N THE TENNESSEE PUBLIC UTILITY COMMISSION
AT NASHVILLE, TENNESSEE

IN RE:	)	
	)	
PETITION OF TENNESSEE	)	
WASTEWATER SYSTEMS, INC., TO	)	**DOCKET NO. 22-00074**
AMEND ITS CERTIFICATE OF	)	
CONVENIENCE AND NECESSITY	)	

PETITION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY TO INCLUDE DERBY MEADOWS SUBDIVISION

Tennessee Wastewater Systems, Inc. ("TWSI", "Utility", or "Company") petitions the Tennessee Public Utility Commission ("TPUC") to amend its Certificate of Convenience and Necessity to expand its service area to include a residential subdivision known as Derby Meadows and commercial parcel for Thornton's Refueling and Convenience Store in Robertson County.

As demonstrated in the application and attached exhibits, there is a public need for service and TWSI has the requisite management experience, financial capability, and technical expertise to provide such service pursuant to the rules and regulations of the Commission. In support of its Petition, TWSI states as follows:

General Information:

1. The applicant is Tennessee Wastewater Systems, Inc. which is located at 851 Aviation Parkway, Smyrna, TN 37167.

2. **Organizational Chart** – See Exhibit 2

3. Tennessee Wastewater Systems, Inc. is wholly owned by Adenus Group, LLC. The members of Adenus Group, LLC are Thomas Pickney, William Pickney, and Robert Pickney. 849 Aviation Parkway, Smyrna, TN 37167. Each owns 33.3% of Adenus Group, LLC.

4. **Corporate Organizational Chart with Affiliates** – See Exhibit 4 – Adenus Technologies, LLC will provide certain materials and supplies to the project as well as panels and telemetry monitoring to the system. TWSI is aware of and will abide by the Commission's affiliate transaction rules with respect to transactions between TWSI and its affiliates.

5. **Articles of Incorporation** – See Exhibit 5

6. **Tennessee Business License** – See Exhibit 6

7. **Description of Geographic Territory** – The Derby Meadows Subdivision is located in Robertson County and is bordered by Henry Gower Road on the west, York Road on the South and TN State Route 49W on the East. The closest highway is TN State Route 49W. The Thornton's Refueling and Convenience Store is located at the intersection of I-24 and TN49. The wastewater facility will be known as Derby Meadows TF. See Exhibit 7 for a map detailing the residential and commercial development location, the lots to be served, and location of the wastewater facilities.

8. **Description of the Proposed Wastewater System** – The collection system will consist of grinder pumps at each home and facility along with low pressure sewer system to route sewage to a set of dosing/flow equalization tanks to remove trash and normalize flow to avoid peak surges. The proposed wastewater treatment facility design is an Extended Aeration treatment system including an air diffusion system, clarification chambers and chlorine disinfection chamber. The treated effluent will be land applied in designated drip areas.

9. **Estimated Dates for commencement and completion of construction** – Construction will commence at a time agreeable between the developer and its contractor and will take approximately 180 days. TWSI is aware of TPUC Rule 1220-04-13-.09(7) and fully expects the wastewater system to be completed within 3 years from the date of the written order

granting the CCN. Notice of completion of the system will be filed in this docket as required by the Rule.

10. **Phases/Houses per Phase** – The subdivision will be built in five (5) phases consisting of roughly sixty (60) houses per phase. The Thornton's Refueling and Convenience Store will be constructed concurrent with the second and/or third phase.

11. **Builder/Developer Identity** – See Request to Serve Letter Exhibit 11

Bill Seely
Harvester, LLC
545 Mainstream Drive, Suite 402
Nashville, TN 37228
Phone: 615-742-9955
bseeley@seeleywallis.com

Existence of Public Need and Property Rights

12. **Letters from local governments and utilities** – See Exhibit 12

13. **Franchise Agreement** – See Exhibit 13

14. **Contracts and Agreements** – See Exhibit 14A (Sewer Service Agreement) and 14B Construction Contract.

Managerial Ability:

15. **Biographies of officers and key wastewater utility staff w/ list of certifications or professional licenses** – See Exhibit 15

16. TWSI is a certified wastewater provider in the State of Tennessee. Its parent company Adenus Group, LLC owns certified wastewater providers in Alabama, Ohio, and Kentucky.

17. **Merger/Acquisition** – n/a

18. **Treatment System Contractor** – Scott & Ritter, Inc. is the contractor for the wastewater treatment facility. Their contractor's license is Exhibit 18.

Technical Ability:

19. **SOP Application/Permit** – See Exhibit 19A (Application) and 19B (Draft SOP). The final SOP will be filed in this docket once issued by TDEC.

20. **State Operator Certificate** – See Exhibit 20

21. **TWSI Contact Person:**

Matthew Nicks
Tennessee Wastewater Systems, Inc.
615-220-7200
Matthew.Nicks@adenus.com

22. **Engineering Certification** –The system has not been constructed at this time. The certification will be filed in this docket upon acceptance of the system by TWSI.

Financial Capability:

23. **Financial Statements** – See Exhibit 23

24. **Pro Forma** (Five years of operations) –With over 4800 customers, the addition of the Derby Meadows subdivision will have minimal impact to the Company's overall finances (as shown in Exhibits 23 and 31).

25. **NARUC Chart of Accounts** – See Exhibit 25

26. **Plant in service account numbers** – See Exhibit 26

27. **Depreciation rates/schedule** – Depreciation is straight line with the following schedule:

Building – 15 years
Fence – 7 years
Panel – 7 years
Tank – 10 years
Treatment – 26 years

28. **Estimated Cost of Construction** –The estimated cost of construction is not to exceed $1,400,000.00 per the construction agreement (Exhibit

14B). TWSI will provide in this docket a final accounting of all contributed assets and property. A TWSI affiliate is not involved in the construction of the system.

29. TWSI will own the system once it is completed, inspected, and accepted by the Utility. Estimated amount of contributed capital will include the treatment plant and collection system, as well as the cost of the land conveyed to the Utility. These costs are not known at this time but will be filed in this Docket along with the actual cost of the treatment system when provided by the Developer to TWSI, no later than at the time the final plat is signed by the Utility. Contributed Capital is recorded when the system is commissioned (accepted) by debiting the appropriate utility plant in service asset account and crediting the CIAC account.

30. **Tariff** – On file with the Commission. See Exhibit 30 for addition of the Derby Meadows Subdivision to the residential and commercial tariff sheets.

31. **Five Year Build Out Estimate of Development** – See Exhibit 31

32. **Municipal Bonding Requirements** – No municipal bonding required.

33. **Performance Bond** – A performance bond from the developer will be provided and a copy will be filed in this docket prior to the commencement of construction for this project.

34. **Funding Sources** - The developer is responsible for funding the construction of the wastewater system.

35. **Financial Security** – On file with the Commission.

THEREFORE, having shown that a public need exists and that TWSI possesses the requisite managerial, technical, and financial capabilities to provide service to the Derby Meadows Subdivision in Robertson County, Tennessee, TWSI respectfully requests the Commission's approval of this Petition.

RESPECTFULLY SUBMITTED,

Jeff Risden (BPR No. 32769)
General Counsel
Tennessee Wastewater Systems, Inc.
851 Aviation Parkway
Smyrna, TN 37167
(615) 220-7171
jeff.risden@adenus.com

EXHIBIT 2

Tennessee Wastewater Systems, Inc.

Organizational Chart

Jeff Risden, CEO

Matthew Nicks, President

Thomas Pickney, Secretary

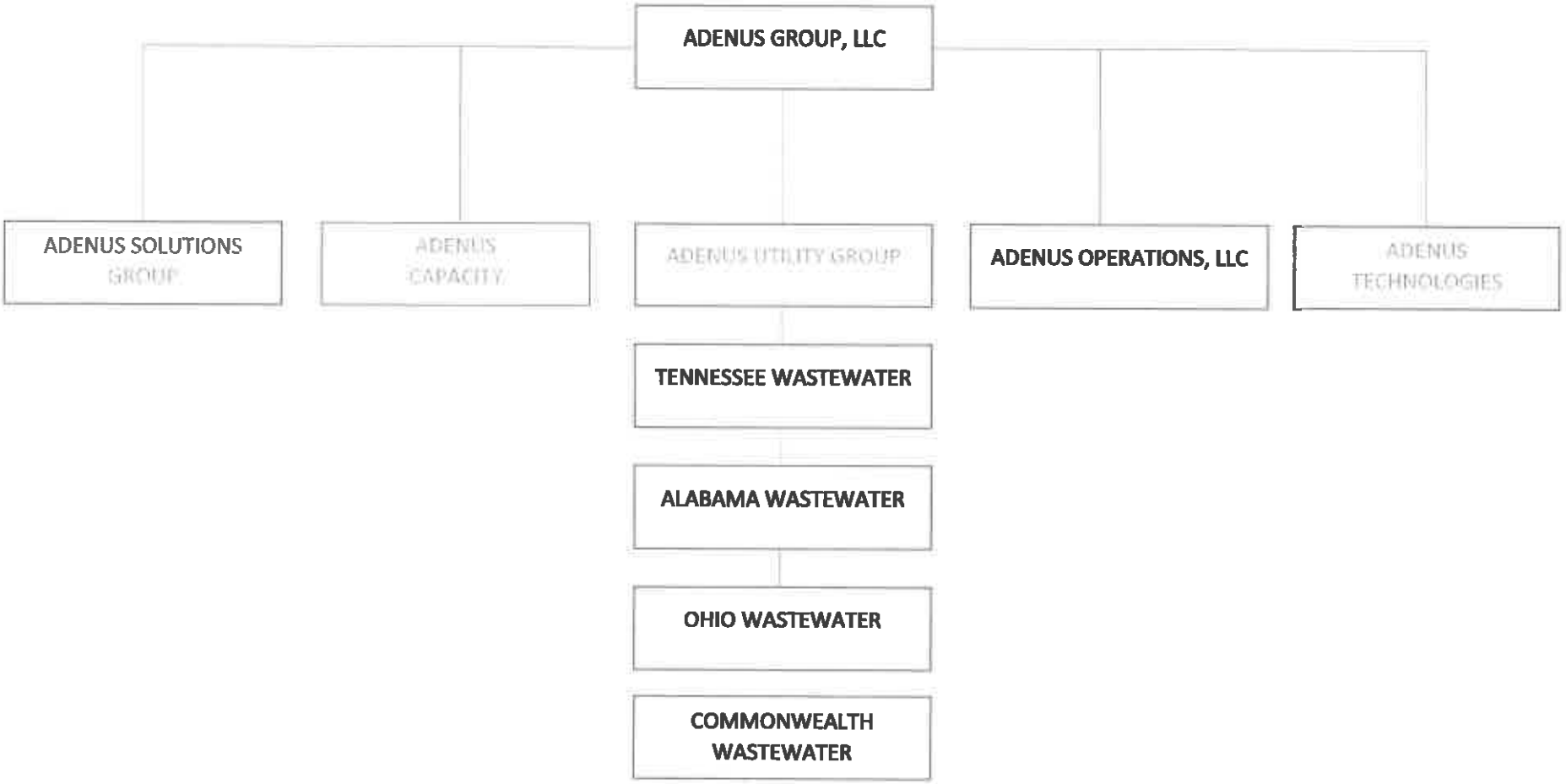
William Pickney, Treasurer

Tim Barber, Controller

Exhibit 4

ADENUS GROUP, LLC

AFFILIATE
ORGANIZATIONAL CHART



EX. 5

State of Tennessee
Department of State
Corporate Filings
312 Eighth Avenue North
6th Floor, William R. Snodgrass Tower
Nashville, TN 37243

4918 1792

ARTICLES OF AMENDMENT TO THE CHARTER (For-Profit)

For Office Use Only

FILED

CORPORATE CONTROL NUMBER (IF KNOWN) 0263854

PURSUANT TO THE PROVISIONS OF SECTION 48-20-106 OF *THE TENNESSEE BUSINESS CORPORATION ACT*, THE UNDERSIGNED CORPORATION ADOPTS THE FOLLOWING ARTICLES OF AMENDMENT TO ITS CHARTER:

1. PLEASE INSERT THE NAME OF THE CORPORATION AS IT APPEARS OF RECORD: ON-SITE SYSTEMS, INC.

IF CHANGING THE NAME, INSERT THE NEW NAME ON THE LINE BELOW: Tennessee Wastewater Systems, Inc.

2. PLEASE MARK THE BLOCK THAT APPLIES:

☑ AMENDMENT IS TO BE EFFECTIVE WHEN FILED BY THE SECRETARY OF STATE.
☐ AMENDMENT IS TO BE EFFECTIVE, ________ (MONTH, DAY, YEAR)

(NOT TO BE LATER THAN THE 90TH DAY AFTER THE DATE THIS DOCUMENT IS FILED.) IF NEITHER BLOCK IS CHECKED, THE AMENDMENT WILL BE EFFECTIVE AT THE TIME OF FILING.

3. PLEASE INSERT ANY CHANGES THAT APPLY:

A. PRINCIPAL ADDRESS: ________
STREET ADDRESS
CITY STATE/COUNTY ZIP CODE

B. REGISTERED AGENT: ________

C. REGISTERED ADDRESS: ________
STREET ADDRESS
CITY TN STATE ZIP CODE COUNTY

D. OTHER CHANGES:

4. THE CORPORATION IS FOR PROFIT.

5. THE MANNER (IF NOT SET FORTH IN THE AMENDMENT) FOR IMPLEMENTATION OF ANY EXCHANGE, RECLASSIFICATION, OR CANCELLATION OF ISSUED SHARES IS AS FOLLOWS:

6. THE AMENDMENT WAS DULY ADOPTED ON June 30, 2003 (MONTH, DAY, YEAR) BY (Please mark the block that applies):

☐ THE INCORPORATORS WITHOUT SHAREHOLDER ACTION, AS SUCH WAS NOT REQUIRED.
☑ THE BOARD OF DIRECTORS WITHOUT SHAREHOLDER APPROVAL, AS SUCH WAS NOT REQUIRED.
☐ THE SHAREHOLDERS.

PRESIDENT
SIGNER'S CAPACITY

[signature]
SIGNATURE

DATE

Charles L. Pickney, Jr.
NAME OF SIGNER (TYPED OR PRINTED)

SS-4421 (Rev. 10/01) Filing Fee: $20.00 RDA 1678

EXHIBIT 6

Tre Hargett
Secretary of State

Division of Business Services
Department of State
State of Tennessee
312 Rosa L. Parks AVE, 6th FL
Nashville, TN 37243-1102

JEFF RISDEN
JEFF RISDEN
851 AVIATION PARKWAY
SMYRNA, TN 37167

February 8, 2021

Request Type: Certificate of Existence/Authorization
Request #: 0402117

Issuance Date: 02/08/2021
Copies Requested: 1

Document Receipt

Receipt # : 006056982

Filing Fee: $20.00

Payment-Credit Card - State Payment Center - CC #: 3798738680 $20.00

Regarding:	TENNESSEE WASTEWATER SYSTEMS, INC.		
Filing Type:	For-profit Corporation - Domestic	Control # :	263854
Formation/Qualification Date:	03/16/1993	Date Formed:	03/16/1993
Status:	Active	Formation Locale:	TENNESSEE
Duration Term:	Perpetual	Inactive Date:	
Business County:	RUTHERFORD COUNTY		

CERTIFICATE OF EXISTENCE

I, Tre Hargett, Secretary of State of the State of Tennessee, do hereby certify that effective as of the issuance date noted above

TENNESSEE WASTEWATER SYSTEMS, INC.

* is a Corporation duly incorporated under the law of this State with a date of incorporation and duration as given above;

* has paid all fees, interest, taxes and penalties owed to this State (as reflected in the records of the Secretary of State and the Department of Revenue) which affect the existence/authorization of the business;

* has filed the most recent annual report required with this office;

* has appointed a registered agent and registered office in this State;

* has not filed Articles of Dissolution or Articles of Termination. A decree of judicial dissolution has not been filed.

Tre Hargett
Secretary of State

Processed By: Cert Web User

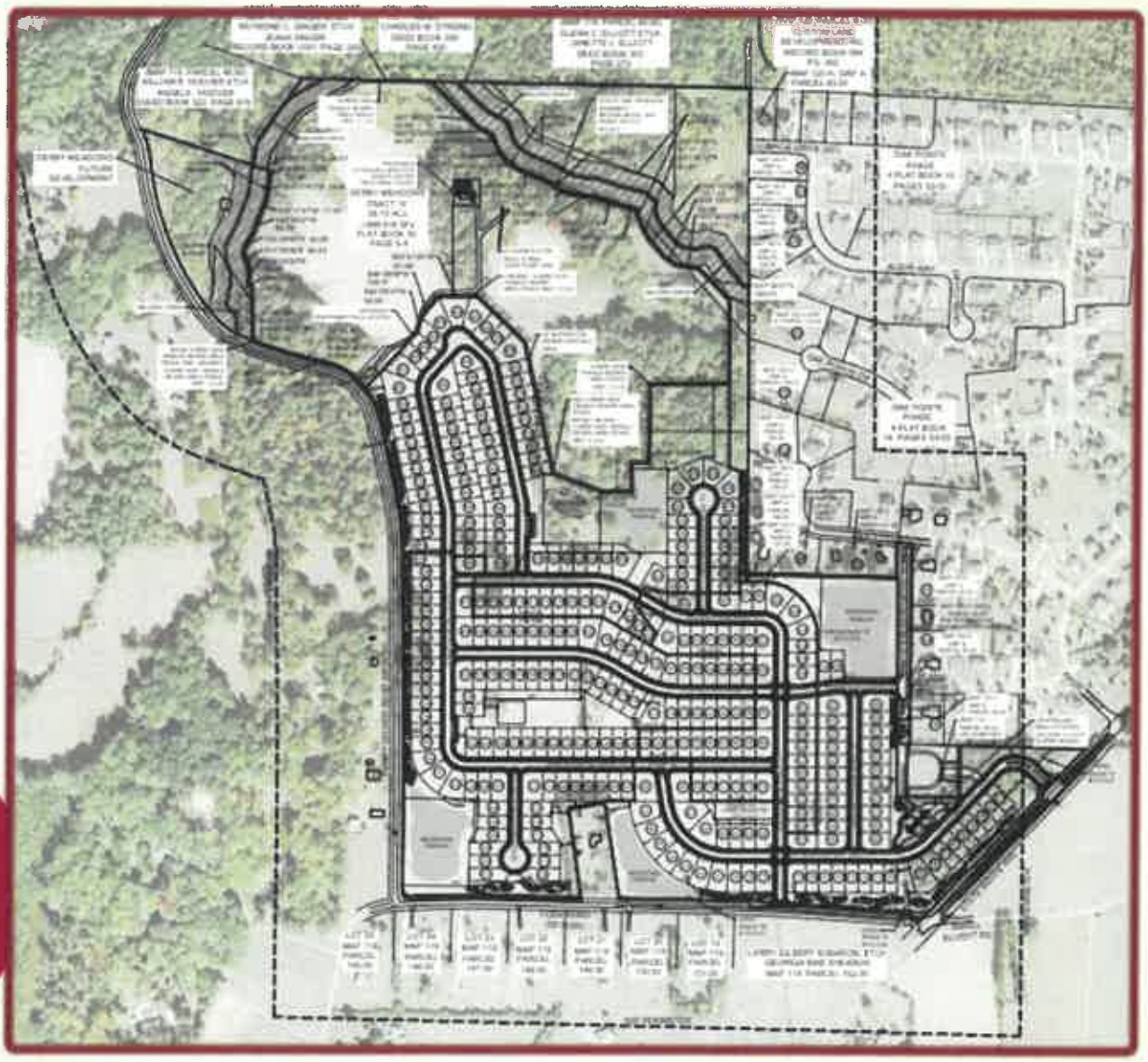
Verification #: 044379741

EX. 1

FINAL ENGINEERING REPORT

Derby Meadows On-site Decentralized Waste Water Treatment Plant

York Rd & TN 49W, Coopertown, Robertson County, TN



HARVESTER, LLC

545 Mainstream Drive, Suite 402, Nashville, TN

Landmark Engineering Group Project #01-21-1598 – April 4th 2022

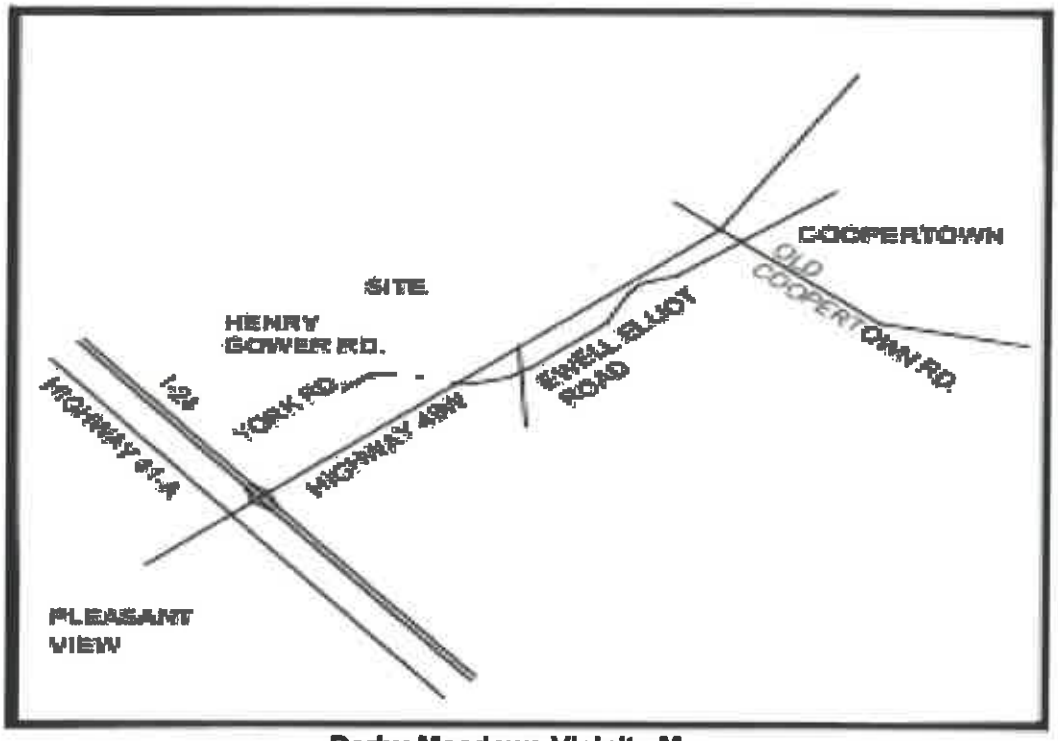
Landmark *Engineering Group, Inc*
Civil & Environmental Engineering and Land Surveying
3440 38th Avenue, Suite 4 – Moline, IL, 61265 – (309) 755.3400 – info@landgroup.biz

PROJECT HISTORY

The Developer, ***HARVESTER, LLC*** is constructing a 309 single family homes and related site amenities within ***Derby Meadows Residential Development*** along with related site improvements on a 139-acre parcel located on York Road & Tn Route 49W in Coopertown, Tennessee as depicted on the Site Plan included herewith for reference. In addition, a commercial parcel is being developed which will consist of a **Thornton's Refueling and Convenience Store** at the intersection I-24 & TN49 as depicted on the additional map exhibits included herein.

DERBY MEADOWS LOCATION

The **Derby Meadows** subdivision site is located in the corporate limits of Coopertown, Tennessee as depicted on the following location map.

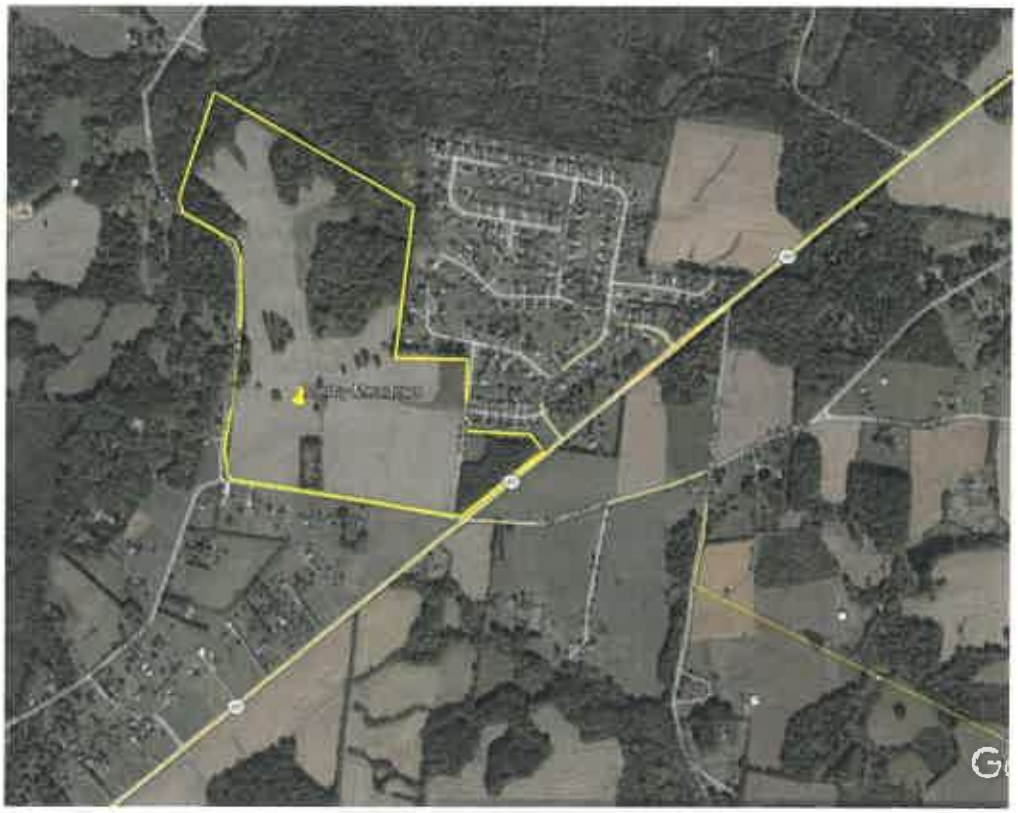


Derby Meadows Vicinity Map

The **Derby Meadows** subdivision is bordered by Henry Gower Road on the west, York Road on the south side, TN State Route 49W on the east side, vacant forested land on the north to northwest side and Oak Pointe Subdivision on the north to northeast side of the development site. Derby Meadows Development site was previously agricultural land that was annexed and approved for development. The site development started and then was terminated after the overall site was disturbed by site grading activities. Thereafter the **Derby Meadows** was approved under the Conservation Zoning regulations for Harvester, LLC which resulted in 54% of the land remained undisturbed and dedicated for Open Space and public enjoyment.

Landmark Engineering Group, Inc.
3340 38th Avenue, Suite 4 – Moline, IL 61265 – (309) 755.3400 – info@landgroup.biz

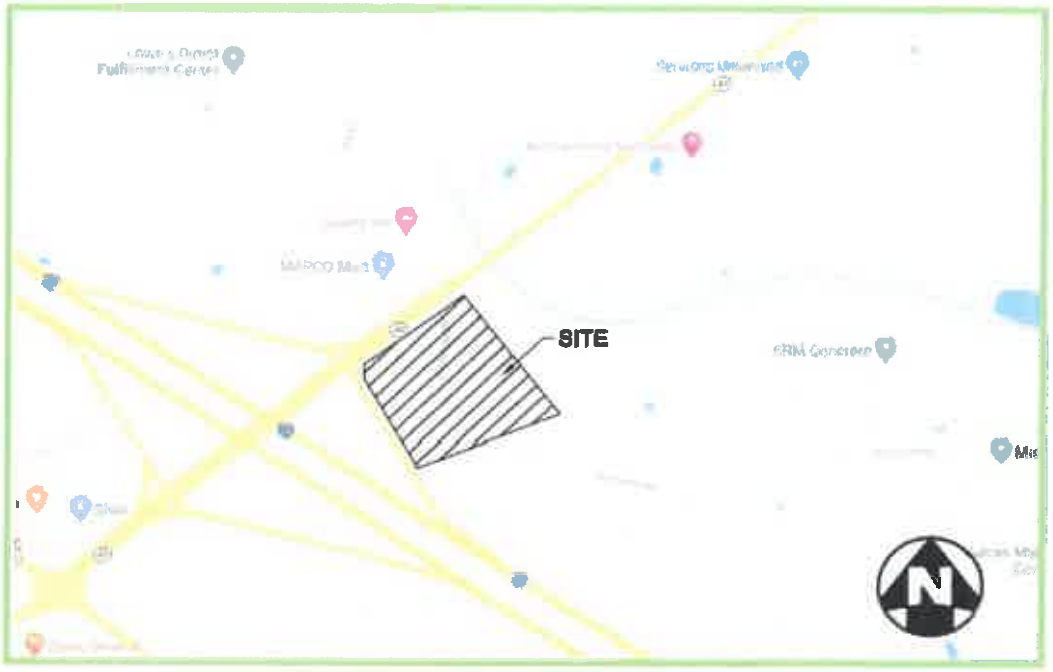
The Derby Meadows subdivision site is also depicted on the following aerial maps.



Landmark Engineering Group, Inc.
3340 38th Avenue, Suite 4 – Moline, IL 61265 – (309) 755.3400 – info@landgroup.biz

THORNTON'S DEVELOPMENT LOCATION

The **Thornton's Development** site is located in the corporate limits of Coopertown, Tennessee as depicted on the following location map.



Thornton's Development Vicinity Map

Thornton's Development Aerial Map

Landmark Engineering Group, Inc.
3340 38th Avenue, Suite 4 – Moline, IL 61265 – (309) 755.3400 – info@landgroup.biz

DERBY MEADOWS
COOPERTOWN, TN
SITE MAP

GRAPHIC SCALE 1' = 1000'

0 1000 2000

Landmark
ENGINEERING GROUP
3440 38TH AVENUE, SUITE 4
MOLINE, IL. 61265
(309) 755-3400
FAX (309) 755-5522
CIVIL ENGINEERING AND LAND SURVEYING
TENNESSEE DESIGN FIRM NUMBER F-21044

DATE: 10/23/2021
JOB NO.: 01-21-1598

U.S. Fish and Wildlife Service

National Wetlands Inventory

Derby Meadows, Coopertown, TN

October 23, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

National Flood Hazard Layer FIRMette

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	20.2 Cross Sections with 1% Annual Chance
	17.5 Water Surface Elevation
	Coastal Transect
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

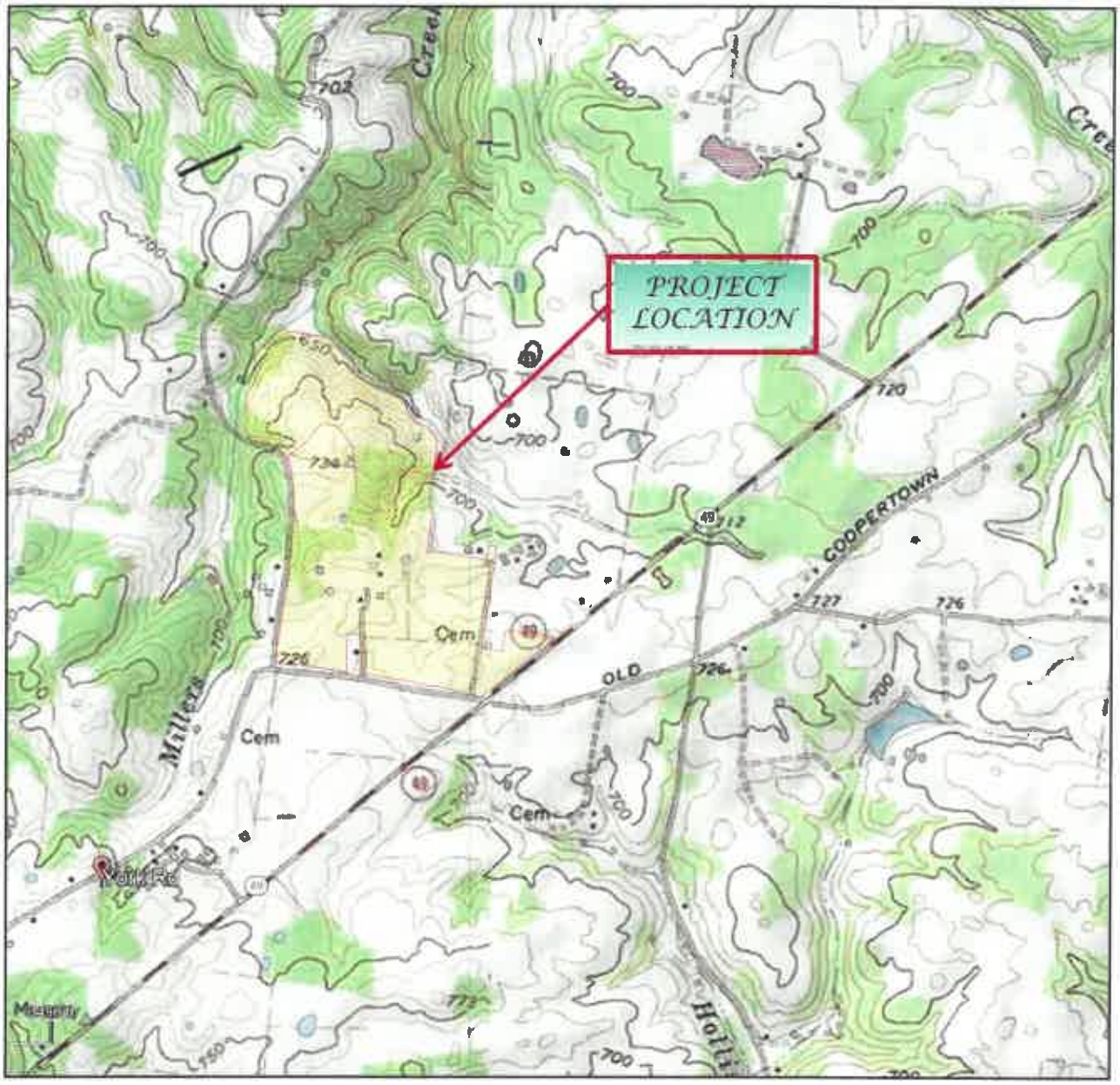
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2021 at 8:16 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



USGS Map

Derby Meadows
York Road & Hwy 49 W
Coopertown, TN

Landmark Engineering Group, Inc.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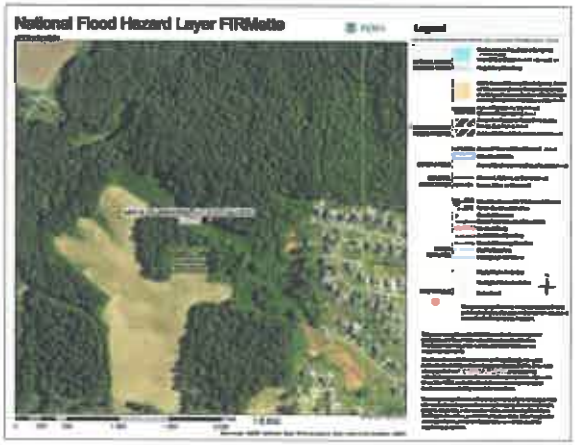
OVERALL SITE PLAN
DERBY MEADOWS SUBDIVISION

"CALL TENNESSEE 811
BEFORE YOU DIG"
(800)351-1111 OR 811

APPROXIMATE LOCATION OF
EXISTING 6"x FORCEMAIN



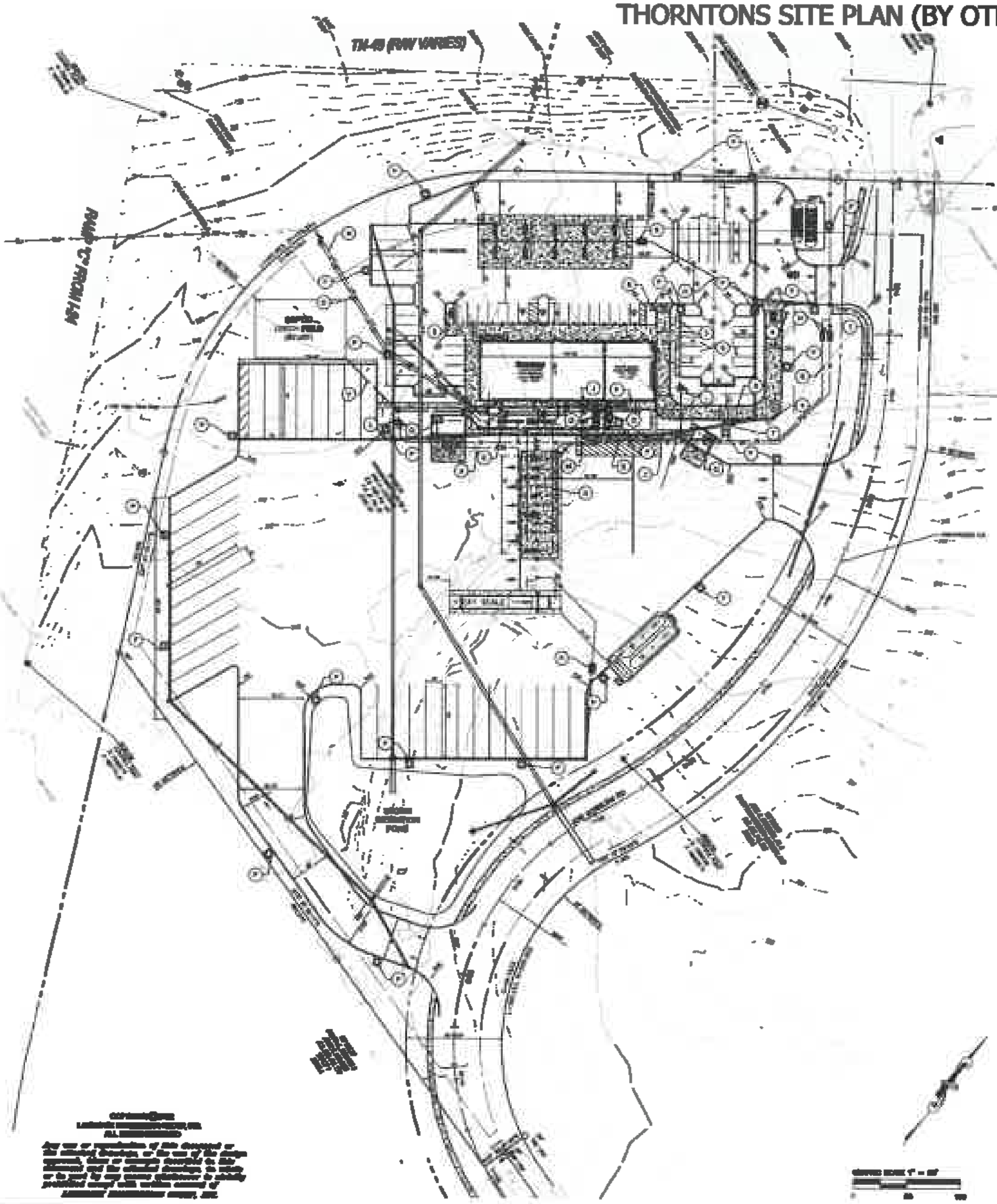
Landmark
ENGINEERING GROUP

OVERALL SITE PLAN
DERBY MEADOWS SUBDIVISION
COOPERTOWN, TENNESSEE

C3

01-21-1598

THORNTONS SITE PLAN (BY OTHERS)



"CALL TENNESSEE 811
BEFORE YOU DIG"
1(800)351-1111 OR 811

TAX MAP

TAX MAP - AERIAL

ZONING INFORMATION

LOCATION LEGEND

UTILITY LEGEND

E. PROPOSED TRANSFORMER LOCATION.

NOTES

OWNER/PARCEL INFORMATION

SURVEY NOTES

4/22/2022

Landmark ENGINEERING GROUP

CIVIL ENGINEERING AND LAND SURVEYING

NO.	DESCRIPTION	DATE
	REVISIONS	

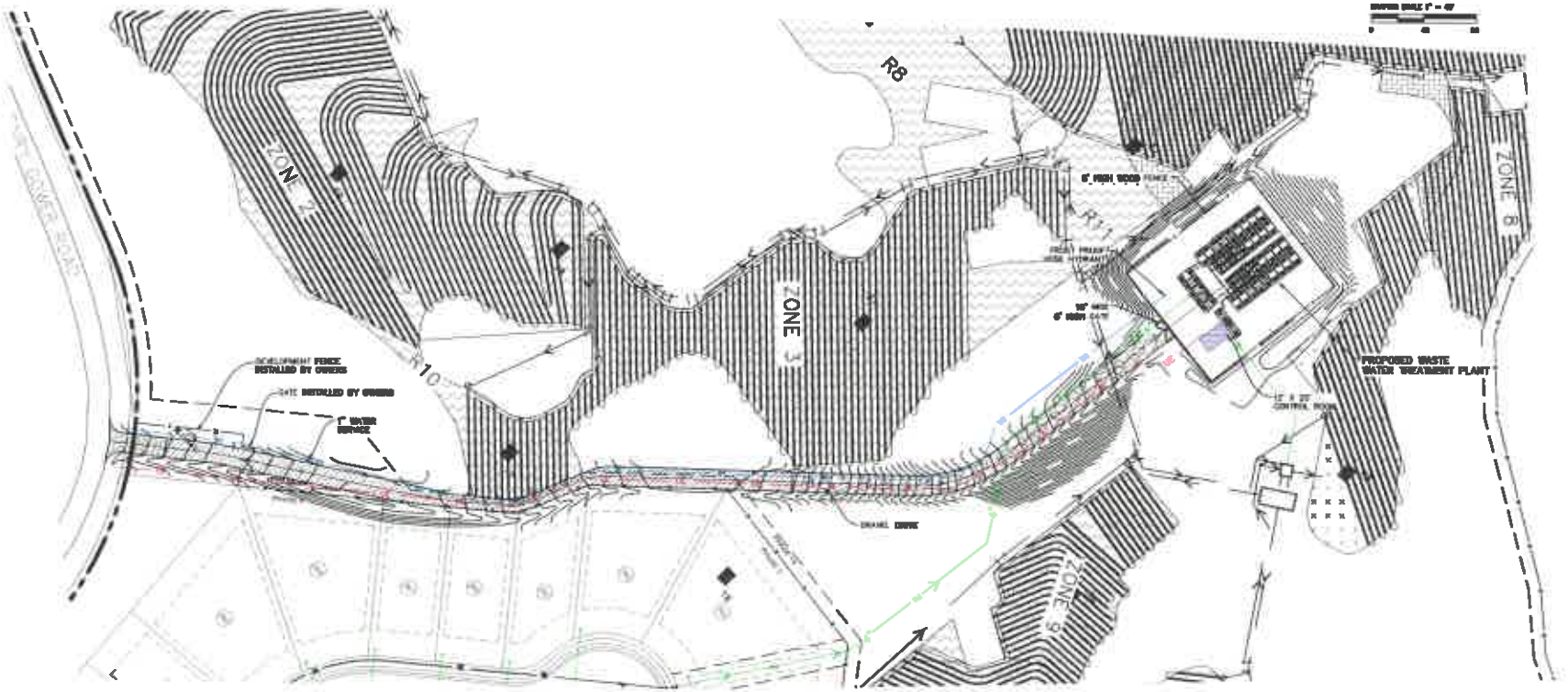
THORNTONS SITE PLAN (BY OTHERS)
DERBY MEADOWS SUBDIVISION
COOPERTOWN, TENNESSEE

C4

01-21-1598

UTILITY PLAN

"CALL TENNESSEE 811
BEFORE YOU DIG"
(800)351-1111 OR 811



UE — UE — UNDERGROUND ELECTRIC 230VL SINGLE PHASE SERVICE BY UTILITY COMPANY

W — W — 1" WATER SERVICE

Landmark
ENGINEERING GROUP

UTILITY PLAN

DERBY MEADOWS SUBDIVISION
COOPERTOWN, TENNESSEE

C8

01-21-1598

GEOTECHNICAL BORING PLAN
DERBY MEADOWS SUBDIVISION

"CALL TENNESSEE 811
BEFORE YOU DIG"
(800)351-1111 OR 811

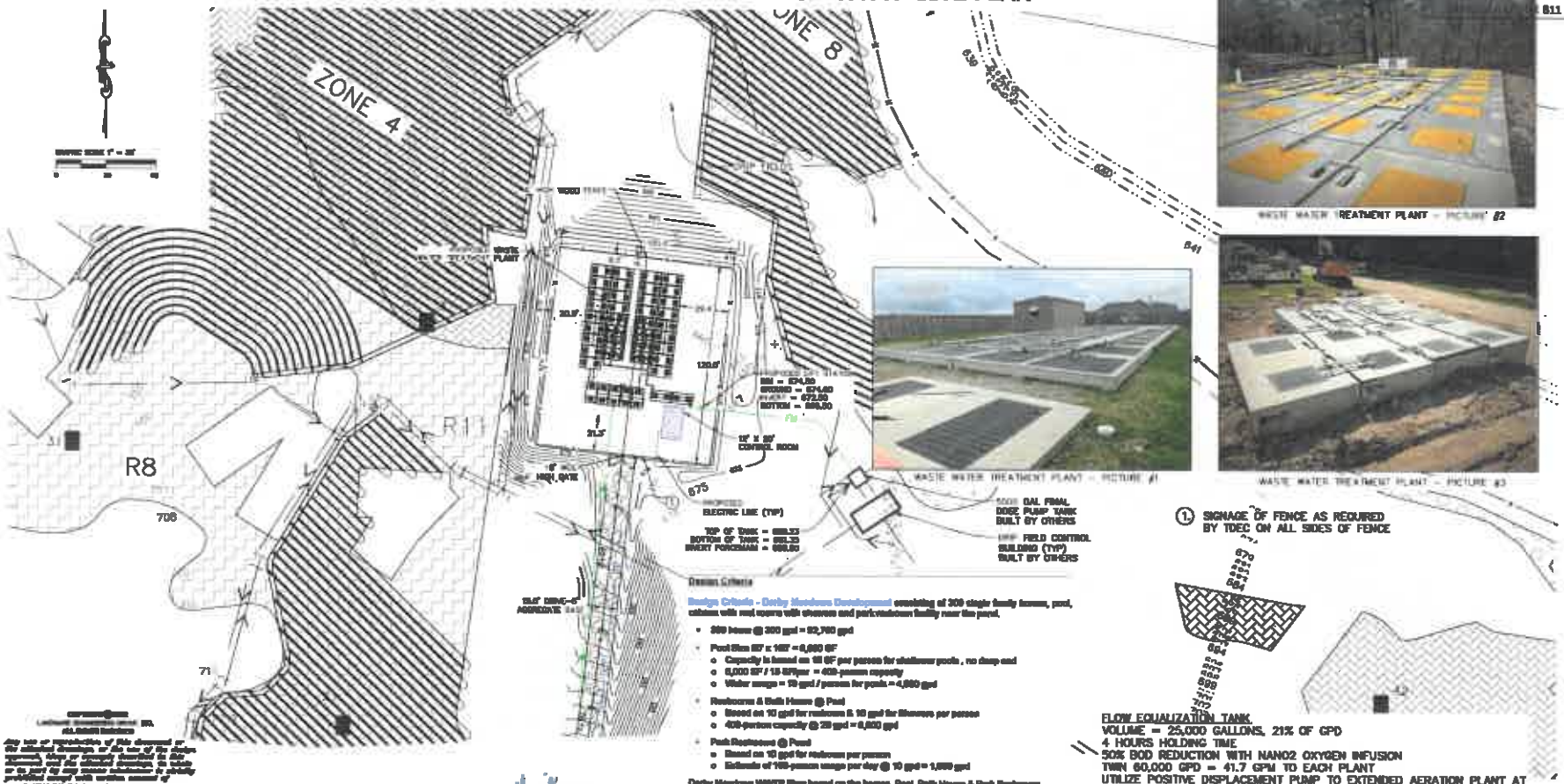
Landmark Engineering Group

GEOTECHNICAL BORING PLAN
DERBY MEADOWS SUBDIVISION
COOPERTOWN, TENNESSEE

C9

01-21-1598

EXTENTED AERATION WWTP SITE PLAN




WASTE WATER TREATMENT PLANT – PICTURE #2

WASTE WATER TREATMENT PLANT – PICTURE #1

WASTE WATER TREATMENT PLANT – PICTURE #3

NANO2 OXYGEN INFUSION TECHNOLOGY IS A CHEMICAL FREE PROCESS
- HIGH STANDARD OXYGEN TRANSFER EFFICIENCY PROCESS
- HIGH PROCESS EFFICIENCY DESIGN
- HIGH VOLUME OF O2 TO KWH
- UP TO 5 TIMES SOTE OF TYPICAL AERATION PROCESSES
- ENERGY EFFICIENT DESIGN REDUCES ELECTRICAL POWER REQUIREMENTS
- PLC MANAGED AUTOMATED OPERATION REDUCES OPERATOR INVOLVEMENT
- ON DEMAND OPERATION TO REACTS TO CHANGING CONDITIONS
- LOW SYSTEM INSTALLATION COSTS
- MINIMAL ROTATING COMPONENTS REDUCES MAINTENANCE REQUIREMENTS
- CORROSION RESISTANT MATERIALS OF CONSTRUCTION EXTENDS SERVICE LIFE OF SYSTEM

NANO2 OXYGEN INFUSION SYSTEM
- PRO_2 TECHNOLOGY
- 8.0# O2 PER HOUR CAPACITY
- OXYGEN GENERATOR REQUIRED TO PRODUCE 96% PURE O2
- NANO BUBBLES INCREASE O2 TRANSFER TO WASTE WATER
- NANO BUBBLES STAY IN SUSPENSION, DON'T FLOAT TO SURFACE
- NANO BUBBLES HAVE UNIFORM DISTRIBUTION THROUGHOUT THE TANK DEPTH
- O2 LEVEL WILL BE IN THE RANGE OF 3 TO 5 MG/L IN THE FLOW EQUALIZATION TANK
- O2 LEVELS WILL REMAIN ELEVATED IN FLOW ENTERING THE EXTENDED AERATION PLANT

Design Criteria

Design Criteria - Derby Meadows Development consisting of 309 single family houses, pool, cabana with rest rooms with showers and pool/restroom facility near the pool.

- 309 house @ 300 gpd = 92,700 gpd
- Pool Size 50' x 100' = 5,000 SF
  - Capacity is based on 10 SF per person for shallower pools , no deep end
  - 5,000 SF / 10 SF/per = 400-person capacity
  - Water usage = 10 gpd / person for pools = 4,000 gpd
- Restrooms & Bath House @ Pool
  - Based on 10 gpd for restrooms & 10 gpd for Showers per person
  - 400-person capacity @ 20 gpd = 8,000 gpd
- Pool Restrooms @ Pool
  - Based on 10 gpd for restroom per person
  - Estimate of 100-person usage per day @ 10 gpd = 1,000 gpd

Derby Meadows WWTP Flow based on the houses, Pool, Bath House & Pool Restrooms
92,700 + 4,000 + 8,000 + 1,000 = 105,700 gpd

Total Derby Meadows Subdivision Development WWTP Flow = 105,700 gpd

Design Criteria - Thornton's Refueling Center Development consisting of 27 Refueling pumps, five (5) showers, restaurant with occupancy of 174 patrons and an estimate of 10 employees.

- 27 Gasoline & Diesel Refueling Pump Islands, Convenience Center with five (5) showers, Restaurant Occupancy with an occupancy of 174 patrons and employees @ 10 per day.
- Thornton's provided data from two other refueling centers located in Roscoe IL and Lincoln IL averaged 2,388 and 4,188 GPD, respectively.
- Our technical analysis in conjunction with Adams, bill each was relatively low based on the area and I-24 truck traffic.
- Adams Group analysis was 28,340 GP based on the following;
  - 27 Pump Islands @ 300 gpd = 10,800 gpd
  - Five (5) showers @ 300 gpd = 1,500 gpd
  - Restaurant Occupancy of 174 patrons @ 60 gpd = 10,440 gpd
  - Employees @ 10 per day @ 10 gpd = 100 gpd
- Our collaboration effort with Adams Group determined that a projected flow of 8,200 GPD or basically doubling the highest average of the 2 other Thornton facilities would be appropriate.

Total Thornton's Refueling Center Development WWTP Flow = 8,200 gpd

Total Derby Meadows & Thornton's Subdivision WWTP Flow = 114,000 gpd

Extended Aeration Waste Water Treatment Plant Design = 120,000 GPD

FLOW EQUALIZATION TANK
VOLUME = 25,000 GALLONS, 21% OF GPD
4 HOURS HOLDING TIME
50% BOD REDUCTION WITH NANO2 OXYGEN INFUSION
TWIN 60,000 GPD = 41.7 GPM TO EACH PLANT
UTILIZE POSITIVE DISPLACEMENT PUMP TO EXTENDED AERATION PLANT AT 41.7 GPM TO EACH PLANT

ORGANIC LOADING
PROJECTED LOADING OF TWIN 60,000 GPD WTP
- BOD5 PER DAY = 178.50 POUNDS PER DAY
- TSS = 196.8 POUNDS PER DAY
- NH3 = 98.4 POUNDS PER DAY
- PHOSPHOROUS = 49.2 POUNDS PER DAY
- 230V THREE (3) PHASE 60 HZ POWER SOURCE
- FLOW EQUAUZATION CHAMBERS OF APPROXIMATELY 20% OF WWTP VOLUME
- DUPLEX GRINDER PUMPS WITH CONTROL PANEL, AUDIO & LIGHT ALARM, VENTED STAND--PIPE, FLOATS & BRACKET.
- ALL BLOWERS TO BE HOUSE IN SOUND ATTENUATION BUILDING, 60 DECIBEL RATING
- CHLORINE CONTACT CHAMBER WITH CHLORINATOR
- EFFLUENT DISCHARGE TO DRIP FIELD DOSING TANK
- PROPOSED EFFLUENT LIMITS BOD5 = 5 MG/L, TSS = 10 MG/L2 AND NH3 = 2 MG/L
- THE EFFLUENT LIMITS WILL BE PER THE TDEC PERMIT

Landmark ENGINEERING GROUP

EXTENTED AERATION WWTP SITE PLAN
DERBY MEADOWS SUBDIVISION
COOPERTOWN, TENNESSEE

C10

01-21-1598

EX. 11

HARVESTER, LLC
545 Mainstream Drive, S-402
Nashville, TN 37228

June 8, 2022

Tennessee Wastewater Systems, Inc.
ATTN: Matthew Nicks
849 Aviation Parkway
Smyrna, TN 37167

RE: Derby Meadows Subdivision, Coopertown, TN

Dear Matt,

Please accept this letter as our formal request for Tennessee Wastewater Systems, Inc. to provide sewer service for our project referenced above.

We look forward to working further with you on this project.

Have a great day.

Sincerely,

Bill Seeley
Harvester, LLC

EX. 12

October 26, 2021

Angela Jones
Tennessee Department of Environment and Conservation
Division of Water Resources
William R Snodgrass – Tennessee Tower
312 Rosa L Parks Avenue
Nashville, TN 37243

VIA EMAIL: Angela.Jones@tn.gov

RE: Derby Meadows Subdivision – Coopertown, TN

Dear Ms. Jones:

This letter is to confirm that Harvester LLC is currently moving through the development process with the Town of Coopertown on a conservation subdivision. This subdivision, Derby Meadows, is located on Hwy 49 and encompasses 139.5 acres. The developer plans on establishing 309 lots to be sold to a builder.

The 2017 Subdivision Regulations, of which this neighborhood is being developed, states that "Conservation Lands are the undisturbed areas of at least fifty (50) percent of the tract." The land is to be "set aside from development" and to "create neighborhoods with direct visual access to open land, with amenities in the form of neighborhood open space, and with a strong neighborhood identity."

Furthermore, Section 6.108.2 #8 states that "Water supply and sewage disposal systems, and stormwater detention areas designed, landscaped, and **available for use** as an integral part of the Open Space" and "#9 Easements for drainage, access, sewer or water lines, or other public purposes" may be included in the open space.

The Town of Coopertown does not operate a wastewater utility. Therefore, Harvester LLC is working with Tennessee Wastewater Systems for the installation of an extended aeration plant. It is our understanding that Tennessee Wastewater Systems has been requested to own and operate this facility, subject to the approval and permitting of the plant by the Tennessee Department of Environment and Conservation.

Originally, the Town was advised by the developer that the type of wastewater system they were proposing would allow for human contact and that the drip line area would be available for use (walking, picnics, flying kites, playing catch, etc.). However, at a later meeting, the Planning Commission was advised that Tennessee Wastewater would require a fence to be placed around the entire drip-line

area and that residents would not have access to the use of this land. This called section 6.108.2 (#8) into question. If the land is fenced, is it truly "available for use?"

Should TDEC and Tennessee Wastewater be able to work out a solution that would allow this land to remain open and available for use, I know the future residents of Derby Meadows would be thankful.

As previously stated, as the Town of Coopertown does not operate a wastewater utility, the Town understands that this decision would be between the Tennessee Department of Environment and Conservation, Tennessee Wastewater Systems, and Harvester LLC.

If you require additional information, please do not hesitate to contact Vicky Bumgardner, Building Commissioner, or myself at 615-382-4470.

Sincerely,

Becca J. Werner
Mayor

EX. 13

ORDINANCE 00-13

An Ordinance granting On-Site Systems, Inc., its successors and assigns, the right, privilege, authority and consent to place, construct, erect, acquire, extend, maintain, repair and relocate septic and sewer lines, works, mains, apparatus and all necessary fixtures under, through, over, along and across the streets, roads, alleys, bridges and viaducts, within the present or future limits of the Town of Coopertown, Tennessee, in Robertson County, for the purpose of providing a system for the proper treatment, movement and disposal of sewage to those persons or entities desiring the same.

WHEREAS, the Town of Coopertown is authorized to provide utility functions, including the provision of wastewater treatment services and is also authorized to grant franchises for public utilities and public services to be furnished;

WHEREAS, at the present time, it is not practically feasible for the Town of Coopertown to provide wastewater treatment services;

WHEREAS, On-Site Systems, Inc. is a public utility authorized to provide wastewater treatment services and is governed by the Tennessee Regulatory Authority, which authority regulates On-Site's provision of services and its rate and fee structure; and,

WHEREAS, On-Site Systems, Inc. is required to construct, maintain and operate all its wastewater treatment facilities in accordance with the regulations of the Tennessee Department of Environment and Conservation (TDEC).

NOW, THEREFORE in consideration of the premises, the Board of Mayor and Aldermen of the Town of Coopertown hereby ordain the following:

Section 1. BE IT ORDAINED that On-Site Systems, Inc. its successors and assigns (hereafter called Grantee), be, and hereby is, granted the exclusive right, privilege, authority and franchise to place, construct, erect, acquire, extend, maintain, repair, relocate and operate all lines, works, mains, apparatus and all necessary fixtures, connections and appurtenances under, through, over, along and across any of the streets, roads, alleys, bridges and viaducts now or hereafter owned, dedicated or used within the limits of the Town of Coopertown as now or hereafter may exist and to render, sell and provide sewer service and or wastewater treatment service, to those persons or entities desiring the same, in the Town of Coopertown as the boundaries thereof are now established and may hereafter be extended.

Section 2. BE IT FURTHER ORDAINED, that no person, company or corporation shall be permitted to make any connections with any of the works of the Grantee unless duly authorized by the Grantee to do so.

Section 3. BE IT FURTHER ORDAINED, that this franchise shall be for a term of twenty-five (25) years from the date of acceptance and shall be an exclusive grant of said rights and privileges as herein granted to the Grantee, its successors and assigns.

Section 4. BE IT FURTHER ORDAINED, that the Grantee, in installing, maintaining and inspecting its lines and other equipment for providing wastewater services to the consumers of the Town of Coopertown, shall so install, repair, and maintain said system with as little interference as reasonably necessary. When such has been installed, repaired or inspected, said streets, alleys, sidewalks and other public places shall be restored as nearly as possible to the same condition as before the work. All pavement and sidewalk replacement required to accomplish this end shall be done by the Grantee at its own expense, through its own forces or by the employment of competent contractor so as to restore or leave the streets or alleys in as nearly as possible the same condition as they were prior to the excavation.

Section 5. BE IT FURTHER ORDAINED, that On-Site Systems, Inc. shall have sole responsibility for the design, construction and operation of the system and shall require appropriate bonds for the creation of such systems.

Section 6. BE IT FURTHER ORDAINED, that On-Site Systems, Inc. shall have sole authority regarding provision of service except that any system created pursuant to this franchise shall not accept any leachate from any landfill.

Section 7. BE IT FURTHER ORDAINED, that the Grantee will be furnished a certified copy of this ordinance upon its adoption and the said Grantee shall, by its legally constituted representatives, file with the recorder of the Town of Coopertown, within thirty (30) days from the date when this Ordinance shall take effect, a written acceptance of this grant, with all of its terms, limitations and requirements, and such acceptance shall constitute a part of this franchise.

Section 8. BE IT FURTHER ORDAINED, that in all transfers or assignments, the Grantee may transfer or assign this franchise only after obtaining the written consent of the Town of Coopertown, which consent shall not be unreasonably withheld.

Section 9. BE IT FURTHER ORDAINED, if any portion of this Ordinance shall hereinafter be declared or determined by a Court of competent jurisdiction to be unconstitutional or invalid, or the applicability thereof to any person or circumstance to be invalid, the remaining portions of this Ordinance and the applicable persons and circumstances shall not be affected.

Section 10. BE IT FURTHER ORDAINED, that upon the conclusion of the twenty-five (25) year term of this Franchise Agreement, it shall automatically renew for another twenty-five (25) year term unless notice of termination is given by either party not sooner than sixty (60) days nor later than thirty (30) days before the completion of this Agreement. In such event, the parties hereto agree that the Town of Coopertown shall purchase the system from On-Site in accordance with the following requirements:

(A) The purchase price shall be the fair market value of the system serving the Specified Area and payment of such purchase price shall be on terms agreed to by the parties. In the event the parties cannot agree on a purchase price, each party shall select a qualified appraiser and the fair market value of the system shall be determined using the Uniform Standards of Professional Appraisal Practice and agreed upon by the two (2) qualified appraisers who are selected. In the event the

two (2) qualified appraisers are unable to agree on the fair market value of the system, they shall jointly select a third qualified appraiser whose determination of the fair market value of the system shall be based on the aforementioned standards and shall control.

(i) The term "Qualified Appraiser" means any individual having demonstrated experience in the appraisal of utility properties who has been certified by a nationally recognized appraisal or assessment association that is a member of The Appraisal Foundation.

Section 11. BE IT FURTHER ORDAINED, that this Ordinance shall take effect from and after its passage, the public welfare requiring it.

Passed First Reading September 18, 2000

Passed Second Reading November 28, 2000

Herman Davis, Mayor

ATTEST:

Elsa Spiller, City Recorder

Confidential Exhibit 14A

Confidential Exhibit 14B

EXHIBIT 15

Tennessee Wastewater System, Inc.,
Officer and Key Employee Biographies

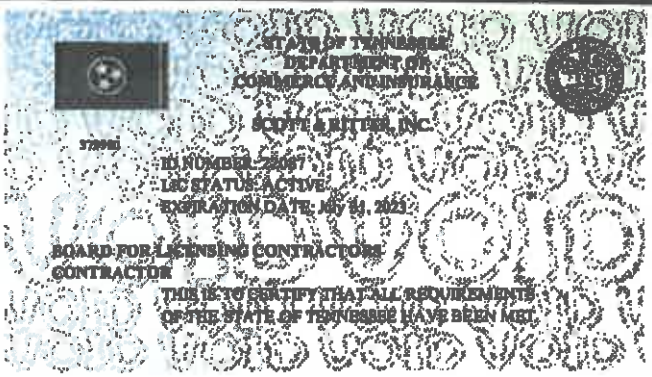
Tennessee Wastewater Systems, Inc. ("TWSI") is a leader in decentralized wastewater systems and technology in the Southeastern United States. TWSI has been a regulated provider of wastewater services in Tennessee since receiving its initial CCN from the Tennessee Public Service Commission, the predecessor to the current Tennessee Public Utility Commission, in 1994; currently holding over 100 certificates for territories in Middle and East Tennessee and providing service to over 3000 customers across the State.

Jeff Risden, CEO – Mr. Risden joined Adenus in 2015 as General Counsel before rising to CEO in late 2018. Prior to Adenus Mr. Risden was in private legal practice and spent over twenty years in the music business as a booking agent and artist manager, representing and guiding the careers of gold and platinum selling, and Grammy nominated musical artists, songwriters, and producers. He received his undergraduate degree from Geneva College in Beaver Falls, PA, and his JD from the Nashville School of Law.

Matthew Nicks – President – Mr. Nicks is the President of Tennessee Wastewater Systems, Inc. Mr. Nicks comes from an environmental remediation background. Mr. Nicks has worked all over the world handling and overseeing the collection, treatment, storage, transportation, and shipping of hazardous waste in a variety of industry settings. Matthew has a strong background in regulatory compliance matters including those related to OSHA, NIOSH, ANSI, NFPA, and the EPA. Mr. Nicks is also a residential developerwho has developed properties in Davidson County. Mr. Nicks is a Tennessee licensed contractor.

Tom Pickney – Secretary
Bill Pickney – Treasurer
Tom and Bill Pickney entered the wastewater business in the mid 1980's by constructing low pressure pipe systems for homes, primarily in Williamson County. They were shortly joined by their brother Bob who through his engineering background added system design to their offerings. Soon Pickney Brothers, Inc. was formed and over the coming years helped bring the decentralized wastewater concept to Tennessee. Tom and Bill, along with their brothers Bob and Charles formed On-Site Systems, Inc. in early 1990's. The company was granted its first CCN in 1994. On-Site's name was changed in 2007 to Tennessee Wastewater Systems, Inc. Tom and Bill have extensive, decades long, experience and knowledge of the design, construction, and operations of decentralized wastewater systems.

EX. 18



SCOTT & RITTER, INC.
P.O. BOX 749
BOWLING GREEN, KY 42102-0749

State of Tennessee

12635322

BOARD FOR LICENSING CONTRACTORS
CONTRACTOR
SCOTT & RITTER, INC.

This is to certify that all requirements of the State of Tennessee have been met.

ID NUMBER: 22087
LIC STATUS: ACTIVE
EXPIRATION DATE: July 31, 2023
UNLIMITED; BC-13; BC-19; BC-24; BC-28; BC-31; HC; HRA; MU-A; MU-B; MU-C; MU-D

IN-1313
DEPARTMENT OF
COMMERCE AND INSURANCE

EX. 19A

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 (applicant): Tennessee Wastewater Systems, Inc.

Permittee Address: 849 Aviation Pkwy, Smyrna, TN 37167

Official Contact: Mr. Jeff Risden	Title or Position: Chief Executive Officer		
Mailing Address: 849 Aviation Parkway	City: Smyrna	State: TN	Zip: 37167
Phone number(s): (615) 220.7171	E-mail: jeff.risden@adenus.com		

Optional Contact: Mr. Matthew Nicks	Title or Position: Engineering Director		
Address: 849 Aviation Parkway	City: Smyrna	State: TN	Zip: 37167
Phone number(s): (615) 220.7166	E-mail: matthew.nicks@adenus.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	Signature	Date
Jeff Risden, CEO		1/10/2020

Permit Number: SOP-_____

Facility Identification:	Existing Permit No. 01028
Facility Name: Derby Meadows WWTP	County: Robertson
Facility Address or Location: York Road & TN State Route 49W Coopertown, Robertson County, Tennessee	Latitude: 36° 25' 38.07" N Longitude: 87° 0' 21.35" W

Name and distance to nearest receiving waters: No Discharge

If any other State or Federal Water/Wastewater Permits have been obtained for this site, list their permit numbers: None

Name of company or governmental entity that will operate the permitted system: Tennessee Wastewater Systems, Inc.

Operator address: 849 Aviation Pkwy, Smyrna, TN 37167

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)? [X] Yes [ ] No [ ] 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. Once the developer constructs the facility, Tennessee Wastewater Systems, Inc. will take ownership, operate and maintain per the agreement & permit

Complete the following information explaining the entity type, number of design units, and daily design wastewater flow:

Entity Type	Number of Design Units		Flow (gpd)
[ ] City, town or county	No. of connections:		
[X] Subdivision	No. of homes: 309	Avg. No. bedrooms per home: 3	92,700
[ ] School	No. of students:	Size of cafeteria(s): No. of showers:	
[ ] Apartment	No. of units:	No. units with Washer/Dryer hookups: No. units without W/D hookups:	
[X] Commercial Business	No. of employees: 10	Type of business: Refueling Center	8,200
[ ] Industry	No. of employees:	Product(s) manufactured:	
[ ] Resort	No. of units:		
[ ] Camp	No. of hookups:		
[ ] RV Park	No. of hookups:	No. of dump stations:	
[ ] Car Wash	No. of bays:		
[X] Other	Pool, Showers & Restrooms	Pool, Bath House, 2 Rest Room Facilities	13,000

Describe the type and frequency of activities that result in wastewater generation.

Permit Number: SOP-_____

Engineering Report (required for collection systems and/or land application treatment systems):

[X] Prepared in accordance with Rule 0400-40-05-.03 and Section 1.2 of the State of Tennessee Design Criteria for Sewage Works

[ ] Attached, or

[ ] Previously submitted and entitled: Approved? [ ] Yes. Date: [ ] No

Operation and Maintenance Inspection Schedule Submitted:

Approved? [ ] Yes. Date: [ ] No

Wastewater Collection System:

System type (i.e., gravity, low pressure, vacuum, combination, etc.): Low Pressure

System Description: 3" ø and 4" ø PVC pipe system to WWTP Flow Eq Tank

Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): all sewage flows to Flow Eq Tank then into WWTP

In the event of a system failure describe means of operator notification: Alarm & Light, Telemetric

List the emergency contact(s) (name/phone): Mathew Nicks (615) 969.6564

For low-pressure systems, who is responsible for maintenance of STEP/STEG tanks and pumps or grinder pumps (list all contact information)? Tennessee Wastewater Systems, Inc., 849 Aviation Pkwy, Smyrna, TN 37167

Approximate length of sewer (excluding private service lateral): 11,355' (3"ø = 6237' & 4"ø = 5118')

Number/hp of lift stations: None / Number/hp of lift pumps - Zero /

Number/volume of low pressure and or grinder pump tanks/ 312 grinder pumps

Number/volume septic tanks - None /

Attach a schematic of the collection system. [X] 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):

Tie-in Point	Latitude (xx.xxxx°)	Longitude (xx.xxxx°)

Permit Number: SOP-_____

Land Application Treatment System:

Type of Land Application Treatment System: X Drip ☐ Spray ☐ Other, explain:

Type of treatment facility preceding land application (recirculating media filters, lagoons, other, etc.): Extended Aeration, NanO2 Oxygen Infusion and Post Treatment Chlorination

Attach a treatment schematic. X Preliminary Plans Attached

Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): All flows to Flow Eq Tank, contained & processed

For New or Modified Projects:

Name of Developer for the project: Harvester, LLC (615) 207.6753

Developer address and phone number: 545 Mainstream Dr, Ste 402, Nashville, TN 37228

For land application, list: Proposed acreage involved: 16.34 Acres of Drip & Reserve
inches/week gpd/sq.ft loading rate to be applied:

Is wastewater disinfection proposed? Post contact Chlorination

☒ Yes Describe land application area access: Open Space, Non-restricted

☐ No Describe how access to the land application area will be restricted:

Attach required additional Engineering Report information (see website for more information)

☒ 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.

☒ 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.

☒ 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. – Previously Submitted under SOP #01028

☒ Topographic map of the area where the wastewater is to be land applied with no greater ten-foot contours presented at a minimum size of 24 inches by 24 inches.

☒ 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.

Permit Number: SOP-_____

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:	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**	

Pump and Haul:	**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.):	

Permit Number: SOP-_____

Holding Ponds (for non-domestic wastewater only): N/A
Pond use: ☐ Recirculation ☐ Sedimentation ☐ Cooling ☐ 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? ☐ Yes ☐ No If so, describe disposal plan:
Is the pond ever dewatered? ☐ Yes ☐ No If so, describe the purpose for dewatering and procedures for disposal of wastewater and/or sludge:
Is(are) the pond(s) aerated? ☐ Yes ☐ 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.)? ☐ Yes ☐ No
Describe the liner material (if soil liner is used give the compaction specifications):
Is there an emergency overflow structure? ☐ Yes ☐ No *If so, provide a design drawing of structure.*
Are monitoring wells or lysimeters installed near or around the pond(s)? ☐ Yes ☐ No *If so, provide location information and describe monitoring protocols (attach additional sheets as necessary):*

Permit Number: SOP-_____

Mobile Wash Operations: ☒ N/A

☐ Individual Operator ☐ Fleet Operation Operator

Indicate the type of equipment, vehicle, or structure to be washed during normal operations (check all that apply):

☐ Cars
☐ Trucks
☐ Trailers (interior washing of dump-trailers, or tanks, is prohibited.)
☐ Other (describe):

☐ Parking Lot(s): sq. ft.
☐ Windows: sq. ft.
☐ Structures (describe):

Wash operations take place at (check all that apply):

☐ Car sales lot(s)
☐ Private industry lot(s)
County(ies), list:

☐ Public parking lot(s)
☐ Private property(ies)
Statewide

Wash equipment description:

☐ Truck mounted
☐ Rinse tank size(s) (gal.):
Collection tank size(s) (gal.):

☐ Trailer mounted
Mixed tanks size(s) (gal.):
Number of tanks per vehicle:

Pressure washer: ☐ psi (rated) gpm
(rated) gas powered 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? ☐ Yes ☐ 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 wash waters 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.

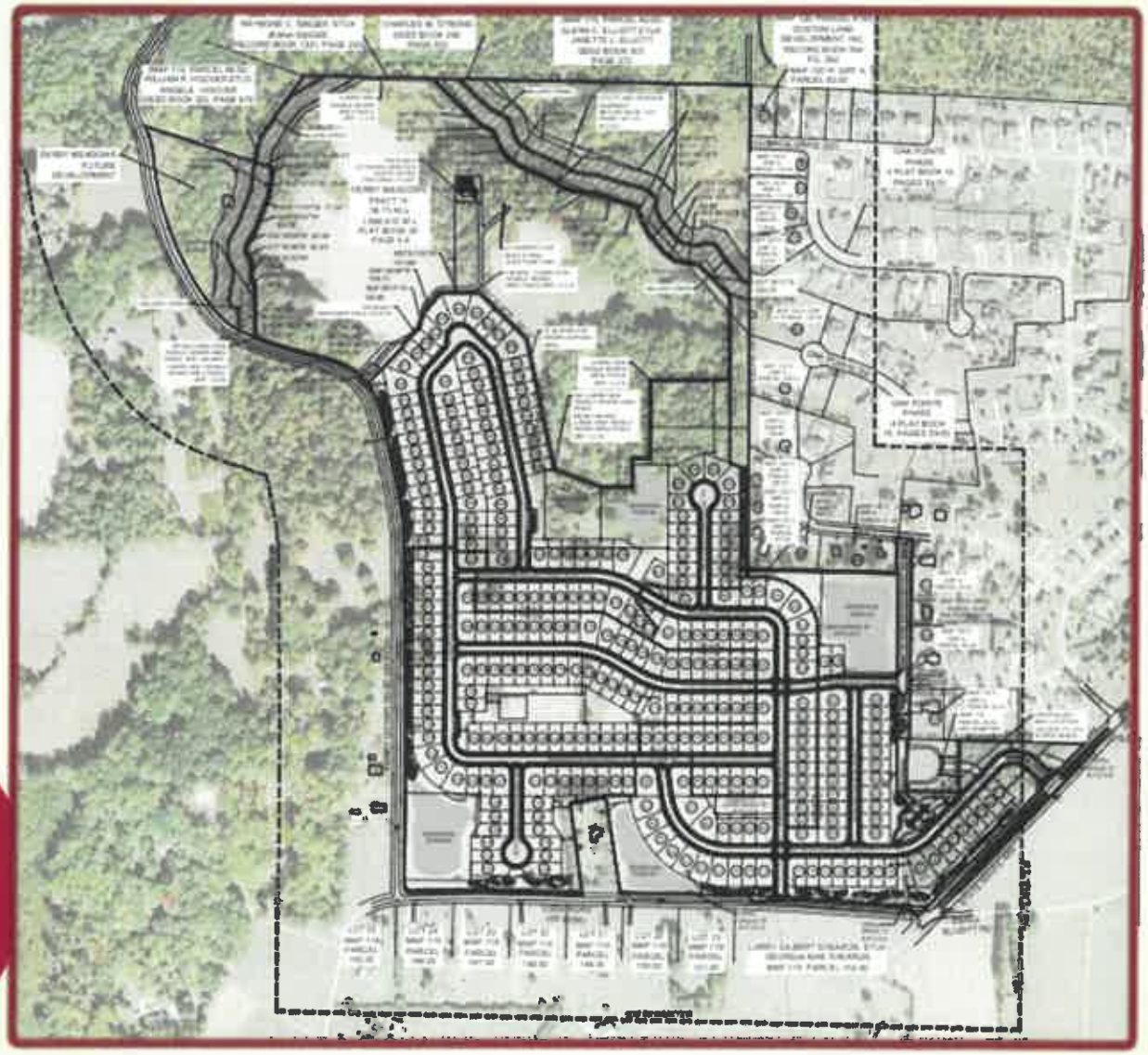
The division has the right to inspect a facility when deemed necessary. In addition, the division has the right to revoke or suspend any permit for violation of permit conditions or any other provisions of the Tennessee Water Quality Control Act and other water pollution control rules.

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.

FINAL ENGINEERING REPORT

Derby Meadows On-site Decentralized Waste Water Treatment Plant

York Rd & TN 49W, Coopertown, Robertson County, TN



HARVESTER, LLC

545 Mainstream Drive, Suite 402, Nashville, TN

Landmark Engineering Group Project #01-21-1598 -- April 4th 2022

Landmark *Engineering Group, Inc*
Civil & Environmental Engineering and Land Surveying
3440 38th Avenue, Suite 4 – Moline, IL, 61265 – (309) 755.3400 – info@landgroup.biz

FINAL ENGINEERING REPORT

for

Derby Meadows On-site Decentralized Waste Water Treatment Plant

York Road & TN State Route 49W
Coopertown, Robertson County, Tennessee

Landmark Engineering Group, Inc.
3440 38th Avenue, Suite 4, Moline, IL 61265
(309) 755.3400 – info@landgroup.biz

I hereby certify that this report, exhibits and analysis was prepared by me or under my direct personal supervision and, that I am a duly Registered Professional Engineer under the laws of the State of Tennessee.

MICHAEL R. SHAMSIE REGISTERED ENGINEER AGRICULTURE COMMERCIAL No. 106732 STATE OF TENNESSEE

Michael R. Shamsie, PE, CFM, CPESC — April 4th 2022
Tennessee PE Registration #106732, Expiration 10/31/2022 — Date

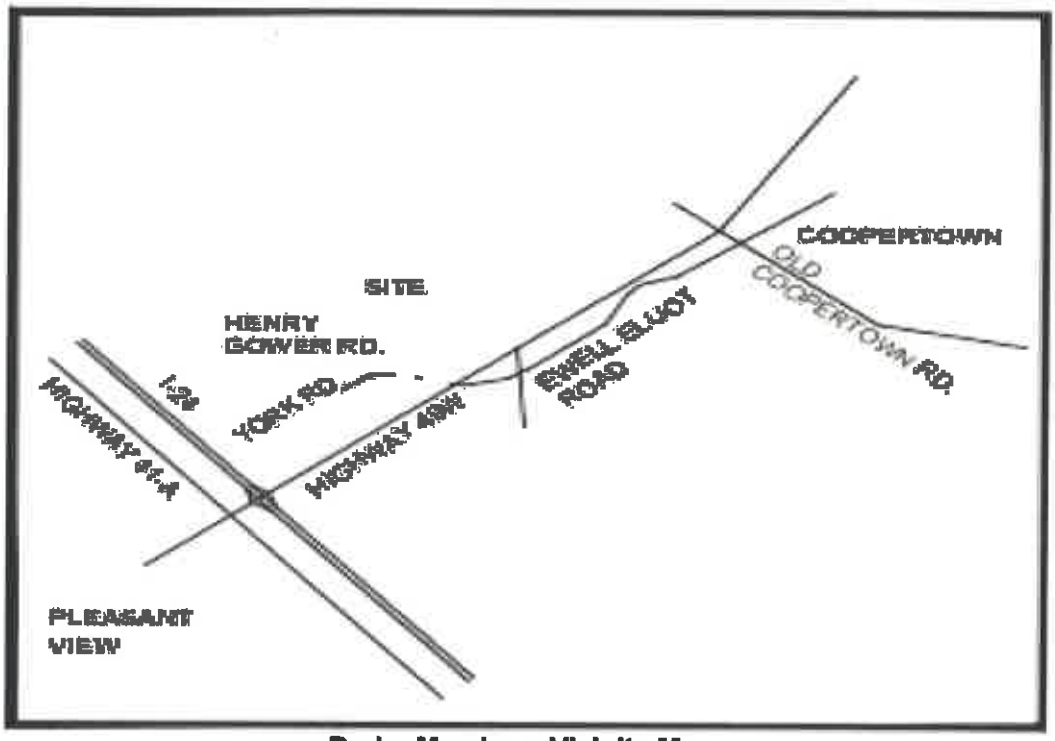
Landmark Engineering Group Project #01-21-1598
April 4th 2022

PROJECT HISTORY

The Developer, ***HARVESTER, LLC*** is constructing a 309 single family homes and related site amenities within ***Derby Meadows Residential Development*** along with related site improvements on a 139-acre parcel located on York Road & Tn Route 49W in Coopertown, Tennessee as depicted on the Site Plan included herewith for reference. In addition, a commercial parcel is being developed which will consist of a **Thornton's Refueling and Convenience Store** at the intersection I-24 & TN49 as depicted on the additional map exhibits included herein.

DERBY MEADOWS LOCATION

The **Derby Meadows** subdivision site is located in the corporate limits of Coopertown, Tennessee as depicted on the following location map.



Derby Meadows Vicinity Map

The **Derby Meadows** subdivision is bordered by Henry Gower Road on the west, York Road on the south side, TN State Route 49W on the east side, vacant forested land on the north to northwest side and Oak Pointe Subdivision on the north to northeast side of the development site. Derby Meadows Development site was previously agricultural land that was annexed and approved for development. The site development started and then was terminated after the overall site was disturbed by site grading activities. Thereafter the **Derby Meadows** was approved under the Conservation Zoning regulations for Harvester, LLC which resulted in 54% of the land remained undisturbed and dedicated for Open Space and public enjoyment.

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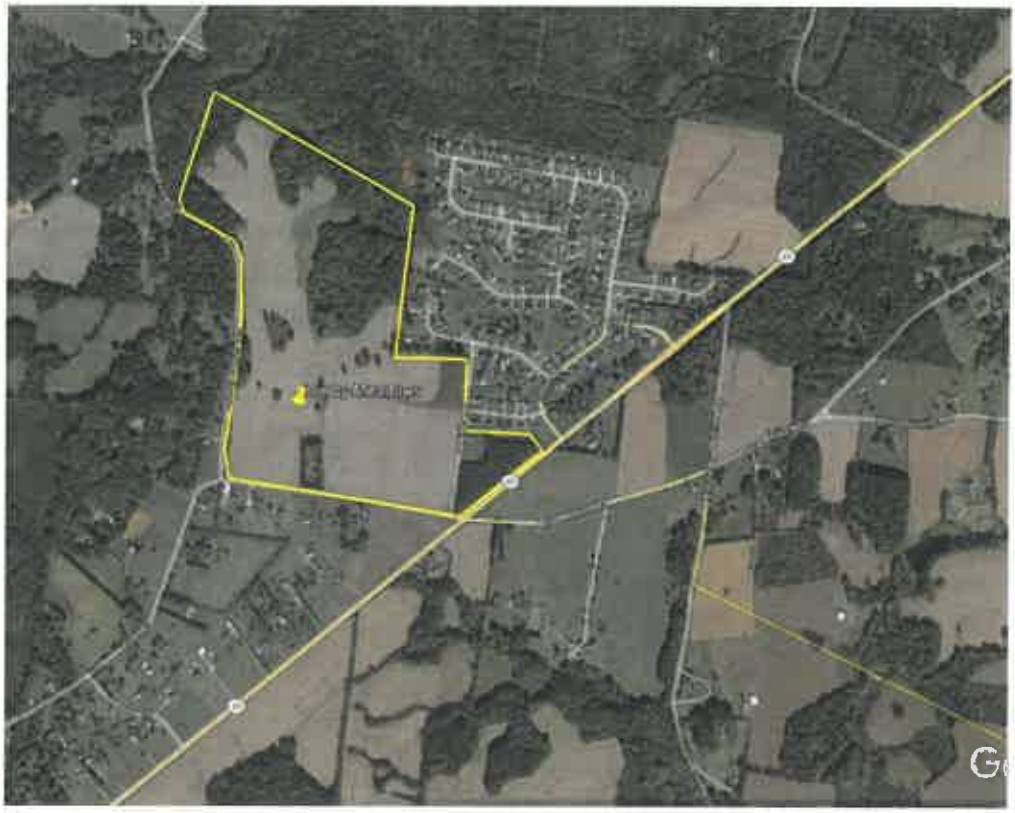
The Derby Meadows subdivision site is also depicted on the following aerial maps.



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THORNTON'S DEVELOPMENT LOCATION

The Thornton's Development site is located in the corporate limits of Coopertown, Tennessee as depicted on the following location map.

Thornton's Development Vicinity Map

Thornton's Development Aerial Map

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CHAPTER 1.3 – FINAL ENGINEERING REPORT AND CONSTRUCTION PLANS & SPECIFICATIONS

Preliminary Engineering Report and Preliminary Plans were submitted to TDEC on February 22nd 2022 in accordance with **Chapter 1 of the *Design Criteria for Review of Sewerage Works Construction Documents***. The subject Final Engineering Report and Construction Plans are hereby and herewith being submitted in accordance with the March 3rd 2022 Technically Approved TDEC letter.

In accordance with **Chapter 1.3.1, the Final Engineering Report and Construction plans and Specifications** are consistent with the Technically Approved Preliminary Engineering Report and Preliminary Plans. Therefore, a revised Preliminary Engineering Report is not warranted since the Final Engineering Report and Construction plans do not modify aforementioned Preliminary Engineering report and plans as submitted.

The Final Engineering Report and Construction Plans and Specifications are in accordance with the following sections of **Chapter 1, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.5 and 1.3.6.**

CHAPTER 1.4 – RELIABILITY CLASSIFICATION

In accordance with **Chapter 1.4 of the *Design Criteria for Review of Sewage Works Construction Plans and Documents***, Derby Meadows WWTP is classified as Reliability Classification III, since it does not discharge to surface near drinking water reservoirs, into shellfish waters, or in close proximity to areas used for water contact sports and does not discharge into navigable waters that would not be permanently or unacceptably damaged by short-term effluent quality degradations .

In accordance with **Chapter 1.4.3.3, Reliability Class III**, the requirement for the Aeration Basin under Activated Sludge Process Components does allow for a single basin. The Aeration Blowers do require at least two blowers or mechanical aerators available for service. Whereas, Air Diffusers requirements are per Reliability Class I requirements which states the air diffusion system for each aeration basin is such that the largest section of diffusers can be isolated without measurably impairing the oxygen transfer capability of the system.

In accordance with **Chapter 1.4.3.3, Reliability Class III**, it states components not requiring backup in the wastewater treatment system are not mandatory for components to provide treatment in excess of primary sedimentation and disinfection. These may include such components as; Trickling Filter, Chemical Flash Mixer, Flocculation Basin, Chemical Sedimentation Basin, Filter and Activated Carbon Column. It assumed by these provisions, that the Pro2 Oxygen Infusion system will not require backup since it does not affect the primary sedimentation and disinfection process of the wastewater treatment plant system.

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The Derby Meadows WWTP design complies with **Chapter 1.4.3.4, Provisions for Isolating Components**, which states each component should have provisions to enable it to be isolated from the flow stream to permit maintenance and repair of the component without interruption of the works' operation. The Construction Plans and Specifications outline and depict the separate piping, electrical and control lines and connections of the various components of the WWTP system in accordance with the provisions.

Furthermore, Derby Meadows WWTP design complies with **Chapter 1.4.3.4, Main Wastewater System Pump Isolation**, which states Minimize the use of inline valves to isolate the main wastewater pumps. The Construction Plans and Specifications outline and depict the main pumps located in the Flow Equalization chambers which have check valves but no other valves on these discharge lines. The flow through the WWTP is hydraulic and no other pumps are required excluding the air lift pumps to return the sludge from the clarifiers to the sludge holding chambers. The Derby Meadows WWTP design is in accordance with these provisions.

CHAPTER 1.5 – ELECTRIC POWER SYSTEM

In accordance with **Chapter 1.5, Electrical Power System** criteria shall apply to those portions of the WWTP system supplying power to vital components. A vital component is one whose operation or function is required to prevent an uncontrolled diversion, is required to meet effluent parameters, or is required to protect other vital components from damage.

In accordance with **Chapter 1.5.1, Power Sources**, which states provide two separate and independent sources of electric power to the works either from two separate utility substations or from a single substation and a works (plant and/or main pump station) generator. The Construction Plans and Specifications outline and depict the main electrical source from the local utility and a 35 Kw backup generator to provide power to the WWTP main components of WWTP system in accordance with the provisions.

In accordance with **Chapter 1.5.1.3 Reliability Class III**, the backup power source shall be sufficient to operate the screening or communication facilities, the main wastewater pumps, the primary sedimentation basins, and the disinfection facility during peak wastewater flow condition, together with critical lighting and ventilation. The Construction Plans and Specifications outline and depict the 35 Kw backup generator to provide power to the WWTP main components of WWTP system in accordance with this provision.

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In accordance with **Chapter 1.5.4, Power Distribution Within the Works, Service to Motor Control Centers**, the internal power distribution system should be designed such that no single fault or loss of a power source will result in disruption of electric service to more than one motor control center associated with the Reliability Class I, II, or III vital components requiring backup power. The Construction Plans and Specifications outline and depict the separate electrical circuits to each component of the WWTP system in accordance with the subject provision.

In accordance with **Chapter 1.5.4, Power Distribution Within the Works, Division of Loads at Motor Control Centers**, Divide vital components of the same type and serving the same function as equally as possible between at least two motor control centers. Also, divide non-vital components in a similar manner, where practicable. The Construction Plans and Specifications outline and depict the separate electrical circuits for the 120V and 230V power distribution and separate circuits to each component of the WWTP system in accordance with the subject provisions.

In accordance with **Chapter 1.5.5, Power Transfer**, Where power feeder or branch circuits can be transferred from one power source to another, a mechanical or electrical safety device should be provided to assure that the two power sources cannot be cross-connected, if unsynchronized. The Construction Plans and Specifications outline and depict the 35 Kw Backup Generator with an automatic transfer switch to prevent back feed into the main utility power source in accordance with the subject provision.

The design for Derby Meadows WWTP meets provisions outlined in **Chapter 1.5.6, Breaker Settings or Fuse Ratings and Chapter 1.5.7, Equipment Type and Location** as specified.

In accordance with **Chapter 1.5.7.1, Switchgear Location**, Protect electric switchgear and motor control centers from sprays or moisture from liquid processing equipment and from breaks in liquid handling piping. Locate, where practicable, the electric equipment in a separate room from the liquid processing equipment. Do not run liquid handling piping through this room. Locate the electric switchgear and motor control centers aboveground and at a minimum, two feet above the one-hundred-year flood (or wave action) elevation.

The motor control panels and electrical control panels are located in the Control building and away from the influent water line coming into the Pro2 system. The liquid piping ran into the control building is for the Pro2 Oxygen Infusion system only and is located on the opposite end away from the main electric control panels and the aeration control panels. The building, control panels, electric panels, aeration blowers and motors are all above the 100-year flood

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elevation and elevated off the floor of the control building in accordance with **Chapter 1.5.7.1, Switchgear Location provisions.**

The design for Derby Meadows WWTP electrical and component control cabling meets provisions outlined in **Chapter 1.5.7.2 Conductor Insulation as specified.**

In accordance with **Chapter 1.5.7.3, Motor Protection from Moisture,** Protect all outdoor motors adequately from the weather. Motors located indoors and near liquid handling, piping or equipment should be, at least, of splash-proof design. Consider providing heaters in motors located outdoors or in areas where condensation may occur.

The motors, aeration blowers and related WWTP mechanical components are located in the Control building and out of the weather. The motors, blowers and other WWTP components are away from the influent water line coming into the Pro2 system. The liquid piping ran into the control building is for the Pro2 Oxygen Infusion system only and is located on the opposite end away from the main electric and system control panels, aeration blowers and motor units. The Control building provides the protection of the motors, aeration blowers and related WWTP mechanical components in accordance **with Chapter 1.5.7.3, Motor Protection from Moisture provisions.**

The design for Derby Meadows WWTP meets provisions outlined in **Chapter 1.5.7.4, Explosion Proof Equipment and Chapter 1.5.7.5, Routing of Cabling as specified.**

Chapter 1.5.7.6, Motor Protection, Protect three-phase motors and their starters from electric overload and short circuits on all three phases. This provision is applicable to the design of Derby Meadows WWTP since there are components of the system which are three (3) phase, more specifically the 15 Hp motors for the aeration blowers.

The design for Derby Meadows WWTP meets provisions outlined in **Chapter 1.5.8, Provisions of Equipment Testing** which states include provisions in the design of equipment requiring periodic testing, to accomplish the tests while maintaining electric power to all vital components as specified.

The design for Derby Meadows WWTP meets provisions outlined in **Chapter 1.5.9, Maintainability** which states design the electric distribution system and equipment to permit inspection and maintenance of individual items without causing a controlled diversion or causing violation of the effluent limitations as specified.

In accordance with **Chapter 1.5.10, Emergency Power Generator Starting,** The means for starting a works-based emergency power generator should be completely independent of the

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normal electric power source. The 35 Kw Backup Generator has a sensor which continuously monitors the main electric feed and upon it failure will automatically start up and signal the transfer switch to open in order provide backup power to the WWTP system. The Backup generator will be set to run a test weekly for 10 minutes or thereabout to insure its operating properly in accordance with the provisions of **Chapter 1.5.10.**

CURRENT EMPHASIS IN THIS REVISION OF THE DESIGN CRITERIA – APPENDIX A

The Mission of the Department of Environment and Conservation (TDEC) is to enhance the quality of life for citizens of Tennessee and to be stewards of our natural environment by protecting and promoting public health and safety, and protecting and improving the quality of Tennessee's water through a responsible regulatory system. The outlined TDEC Mission is exactly in line with our conservation design basis of the Derby Meadows Subdivision & WWTP and the additional components we have incorporated to produce a high-quality effluent that is not detrimental to the natural environment. We concur that all parties should promote methods and processes to obtain high quality effluent and be good stewards of the natural environment, in other words, go above and beyond, exceed the goals and objectives!

Whereas, In the TDEC March 3rd 2022 Technically Approved letter, bullet point #2 states, *the alternative systems appeared to be based on meeting reuse limits, which is not required and adds additional costs.* Correct, the design is based on meeting reuse limits or as stated in previous correspondence, "Unrestricted Urban" per Rule 0400-40-06. The proposed WWTP effluent standard meeting the Unrestricted Urban per Rule 0400-40-06 is our effluent quality target and that coincides with TDEC's Mission to be stewards of our natural environment by protecting and promoting public health and safety.

Furthermore, bullet point #2 states, *the costs of similar systems that would meet the proposed permit limits would be reduced by a substantial amount.* We are not trying to meet a Permit Limit of 45 mg/l for BOD_5 but rather substantially exceeding that level as responsible stakeholders of the environment. In some cases the designs are not always based on cost but rather on the overall objective of the development, meeting conservation standards and being environmentally protective of the natural environment which is the basis of the Derby Meadows WWTP design. When you factor in all the associated costs and impacts, the proposed WWTP design is by far less expensive, less impact on the environment of the development and protective of the natural environment.

The Division of Water Resources (DWR) has been delegated the responsibility to promulgate guidance for the review of engineering reports and plans for public, private and industrial wastewater facilities' design, construction and acceptance of these works in support of the

TDEC Mission. This is very inspiring to know and assume DWR will embrace our design and proposed effluent standards at 80% below the typical Decentralized WWTP effluent permit limits with such being in accordance with "Unrestricted Urban" per Rule 0400-40-06.

In accordance with I. Overall Objectives, subsection a.; *Regardless of the review process and the Criteria, the design agent remains principally responsible for the design, procurement, construction and efficacy of the design.* I concur with this requirement and realize as the Engineer of Record, I am responsible for the design, procurement, construction, startup and WWTP operation efficiency and success including but not limited to meeting the effluent limits in conjunction with .

PRELIMINARY AND PRETREATMENT FACILITIES – CHAPTER 4

Chapter 4.1 Screening and Grinding; *Some type of screening and/or grinding device shall be provided at all mechanical wastewater plants.* – The Derby Meadows waste water low pressure collection system includes grinder pumps at each home or facility. In addition, the pumps within the flow equalization chambers are submersible grinder pumps. **Therefore, the Derby Meadows collection system and WWTP design satisfy Chapter 4, Screening and Grinding provisions.**

Cont'd Chapter 4.1 Screening and Grinding; *The effective removal of grit, rocks, debris, excessive oil or grease and the screening of solids shall be accomplished prior to any activated sludge process.* -- The proposed WWTP has a bar screen for the influent from the low-pressure collection system screening and collection of large object. In addition, the flow equalization chambers are constructed with baffles to trap solids and prevent floating debris from entering the WWTP. **Therefore, the Derby Meadows collection system and WWTP design satisfy the subject provision.**

Chapter 4.2 Grit Removal; *Grit removal is recommended for all mechanical wastewater plants.* — The proposed Derby Meadows WWTP has flow equalization chambers are constructed with baffles to trap solids and grit and prevent floating debris from entering the WWTP. **Therefore, the Derby Meadows WWTP design as proposed satisfies Chapter 4.2, Grit Removal provisions.**

Chapter 4.3, Pre-aeration; *Pre-aeration is desirable in certain instances, such as to reduce septicity. Pre-aeration may be required where pressure or small diameter collection systems are used.* – The proposed WWTP has pre-aeration in the flow equalization chambers as outlined and depicted in the Construction Plans & Specifications. The pre-aeration is accomplished with the Pro2 Oxygen Infusion system which will deliver pure oxygen is

saturated stream on nano size bubbles into the flow equalization chambers and prevent the production of H_2S gas and promote the degradation of the waste before the flow enters the WWTP.

The Derby Meadows WWTP design satisfies Chapter 4.3, Pre-aeration provisions.

Chapter 4.4.1, Flow Equalization; *Equalization may be used to minimize random or cyclic peaking of organic or hydraulic loadings when the total flow is ultimately processed through the plant. Either in-line or side-line equalization is acceptable. Equalization may be required where peak flows are greater than 2 times the average design flow.* – The proposed WWTP has flow equalization chambers as outlined and depicted in the Construction Plans & Specifications. The flow equalization has a volume of 25,000 Gallons consisting of six (6) chambers as outlined and depicted in the Construction Plans and Specifications.

Therefore, the Derby Meadows WWTP design satisfies Chapter 4.4.1, Flow Equalization provisions.

Chapter 4.4.2, Location of Flow Equalization; *Tanks are generally located after screening and grit removal.* –

The proposed Derby Meadows WWTP has flow equalization chambers as outlined and depicted in the Construction Plans & Specifications located at the front of the WWTP. The flow equalization has a volume of 25,000 Gallons consisting of six (6) chambers as outlined and depicted in the Construction Plans and Specifications.

Therefore, the Derby Meadows WWTP design satisfies Chapter 4.4.2, Flow Equalization Location provisions.

Chapter 4.4.3, Flow Equalization Design and Operability; *Generally, aeration will be required. Minimum requirements are to maintain 1.0 mg/l of dissolved oxygen. Odor consideration must be addressed when a plant is located in a sensitive area.*

The proposed WWTP has pre-aeration in the flow equalization chambers as outlined and depicted in the Construction Plans & Specifications. The pre-aeration is accomplished with the Pro2 Oxygen Infusion system which will deliver pure oxygen is saturated stream on nano size bubbles into the flow equalization chambers and prevent the production of H_2S. The level of Oxygen (O_2) within flow equalization will be maintained at a level of approximately 3 mg/l.

Therefore, the Derby Meadows WWTP design satisfies Chapter 4.4.3, Flow Equalization Design and Operability provisions.

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CLARIFIERS – CHAPTER 5

Chapter 5.1, General Criteria

Section 5.1.1 Purpose; *Clarifiers (sedimentation basins, settling tanks) are designed to perform three (3) functions in a treatment scheme, Remove solids from liquids by sedimentation, Remove scum from liquid by flotation and Thicken solids for removal and further treatment.* -- The proposed Derby Meadow WWTP has clarifiers included within the WWTP system for the reasons outlined herein which satisfies **Chapter 5, Section 5.1.1 Purpose** provision.

Section 5.1.2, Number of Clarifier Units; *Multiple units capable of independent operation shall be provided in all facilities where design flows exceed 250,000 gallons per day. Otherwise, the number of units required shall satisfy reliability requirements.*

The proposed WWTP has multiple clarifier units in each section of the WWTP. There are four (4) clarifier chambers in each section of the plant as depicted in the Construction Plans and Specifications. **Therefore, the Derby Meadows WWTP design satisfies Chapter 5, Section 5.1.2 Number of Clarifier Units provision.**

Section 5.1.3, Arrangements; *Clarifiers shall be arranged for greatest operating and maintenance convenience, flexibility, economy, continuity of maximum effluent quality, and ease of installation of future units.* **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.1.3 Arrangement of Clarifiers provision.**

Section 5.1.4, Tank Configuration; *Consideration should be given to the probable flow pattern in the selection of tank size and shape and inlet and outlet type and location.* **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.1.4 Tank Configuration provision since chambers are standard size with 12' depth.**

Section 5.1.5, Flow Distribution; *Effective flow measuring devices and control appurtenances (i.e., valves, gates, splitter boxes, etc.) shall be provided to permit proper proportion of flow to each unit.* **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.1.5 Flow Distribution provision with hour meter on equalization chamber pumps to determine flow into each section of the WWTP.**

Chapter 5.2, Clarifier Design Loading

Section 5.2.1, Primary Clarifiers; *Primary clarifier designs are primarily based upon surface overflow rate (SOR). The following criteria are recommended for design; Since the WAS is returned to the primary chamber, the following are applicable;*

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Hydraulic Loading Rate	*Surface Overflow Rate*
Average Design Flow	*600-800 gpd/sf*
Peak Design Flow	*1200-1500 gpd/sf.*

Whereas, the proposed Derby Meadows WWTP has 7 Clarifier chambers of each being 6'-2" x 12'-2" which equates to 75.09 surface square feet per chamber for a total of 525.62 surface square feet. The design flow of 120,000 over the 525.62 Surface square feet equates to a SOR equal to 441.77 gpd/sf which is substantially lower than the 600–800 gpd/sf. Designs are typically in the range of 300 to 1200 gpd/sf. The proposed Derby Meadow WWTP system satisfies **Chapter 5, Section 5.2.1 Primary Clarifiers** provision with SOR = 441.77 gpd/sf for the WWTP.

Section 5.2.2, Intermediate Clarifiers; – Not Applicable

Section 5.2.3, Final Clarifiers; - *Final clarifier designs shall be based upon the type of secondary treatment application used. Surface overflow and solids loading rates shall be the general basis for clarifier designs. In activated sludge systems, the surface overflow rate for final clarifiers should be based on influent wastewater flows and not include return activated sludge flows (RAS). Table 5-1 within the TDEC* **Chapter 5 of the *Design Criteria for Review of Sewerage Works Construction Documents*** *depicts the criteria established for final clarifier surface overflow and solids loading rates for Activated Sludge and Extended Aeration as follows;*

TABLE 5-1
FINAL CLARIFIER DESIGN PARAMETERS

	Maximum Surface Overflow Rate gpd/sq.ft.		Solids Loading Rate lbm/day-sq.ft.	
Type of Process	Average Design Flow	Peak Design Flow	Average Design Flow	Peak Design Flow
Trickling Filter	600	1200	25	40
Activated Sludge	800 (600 for plants less than 1 MGD)	1200	30	50
Extended Aeration	400	1000	25	35
Nitrification	400	800	25	35
Pure Oxygen	700	1200	25	40

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The final clarifier maximum surface overflow rate for Activated Sludge for the ADF = 600 gpd/sf since the Derby Meadows WWTP is less than 1MGD and the 1200 gpd/sf for the Peak Design Flow. Whereas, the maximum surface overflow rate for Extended Aeration for the ADF = 400 gpd/sf and the 1000 gpd/sf for the Peak Design Flow. Derby Meadows Average Daily Flow Surface Overflow Rate = 441.77 gpd/sf which exceeds the provisions for Activated Sludge plants. The Peak Design Flow based on four (4) times ADF equates to SOR of approximately 800 gpd/sf which exceeds the provisions outlined herein both Activated Sludge and Extended Aeration. The proposed Derby Meadow WWTP not only satisfies but exceeds **Chapter 5, Section 5.2.3 Final Clarifiers** provisions with the Average Daily Flow SOR = 441.77 gpd/sf and the Peak Design Flow SOR = 800 gpd/sf.

Section 5.2.4, Weir Loading Rates; – *Weir loadings should not exceed 15,000 gallons per day per linear feet (gpd/li ft).*

The effluent weir length is 44' which equates to an overflow rate of 5,271 gallons per lineal foot per day at peak hourly flow and the surface area of the tank shall provide a setting rate of 442 gallons per day per square foot at peak hourly flow. The Derby Meadows WWTP design has an effluent weir length is 44' with an overflow rate 5,271 gallons per lineal foot per day as outlined in the WWTP Design Specifications and such satisfies the requirements of **Chapter 5, Section 5.2.4 Weir Loading Rates.**

Section 5.2.5, Depth/Detention Time; – *The side water depth (SWD) for clarifier designs associated with design surface overflow rates should dictate the hydraulic detention time of the clarifier. For design purposes, the following criteria in Table 5-2 are established specific to clarifier application:*

TABLE 5-2
CLARIFIER DEPTH

Type of Process	Diameter [ft]	Minimum Sidewater Depth [ft]
*Primary	-	8
Trickling Filter	-	10
**Activated Sludge	Less than 40	11
	40-70	12
	71-100	13
	101-140	14
	Over 140	15

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The Derby Meadows WWTP Clarifier is less than 40' diameter. **Therefore, the minimum depth is 11' as depicted in Table 5-2 above from Chapter 5, Section 5.2.5 Clarifier Depth & Detention Time.** The Derby Meadows WWTP design has a Clarifier depth of 12'-2" as depicted and outlined in the Construction Plans & Specifications and such satisfies the requirements of **Chapter 5, Section 5.2.5 Clarifier Depth & Detention Time.**

Chapter 5.3, Design Details

Section 5.3.1, Inlets – *Inlets should be designed to dissipate the influent velocity, to distribute the flow equally in both the horizontal and vertical vectors, and to prevent short-circuiting.*

The Derby Meadows collection system and WWTP has no inlets. The waste water is entering the Flow equalization chambers by Forcemain and grinder pumps are utilized in Flow Equalization chamber to distribute flow to the WWTP plant in controlled uniform volume. The proposed Derby Meadow WWTP system satisfies **Chapter 5, Section 5.3.1 Inlets** provisions.

Section 5.3.2, Submerged Surfaces – Not Applicable

Section 5.3.3, Weir Troughs – Not Applicable

Section 5.3.4, Freeboard – *Walls of clarifiers shall extend at least six (6) inches above the surrounding ground surface and shall provide not less than twelve (12) inches of freeboard.*

The Derby Meadows WWTP is set a grade of 18" to 2' above surrounding earthen grade as depicted in the Construction Plans and Specifications. The WWTP is design to have 1' of free board within the interior of the chambers. **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.3.4 Freeboard provisions.**

Chapter 5.4, Sludge and Scum Removal

Section 5.4.1, Scum Removal – *Effective scum collection and removal facilities, including baffling ahead of the outlet weirs, shall be provided for all clarifiers. Provisions may be made for discharge of scum with sludge.*

The Derby Meadows WWTP will have an airlift surface skimming system installed in the settling zone of the clarification chamber(s). The airlift skimmer(s) shall be constructed of schedule forty PVC pipe and fittings. The skimmer inlet(s) shall be equipped with an adjustable cone. The inlet cone(s) shall be provided with attached flexible connector for installation and adjustment of the cone(s) on the airlift assembly. A removable SCH40 PVC clean-out plug shall be provided at the top of the skimmer airlift pipe where it joins the

horizontal discharge line. The discharge line shall run on top of the plant and return back to the aeration chamber for final discharge. The skimmer air supply connected to the main air header of the treatment plant. Air adjustment/shut-off valve(s) will be installed in the skimmer air manifold supply line(s). The proposed Derby Meadow WWTP airlift surface skimming system satisfies **Chapter 5, Section 5.4.1 Scum Removal** provisions.

Section 5.4.2, Sludge Removal -- *Sludge collection and withdrawal facilities shall be designed to assure rapid removal of the sludge. Provisions shall be made to permit continuous sludge removal from settling tanks. Final clarifiers in activated sludge plants shall be provided with positive scraping devices. Suction withdrawal should be provided for activated sludge plants designed for the reduction of nitrogenous oxygen demand.*

The Derby Meadows WWTP shall have a SCH40 PVC airlift sludge return pump with a maximum flow of 122.7 gallons per minute (gpm) shall be provided for each hopper in the clarification chamber. Air shall be supplied to the airlift pumps through a secondary air distribution system connected to the main air header of the treatment plant. Individual air manifold piping shall be installed for each airlift and shall be equipped with a valve for fine adjustment or shut-off. The proposed Derby Meadow WWTP sludge collection and pumping system satisfies **Chapter 5, Section 5.4.2 Sludge Removal** provisions.

Section 5.4.3, Sludge Removal Piping – *Each sludge hopper shall have an individually valved sludge withdrawal line at least six (6) inches in diameter if pumped and at least eight (8) inches in diameter if gravity flow is used. This does not apply to air lift methods of sludge removal, as this should be determined by the sludge removal rate.*

The airlift piping shall be constructed of schedule forty (SCH 40) galvanized steel piping and fittings. A removable clean-out plug shall be installed at the top of the vertical airlift pipe. Piping shall be arranged so that returned sludge is deposited in the aeration chamber at a point which prevents short-circuiting and with positive visible return. The airlift pump(s) shall be designed and manufactured of adequate size pipe and with sufficient air supply to provide a pumping rate in excess of the total daily flow. Air required to achieve this shall be provided in excess of the necessary for aeration, mixing and treatment. The proposed Derby Meadow WWTP sludge removal piping system satisfies **Chapter 5, Section 5.4.3 Sludge Removal Piping** provisions.

Section 5.4.4, Sludge Removal Control -- *Sludge wells equipped with telescoping valves or other appropriate equipment shall be provided for viewing, sampling and controlling the rate of sludge withdrawal. A means for measuring the sludge removal rate and sludge return rate shall be provided. Sludge pump motor control systems shall include time clocks and valve activators for regulating the duration and sequencing of sludge removal.*

The Derby Meadows WWTP is designed for sludge to be returned to the aeration chamber by continuous airlift pumping. Sludge being returned will be visible to the Operator and accessible for sampling. The sludge removal rate can be checked by the operator and determined by the volume of the sludge in the Sludge Chamber for any given period of time. **The proposed Derby Meadow WWTP Sludge Removal system satisfies Chapter 5, Section 5.4.4 Sludge Removal Control provisions.**

Section 5.4.5, Sludge Hopper – *The minimum slope of the side walls shall be 1.75 vertical to 1 horizontal. Hopper wall surfaces should be made smooth with rounded corners to aid in sludge removal. Hopper bottoms shall have a maximum dimension of two (2) feet.*

The Derby Meadows WWTP sludge hoppers shall be constructed with side slopes of greater than 1.75:1 and are actually at 62° angle, with 2' square bottom area. The sludge shall settle by gravity to the bottom of the hopper(s). The hopper(s) having sloping sidewalls which will direct the sludge to the bottom near the airlift pump inlet(s). Maximum area at the base of the hopper (s) shall be two (2) square feet. The settled sludge will be returned to the aeration chamber by continuous airlift pumping. The Derby Meadows WWTP sludge hopper configuration is detailed in the Construction Plans and Specifications. The proposed Derby Meadow WWTP system satisfies **Chapter 5, Section 5.4.5 Sludge Hopper** provisions.

Chapter 5.5, Protective and Service Facilities

Section 5.5.1, Operator Protection – *All clarifiers shall be equipped to enhance safety for operators. Such features shall appropriately include machinery cover lift lines, stairways, walkways, handrails and slip-resistant surfaces.*

The Derby Meadows WWTP has the appropriate safety provisions and walkway grating surface for the operator. **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.5.1 Operator Protection provisions.**

Section 5.5.2, Mechanical Maintenance Access – *The design shall provide for convenient and safe access to routine maintenance items such as gear boxes, scum removal mechanisms, baffles, weirs, inlet stilling baffle area, and effluent channels.*

The Derby Meadows WWTP is designed for maintenance access to all components within the physical WWTP and the Control Building. **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.5.2 Mechanical Maintenance Access provisions.**

Section 5.5.3, Electrical Fixtures and Controls – *Electrical fixtures and controls in enclosed settling basins shall meet the requirement of the National Electrical Code. The*

fixtures and controls shall be located so as to provide convenient and safe access for operation and maintenance. Adequate area lighting shall be provided.

The Derby Meadows WWTP design and construction shall be meet all National Electrical Code (NEC) provisions. The Control Panels within the Control Building are situated for easy obstructed access in accordance with the NEC. The interior of the Control Building is adequately lit with 3 LED fixtures as depicted in the Construction Plans and Specifications. The exterior of the building shall have three (3) motion detection LED fixtures as depicted in Construction Plans and Specifications. **The proposed Derby Meadow WWTP system satisfies Chapter 5, Section 5.5.3 Electrical Fixtures and Controls provisions.**

Chapter 5.6, Operability, Flexibility, and Reliability

Section 5.6.1, Scum Removal -- ***A method of conveying scum across the water surface to a point of removal should be considered, such as water or air spray. Baffles should be designed to ensure capture of scum at minimum and maximum flow rates.***

The Derby Meadows WWTP will have an airlift surface skimming system installed in the settling zone of the clarification chamber(s). The airlift skimmer(s) shall be constructed of schedule forty PVC pipe and fittings. The skimmer inlet(s) shall be equipped with an adjustable cone. The inlet cone(s) shall be provided with attached flexible connector for installation and adjustment of the cone(s) on the airlift assembly. A removable SCH40 PVC clean-out plug shall be provided at the top of the skimmer airlift pipe where it joins the horizontal discharge line. The discharge line shall run on top of the plant and return back to the aeration chamber for final discharge. The skimmer air supply connected to the main air header of the treatment plant. Air adjustment/shut-off valve(s) will be installed in the skimmer air manifold supply line(s). The proposed Derby Meadow WWTP system satisfies **Chapter 5, Section 5.6.1 Scum Removal** provisions.

Section 5.6.2, Overflow Weirs – The overflow weirs are of the notched type and are adjustable for leveling as outlined in the WWTP Specifications.

Section 5.6.3, Unit Dewatering – The WWTP chambers can be dewatered by a mechanical pump of sufficient size within the specified time period. The structure weight is sufficient to prevent displacement by buoyancy forces when empty if the surround ground is dry and water table is sufficiently below the bottom of chambers or at a maximum of 4' depth from bottom of chamber. Each chamber of the WWTP structure is over 27,000# not including any liquid, equipment or piping.

The buoyancy forces if the soil is completely saturated would be in the range of 48.3 kips and would cause the empty structure to float out of the ground by over 4' since the

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hydrostatic force would be over 2 times the structure weight. Therefore, any consideration of dewatering must be done in conjunction with forecasted weather conditions and existing ground water depth in the immediate vicinity of the WWTP.

The weight of each chamber including 8.83' of liquid is approximately 70 kips which exceeds the maximum buoyancy force on the chamber in the event the ground is 100% saturated or flooded to the top of the structure.

Section 5.6.4, Hydraulics – Not Applicable

Section 5.6.5, Sludge Removal

Section 5.6.5.1 – *When two or more clarifiers are used, provisions shall be made to control and measure the rate of sludge withdrawal from each clarifier.*

The Derby Meadows WWTP is designed for sludge to be returned to the aeration chamber by continuous airlift pumping from each clarifier.

Section 5.6.5.2 *– Consideration should be given to removing activated sludge from the effluent end of rectangular clarifiers.*

The Derby Meadows WWTP is designed with circular clarifiers within the rectangular precast concrete chamber.

Section 5.6.5.3 *– Consideration shall be given to chlorination of return activated sludge and digester supernate. Sufficient mixing and contact time should be provided.*

The Derby Meadows WWTP is designed for sludge to be returned prior to chlorination of the discharge effluent form the clarifier.

Section 5.6.6, Other Design Considerations – Plant modifications are possible if warranted based operating experience and effluent quality.

ACTIVATED SLUDGE – CHAPTER 7

7.1 GENERAL

7.1.1 APPLICABILITY – *The activated sludge process and its various modifications may be used where sewage is amenable to biological treatment.*

The Derby Meadows WWTP will consist of treatment of daily waste water flow from the development and shall be accomplished by the Activated Sludge process. This plant will treat non-industrial sewage influent with a BOD concentration of 204 mg/l over 24 hours to

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provide an effluent quality of 10mg/l of BOD5 and 15mg/l TSS. The chlorine contact chamber will provide adequate disinfection (<400 ppm fecal) through a hypochlorite concentration of 8 mg/l to meet disinfection standards including a minimum retention of 30 minutes DAF and 15 minutes at PHF.

The Derby Meadows WWTP facility is a GAINEY model W.O. 1200 as depicted in the Construction Plans and Specifications capable of treating 120,000 gallons per day of sanitary sewage. The WWTP is designed to serve a population equivalent of 1,200 with a total loading and treatment capability of 196.81 pounds of BOD_5 per day.

7.1.2 PROCESS SELECTION – *The activated sludge process and its several modifications may be employed to accomplish varied degrees of removal of suspended solids and reduction of BOD and ammonia. Choice of the process most applicable will be influenced by the proposed plant size, type of waste to the treated, and degree and consistency of treatment required. All designs should provide for flexibility to incorporate as many modes of operation as is reasonably possible.*

Primary treatment shall be accomplished in the aeration chamber of the WWTP facility. All incoming waste water shall enter the flow equalization chambers and then pumped into and retained in the aeration chamber for twenty-four hours. Air will be introduced along one wall near the bottom to produce a mixing and rolling action in the tank. Two thousand one (2,100) hundred cubic feet of air shall be pumped into the aeration chamber for each pound of BOD applied per day. The spiral rolling action created by the introduction of air shall insure thorough mixing of the incoming organic material with the activated sludge present in the chamber. In addition, the spiral flow pattern shall prevent short circuiting of the flow and assure adequate retention of all organic materials.

Secondary treatment of the waste water shall be accomplished in a clarification chamber. Mixed liquors shall flow from the aeration chamber into the clarification chamber by hydraulic displacement. The effective holding capacity of the clarifier is calculated excluding the lower two-thirds, by height, of the hopper(s) and is of sufficient volume to provide in excess of four-hour retention of the average daily flow. The chamber is designed so that the clarifier will successfully perform its function of solids separation without hydraulic upset even when the significant runoff period is eight hours.

7.1.3 Pretreatment -- *Where primary settling tanks are not used, effective removal or exclusion of grit, debris, excessive oil or grease, and comminution or screening of solids shall be accomplished prior to the activated sludge process. Where primary settling is used, provisions should be made for discharging raw sewage directly to the aeration tanks to facilitate plant start-up and operation during the initial stages of the plant's design life.*

Prior to the primary treatment, sewage will enter a set of flow equalization chambers to remove trash and normalize the flow to avoid peak surges on the treatment process. The flow will be dosed using two non-clog submersible pumps with 5.25 impellor, 230 Volt, 3 Phase. In addition, Pro2 Oxygen Infusion system will be utilized to inject a saturated oxygen infused stream in the flow equalization chamber.

7.2 Types of Processes

Section 7.2.1 Conventional

Conventional activated sludge is characterized by introduction of influent wastewater and return activated sludge at one end of the aeration tank, a plug-flow aeration tank, and diffused aeration.

Section 7.2.2 Complete Mix

Complete mix activated sludge is characterized by introduction of influent wastewater and return activated sludge throughout the aeration basin and the use of a completely mixed aeration tank. Complete mix aeration tanks may be arranged in series to approximate plug flow and conventional activated sludge.

The Derby Meadows WWTP process can be classified as Activated Sludge with a biological treatment processes that use a suspended growth of organisms to remove BOD and suspended solids. The process is enhanced by the infusion of pure oxygen from the Pro2 Oxygen infusion system in addition to the standard aeration system. The WWTP system includes a Flow Equalization chambers, Aeration chambers, Clarifier settling chambers, return wasted sludge and effluent disinfection.

In general the primary influent of sewage is mixed with the return activated sludge to form mixed liquor. The mixed liquor is aerated for a specified length of time. During the aeration the activated sludge organisms use the available organic matter as food producing stable solids and more organisms. The suspended solids produced by the process and the additional organisms become part of the activated sludge. The solids are then separated from the wastewater in the settling tank. The solids are returned to the influent of the aeration tank (return activated sludge). Periodically the excess solids and organisms are removed from the system (waste activated sludge).

7.3 Aeration Tanks

Section 7.3.1 Required Volume

The size of the aeration tank for any particular adaptation of the process shall be based on the food-to-microorganism (F/M) ratio, using the influent BOD (load per day) divided by the

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mixed-liquor volatile suspended solids. Alternatively, aeration tanks may be sized using sludge age. The calculations using the F/M ratio or sludge age shall be based on the kinetic relationships. APPENDIX 7A shows the permissible range of F/M ratio, sludge age, mixed-liquor suspended solids, aeration tank detention time, aerator loading, and activated sludge return ratio for design of the various modifications of the activated sludge process. All design parameters shall be checked to determine if they fall within the permissible range for the selected F/M ratio or sludge area and the aeration tank size. Diurnal load variations and peak loadings must be considered when checking critical parameters.

The aeration chamber has a capacity of 118,935 gallons to provide twenty-four-hour retention of daily waste water flow. The chamber is of sufficient size to provide a minimum of eighty (80) cubic feet of tank capacity per pound of applied BOD_5.

Concrete fillets are installed in the bottom of the chambers parallel to the treatment flow to insure uniform tank roll and prevent deposition of solids. The overall design of the chamber is such that effective mixing shall be maintained to provide optimum treatment.

Section 7.3.2 Shape and Mixing

The dimensions of each independent mixed-liquor aeration tank or return sludge reaeration tank should be such as to maintain effective mixing and utilization of air when diffused air is used. Liquid depths should not be less than 10 feet or more than 30 feet except in special design cases. For plug-flow conditions using very small tanks or tanks with special configuration, the shape of the tank and/or the installation of aeration equipment should provide for elimination of short-circuiting through the tank. Aerator loadings should be considered and the horsepower per 1,000 cubic feet of basin volume required for oxygen transfer should be limited to prevent excessive turbulence in the aeration basins, which might reduce activated sludge settleability.

The Derby Meadows WWTP aeration chambers are rectangular in shape. The aeration chambers are 10'-8" overall height with interior height of 10'-2" with a water height of 8'-10" leaving 1'-6" of freeboard as depicted in the Construction Plans and Specifications.

Section 7.3.3 Number of Units

Multiple tanks capable of independent operation may be required for operability and maintenance reasons, depending on the activated sludge process, size of the plant, and the reliability classification of the sewerage works (refer to Section 1.3.11).

The Derby Meadows WWTP will have twenty-four (24) aeration chambers which are rectangular in shape ands sized to provide a minimum of eighty (80) cubic feet of tank

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capacity per pound of applied BOD_5 as depicted in the Construction Plans and Specifications.

Section 7.3.4 Inlets and Outlets – Not Applicable

Section 7.3.5 Measuring Devices – *For plants designed for less than 250,000 gallons per day, devices shall be installed for indicating flow rates of influent sewage, return sludge, and air to each aeration tank.*

Flow being distributed into the WWTP is measured by the hour meters on each of the flow equalization pumps which alternate for each leg of the WWTP.

Where the design provides for all returned sludge to be mixed with the raw sewage (or primary effluent) at one location, the mixed-liquor flow rate to each aeration tank shall be measured, and the flow split in such a manner to provide even loading to each tank, or as desired by operations.

All flow is going to one aeration chamber and splitting the flow is not possible.

Section 7.3.6 Freeboard and Foam Control – *Aeration tanks shall have a freeboard of at least 18 inches.*

Aeration Chambers have 18" of freeboard as depicted in Construction Plan details.

Section 7.3.7 DRAIN AND BYPASS – *Provisions shall be made for dewatering each aeration tank for cleaning and maintenance. The dewatering system shall be sized to permit removal of the tank contents within 24 hours. If a drain is used, it shall be valved. The dewatering discharge shall be upstream of the activated sludge process. Provisions shall be made to isolate each aeration tank without disrupting flow to other aeration tanks. Proper precautions shall be taken to ensure the tank will not "float" when dewatered.*

Refer to information provided herein Section 5.6.3.

7.4 AERATION EQUIPMENT

Section 7.4.1 General -- *Oxygen requirements generally depend on BOD loading, degree of treatment, and level of suspended solids concentration to be maintained in the aeration tank mixed liquor. Aeration equipment shall be designed to supply sufficient oxygen to maintain a minimum dissolved oxygen concentration of 2 milligrams per liter (mg/l) at average design load and 1.0 mg/l at peak design loads throughout the mixed liquor.*

The Derby Meadows WWTP is designed to have convention aeration system utilizing Roots blowers to provide air to the fine bubbler diffusers. In addition, Pro2 Oxygen Infusion system will supplement the DO with pure oxygen saturated stream injected into the aeration

chamber which will elevate the DO level to 5 mg/l in the aeration chamber and enhance the biodegradation process prior to the hydraulic transfer to the clarifiers.

Aeration equipment shall be of sufficient size and arrangement to maintain velocities greater than 0.5 foot per second at all points in the aeration tank.

The WWTP aeration system will consist of 4 model ROOTS blowers which will provide 271 CFM/Leg C.F.M. of free air at the rated operating pressure of 4 PSI which will satisfy the minimum velocity of the aeration within the aeration chamber.

Section 7.4.2 Diffused Air Systems

7.4.2.1 Design Air Requirements – ***The aeration equipment shall be designed to provide the oxygen requirements set forth above. Minimum requirements for carbonaceous removal are shown below. (Oxygen requirements for nitrification are in addition to that required for carbonaceous removal where applicable; i.e., low F/M.) Air required for channels, pumps, or other air-use demand shall be added to the air volume requirements.***

Diffusers are provided parallel to the treatment flow in the aeration chamber. Each diffuser assembly is installed no more than twelve inches off the floor of the chamber and nor more than twelve inches away from the chamber sidewall. Diffusers shall be constructed of SCH40 polyvinyl chloride plastic (PVC) and shall be designed to insure uniform mixing within the aeration chamber. Fine air bubble distribution effected by the diffusers shall provide oxygen necessary for the Aerobic Digestion process while maintaining an acceptable dissolved oxygen level in the final plant effluent. In addition, the Pro2 Oxygen Infusion system will be utilized to supplement the aeration with pure oxygen in nano size bubble to improve the SOTE within the aeration chambers.

Primary air distribution shall be provided through a galvanized air header. The air header will have individual drop pipes connected to the header assembly for air supply to individual diffuser assemblies. Each drop pipe shall be equipped with an air adjustment valve to control air flow individually to each diffused assembly. In addition, a quick release coupling or union shall be provided for each pipe diffuses assembly downstream from the air adjustment valve.

The Pro2 Oxygen Infusion system will have two (2) zones that will be connected to four nozzles with two (2) nozzles on each zone distributing the saturated oxygen stream into the aeration chambers to provide supplemental aeration and elevate the DO in the aeration chamber to a level of 5 mg/l.

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7.4.2.2 Special Details – *The specified capacity of blowers or air compressors, particularly centrifugal blowers, shall take into account that the air intake temperature might reach extremes and that pressure might be less than normal. Motor horsepower shall be sufficient to handle the minimum and maximum ambient temperatures on record.* – Four (4) seventeen hundred fifty (1750) RPM 230V, 3-phase 60Hz, 15 Hp motors.

Air required for the treatment process and operation of airlifts in the clarifier will be provided by four (4) model ROOTS blowers. The four (4) blowers and motors are designated as two (2) units each for each leg of the WWTP which can fully operate if one of the aeration blower and motor unit is out of commission.

The blower(s) will be of the rotary positive displacement type and will provide 271 CFM/Leg C.F.M. of free air at the rated operating pressure of 4 PSI. The blower unit will be provided with inlet air filter silencer(s), discharge flexible coupling connector to air header assembly. Blower connection to the drive motor(s) shall be conventional v-belts power transmission drive assembly.

Four (4) seventeen hundred fifty (1750) RPM 230V, 3-phase 60Hz, 15 Hp motors, 37.2 amps for the 3-phase shielded, drip-proof electric motor(s) shall be used to drive the blower(s). When operation at the rated horsepower the motor(s) shall reach maximum speed that shall not exceed ninety-seven percent of the reference synchronous speed. The motor(s) are designed and rated for continuous duty applications and shall not overload or exceed motor name plate ratings when operating as outlined herein.

The blower filters shall be easily accessible. The Derby Meadows WWTP is designed for maintenance access to all components within the physical WWTP and the Control Building including the aeration blowers and motors.

Spare filters should be provided. – Filters can be locally acquired by several suppliers.

The blowers shall be provided in multiple units, arranged and in capacities to meet the maximum air demand with the single largest unit out of service – Aeration blowers and motors are included in pairs for each segment of the WWTP in accordance with redundancy as outlined in the WWTP reliability.

The design shall also provide for varying the volume of air delivered in proportion to the load demand of the plant. The spacing of diffusers shall be in accordance with the oxygen and mixing requirements in the basin. – Diffusers will be provided parallel to the treatment flow in the aeration chamber. Each diffuser assembly shall be installed no more than twelve inches off the floor of the chamber nor more than twelve inches away from the

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chamber sidewall. Diffusers shall be constructed of SCH40 polyvinyl chloride plastic (PVC) and shall be designed to insure uniform mixing within the aeration chamber.

Individual units of diffusers shall be equipped with control valves, preferably with indicator markings, for throttling or for complete shutoff. Diffusers in each assembly shall have substantially uniform pressure loss. The adjustment of one diffuser should have minimal influence on the air supply rate to any other diffusers. -- Primary air distribution shall be provided through a galvanized air header. The air header will have individual drop pipes connected to the header assembly for air supply to individual diffuser assemblies. Each drop pipe shall be equipped with an air adjustment valve to control air flow individually to each diffused assembly.

Flow meters and throttling valves shall be placed in each header. –
Primary air distribution shall be provided through a galvanized air header. The air header shall have individual drop pipes connected to the header assembly for air supply to individual diffused assemblies. Each drop pipe shall be equipped with an air adjustment valve to control air flow individually to each diffused assembly. In addition, a quick release coupling or union shall be provided for each pipe diffuses assembly downstream from the air adjustment valve.

Air filters shall be provided as part of the blower assembly to prevent clogging of the diffuser system. Means shall be provided to easily check the air filter so that it will be replaced when needed. – Aeration blower and motor assembly have air filters as required.

Section 7.4.3 Mechanical Aeration Equipment -- *Power input from mechanical aerators should range from 0.5 to 1.3 horsepower per 1,000 cubic feet of aeration tank.* – Not applicable to Derby Meadows WWTP design.

Section 7.4.4 Flexibility and Energy Conservation -- *The design of aeration systems shall provide adequate flexibility to vary the oxygen transfer capability and power consumption in relation to oxygen demands.*
The control systems record the blower/motor operating time for each unit. The aeration piping system has manual valves for the operator to control air volume to each chamber. In addition, DO probes are being utilized in various locations throughout the WWTP to monitor DO and signal and activate the Pro2 unit for O2 demand at specified chambers.

Particular attention should be given to initial operation when oxygen demands may be significantly less that the design oxygen demand. DO probes are being utilized in various locations throughout the WWTP to monitor DO.

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The design shall always maintain the minimum mixing levels; mixing may control power requirements at low oxygen demands. Dissolved oxygen probes and recording should be considered for all activated sludge designs. – DO probes are being utilized in various locations throughout the WWTP to monitor DO and signal and activate the Pro2 unit for O2 demand at specified chambers. In addition, the blower and aeration unit may be operated even though the O2 demand is low in order to roll the flow in the aeration chamber periodically every hour.

Consideration will be given to automatic control of aeration system oxygen transfer, based on aeration basin dissolved oxygen concentrations, provided manual back-up operation is available. A dissolved oxygen field probe and meter is to be provided for all activated sludge installations. – DO probes are being utilized in various locations throughout the WWTP to monitor DO and signal and activate the Pro2 unit for the infused oxygen saturated stream at specified chambers.

Watt-hour meters shall be provided for all aeration system drives to record power usage. – Watt-hour meters are provided for the aeration blower & motors and Flow Equalization pumps.

Energy conservation measures shall be considered in design of aeration systems. – The aeration blowers and motors are on timers to control and minimize use. The Pro2 unit has 2 Hp motor and will deliver 95% pure oxygen in nano size bubble with 95% SOTE which will reduce the operational time of the aeration 15Hp motor and blowers since the DO will be at a level in the range of 5 mg/l.

Section 7.5 Additional Details – Not Applicable

NITRIFICATION – CHAPTER 8

8.1 GENERAL

Section 8.1.1 Applications

Nitrogen exists in treated wastewater primarily in the form of ammonia which is oxidized to nitrate by bacteria. This process requires oxygen and can exert a significant oxygen demand on the receiving water.

Section 8.1.2 Process Selection

8.2 SUSPENDED GROWTH SYSTEMS

8.2.1 Single - Stage Activated Sludge

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This section details the requirements for activated sludge systems designed to both remove carbonaceous matter and oxidize ammonia. – Derby Meadows WWTP design

8.2.1.1 Process Design

Design must provide adequate solids retention time in the activated sludge system for sufficient growth of nitrifying bacteria. – Derby Meadows WWTP design does provide adequate retention time in the aeration basin.

8.2.1.2 Special Details

a. *Sufficient oxygen must be provided for both carbonaceous BOD oxidation and ammonia oxidation. Use 4.6 pounds O2 per pound total Kjeldahl nitrogen to calculate the oxygen requirements for nitrification, in addition to the oxygen needed for BOD removal.*

   Hence the reason for the Pro2 Oxygen Infusion system which is being utilized to supplement the oxygen levels in the aeration basin with pure oxygen in nano size bubble to improve the SOTE and maintain DO level of 5 mg/l.

b. *Aeration basin design dissolved oxygen shall be greater than or equal to 2.0 mg/l.*

   The Pro2 Oxygen infusion system will deliver 95% pure oxygen in nano size bubble with 95% SOTE which will reduce the loading on the standard aeration blowers and 15Hp motor and maintain a DO level in the range of 5 mg/l.

c. *Diurnal peak mass flow rates of BOD and total Kjeldahl nitrogen must be considered in the aeration system design.*

   The WWTP design is based on peak flow rates.

d. *The pH levels must be controlled within the range of 6.5 to 8.4. Nitrification is optimized in the upper portion of this range (7.9 to 8.4) but pH levels in the range of 7.6 to 7.8 are recommended since CO2 produced will be released from the wastewater.*

   The pH will be monitored by the operator and adjusted if required. Experience has been that no significant pH adjustments have been required. Realize each and every plant is different and may have operational issues unlike others.

e. *Nitrification requires alkalinity, 7.1 pounds as CaCO3 per pound NH3-N oxidized. The wastewater must be shown to have sufficient alkalinity or chemical treatment must be considered to provide adequate alkalinity.*

   The pH will be monitored by the operator. If the pH tends to stay acidic, required chemical treatment will be added after startup and operation for an extended period of time to determine the operation issues that warrant the chemical feeds.

f. *Clarifier and return sludge pumping must be designed with the capability to allow operation over a range of solids retention times.*

The Derby Meadows WWTP is designed for sludge to be returned to the aeration chamber by continuous airlift pumping from each clarifier.

Flexibility should be provided to prevent denitrification in the clarifier from low D.O. levels in the sludge blanket. This could cause violations of other effluent limits (i.e., suspended solids).

The Pro2 Oxygen infusion system will provide flexibility of the DO level to insure adequate DO level in the clarifier as required. One of the Pro2 oxygen zones will be locate near the final aeration chambers and prior to the clarifier. A DO probe will be utilized in the final aeration chambers to monitor the DO and signal and activate the Pro2 unit for the infused oxygen saturated stream at specified chamber.

DISINFECTION – CHAPTER 10

Section 10.1.1 Requirement for Disinfection – *Proper disinfection of treated wastewater before disposal is required for all plants (with the exception of some land application systems) to protect the public health.*

The Derby Meadows WWTP utilizes Chlorine disinfection by Sodium Hypochlorite tablets within a Norweco Model LF460, 4 tube chlorinator and a chlorine contact chamber. The chlorine contact chamber consists of 3 chambers due to the 30:1 ratio and the baffles required longitudinally and such will have the volume of 5,500 gallons for 30-minute retention time at peak hourly flow and 60-minute retention time for average daily flows.

Section 10.1.2 Methods of Disinfection –

Section 10.1.2.1 Chlorination

Chlorination using dry chlorine (see definition in following section) is the most commonly applied method of disinfection and should be used unless other factors, including chlorine availability, costs, or environmental concerns, justify an alternative method. --- Dry Chlorine is not utilized as part of the design for the Derby Meadows WWTP but rather Sodium Hypochlorite tablets within a Norweco Model LF460, 4 tube chlorinator within the 8" Ø pipe from the clarifiers to the chlorine contact chamber.

Section 10.1.3 De-chlorination

Capability to add dechlorination should be considered in all new treatment plants. De-chlorination of chlorinated effluents shall be provided when permit conditions dictate the need. --- De-chlorination is not utilized as part of the design for the Derby Meadows WWTP but could be added if warranted or as a condition of permitting.

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10.2 Chlorination

Section 10.2.1 Forms of Chlorine –

a. Dry Chlorine — Not utilized for the Derby Meadows WWTP

Dry chlorine is defined as elemental chlorine existing in the liquid or gaseous phase, containing less than 150 mg/l water. Unless otherwise stated, the word "chlorine" wherever used in this section refers to dry chlorine.

b. Sodium Hypochlorite

Sodium hypochlorite may be used as an alternative to chlorine whenever dry chlorine availability, cost, or public safety justifies its use. The requirements for sodium hypochlorite generation and feeding will be determined on a case-by-case basis. — The Derby Meadows WWTP disinfection is by Sodium Hypochlorite tablets within a Norweco Model LF460, 4 tube chlorinator and a chlorine contact chamber within the 8" Ø pipe from the clarifiers to the chlorine contact chamber.

Section 10.2.2 Design Considerations

Chlorination system designs should consider the following design factors such as Flow, Contact time, Concentration and type of chlorine residual, Mixing, pH, Suspended solids, Industrial wastes, Temperature, Concentration of organisms and Ammonia concentration. Derby Meadows WWTP design process took the aforementioned factors among others into consideration and evaluation for the WWTP design.

Section 10.2.2.2 Capacity

Required chlorinator capacities will vary, depending on the use and point of application of the chlorine. Chlorine dosage should be established for each individual situation, with those variables affecting the chlorine reaction taken into consideration. For normal wastewater, the dosing capacity outline in Chapter 10 may be used as a guideline.

Section 10.2.2.3 Mixing

The mixing of chlorine and wastewater can be accomplished by hydraulic or mechanical mixing. Hydraulic mixing is preferred in smaller plants over mechanical mixing and should be done according to the following criteria. — Mixing of the disinfection (Sodium Hypochlorite tablets) is accomplished hydraulically and by contact time within the Chlorine chamber as allowed by this provision.

Section 10.2.2.4 Contact Period

Contact chambers shall be sized to provide a minimum of 30 minutes detention at average design flow and 15 minutes detention at daily peak design flow, whichever is greater. Contact chambers should be designed so detention times are less than 2 hours for initial

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flows. — Derby Meadows WWTP disinfection system design complies with the provision as outlined in previous sections and restated as the chlorine contact chamber will have the volume of 5,500 gallons for 30-minute retention time at peak hourly flow and 60-minute retention time for average daily flows.

Section 10.2.2.5 Contact Chambers

The contact chambers should be baffled to minimize short-circuiting and back mixing of the chlorinated wastewater to such an extent that plug flow is approached. It is recommended that baffles be constructed parallel to the longitudinal axis of the chamber with a minimum length-to-width ratio of 30:1 (the total length of the channel created by the baffles should be 30 times the distance between the baffles). Shallow unidirectional contact chambers should also have cross-baffles to reduce short-circuiting caused by wind currents.

Provision shall be made for removal of floating and settleable solids from chlorine contact tanks or basins without discharging inadequately disinfected effluent. To accomplish continuous disinfection, the chlorine contact tank should be designed with duplicate compartments to permit draining and cleaning of individual compartments.

A sump or drain within each compartment, with the drainage flowing to a raw sewage inlet, shall be provided for dewatering, sludge accumulation, and maintenance. Unit drains shall not discharge into the outfall pipeline. Baffles shall be provided to prevent the discharge of floating material.

A readily accessible sampling point shall be provided at the outlet end of the contact chamber. In some instances, the effluent line may be used as chlorine contact chambers provided that the conditions set forth above are met.

The chlorine contact chamber system consists of two (2) - 6'-2" x 12'-2" chambers in accordance with the 30:1 ratio and the baffles being placed longitudinally and spaced 14.6" apart. The two (2) chamber Chlorine contact system will have a combined volume of 5,500 gallons and will provide a 30-minute retention time for peak hourly flow and 60-minute retention time for average daily flows. The Chlorine contact system can be easy be sampled right before the outlet due to the open grating and removability of such grating.

Section 10.2.2.6 Dechlorination -- — Not utilized for the Derby Meadows WWTP

Section 10.2.2.7 Sampling, Instrumentation, and Control

For treatment facility designs of 0.5 mgd and greater, continuously modulated dosage control systems should be used. — Since the WWTP size is under 0.5 MGD,

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instrumentation and dosage control system are not required and continuous mixing hydraulically is preferred with sufficient contact time within the Chlorine chamber.

SLUDGE PROCESSING AND DISPOSAL — CHAPTER 12

Sludge is a broad term used to describe the various aqueous suspensions of solids encountered during treatment of sewage. The nature and concentration of the solids control the processing characteristics of the sludge.

The sludge is removed from the clarifiers and returned to the aeration basin and sludge holding chambers. The Derby Meadows WWTP is designed for recycle stream of sludge to be returned to the aeration chamber and sludge digester by continuous airlift pumping from each clarifier.

The aeration chambers and sludge digester chambers have a Pro2 oxygen infusion zone dedicated to this section of the WWTP to maintain adequate DO levels to promote the degradation of accumulated sludge in the digester and aeration basins. Thereby continuously reducing the volume of accumulated sludge in the sludge holding basin and the frequency of the pump out and disposal.

PLANT FLOW MEASUREMENT AND SAMPLING — CHAPTER 13

Complete and accurate flow measuring and sampling are essential in the proper treatment of wastewater. Compliance with discharge limits requires proper flow measurement and sampling. They provide the operator with the information to optimize process control and operational costs, as well as providing an accurate data base of flows and process performance which can be used to analyze changes in operational strategy or assist future plant design.

Watt-hour meters are provided for the aeration blower & motors and Flow Equalization pumps which provide the influent flow into the WWTP. The flow through the WWTP is by hydraulics with no monitoring of the flow between chambers or into the clarifiers. The Pro2 unit is also equipped with hour meter to record operating time and power usage. The oxygen generator is equipped with an hour meter to record the run time of the O_2 generator and booster unit.

INSTRUMENTATION, CONTROL AND ELECTRICAL SYSTEMS — CHAPTER 14

Plant instrumentation, control and electrical systems shall be designed to comply with the applicable requirements of reliability standard per publication number EPA-430-99-74-001.

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The design of the treatment facilities instrumentation, control and electrical systems shall conform to applicable codes and regulations including: National Electric Code (NEC) Occupational Safety and Health Act (OSHA) State and Local Building Codes National Electrical Safety Code (NESC) Instrument Society of America (ISA).

The Derby Meadows WWTP control system will consist of remote monitoring for both the main serration and blower system and Pro2 oxygen infusion system. The remote access and control system will be in accordance and compatible with Tennessee Wastewater Systems, Inc. existing remote access and control system.

SMALL ALTERNATIVE WASTEWATER SYSTEMS --- CHAPTER 15

DECENTRALIZED DOMESTIC WASTEWATER TREATMENT SYSTEMS

15.1 Preface

This chapter presents the method to determine the proper design for decentralized wastewater treatment systems (DWWTS). DWWTS are systems that are not the traditional, centralized/regionalized wastewater treatment systems. DWWTS treat domestic, commercial and industrial wastewater using water tight collection, biological treatment, filtration and disinfection. These systems typically will utilize land application with either surface or subsurface effluent dispersal.

15.2 General Considerations

Section 15.2.1 Ownership – *Plans for sewer systems including domestic wastewater treatment systems will not be approved unless ownership and responsibility for operation are by a municipality, publicly owned utility, or a privately owned public utility regulated by the Tennessee Regulatory Authority (TRA). The owner is defined as the entity responsible for the operation of the system. The property being served is defined as the user.*

Tennessee Wastewater Systems, Inc. will own and operate the Derby Meadows WWTP, low pressure sanitary sewer system, grinder pumps and all related appurtenances.

Section 15.2.2 Planning

The applicant should contact the Division of Water Pollution Control as early as possible in the planning process. --- Previously completed

15.3 Design Basis

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Small systems are more sensitive to influent problems due to a reduction in hydraulic or organic buffering capacity. Small systems are much more susceptible to flow variations due to daily, weekend or seasonal fluctuations. An accurate characterization of the waste and flow conditions should be projected for the site and should include flow, BOD5, TSS, ammonia and, oil and grease.

Section 15.3.1 Hydraulic Loading – Previously outlined and submitted in Preliminary Engineering Report with no modifications herein. Previous information presented as follows for reference.

Project: Derby Meadows SOP-01028 Maple Green									
Place	DAF GPD	BOD Lb / Day	Conc mg/l	Design Basis	Qty	Hydraulic Load	Organic Load	Conc mg/l	Size-GPD
Tennessee Sizing Criteria per Mike Shemaka	300	0.51	204	2BR	309	92,700	157.59		94301.856
Refueling Station Restaurant (not 24 hr) - Modified Conc. Per Mike	35	0.058	199	Seat	174	6,090	10.092		6039.0528
Refueling Center Employees	20	0.051	306	Employee	10	200	0.51		305.184
Retail Fuel Stations (on Major HWYS)	250	0.43	206	Fueling Pointup to the first 4	4	1,000	1.72		1029.248
	125	0.21	202	Fueling Point as addl over 4	23	2,875	4.83		2890.272
Swimming Pools (incl employees)	10	0.017	204	Swimmer	400	4,000	6.8		4069.12
Restrooms & Bath House - Modified per Mike	20	0.0335	201	Shower	400	8,000	13.4		8018.56
Park Restrooms - Modified per Mike	10	0.017	204	Person	100	1,000	1.7		1017.28
Refueling Center Showers	20	0.0335	201	Shower	5	100	0.1675		100.232
Total			%			115,965.0	196.81	204	117,771

Design Criteria - Derby Meadows Development consisting of 309 single family homes, pool, cabana with rest rooms with showers and park restroom facility near the pond.

- 309 home @ 300 gpd = 92,700 gpd
- Pool Size 60' x 100' = 6,000 SF
  - Capacity is based on 15 SF per person for shallower pools , no deep end
  - 6,000 SF / 15 SF/per = 400-person capacity
  - Water usage = 10 gpd / person for pools = 4,000 gpd
- Restrooms & Bath House @ Pool
  - Based on 10 gpd for restroom & 10 gpd for Showers per person
  - 400-person capacity @ 20 gpd = 8,000 gpd
- Park Restrooms @ Pond
  - Based on 10 gpd for restroom per person
  - Estimate of 100-person usage per day @ 10 gpd = 1,000 gpd

Derby Meadows WWTP Flow based on the homes, Pool, Bath House & Park Restrooms
92,700 + 4,000 + 8,000 + 1,000 = 105,700 gpd

Total Derby Meadows Subdivision Development WWTP Flow = 105,700 gpd

Design Criteria - Thornton's Refueling Center Development consisting of 27 Refueling pumps, five (5) showers, restaurant with occupancy of 174 patrons and an estimate of 10 employees.

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- 27 Gasoline & Diesel Refueling Pump Islands, Convenience Center with five (5) showers, Restaurant Occupancy with an occupancy of 174 patrons and employees @ 10 per day.
- Thornton's provided data from two other refueling centers located in Roscoe IL and Lincoln IL averaged 2,305 and 4,108 GPD, respectively.

Thorntons LLC
Water Usage
12/6/2021

Address	City State Zip	Store			2020 Dec	2021 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
13935 Willowbrook Rd	Roscoe, IL 61073	181	North Park Public Water	Gallons	103,030	45,890	50,720	38,170	45,630	58,090	46,410	57,150	111,670	88,550	97,580	59,970
			Average Daily Flow/month		3322.90	1480.32	1811.43	1231.29	1521.67	1899.68	1547.00	1843.55	3602.26	2951.67	3148.39	2312.59
			Average Daily Flow													2305.85

Address	City State Zip	Store			2020 Dec	2021 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
2903 Woodlawn Rd	Lincoln, IL 62656	369	Illinios AM Water	Gallons	124,900	91,100	100,800	104,500	105,900	129,700	124,900	146,000	140,500	168,400	150,800	131,900
			Average Daily Flow/month		4029.03	2845.16	3600.00	3370.97	3530.00	4183.87	4163.33	4709.68	4532.26	5613.33	4219.35	4396.67
			Average Daily Flow													4107.80

- Our technical analysis in conjunction with Tennessee Wastewater Systems, Inc., felt such was relatively low based on the uses and I-24 truck traffic.
- Tennessee Wastewater Systems, Inc. analysis was 25,340 GP based on the following;
  - *27 Pump Islands @ 500 gpd = 13,500 gpd*
  - *Five (5) showers @ 250 gpd = 1,250 gpd*
  - *Restaurant Occupancy of 174 patrons @ 60 gpd = 10,440 gpd*
  - *Employees @ 10 per day @ 15 gpd = 150 gpd*
- Our collaborative effort with Tennessee Wastewater Systems, Inc. determined that a projected flow of 8,200 GPD or basically doubling the highest average of the 2 other Thornton facilities would be appropriate.

- Total Thornton's Refueling Center Development WWTP Flow = 8,200 gpd
- Total Derby Meadows & Thornton's Subdivision WWTP Flow = 114,000 gpd
- Waste Water Treatment Plant Design = 120,000 GPD

Section 15.3.2 Engineering Report – Preliminary Engineering Report (PER) Previously completed, submitted and technically Approved by TDEC letter dated March 3rd 2022. Final Engineering Report being submitted with Construction Plans and Specifications in accordance with permitting requirements.

Section 15.3.3 Pollutant Loading – Previously outlined and submitted in Preliminary Engineering Report with no modifications herein. Previous information presented as follows for reference. The BOD5 loading is projected to be 196.81 pounds per day.

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Project:	Derby Meadows			**Water Well within 100'** ☐ YES ☐ NO
Engineer:	Michael Shamaie			
General Scope of Project:	120,000 GPD Waste Water Treatment Plant			
Design Average Flow:	117771 GPD Organic	115965 GPD Hydraulic		
BOD_5 Loading (in lbs of BOD_5 per day)	196.81			
Maximum # of Lots or Population at Maximum Capacity:		309 Homes		
Initial # of Lots (or population):	309 Homes, Pool, Bath House, Park, Refueling Station			
Industrial Waste:	N/A			
Design Effluent Limits:	**BOD5** 10 mg/L	**TSS** 15 mg/L	**NH_3N** N/A	
Receiving Stream (provide complete path from outfall to first perennial non-intermittent waterway in the path of the projected outfall.)				
Plant Manufacturer:	Gainey's Concrete Products, LLC.			
Plant Model #:	W.O. 1200			
Materials of Construction:	Reinforced High Strength Concrete			
AERATION TANK	**Volume:**	118935 Gallons		
	Retention Time: (24 hour min.)	24 hour		
	BOD_5 Loading (lbs per 1000CF, 12.5 max.)		12.38	
	Screen or Communutor ___ YES _X_ NO			
FINAL CLARIFIER	**Surface Area:**		525	
	Surface Loading: (extended aeration plants 1000 gpd/ft² @ phf max loading)		441.77	
	Volume:		21658 Gallons	
	Scum Baffle:		40 year treated pine	
	Skimmer Through:		Airlift	
	Weir Length (ft):		44	
	Weir Loading: (at PHF) (Plant ≤ 1mgd has 20,000 gpd/ft max load) (Plant >1mgd has 30,000 gpd/ft max load)		5271	
Name of Certified Operator:				

15.4 Preliminary Treatment

Section 15.4.2 Grinder Pumps

For systems served by grinder pumps, all raw wastewater should be collected from individual buildings/dwellings and transported to the pressure or gravity system by appropriately sized pumps. For restaurants or facilities with commercial-grade kitchen facilities, grease and oil interceptors (as described in 15.4.4) should be installed prior to the grinder pump. All pumps must have adequate operating curves that allow for pumping into

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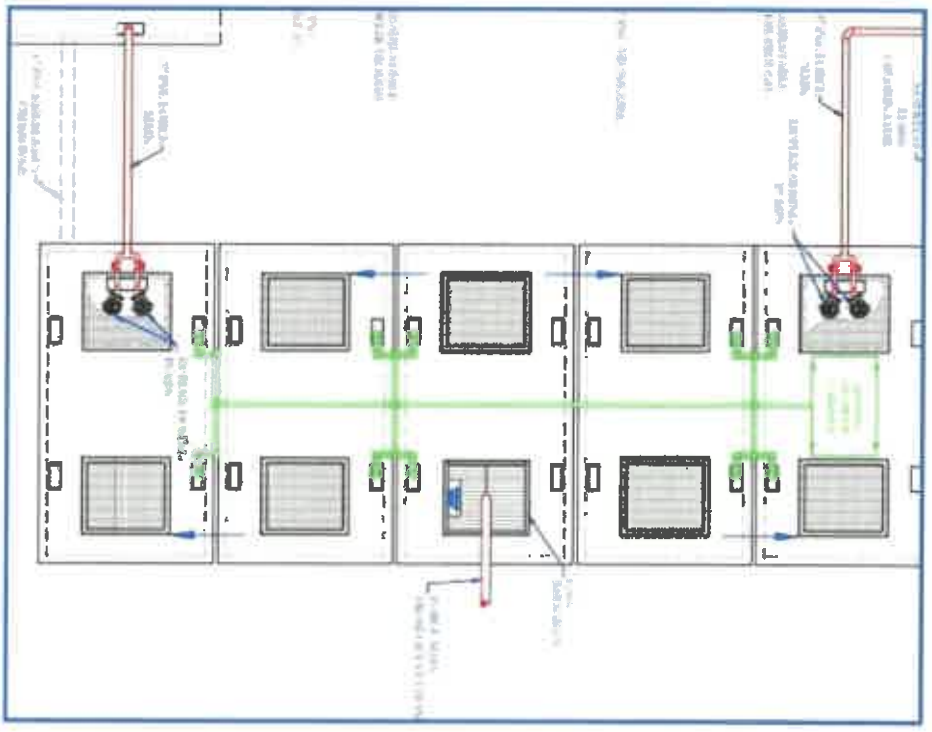
the pressurized common line under maximum head conditions. Additionally, each pump must be equipped with properly installed and approved backflow prevention assembly. Furthermore, tanks must be watertight and located above the seasonal groundwater table where possible.

Grinder pumps are being utilized at each home and facility along with low pressure sanitary sewer system to route sewage to the Flow Equalization tanks at the WWTP.

Prior to the primary wastewater treatment, sewage will enter a set of dosing system / flow equalization tanks to remove trash and normalize the flow to avoid peak surges on the treatment process. Pro2 Nano Oxygen Infusion will be performed in the flow equalization chamber prior to be dosed to the WWTP. The aerated flow equalization chamber distributes the influent evenly over the course of a day. This optimizes the efficiency of the treatment plant. Even distribution is accomplished with time-dose pumps that are equipped with high water alarm.

The proposed WWTP design includes a 25,000 Gallon Dosing / Flow Equalization chamber to equalize flow and allow adequate retention time for pre-treatment with Pro2 Nano Oxygen infusion. The 25,000-gallon Flow Equalization consist of 5 chambers as depicted below.



WWTP Flow Equalization Five (5) Chamber Design Layout

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Section 15.4.3 Grease and Oil

Facilities with commercial-grade kitchen facilities should be equipped with an effective grease and oil interceptor. Other potential sites of grease/oil production should be investigated by the design engineer. – Local code will require Grease Trap at all commercial facilities

15.5 Secondary Treatment Design

Section 15.5.1.6 Dosing Chamber

Where the treated effluent is intended to be distributed through a drain field, drip dispersal system or other land application mechanisms, a dosing chamber should be employed, sized and equipped to provide timed-dosing of the daily wastewater flow with adequate reserve storage capacity for system malfunctions. The dosing chamber should be equipped with an audible visual or other approved high-water alarm set to provide notification to the owner/operator of a malfunction when the design high water level is exceeded and the emergency reserve capacity is being used. A low-water cutoff device must be provided to prevent damage to the pump during low-water conditions. A programmable timer and control panel should be employed to regulate the dosing frequency and volume, and to record wastewater flow, the number of doses and other pertinent dosing data. Time dosing should be utilized to dose the absorption field or zones. The frequency of dosing must be based upon the soil's hydraulic loading rate and the design flow. Fields or zones should be time dosed to ensure the total twenty four (24) hour wastewater effluent flow is applied in a 24-hour period.

The proposed WWTP effluent will be routed to the drip field dosing tank and drip fields that has been constructed per and in accordance with the previous SOP. The requirements outlined herein for the Drip Field Dosing system have been satisfied and under TDEC SOP-01028.

15.6 Disinfection and Fencing

Disinfection of effluent is required prior to spray irrigation. Disinfection of effluent will be required for drip dispersal of unfenced drip irrigation if the drip field access is classified as either "Open Access" (where drip areas are used for ball fields, playgrounds, picnic areas, golf courses, etc.) or "Attractive Access" (where open spaces are maintained similar to residential lawns with easy access and with grass maintained at short heights, but with the area undeveloped for recreational purposes).

The **Derby Meadows** was approved under the Conservation Zoning regulations for Harvester, LLC which resulted in 54% of the land remained undisturbed and dedicated for

Open Space and public enjoyment. The Drip Filed area will not be fenced and will be open for public open space enjoyment.
Regardless, the effluent will be disinfected as outlined herein and per Chapter 10 of the of the ***Design Criteria for Review of Sewerage Works Construction Documents***.

The design is based on meeting reuse limits or as stated in previous correspondence per "Unrestricted Urban" per Rule 0400-40-06. The proposed WWTP effluent standard meeting the Unrestricted Urban per Rule 0400-40-06 is our effluent quality target and that coincides with TDEC's Mission to be stewards of our natural environment by protecting and promoting public health and safety.

In addition, notwithstanding any less stringent provisions established in the end user service agreement, the permittee shall comply with the following minimum standards and monitoring frequency:

	Urban Unrestricted Reuse		Urban Restricted Reuse	
Parameter	Daily Limit	Monitoring Frequency See Note 1	Daily Limit	Monitoring Frequency See Note 1
pH	6.0-9.0	Weekly See Note 2	6.0-9.0	Weekly See Note 2
$CBOD_5$ or NH3-N	10 mg/L or 5 mg/L	Weekly See Note 2	30 mg/L or 10 mg/L	Weekly See Note 2
NTU or TSS	5 NTU 5 TSS mg/L	Continuous Daily See Note 2	30 mg/L	Weekly See Note 2
E. coli	23 cfu/100 mL	See Note 3	200 cfu/100 mL	See Note 3
Chlorine residual	Minimum of 1 mg/L	See Note 3	Minimum of 1 mg/L	See Note 3

Note 1: The monitoring frequency may be increased due to special circumstances in the NPDES permit or SOP, as agreed upon in end user agreement, or as agreed by reclaimed wastewater provider.

Note 2: pH, CBOD5/NH3-N, NTU/TSS values shall be measured at the effluent sampling point of the pump station into the reclaimed water distribution system or as otherwise indicated in the SOP or NPDES permit.

Note 3: Chlorine residual limits apply only upon failure to comply with E. coli limits more than 10% of the time for the previous month after there is a demonstration that the system can meet the delivery standards. The minimum chlorine residual and E. coli shall be measured at the point of release from the reclamation system (i.e., the delivery meter) to ensure it is maintained within the distribution

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system. Chlorine and E. coli minimum frequency of measurement is based on weekly applications the previous month:

</= 100,000 gal per week Once per week when activated
>/= 100,000 gal per week Twice per week when activated
>/= 1,000,000 gal per week Daily when activated

15.9 Package Activated Sludge Plants

For any activated sludge or fixed film process, the criteria presented in Chapters 4, 5, 6, 7, 8, 10, 11, and 12 of these design criteria must be utilized for each unit process. The design should include aerobic digestion or sludge holding for sludge wasting.

The proposed Derby Meadow WWTP system and design provisions satisfies **Chapter 15, Section 15.9 Package Activated Sludge Plants** provisions and requirements.

Design Summary of Gainey Activated Sludge / Extended Aeration Waste Water Treatment Plant w/ Pro2 Nano Oxygen Infusion

Description of WWTP

Gainey's 120,000 GPD Extended Aeration Sewer Treatment Plant. The WWTP is designed to treat non-industrial sewage influent with a hydraulic loading of 120,000 GPD and a BOD concentration of 204 mg/l over 24 hours and with the addition of the NanO2 Oxygen Infusion System to provide an effluent quality of 10 mg/l of BOD 5-day, 15 mg/l TSS, 2 mg/l of NH3 and 10 mg/l of DO. The chlorine contact chamber will provide adequate disinfection (<400ppm fecal) through a hypochlorite concentration of 8mg/l to meet typical standards including a minimum retention of 30 minutes at DAF and 15 minutes at PHF.

The plant will include aeration, clarification, and a chlorine contact chamber (sized to accommodate full buildout) with a Norweco LF4800 Chlorinator. The mechanical equipment will consist of four (4) Roots blowers and motors installed on a precast slab in a control building. An electrical power source will be required to connect control panel to the power source, as well as provide a 230-volt, 3-phase power supply.

Design includes a 25,000 Gallon Dosing / Flow Equalization chamber to equalize flow and allow adequate retention time for pre-treatment with NanO2 Oxygen infusion. NanO2 oxygen infusion will be provided within the 25,000-gallon flow equalization chamber to achieve BOD reduction prior to being discharged to the WWTP.

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The WWTP package includes all equipment and precast concrete chambers including aeration equipment, diffusers, submersible pumps, and a timer to provide a controlled flow into the WWTP.

Primary Treatment

Primary treatment shall be accomplished in the aeration chamber of the facility. All incoming waste water shall enter and be retained in the aeration chamber for twenty-four (24) hours. Air shall be introduced along one wall near the bottom to produce a mixing and rolling action in the tank chambers. Two thousand one hundred (2,100) cubic feet of air shall be pumped into the aeration chamber for each pound of BOD applied per day. The spiral rolling action created by the introduction of air shall insure thorough mixing of the incoming organic material with the activated sludge present in the chamber. In addition, the spiral flow pattern shall prevent short circuiting of the flow and assure adequate retention of all organic materials.

Operating Conditions

The waste water treatment facility shall be a GAINEY model W. O.1200, as depicted and detailed on the construction plans included herewith, capable of treating 120,000 gallons per day of sanitary sewage. The proposed WWTP shall be designed and built to serve a population equivalent of 1,200 people with a total loading and treatment capability of 197.81 pounds of BOD_5 per day from the **Derby Meadows** development and the loading from the **Thornton's Refueling Center.**

Aeration

The aeration chamber shall have a capacity of **118,935 gallons** to provide twenty-four-hour retention of daily waste water flow. The chamber shall be of sufficient size to provide a minimum of eighty cubic feet of tank capacity per pound of applied BOD. Concrete fillets shall be installed in the bottom of the chamber parallel to the treatment flow to insure uniform tank roll and prevent deposition of solids. Overall design of the chamber shall be such that effective mixing shall be maintained to provide optimum treatment.

In the aeration tank, "aerobic digestion" or "wet burning" takes place. Here the pre-treated incoming wastewater is mixed and aerated by air diffusers, located in the bottom of the tank. These diffusers inject ample air to meet the oxygen demand of the aerobic digestion process as well as mix the entire tank contents.

Air Distribution Piping

Galvanized SCH40 piping and galvanized malleable iron pipe fittings shall be used throughout the air distribution system. Individual galvanized pipe unions, dresser couplings and flexible couplings with stainless steel clamps shall be provided as necessary in the air distribution piping as required to allow individual adjustment of each separate element within the system.

Primary air distribution shall be provided through a galvanized air header. The air header shall have individual drop pipes connected to the header assembly for air supply to individual diffused assemblies. Each drop pipe shall be equipped with an air adjustment valve to control air flow

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individually to each diffused assembly. In addition, a quick release coupling or union shall be provided for each pipe diffuses assembly downstream from the air adjustment valve.

Gainey has WWTP in service for over 40 years with galvanized piping since our aeration tanks provide a PH neutral environment. Initially, they had some issues around the threads but changed their procedure to spraying with galvanizing spray to increase the life expectancy. Gainey has not had any major replacements.

Air Diffusion System

Diffusers shall be provided parallel to the treatment flow in the aeration chamber. Each diffuser assembly shall be installed no more than twelve inches off the floor of the chamber nor more than twelve inches away from the chamber sidewall. Diffusers shall be constructed of SCH40 polyvinyl chloride plastic (PVC) and shall be designed to insure uniform mixing within the aeration chamber. Fine air bubble distribution effected by the diffusers shall be adequate to provide all oxygen necessary for the Aerobic Digestion process while maintaining an acceptable dissolved oxygen level in the final plant effluent. The PVC piping is SCH 40 and performs well. Since the PVC is light weight and inexpensive, when it does need replacing years down the line, the process is easy and inexpensive.

Secondary Treatment

The next step in the process takes place in the settling compartment. Here there is no circulation so any remaining solids can settle to the tank bottom and be returned to the aeration chamber by the sludge return.

Mixed liquors shall flow from the aeration chamber into the clarification chamber by hydraulic displacement. The effective holding capacity of the clarifier is calculated after excluding the lower two-thirds, by height, of the hopper(s) and shall still be of sufficient volume to provide in excess of four-hour retention of the daily flow. The clarifier chamber shall be designed so that the clarifier will successfully perform its function of solids separation without hydraulic upset even when the significant runoff period is eight (8) hours.

Clarification

A final clarification chamber shall be provided for secondary treatment of the daily flow. It shall be provided for a capacity of 21,658 gallons. The effluent weir shall be sufficient length to provide an overflow rate of 5,271 gallons per lineal foot per day at peak hourly flow and the surface area of the tank shall provide a setting rate of 442 gallons per day per square foot at peak hourly flow.

The clarifier shall be constructed of properly reinforced five thousand PSI, twenty-eight-day compression strength concrete. Each casting in the clarifier shall be monolithic unit with all four walls incorporated into the tank section. The clarifier shall consist of essentially four independent zones operating together to provide satisfactory solids separation. An inlet baffle zone shall be provided at the flow inlet to the clarification chamber. All transfer turbulence shall be dissipated upstream, of the inlet baffle and its performance shall be adequate to eliminate all turbulence

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downstream from the baffle. The area contained behind the baffle shall allow adequate capacity and retention for surfacing of all buoyant material entering the clarifier. The baffle shall extend above the surface and adequate distance to entrap all floating material and it shall extend below the transfer port a sufficient distance to eliminate passage of buoyant material or surface turbulence.

Flows shall be directed out of the inlet baffle zone into the hopper zone. All transfer shall be accomplished below the bottom of the inlet baffle into the upper one-third area of the hopper zone. In this zone, sludge shall settle by gravity to the bottom hopper(s). The hopper(s) shall have sloping sidewalls directing all sludge to the bottom near the airlift pump inlet(s). Maximum area at the base of the hopper (s) shall be one square foot. Here settled sludge shall be returned to the aeration chamber by continuous airlift pumping.

Clarified liquids shall be contained in the settling zone above the hopper area for additional gravity settling. From here they shall be hydraulically displaced to the outlet zone. The outlet zone shall consist of an adjustable side plate effluent weir trough and outlet baffle. The outlet baffle shall extend into the surface of the liquid to a point not exceeding three inches and shall extend above the surface an equal distance. The baffle shall run the entire length of the outlet zone and shall totally separate the surface liquids of the settling and outlet zones. Centered in the outlet zone parallel to the outlet baffle shall be an effluent weir trough with two adjustable v-notched side plates. The trough shall be capable of being adjusted from end to end to provide adequate fall to the plant outlet and the side plates shall each be capable of being leveled from side to side and end to end to the level of the liquid surface in the chamber.

Air Lift Sludge Return

A SCH40 PVC airlift sludge return pump shall be provided for the hopper(s) in the clarification chamber. Air shall be supplied to the airlift(s) through a secondary air distribution system connected to the main air header of the treatment plant. Individual air manifold piping shall be installed for each airlift and shall be equipped with a valve for fine adjustment or shut- off.

The airlift(s) proper shall be constructed of schedule forty galvanized steel pipe and fittings. A removable clean-out plug shall be installed at the top of the vertical airlift pipe. Piping shall be arranged so that returned sludge is deposited in the aeration chamber at a point which prevents short-circuiting and with positive visible return. The airlift pump(s) shall be designed and manufactured of adequate size pipe and with sufficient air supply to provide a pumping rate in excess of the total daily flow.

Air required to achieve this shall be provided in excess of the necessary for aeration, mixing and treatment. The airlift pump inlet(s) shall be equipped to achieve this. Brackets shall be used to position the inlet correctly at the base of the hopper. Inlets will restrict sludge flow and shall not be considered.

Air Lift Surface Skimmer

An airlift surface skimming system shall be installed in the settling zone of the clarification chamber(s). The airlift skimmer(s) shall be constructed of schedule forty PVC pipe and fittings. The

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skimmer inlet(s) shall be equipped with an adjustable cone. The inlet cone(s) shall be provided with attached flexible connector for installation and adjustment of the cone(s) on the airlift assembly.

A removable SCH40 PVC clean-out plug shall be provided at the top of the skimmer airlift pipe where it joins the horizontal discharge line. The discharge line shall run on top of the plant and return back to the aeration chamber for final discharge. The skimmer air supply connected to the main air header of the treatment plant. Air adjustment/shut-off valve(s) will be installed in the skimmer air manifold supply line(s).

Chlorination Disinfection

Disinfection of treatment plant effluent shall be done by a Norweco Model LF4600 – 4 tube chlorinator and a chlorine contact chamber. The chlorine contact chamber will have the volume of 5,500 gallons with the retention time of 30 minutes at peak hourly flow and 60 minutes at average daily flow. In addition, the baffles are placed longitudinally and meet the 30:1 ratio for length versus width.

Mechanical Equipment

Air required for the treatment process and operation of airlifts in the clarifier shall be provided by 4 model ROOTS blowers. The blower(s) shall be of the rotary positive displacement type and shall provide 245 C.F.M. of free air at the rated operating pressure of 4 PSI. The blower unit shall be provided with inlet air filter silencer(s), discharge flexible coupling connector to air header assembly. If more than one blower is provided check valves shall be included in the discharge piping. Blower connection to the drive motor(s) shall be conventional v-belts power transmission drive assembly.

Four (4) seventeen hundred fifty RPM 230 V, Three Phase, 60 Hz, 10 horsepower, 37.2 amps for 230 V, 3-Phase 59-URAI shielded, drip-proof electric motor(s) shall be used to drive the blower(s). When operation at the rated horsepower the motor(s) shall reach maximum speed that shall exceed ninety-seven percent of the reference synchronous speed. The motor(s) for the facility shall be designed and rated for continuous duty applications and shall not overload or exceed motor nameplate ratings when operating as outlined for this facility.

Plant Start-up

Wastewater treatment plant start-up is simply balancing the plant's variable capacities, such as mixing, aeration, and running time, against the load of the facility it serves. Since no two plant loads are ever exactly alike, it is impossible at the time a plant is installed to pre-set it to do the best job it is capable of. At first, all you can do is analyze the load, choose the correct plant size, and make some initial equipment settings. From here on out it is a matter of observing the plant's performance closely for up to ten weeks, and making adjustments based on these observations. Fine tuning a plant to accommodate the influent load is called plant "start-up." Plant start-up must be successfully completed before any plant will do the job it was intended to do. There is no question about the fact that all plants must receive regular start-up attention if they are to perform correctly. A conscientious start-up program will quickly bring the WWTP up to peak operating efficiency.

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Start-Up Check List

Adjustments of the WWTP during the start-up period are based mainly on the appearance of the plant and its effluent. Rates of aeration and sludge return should be adjusted until the plant reaches a level of efficient operation.

The check list given here contains the start-up information needed to make plant adjustments and give each plant the "fine tuning" it needs to operate at peak efficiency. Normally the start-up adjustments given here are all you will need.

Influent Color	Aeration Tank Color	Settling Tank Color	Color of Return Sludge	Odor	Condition	Adjustment
Gray	Chocolate Brown	Clear	Chocolate Brown	Earthy	Good Operation	None
Gray	Chocolate Brown	Clear	Chocolate Brown	Earthy	Excessive foaming	Install or operate spray system
Gray	Chocolate Brown	Murky	Light Brown	Musty	Solids in effluent	Reduce sludge return rate
Gray	Light Brown	Light Brown	Light Brown	Musty	Floating solids in settling compartment	Scrape hopper. Skim settling tank
Gray	Light Brown	Light Brown	.....	Slightly septic	No sludge return	Backwash sludge return. Scrape hopper
Gray	Red	Reddish	Light Brown	None	Over aeration	Reduce aeration
Gray	Black	Black	Black	Septic	Insufficient aeration	Increase aeration.

A great deal of the time taken in plant start-up is spent developing a good activated sludge culture. In some situations, such as the early opening of a restaurant, the owner may want to accelerate the start-up process. This can be done by "seeding" the plant which is accomplished by taking sludge from a plant already in operation and adding it to the new plant. Although seeding can speed up a start-up program, it should be remembered that even a "seeded" plant will deteriorate and not work properly if it does not receive the necessary start-up adjustments.

Air Mixing and Cycle Adjustments

Both the level of dissolved oxygen and the degree of mixing within Jet's Aeration Chamber are determined by the amount of air being diffused. For this reason, adjusting the aeration rate is the principal technique in plant start-up.

Minor air adjustments to provide even mixing can be made by regulating the individual valves for each diffuser bar assembly. Larger air adjustments, to alter the aeration rate, require the use of a time clock. The time clock is supplied as standard equipment on all plants. These time clocks regulate the air supply by controlling the "on" and "off" cycles of the blower. Time clocks are factory set to operate fifteen minutes out of every half hour and, although they can run longer or on other settings.

The individual air valves should be used to regulate the air flow to provide even mixing. Even mixing simply means that the air should move the tank contents so that they are rolling evenly all

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along the tank wall. The valves should never be "throttled down," however. If the aeration rate needs to be reduced or increased, it should be done primarily by regulating the time clocks. By using a time clock to regulate the aeration cycle rather than throttling down the valves, it is possible to maintain high mixing velocities in the aeration chamber and still control and maintain a desired level of dissolved oxygen.

Any increase or reduction in the time cycle should equal 10% of the total running time. After a change is made, the plant should always be permitted to run at least 48 hours before any further adjustment. If the adjustment has been sufficient, improvement should be evident in the plant effluent within 48 hours.

Sludge Return Rate

An important factor in the treatment process is the return of the settled, activated sludge from the settling tank to the aeration tank. The Sludge-Return Assembly, located in the final settling tank, is operated with air from the blower. This air is injected into the sludge return assembly near the bottom of the hopper, causing settled sludge to be drawn in and up the pipe, where it is discharged back into the aeration chamber. A small valve installed on the sludge-return airline is used to adjust the return rate. The sludge-returns are capable of pumping in excess of the total daily plant flow but normally they are adjusted to pump considerably less.

Initially the sludge-return airline valve should be turned all the way open. It should be left open for the first week or until the plant begins building up solids. This can be determined by the appearance and odor of the mixed liquor. As solids start to develop, the contents of the aeration chamber should lose their gray color and appear light brown. They should also develop a somewhat "earthy" odor and, as they continue to build up, the color should change to a richer brown.

An excessive sludge-return rate will cause the plant to lose solids over the weir. This can be easily detected by observing the effluent. If the sludge return is pumping too fast, it does not give the sludge time to settle, and creates a flow through the final tank which stirs up the solids and causes them to be discharged from the plant. If this happens, the air valve should be turned down one quarter turn each day until the plant stops losing solids. On the other hand, the return should never be adjusted too low and this should be checked by seeing that the end of the sludge-return outlet is never less than 1/4 full.

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Operation Check List

Influent Color	Aeration Tank Color	Settling Tank Color	Color of Return Sludge	Odor	Condition	Adjustment
Gray	Chocolate Brown	Clear	Chocolate Brown	Earthy	Good Operation	None
Gray	Chocolate Brown	Clear	Chocolate Brown	Earthy	Excessive foaming	Install or operate spray system
Gray	Chocolate Brown	Clear	Chocolate Brown	Earthy	Floating lumps of grease in setting tank	Skim settling tank frequently. Clean or install grease trap
Gray	Chocolate Brown	Clear	Chocolate Brown	Musty	Layer of sludge visible near surface of settling tank	Increase sludge return rate. Scrape hopper
Gray	Chocolate Brown	Murky	Light Brown	Musty	Solids in effluent	Reduce sludge return rate
Gray	Light Brown	Light Brown	Light Brown	Slightly Musty	Floating solids in settling compartment	Scrape hopper. Skim setting tank
Gray	Light Brown	Light Brown	----------	Slightly septic	No sludge return	Backwash sludge return. Scrape hopper
Gray	Light Brown	Brown slime floating on surface	Light Brown	None	Plant under-loaded	Reduce running time
Gray	Light Brown	Black	Black	Slightly septic	Inadequate return of sludge	Increase sludge return rate.
Gray	Light Brown	Clear	Light Brown	Musty	Uneven tank oil	Adjust valves until roil (mixing) is uniform
Gray	Gray	Murky	Gray	None	Insufficient solids in plant	Increase aeration. Increase sludge return rate.
Gray	Red	Reddish	Light Brown	None	Over aeration	Reduce aeration
Gray	Black	Black	Black	Septic	Insufficient aeration	Increase aeration.
Gray	Black	Black	----------	Septic	No air rising in tank. Blower not running.	Press reset on starter. Check V-belt. Check circuit breaker. Check power.
Black	Black	Black	Black	Septic	Septic wastewater	Maximum aeration. Check incoming flow for toxic material such as bleach, gasoline, etc.

Warranty

The manufacturer shall warrant the equipment being supplied for one year from install against defects in workmanship and materials when operated under normal use and service, and when maintained and operated by a licensed sewer maintenance operator. The warranty shall not cover any item which has been subjected to external damage, disassembled, modified, and/or repaired by unauthorized persons, flooded, or otherwise mistreated.

Manufacturer: **Gainey's Concrete Products, Inc.** located at 28021 Coker-Vall Road, Holden, Louisiana 70744; Phone (225) 567-2700; Fax (225) 567-3089

Contractor will also provide a performance one-year warranty of the WWTP system to meet TDEC Effluent Permit Limits.

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Gainey's 120,000 GPD Extended Aeration Sewer Treatment Plant. The WWTP is designed to treat non-industrial sewage influent with a hydraulic loading of 120,000 GPD and a BOD concentration of 204 mg/l over 24 hours to provide an effluent quality of 5 mg/l of BOD 5-day, 7.5 mg/l TSS, 2 mg/l of NH3 and 10 mg/l of DO. The chlorine contact chamber will provide adequate disinfection (<400ppm fecal) through a hypochlorite concentration of 8 mg/l to meet typical standards including a minimum retention of 60 minutes at DAF and 30 minutes at PHF.

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Exhibits

APPENDIX 1-D-4
FINAL DESIGN SUBMISSION ADDITIONAL REVIEW GUIDANCE - CHECKLIST
LEGEND: SEE APPENDIX 1-D

		4-step process req'd				4-step process optional. Final ER or App 1-D-5 req'd				
		Treatment				Non-treatment				
ITEM	DESCRIPTION	TF	DC	IW	LA	SLS	FM	GR	RH	RU
I.	FINAL PLANS REVIEW EMPHASIS: • PUBLIC HEALTH, OPERATOR AND EQUIPMENT SAFETY; • IMPLEMENTATION OF PERMIT OBJECTIVES (AND CONFORMANCE TO PRELIMINARY DESIGN SUBMISSION IF APPROPRIATE); • DEMONSTRATE APPROPRIATE DETAIL TO MEET GENERALLY ACCEPTED ENGINEERING STANDARDS FOR WASTEWATER ENGINEERING; • PROVIDE FOR MAINTAINABLE OPERATION OF THE PLANT. IF PRELIMINARY DESIGN STAGE SUBMISSION HAS NOT BEEN SUCCESSFULLY COMPLETED, THE REQUIREMENTS IN APPENDIX 1-D-2 MUST ALSO BE MET. RECORD DRAWINGS SHALL HAVE THE SAME FEATURES WITH AN EMPHASIS ON CRITICAL ELEVATIONS AND EQUIPMENT LOCATIONS, ESPECIALLY BURIED FEATURES NECESSARY FOR REPAIRS OR MAINTENANCE.) — OS – Upon Completion of WWTP									
	Cover letter: Follow guidance for Preliminary Plans submittal in Appendix 1-D-2.									
A.	Implement the approved preliminary plans – No major modifications	X	X	X	X	X	X	X	X	X
B.	Safety features included: handrails; chemical storage compatibility; eye wash stations; egress; ventilation; explosive safety for electrical components in potentially explosive environments (NFPA 820)	X	X	X	?	X	?			X
C.	Maintainability: adequate equipment isolation; redundancy; drains for tanks and lines to support repair; accessibility; lift points, cranes, rails, & clearance for equipment removal, duplication/redundancy for maintenance during operations	X	X	X	X	X	?			X
D.	Piping and storage tank material-liquid compatibility; secondary containment	X		X		X				
E.	Erosion control/ construction permit/SWPPP/ARAP system implementation – Existing Permit	X	X	X	X	X	X	X	X	X
F.	100 year flood elevation; setbacks for streams (500 year flood elevation for USDA RDA projects.) – FEMA Map Included	X	X	X	X	X	X	X		X
G.	Reference to seismic design standards if applicable. N/A	X	?	X		X				?
H.	Biosolids and residual handling equipment. N/A	X	?	X						
I.	All plan sheets sealed by professional engineer from TN; legible at the half-size (11x17 sheet)	X	X	X	X	X	X	X	X	X
J.	Plan views, elevations, sections, profiles, penetrations, overlapping features and supplementary views properly shown to avoid ambiguity; clearly distinguish between existing and proposed structures and those to be demolished or abandoned in place;	X	X	X	?	X	?	?	?	X

		TF	DC	IW	LA	SLS	FM	GR	RH	RU
	existing interferences; proper clearances between potable water and non-potable water lines									
K.	Survey data for property on which features are to be constructed; owners of adjacent property; easements (permanent and temporary construction easements coordinated with boundaries of construction.	X	X	X	X	X	X	X	X	X
L.	Existing and final contours on site plans; critical pipe inverts	X	X	X	X	X	?	?	?	X
M.	Geotechnical boring locations covered in specifications	X	X		?	X	?	?	?	?
N.	Anti-flotation considerations on buried features.	X	X		?	X	?	?	?	?
O.	Final Process Flow Diagram/P&ID	X	X	X	X	X				X
P.	Vehicular accesses for personnel and bulk material handling; security fencing and exterior lighting.	X	X	X	X	X				X
Q.	Permit required monitoring and sampling locations included at appropriate and accessible locations	X	X	X	X					X
II.	**SPECIFICATIONS:** Technical performance-based specifications may not be applicable if equipment sole-sourced and specific equipment called out on drawings; or if equipment and material are included in standard specifications previously approved; or implemented as notes on the drawings. Procurement section may not be necessary if the project is not being bid.									
A.	Performance or specific equipment called out in the technical specifications for all critical process equipment; major equipment performance matches Engineering Report capacities.	X	X	X	X	X	X	X	X	X
B.	SCADA or instrumentation and controls sequence of operation included. (Sequence of operation should define the logic to be implemented in the automatic or manual control of the system. Places requiring or allowing operator intervention or override should be identified. Initial alarm set-points and the level of adjustment provided for should be indicated. Description of operation should be included in engineering report if not provided in the specifications.)	X	X	X	X	X				?
C.	Storm water permits, SWPPP, ARAP provisions implemented	X	X	X	X	X	X	X	?	X
D.	Procurement methodology: Specifications should insure that the procurement has adequate checks to ensure clear lines of responsibility and accountability and that procurement outside the contract meets approved plans, engineering report and specification requirements.	X	?		?	X	X	X	X	X
F.	Specifications should clearly define responsibilities of owner, engineer, inspector, and contractor for: • substantial completion, • warranty period and responsibilities, • punchlist generation, • delivery, acceptance, start-up, demonstration of equipment performance, • delivery of record drawings and operation and maintenance manuals; and • training of operation and maintenance personnel	X	?		?	X	X	X	X	X

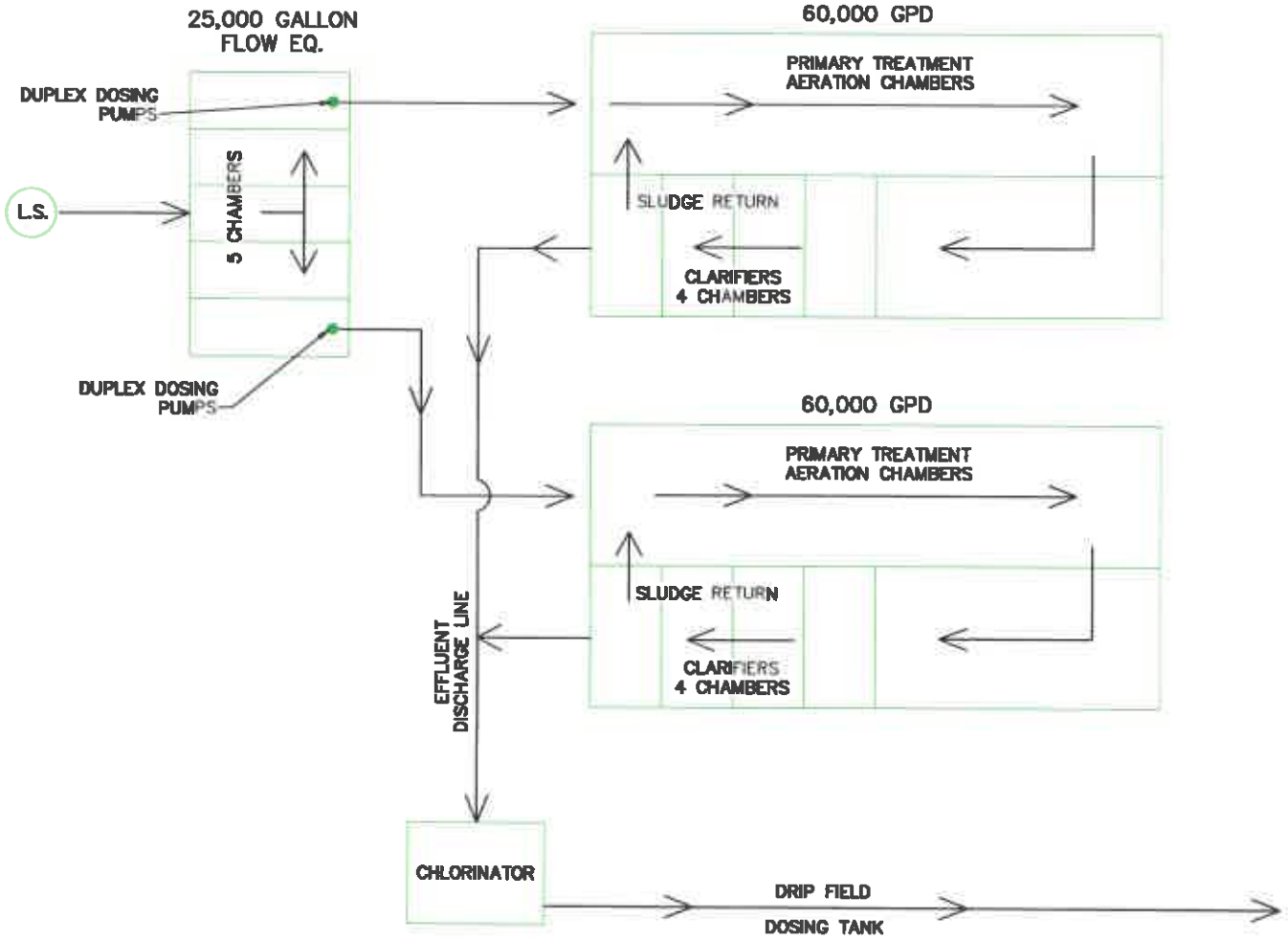
G. Recommendations:

- specifications include requirement for progress meetings;
- maintenance of "red line" drawings on-site to record field changes;
- list of equipment submittals required for submission before purchase;
- clear delineation of owner, contractor, engineer and inspector responsibilities and authority
- withholding final payment until record drawings and O&M manuals are provided

ITEM	DESCRIPTION	TF	DC	IW	LA	SLS	FM	GR	RH	RU
III.	**Engineering Report** – Final Engr. Report submitted Revisions only required if changes from the preliminary submission have occurred that alter the basis of design. A final engineering report should be a permanent reference for the project just as the record drawings are and both are the basis for O&M manuals, training and considerations for process improvements and facility expansion planning.	X	X	X	X	X	X	X	X	X

ABBREVIATIONS/DEFINITIONS	
ADDWF	Average Daily Dry Weather Flow (average daily flow of lowest 5 day consecutive period within last 5 years or since last major rehabilitation or construction affecting collection system flows; assumed to be baseline flow without significant rain derived Inflow and infiltration addition (RDI&I))
ADF	Average Daily Flow over 5 years or since the last major rehabilitation or construction affecting collection system flows
Design Flow	Average Daily Flow for which the plant is designed; assumed to include projected growth for 20 years unless otherwise indicated
Peak Flow	Highest 15 minute flow observed in last 5 years
Influent Loads	Raw wastewater flow characteristics in terms of [mg/L] of the constituents; constituents of concern include CBOD5, TSS, NH3-N, TN, TP; depending on process or collection system can include other parameters of concern; pH in common pH units; temperature in degrees C

120,000 GPD WWTP FLOW SCHEMATIC
DERBY MEADOWS
COOPERTOWN, TENNESSEE



NO SCALE

Landmark

120,000 GPD WWTP FLOW SCHEMATIC
DERBY MEADOWS
COOPERTOWN, TENNESSEE

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01-21-1998

Permit #	DESIGN CRITERIA - DERBY MEADOWS DEVELOPMENT										
Facility Name:	DERBY MEADOWS DEVELOPMENT - Mass Balance Analysis Daily Basis										
Outfall #: 1	RAW WASTE							EFFLUENT AFTER DISINFECTION PRIOR TO OUTFALL			
Parameter	POP. EQIV.	FLOW GPD	BOD5		TSS		NH3	BOD5		TSS	NH3
Units		X Thousand	MG/L	LBS/DAY	MG/L	LBS/DAY	MG/L	MG/L	LBS/DAY	MG/L	MG/L
2/1/2022											
DERBY MEADOWS DEV.	1057	105.7	203.7	179.7	239.7	211.4	203.7	22.1	19.5	22.1	8.8210878
THORNTON'S REFUELING CENTER	82	8.2	509.3	34.85	599.1	41	509.3	1.7	0.1	1.7	0.6843228
TOTAL	1139	113.9	713	214.5	838.8	252.4	713.0	23.8	19.6	23.8	9.5054106
Target Limits								5		5	2

Commercial Facility - Factor of 2.5

1 lb/gal = 119826.427301 mg/L

BOD = 0.17 lbs/day/person
TSS = 0.2 lbs/day/person
NH3 = 0.17 lbs/day/person
TKN = 0.029 lbs/day/person
TP = 0.007 lbs/day/person
FOG = 0.066 lbs/day/person
COD = 0.195 lbs/day/person

Appendix A

Site Location Map, Exhibits & Information

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DERBY MEADOWS
COOPERTOWN, TN
SITE MAP

GRAPHIC SCALE 1' = 1000'

0 1000 2000

Landmark
ENGINEERING GROUP
3440 38TH AVENUE, SUITE 4 MOLINE, IL. 61265
(309) 755-3400 FAX (309) 755-5522
CIVIL ENGINEERING AND LAND SURVEYING
TENNESSEE DESIGN FIRM NUMBER F-21044

DATE: 10/23/2021
JOB NO.: 01-21-1598

U.S. Fish and Wildlife Service

National Wetlands Inventory

Derby Meadows, Coopertown, TN

October 23, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

National Flood Hazard Layer FIRMette

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

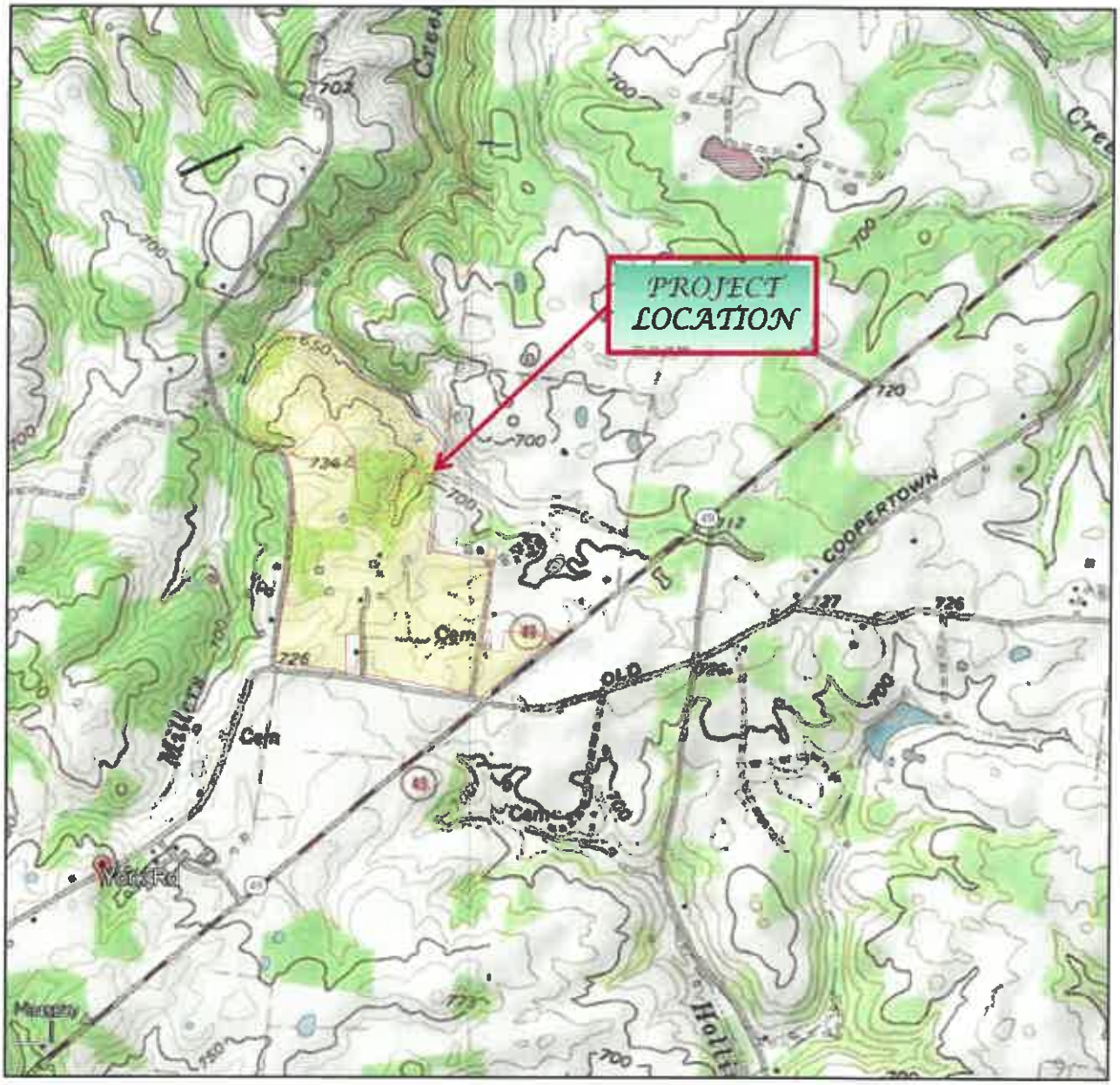
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2021 at 8:16 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



USGS Map

Derby Meadows
York Road & Hwy 49 W
Coopertown, TN

Landmark Engineering Group, Inc.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Appendix B

Reference Data

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EX. 19B

STATE OF 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

April 5, 2022

Mr. Jeff Risden
Chief Executive Officer
Tennessee Wastewater Systems, Inc.
e-copy: jeff.risden@adenus.com
849 Aviation Pkwy
Smyrna, TN 37167

Subject: **Draft of State Operating Permit No. SOP-22001**
Tennessee Wastewater Systems, Inc.
Derby Meadows
Pleasant View, Robertson County, Tennessee

Dear Mr. Risden:

Enclosed please find one copy of the draft state operating permit, which the Division of Water Resources (the division) proposes to issue. The issuance of this permit is contingent upon your meeting all of the requirements of the Tennessee Water Quality Control Act and the rules and regulations of the Tennessee Water Quality, Oil and Gas Board.

If you disagree with the provisions and requirements contained in the draft permit, you have thirty (30) days from the date of this correspondence to notify the division of your objections. If your objections cannot be resolved, you may appeal the issuance of this permit. This appeal should be filed in accordance with Section 69-3-110, Tennessee Code Annotated.

If you have questions, please contact the Nashville Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Ms. Anastasia Sharp at (615) 532-1508 or by E-mail at *Anastasia.Sharp@tn.gov*.

Sincerely,

Brad Harris, P.E.
Manager, Land-Based Systems

Enclosure

cc: Permit File
Nashville Environmental Field Office
Mr. Matthew Nicks, Adenus Group, LLC, Matthew.Nicks@adenus.com

STATE OF 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

Permit No. SOP-22001

PERMIT

For the operation of Wastewater Treatment Facilities

In accordance with the provision of Tennessee Code Annotated section 69-3-108 and Regulations promulgated pursuant thereto:

PERMISSION IS HEREBY GRANTED TO

Tennessee Wastewater Systems, Inc.
Derby Meadows
Pleasant View, Robertson County, Tennessee

FOR THE OPERATION OF

Effluent collection, extended aeration decentralized treatment, chlorine disinfection and drip irrigation system located at latitude 36.427242 and longitude -87.005931000000004 in Robertson County, Tennessee to serve approximately 309 homes in the Derby Meadows subdivision(s) and a refueling station. The design capacity of the system is 0.1139 MGD and will be dispersed on approximately 13 acres of suitable soils.

This permit is issued as a result of the application filed on March 18, 2022, in the office of the Tennessee Division of Water Resources. This permit is contingent on the submission and department approval of construction plans, specifications and other data in accordance with rules of the department. Updated plans and specifications must be approved before any further construction activity.

This permit shall become effective on:

This permit shall expire on:

Issuance date:

for Jennifer Dodd
Director

A. GENERAL REQUIREMENTS

The treatment system shall be monitored by the permittee as specified below:

Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
Oxygen, dissolved (DO)	>=	3.0	mg/L	Grab	Five Per Week	Instantaneous Minimum
BOD, 5-day, 20 C	<=	30	mg/L	Grab	Twice Per Month	Monthly Average
BOD, 5-day, 20 C	<=	45	mg/L	Grab	Twice Per Month	Daily Maximum
pH	>=	6.0	SU	Grab	Two Per Week	Daily Minimum
pH	<=	9.0	SU	Grab	Two Per Week	Daily Maximum
Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Twice Per Month	Monthly Average
Total Suspended Solids (TSS)	<=	45	mg/L	Grab	Twice Per Month	Daily Maximum
Settleable Solids	<=	1.0	mL/L	Grab	Two Per Week	Daily Maximum
Flow	Report	-	Mgal/d	Instantaneous	Five Per Week	Daily Maximum
Flow	Report	-	Mgal/d	Instantaneous	Five Per Week	Monthly Average
E. coli	<=	941	#/100mL	Grab	Twice Per Month	Daily Maximum

Sampling requirements in the table above apply to effluent being discharged to the drip irrigation plots.

This permit allows the operation of a wastewater collection, treatment, and storage system with disposal of treated wastewater through approved land application areas. There shall be no discharge of wastewater to any surface waters or to any location where it is likely to enter surface waters. There shall be no discharge of wastewater to any open throat sinkhole. In addition, the drip irrigation system shall be operated in a manner preventing the creation of a health hazard or a nuisance.

The land application component shall be operated and maintained to ensure complete hydraulic infiltration within the soil profile, transmission of the effluent away from the point of application, and full utilization of the soil profile as a portion of the treatment system.

Instances of surface saturation, ponding or pooling within the land application area as a result of system operation are prohibited. Instances of surface saturation, ponding or pooling shall be promptly investigated and noted on the Monthly Operations Report. The report shall include details regarding location(s), determined cause(s), the actions taken to eliminate the issue, and the date the corrective actions were made. Any instances of surface saturation, ponding or pooling not associated with a major precipitation event not corrected within three days of discovery shall be reported to the local Environmental Field Office at that time for investigation. Surface saturation, ponding or pooling resulting in the discharge of treated wastewater into Waters of the State or to locations where it is likely to move to Waters of the State shall be immediately reported to the local Environmental Field Office, unless the discharge is separately authorized by a NPDES permit."

All drip fields ~~shall~~ are recommended to be fenced sufficiently to prevent or impede unauthorized entry as well as to protect the facility from vandalism. Fencing shall be a minimum of four feet in height. Fencing shall be constructed of durable materials. Gates shall be designed and constructed in a manner to prevent or impede unauthorized entry. All designs are subject to division approval. Fence shall be installed prior to beginning of operation. Drip field fencing shall not be required if effluent meets "Unrestricted Urban" per Rule 0400-40-06.

The permittee must disinfect the wastewater in order to meet the above *E. Coli* limit.

All drip lines shall be buried and maintained 6 to 10 inches below the ground surface.

The site shall be inspected by the certified operator or his/her designee, at a minimum, once per fourteen days (default) OR in accordance with an operating and maintenance inspection schedule in the permit administrative file record. The default inspection frequency will apply if an operating and maintenance inspection schedule is not submitted to be a part of the permit administrative file record. The operating and maintenance inspection schedule shall at a minimum evaluate the following via onsite visits or telemetry monitoring or a combination of the two:

- the condition of the treatment facility security controls (doors, fencing, gates, etc.),
- the condition of the drip area security controls (doors, fencing, gates, etc.),
- the condition of the site signage,
- the operational status of the mechanical parts of the treatment system (pumps, filters, telemetry equipment, etc.)
- the condition of the UV bulbs (if applicable)
- the condition of the land application area including the location of any ponding
- the name of the inspector
- the description of any corrective actions

Submission of the schedule, or revisions to the schedule, may be submitted to the division electronically. The schedule shall be submitted on or before the effective date of the permit.

The permittee is responsible for maintaining evidence that the schedule, or revisions, have been submitted to the division.

B. MONITORING PROCEDURES

1. Representative Sampling

Samples and measurements taken in compliance with the monitoring requirements specified above shall be representative of the volume and nature of the monitored discharge, and shall be taken at the following location(s):

Effluent to drip irrigation plots.

2. Test Procedures

Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR, Part 136.

C. DEFINITIONS

The "daily maximum concentration" is a limitation on the average concentration, in milligrams per liter, of the discharge during any calendar day.

The "***monthly average concentration***", other than for *E. coli* bacteria, is the arithmetic mean of all the composite or grab samples collected in a one-calendar month period.

A "grab sample" is a single influent or effluent sample collected at a particular time.

For the purpose of this permit, "***continuous monitoring***" means collection of samples using a probe and a recorder with at least one data point per dosing cycle.

A "quarter" is defined as any one of the following three-month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, and/or October 1 through December 31.

"Wastewater" for the purpose of this permit means "sewage" as defined in TCA 69-3-103

D. REPORTING

1. Monitoring Results

Monitoring results shall be recorded consistent with the general requirements imposed in Part A above OR in accordance with the operating and maintenance inspection schedule in the permit administrative file record and submitted quarterly.

Submittals shall be postmarked no later than 15 days after the completion of the reporting period. A copy should be retained for the permittee's files. Monitoring results shall be reported in a format approved by the division. Operation reports and any communication regarding compliance with the conditions of this permit must be sent to:

Division of Water Resources
Nashville Environmental Field Office
711 R.S. Gass Boulevard
Nashville, TN 37216

Sampling results may be submitted electronically to: DWRWW.Report@tn.gov.

The first operation report is due on the 15th of the month following the quarter containing the permit effective date. Until the construction of the treatment system is complete and the treatment system is placed into operation, operational reports shall report "monitoring not required".

2. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in Rule 0400-40-05-.07(2)(h)2, the results of such monitoring shall be included in the calculation and reporting of the values required in the Quarterly Operation Report. Such increased frequency shall also be indicated.

3. Falsifying Reports

Knowingly making any false statement on any report required by this permit may result in the imposition of criminal penalties as provided for in Section 69-3-115 of the Tennessee Water Quality Control Act.

4. Signatory Requirement

All reports or information submitted to the commissioner shall be signed and certified by the persons identified in Rules 0400-40-05-.05(6)(a-c).

PART II

A. GENERAL PROVISIONS

1. Duty to Reapply

The permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Resources (the "Director") no later than 180 days prior to the expiration date.

2. Right of Entry

The permittee shall allow the Director, or authorized representatives, upon the notification of permittee and presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;

b. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and

c. To sample at reasonable times any discharge of pollutants.

3. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Resources.

4. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.

The monitoring frequency stated in this permit shall not be construed as specifying a minimum level of operator attention to the facility. It is anticipated that visits to the treatment facility by the operator will occur at intervals frequent enough to assure proper operation and maintenance, but in no case less than one visit every fourteen days OR in accordance with an operating and maintenance inspection schedule in the permit administrative file record. If monitoring reports, division's inspection reports, or other information indicates a problem with the facility, the permittee may be subject to enforcement action and/or the permit may be modified to include increased parameter monitoring, increased monitoring frequency or other requirements as deemed necessary by the division to correct the problem. The permittee shall ensure that the certified operator is in charge of the facility and observes the operation of the system frequently enough to ensure its proper operation and maintenance regardless of the monitoring frequency stated in the permit

Dilution water shall not be added to comply with effluent requirements.

5. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

6. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

7. Other Information

If the permittee becomes aware that he failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he shall promptly submit such facts or information.

B. CHANGES AFFECTING THE PERMIT

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

2. Permit Modification, Revocation, or Termination

a. This permit may be modified, revoked and reissued, or terminated for cause as described in Section 69-3-108 (h) of the Tennessee Water Quality Control Act as amended.

b. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

3. Change of Ownership

This permit may be transferred to another person by the permittee if:

a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

b. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and liability between them; and

c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

C. NONCOMPLIANCE

1. Effect of Noncompliance

Any permit noncompliance constitutes a violation of applicable State laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the appropriate Division environmental field office within 24 hours from the time the permittee becomes aware of the circumstances. (The environmental field office should be contacted for names and phone numbers of emergency response personnel.)

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

i. A description of the discharge and cause of noncompliance;

ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and

iii. The steps being taken to reduce, eliminate, and prevent recurrence of the non complying discharge.

b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.a. above, the permittee shall report the noncompliance on the Quarterly Operation Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

3. Overflow

a. "*Overflow*" means the discharge of wastewater from any portion of the collection, transmission, or treatment system other than through permitted outfalls.

b. Overflows are prohibited.

c. The permittee shall operate the collection system so as to avoid overflows.

d. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report submitted to the local TDEC Environmental Field Office on a quarterly basis. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

e. In the event that more than 5 overflows have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium or completion of the actions identified in this paragraph, the permittee may request a meeting with the Division of Water Resources EFO staff to petition for a waiver based on mitigating evidence.

4. Upset

a. "*Upset*" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee

demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:

i. An upset occurred and that the permittee can identify the cause(s) of the upset;

ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;

iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and

iv. The permittee complied with any remedial measures required under "Adverse Impact."

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

6. Bypass

a. "***Bypass***" is the intentional diversion of wastewater away from any portion of a treatment facility.

b. Bypasses are prohibited, unless:

i. The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

iii. For anticipated bypass, the permittee submits prior notice, if possible at least ten days before the date of the bypass; or

iv. For unanticipated bypass, the permittee submits notice of an unanticipated bypass within 24 hours from the time that the permittee becomes aware of the bypass.

c. A bypass that does not cause effluent limitations to be exceeded may be allowed only if the bypass is necessary for essential maintenance to assure efficient operation.

d. "Severe property damage" when used to consider the allowance of a bypass means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

D. LIABILITIES

1. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law.

PART III
OTHER REQUIREMENTS

A. CERTIFIED OPERATOR

The waste treatment facilities shall be operated under the supervision of a Biological Natural System certified wastewater treatment operator and collection system shall be operated under the supervision of a the grade I certified collection system operator in accordance with the Water Environmental Health Act of 1984.

B. PLACEMENT OF SIGNS

The permittee shall place a sign at the entrance to the land application area if fenced or all reasonsable approaches to the land application area. The sign should be clearly visible to the public. The minimum sign size should be two feet by two feet (2' x 2') with one inch (1") letters. The sign should be made of durable material

RECLAIMED WASTEWATER

DRIP IRRIGATION
(PERMITTEE'S NAME)
(PERMITTEE'S PHONE NUMBER)
TENNESSEE DIVISION OF WATER RESOURCES
Nashville Environmental Field Office
PHONE NUMBER: 1-888-891-8332

No later than sixty (60) days from the effective date of the permit, the permittee shall have the above sign(s) on display in the location specified. New facilities must have the signs installed upon commencing operation.

C. ADDITION OF WASTE LOADS

The permittee may not add wasteloads to the existing treatment system without the knowledge and approval of the division.

D. SEPTIC (STEP) TANK OPERATION

Not Applicable – using grinder pumps and low pressure sewer system.

The proper operation of this treatment system depends, largely, on the efficient use of the septic tank. The solids that accumulate in the tank shall be removed at a frequency that is sufficient to insure that the treatment plant will comply with the discharge requirements of this permit.

E. SEPTAGE MANAGEMENT PRACTICES

The permittee must comply with the provisions of Rule 0400-48-01-.22. If the septage is transported to another POTW for disposal, the permittee shall note the amount of septage wasted in gallons and name of the facility the hauler intends to use for disposal of the septage on the monthly operation report. Sludge or any other material removed by any treatment works must be disposed of in a manner which prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.

F. OWNERSHIP OF THE TREATMENT FACILITIES

a. The permittee shall own the treatment facilities (and the land upon which they are constructed) including the land to be utilized for drip or spray irrigation. Evidence of ownership of the treatment facility and land application site(s) must be furnished to the division for approval prior to initiation of operation the wastewater collection and treatment system for sewer service to any structure.

b. Where the treatment facility serves private homes, condominiums, apartments, retirement homes, nursing homes, trailer parks, or any other place where the individuals being served have property ownership, rental agreements, or other agreements that would prevent their being displaced in the event of abandonment or noncompliance of the sewerage system, ownership of the treatment facilities must be by a municipality, a public utility, a wastewater authority, or a

privately owned public utility (having a Certificate of Convenience and Necessity from the Tennessee Public Utility Commission) or another public agency.

Attachment 1

RATIONALE

Tennessee Wastewater Systems, Inc.
STATE OPERATION PERMIT NO. SOP-22001
Pleasant View, Robertson County, Tennessee

Permit Writer: Ms. Anastasia Sharp

FACILITY CONTACT INFORMATION:
Mr. Jeff Risden
Chief Executive Officer
Phone: (615) 220-7171
jeff.risden@adenus.com
York Road & State Route 49W
Smyrna, TN 37167

Activity Description:	Treatment of domestic wastewater via a decentralized waste water system to support construction of effluent collection, extended aeration decentralized treatment, chlorine disinfection and drip irrigation to service the Derby Meadows and Thornton's developments
Facility location:	Latitude 36.427242 and Longitude -87.005931000000004
Name of the nearest stream:	No discharge allowed.
Treatment system:	effluent collection, extended aeration decentralized treatment, chlorine disinfection and drip irrigation
Permit period:	This permit will be issued for a five year period effective from the issuance date on the title page.
Terms & Conditions:	BOD_5 is a standard measure of sewage strength. The 45 mg/L daily maximum limit is the required treatment standard for domestic waste water in Tennessee. Ammonia and BOD5 reporting serve to demonstrate the treatment system is meeting minimum treatment standards. Land application, versus stream discharge, enables reduced monitoring frequency for these parameters. Narrative conditions for drip disposal and septage management are proposed in support of proper system operation to prevent runoff to streams and avoidance of nuisance conditions. E.coli limits apply when the diposal area is not fenced. Additional parameters to ensure proper function of the treatment system have been added at the recommendation of the Engineering Services Unit.

Financial Security: Municipalities and Utility Districts are government entities exempt from the financial security requirement in TCA 69-3-122. (or) Privately-owned public utilities provide financial security to the Public Utility Commission to comply with TCA 69-3-122.

Annual Maintenance Fee: An annual maintenance fee for the permit will apply after permit issue and upon receipt of an invoice. The fee is currently $350.00 for non-discharging facilities with influent flow less than 0.075 MGD.

Items Requisite for Operation: This draft permit proposes terms and conditions for planning purposes and to seek public comment on the potential water quality impacts of the proposed activity. Actual operation of the sewerage system is contingent on the following items (items may occur in any order):

- Approval of sewerage system construction plans and specifications per TCA 69-3-108(i),
- Final construction inspection and submission of O &M manual per Rule 0400-40-02-.09,
- Issuance of a Certificate of Convenience and Necessity (CCN) by the Public Utility Commission,
- Utility ownership of sewerage system assets consistent with Rule 0400-40-16-.02(8). Sewerage system assets broadly consist of those units integral to the collection, treatment and disposal of both the solid and liquid component of sewage (i.e. septic tanks and pumps, collection lines, treatment system and drip irrigation area and related appurtenances), and
- Final issue of the permit.

EX. 20

D

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
WATER AND WASTEWATER OPERATOR CERTIFICATION BOARD

I.D. NO.
15046

EXPIRATION DATE
12/31/2022

THIS IS TO CERTIFY THAT
Tracy A. Nichols

IS IN GOOD STANDING WITH THE BOARD FOR THE CLASSIFICATIONS LISTED:

BNS, CS2

WHEN CORRESPONDING ALWAYS REFER TO YOUR I.D. NUMBER
AND SEND NOTIFICATION OF ADDRESS CHANGE

Confidential Exhibit 23

Tennessee Wastewater Systems, Inc.
Account Listing
February 8, 2021

Account	Type	Accnt. #
1072 · Bill.com Money Out Clearing	Bank	1072
131 · Cash	Bank	131
131 · Cash:131.1 · AmSouth - CD	Bank	131.1
131 · Cash:131.14 · FirstBank - Checking	Bank	131.14
131 · Cash:131.15 · FirstBank - Rider Depository	Bank	131.15
131 · Cash:131.16 · FirstBank - CIAC	Bank	131.16
131 · Cash:131.17 · FirstBank - Escrow	Bank	131.17
Accounts Receivable	Accounts Re...	
141 · Customer A/R	Accounts Re...	141
141 · Customer A/R:141.1 · Sewer Service	Accounts Re...	141.1
141 · Customer A/R:141.1 · Sewer Service:141.12 · East TN	Accounts Re...	141.12
141 · Customer A/R:143 · Bad Debt Reserve	Accounts Re...	143
186.3 · Regulatory Assets	Other Curren...	186.3
186.3 · Regulatory Assets:186.32 · Legal Recovery Receivable	Other Curren...	186.32
186.3 · Regulatory Assets:186.31 · Enviro Rider Settlement	Other Curren...	186.31
99.99 · Customer Count Offset	Other Curren...	99.99
99.99 · Customer Count Offset:99.01 · Customer Count - Rate Class 1	Other Curren...	99.01
99.99 · Customer Count Offset:99.02 · Customer Count - Rate Class 2	Other Curren...	99.02
99.99 · Customer Count Offset:99.03 · Customer Count - Rate Class 5	Other Curren...	99.03
99.99 · Customer Count Offset:99.04 · Customer Count - Rate Class 6	Other Curren...	99.04
99.99 · Customer Count Offset:99.05 · Customer Count - Rate Class 9	Other Curren...	99.05
99.99 · Customer Count Offset:99.06 · Customer Count - Comm Cabin	Other Curren...	99.06
99.99 · Customer Count Offset:99.07 · Customer Count - Comm w/ Food	Other Curren...	99.07
99.99 · Customer Count Offset:99.08 · Customer Count - Comm Nonfood	Other Curren...	99.08
151.00 · Plant Material & Supplies	Other Curren...	151.00
174 · Misc. Current and Accrued Asset	Other Curren...	174
174 · Misc. Current and Accrued Asset:174.2 · Construction Pass-Maple Green	Other Curren...	174.2
174 · Misc. Current and Accrued Asset:174.5 · UMS Undeposited Funds	Other Curren...	174.5
174 · Misc. Current and Accrued Asset:174.6 · Prepaid Expenses	Other Curren...	174.6
105.0 · Construction In Process	Fixed Asset	105.0
105.0 · Construction in Process:105.1 · Smoky Village	Fixed Asset	105.1
105.0 · Construction in Process:105.2 · Maple Green	Fixed Asset	105.2
105.0 · Construction in Process:105.3 · Cedar Hill	Fixed Asset	105.3
105.0 · Construction in Process:105.4 · Hidden Springs TDEC Project	Fixed Asset	105.4
105.0 · Construction in Process:105.5 · TDEC Cross Plains Rehab	Fixed Asset	105.5
101 · Utility Plant in Service	Fixed Asset	101
101 · Utility Plant in Service:353 · Land	Fixed Asset	353
101 · Utility Plant in Service:353.4 · Land - Capital Asset	Fixed Asset	353.4
101 · Utility Plant in Service:354 · Structures & Improv - Capital	Fixed Asset	354
101 · Utility Plant in Service:355 · Structures & Improvements	Fixed Asset	355
101 · Utility Plant in Service:360.5 · Sewer Force Main - Capital	Fixed Asset	360.5
101 · Utility Plant in Service:360 · Collection Sewers-Force	Fixed Asset	360
101 · Utility Plant in Service:361 · Collection Sewers-Gravity	Fixed Asset	361
101 · Utility Plant in Service:380 · Treatment and Disposal Equip	Fixed Asset	380
101 · Utility Plant in Service:390 · Office Furniture & Misc. Equip	Fixed Asset	390
101 · Utility Plant in Service:391 · Transportation Equipment	Fixed Asset	391
108 · Accum. Deprec.-Utility Plant	Fixed Asset	108
108.1 · Accum. Deprec.- Equip	Fixed Asset	108.1
108.2 · Accum. Deprec.Cap. - Buildings	Fixed Asset	108.2

Tennessee Wastewater Systems, Inc.
Account Listing
February 8, 2021

Account	Type	Accnt. #
108.3 · Accum. Deprec.Cap. - Force Main	Fixed Asset	108.3
108.4 · Accum. Deprec.Cap. - Treatment	Fixed Asset	108.4
175 · Security Deposits Paid	Other Asset	175
Deferred Tax Benefits	Other Asset	
231 · Accounts Payable	Accounts Pa...	231
253 · Other Deferred Liabilities	Other Curren...	253
253 · Other Deferred Liabilities:253.1 · Defer Rev - Settlement Tariff	Other Curren...	253.1
253 · Other Deferred Liabilities:253.2 · Deferred CIAC Revenue	Other Curren...	253.2
236.12 · Tax from CIAC	Other Curren...	236.12
2110 · Direct Deposit Liabilities	Other Curren...	2110
241 · Misc. Current & Accrued Liab.	Other Curren...	241
241 · Misc. Current & Accrued Liab.:241.1 · Payroll Liabilities	Other Curren...	241.1
241 · Misc. Current & Accrued Liab.:241.1 · Payroll Liabilities:241.1.6 · Aflac Payable	Other Curren...	241.1.6
241 · Misc. Current & Accrued Liab.:241.1 · Payroll Liabilities:241.1.5 · Workers Comp Payable	Other Curren...	241.1.5
241 · Misc. Current & Accrued Liab.:241.1 · Payroll Liabilities:241.1.4 · Simple IRA Payable	Other Curren...	241.1.4
242 · Intercompany Liabilities	Other Curren...	242
242 · Intercompany Liabilities:242.1 · Intercompany-Adenus Group	Other Curren...	242.1
242 · Intercompany Liabilities:242.10 · Intercompany-ALWW	Other Curren...	242.10
242 · Intercompany Liabilities:242.5 · Intercompany-Adenus Operations	Other Curren...	242.5
242 · Intercompany Liabilities:242.6 · Adenus Technologies	Other Curren...	242.6
242 · Intercompany Liabilities:242.7 · Intercompany-Commonwealth	Other Curren...	242.7
242 · Intercompany Liabilities:242.9 · Intercompany Cash	Other Curren...	242.9
232 · Notes Payable	Long Term L...	232
232 · Notes Payable:232.9 · Wilson B&T - (2) Skid Steers	Long Term L...	232.9
232 · Notes Payable:232.10 · Wilson B&T - ETN Truck	Long Term L...	232.10
232 · Notes Payable:232.11 WB&T - Truck	Long Term L...	
232 · Notes Payable:232.12 · FB Environmental Loan - RR	Long Term L...	232.12
232 · Notes Payable:232.13 · Wilson B&T - Bobcat ETN Loan	Long Term L...	232.13
265 · Misc. Operating Reserves	Long Term L...	265
265 · Misc. Operating Reserves:265.1 · Inspection Costs	Long Term L...	265.1
265 · Misc. Operating Reserves:265.2 · Sewer Sys/Comp Repl - Post 2006	Long Term L...	265.2
265 · Misc. Operating Reserves:265.4 · Eudally Reserve	Long Term L...	265.4
215 · Retained Earnings	Equity	215
271 · Cont. In Aid of Construction	Equity	271
271 · Cont. in Aid of Construction:271.1 · CIAC - Williamson County	Equity	271.1
271 · Cont. In Aid of Construction:271.5 · CIAC -ETN Capital	Equity	271.5
272 · Accum. Amort. on CIAC	Equity	272
400 · Operating Revenues	Income	400
400 · Operating Revenues:521 · Flat Rate Revenues	Income	521
400 · Operating Revenues:521 · Flat Rate Revenues:521.1 · Residential-Flat Sewer	Income	521.1
400 · Operating Revenues:521 · Flat Rate Revenues:521.1 · Residential-Flat Sewer:521.1.1 · Resid...	Income	521.1.1
400 · Operating Revenues:521 · Flat Rate Revenues:521.1 · Residential-Flat Sewer:521.1.2 · Resid...	Income	521.1.2
400 · Operating Revenues:521 · Flat Rate Revenues:521.1 · Residential-Flat Sewer:521.1.3 · Resid...	Income	521.1.3
400 · Operating Revenues:521 · Flat Rate Revenues:521.1 · Residential-Flat Sewer:521.1.4 · Resid...	Income	521.1.4
400 · Operating Revenues:521 · Flat Rate Revenues:521.1 · Residential-Flat Sewer:521.1.5 · Resid...	Income	521.1.5
400 · Operating Revenues:521 · Flat Rate Revenues:521.2 · Commercial Sewer	Income	521.2
400 · Operating Revenues:521 · Flat Rate Revenues:521.2 · Commercial Sewer:521.2.1 · Commercial ...	Income	521.2.1
400 · Operating Revenues:521 · Flat Rate Revenues:521.2 · Commercial Sewer:521.2.2 · Commercial ...	Income	521.2.2
400 · Operating Revenues:521 · Flat Rate Revenues:521.2 · Commercial Sewer:521.2.3 · Commercial ...	Income	521.2.3

Tennessee Wastewater Systems, Inc.
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Account	Type	Accnt. #
400 · Operating Revenues:522 · Measured Revenues	Income	522
400 · Operating Revenues:522 · Measured Revenues:522.1 · Residential	Income	522.1
400 · Operating Revenues:536 · Other Wastewater Revenues	Income	536
400 · Operating Revenues:536 · Other Wastewater Revenues:536.1 · Sewer Access Fees	Income	536.1
400 · Operating Revenues:536 · Other Wastewater Revenues:536.3 · Operations & Maintenance	Income	536.3
400 · Operating Revenues:536 · Other Wastewater Revenues:536.4 · Billing & Collections	Income	536.4
400 · Operating Revenues:536 · Other Wastewater Revenues:536.5 · Bonding	Income	536.5
400 · Operating Revenues:536 · Other Wastewater Revenues:536.5 · Bonding:536.5.1 · Bonding - Sta...	Income	536.5.1
400 · Operating Revenues:536 · Other Wastewater Revenues:536.5 · Bonding:536.5.2 · Bonding - Goo...	Income	536.5.2
400 · Operating Revenues:536 · Other Wastewater Revenues:536.5 · Bonding:536.5.3 · Bonding - Mil...	Income	536.5.3
400 · Operating Revenues:536 · Other Wastewater Revenues:536.6 · Franchise Income	Income	536.6
400 · Operating Revenues:536 · Other Wastewater Revenues:536.7 · Bioxide	Income	536.7
400 · Operating Revenues:536 · Other Wastewater Revenues:536.9 · Penalty Fees	Income	536.9
400 · Operating Revenues:536 · Other Wastewater Revenues:536.10 · Disconnect/Reconnect Charges	Income	536.10
530 · Guaranteed Revenues	Income	530
419 · Interest Earned	Income	419
421 · Nonutility Income	Income	421
421 · Nonutility Income:421.2 · Gain/Loss on Sale of Assets	Income	421.2
421 · Nonutility Income:421.3 · Utility Fee	Income	421.3
421 · Nonutility Income:421.4 · Professional Services	Income	421.4
421 · Nonutility Income:421.5 · Developer Income	Income	421.5
421 · Nonutility Income:421.7 · Construction Income	Income	421.7
401 · Operating Expenses	Expense	401
401 · Operating Expenses:701.6 · Salary & Wages - Construction	Expense	701.6
401 · Operating Expenses:701 · Salaries and Wages - Employees	Expense	701
401 · Operating Expenses:703 · Salaries and Wages - Officers	Expense	703
401 · Operating Expenses:704 · Employee Benefits	Expense	704
401 · Operating Expenses:704 · Employee Benefits:704.2 · Life Insurance	Expense	704.2
401 · Operating Expenses:704 · Employee Benefits:704.1 · Workers Compensation	Expense	704.1
401 · Operating Expenses:705 · Simple IRA	Expense	705
401 · Operating Expenses:710 · Purchased Wastewater Treatment	Expense	710
401 · Operating Expenses:715 · Purchased Power	Expense	715
401 · Operating Expenses:716 · Telemetry Monitoring	Expense	716
401 · Operating Expenses:718 · Bioxide	Expense	718
401 · Operating Expenses:720 · Materials and Supplies	Expense	720
401 · Operating Expenses:731 · Contractual Svc - Professional	Expense	731
401 · Operating Expenses:735 · Contractual Svc - Testing	Expense	735
401 · Operating Expenses:736 · Contractual Services	Expense	736
401 · Operating Expenses:736 · Contractual Services:736.01 · Sign-up Costs	Expense	736.01
401 · Operating Expenses:736 · Contractual Services:736.02 · Contract Maintenance	Expense	736.02
401 · Operating Expenses:736 · Contractual Services:736.03 · Contractual Svc	Expense	736.03
401 · Operating Expenses:736 · Contractual Services:736.04 · Subcontract Work	Expense	736.04
401 · Operating Expenses:736 · Contractual Services:736.05 · Access Fees	Expense	736.05
401 · Operating Expenses:736 · Contractual Services:736.08 · Lawn Mowing	Expense	736.08
401 · Operating Expenses:736 · Contractual Services:736.10 · One-Call Expenses	Expense	736.10
401 · Operating Expenses:736 · Contractual Services:736.11 · Contractual Profit Sharing	Expense	736.11
401 · Operating Expenses:736 · Contractual Services:736.12 · AUG - MGMT Fees	Expense	736.12
401 · Operating Expenses:736 · Contractual Services:736.13 · IT Expenses	Expense	736.13
401 · Operating Expenses:736 · Contractual Services:736.9 · Adenus Group - MGMT Fees	Expense	736.9

Tennessee Wastewater Systems, Inc.
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Account	Type	Accnt. #
401 · Operating Expenses:740 · Rent	Expense	740
401 · Operating Expenses:750 · Transportation Expense	Expense	750
401 · Operating Expenses:750 · Transportation Expense:750.3 · Registration Renewal	Expense	750.3
401 · Operating Expenses:750 · Transportation Expense:750.1 · Fuel	Expense	750.1
401 · Operating Expenses:750 · Transportation Expense:750.2 · Vehicle Maintenance	Expense	750.2
401 · Operating Expenses:755 · Insurance	Expense	755
401 · Operating Expenses:755 · Insurance:755.10 · Dental Insurance	Expense	755.10
401 · Operating Expenses:755 · Insurance:755.8 · Auto Insurance	Expense	755.8
401 · Operating Expenses:755 · Insurance:755.9 · Health Insurance	Expense	755.9
401 · Operating Expenses:765 · Regulatory Commission Exp.	Expense	765
401 · Operating Expenses:765 · Regulatory Commission Exp.:765.1 · Rate Case Work	Expense	765.1
401 · Operating Expenses:765 · Regulatory Commission Exp.:765.2 · Filing Fee	Expense	765.2
401 · Operating Expenses:765 · Regulatory Commission Exp.:765.3 · Inspection Fee	Expense	765.3
401 · Operating Expenses:770 · Bad Debt	Expense	770
401 · Operating Expenses:775 · Miscellaneous Expenses	Expense	775
401 · Operating Expenses:775 · Miscellaneous Expenses:DVF Misc Account	Expense	
401 · Operating Expenses:775 · Miscellaneous Expenses:775.21 · Website and Internet Hosting	Expense	775.21
401 · Operating Expenses:775 · Miscellaneous Expenses:775.27 · Equipment Maintenance	Expense	775.27
401 · Operating Expenses:775 · Miscellaneous Expenses:775.26 · Equipment Rental	Expense	775.26
401 · Operating Expenses:775 · Miscellaneous Expenses:775.25 · Small Equipment Purchase	Expense	775.25
401 · Operating Expenses:775 · Miscellaneous Expenses:775.1 · Telephone	Expense	775.1
401 · Operating Expenses:775 · Miscellaneous Expenses:775.10 · Office Supplies	Expense	775.10
401 · Operating Expenses:775 · Miscellaneous Expenses:775.11 · Letter of Credit - Fees	Expense	775.11
401 · Operating Expenses:775 · Miscellaneous Expenses:775.11 · Letter of Credit - Fees:775.111 ·...	Expense	775.111
401 · Operating Expenses:775 · Miscellaneous Expenses:775.11 · Letter of Credit - Fees:775.112 ·...	Expense	775.112
401 · Operating Expenses:775 · Miscellaneous Expenses:775.11 · Letter of Credit - Fees:775.113 ·...	Expense	775.113
401 · Operating Expenses:775 · Miscellaneous Expenses:775.12 · Depreciation Expense	Expense	775.12
401 · Operating Expenses:775 · Miscellaneous Expenses:775.13 · Easement Fees	Expense	775.13
401 · Operating Expenses:775 · Miscellaneous Expenses:775.2 · Postage	Expense	775.2
401 · Operating Expenses:775 · Miscellaneous Expenses:775.20 · Software Licenses	Expense	775.20
401 · Operating Expenses:775 · Miscellaneous Expenses:775.23 · Maintenance Agreements	Expense	775.23
401 · Operating Expenses:775 · Miscellaneous Expenses:775.3 · Licenses & Permits	Expense	775.3
401 · Operating Expenses:775 · Miscellaneous Expenses:775.4 · Membership Dues	Expense	775.4
401 · Operating Expenses:775 · Miscellaneous Expenses:775.5 · Deed Registration	Expense	775.5
401 · Operating Expenses:775 · Miscellaneous Expenses:775.6 · Franchise Fees	Expense	775.6
401 · Operating Expenses:775 · Miscellaneous Expenses:775.7 · Public Notice Costs	Expense	775.7
401 · Operating Expenses:775 · Miscellaneous Expenses:775.8 · Interest on Customer Deposits	Expense	775.8
401 · Operating Expenses:775 · Miscellaneous Expenses:775.9 · Billing Costs	Expense	775.9
408 · Taxes Other than Income	Expense	408
408 · Taxes Other than Income:408.1 · Property Taxes	Expense	408.1
408 · Taxes Other than Income:408.3 · Franchise & Excise	Expense	408.3
408 · Taxes Other than Income:408.4 · Labor & Workforce Dev.	Expense	408.4
408 · Taxes Other than Income:408.5 · Personal Privilege Tax	Expense	408.5
408 · Taxes Other than Income:408.6 · Public Utility	Expense	408.6
408 · Taxes Other than Income:408.7 · Tax Penalties	Expense	408.7
408 · Taxes Other than Income:408.12 · Payroll Taxes	Expense	408.12
409 · Income Tax	Expense	409
426 · Misc. Nonutility Expenses	Expense	426
426 · Misc. Nonutility Expenses:426.8 · Penalties/Fines	Expense	426.8

Tennessee Wastewater Systems, Inc.
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Account	Type	Accnt. #
426 · Misc. Nonutility Expenses:246.91 · Lodging	Expense	246.91
426 · Misc. Nonutility Expenses:426.9 · Meals and Entertainment	Expense	426.9
426 · Misc. Nonutility Expenses:426.1 · Dues and Subscriptions	Expense	426.1
426 · Misc. Nonutility Expenses:426.2 · Bank & NSF Fees	Expense	426.2
426 · Misc. Nonutility Expenses:426.3 · Miscellaneous	Expense	426.3
426 · Misc. Nonutility Expenses:426.4 · Parking	Expense	426.4
426 · Misc. Nonutility Expenses:426.5 · Developer Income Reimbursement	Expense	426.5
426 · Misc. Nonutility Expenses:426.7 · Construction Expense	Expense	426.7
427 · Interest Expense	Expense	427
427 · Interest Expense:427.1 · Interest on Debt to Associated	Expense	427.1
427 · Interest Expense:427.2 · Loan Interest	Expense	427.2
427 · Interest Expense:427.5 · Sewer Deposit Interest	Expense	427.5
66900 · Reconciliation Discrepancies	Expense	66900
421.6 · Misc. Income	Other Income	421.6
90100 · Purchase Orders	Non-Posting	90100
90200 · Sales Orders	Non-Posting	90200

Confidential Exhibit 26

Tennessee Wastewater Systems, Inc.

TPUC No. 2
Section 3
First Revised Page 6

WASTEWATER UTILITY SERVICE

Service Territory	County	TPUC Docket #	Rate Class
Smokey Mountain Reflections RV Park	Sevier	07-00235	RATE CLASS 1
Milky Way Farms	Giles	08-00029	RATE CLASS 1
Preserve Condominiums	DeKalb	08-00113	RATE CLASS 1
Tarpley Shop Utility District	Giles	08-00161	RATE CLASS 5
Lakeside Meadows	Monroe	08-00162	RATE CLASS 1
Fairway Vistas	Blount	08-00163	RATE CLASS 1
Saddle Ridge	Monroe	08-00209	RATE CLASS 1
Scenic River	Monroe	09-00006	RATE CLASS 1
Preserve at Eagle Rock	Hamblen	09-00007	RATE CLASS 1
Bluff at Bradbury Farms	Montgomery	11-00155	RATE CLASS 1
Scales Project Clovercroft Farms/Clovercroft Wells TF	Williamson	14-00006	RATE CLASS 1
Clovercroft Preserve Clovercroft Acres/Clovercroft Tulloss TF	Williamson	14-00062	RATE CLASS 1
Enclave at Dove Lake	Williamson	15-00025	RATE CLASS 1
Lighthouse Pointe	Grainger	17-00146	RATE CLASS 1
Warrioto Hills	Montgomery	18-00107	RATE CLASS 1
Chelsea's Way	Robertson	19-00030	RATE CLASS 1
Oak Plains	Montgomery	21-00075	RATE CLASS 1
The Pointe	Clay	21-00026	RATE CLASS 1
Derby Meadows	Robertson	XX-XXXXX	RATE CLASS 1(T)

SECTION 4 – RESIDENTIAL RATES SHEET

	Base	Escrow	Bonding	Environmental Rider	Legal Rider	Total
Rate Class 1	$ 40.48(I)	$ 7.27	$0.11	$3.76	$0.45	$ 52.07(I)
Rate Class 2	$ 40.48(I)	$ 7.27	$0.11	$3.76	$0.45	$ 52.07(I)
Rate Class 5	$ 36.66(I)	$ 5.69	$0.11	$3.76	$0.45	$ 46.67(I)
Rate Class 6	$ 36.66(I)	$ 5.69	$0.11	$3.76	$0.45	$ 46.67(I)
Rate Class 9	$ 20.55	$ 3.39	$0.11	$3.76	$0.45	$ 28.26*

* Southridge customers will have a pass-through treatment cost assessed to their monthly bill. The pass-through treatment cost is calculated using the water meter meter readings as provided to TWSI by the East Montgomery Water Co. and the multiplier charged by TWSI by Clarksville Water and Gas to provide wastewater treatment. This cost will be filed annually with TPUC in June and effective upon approval. The current pass through treatment cost is 0.0104639184 per gallon.

** Each condominium unit will be billed as a residential customer and be individually billed. (N)

*** Customers in the City of Coopertown will be billed a 3% franchise fee (applied to the base rate only). (T)(M) from Section 4, Fifteenth Revised Page 2

**** The bonding fee will be updated with an annual filing with TPUC in August and effective upon approval. (T)

Fees: (M) from Section 4, Fifteenth Revised Page 2

Non-Payment – 5% of total bill amount
Disconnection – $40
Reconnection – $50
Returned Check (NSF Fee) – $25
Returned ACH - $25 (T)(N)
Capacity Reservation Fee – $10 per month (See Rules and Regulations for Explanation) (T)(N)
Credit Card Convenience Fee: 3%
City of Coopertown Franchise Fees: 3%

Replaces Section 4, Fifteenth Revised Page 1 and Fifteenth Revised Page 2. (D)

WASTEWATER UTILITY SERVICE

Service Territory

	County	TPUC Docket #
Scales Project	Williamson	14-00006
Clovercroft Acres	Williamson	14-00062
Nolensville Catholic Church	Williamson	21-00096
Oak Plains	Montgomery	21-00075
The Pointe	Clay	21-00026
Derby Meadows	Robertson	XX-XXXXX (T)

SECTION 6 – COMMERCIAL RATE SHEETS

COMMERCIAL RATES SHEET
without FOOD SERVICE

The monthly sewer charge per customer is based on the daily design flow expected from the type of establishment being served. The utility will periodically check actual flow to determine whether billing adjustments will need to be made. (T)(N)

	Base	Escrow	Bonding	Environmental Rider	Legal Rider	Total
Tier 1 (0 - 300 GPD)	$95.93(I)	$14.87	$0.11	$3.76	$0.45	$115.12(I)
Tier 2.1 (301 - 400 GPD)	$115.07(I)	$17.98	$0.11	$3.76	$0.45	$137.37(I)
Tier 2.2 (401 - 500 GPD)	$134.21(I)	$21.09	$0.11	$3.76	$0.45	$159.62(I)
Tier 2.3 (501 - 600 GPD)	$153.34(I)	$24.21	$0.11	$3.76	$0.45	$181.87(I)
Tier 2.4 (601 - 700 GPD)	$172.48(I)	$27.32	$0.11	$3.76	$0.45	$204.12(I)
Tier 2.5 (701 - 800 GPD)	$191.62(I)	$30.43	$0.11	$3.76	$0.45	$385.99(I)
Tier 2.6 (801 - 900 GPD)	$210.76(I)	$33.54	$0.11	$3.76	$0.45	$248.62 (I)
Tier 2.7 (901 - 1,000 GPD)	$229.89(I)	$36.66	$0.11	$3.76	$0.45	$270.87(I)
Tier 3.1 (1,001 - 2000 GPD)	$381.18(I)	$56.37	$0.11	$3.76	$0.45	$519.49 (I)
Tier 3.2 (2,001 - 3,000 GPD)	$533.29(I)	$76.11	$0.11	$3.76	$0.45	$613.72(I)
Tier 3.3 (3,001 - 4,000 GPD)	$685.41(I)	$95.84	$0.11	$3.76	$0.45	$785.57 (I)
Tier 3.4 (4,001 - 5,000 GPD)	$837.53(I)	$115.57	$0.11	$3.76	$0.45	$956.89(I)
Tier 3.5 (5,001 - 6,000 GPD)	$989.64(I)	$135.31	$0.11	$3.76	$0.45	$1,129.27 (I)
Tier 3.6 (6,001 - 7,000 GPD)	$1,141.76(I)	$155.04	$0.11	$3.76	$0.45	$1,301.12(I)
Tier 3.7 (7,001 - 8,000 GPD)	$1,293.88(I)	$174.77	$0.11	$3.76	$0.45	$1,472.97 (I)
Tier 3.8 (8,001 - 9,000 GPD)	$1,446.00(I)	$194.50	$0.11	$3.76	$0.45	$1,644.82(I)
Tier 3.9 (9,001 - 10,000 GPD)	$1,598.11(I)	$214.24	$0.11	$3.76	$0.45	$1,816.67 (I)
Unknown 25,000 GPD	$ 3,879.87 (I)	510.23	$0.11	$3.76	$0.45	$ 4,394.42(I)

Excess water usage

Additional surcharges will apply when customers exceed their expected design flows. For any month that a customer's water meter reading exceeds the expected design flow, the following surcharges will apply:

If usage exceeds 10,000 gallons per day, the charge will be $1628.40 plus applicable escrow, bonding, and rate rider amount plus $171.85 per 1000 gallons. (N)

WASTEWATER UTILITY SERVICE

If the water meter readings exceed the design flow for any three consecutive months, the monthly charge will be revised to reflect the increased usage and any capital costs associated with increasing the capacity of the system will be paid by the customer. (M)*

Fees: (M)*
Nonpayment – 5%
Disconnection - $40
Reconnection - $50
Returned Check - $25
Returned ACH - $25 (N)
City of Coopertown Franchise Fees: 3%
Credit Card Convenience Fee: 3%

* Moved from Section 6, Thirteenth Revised Page 1

COMMERCIAL RATES SHEET
with FOOD SERVICE

The monthly sewer charge per customer is based on the design daily flow expected from the type of establishment being served. The utility will periodically check actual flow to determine whether billing adjustments will need to be made.

	Base	Escrow	Bonding	Environmental Rider	Legal Rider	Total
Tier 1 (0 - 300 GPD)	$127.88(I)	$19.82	$0.11	$3.76	$0.45	$152.02(I)
Tier 2.1 (301 - 400 GPD)	$151.18(I)	$23.17	$0.11	$3.76	$0.45	$178.67(I)
Tier 2.2 (401 - 500 GPD)	$174.49(I)	$26.51	$0.11	$3.76	$0.45	$330.69(I)
Tier 2.3 (501 - 600 GPD)	$197.80(I)	$29.85	$0.11	$3.76	$0.45	$231.97(I)
Tier 2.4 (601 - 700 GPD)	$221.11(I)	$33.19	$0.11	$3.76	$0.45	$258.62(I)
Tier 2.5 (701 - 800 GPD)	$244.42(I)	$36.53	$0.11	$3.76	$0.45	$490.59(I)
Tier 2.6 (801 - 900 GPD)	$267.73(I)	$39.87	$0.11	$3.76	$0.45	$311.92(I)
Tier 2.7 (901 - 1,000 GPD)	$291.03(I)	$43.22	$0.11	$3.76	$0.45	$338.57(I)
Tier 3.1 (1,001 - 2000 GPD)	$475.73(I)	$67.97	$0.11	$3.76	$0.45	$650.49(I)
Tier 3.2 (2,001 - 3,000 GPD)	$661.37(I)	$92.73	$0.11	$3.76	$0.45	$758.42(I)
Tier 3.3 (3,001 - 4,000 GPD)	$847.00(I)	$117.50	$0.11	$3.76	$0.45	$968.82(I)
Tier 3.4 (4,001 - 5,000 GPD)	$1,032.63(I)	$142.27	$0.11	$3.76	$0.45	$1,179.22(I)
Tier 3.5 (5,001 - 6,000 GPD)	$1,218.26(I)	$167.04	$0.11	$3.76	$0.45	$1,389.62(I)
Tier 3.6 (6,001 - 7,000 GPD)	$1,403.89(I)	$191.81	$0.11	$3.76	$0.45	$1,600.02(I)
Tier 3.7 (7,001 - 8,000 GPD)	$1,589.53(I)	$216.57	$0.11	$3.76	$0.45	$1,810.42(I)
Tier 3.8 (8,001 - 9,000 GPD)	$1,775.16(I)	$241.34	$0.11	$3.76	$0.45	$2,020.82(I)
Tier 3.9 (9,001 - 10,000 GPD)	$1,960.79(I)	$266,11	$0.11	$3.76	$0.45	$2,231.22(I)
Unknown 25,000 GPD	$4,745.27(I)	$637.63	$0.11	$3.76	$0.45	$5,387.22(I)

Excess water usage

Additional surcharges will apply when customers exceed their expected design flows. For any month that a customer's water meter reading exceeds the expected design flow, the following surcharges will apply:

If usage exceeds 10,000 gallons per day, the charge will be $1997.95 plus applicable escrow, bonding, and rate rider amount plus $210.40 per 1000 gallons. **(N)**

If the water meter readings exceed the design flow for any three consecutive months, the monthly charge will be revised to reflect the increased usage and any capital costs associated with increasing the capacity of the system will be paid by the customer. **(M)***

Fees: (M)*
Nonpayment – 5%
Disconnection - $40
Reconnection - $50
Returned Check - $25
Returned ACH - $25(N)
City of Coopertown Franchise Fees: 3%
Credit Card Convenience Fee: 3%

* Moved from Section 6, Thirteenth Revised Page 2

COMMERCIAL RATES SHEET
CABINS

The monthly sewer charge per customer is based on the square footage of the cabin as recorded with the Register of Deeds office. (N)

		Base	Escrow	Bonding	Environmental Rider	Legal Rider	Total
Small 0-2000	(N)	$60.85(N)	$13.15(I)	$0.11	$3.76	$0.45	$78.32(N)
Medium 2001-4000	(N)	$69.68(N)	$16.32(I)	$0.11	$3.76	$0.45	$90.32(N)
Large 4001-6000	(N)	$82.44(N)	$19.56(I)	$0.11	$3.76	$0.45	$106.32(N)
Extra Large 6001+	(N)	$102.07(N)	$22.93(I)	$0.11	$3.76	$0.45	$129.32(N)

(D)

Fees: (M)*
Nonpayment – 5%
Reconnection - $50
Disconnection - $40
Returned Check - $25
Returned ACH - $25 **(N)**
Credit Card Convenience Fee: 3%

* Moved from Section 6, Eleventh Revised Page 3

Derby Meadows Subdivision

1-Jun-22

Projected Income Statement

Line No.	Item	Year 1	Year 2	Year 3	Year 4	Year 5
	Number of Sewer Customers	45	110	175	250	300
	Access Fees					
	Number of lots with sewer access but no customer	278	213	148	72	23
	Access fee revenue ($120 x lots)	$ 33,360.00	$ 25,560.00	$ 17,760.00	$ 8,640.00	$ 2,760.00
	Operating Revenue					
1	Service Revenue	$ 28,117.80	$ 68,732.40	$ 109,347.00	$ 156,210.00	$ 187,452.00
2	Re-connect Fees	$ -	$ -	$ -	$ -	$ -
3	Returned Check Charge	$ -	$ -	$ -	$ -	$ -
4	Late Payment Charge	$ -	$ -	$ -	$ -	$ -
5	Total Operating Revenue (sum of Line 1 through 4)	$ 28,117.80	$ 68,732.40	$ 109,347.00	$ 156,210.00	$ 187,452.00
	Operating Expenses[1]					
6	Total salaries and wages and payroll taxes (employees only)	$ 2,000.00	$ 3,000.00	$ 4,000.00	$ 4,500.00	$ 5,000.00
7	Outside labor expenses (non-employee)	$ -	$ -	$ -	$ -	$ -
8	Administrative and office expenses	$ 1,200.00	$ 1,500.00	$ 1,800.00	$ 1,800.00	$ 1,800.00
9	Maintenance and repair expense[2]	$ 1,000.00	$ 1,200.00	$ 1,400.00	$ 1,500.00	$ 1,600.00
10	Purchased water	$ -	$ -	$ -	$ -	$ -
11	Purchased sewerage treatment	$ -	$ -	$ -	$ -	$ -
12	Electric power expense[3]	$ 750.00	$ 900.00	$ 1,100.00	$ 1,300.00	$ 1,500.00
13	Chemical expense	$ -	$ -	$ -	$ -	$ -
14	Testing fees	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00
15	Transportation expense	$ 500.00	$ 600.00	$ 700.00	$ 800.00	$ 900.00
16	Other operating expense	$ -	$ -	$ -	$ -	$ -
17	Telemetry	$ 1,320.00	$ 1,320.00	$ 1,320.00	$ 1,320.00	$ 1,320.00
18	Total operation and maintenance expenses (sum of Line 6 through Line 17)	$ 9,170.00	$ 10,920.00	$ 12,720.00	$ 13,620.00	$ 14,520.00
19	Annual depreciation expense	$ 46,153.00	$ 46,153.00	$ 46,153.00	$ 46,153.00	$ 46,153.00
20	Property taxes paid on utility property	$ 1,500.00	$ 1,500.00	$ 1,500.00	$ 1,500.00	$ 1,500.00
21	Franchise (gross receipts tax)	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00
22	Annual NCUC regulatory fee	$ 1,195.01	$ 2,921.13	$ 4,647.25	$ 6,638.93	$ 7,966.71
23	Total operating expenses (sum of Line 18 through Line 22)	$ 61,018.01	$ 64,494.13	$ 68,020.25	$ 70,911.93	$ 73,139.71

EX. 31

24 Income taxes	$ -	$ -	$ -	$ -	$ -
25 State income taxes	$ -	$ -	$ -	$ -	$ -
26 Federal income taxes	$ -	$ -	$ -	$ -	$ -
27 Total income taxes	$ -	$ -	$ -	$ -	$ -
28 Net operating income	$ 459.79	$ 29,798.27	$ 59,086.75	$ 93,938.08	$ 117,072.29
29 Interest expense	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
30 Net income	$ (540.21)	$ 28,798.27	$ 58,086.75	$ 92,938.08	$ 116,072.29

1. Expenses were estimated using comparisons to known expenses from similar sewer systems.
2. It is assumed that maintenance expense will increase due to more homes sending wastewater flow into the sewer system.
3. It is assumed that electric power expense will increase due to the sewer system treating more wastewater flow.