



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, TN 37243-1102

MEETING MINUTES

PRELIMINARY PROJECT DISCUSSION

PROJECT NAME: 2020 CDBG Alamo

COUNTY: Crockett

DATE REQUESTED: November 3, 2020

DATE HELD: November 13, 2020

MEETING LOCATION: Teams

MEETING TIME: 10:00am

PERMIT: TN0024988

WPN: 20.0683

PARTICIPANTS/REPRESENTING: (checklist ITEM I.A)

A2H:

Jason Dittrich - jasond@a2h.com
Ed Hargraves - edwardh@a2h.com
David Smith - davids@a2h.com

TDEC:

Liz Campbell – liz.camppbell@tn.gov
Conner Franklin – conner.franklin@tn.gov
Vojin Janjic – vojinjanjic@tn.gov
Angela Jones PE – angela.jones@tn.gov
Tammy Miller – tammy.miller@tn.gov
Maybelle Sparks – Maybelle.sparks@tn.gov

PROJECT BACKGROUND AND PURPOSE: (checklist ITEM B)

The Town of Alamo has received a CDGB grant which includes cured in place pipe rehabilitation, a new clarifier, repurposing the existing trickling filter as a surge basin, as well as cleaning and repairing the existing grit removal system.

SUMMARY OF PRELIMINARY ENGINEERING REPORT CONSIDERATIONS (checklist ITEMS C, D, E):

The division is supportive of collection system and treatment plant upgrades, but takes this opportunity to note some future planning needs. The preliminary engineering report is not required for the scope of this project, however Alamo may have more stringent ammonia, total nitrogen and total phosphorus limits in the next permit cycle and should perform an alternatives analysis to consider other treatment options such as land application.

SUMMARY OF RECEIVING WATERS OR SITE SUITABILITY: (checklist ITEM F)

Alamo is in a rural area and should consider land application of treated wastewater to help meet the anticipated future pollutant loading requirements. Securing land at this time, while keeping existing NPDES permit may be the preferred “hybrid” option, securing disposal capacity even for a future expansion. The division assesses Buck Creek as not having water quality to support its fish and aquatic life designated use due to substrate habitat alteration and concentrations of phosphorus, nitrates, un-ionized ammonia, and low levels of dissolved oxygen.

SUMMARY OF ANTICIPATED PERMITTING NEEDS: (checklist ITEM G, I, J, K):

TDEC noted that Alamo has quite a few ammonia violations and talked about more stringent limits in the upcoming permit cycle. TDEC will provide Alamo with some estimated calculations of proposed total nitrogen, total phosphorus and ammonia effluent limits. Keep in mind these are proposed limits and may be revised given more data. The proposed total nitrogen and total phosphorus limits are calculated using watershed modeling (SPARROW) and are based on current concentrations to cap the loadings at their present level. These treatment levels would apply at 5,571 lb/yr for total nitrogen and 2,848 lb/yr for total phosphorus (TP) at the average flow rate of 0.5084 MGD. The proposed ammonia limits are calculated using the updated ammonia water quality criteria effective on September 11, 2019. As discussed in the PPD, the proposed ammonia limits would be cut in half using the updated ammonia water quality criteria. However, actual



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, TN 37243-1102

MEETING MINUTES

PRELIMINARY PROJECT DISCUSSION

stream temperatures and pH (23 C, 10 C and 7 pH) were used to derive the limits instead of assumed temperatures and pH (27 C, 17 C and 8 pH) used in the current permit. Thus, the ammonia limits are not cut in half, rather it is retained at 1.1 mg/l (summer) and 2 mg/l (winter) due to the anti-backsliding provision of 40 CFR 122.44(l).

DWR ORGANIZER: Angela Jones
2020

MINUTES PREPARED BY: Liz Campbell

DATE MINUTES PREPARED: November 17, 2020,

TENNESSEE SPARROW HUC10 TOTAL NITROGEN ANALYSIS SHEET

MIDDLE FORK FORKED DEER RIVER WATERSHED (HUC10 - 02)

vs 11/13/20

SPARROW Modeled TN Load at Outlet of HUC10 (02)

Source Category	Contribution (%)
Air Deposition ("background")	28.5
Manure	3.6
Fertilizer	59.5
Legume Crops	0.0
Urban	2.8
Wastewater	5.6
Total	100.0
Total Load	1,107,941 lbs/yr
Drainage Area	155 sq mi
Unit Area Load	11.188 lbs/ac/yr
Mean Annual Streamflow	739.4 cfs

Point Source Load Contribution	Enrichment Factor		
	EF < 2.35	2.35 ≤ EF < 2.66	EF ≥ 2.66
%C ≥ 5.77%	Low	Medium	High
2.27% ≤ %C < 5.77%	Low	Medium	Medium
%C < 2.27%	Low	Low	Low

TN Enrichment Factor = $\frac{\text{Total Current Load}}{\text{Total "Background" Load}}$ = **3.51**

Impact Category: **Medium**
 Proposed WWTP Treatment Performance: **8 mg/L**

Point Source Characteristics

Facility	Permit #	Design Flow (MGD)	Average Flow (MGD)	Ratio (Avg/Design)	Avg TN Conc (mg/L)	Recommended Reduction (%)	# of Samples	Data Source	Discharge to Nutrient Impaired Waterbody (2016)
Humboldt STP	TN0062588	2.6	1.655	63.7%	8.28	Cap *	18	DMRs (2008-15)	
Alamo STP	TN0024988	0.4	0.5084	127.1%	3.6	Cap	3	application (2017)	

* Discharge from Humboldt STP does not require a reduction because the average discharge flow is less than the design flow.

Recommended Point Source Facility Load

Facility	Permit #	Allowable Annual Load *	Recommended Monitoring
Humboldt STP	TN0062588	41,715	Semi-monthly composite sample + in-stream monitoring
Alamo STP	TN0024988	5,571	monthly grab sample + in-stream monitoring

* Allowable Annual Load calculated based on expected treatment performance (if reduction is recommended) or monitoring data (if no reduction is recommended). In the absence of monitoring data, load is calculated from design flow and a default TN concentration of 45 mg/L.

Potential Trading Source

Ratio -- Wastewater(STP)/Wastewater(other)	40.62
Ratio -- WWTP/(fertilizer+manure+legumes)	0.09
Ratio -- (WWTP+urban)/(fertilizer+manure+legumes)	0.13

TENNESSEE SPARROW HUC10 TOTAL PHOSPHORUS ANALYSIS SHEET

MIDDLE FORK FORKED DEER RIVER WATERSHED (HUC10 - 02)

vs 11/13/20

SPARROW Modeled TP Load at Outlet of HUC10 (02)

Source Category	Contribution (%)	
Soil Parent Rock ("background")	32.7	
Mines	0.0	
Manure	3.7	
Fertilizer	58.3	
Urban	2.5	
Wastewater	2.7	
Total	99.9	
Total Load	426,014	lbs/yr
Drainage Area	99,030	acres
Unit Area Load	4.302	lbs/ac/yr
Mean Annual Streamflow	739.4	cfs

Point Source Load Contribution	Enrichment Factor		
	EF < 2.67	2.67 ≤ EF < 3.05	EF ≥ 3.05
%C ≥ 2.75%	Low	Medium	High
1.29% ≤ %C < 2.75%	Low	Medium	Medium
%C < 1.29%	Low	Low	Low

TP Enrichment Factor = $\frac{\text{Total Current Load}}{\text{Total "Background" Load}}$ = **3.06**

Impact Category: **Medium**
 Proposed WWTP Treatment Performance: **1 mg/L**

Point Source Characteristics

Permittee	Permit #	Design Flow (MGD)	Average Flow (MGD)	Ratio (Avg/Design)	Avg TP Conc (mg/L)	Recommended Reduction (%)	# of Samples	Data Source	Discharge to Nutrient Impaired Waterbody (2016)
Humboldt STP	TN0062588	2.6	1.655	63.7%	2.05	23.4	19	DMRs (2008-15)	MFFDr Mile 23.4
Alamo STP	TN0024988	0.4	0.5084	127.1%	1.84	Cap	70	DMRs (2015-20)	ut to Buck Creek

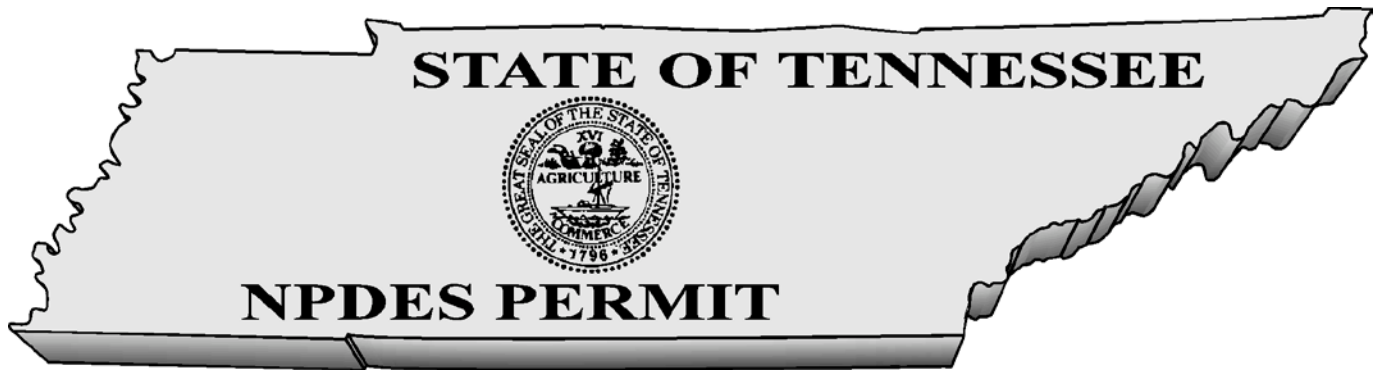
Recommended Point Source Facility Load

Facility	Permit #	Allowable Annual Load *	Recommended Monitoring
Humboldt STP	TN0062588	7,915	Semi-monthly composite sample + in-stream monitoring
Alamo STP	TN0024988	2,848	monthly grab sample + in-stream monitoring

* Allowable Annual Load calculated based on expected treatment performance (if reduction is recommended) or monitoring data (if no reduction is recommended). In the absence of monitoring data, load is calculated from design flow and a default TP concentration of 5 mg/L.

Potential Trading Source

Ratio -- Wastewater(STP)/Wastewater(other)	4.40
Ratio -- WWTP/(fertilizer+manure)	0.04
Ratio -- (WWTP+urban)/(fertilizer+manure)	0.08



No. TN0024988

Authorization to discharge under the
National Pollutant Discharge Elimination System (NPDES)

Issued By

**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**

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger: **Town of Alamo
Alamo STP**

is authorized to discharge: **treated municipal wastewater from Outfall 001**

from a facility located: **in Alamo, Crockett County, Tennessee**

to receiving waters named: **Unnamed tributary to Buck Creek at mile 4.5 then to the
Forked Deer at mile 118**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on:

This permit shall expire on:

Issuance date:

for Jennifer Dodd
Director

6.2. NH₃-N TOXICITY

To assess toxicity impacts, the state utilizes the EPA Ambient Water Quality Criteria for Ammonia (<https://www.epa.gov/wqc/aquatic-life-criteria-ammonia>), which is promulgated in Tennessee Rules, Chapter 0400-40-03-.03-3(3)(j), dated *September 11, 2019*, and stream temperatures of 23°C and 10°C and pH of 7.0 to derive an allowable instream protection value protective of chronic exposure to a continuous discharge. A mass balance equation with sewage treatment facility and stream flows and this allowable value determines the monthly average permit limit. The criteria document states that a 30Q5 flow value is protective in deriving allowable values. Where the division has 30Q5 flow values, the division may use them. Otherwise, the division utilizes the available 7Q10 or 1Q10 values that are generally more conservative. The criteria continuous concentrations (CCC) derived from assumed temperature and pH values are as follows:

CCC values based on temperature and pH, in mg/L:

Temperature (°C)	7.0 pH	7.5 pH	8.0 pH
23	1.56	1.15	0.64
25	1.37	1.01	0.56
27	1.20	0.89	0.49
30	0.99	0.73	0.41

Temperature (°C)	7.0 pH	7.5 pH	8.0 pH
10	3.6	2.66	1.48
15	2.6	1.92	1.07
17	2.29	1.69	0.94
20	1.89	1.39	0.78

The mass balance equation is as follows:

$$CCC = \frac{Q_S C_S + Q_{STP} C_{STP}}{Q_S + Q_{STP}} \quad \text{or,} \quad C_{STP} = \frac{CCC(Q_S + Q_{STP}) - (Q_S C_S)}{Q_{STP}}$$

where:

CCC = Criteria continuous concentration (mg/L)

Q_S = 7Q10 flow of receiving stream (MGD)

Q_{STP} = Design flow of STP (MGD)

C_S = Assumed/Measured instream NH₃ (mg/L)

C_{STP} = Allowable STP discharge of NH₃ (mg/L)

$$C_{STP} = \frac{CCC (0 \text{ MGD} + 0.4 \text{ MGD}) - (0 \text{ MGD} \times 0.1 \text{ mg/L})}{0.4 \text{ MGD}} = 1.56 \text{ mg/L (summer)}$$

$$C_{STP} = \frac{CCC (0 \text{ MGD} + 0.4 \text{ MGD}) - (0 \text{ MGD} \times 0.1 \text{ mg/L})}{0.4 \text{ MGD}} = 3.6 \text{ mg/L (winter)}$$

In this case, limiting NH₃-N to 1.1 mg/l (summer) and 2 mg/l (winter) is retained due to the anti-backsliding provision of 40 CFR 122.44(l) that requires a reissued permit to be as stringent as the previous permit.

*In the current permit, keep in mind that the state utilized the EPA document, 1999 Update to Ambient Water Quality Criteria for Ammonia, pursuant to 0400-40-03-.0-3(3)(j), and assumed stream temperatures of 27°C and 17°C and pH of 8.0 to derive an allowable instream protection value protective of chronic exposure to a continuous discharge.

CCC values based on temperature and pH, in mg/L:

Temperature (°C)	7.5 pH	8.0 pH	Temperature (°C)	7.5 pH	8.0 pH
25	2.22	1.24	15	4.22	2.36
27	1.94	1.09	17	3.72	2.07
30	1.61	0.90	20	3.06	1.71

$$C_{\text{STP}} = \frac{1.09 (0 \text{ MGD} + 0.4 \text{ MGD}) - (0 \text{ MGD} \times 0.1 \text{ mg/l})}{0.4 \text{ MGD}} = 1.09 \text{ mg/l (summer)}$$

$$C_{\text{STP}} = \frac{2.07 (0 \text{ MGD} + 0.4 \text{ MGD}) - (0 \text{ MGD} \times 0.1 \text{ mg/l})}{0.4 \text{ MGD}} = 2.07 \text{ mg/l (winter)}$$

In this case, limiting NH₃-N to 1.1 mg/l (summer) and 2 mg/l (winter) is necessary to prevent ammonia toxicity.



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, TN 37243-1102

MEETING MINUTES
PRELIMINARY PROJECT DISCUSSION

Courtesy Information
Four-Step Planning Process

1. PRELIMINARY PROJECT DISCUSSION: Minutes provided above. Refer to Wastewater Project Number and Permit number in all correspondence.
2. SITE APPROVAL PHASE: Submit NPDES Permit application (see instructions at <https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/national-pollutant-discharge-elimination-system--npdes--permit.html>) including:
 - a. A preliminary engineering report (alternatives evaluation in terms of life cycle costs and permit implications) must be submitted before negotiations for the permit can be completed.
 - b. Ensure treatment schematic on application matches engineering report and preliminary plans to be submitted in preliminary design phase (WW Design Criteria, Chapter 1, Appendices 1-D-2 and -3)
 - c. Agreement stipulating transfer of property or permanent easements for utility access for maintenance and operation of collection system and treatment system.
 - d. Plan review fee
3. PRELIMINARY DESIGN PHASE: After agreement on draft permit, submit preliminary design submittal consisting of:
 - a. Engineering Report (or Basis of Design or Design Memorandum) in accordance with WW Design Criteria Chapter 1 Appendix 1-D-2; Review of the engineering report primarily focuses on due diligence taken in the characterization of the influent and the selection of an appropriate technology to meet the agreed upon discharge requirements given the influent characterization. Life cycle cost estimates should be upgraded; previously considered alternatives should be omitted or will be disregarded at this point. Treatment processes outside the Design Criteria parameters must be justified with preferably actual data on similar installations. Performance should be examined over the realistic range of influent values.
 - b. Preliminary Plans in accordance with WW Design Criteria Chapter 1 Appendix 1-D-3. Review of the preliminary plans focuses on the process in accordance with the checklists. Preliminary plans may be attachments or figures in the engineering report.
 - c. Engineering Report review fee
4. FINAL DESIGN PHASE: Upon completion successful completion of the public comment period of the permit and approval of the engineering report and the preliminary plans, the final design phase is authorized. The final CD's should consist of:
 - a. Final Plans and Specifications in accordance with WW Design Criteria Chapter 1 Appendix 1-D-4. Note that the primary review emphasis is on those aspects not previously evaluated during the PRELIMINARY DESIGN PHASE: Maintainability, sustainability, operability and flexibility (including the visibility of process parameters to support operator optimization), expandability, and safety.



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, TN 37243-1102

MEETING MINUTES

PRELIMINARY PROJECT DISCUSSION

- b. Note procurement documentation in the project manual/specifications is generally reviewed for functionality and does not duplicate review procurement requirements, policies, or ordinances of funding agencies or owning public entities.
- c. Proof of ownership/permanent easements must be provided prior to transmission of wastewater or acceptance of wastewater at a new facility for treatment and disposal.
- d. Note Rules authorize and require the Division to specify the format and content of the submittals. Current versions of the Rules and Design Criteria specify paper submittals. The Division is moving towards accepting and prefers digital submissions. Plans should be able to be legible if printed in 11x17 paper format; documents should be word/phrase searchable. PDF versions will be digitally stamped approved on cover sheets and indices and when reproduced will fulfill the requirements for on-site construction monitoring. A paper copy (red-lined plans) of the contract documents should also be on site to record field changes to ensure an accurate record drawing set can be provided.
- e. Plan review fee

5. CONSTRUCTION PHASE

- a. Notify location environmental field office (EFO) upon:
 - i. Start of construction
 - ii. Start up, final inspection, commissioning
- b. Submit record or "as-built" drawings"