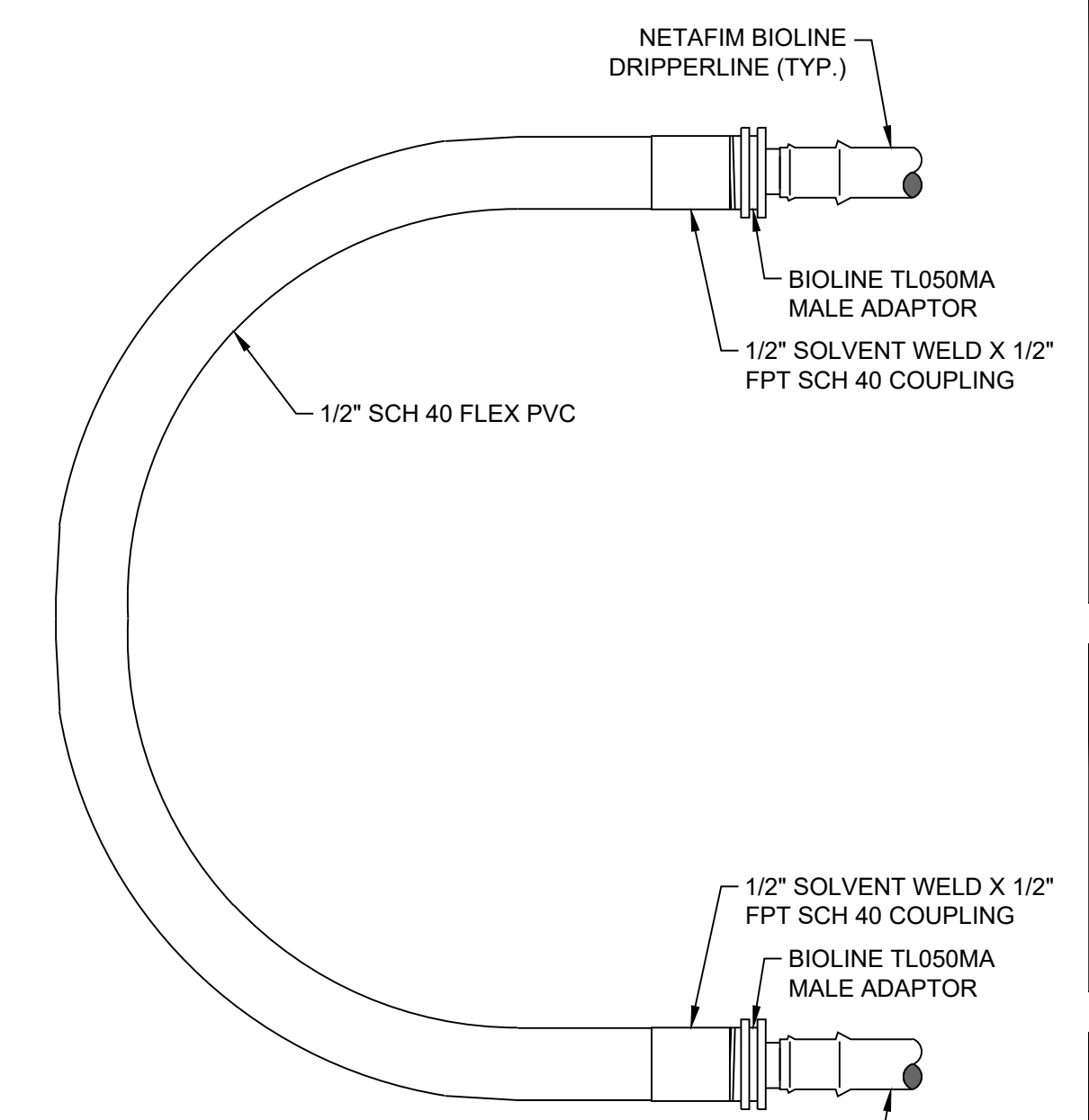
DRIP DISPERSAL LEGEND



DETAIL 3
START CONNECTION WITH FLEX PIPE
NOT TO SCALE

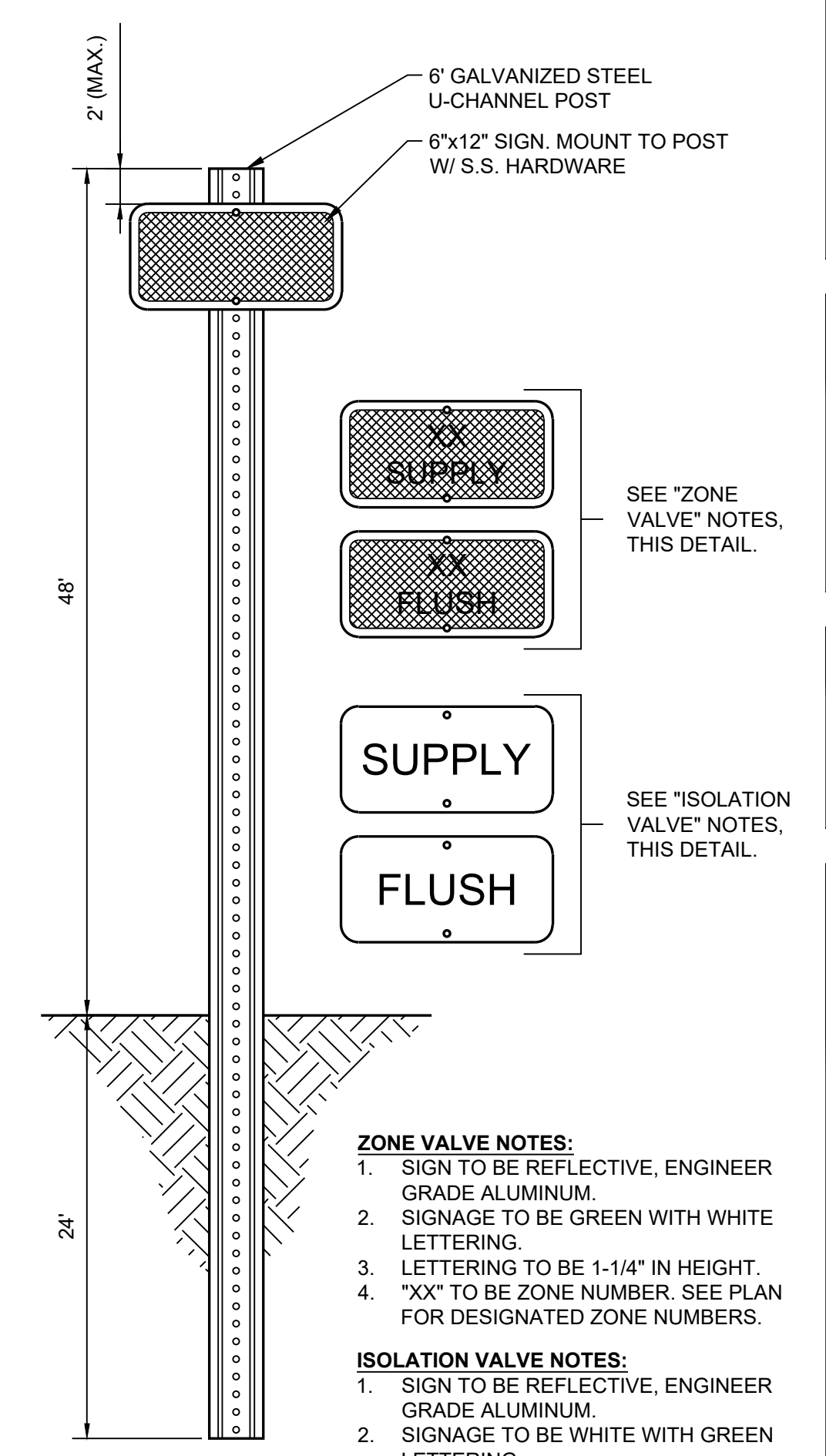


DETAIL 5
1/2" AIR / VACUUM RELEASE VALVE
NOT TO SCALE

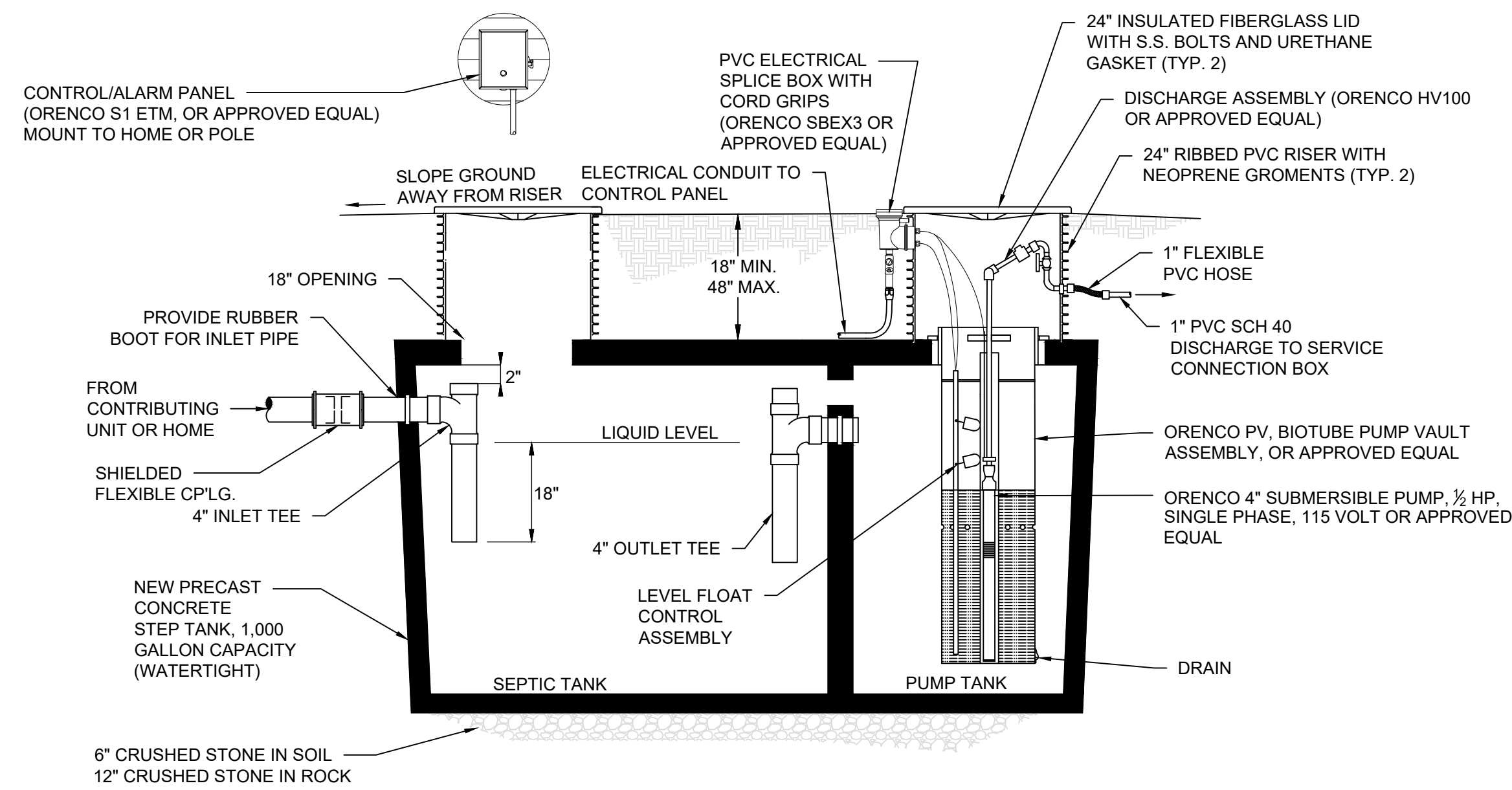


NOTE:
FLEX PVC TO BE USED AT ALL BENDS GREATER THAN 45°. SEE PLAN FOR LOCATION.

DETAIL 4
DRIPPERLINE BEND WITH FLEX PVC
NOT TO SCALE



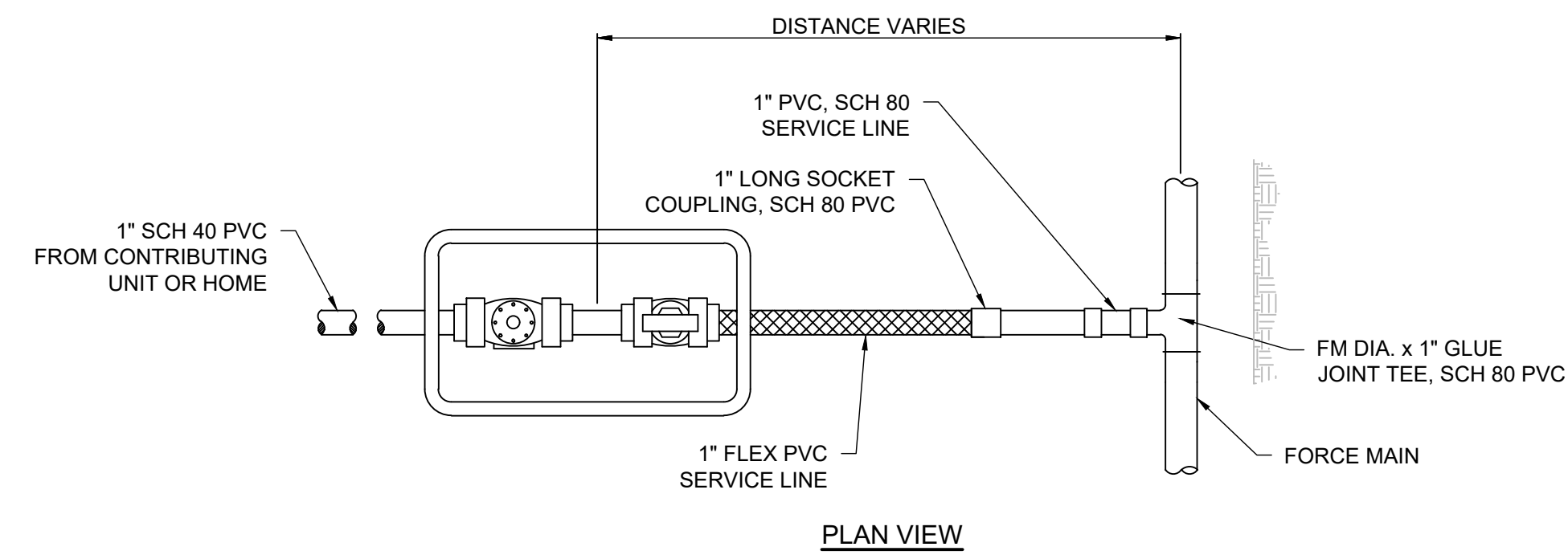
DETAIL 6
VALVE SIGNAGE
NOT TO SCALE



DETAIL 1
SEPTIC TANK EFFLUENT PUMP (STEP) INSTALLATION
NOT TO SCALE

NOTES:

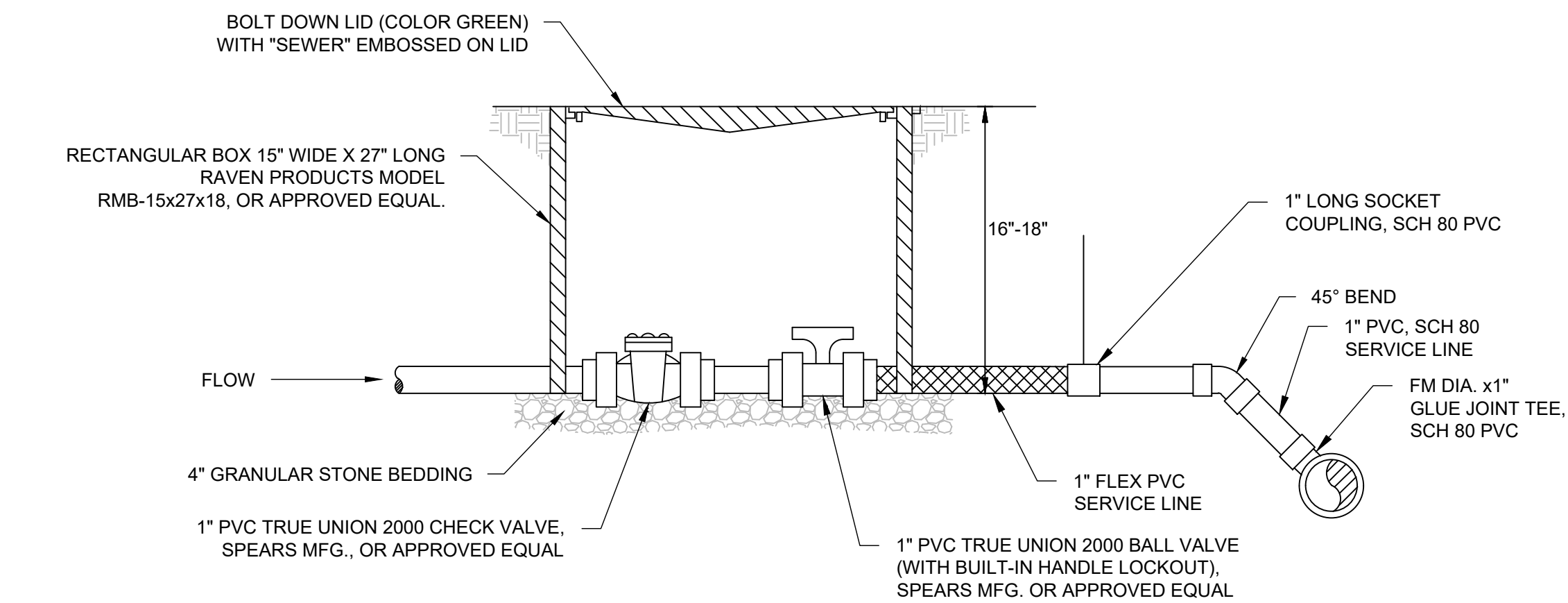
1. CONTRACTOR IS RESPONSIBLE FOR LOCATING THE EXISTING SEPTIC TANK ON THE SUBJECT PROPERTY, IF APPLICABLE.
2. EXISTING SEPTIC TANKS SHALL BE ABANDONED IN PLACE & FILLED W/ CRUSHED STONE ONCE EMPTY. CONTENTS MAY BE TRANSFERRED TO NEW TANK.
3. NEW SEPTIC TANK, INSPECTION PORTS, ACCESS RISERS AND TANK CONNECTIONS SHALL BE WATERTIGHT. TANK SHALL BE FIELD TESTED FOR WATER TIGHTNESS, IN ACCORDANCE W/ ASTM C1227.
4. SEPTIC TANKS WITHIN TRAFFIC LOADING CONDITIONS SHALL BE DESIGNED BY AN ENGINEER TO MEET THE ANTICIPATED LOADING. DEPTH OF BURIAL, TRAFFIC OR NON-TRAFFIC LOADING SHALL BE CONSIDERED.
5. PLUMBING BETWEEN THE STRUCTURE AND SEPTIC TANK AND SEPTIC TANK AND FORCE MAIN SERVICE CONNECTION BOX SHALL BE WATERTIGHT AND INSTALLED IN ACCORDANCE WITH STATE AND LOCAL CODES.
6. ALL ELECTRICAL WORK SHALL BE INSTALLED BY A LICENSED ELECTRICIAN AND INSTALLED IN ACCORDANCE WITH STATE AND LOCAL CODES.



DETAIL 2
SERVICE CONNECTION BOX (TYP.)
NOT TO SCALE

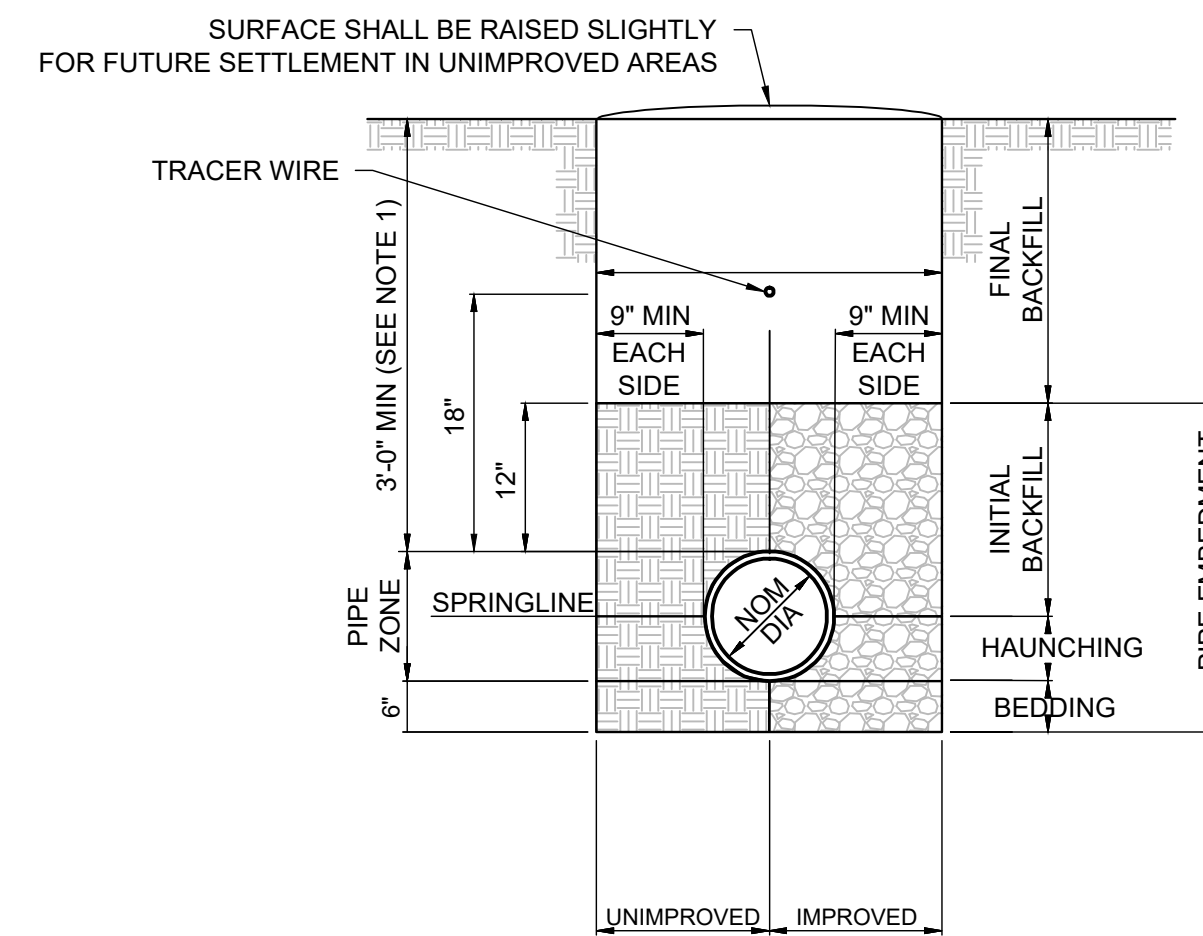
NOTES:

1. LOCATE SERVICES AT EXTENTS OF RIGHT-OF-WAY UNLESS NOTED OTHERWISE.
2. ALTERNATIVELY, HDPE FITTINGS & SERVICE LINE MAY BE USED. USE COMPRESSION FITTINGS AND VALVES.



DETAIL 3
MAINLINE PVC ISOLATION BALL VALVE ASSEMBLY
NOT TO SCALE

DETAIL 4
SERVICE CONNECTION BOX (TYP.)
NOT TO SCALE



DETAIL 5
SERVICE SADDLE CONNECTION
NOT TO SCALE

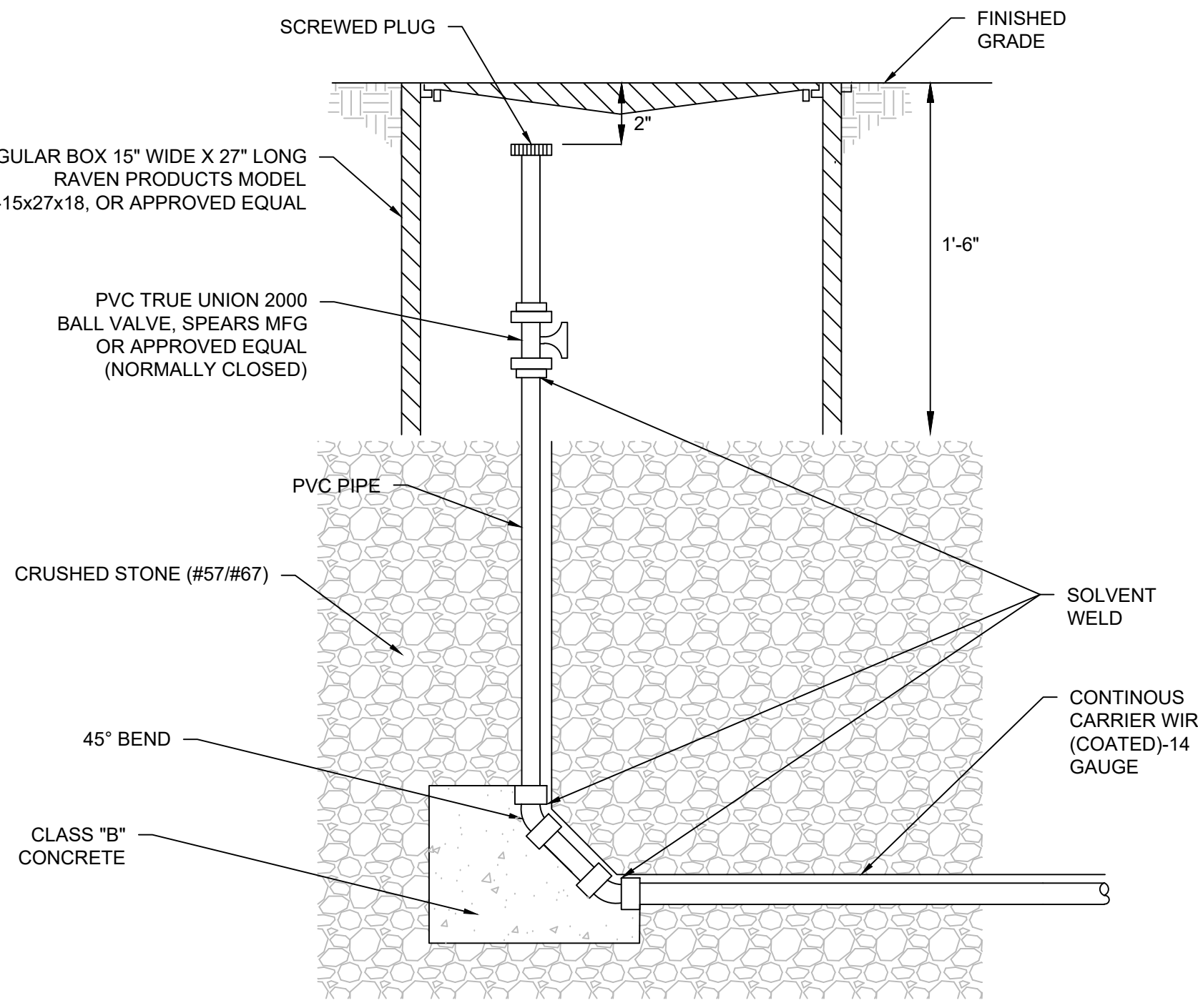
NOTES:

1. PROVIDE 4'-0" MINIMUM COVER UNDER PUBLIC ROADWAYS.
2. BEDDING, HAUNCHING, AND INITIAL BACKFILL SHALL BE CRUSHED STONE COMPACTED TO 95% PER ATSM D698.
3. FINAL BACKFILL SHALL BE COMMON EARTH, CRUSHED STONE, OR FLOWABLE FILL. CRUSHED STONE SHALL BE USED UNDER ALL IMPROVED SURFACES SUBJECT TO WHEEL LOAD. FLOWABLE FILL SHALL ONLY BE USED WHEN REQUIRED BY A DOT PERMIT REQUIREMENT & WITH ENGINEER APPROVAL.
4. PIPE TO BE CONTINUOUSLY SUPPORTED ALONG LENGTH OF PIPE BARREL EXCEPT AT BELL. BELL HOLES ARE REQUIRED SUCH THAT NO BEARING LOAD IS TAKEN BY THE BELL.
5. NOMINAL DIAMETER SHALL REFER TO CASING DIAMETER IN CASED INSTALLATIONS.
6. TRACER WIRE SHALL BE 14GA, THHN, SOLID COPPER WITH GREEN INSULATED JACKET AND WATERPROOF GREASE FILLED WIRE CONNECTORS AT JUNCTIONS.

DETAIL 6
TERMINAL CLEANOUT (TYP.)
NOT TO SCALE

NOTES:

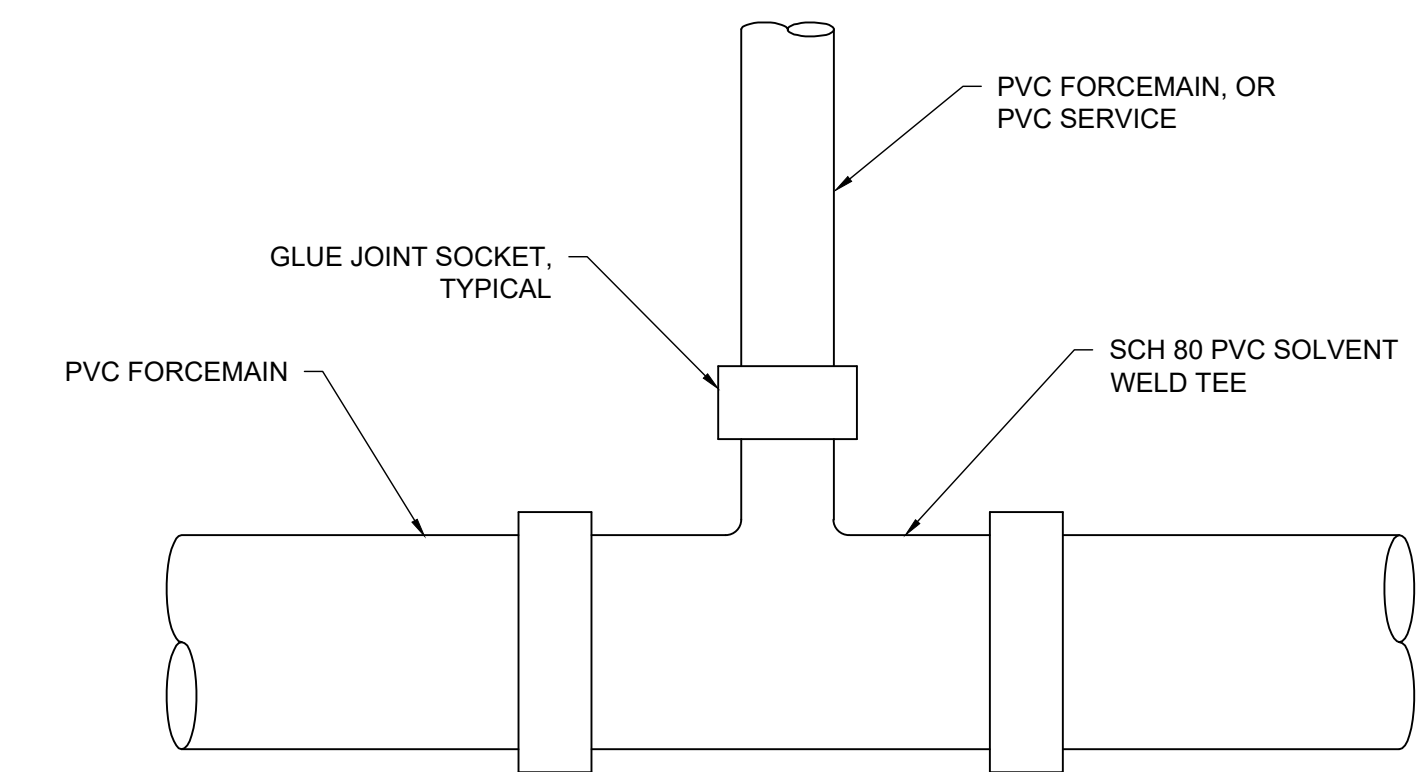
1. CLEANOUT SIZES SHALL MATCH THE SIZES OF THE FORCEMAINS ON WHICH THEY ARE TO BE INSTALLED.



DETAIL 7
COMBINATION AIR/VACUUM VALVE (ARV) (TYP.)
NOT TO SCALE

NOTES:

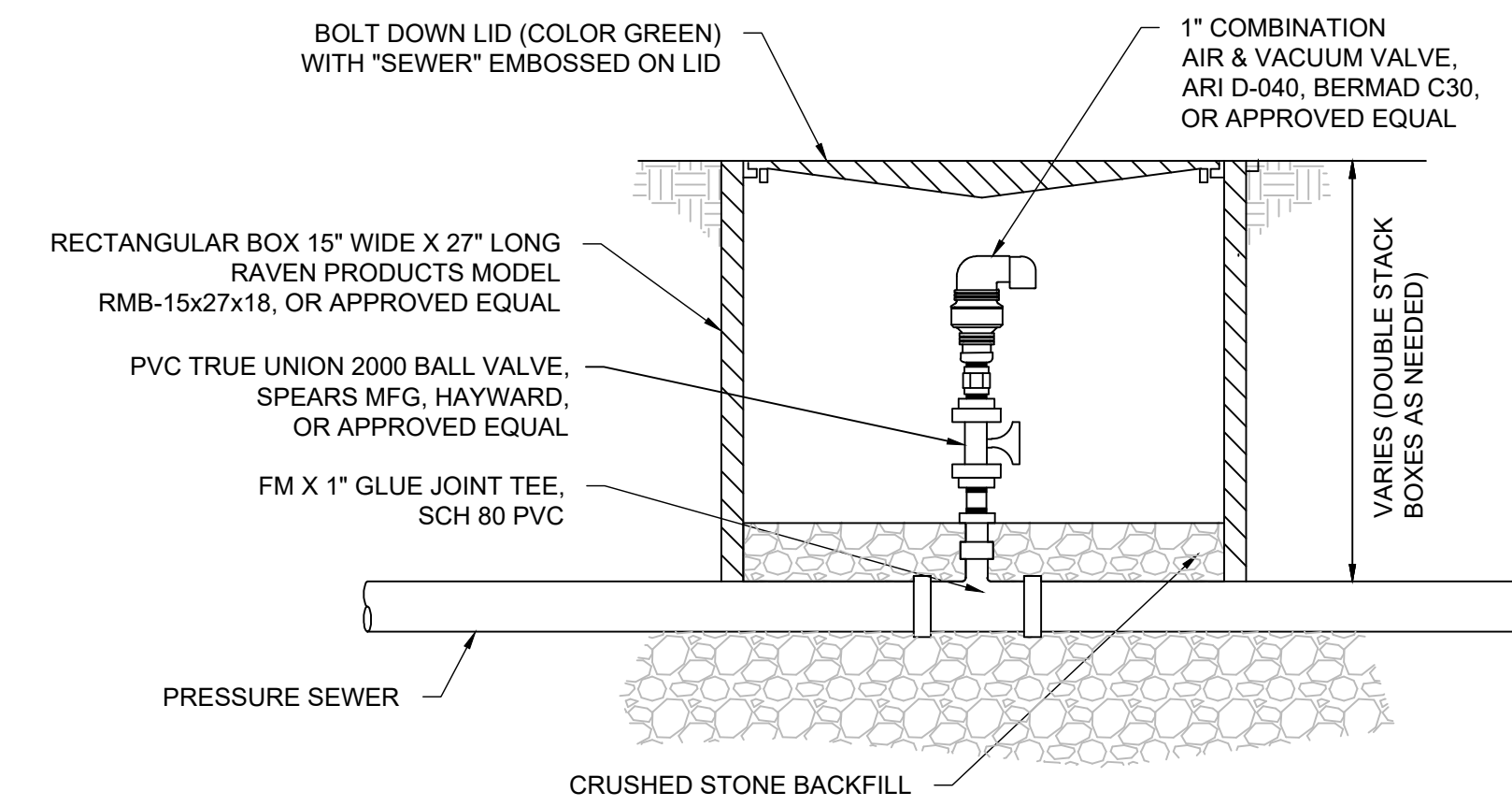
1. LOCATE ENTIRELY WITHIN RIGHT-OF-WAY.
2. USE NIPPLES BETWEEN PVC TEE, BALL VALVE, AND ARV.



DETAIL 8
TERMINAL CLEANOUT (TYP.)
NOT TO SCALE

NOTES:

1. PRIMER & GLUE REQUIRED. OATLEY HEAVY DUTY MEDIUM SET CEMENT, OR ASTM D256Y CONFORMING.

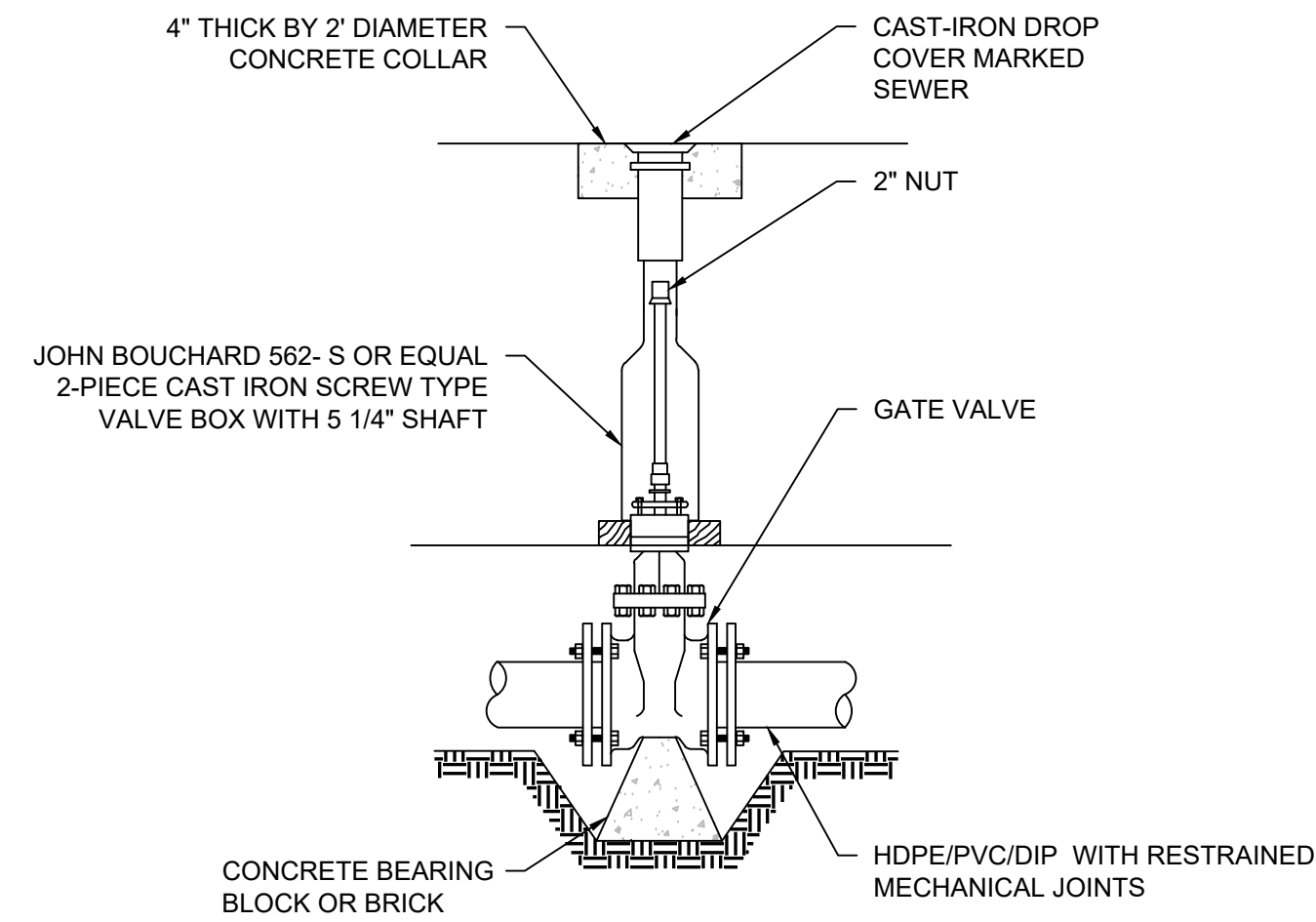


DETAIL 9
MAINLINE PVC ISOLATION BALL VALVE ASSEMBLY
NOT TO SCALE

NOTES:

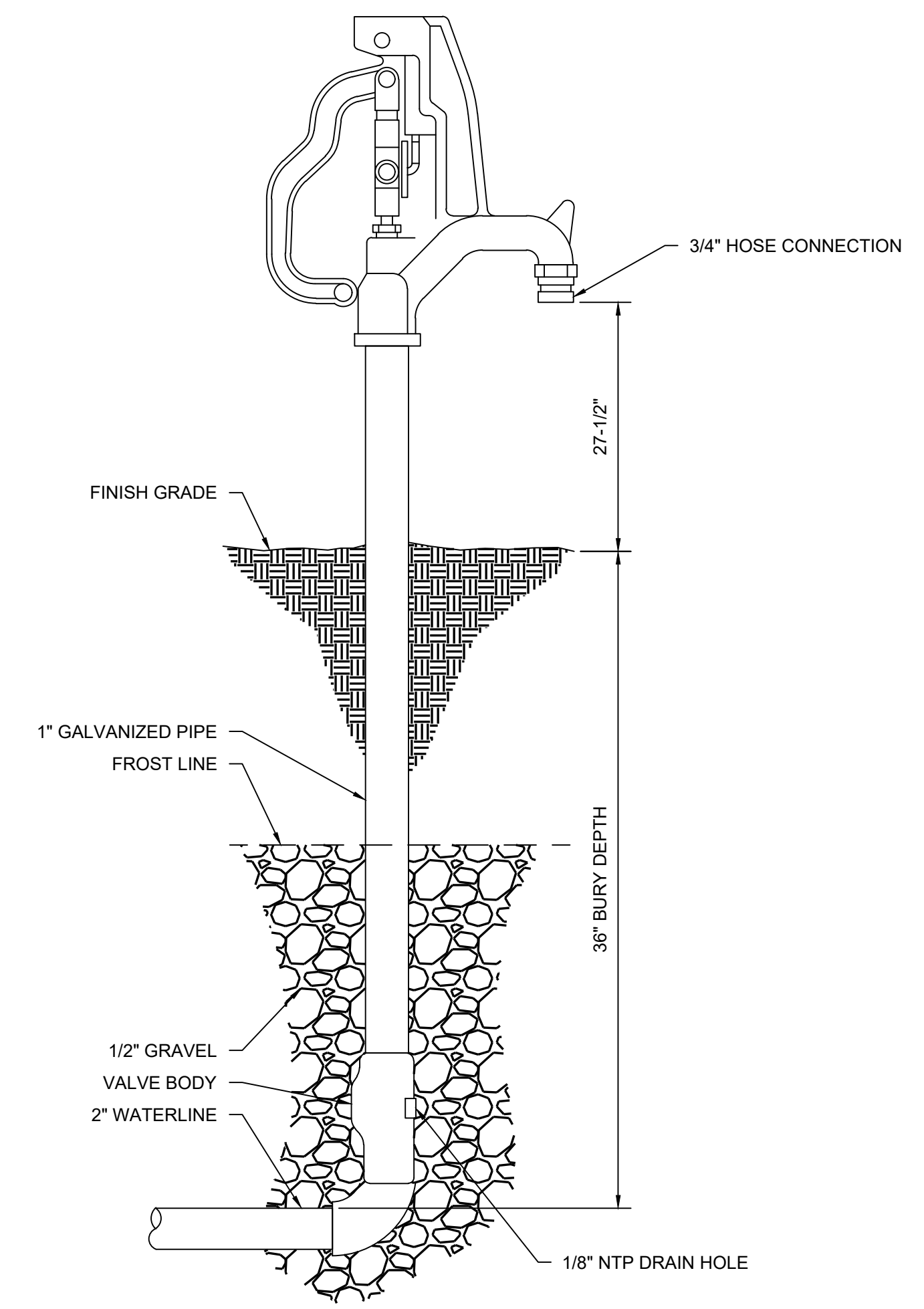
1. PVC BALL VALVES TO BE USED ON ALL FORCEMAIN 4" & SMALLER. BALL VALVES SHALL BE TRUE UNION 2000 BY SPEARS MFG, HAYWARD, OR APPROVED EQUAL. OPERATOR SHALL BE 2" SQUARE NUT.
2. D.I. GATE VALVE TO BE USED ON ALL FORCEMAIN 6" & LARGER W/ 2" SQUARE NUT, INCLUDE C.I. VALVE BOX.

DATE	REVISION



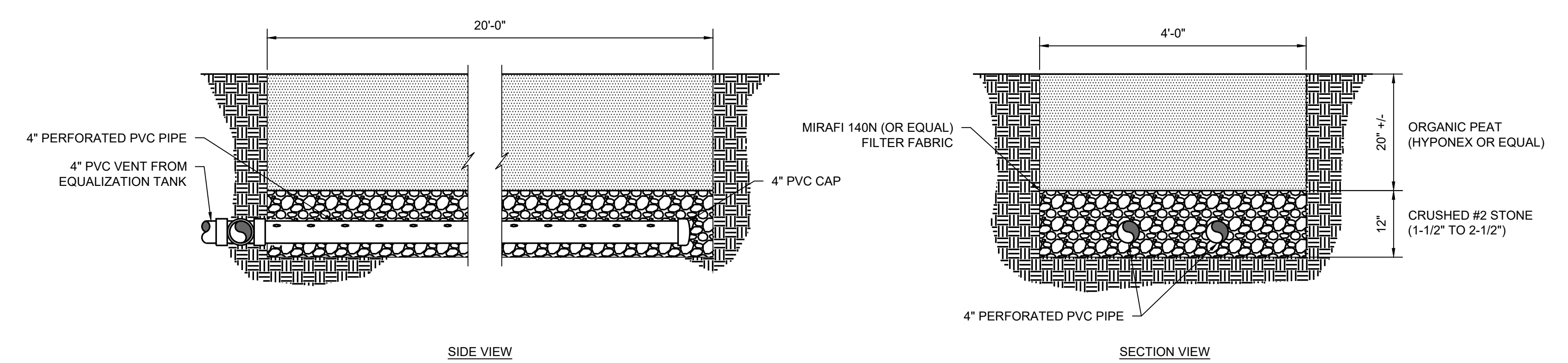
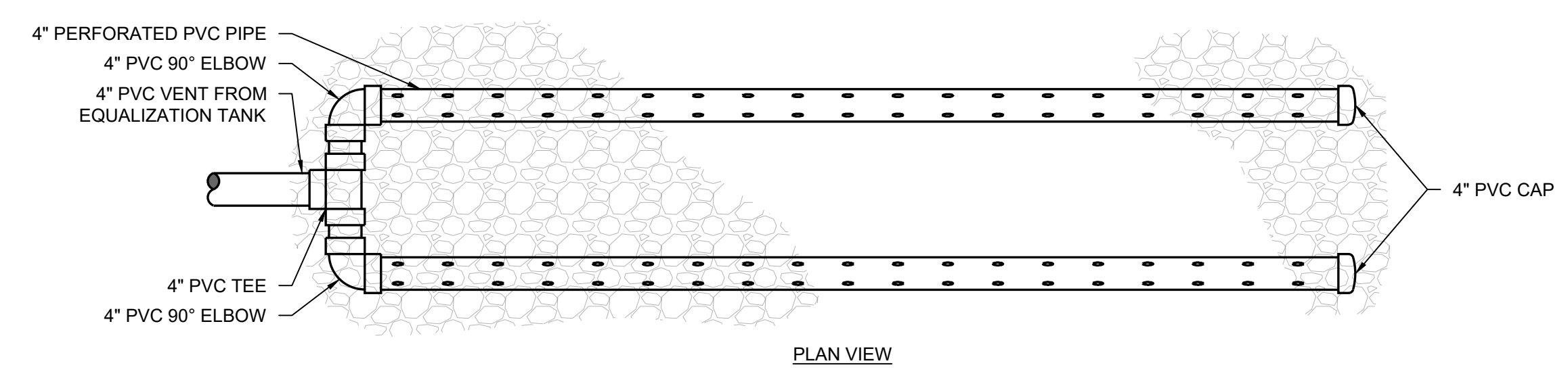
DETAIL
GATE VALVE ASSEMBLY
NOT TO SCALE

NOTES:
1. VALVES 4" AND LARGER SHALL BE GATE VALVES.
AMERICAN SERIES 2500 RESILIENT WEDGE OR EQUAL.

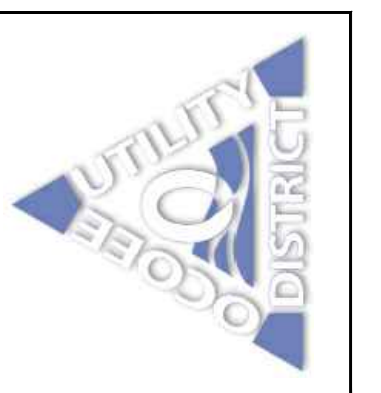


DETAIL
YARD HYDRANT ASSEMBLY
NOT TO SCALE

NOTES:
1. YARD HYDRANT TO BE WOODFORD Y34 FREEZE PROOF
OR EQUAL.



DETAIL
ODOR CONTROL SOIL BED
NOT TO SCALE



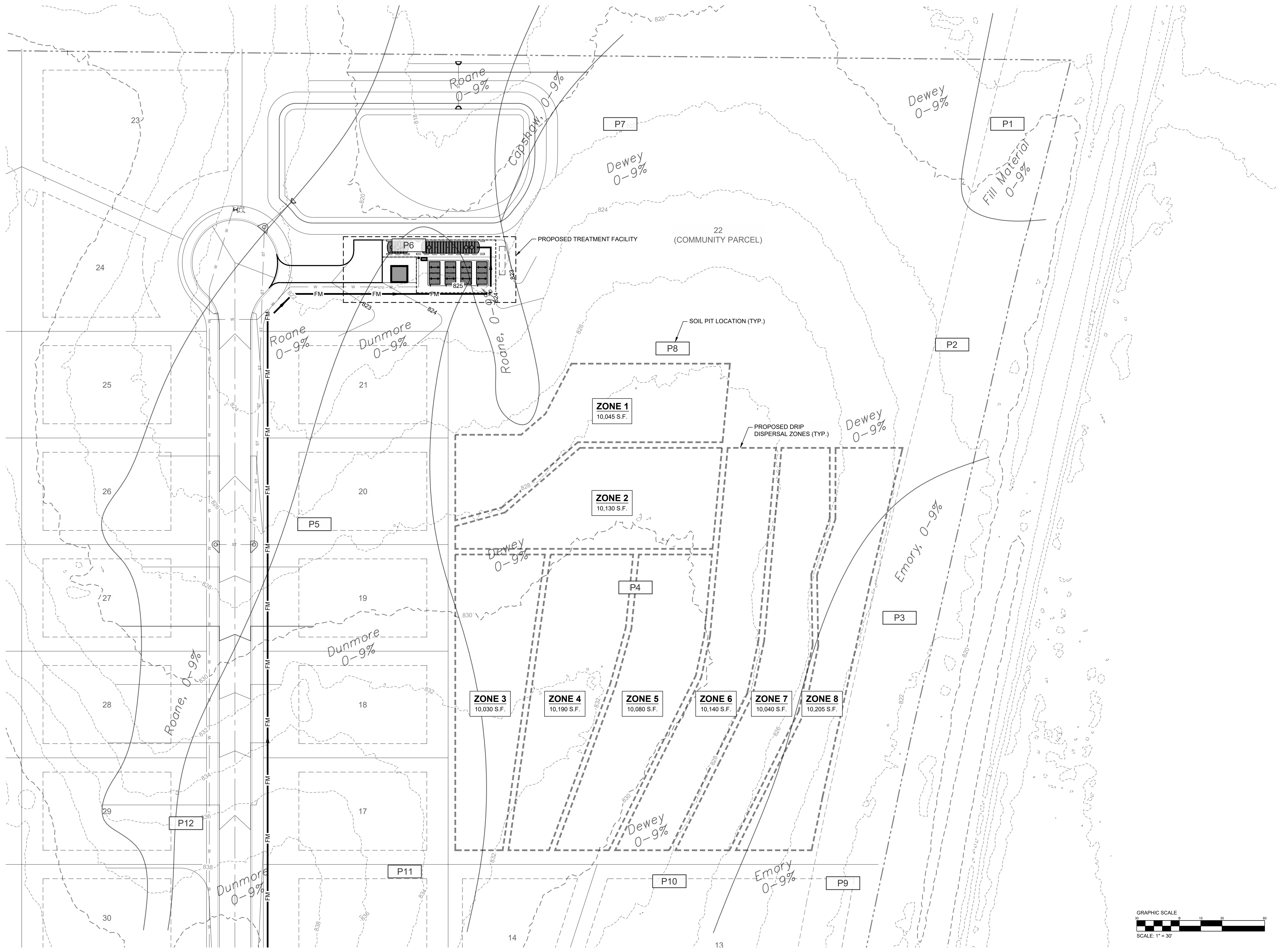
NORTH	DRAWN BY CAJ
	APPROVED BY JDF

DATE	REVISION

All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

Appendix C

Soil Map



DATE	REVISION

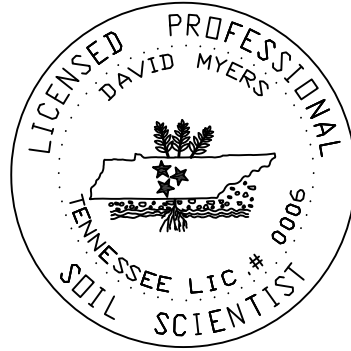
All dimensions to be field verified prior to commencement of work. This drawing is COPYRIGHT of FOXPE. Any unauthorized reproduction, transmission, or storage of this document in whole or part constitutes an infringement of copyright. The information, ideas, and concepts presented within this document are confidential and the recipients of this document are prohibited from disclosing such information, ideas or concepts to any person without the prior written consent of FOXPE.

Client: River Stone Construction
 Number of Acres: 21.33±
 Location: Old Charleston Road
 County: Bradley

High Intensity Soil Map Prepared By:
 David Myers Soil Consultant, TN Lic. #6

March 29, 2022

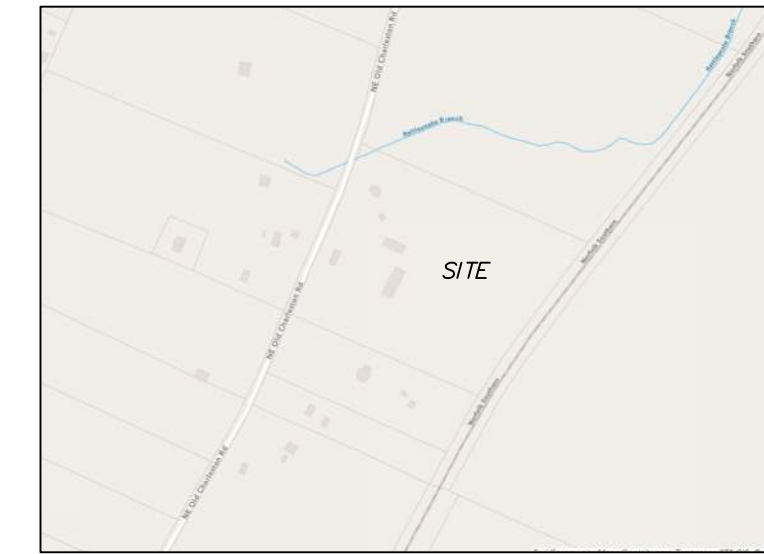
Signature of Soils Consultant does not constitute approval
 of this map by the Division of Water Resources.



SOILS LEGEND & SLOPE CLASSES:

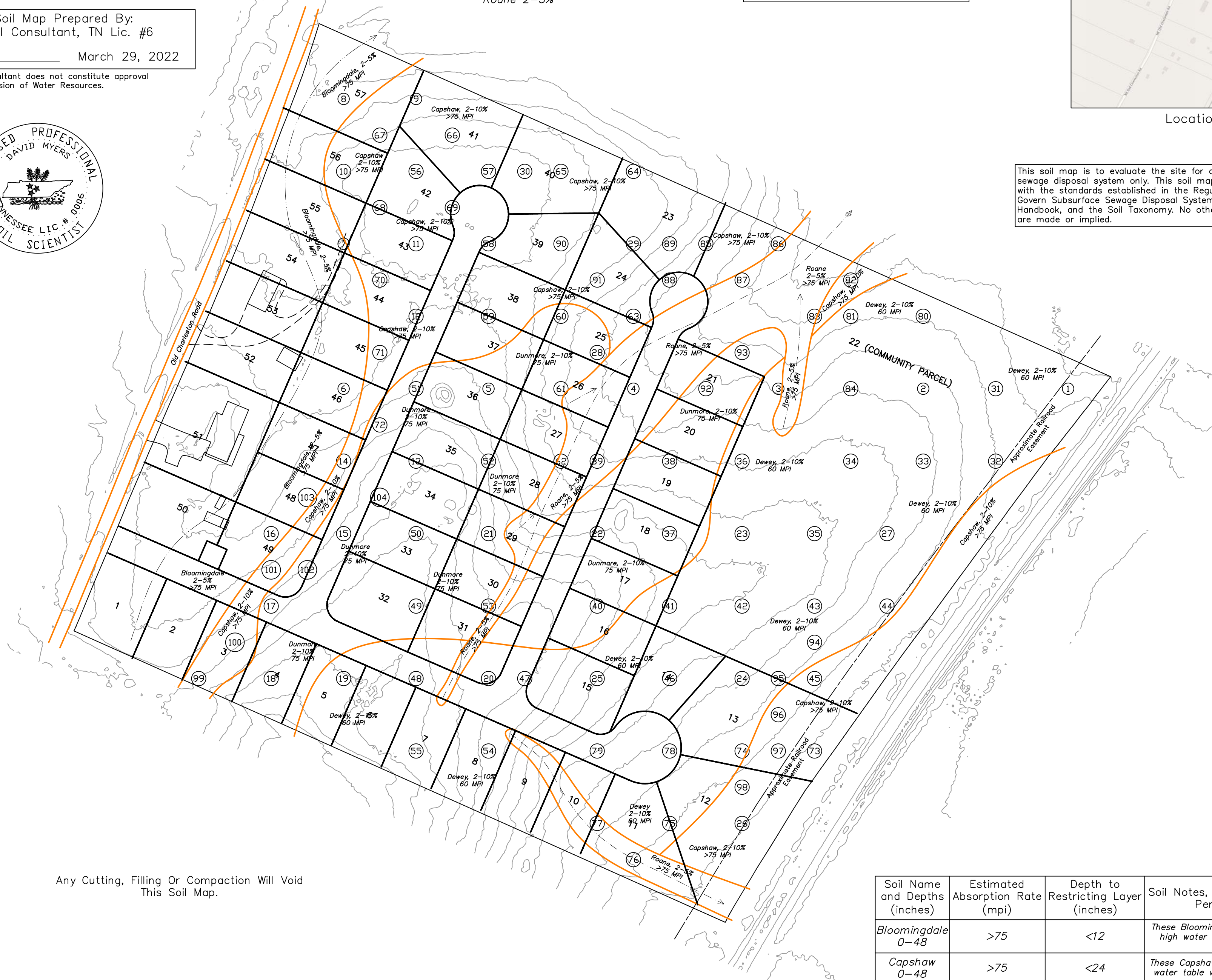
Bloomingdale 2-5%
 Capshaw 2-10%
 Dewey 2-10%
 Dunmore 2-10%
 Roane 2-5%

Map Legend	
①	Auger Hole
—	Soil Boundary
←	Drainage >12 inches
←	Perennial Drainage



Location Map

This soil map is to evaluate the site for a subsurface sewage disposal system only. This soil map complies with the standards established in the Regulations to Govern Subsurface Sewage Disposal Systems, the Soils Handbook, and the Soil Taxonomy. No other warranties are made or implied.



Any Cutting, Filling Or Compaction Will Void
 This Soil Map.

Soil Name and Depths (inches)	Estimated Absorption Rate (mpi)	Depth to Restricting Layer (inches)	Soil Notes, Improvement Practices, Restricting Layer, Percolation Status
Bloomingdale 0-48	>75	<12	These Bloomingdale soils have a seasonal high water table within a depth of 12 inches.
Capshaw 0-48	>75	<24	These Capshaw soils have a seasonal high water table within a depth of 24 inches.
Dewey 0-30 30-48	60 75	>48	Clay content increases modestly below a depth of 30 inches.
Dunmore 0-24 24-48	75 >75	>48	Clay content increases markedly below a depth of 24 inches.
Roane 0-48	>75	<24	These areas are located in drainageways and have excess wetness and/or flooding.



David Myers Soil Consultants, LLC
 P.O. Box 5088
 Cleveland, TN 37312
 Cell: (423) 716-2577
 Email: davidmsoil@yahoo.com
 www.davidmyerssoilconsultants.com



Appendix D
Pedon Descriptions

Appendix E
Fee Payment

OCOEE UTILITY DISTRICT

September 2, 2022

Tennessee Department of Environment & Conservation
Division of Water Resources
c/o Brad Harris, P.E.
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

RE: Bradley County, Tennessee
State Operating Permit – Graywood Farms North
Bradley County, TN
OHM Project Number: 0563220150

Dear Mr. Harris:

Ocoee Utility District (the District) is pleased to submit a State Operating Permit (SOP) application for the Graywood Farms North Residential Subdivision for review by TDEC. The proposed application, sent under separate cover by OHM Advisors, seeks to provide sewer service to 57-single family homes with the District serving as operator of the collection and treatment system.

Project Description

The project consists of the installation of a STEP system with a low-pressure force main collector discharging to a 20,000 gpd drip-dispersal wastewater treatment plant. Approximately 2,750 LF of 4-inch force main will be installed and each of the 57 homes will be equipped with a 1,500-gallon STEP system.

Conclusion

This transmittal includes a fee payment in the amount of \$750 per TAC Fund Fee Rule 0400-40-11-.02 for a 20,000 GPD Treatment Facility. By separate cover the attachments for review and approval will include: Application for a State Operating Permit (SOP) (CN 1251, Rev. 03-19), Soils Map and Pedon Descriptions, General System Layout, and Engineering Report.

Thank you for your review and consideration of this project.

Sincerely,
Ocoee Utility District


Tim Lawson, General Manager

