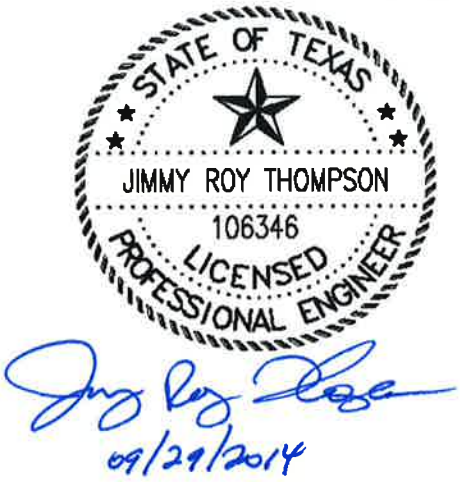
Angelina & Neches River Authority

Redland Estates and Angelina County FWSD No. 1 Sewer Improvements

TWDB CWSRF No. 73677

Amended Engineering Feasibility Report

REVISED SEPTEMBER 29, 2014



Prepared by:

KSA Engineers, Inc.
107 W. Lufkin Ave Suite 200
Lufkin, Texas 75904
936-637-6061
936-637-6239 - FAX
TBPE Firm Registration No. F-1356

KSA ENGINEERS

Exhibits:

SECTION I
INTRODUCTION

I.A. Introduction

Angelina & Neches River Authority (ANRA) provides general management services, operation services and maintenance services for the Angelina County Fresh Water Supply District No. 1's (District) current wastewater collection system. Currently there are approximately 238 potential connections within the District's service area, however only 80 residents are currently served with sanitary sewer services. The remaining connections within the District service area utilize on-site sanitary sewer facilities (OSSF). Many of the existing OSSF's no longer meet local and state regulatory requirements and therefore Phase I of the proposed project was initiated to provide first time sanitary sewer service to existing residents within the District's service area. Providing a centralized sanitary sewer collection system will also mitigate future sanitary sewer connections to residents outside the District's service area, within proximity to proposed collection mains. Phase I will provide first time sewer service to approximately 105 connections within the District's service area. Phase I will include elimination of existing on-site sewer facilities for existing connections and provide collection through a proposed sanitary sewer collection system with treatment being provided by the ANRA's North Angelina County Regional Wastewater Treatment Facility.

In May 2012 the District held an election to annex Redland Estates Subdivision, which currently includes 41 existing sanitary sewer connections that discharge to a non-functional wastewater treatment facility. Over the last 20 years the Redland Estates WWTF has discharged untreated wastewater directly into an unnamed tributary, ultimately to Segment No. 0611 of the Angelina River. In an effort to mitigate the discharge of raw sanitary sewer, Phase II includes the demolition of the remainder of the Redland Estates Wastewater Treatment Plant. It should be noted that a Public Health Threat has been issued by TCEQ and the Angelina County/Cities and Health District, attached as **Exhibit A**. TCEQ and TWDB have determined that Segment No. 0611 is an Impaired Water Body that has been and will continue to be affected by the direct discharge of untreated wastewater from Redland Estates. Phase II will eliminate the Redland Estates WWTF and pump wastewater from the existing 41 connections to the

District's collection system which will ultimately be treated at ANRA's North Angelina County Regional (NAC) Wastewater Treatment Facility (WWTF), which is described below as Phase III.

Phase III will include modifications to ANRA's North Angelina County Regional Wastewater Treatment Facility, to facilitate design flow and provide connection for the proposed wastewater service area as shown. The North Angelina County Regional Wastewater Treatment Facility currently provides treatment for Central ISD, Idlewood WCID and Department of Aging and Disability Services (DADS)-Lufkin State Supported Living Center and is permitted to treat and discharge 370,000 gallons per day. The proposed connection for the addition of Redland Estates and all participants in Phases I and II will require basin modifications which will include, construction of plant headworks to replace the existing headworks due to lack of available space to incorporate the proposed connection, construction of a chlorine contact chamber to replace the existing chlorine contact chamber and site fencing of ANRA's North Angelina County Regional Wastewater Treatment Facility to include all designated treatment facility land owned by ANRA.

The proposed project as described above will be submitted and completed as one (1) project through this Engineering Feasibility Report (EFR), but will be presented as three (3) separate phases for clarity.

I.B. Purpose

The purpose of this wastewater treatment study is to provide ANRA, the District, and TWDB with the engineering information necessary to:

- Provide general information, proposed layouts, cost estimates, and alternatives to provide first-time sanitary sewer service to residents within the District's service area, as described as Phase I;

- Provide general information, decommissioning / closure criteria for the demolition of Redland Estates WWTF, in accordance with applicable TCEQ rules and regulations, and provide an alternative collection system to convey

wastewater from Redland Estates to the District's collection system, ultimately to ANRA's North Angelina County Regional Wastewater Treatment Facility, as described as Phase II;

- Provide general information, layouts, cost estimates and alternatives for connection of the District's current and proposed sanitary sewer collection system to ANRA's North Angelina County Regional Wastewater Treatment Facility, as described as Phase III.

I.C. Authorization

Work on this project was authorized by "Task Order No. ANF.004" dated May 30, 2014, with Notice to Proceed authorized by Mr. Kelley Holcomb, ANRA General Manager following loan closing with TWDB dated June 10, 2014.

I.D. Acknowledgments

Engineering studies are only as effective in providing solutions to specific problems as the quality of the data available for analysis. The officials, staff, and operators of ANRA and the District provided valuable information for this study. Their assistance in gathering data and providing project-specific information is gratefully acknowledged.

I.E. Definitions

1. 2-hour peak flow
   (domestic wastewater treatment plants) The maximum flow sustained for a two-hour period during the period of daily discharge.
2. Absorption
   A process in wastewater treatment by which organic material is consumed by a microorganism by passing the material through the cell of the microorganism.
3. Activated Sludge
   Sludge particles produced in wastewater by the growth of organisms in aeration tanks in the presence of dissolved oxygen.
4. Adsorption
   The adhesion of material in the wastewater to the surface of the microorganism.
5. Aerobic
   A condition in which "free" or dissolved oxygen is present in the aquatic environment.

6. Aerobic Digestion
   A process by which wastewater solids and water are placed in a large tank where bacteria decompose the solids under aerobic conditions.
7. Alkalinity
   The capacity of water or wastewater to neutralize acids. Alkalinity is expressed in milligrams per liter of equivalent calcium carbonate.
8. Ammonia-Nitrogen (NH_3-N)
   Nitrogen content of the wastewater in the form of ammonia. Ammonia is oxidized to nitrite (NO_2-N) and nitrate (NO_3-N) during the nitrification process.
9. Anaerobic
   A condition in which "free" or dissolved oxygen is not present in the aquatic environment.
10. Anaerobic Digestion
    A process by which wastewater solids and water are placed in a large tank where bacteria decompose the solids under anaerobic conditions. Two groups of bacteria act in balance: acid formers and methane formers.
11. Annual Average Flow (AAF)
    The arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months.
12. Autotrophic
    A term generally applied to bacteria that consume only inorganic matter. These organisms have a slower growth rate than heterotrophic bacteria.
13. Biochemical Oxygen Demand (BOD_5)
    A measurement of the amount of oxygen required by the microorganisms to metabolize or digest the organic material in the wastewater.
14. Carbonaceous BOD ($CBOD_5$)
    A measurement of the amount of oxygen required when aerobic bacteria change carbon compounds to carbon dioxide. This is usually measured by inhibiting nitrification in the BOD analysis.
15. Daily average flow
    The arithmetic average of all determinations of the daily flow within a period of one calendar month
16. Daily maximum flow
    The highest total flow for any 24-hour period in a calendar month.
17. Dissolved Solids
    Consists of organic and inorganic material that is present in true solution in the wastewater.
18. F/M Ratio
    Food to microorganism ratio usually expressed in terms of BOD and Mixed Liquor Volatile Suspended Solids (MLVSS). A measure of food provided to bacteria in an aeration tank.
    F/M = lb. BOD/day/lb. MLVSS
19. Flocculation
    The gathering together of fine particles to form larger particles.

20. Grit

    The heavy mineral material present in wastewater such as sand, eggshells, gravel, and cinders.

21. Heterotrophic

    A term generally applied to bacteria that consume only organic matter. These organisms have a higher growth rate than autotrophic bacteria.

22. Maximum 2-hour peak flow

    (domestic wastewater treatment plants) The highest 2-hour peak flow for any 24 hour period in a calendar month.

23. Media

    The material in a trickling filter on which organisms grow.

24. Microorganisms

    Microscopic living objects which require energy, carbon, and small amounts of inorganic elements to grow and multiply. They get these requirements from the wastewater and in doing so, help to remove the pollutants from the wastewater.

25. Mixed Liquor

    Used to refer to the mixture of wastewater and return activated sludge in the aeration tank of an activated sludge system.

26. Mixed Liquor Suspended Solids (MLSS)

    The suspended solids in the mixed liquor of an aeration tank.

27. Mixed Liquor Volatile Suspended Solids (MLVSS)

    The organic or volatile suspended solids in the mixed liquor of an aeration tank.

28. Nitrification

    A process in which bacteria change the ammonia and organic nitrogen in wastewater into oxidized nitrogen (nitrate). This process employs autotrophic bacteria termed nitrosomonas and nitrobacteria.

29. Overaerated

    Sludge having long periods in aeration tanks with dissolved oxygen at 4 mg/l and over.

30. Overoxidized

    Sludge which has been treated by aeration to such an extent that it no longer has significant organic content. This sludge is often referred to as "ash."

31. Organic Waste

    Waste material which comes from animal or vegetable sources. Organic waste generally can be consumed by bacteria and other small organisms. Organic wastes contain mainly carbon and hydrogen along with other elements.

32. pH

    A term used to express the intensity of the acid or alkaline sources. A pH of 7 is considered neutral and optimal for wastewater treatment, with acidity increasing as the pH decreases. Normal pH for wastewater treatment is 6.5 to 7.5.

33. Preliminary Treatment
    The removal of metal, rocks, sand, rags, and similar materials which can hinder the operation of a treatment facility.
34. Primary Treatment
    A process in which those substances in wastewater that settle or float are removed.
35. Secondary Treatment
    A process used to convert dissolved or suspended materials into a form more readily separated from the water being treated.
36. Septic
    A condition produced by the growth of anaerobic organisms. If severe, the wastewater turns black, giving off foul odors and creating a heavy oxygen demand.
37. Settleable Solids
    That matter in wastewater which will not stay in suspension during a preselected settling period.
38. Sloughings
    Trickling filter slimes that have been washed off the media.
39. Soluble BOD (SBOD)
    BOD of water that has been filtered in the suspended solids test.
40. Sludge
    The settleable solids separated from the liquid during clarification.
41. Sludge Age
    The theoretical length of time that a particle of activated sludge will remain in the aeration system.
42. Sludge Digestion
    A process by which organic matter in sludge is gasified, liquefied, mineralized, or converted to a more stable form by anaerobic or aerobic organisms.
43. Supernatant
    Liquid removed from settled sludge. Supernatant commonly refers to the liquid between the sludge on the bottom and the scum on the surface of any settling tank.
44. Suspended Solids
    Solids that either float on the surface of or are in suspension in water, wastewater, or other liquids and are largely removable by filtering.
45. Total Kjeldahl Nitrogen (TKN)
    Nitrogen content detected by the Kjeldahl analytical procedure which includes the organic and ammonia forms.

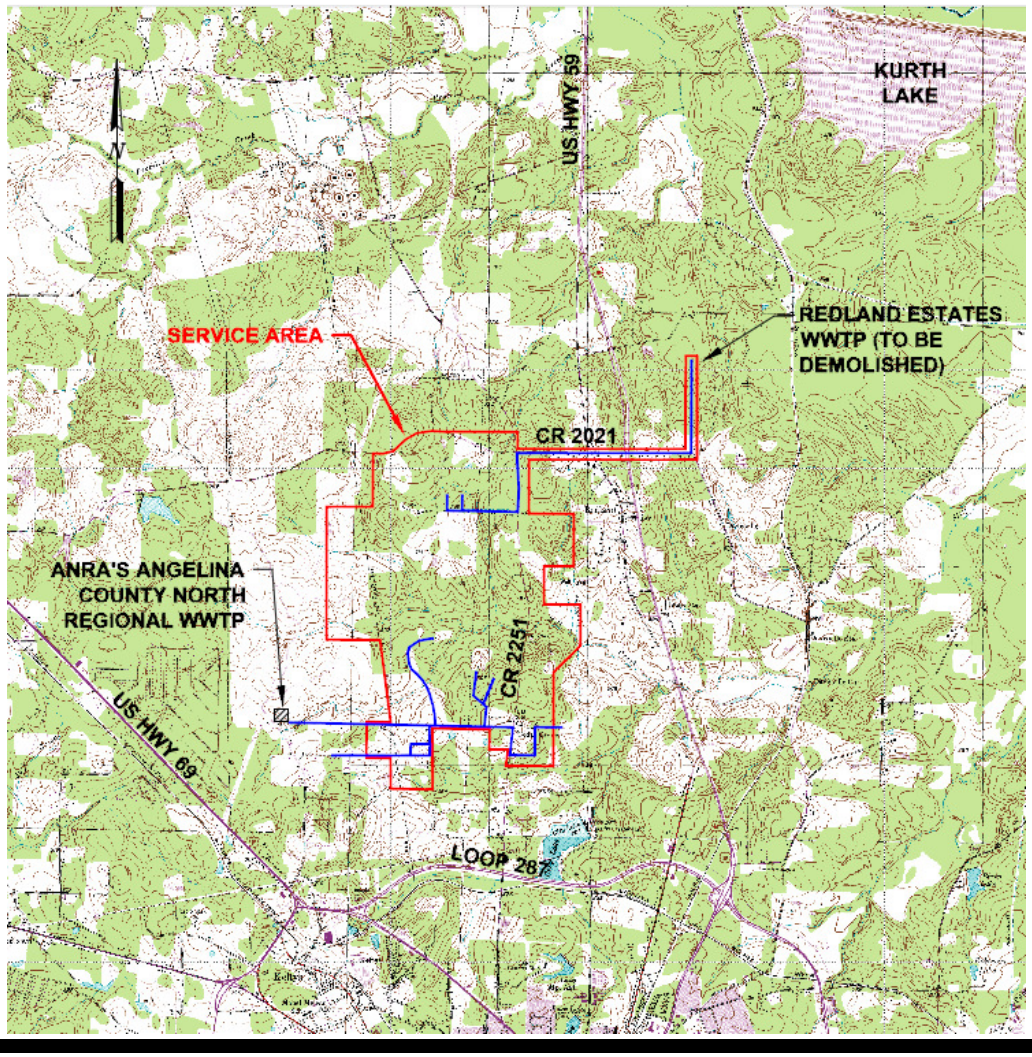
SECTION II
SEWER SYSTEM GENERAL INFORMATION AND POPULATION TRENDS

This section provides a general description of the project area, current and future population of the area to be served, and project description of each of the phases identified in **Section I**.

II.A. General Information

II.A.1 – Service Area: Angelina County Fresh Water Supply District No. 1 serves areas outside current incorporated limits within Angelina County, just north of the City of Lufkin, as shown below in **Figure II.1**. The service area is more specifically described as north to south from Bar-B-Q Road to FM 2021 and east to west from approximately Allen Gin Road to approximately 1,770 L.F. east of FM 2251.

Figure II.1 - District Service Area



Wastewater service is currently provided to approximately 80 of the total 238 dwellings within the District's service area and includes residential and commercial customers. The remaining connections within the District service area utilize on-site sanitary sewer facilities (OSSF). Many of the existing OSSF's no longer meet local and state regulatory requirements and therefore Phase I of the project is proposed to provide first time sanitary sewer service to existing residents within the District's service area. Providing a centralized sanitary sewer collection system will also mitigate future sanitary sewer connections to residents outside the District's service area, within proximity to proposed collection mains. Phase I will include elimination of existing on-site sewer facilities for existing connections and provide collection through a proposed sanitary sewer collection system with treatment being transferred to ANRA's North Angelina County Regional Wastewater Treatment Facility, as proposed in the 2013 IUP to initiate regionalization with Redland Estates WWTF, District service area and ANRA's North Angelina County Regional Wastewater Treatment Facility. No heavy industrial users are currently located in the District's service area; however TxDOT is currently under construction of highway widening for the I-69 corridor located just east of the District's service area. Therefore there is potential for additional commercial customers and future industrial connections.

In May 2012 the District held an election to annex Redland Estates Subdivision, which currently includes 41 existing sanitary sewer connections that discharge to a non-functional wastewater treatment facility. Over the last 20 years the Redland Estates WWTF has discharged untreated wastewater directly into an unnamed tributary, ultimately to Segment No. 0611 of the Angelina River. It should be noted that a Public Health Threat has been issued by TCEQ and the Angelina County Cities and Health District, attached as **Exhibit A**. TCEQ and TWDB have determined that Segment No. 0611 is an Impaired Water Body that has been and will continue to be affected by the direct discharge of untreated wastewater from Redland Estates. Phase II will eliminate the Redland Estates WWTF and pump wastewater from the existing 41 connections to the District's collection system which will ultimately be treated at Angelina & Neches River Authority's (ANRA) North Angelina County Regional Wastewater Treatment Facility, which is described below as Phase III.

The North Angelina County Regional Wastewater Treatment Facility currently provides treatment for Central ISD, Idlewood WCID and DADS-Lufkin State Supported Living Center and is permitted to treat and discharge 370,000 gallons per day. ANRA holds a TCEQ permit for discharging treated effluent into waters of the State of Texas. The facility is authorized to discharge into an unnamed tributary; thence to Mill Creek; thence to Paper Mill Creek; thence to Angelina River/Sam Rayburn Reservoir in Segment No. 0615 of the Neches River Basin. The Texas Pollutant Discharge Elimination System (TPDES) permit number for the plant is WQ0011620001. The proposed connection for the addition of Redland Estates and all participants in Phases I and II will require basin modifications which will include, construction of plant headworks to replace the existing headworks due to lack of available space to incorporate the proposed connection, construction of a chlorine contact chamber to replace the existing chlorine contact chamber and site fencing of ANRA's North Angelina County Regional Wastewater Treatment Facility to include all designated treatment facility land owned by ANRA.

***II.A.2 – Environmental Resources*:** The existing environmental resources of the District service area and the surrounding area are important to recognize since any proposed improvements will have some level of impact on these resources. A general overview of the environmental factors affecting land resources follow.

1. Climate

The District's service area is in a subtropical area having warm summers and mild winters. The average daily temperature in January is 49 degrees Fahrenheit while the average daily temperature in July is 83 degrees Fahrenheit. The highest recorded temperature is 110 degrees F in 1909 and the lowest was -2 degrees F in 1951 (*www.weather.com*). The prevailing winds in the area are generally from the south. Rainfall information for the area indicates an average annual rainfall of approximately 49 inches. **Table II.1** lists the average monthly minimum and maximum temperatures and rainfall (available from www.weather.com).

Table II.1 - Average Monthly Temperature and Rainfall

Month	Average High Temperature	Average Low Temperature	Average Monthly Rainfall
January	60	38	4.18
February	64	42	4.00
March	71	48	3.78
April	78	55	3.05
May	85	64	4.64
June	90	70	4.68
July	93	72	3.05
August	94	72	3.34
September	89	66	4.08
October	80	56	4.83
November	70	47	5.01
December	61	39	4.44
Total	**NA**	**NA**	***49.08***
Average	**78**	**56**	**4.09**

Based on all the data shown in **Table II.1**, the average monthly rainfall in the service area of the District is approximately 4.09 inches.

2. Topography

Angelina County encompasses approximately 864 square miles and the District's service area is approximately 2 square miles. The area is generally level country and is used for logging and farming. The terrain is best described as hilly with a high congregation of pine trees, with an average elevation of 300 feet above mean sea level. Elevation ranges from 370 feet to 260 feet in various areas throughout the District's service area, based upon information provided in the USGS 7.5 minute topographic map. The District is separated by several unnamed tributaries which drain west to east, ultimately to Mill Creek.

3. Geology

Geologic units in Angelina County (from oldest to youngest) are Alluvium, Catahoula Formation, Jackson Group, Yegua Formation, Cook Mountain Formation, Sparta Sand, Weches Formation, Queen City Sand, Reklaw Formation, Carrizo Sand, and Wilcox Group (*Texas Water Development Board, March 1970*).

4. Soils

The predominant soil type in the District service area is conducive to farming activities. The soils are primarily a clay, quartz sand, and lignite mixture. The soils are typically brown to dark brown. The soils exhibit a low to moderate permeability and are considered moderate to highly expansive (*USDA, August 1977*).

5. Floodplains

Floodplains within the planning area have been identified by the U.S. Department of Housing and Urban Development - Federal Emergency Management Agency (FEMA) in the recent flood insurance study of Angelina County. Any proposed construction in floodplain areas must meet all applicable state and federal regulations.

6. Wetlands

A wetlands map for the planning area is available from the Texas Natural Resources Information System. These maps are prepared by stereoscopic analysis of high altitude aerial photographs. Similar to identifying floodplains, all supposed wetland areas will be identified prior to construction. It is generally best to avoid construction in any wetlands to limit mitigation efforts required to recover existing wetlands.

An Environmental Data Form (TWDB-0800) has been prepared for this project and submitted to applicable review agencies for comments and proposed mitigation measures. Proposed comments and mitigation measures provided by respective review agencies will be submitted to TWDB for final environmental review ultimately for issuance of a Finding of No Significant Impact (FONSI). It should be noted that construction is

proposed within existing State or County right-of-ways and therefore will be installed within previously disturbed and currently maintained areas.

II.B. Present and Projected Population

With the confined limits of the District's service area, and due to the size of the census block for this area, the population projection will be based upon the Angelina County population projection from TWDB 2016 Regional Water Plan, which projects an average annual growth rate of 0.48%. TWDB 2016 Regional Water Plan population projections for Angelina County were also compared to City of Lufkin, City of Huntington and City of Diboll to verify projected population growth; data presented shows consistent growth for various areas around Angelina County, as shown below in **Table II.2**.

Table II.2 - TWDB 2016 Regional Water Plan Population Projections

Year	Angelina County	AAG	City of Lufkin	AAG	City of Huntington	AAG	City of Diboll	AAG
2020	93,316		37,713		2,278		5,137	
2030	99,848	0.68%	40,352	0.68%	2,438	0.68%	5,496	0.68%
2040	105,329	0.54%	42,567	0.54%	2,571	0.53%	5,798	0.54%
2050	110,332	0.47%	44,589	0.47%	2,694	0.47%	6,073	0.46%
2060	114,808	0.40%	46,398	0.40%	2,803	0.40%	6,320	0.40%
2070	118,772	0.34%	48,000	0.34%	2,900	0.34%	6,538	0.34%
Average		0.48%		0.48%		0.48%		0.48%

The projected population for the District's service area, based upon criteria discussed above, is shown below in **Figure II.2** and **Table II.3**.

Figure II.2 - District Service Area Population Projection

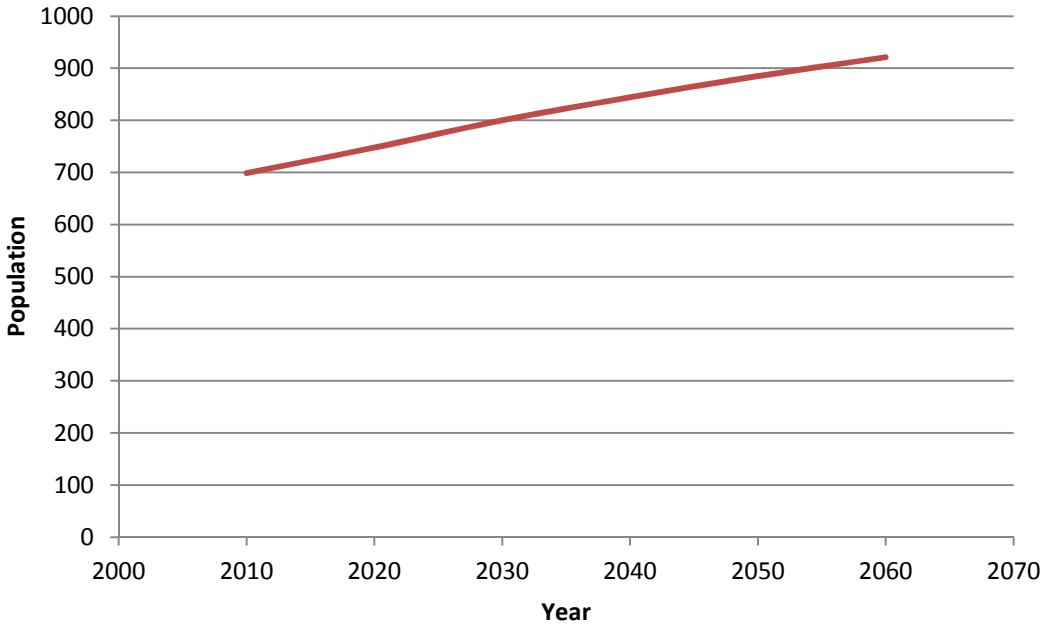


Table II.3 - District Service Area Population Projection

Year	Population Projection
2010	699
2020	748
2030	800
2040	**844**
2050	885
2060	921
2070	953

It should be noted that the District's 2010 population is based upon a total projected connection/dwelling count of 238, in conjunction with the 2013 Socioeconomic Survey average household size for the occupied dwellings at 2.94 persons per household.

Table II.4 - District Service Area Population Projection

	Existing Connections / Dwellings	Existing Population	2040 Design Population	2040 Design Connections
Existing District Customers	80	235	284	97
Redland Estates (Including 2021)	66	194	234	80
County Barn Road	10	29	35	12
Smallwood Road	9	26	31	11
Ruth Lane	14	41	50	17
BBQ Road	23	68	82	28
Phil Jackson Road	36	106	128	44
Total	**238**	**699**	**844**	**289**

*Persons per household = 2.94 (from 2013 District Socioeconomic Survey)

II.C. Present and Projected Wastewater Loadings

Table II.4 above shows a population projection breakdown of individual areas, existing and proposed, which will ultimately contribute to the District's collection system. **Table II.5** below shows a breakdown of present and projected wastewater loadings.

Table II.5 - District Present and Projected Wastewater Loadings

	Existing Population	Average Daily Wastewater Loading (gpd)	Peak 2-Hour Wastewater Loading (gpd)	2040 Design Population	Average Daily Wastewater Loading (gpd)	Peak 2-Hour Wastewater Loading (gpd)
Existing District Customers	235	23,500	94,000	284	28,400	113,600
Redland Estates (Including 2021)	194	19,400	77,600	234	23,400	93,600
County Barn Road	29	2,900	11,600	35	3,500	14,000
Smallwood Road	26	2,600	10,400	31	3,100	12,400
Ruth Lane	41	4,100	16,400	50	5,000	20,000
BBQ Road	68	6,800	27,200	82	8,200	32,800
Phil Jackson Road	106	10,600	42,400	128	12,800	51,200
Total	**699**	**69,900**	**279,600**	**844**	**84,400**	**337,600**

As shown above in **Table II.5**, design year 2040 average daily wastewater flows for Angelina County FWSD No. 1 are projected to be 84,400 gallons per day with a two-hour peak flow of 337,600 gallons per day. The Texas Commission on Environmental Quality (TCEQ) Chapter 217 rules require a daily wastewater flow of 75 to 100 gallons per person for calculating average daily flow and a peaking factor of 4 to calculate peak two-hour flow, in the absence of historical flow data.

II.D. Ability of Dwellings

All existing connections within the existing service area of the District are currently served by Angelina County FWSD No. 1 for sewer service or have private treatment facilities. The proposed facilities, as described in **Section III**, will provide a safer and more sanitary treatment option to dwellings with private systems, as shown in the Public Health Threat as issued by TCEQ and Angelina County/Cities and Health District, attached as **Exhibit A**, but will not significantly change system operation. Minor operational and maintenance cost will be associated with the use of the proposed facilities which will be borne by the District, but no additional costs (other than connection fees, as required, and monthly service bills) will be incurred by residents.

SECTION III
ALTERNATIVES AND DESIGN ANALYSIS

III.A. Design Criteria

Sewer service inadequacies fall into two (2) categories: 1) does not exist or is not provided and 2) is provided by an organized sewage collection and treatment facility that does not comply with the standards and requirements established by TCEQ.

As shown above in **Table II.3**, the District is projected to grow from a current estimated population of 699 to a 2040 design year population of 844. Also, 2040 design year projected wastewater flow data was utilized for design criteria for individual areas, as broken down in **Table II.5**, specifically for pipe and pump sizing as presented below in **Section III.B** below for proposed Phase I improvements.

Sanitary sewer main design criteria for the proposed project are based upon Texas Commission on Environmental Quality Chapter 217 - Design Criteria for Domestic Wastewater Systems. The design criteria will be summarized below for the proposed projects and alternatives.

Chapter 217 - Design Criteria for Domestic Wastewater Systems:

- Ability of the system to handle transport of peak dry weather flow plus infiltration and inflow, immediately upon completion and at the end of its design life (§217.53 (a)).
- Pipe material for gravity and forcemain systems for characteristics of wastewater conveyed, possibility of septic conditions, external forces, ground water, internal pressures, abrasion / corrosion resistance and joint material (§217.53 (b-c) , §217.64 - §217.67).
- Separation distances between public water supply pipes and wastewater collection system pipes or manholes (§217.53 (d)).
- Installation of laterals and taps (§217.53 (e)).

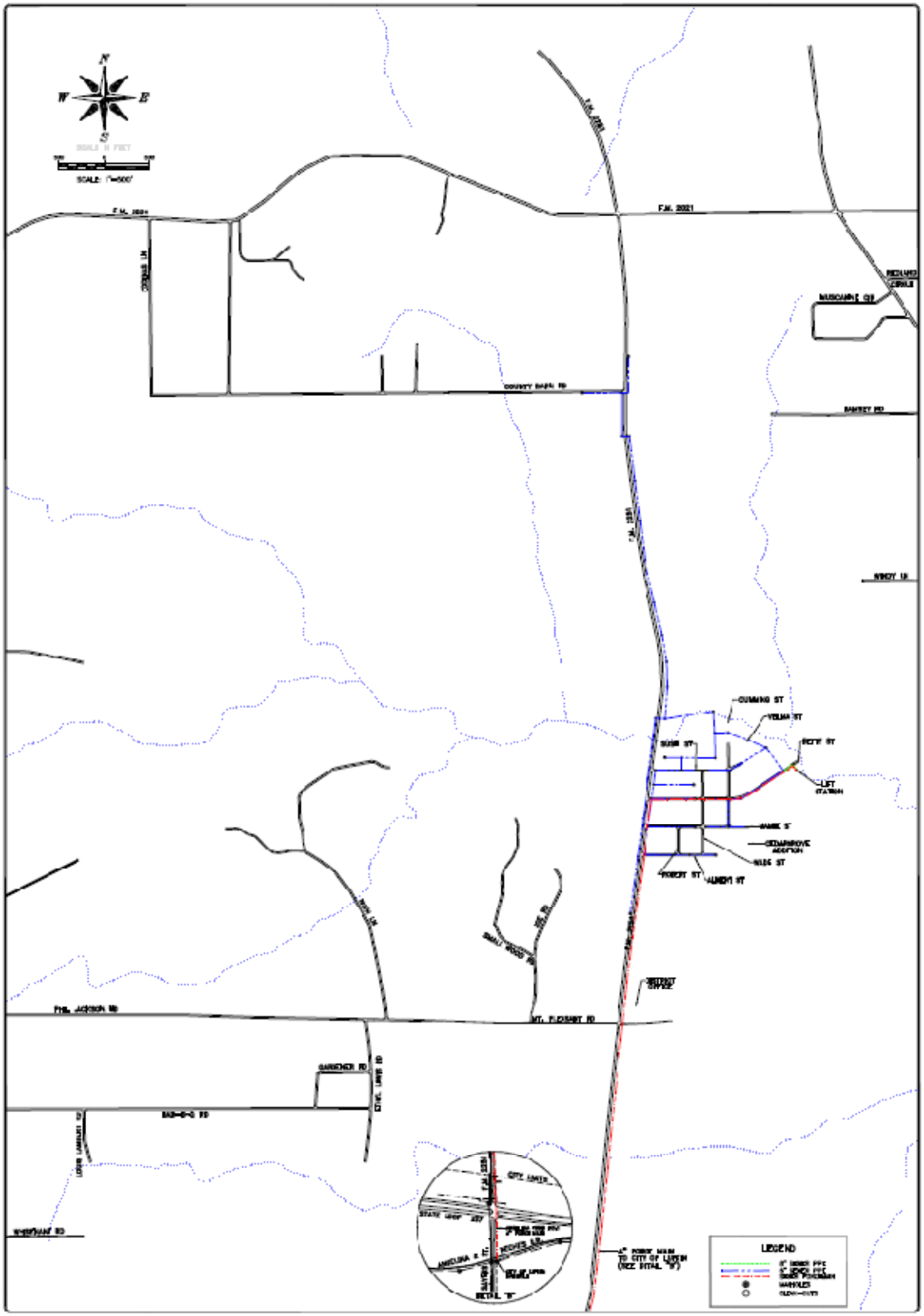
- Bores for crossings (§217.53 (f)).
- Corrosion Potential (§217.53 (g)).
- Capacity analysis to ensure the system's capacity is sufficient to serve estimated future population, prevent surcharge at the expected peak flow, and minimum main line size requirement (§217.53 (j)).
- Minimum and maximum slopes, per Table C.1 of §217.53 (l)), to allow a full flow velocity not less than 2.0 feet per second nor to exceed 10 feet per second (§217.53 (j)).
- Alignment to maintain uniform grade between manholes with maximum allowable spacing for collection systems (§217.53 (m)).
- Pipe embedment (§217.54 (a)).
- Compaction (§217.54 (b)).
- Envelope size and trench width (§217.54 (c-d)).
- Manholes and related structures ((§217.55).

With projected population and design flow calculations as shown in **Section II**, individual projects and alternatives for Phases I – III will be discussed further below.

III.B. Phase I - Project Alternatives Considered and Recommendations

Phase I improvements consist of providing first time sanitary sewer service to residents within the District's current service area, and will by necessity also include future connections to residential, commercial and industrial connections outside the District's service area who do not have centralized sanitary sewer. **Figure III.1** below shows the location and size of the District's existing sanitary collection system. Due to the sparse nature of the location of existing / proposed connections, as shown below, Phase I will be broken up into five (5) different sub-categories for design analysis. Each independent project will be discussed below along with alternatives considered. Modeling of proposed sewer mains was completed in conjunction with the projected design flow, as shown in **Table II.5**, utilization of Google Earth for residences along project path and to estimate elevation, and Bentley's Sewer Gems software.

Figure III.1 – Existing District Wastewater Map



Proposed collection system improvements and installation of first time sanitary sewer service for Phase I, includes providing sanitary sewer collection system facilities within the District's current service area, specifically including wastewater collection system design for County Road 89 (Phil Jackson Road), Service Area Near District Office, Bar-B-Q Road, Ruth Lane, Smallwood Road, Joe Road and County Barn Road. Additional improvements will be considered for Redland Estates and will be considered in Phase II.

Four (4) alternatives were considered for the proposed improvements for Phase I, including: 1) gravity sanitary sewer with lift stations/forcemains, 2) pressure sewer system, 3) replacement of on-site sanitary sewer facilities (OSSF's), and 4) combination gravity sanitary sewer in conjunction with vacuum system.

Due to the topographic nature of the District's service area, as discussed in **Section II**, and the sparse layout of existing dwellings, Alternative No. 4 (gravity sanitary sewer in conjunction with vacuum system) will not be discussed further. Vacuum sanitary sewer systems are ideal for densely populated areas, with a minimum of 200 connections to offset capital installation cost, and relatively flat terrain. Elevation differences up to a maximum of 30' are generally conducive for vacuum systems, however vacuum systems are not efficient in providing suction lift above 30' or providing service to sparsely populated areas. Operation and maintenance costs for vacuum systems are also not comparable to Alternatives 1 through 3, for the District's design characteristics. Therefore, Alternatives 1 through 3 will only be considered for Phase I improvements, and again include: 1) gravity sanitary sewer with lift stations/forcemains, 2) pressure sewer system, and 3) replacement of on-site sanitary sewer facilities (OSSF's).

III.B.1: Line A – County Barn Road: Line A proposed to provide first time sanitary sewer service to ten (10) existing residences located on County Barn Road to the District's existing 6" PVC gravity sanitary sewer main located on FM 2251. Due to elevation differences along County Barn Road, standard gravity sanitary sewer installation cannot be utilized but must be combined with a pressure sewer system to collect and divert sanitary sewer to the District's collection system. Therefore there are

three (3) alternatives to providing sewer service to connections along County Barn Road: 1) full pressure system which would ultimately connect to a 6" PVC gravity main on FM 2251 and 2) a combination gravity and pressure system, which will utilize gravity collection where possible and pressure sewer the remainder of the way to connect to the existing 6" PVC gravity main on FM 2251, and 3) replacement of existing OSSF's.

Option 1: 2"/3" PVC SDR 26 Pressure Sanitary Sewer Main:

Option 1 consists of a traditional open cut installation of proposed sanitary sewer pressure mains. Open cut trenches would be excavated in existing County right-of-ways for installation of proposed pressure mains to connect to the existing 6" PVC gravity main located at the intersection of County Barn Road and FM 2251. The new pressure main will be installed and tested prior to services being transferred and will require installation of individual 2 hp residential grinder lift stations at each connection and abandonment of existing septic tanks in accordance with TCEQ regulations. The proposed pressure system will require approximately 3,415 linear feet of 2" and 3" PVC SDR 26 sanitary sewer main, including ten (10) individual residential package lift stations, electrical connections and sanitary sewer services from the pressure main to the proposed package lift station. For design and budgeting purposes, the package lift station consists of a 24"x48" fiberglass basin, 2 HP explosion proof grinder pump and standard control panel with alarms as required in accordance with 30 TAC Chapter 217.

Figure III.2 – Option 1 (County Barn Road)

Figure III.2 above shows the general location of County Barn road and proposed installation for Option 1. **Table III.2** below provides a detailed breakdown of projected construction costs.

Table III.2 - Line A: Option 1 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Total Cost
1.01	2" SDR 26 Pressure Sewer	LF	2,150	$12.00	$25,800.00
1.02	3" SDR 26 Pressure Sewer	LF	1,265	$15.00	$18,975.00
1.03	Connect to Existing Manhole	EA	2	$1,500.00	$3,000.00
1.04	Package Simplex Grinder Lift Station	EA	10	$9,500.00	$95,000.00
1.05	Service Reconnections	EA	10	$1,500.00	$15,000.00
1.06	Gravel Repair	LF	515	$15.00	$7,725.00
1.07	Demolition and Abandonment of Existing Septic Tank	LF	10	$850.00	$8,500.00
1.08	Seeding and Fertilizing	LF	2,150	$2.00	$4,300.00
1.09	Storm Water Pollution Prevention	LF	2,150	$1.00	$2,150.00
1.10	Trench Safety	LF	2,150	$1.00	$2,150.00
1.11	Mobilization	LS	1	$18,260.00	$18,260.00
				Subtotal Construction Cost	**$200,860.00**
				15% Contingencies	$29,640.00
				Total Projected Construction Cost	**$230,500.00**

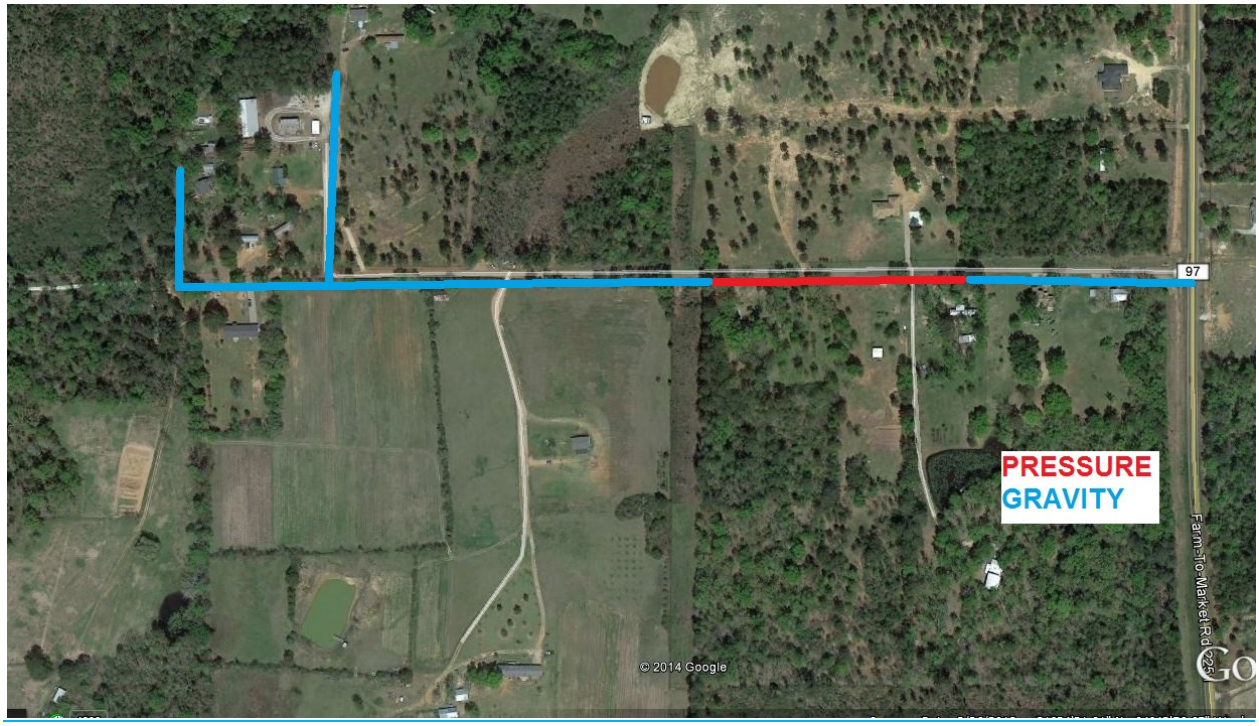
As shown in **Table III.2**, the total projected construction cost for County Barn Road Option 1 is $230,500.00, including 15% contingencies. The total projected cost of per connection of the existing ten (10) houses on County Bard Road, equates to $23,050.00 per connection. Historical operation and maintenance cost of pressure sewer mains is approximately 1.5% of the construction cost per year. For this project, annual O&M cost of the proposed pressure sanitary sewer main is projected to be $3,460 per year. The present value of the O&M cost assuming an annual 3% interest rate for inflation over a 20 period is $51,475.

Option 2: Combination Gravity/Pressure and Lift Station:

Option 2 consists of installation of a combination pressure and gravity system. Existing connections will be serviced via gravity main down to the low point of County Barn

Road, where a lift station is proposed to carry the wastewater to a gravity main located on FM 2251. The new lift station and forcemain would be installed/laid and tested prior to services being started. **Figure III.3** below shows the general location of County Barn Road and proposed installation for Option 2. **Table III.3** below provides a detailed breakdown of projected construction costs.

Figure III.3 – Option 2 (County Barn Road)



As shown below in **Table III.3**, the total projected construction cost for County Barn Road Option 2 is $327,500.00, including 15% contingencies. The total projected cost of ten (10) houses on County Barn Road, utilizing Option 2, equates to $32,750 per connection. Historical operation and maintenance cost of combination pressure/gravity sewer mains is approximately 1.0% of the construction cost per year. For this project, annual O&M cost of the proposed gravity replacement main is projected to be $3,275 per year. The present value of the O&M cost assuming a 3% interest and a 20 period is $48,725.

Table III.3: Line A Option 2 Construction Cost

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	6" SDR 26 Sanitary Sewer (All Depths)	LF	3,520	$25.00	$88,000.00
2.02	3" SDR 26 Pressure Sewer	LF	565	$15.00	$8,475.00
2.03	Proposed Lift Station	EA	1	$55,000.00	$55,000.00
2.04	Package Simplex Grinder Lift Station	EA	3	$9,000.00	$27,000.00
2.04	Service Reconnections	EA	7	$2,500.00	$17,500.00
2.05	Gravel Repair	LF	515	$15.00	$7,725.00
2.06	Manholes (0-6)	EA	8	$3,250.00	$26,000.00
2.07	Manholes Extra Depth	VF	30	$230.00	$6,900.00
2.08	Demolition and Abandonment of Existing Septic Tank	LF	10	$850.00	$8,500.00
2.09	Seeding and Fertilizing	LF	3,520	$2.00	$7,040.00
2.10	Storm Water Pollution Prevention	LF	3,520	$1.00	$3,520.00
2.11	Trench Safety	LF	3,520	$1.00	$3,520.00
2.12	Mobilization	LS	1	$25,918.00	$25,918.00
				Subtotal Construction Cost	**$285,098.00**
				15% Contingencies	$42,402.00
				Total Projected Construction Cost	**$327,500.00**

Option 3: Replacement of existing OSSF

Option 3 consists of installation and replacement of existing OSSF's. The existing residents currently have septic systems. Aerobic septic systems, as required by Angelina County/Cities Health District will be utilized for Option 3, with existing OSSF's being removed and hauled off-site.

Table III.4 below provides a detailed breakdown of projected construction costs. As shown below in **Table III.4**, the total projected construction cost for Option 3 is $110,000.00 including 15% contingencies. The total projected cost of ten (10) houses on County Barn Road, utilizing Option 3, equates to $11,000 per connection. Operation and maintenance cost of OSSFs are projected to be 0.5% of the construction cost per year. For this project, annual O&M cost of the individual OSSF's is projected to be $550.00. The present value of the O&M cost assuming a 3% interest and a 20 period is $8,185.

Table III.4: Line A Option 3 Construction Cost

Item	Description	Units	Quantity	Unit Cost	Cost
3.01	Aerobic Septic System	EA	10	$7,500.00	$75,000.00
3.02	Demolition and Abandonment of Existing Septic Tank	LF	10	$850.00	$8,500.00
3.03	Seeding and Fertilizing	LS	1	$2,500.00	$2,500.00
3.04	Mobilization	LS	1	$8,600.00	$8,600.00
				Subtotal Construction Cost	**$94,600.00**
				15% Contingencies	$15,400.00
				Total Projected Construction Cost	**$110,000.00**

The total projected cost per connection for Option 3 is $11,000.00, however it should be noted that individual aerobic septic systems generally have a two (2) year warranty at which time the owner is responsible for operation and maintenance. Existing OSSFs on-site have demonstrated the lack of owner operation and maintenance throughout the years and typical replacement of major mechanical equipment can range from five (5) to fifteen (15) years. Assuming a ten (10) year mechanical replacement on each OSSF, at 25% of the original per connection cost, including 3% inflation the individual annual O&M cost for Option 3 is projected to be $10,935 which includes a projected mechanical replacement cost of $2,750. Additionally, a replacement of the proposed OSSF's for Option 3 should be considered at the end of the 20 year design life of the projects. Therefore, replacement cost of individual OSSF's are also considered in the O&M cost using the current cost per connection as a future value, including 3% inflation over the 20 year design life. Projected O&M costs are therefore $30,805.

Ranking and Recommendation

Three (3) different options were presented above to provide first time sanitary sewer service to residents along County Barn Road. **Table III.5** below contains a ranking of the options presented above.

Table III.5 - Ranking of Options

Options	Capital Cost	Technical Soundness	O&M Cost	Design Life of Proposed Improvements	Total Score
Option 1 - Full Pressure	2	2	3	2	9
Option 2 - Combination Gravity Pressure System	1	3	2	3	9
Option 3 - OSSF	3	1	1	1	6

In **Table III.5** a higher total score indicates a higher overall ranking. Options 1 and 2 have the overall highest ranking (9), however Option 2 has a higher overall capital cost ($327,500) as compared to Option 1 ($230,500). Although Option 1 has an overall lower capital and O&M cost, as compared to Option 2, the District's system currently consists of gravity sanitary sewer with lift stations as required. In an effort to keep the District's existing system consistent with the proposed system, it is recommended that Option 2 be utilized for Line A to provide first time sanitary sewer service to residents along County Barn Road.

III.B.2: Line B – Smallwood Road: Line B proposes to provide first time sanitary sewer service to nine (9) existing residences located on Smallwood Road to the District's proposed sanitary sewer collection main which will be located on Phil Jackson Road. There are five (5) existing residential connections along Joe Road and four (4) along Smallwood Road. There are four (4) alternatives to providing sewer service to connections along Smallwood Road, including: 1) full pressure system which would ultimately connect to a proposed sanitary sewer collection main on Phil Jackson Road, 2) a gravity sanitary sewer system with a lift station, which will pump sanitary sewer to a proposed sanitary sewer collection main on Phil Jackson Road, 3) replacement of existing OSSF's and 4) combination gravity sanitary sewer system with lift stations to consolidate Lines B and C.

Option 1: 2"/3" PVC SDR 26 Pressure Sanitary Sewer Main:

Option 1 consists of a traditional open cut installation of proposed sanitary sewer pressure mains. Open cut trenches would be excavated in existing County right-of-ways

for installation of proposed pressure mains to connect to the District's proposed sanitary sewer collection main which will be located on Phil Jackson Road. The new pressure main will be installed and tested prior to services being transferred and will require installation of individual 2 hp residential grinder lift stations at each connection and abandonment of existing septic tanks in accordance with TCEQ regulations. The proposed pressure system will require approximately 2,950 linear feet of 2" and 3" PVC SDR 26 sanitary sewer main, including nine (9) individual residential package lift stations, electrical connections and sanitary sewer services from the pressure main to the proposed package lift station. For design and budgeting purposes, the package lift station consists of a 24"x48" fiberglass basin, 2 HP explosion proof grinder pump and standard control panel with alarms as required in accordance with 30 TAC Chapter 217.

Figure III.4 below shows the general location of Smallwood Road and proposed installation for Option 1.

Figure III.4 – Option 1 (Smallwood Road)

Table III.6 below provides a detailed breakdown of projected construction costs. As shown in **Table III.6**, the total projected construction cost for Smallwood Road Option 1 is $137,500.00, including 15% contingencies. The total projected cost of per connection of the existing nine (9) houses on Smallwood Road and Joe Road, equates to $15,280 per connection. Historical operation and maintenance cost of pressure sewer mains is approximately 1.5% of the construction cost per year. For this project, annual O&M cost of the proposed pressure sanitary sewer main is projected to be $2,065 per year. The present value of the O&M cost assuming an annual 3% interest rate for inflation over a 20 period is $30,720.

Table III.6 - Line B: Option 1 Construction Costs

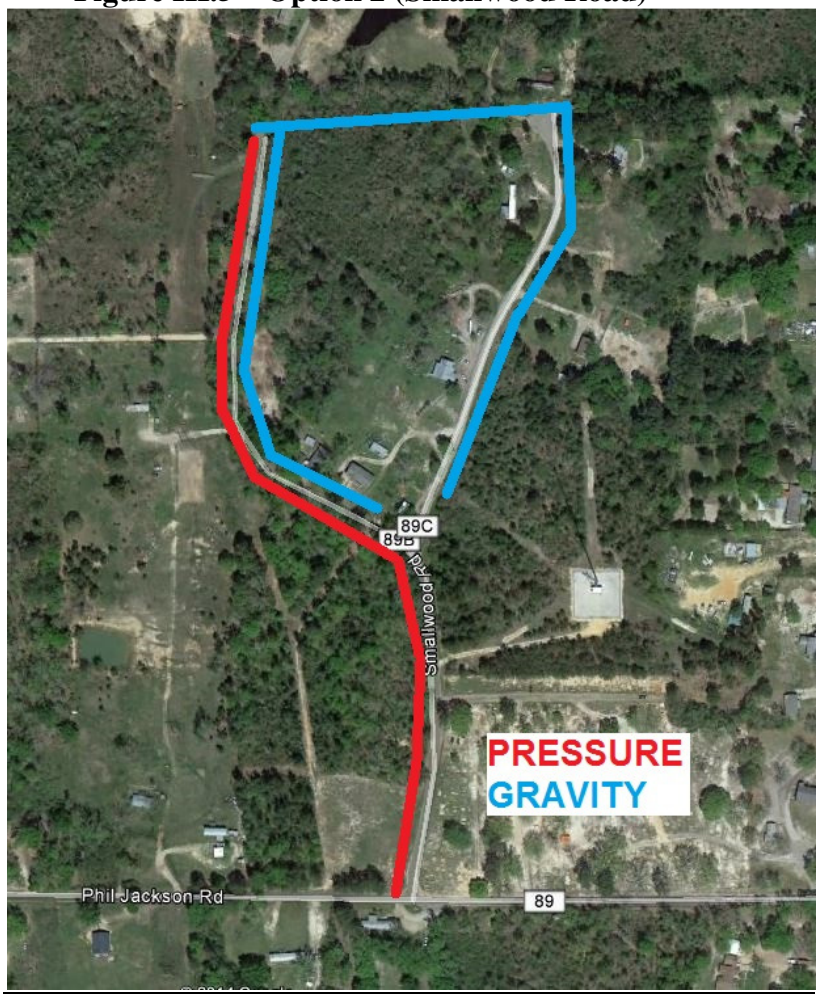
Item	Description	Units	Quantity	Unit Cost	Total Cost
1.01	2" SDR 26 Pressure Sewer	LF	2,205	$12.00	$26,460.00
1.02	3" SDR 26 Pressure Sewer	LF	745	$15.00	$11,175.00
1.03	Package Simplex Grinder Lift Station	EA	9	$7,500.00	$67,500.00
1.04	Service Reconnections	EA	9	$1,500.00	$13,500.00
1.05	Gravel Repair	LF	225	$15.00	$3,375.00
1.06	Demolition and Abandonment of Existing Septic Tank	LF	9	$850.00	$7,650.00
1.07	Seeding and Fertilizing	LF	745	$2.00	$1,490.00
1.08	Storm Water Pollution Prevention	LF	745	$1.00	$745.00
1.09	Trench Safety	LF	745	$1.00	$745.00
1.10	Mobilization	LS	1	$13,264.00	$13,264.00
				Subtotal Construction Cost	**$119,444.00**
				15% Contingencies	$18,056.00
				Total Projected Construction Cost	**$137,500.00**

Option 2: Gravity Sanitary Sewer and Lift Station:

Option 2 consists of installation of a gravity sanitary sewer system to provide first time sanitary sewer to residents along Smallwood Road and Joe Road. Existing connections will be serviced via gravity main along Smallwood Road and Joe Road to a lift station, which is proposed to be installed at the northernmost end of Joe Road, which will pump collected wastewater to a proposed collection main on Phil Jackson Road. The new lift

station, gravity main and forcemain would be installed/laid and tested prior to services being started. **Figure III.5** below shows the general location of Smallwood Road and proposed installation for Option 2. **Table III.7** below provides a detailed breakdown of projected construction costs.

Figure III.5 – Option 2 (Smallwood Road)



As shown above in **Table III.7**, the total projected construction cost for Smallwood Road Option 2 is $265,500.00, including 15% contingencies. The total projected cost of nine (9) houses on Smallwood Road and Joe Road, utilizing Option 2, equates to $29,500 per connection. Historical operation and maintenance cost of gravity sewer mains with lift stations is approximately .75% of the construction cost per year. For this project, annual O&M cost of the proposed gravity replacement main is projected to be $1,990 per year. The present value of the O&M cost assuming a 3% interest and a 20 period is $29,605.

Table III.7 - Line B: Option 2 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	6" SDR 26 Sanitary Sewer (All Depths)	LF	2180	$25.00	$54,500.00
2.02	3" SDR 26 Pressure Sewer	LF	1,880	$10.00	$18,800.00
2.03	Proposed Lift Station	EA	1	$55,000.00	$55,000.00
2.04	Service Reconnections	EA	9	$2,500.00	$22,500.00
2.05	Manholes (0-6)	EA	9	$3,250.00	$29,250.00
2.06	Manholes Extra Depth	VF	12	$230.00	$2,760.00
2.07	Gravel Repair	LF	225	$15.00	$3,375.00
2.08	Demolition and Abandonment of Existing Septic Tank	LF	9	$850.00	$7,650.00
2.09	Seeding and Fertilizing	LF	4,060	$2.00	$8,120.00
2.10	Storm Water Pollution Prevention	LF	4,060	$1.00	$4,060.00
2.11	Trench Safety	LF	4,060	$1.00	$4,060.00
2.12	Mobilization	LS	1	$21,007.50	$21,007.50
				Subtotal Construction Cost	**$231,082.50**
				15% Contingencies	$34,417.50
				Total Projected Construction Cost	**$265,500.00**

Option 3: Replacement of existing OSSF

Option 3 consists of installation and replacement of existing OSSF's. The existing residents located on Smallwood Road and Joe Road currently have septic systems. Aerobic septic systems, as required by Angelina County/Cities Health District will be utilized for Option 3, with existing OSSF's being removed and hauled off-site.

Table III.8 below provides a detailed breakdown of projected construction costs. As shown below in **Table III.8**, the total projected construction cost for Option 3 is $98,500.00 including 15% contingencies. The total projected cost of nine (9) houses on Smallwood Road and Joe Road, utilizing Option 3, equates to $10,945 per connection. . Operation and maintenance cost of OSSFs are projected to be 0.5% of the construction cost per year. For this project, annual O&M cost of the individual OSSF's is projected to be $490. The present value of the O&M cost assuming a 3% interest and a 20 period is $7,290.

The total projected cost per connection for Option 3 is $10,945, however it should be noted that individual aerobic septic systems generally have a two (2) year warranty at which time the owner is responsible for operation and maintenance. Existing OSSFs on-site have demonstrated the lack of owner operation and maintenance throughout the years and typical replacement of major mechanical equipment can range from five (5) to fifteen (15) years. Assuming a ten (10) year mechanical replacement on each OSSF, at 25% of the original per connection cost, including 3% inflation the individual annual O&M cost for Option 3 is projected to be $10,000 which includes a projected mechanical replacement cost of $2,710. Additionally, a replacement of the proposed OSSF's for Option 3 should be considered at the end of the 20 year design life of the projects. Therefore, replacement cost of individual OSSF's are also considered in the O&M cost using the current cost per connection as a future value, including 3% inflation over the 20 year design life. Projected O&M costs are therefore $29,570.

Table III.8: Line B Option 3 Construction Cost

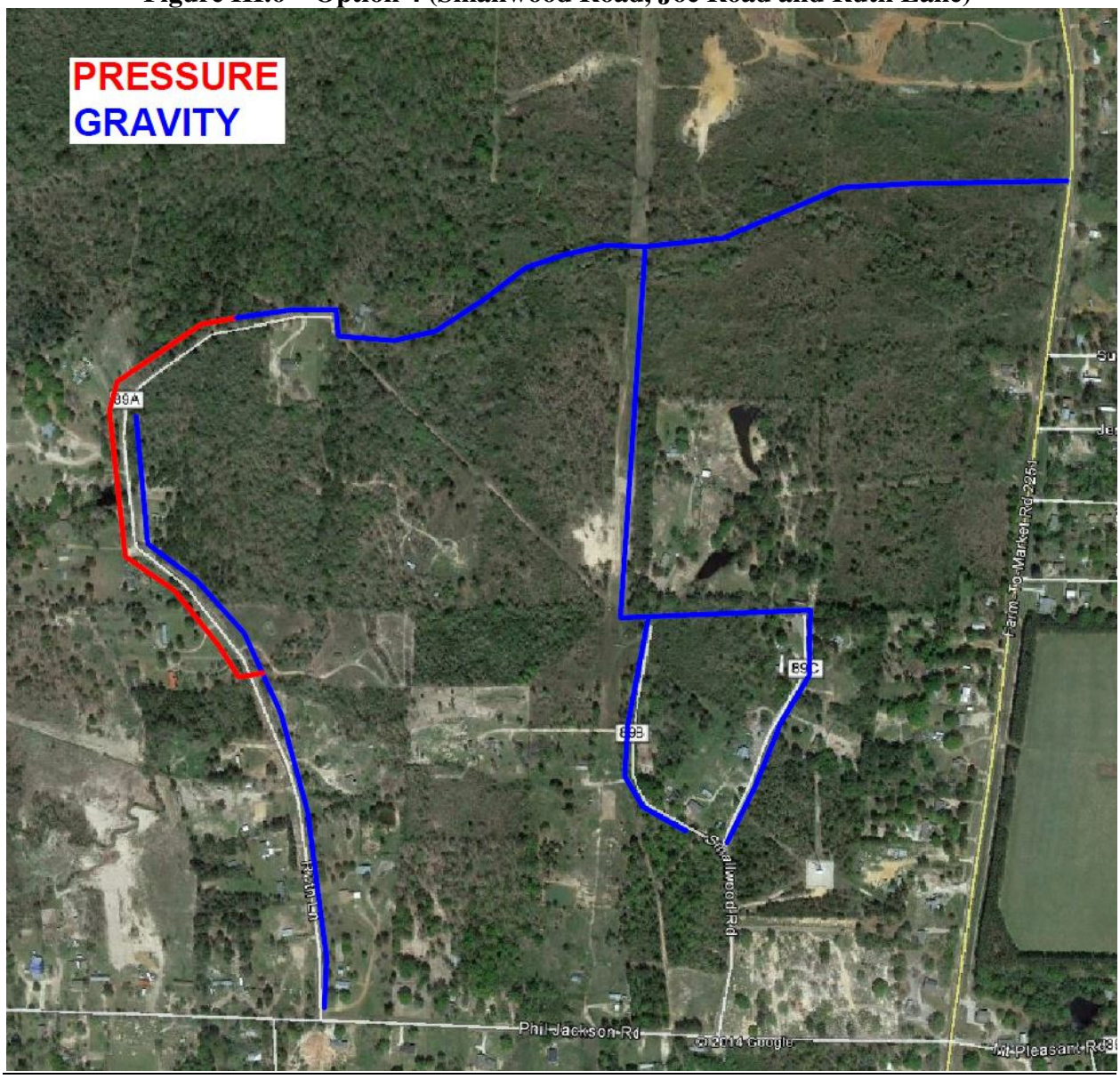
Item	Description	Units	Quantity	Unit Cost	Cost
3.01	Aerobic Septic System	EA	9	$7,500.00	$67,500.00
3.02	Demolition and Abandonment of Existing Septic Tank	LF	9	$850.00	$7,650.00
3.03	Seeding and Fertilizing	LS	1	$2,500.00	$2,500.00
3.04	Mobilization	LS	1	$7,765.00	$7,765.00
				Subtotal Construction Cost	**$85,415.00**
				15% Contingencies	$13,085.00
				Total Projected Construction Cost	**$98,500.00**

Option 4: Gravity Sanitary Sewer and Lift Station to Consolidate Lines B and C:

Option 4 consists of installation of a gravity sanitary sewer system to provide first time sanitary sewer to residents along Smallwood Road, Joe Road and Ruth Lane by consolidating proposed Lines B and C. Existing connections will be serviced via gravity main along Smallwood Road and Joe Road to a proposed trunk sewer main which will connect Ruth Lane, Smallwood Road, Joe Road and areas north of an unnamed tributary to FM 2251. Two (2) lift stations are proposed for Option 4; one (1) is proposed on Ruth

Lane to pump to the proposed gravity main at the northernmost end of Ruth Lane and the other lift station is proposed near FM 2251 to pump collected wastewater from Ruth Land, Smallwood Road and Joe Road to an existing 6" sanitary sewer main located on FM 2251. **Figure III.6** below shows the general location of Smallwood Road and proposed installation for Option 2. **Table III.9** below provides a detailed breakdown of projected construction costs.

Figure III.6 – Option 4 (Smallwood Road, Joe Road and Ruth Lane)



As shown below in **Table III.9**, the total projected construction cost for Smallwood Road, Joe Road and Ruth Lane Option 4 is $688,500.00, including 15% contingencies. The total projected cost of 23 existing houses on Smallwood Road, Joe Road and Ruth Lane, utilizing Option 4, equates to $29,935 per connection. Historical operation and maintenance cost of gravity sewer mains with lift stations is approximately .75% of the construction cost per year. For this project, annual O&M cost of the proposed gravity replacement main is projected to be $5,165 per year. The present value of the O&M cost assuming a 3% interest and a 20 period is $76,840.

Table III.9 - Line B and C: Option 4 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Cost
4.01	6" SDR 26 Sanitary Sewer (All Depths)	LF	10,300	$25.00	$257,500.00
4.02	3" SDR 26 Pressure Sewer	LF	2,700	$15.00	$40,500.00
4.03	Proposed Lift Station	EA	2	$35,000.00	$70,000.00
4.04	Service Reconnections	EA	23	$2,500.00	$57,500.00
4.05	Manholes (0-6)	EA	11	$3,250.00	$35,750.00
4.06	Manholes Extra Depth	VF	25	$230.00	$5,750.00
4.07	Gravel Repair	LF	225	$15.00	$3,375.00
4.08	Demolition and Abandonment of Existing Septic Tank	LF	23	$850.00	$19,550.00
4.09	Seeding and Fertilizing	LF	13,645	$2.00	$27,290.00
4.10	Storm Water Pollution Prevention	LF	13,645	$1.00	$13,645.00
4.11	Trench Safety	LF	13,645	$1.00	$13,645.00
4.12	Mobilization	LS	1	$54,450.50	$54,405.50
				Subtotal Construction Cost	**$598,910.50**
				15% Contingencies	$89,589.50
				Total Projected Construction Cost	**$688,500.00**

Ranking and Recommendation

Four (4) different options were presented above to provide first time sanitary sewer service to residents along Smallwood Road and Joe Road. Option 4 provides first time sanitary sewer service to residents along Ruth Lane also. **Table III.10** below contains a ranking of the options presented above.

Table III.10 - Ranking of Options

Options	Capital Cost	Technical Soundness	O&M Cost	Design Life of Proposed Improvements	Total Score
Option 1 - Full Pressure	3	2	2	2	9
Option 2 - Gravity Sewer with Lift Station	2	3	3	3	11
Option 3 - OSSF	4	1	1	1	7
Option 4 - Gravity Sewer with Lift Station to Consolidate Lines B and C	1	4	4	4	13

In **Table III.10** a higher total score indicates a higher overall ranking. Option 4 has the overall highest ranking (13) with the highest projected capital cost ($688,500). Option 4 also provides future gravity sanitary sewer system for proposed development in an area where a proposed subdivision is being proposed, as required, with minimum future cost to connect. Therefore, it is recommended that Option 4 be utilized for Lines B and C to provide first time sanitary sewer service to residents along Smallwood Road, Joe Road and Ruth Lane.

III.B.3: Line C – Ruth Lane: Line C proposes to provide first time sanitary sewer service to 14 existing residences located on Ruth Lane to the District's proposed sanitary sewer collection main which will be located on Phil Jackson Road. There are three (3) alternatives to providing sewer service to connections along Ruth Lane, including: 1) full pressure system which would ultimately connect to a proposed sanitary sewer collection main on Phil Jackson Road, 2) a gravity sanitary sewer system with a lift station, which will pump sanitary sewer to a proposed sanitary sewer collection main on Phil Jackson Road, 3) replacement of existing OSSF's and 4) combination gravity sanitary sewer system with lift stations to consolidate Lines B and C (Option 4 is discussed in Line B).

Option 1: 2"/3" PVC SDR 26 Pressure Sanitary Sewer Main:

Option 1 consists of a traditional open cut installation of proposed sanitary sewer pressure mains. Open cut trenches would be excavated in existing County right-of-ways for installation of proposed pressure mains to connect to the District's proposed sanitary

sewer collection main which will be located on Phil Jackson Road. The new pressure main will be installed and tested prior to services being transferred and will require installation of individual 2 hp residential grinder lift stations at each connection and abandonment of existing septic tanks in accordance with TCEQ regulations. The proposed pressure system will require approximately 3,760 linear feet of 2" and 3" PVC SDR 26 sanitary sewer main, including 14 individual residential package lift stations, electrical connections and sanitary sewer services from the pressure main to the proposed package lift station. For design and budgeting purposes, the package lift station consists of a 24"x48" fiberglass basin, 2 HP explosion proof grinder pump and standard control panel with alarms as required in accordance with 30 TAC Chapter 217.

Figure III.7 below shows the general location of Ruth Lane and proposed installation for Option 1.

Figure III.7 – Option 1 (Ruth Lane)

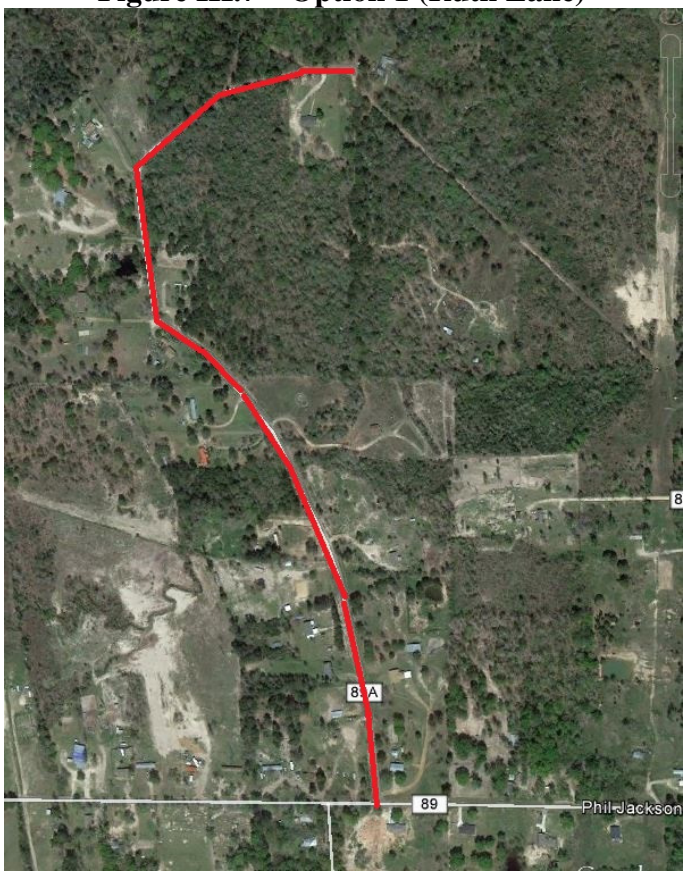


Table III.11 below provides a detailed breakdown of projected construction costs. As shown in **Table III.11**, the total projected construction cost for Ruth Lane Option 1 is $235,000.00, including 15% contingencies. The total projected cost of per connection of the existing 14 houses on Ruth Lane, equates to $16,785 per connection. Historical operation and maintenance cost of pressure sewer mains is approximately 1.5% of the construction cost per year. For this project, annual O&M cost of the proposed pressure sanitary sewer main is projected to be $3,525 per year. The present value of the O&M cost assuming an annual 3% interest rate for inflation over a 20 period is $52,445.

Table III.11 - Line C: Option 1 Construction Costs

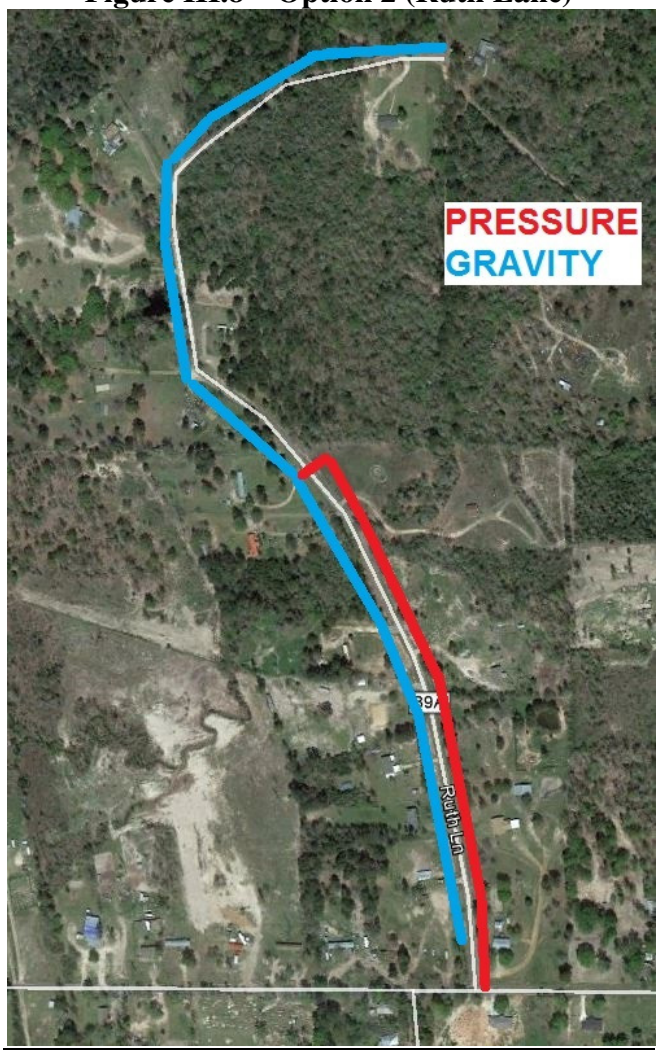
Item	Description	Units	Quantity	Unit Cost	Total Cost
1.01	2" SDR 26 Pressure Sewer	LF	1,850	$12.00	$22,200.00
1.02	3" SDR 26 Pressure Sewer	LF	1,910	$15.00	$28,650.00
1.03	Package Simplex Grinder Lift Station	EA	14	$7,500.00	$105,000.00
1.04	Service Reconnections	EA	14	$1,500.00	$21,000.00
1.05	Gravel Repair	LF	285	$15.00	$4,275.00
1.06	Demolition and Abandonment of Existing Septic Tank	LF	14	$850.00	$11,900.00
1.07	Seeding and Fertilizing	LF	3,760	$2.00	$7,520.00
1.08	Storm Water Pollution Prevention	LF	3,760	$1.00	$3,760.00
1.09	Trench Safety	LF	3,760	$1.00	$3,760.00
1.10	Mobilization	LS	1	$18,586.50	$18,586.50
				Subtotal Construction Cost	**$204,451.50**
				15% Contingencies	$30,548.50
				Total Projected Construction Cost	**$235,000.00**

Option 2: Gravity Sanitary Sewer and Lift Station:

Option 2 consists of installation of a gravity sanitary sewer system to provide first time sanitary sewer to residents along Ruth Lane. Existing connections will be serviced via gravity main along Ruth Lane to a lift station, which is proposed to be installed at the lowest point on Ruth Lane, which will pump collected wastewater to a proposed collection main on Phil Jackson Road. The new lift station, gravity main and forcemain would be installed/laid and tested prior to services being started. **Figure III.8** below

shows the general location of Ruth Lane and proposed installation for Option 2. **Table III.12** below provides a detailed breakdown of projected construction costs.

Figure III.8 – Option 2 (Ruth Lane)



As shown below in **Table III.12**, the total projected construction cost for Ruth Lane Option 2 is $350,500.00, including 15% contingencies. The total projected cost of 14 houses on Ruth Lane, utilizing Option 2, equates to $25,035 per connection. Historical operation and maintenance cost of gravity sewer mains with lift stations is approximately .75% of the construction cost per year. For this project, annual O&M cost of the proposed gravity replacement main is projected to be $2,630 per year. The present value of the O&M cost assuming a 3% interest and a 20 period is $39,125.

Table III.12 - Line C: Option 2 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	6" SDR 26 Sanitary Sewer (All Depths)	LF	3,500	$25.00	$87,500.00
2.02	3" SDR 26 Pressure Sewer	LF	1,450	$15.00	$21,750.00
2.03	Proposed Lift Station	EA	1	$65,000.00	$65,000.00
2.04	Service Reconnections	EA	14	$2,500.00	$35,000.00
2.05	Manholes (0-6)	EA	9	$3,250.00	$29,250.00
2.06	Manholes Extra Depth	VF	12	$230.00	$2,760.00
2.07	Gravel Repair	LF	285	$15.00	$4,275.00
2.08	Demolition and Abandonment of Existing Septic Tank	LF	14	$850.00	$11,900.00
2.09	Seeding and Fertilizing	LF	4,950	$2.00	$9,900.00
2.10	Storm Water Pollution Prevention	LF	4,950	$1.00	$4,950.00
2.11	Trench Safety	LF	4,950	$1.00	$4,950.00
2.12	Mobilization	LS	1	$27,723.50	$27,723.50
				Subtotal Construction Cost	**$304,958.50**
				15% Contingencies	$45,541.50
				Total Projected Construction Cost	**$350,500.00**

Option 3: Replacement of existing OSSF

Option 3 consists of installation and replacement of existing OSSF's. The existing residents located on Ruth Lane currently have septic systems. Aerobic septic systems, as required by Angelina County/Cities Health District will be utilized for Option 3, with existing OSSF's being removed and hauled off-site.

Table III.13: Line C Option 3 Construction Cost

Item	Description	Units	Quantity	Unit Cost	Cost
3.01	Aerobic Septic System	EA	14	$7,500.00	$105,000.00
3.02	Demolition and Abandonment of Existing Septic Tank	LF	14	$850.00	$11,900.00
3.03	Seeding and Fertilizing	LS	1	$5,500.00	$5,500.00
3.04	Mobilization	LS	1	$12,240.00	$12,240.00
				Subtotal Construction Cost	**$134,640.00**
				15% Contingencies	$20,360.00
				Total Projected Construction Cost	**$155,000.00**

Table III.13 above provides a detailed breakdown of projected construction costs. As shown above in **Table III.13**, the total projected construction cost for Option 3 is $155,000.00 including 15% contingencies. The total projected cost of 14 houses on Ruth Lane, utilizing Option 3, equates to $11,075 per connection. Operation and maintenance cost of OSSFs are projected to be 0.5% of the construction cost per year. For this project, annual O&M cost of the individual OSSF's is projected to be $775. The present value of the O&M cost assuming a 3% interest and a 20 period is $11,530.

The total projected cost per connection for Option 3 is $11,075, however it should be noted that individual aerobic septic systems generally have a two (2) year warranty at which time the owner is responsible for operation and maintenance. Existing OSSFs on-site have demonstrated the lack of owner operation and maintenance throughout the years and typical replacement of major mechanical equipment can range from five (5) to fifteen (15) years. Assuming a ten (10) year mechanical replacement on each OSSF, at 25% of the original per connection cost, including 3% inflation the individual annual O&M cost for Option 3 is projected to be $14,300 which includes a projected mechanical replacement cost of $2,770. Additionally, a replacement of the proposed OSSF's for Option 3 should be considered at the end of the 20 year design life of the projects. Therefore, replacement cost of individual OSSF's are also considered in the O&M cost using the current cost per connection as a future value, including 3% inflation over the 20 year design life. Projected O&M costs are therefore $34,300.

Ranking and Recommendation

Four (4) different options were presented above to provide first time sanitary sewer service to residents along Ruth Lane. Option 4 provides first time sanitary sewer service to residents along Smallwood Road and Joe Road also. **Table III.14** below contains a ranking of the options presented above.

Table III.14 - Ranking of Options

Options	Capital Cost	Technical Soundness	O&M Cost	Design Life of Proposed Improvements	Total Score
Option 1 - Full Pressure	3	2	2	2	9
Option 2 - Gravity Sewer with Lift Station	2	3	3	3	11
Option 3 - OSSF	4	1	1	1	7
Option 4 - Gravity Sewer with Lift Station to Consolidate Lines B and C	1	4	4	4	13

In **Table III.14** a higher total score indicates a higher overall ranking. Option 4 has the overall highest ranking (13) with the highest projected capital cost ($688,500). Option 4 also provides future gravity sanitary sewer system for proposed development in an area where a proposed subdivision is being proposed, as required, with minimum future cost to connect. Therefore, it is recommended that Option 4 be utilized for Lines B and C to provide first time sanitary sewer service to residents along Smallwood Road, Joe Road and Ruth Lane.

III.B.4: Line D – BBQ, Garner Road and Ethel Lewis Road: Line D proposes to provide first time sanitary sewer service to 23 existing residents located on BBQ Road, Garner Road and Ethel Lewis Road to the District's proposed sanitary sewer collection main which will be located on Phil Jackson Road. There are three (3) alternatives to providing sewer service to existing connections, including: 1) full pressure system which would ultimately connect to a proposed sanitary sewer collection main on Phil Jackson Road, 2) a gravity sanitary sewer system with a lift station, which will pump sanitary sewer to a proposed sanitary sewer collection main on Phil Jackson Road, and 3) replacement of existing OSSF's.

Option 1: 2"/3" PVC SDR 26 Pressure Sanitary Sewer Main:

Option 1 consists of a traditional open cut installation of proposed sanitary sewer pressure mains. Open cut trenches would be excavated in existing County right-of-ways for installation of proposed pressure mains to connect to the District's proposed sanitary

sewer collection main which will be located on Phil Jackson Road. The new pressure main will be installed and tested prior to services being transferred and will require installation of individual 2 hp residential grinder lift stations at each connection and abandonment of existing septic tanks in accordance with TCEQ regulations. The proposed pressure system will require approximately 3,330 linear feet of 2" and 3" PVC SDR 26 sanitary sewer main, including 23 individual residential package lift stations, electrical connections and sanitary sewer services from the pressure main to the proposed package lift station. For design and budgeting purposes, the package lift station consists of a 24"x48" fiberglass basin, 2 HP explosion proof grinder pump and standard control panel with alarms as required in accordance with 30 TAC Chapter 217.

Figure III.9 below shows the general location of BBQ Road, Garner Road and Ethel Lewis Road and proposed installation for Option 1.

Figure III.9 – Option 1 (BBQ Road)

Table III.15 below provides a detailed breakdown of projected construction costs. As shown in **Table III.15**, the total projected construction cost for BBQ Road Option 1 is $340,500.00, including 15% contingencies. The total projected cost of per connection of

the existing 23 houses on BBQ Road, Garner Road and Ethel Lewis Road, equates to $14,805 per connection. Historical operation and maintenance cost of pressure sewer mains is approximately 1.5% of the construction cost per year. For this project, annual O&M cost of the proposed pressure sanitary sewer main is projected to be $5,105 per year. The present value of the O&M cost assuming an annual 3% interest rate for inflation over a 20 period is $75,950.

Table III.15 - Line D: Option 1 Construction Costs

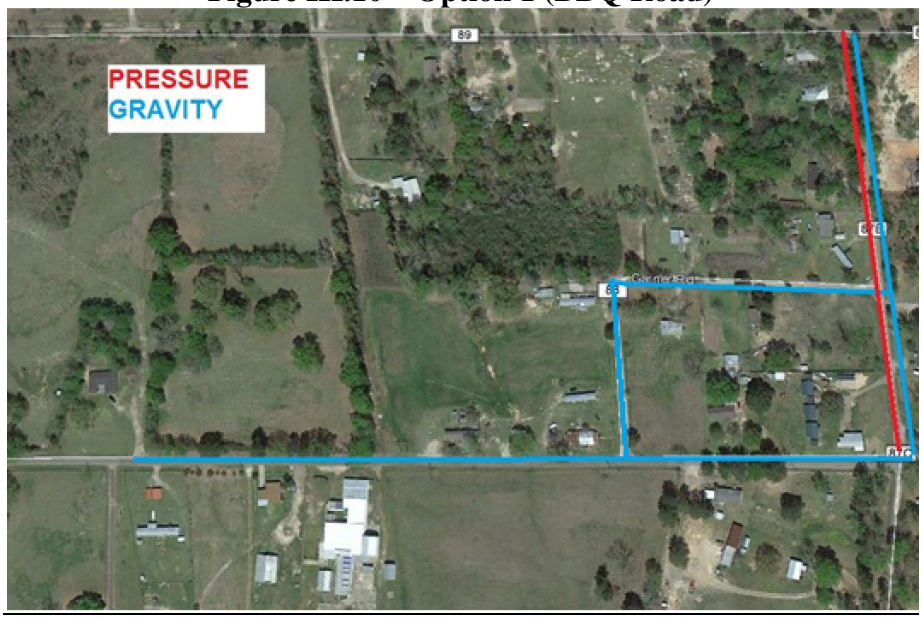
Item	Description	Units	Quantity	Unit Cost	Total Cost
1.01	2" SDR 26 Pressure Sewer	LF	1,850	$12.00	$22,200.00
1.02	3" SDR 26 Pressure Sewer	LF	1,480	$15.00	$22,200.00
1.03	Package Simplex Grinder Lift Station	EA	23	$7,500.00	$172,500.00
1.04	Service Reconnections	EA	23	$1,500.00	$34,500.00
1.05	Gravel Repair	LF	460	$15.00	$6,900.00
1.06	Demolition and Abandonment of Existing Septic Tank	LF	23	$850.00	$19,550.00
1.07	Seeding and Fertilizing	LF	3,330	$2.00	$6,660.00
1.08	Storm Water Pollution Prevention	LF	3,330	$1.00	$3,330.00
1.09	Trench Safety	LF	3,330	$1.00	$3,330.00
1.10	Mobilization	LS	1	$26,897.00	$26,897.00
				Subtotal Construction Cost	**$295,867.00**
				15% Contingencies	$44,633.00
				Total Projected Construction Cost	**$340,500.00**

Option 2: Gravity Sanitary Sewer and Lift Station:

Option 2 consists of installation of a gravity sanitary sewer system to provide first time sanitary sewer to residents located on BBQ Road, Garner Road and Ethel Lewis Road. Existing connections will be serviced via gravity main on BBQ Road, Garner Road or Ethel Lewis Road respectively to a lift station, which is proposed to be installed at the intersection of BBQ Road and Ethel Lewis Road, which will pump collected wastewater to a proposed collection main on Phil Jackson Road. The new lift station, gravity main and forcemain would be installed/laid and tested prior to services being started. **Figure III.10** below shows the general location of BBQ Road, Garner Road and Ethel Lewis

Road and proposed installation for Option 2. **Table III.16** below provides a detailed breakdown of projected construction costs.

Figure III.10 – Option 1 (BBQ Road)



As shown below in **Table III.16**, the total projected construction cost for BBQ Road, Garner Road and Ethel Lewis Road Option 2 is $347,000.00, including 15% contingencies. The total projected cost of 23 residents, utilizing Option 2, equates to $15,085 per connection. Historical operation and maintenance cost of gravity sewer mains with lift stations is approximately .75% of the construction cost per year. For this project, annual O&M cost of the proposed gravity replacement main is projected to be $2,605 per year. The present value of the O&M cost assuming a 3% interest and a 20 period is $38,755.

Table III.16 - Line D: Option 2 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	6" SDR 26 Sanitary Sewer (All Depths)	LF	3,330	$25.00	$83,250.00
2.02	3" SDR 26 Pressure Sewer	LF	1,000	$15.00	$15,000.00
2.03	Proposed Lift Station	EA	1	$65,000.00	$65,000.00
2.04	Service Reconnections	EA	23	$1,500.00	$34,500.00
2.05	Manholes (0-6)	EA	12	$2,500.00	$30,000.00
2.06	Manholes Extra Depth	VF	12	$230.00	$2,760.00
2.07	Demolition and Abandonment of Existing Septic Tank	LF	23	$850.00	$19,550.00
2.08	Gravel Repair	LF	460	$15.00	$6,900.00
2.09	Seeding and Fertilizing	LF	4,330	$2.00	$8,660.00
2.10	Storm Water Pollution Prevention	LF	4,330	$1.00	$4,330.00
2.11	Trench Safety	LF	4,330	$1.00	$4,330.00
2.12	Mobilization	LS	1	$27,428.00	$27,428.00
				Subtotal Construction Cost	**$301,708.00**
				15% Contingencies	$45,292.00
				Total Projected Construction Cost	**$347,000.00**

Option 3: Replacement of existing OSSF

Option 3 consists of installation and replacement of existing OSSF's. The existing residents located on Ruth Lane currently have septic systems. Aerobic septic systems, as required by Angelina County/Cities Health District will be utilized for Option 3, with existing OSSF's being removed and hauled off-site.

Table III.17: Line C Option 3 Construction Cost

Item	Description	Units	Quantity	Unit Cost	Cost
3.01	Aerobic Septic System	EA	23	$7,500.00	$172,500.00
3.02	Demolition and Abandonment of Existing Septic Tank	LF	23	$850.00	$19,550.00
3.03	Seeding and Fertilizing	LS	1	$7,500.00	$7,500.00
3.04	Mobilization	LS	1	$19,955.00	$19,955.00
				Subtotal Construction Cost	**$219,505.00**
				15% Contingencies	$32,995.00
				Total Projected Construction Cost	**$252,500.00**

Table III.17 above provides a detailed breakdown of projected construction costs. As shown above in **Table III.17**, the total projected construction cost for Option 3 is $252,500.00 including 15% contingencies. The total projected cost of 23 houses on BBQ Road, Garner Road and Ethel Lewis Road, utilizing Option 3, equates to $10,110 per connection. Operation and maintenance cost of OSSFs are projected to be 0.5% of the construction cost per year. For this project, annual O&M cost of the individual OSSF's is projected to be $1,265. The present value of the O&M cost assuming a 3% interest and a 20 period is $18,820.

The total projected cost per connection for Option 3 is $10,110, however it should be noted that individual aerobic septic systems generally have a two (2) year warranty at which time the owner is responsible for operation and maintenance. Existing OSSFs on-site have demonstrated the lack of owner operation and maintenance throughout the years and typical replacement of major mechanical equipment can range from five (5) to fifteen (15) years. Assuming a ten (10) year mechanical replacement on each OSSF, at 25% of the original per connection cost, including 3% inflation the individual annual O&M cost for Option 3 is projected to be $21,350 which includes a projected mechanical replacement cost of $2,530. Additionally, a replacement of the proposed OSSF's for Option 3 should be considered at the end of the 20 year design life of the projects. Therefore, replacement cost of individual OSSF's are also considered in the O&M cost using the current cost per connection as a future value, including 3% inflation over the 20 year design life. Projected O&M costs are therefore $39,610.

Ranking and Recommendation

Three (3) different options were presented above to provide first time sanitary sewer service to residents along BBQ Road, Garner Road and Ethel Lewis Road. **Table III.18** below contains a ranking of the options presented above.

Table III.18 - Ranking of Options

Options	Capital Cost	Technical Soundness	O&M Cost	Design Life of Proposed Improvements	Total Score
Option 1 - Full Pressure	2	2	2	2	8
Option 2 - Gravity Sewer with Lift Station	1	3	3	3	10
Option 3 - OSSF	3	1	1	1	6

In **Table III.18** a higher total score indicates a higher overall ranking. Option 2 has the overall highest ranking (11) with the highest projected capital cost ($347,000). Although Option 1 has an overall lower capital cost, as compared to Option 2, the District's system currently consists of gravity sanitary sewer with lift stations as required. In an effort to keep the District's existing system consistent with the proposed system, it is recommended that Option 2 be utilized for Line D.

III.B.5: Line E – Phil Jackson Road: Line E proposes to provide first time sanitary sewer service to 36 existing residents located on Phil Jackson Road, FM 2251, FM 2680, and Mt Pleasant Road and will also be the collection main for all existing and proposed sanitary sewer for the District's service area. Since Line E will be the trunk main for all existing and proposed District sanitary sewer and will divert wastewater to ANRA's NAC WWTF, there are only two (2) alternatives to providing sewer service to existing connections, including: 1) full pressure system which would ultimately connect to ANRA's NAC WWTF, and 2) a gravity sanitary sewer system with a lift station, which will pump sanitary sewer to ANRA's NAC WWTF. Both Options presented below will also include pump replacement and lift station upgrades to the Jerri Street lift station.

Option 1: Pressure Sanitary Sewer Main:

Option 1 consists of a traditional open cut installation of proposed sanitary sewer pressure mains. Open cut trenches would be excavated in existing County right-of-ways for installation of proposed pressure mains to connect to the District's proposed sanitary sewer collection main which will be located on Phil Jackson Road. The new pressure main will be installed and tested prior to services being transferred and will require

installation of individual 2 hp residential grinder lift stations at each connection and abandonment of existing septic tanks in accordance with TCEQ regulations. The proposed pressure system will require approximately 7,440 linear feet of 3" and 4,250 L.F. of 6" PVC SDR 26 sanitary sewer main, including 36 individual residential package lift stations, electrical connections and sanitary sewer services from the pressure main to the proposed package lift station. Also included for Option 1 is the proposed District lift station, located on Phil Jackson Road that will divert flow to ANRA's NAC WWTF. For design and budgeting purposes, the package lift station consists of a 24"x48" fiberglass basin, 2 HP explosion proof grinder pump and standard control panel with alarms as required in accordance with 30 TAC Chapter 217.

Figure III.11 below shows the general location of Phil Jackson Road and proposed installation for Option 1.

Figure III.11 – Option 1 (Phil Jackson Road)

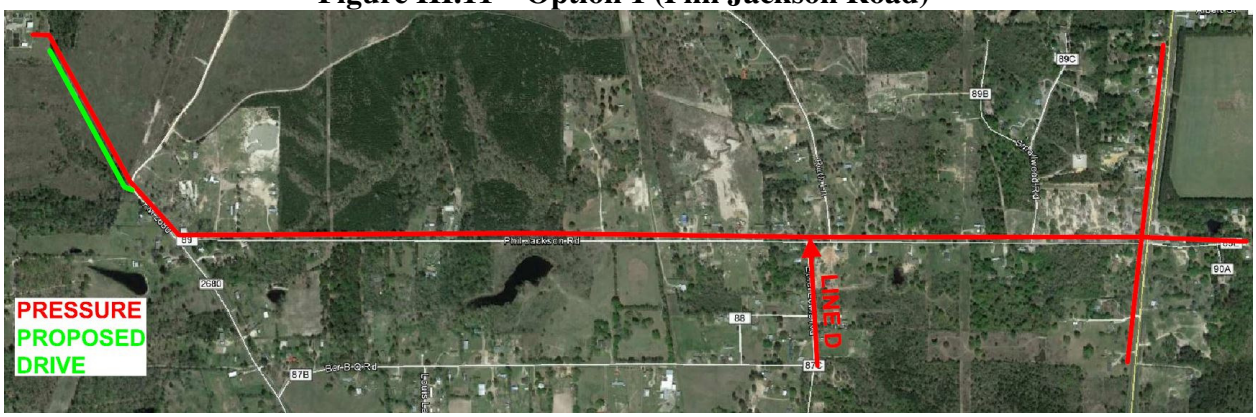


Table III.19 below provides a detailed breakdown of projected construction costs. As shown in **Table III.19**, the total projected construction cost for Phil Jackson Road Option 1 is $978,500.00, including 15% contingencies. The total projected cost of per connection of the existing 36 residents on Phil Jackson Road, FM 2251, FM 2680, and Mt Pleasant Road, equates to $27,180 per connection. Historical operation and maintenance cost of pressure sewer mains is approximately 1.5% of the construction cost per year. For this project, annual O&M cost of the proposed pressure sanitary sewer

main is projected to be $14,680 per year. The present value of the O&M cost assuming an annual 3% interest rate for inflation over a 20 period is $218,400.

Table III.19 - Line E: Option 1 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Total Cost
1.01	3" SDR 26 Pressure Sewer	LF	7,440	$15.00	$111,600.00
1.02	6" SDR 26 Pressure Sewer	LF	4,250	$22.00	$93,500.00
1.03	Connect to Existing Manhole	EA	2	$1,500.00	$3,000.00
1.04	Package Simplex Grinder Lift Station	EA	36	$7,500.00	$270,000.00
1.05	Proposed Lift Station	EA	1	$95,000.00	$95,000.00
1.06	Jerri Street Lift Station Rehabilitation	EA	1	$35,000.00	$35,000.00
1.07	Service Reconnections	EA	36	$1,500.00	$54,000.00
1.08	Gravel Repair	LF	2250	$15.00	$33,750.00
1.09	Demolition and Abandonment of Existing Septic Tank	LF	36	$850.00	$30,600.00
1.10	Seeding and Fertilizing	LF	11,690	$2.00	$23,380.00
1.11	Storm Water Pollution Prevention	LF	11,690	$1.00	$11,690.00
1.12	Trench Safety	LF	11,690	$1.00	$11,690.00
1.13	Mobilization	LS	1	$77,321.00	$77,321.00
				Subtotal Construction Cost	**$850,531.00**
				15% Contingencies	$127,969.00
				Total Projected Construction Cost	**$978,500.00**

Option 2: Gravity Sanitary Sewer and Lift Station:

Option 2 consists of installation of a gravity sanitary sewer system to provide first time sanitary sewer to residents located on Phil Jackson Road, FM 2251, FM 2680, and Mt Pleasant Road. Existing connections will be serviced via gravity mains to a lift station for each respective gravity sewer main as shown below in **Figure III.12** below. The lift stations will ultimately pump collected wastewater to ANRA's NAC WWTF. The new lift stations, gravity mains and forcemains will be installed/laid and tested prior to services being started. **Figure III.12** below shows the general location of proposed gravity mains, forcemains and lift stations for Option 2. **Table III.20** below provides a detailed breakdown of projected construction costs.

Figure III.12 – Option 2 (Phil Jackson Road)

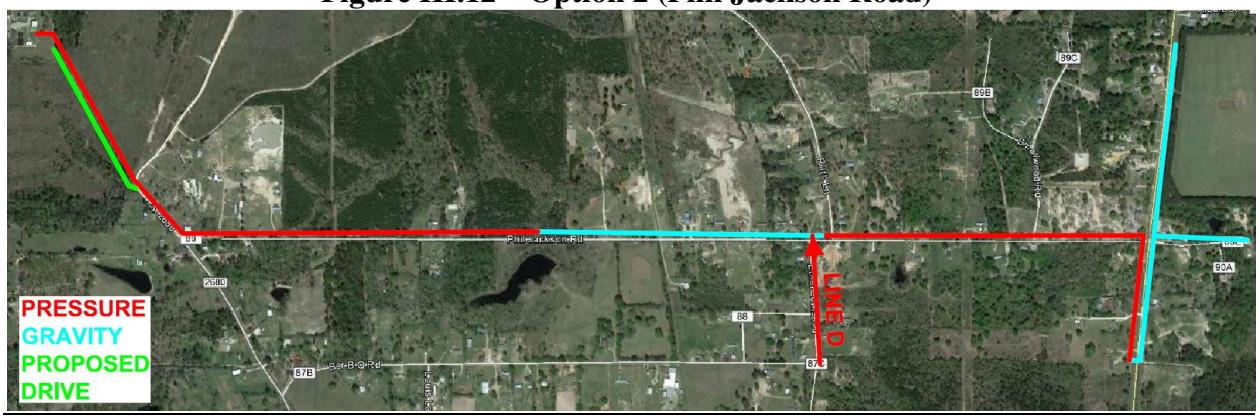


Table III.20 - Line E: Option 2 Construction Costs

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	6" SDR 26 Sanitary Sewer (0-6)	LF	7,750	$25.00	$193,750.00
2.02	6" SDR 26 Pressure Sewer	LF	4,250	$22.00	$93,500.00
2.03	3" SDR 26 Pressure Sewer	LF	3,750	$15.00	$56,250.00
2.04	Proposed District Lift Station on Phil Jackson Road	EA	1	$95,000.00	$95,000.00
2.05	Proposed Lift Station	EA	2	$35,000.00	$70,000.00
2.05	Jerri Street Lift Station Rehabilitation	EA	1	$25,000.00	$25,000.00
2.06	Service Reconnections	EA	36	$2,500.00	$90,000.00
2.07	Manholes (0-6)	EA	8	$2,500.00	$20,000.00
2.08	Manholes Extra Depth	VF	8	$230.00	$1,840.00
2.09	Gravel Repair	LF	2250	$15.00	$33,750.00
2.10	Demolition and Abandonment of Existing Septic Tank	LF	36	$850.00	$30,600.00
2.11	Seeding and Fertilizing	LF	14,790	$2.00	$29,580.00
2.12	Storm Water Pollution Prevention	LF	14,790	$1.00	$14,790.00
2.13	Trench Safety	LF	14,790	$1.00	$14,790.00
2.14	Mobilization	LS	1	$76,885.00	$76,885.00
				Subtotal Construction Cost	**$845,735.00**
				15% Contingencies	$126,765.00
				Total Projected Construction Cost	**$972,500.00**

As shown above in **Table III.20**, the total projected construction cost for Phil Jackson Road, FM 2251, FM 2608 and Mount Pleasant Road Option 2 is $972,500.00, including 15% contingencies.

The total projected cost of 36 residents, utilizing Option 2, equates to $27,015 per connection. Historical operation and maintenance cost of gravity sewer mains with lift stations is approximately .75% of the construction cost per year. For this project, annual O&M cost of the proposed gravity replacement main is projected to be $7,295 per year. The present value of the O&M cost assuming a 3% interest and a 20 period is $108,530.

Ranking and Recommendation

Two (2) different options were presented above to provide first time sanitary sewer service to residents along Phil Jackson Road, FM 2251, FM 2608 and Mount Pleasant Road. **Table III.21** below contains a ranking of the options presented above.

Table III.21 - Ranking of Options

Options	Capital Cost	Technical Soundness	O&M Cost	Design Life of Proposed Improvements	Total Score
Option 1 - Full Pressure	2	1	1	1	5
Option 2 - Gravity Sewer with Lift Station	1	2	2	2	7

In **Table III.21** a higher total score indicates a higher overall ranking. Option 2 has the overall highest ranking (7) with the lowest projected capital cost ($972,500). The District's system currently consists of gravity sanitary sewer with lift stations as required. In an effort to keep the District's existing system consistent with the proposed system, it is recommended that Option 2 be utilized for Line E.

III.B.6: Phase I Summary: Sections III.B.1 through III.B.5 above provided project specific discussions for providing first time sanitary sewer service to residents within the District's service area. As noted in each respective section, proposed collection systems will consist of gravity sanitary sewer mains with lift stations to collect sewer and

ultimately convey wastewater to ANRA's NAC WWTF. **Table III.22** below provides an overall total projected construction cost summary for Phase I.

Table III.22 – Phase I Total Projected Construction Cost

Proposed Project	Total Projected Construction Cost
Line A - County Barn Road	$327,500.00
Line B and C - Smallwood Road, Joe Road and Ruth Lane	$688,500.00
Line D - BBQ Road	$347,000.00
Line E - Phil Jackson Road	$972,500.00
Total Projected Construction Cost	**$2,335,500.00**

As shown above in **Table III.22**, the total projected construction cost for Phase I improvements is estimated to be $2,335,500, which includes 15% contingencies. Non-construction costs are not included in **Table III.21**, however they will be included in **Section IV**.

III.C. Phase II - Project Alternatives Considered and Recommendations

Phase II improvements consist of mitigating sanitary sewer overflows from Redland Estates which have continued for the last 20 years due to deficient wastewater treatment facilities. As noted above in **Section II**, the Redland Estates WWTF has discharged untreated wastewater directly into an unnamed tributary, ultimately to Segment No. 0611 of the Angelina River. A Public Health Threat has been issued by TCEQ and the Angelina County Cities and Health District, attached as **Exhibit A**. TCEQ and TWDB have determined that Segment No. 0611 is an Impaired Water Body that has been and will continue to be affected by the direct discharge of untreated wastewater from Redland Estates. Phase II proposes to eliminate the Redland Estates WWTF, via proposed TCEQ

closure mitigation measures, and provide regulated sanitary sewer collection or treatment facilities to pump wastewater from the existing 41 connections to the District's collection system which will ultimately be treated at Angelina & Neches River Authority's North Angelina County Regional Wastewater Treatment Facility, which is described below as Phase III.

Three (3) alternatives were considered for the proposed improvements for Phase II, including: 1) gravity sanitary sewer with lift stations/forcemains, 2) installation of a package wastewater treatment plant, and 3) do nothing. As noted above, the District entered into a non-compliance agreement with TCEQ, in regard to Redland Estates and therefore Option 3, cannot be utilized. Options 1 and 2 for Phase II improvements will be discussed further below.

Option 1: Gravity Sanitary Sewer with Lift Stations/Forcemains:

Option 1 proposes to provide TCEQ regulated WWTF closure measures and mitigation requirements to abandon and demolish the remainder of Redland Estates WWTF in conjunction with installation of a lift station and a gravity sanitary sewer pipe network along with forcemains to divert wastewater from the exiting 41 connections within Redland Estates, as well as 21 additional first-time residential sanitary sewer connections located on St. Clair St, Tillman Road, FM 2021, and FM 2251 to the District's existing collection system on FM 2251 ultimately to ANRA's North Angelina County Regional Wastewater Treatment Facility. Infrastructure requirements for Option 1 will include two (2) lift stations (one (1) lift station at Redland Estates and one (1) lift station on the west side of State Highway 59 – I69) and approximately 14,810 linear feet of gravity and pressure collection system, which will utilize gravity mains to lift stations that will pump to the District's existing 6" PVC gravity main on FM 2251.

Option 1 consists of a traditional open cut installation of the proposed sanitary sewer mains, including highway / directional bores as required. Open cut trenches are proposed to be excavated in existing County/State right-of-ways. The proposed mains and lift

stations will be installed and tested prior to services being transferred. **Figure III.13** below shows the projected layout of Option 1 for proposed Phase II improvements.

Figure III.13 – Phase II Option 1

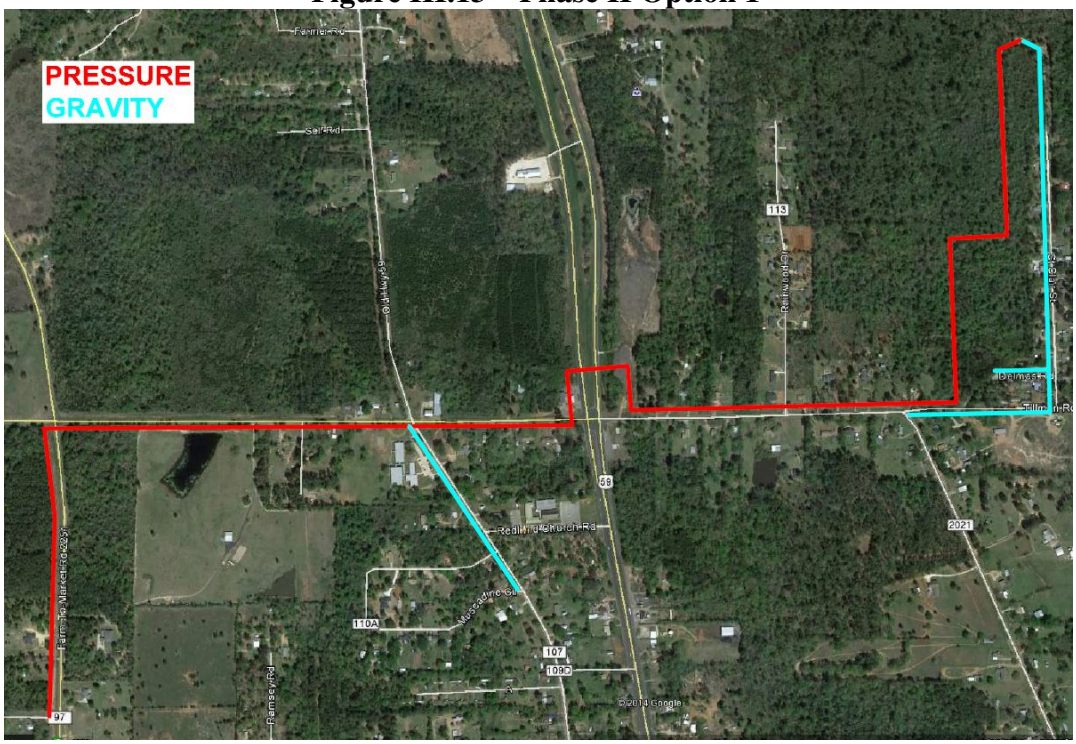


Table III.23 above provides a detailed breakdown of projected construction costs. As shown in **Table III.23**, the total projected construction cost for Phase II Option 1 is $1,163,500.00 including 15% contingencies. The total projected cost of per connection of the existing 41 residents in Redland Estates, as well as 21 additional first-time residential sanitary sewer connections located on St. Clair St, Tillman Road, FM 2021, and FM 2251, equates to $18,765 per connection. Historical operation and maintenance cost of gravity mains with lift stations is approximately 0.75% of the construction cost per year. For this project, annual O&M cost of the proposed gravity main is projected to be $8,725. The present value of the O&M cost assuming a 3% interest and a 20 period is $129,805. Option 1 will also provide replacement of the existing sanitary sewer collection system within Redland Estates and also provide first-time sanitary sewer collection for 21 existing connections. It should also be noted that installation of gravity sanitary sewer mains and lift stations will also provide sanitary sewer services for future

residential, commercial and industrial connections as well as connections outside of the District's existing service area.

Table III.23: Phase II Option 1 Projected Costs

Item	Description	Units	Quantity	Unit Cost	Cost
1.01	6" PVC C-900 Sanitary Sewer (0-6)	LF	6,450	$25.00	$161,250.00
1.02	4" SDR 26 Pressure Sewer	LF	11,590	$18.00	$208,620.00
1.03	12" x 0.25" Steel Highway Bore	LF	350	$150.00	$52,500.00
1.04	Proposed Lift Station	EA	2	$55,000.00	$110,000.00
1.05	Service Reconnections	EA	62	$1,500.00	$93,000.00
1.06	Manholes (0-6)	EA	8	$3,250.00	$26,000.00
1.07	Manholes Extra Depth	VF	45	$230.00	$10,350.00
1.08	Wet Bore	LF	265	$50.00	$13,250.00
1.09	Asphalt Repair	LF	750	$40.00	$30,000.00
1.10	Demolition and Abandonment of Existing Septic Tank	LF	21	$850.00	$17,850.00
1.11	Demolition and Closure of Redland Estates WWTP	LS	1	$125,000.00	$125,000.00
1.12	Seeding and Fertilizing	LF	18,040	$2.00	$36,080.00
1.13	Storm Water Pollution Prevention	LF	18,040	$1.00	$18,040.00
1.14	Trench Safety	LF	18,040	$1.00	$18,040.00
1.15	Mobilization	LS	1	$91,998.00	$91,998.00
				Subtotal Construction Cost	**$1,011,978.00**
				15% Contingencies	$151,522.00
				Total Projected Construction Cost	**$1,163,500.00**

Option 2: Construction of Package Treatment Plant:

Option 2 proposes to provide TCEQ regulated WWTF closure measures and mitigation requirements to abandon and demolish the remainder of Redland Estates WWTF in conjunction with installation of a conventional activated sludge package treatment plant to treat wastewater from the exiting 41 connections within Redland Estates. Infrastructure requirements for Option 2 will include a conventional activated sludge package treatment plant and approximately 3,500 linear feet of 6" PVC gravity sanitary sewer main to replace the existing gravity collection system within Redland Estates.

Based upon TCEQ Chapter 217 design criteria for establishing design flows in conjunction with a total projected 45 connections within Redland Estates and average household size of 2.94, the projected average daily flow for the package WWTF is 20,000 gallons per day with a two-hour peak flow of 80,000 gallons per day. Projected WWTF permit constituents for design of the proposed package treatment plant are 10 mg/l BOD_5, 15 mg/l TSS, 3 mg/l NH_4N, 4 mg/l (min) DO, 1 mg/l to 4 mg/l chlorine residual and 126 cfu/100 ml E-Coli. Since the existing Redland Estates WWTF permit is no longer an active permit, a new permit will be required for approval by TCEQ to discharge into Segment No. 0611 of the Angelina River.

Table III.24: Phase II Option 2 Projected Costs

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	Construction of Package Treatment Plant	LS	1	$725,000.00	$725,000.00
2.02	6" PVC C-900 Sanitary Sewer (0-6)	LF	3,500	$25.00	$87,500.00
2.03	Proposed Lift Station	EA	1	$65,000.00	$65,000.00
2.04	Service Reconnections	EA	45	$1,500.00	$67,500.00
2.05	Manholes (0-6)	EA	12	$3,250.00	$39,000.00
2.06	Manholes Extra Depth	6	45	$230.00	$10,350.00
2.07	Gravel Repair	LF	750	$15.00	$11,250.00
2.08	Demolition and Closure of Redland Estates WWTF	LS	1	$125,000.00	$125,000.00
2.09	Seeding and Fertilizing	LF	3,500	$2.00	$7,000.00
2.10	Storm Water Pollution Prevention	LF	3,500	$1.00	$3,500.00
2.11	Trench Safety	LF	3,500	$1.00	$3,500.00
2.12	Mobilization	LS	1	$114,460.00	$114,460.00
				Subtotal Construction Cost	**$1,259,060.00**
				15% Contingencies	$190,940.00
				Total Projected Construction Cost	**$1,450,000.00**

Table III.24 above provides a detailed breakdown of projected construction costs.

As shown in **Table III.24**, the total projected construction cost for Phase II Option 2 is $1,450,000.00 including 15% contingencies. The total projected cost of per connection of the existing 41 residents in Redland Estates, equates to $35,365 per connection.

Historical operation and maintenance cost of package treatment plants is approximately 1.5% of the construction cost per year. For this project, annual O&M cost of the proposed gravity main is projected to be $21,750.

Ranking and Recommendation

Two (2) different alternatives were presented above for Phase II improvements. **Table III.25** below contains a ranking of the options presented above.

Table III.25 - Ranking of Options

Options	Capital Cost	Technical Soundness	O&M Cost	Design Life of Proposed Improvements	Total Score
Option 1 – Gravity Sanitary Sewer with Lift Stations/Forcemains	2	2	2	2	8
Option 2 – Construction of Package Treatment Plan	1	2	1	1	5

In **Table III.25** a higher total score indicates a higher overall ranking. Option 1 has the overall highest ranking (8) with the lowest projected capital cost ($1,163,500). Option 1 also provides collection facilities for future residential, commercial and industrial connections as well as existing residential connections located outside the District's service area. Therefore, it is recommended that Option 1 be utilized for Phase II improvements.

III.D. Phase III - Project Alternatives Considered and Recommendations

As noted above in **Section III.A,** ANRA's North Angelina County Regional Wastewater Treatment Facility (NAC WWTF) currently provides treatment for Central ISD, Idlewood WCID and DADS-Lufkin State Supported Living Center and is permitted to treat and discharge 370,000 gallons per day. ANRA holds a TCEQ permit for discharging treated effluent into waters of the State of Texas. The facility is authorized to discharge into an unnamed tributary; thence to Mill Creek; thence to Paper Mill Creek; thence to Angelina River/Sam Rayburn Reservoir in Segment No. 0615 of the Neches

River Basin. The Texas Pollutant Discharge Elimination System (TPDES) permit number for the plant is WQ0011620001. As part of the permit conditions, the TCEQ requires monthly operating reports to be completed in an effort to track the ability of the plant to meet its permitted requirements. The effluent parameters require the plant to treat incoming flows such that the final quality specified by the TCEQ is achieved. **Table III.26** shows a list of all of the permitted parameters included as part of ANRA's NAC WWTF permit and required discharge monitoring reports to be submitted monthly to TCEQ. A copy of the Discharge Permit is included in **Exhibit B**.

Table III.26 – NAC WWTF TCEQ Permit Limits

Effluent Parameter	Current Limit[1]
Daily Average Flow **(daily average flow - 5 per week)**	**0.37 MGD**
Maximum two-hour peak	1.11 MGD
Minimum Dissolved Oxygen (D.O.) (measure by grab sample - 1 per week)	4.0 mg/L
Daily Average Biochemical Oxygen Demand (BOD_5) (measure by grab sample - 1 per week)	**10 mg/L** & 31 ppd
Daily Maximum BOD_5	25 mg/L
Individual Grab Sample Maximum BOD_5	35 mg/L
Max. pH (measure by grab sample - 1 per month)	9.0
Min. pH (measure by grab sample - 1 per month)	6.0
Daily Average Total Suspended Solids (TSS) (measure by grab sample - 1 per week)	**15 mg/L** & 46 ppd
Escherichia Coli CFU per 100 ML – Daily Average	**126**
Escherichia Coli CFU per 100 ML – Single Grab	**394**
The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of 20 minutes (peak flow), monitored five times per week by grab sample.	
No discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil	-

[1] Units abbreviations:
MGD – million gallons per day / gpm – gallons per minute
mg/L – milligrams per liter / ppd – pounds per day

Figure III.14 below shows the flow diagram and **Figure III.15** shows the existing layout of ANRA's NAC WWTF.

Figure III.14 – NAC Regional WWTF Flow Diagram

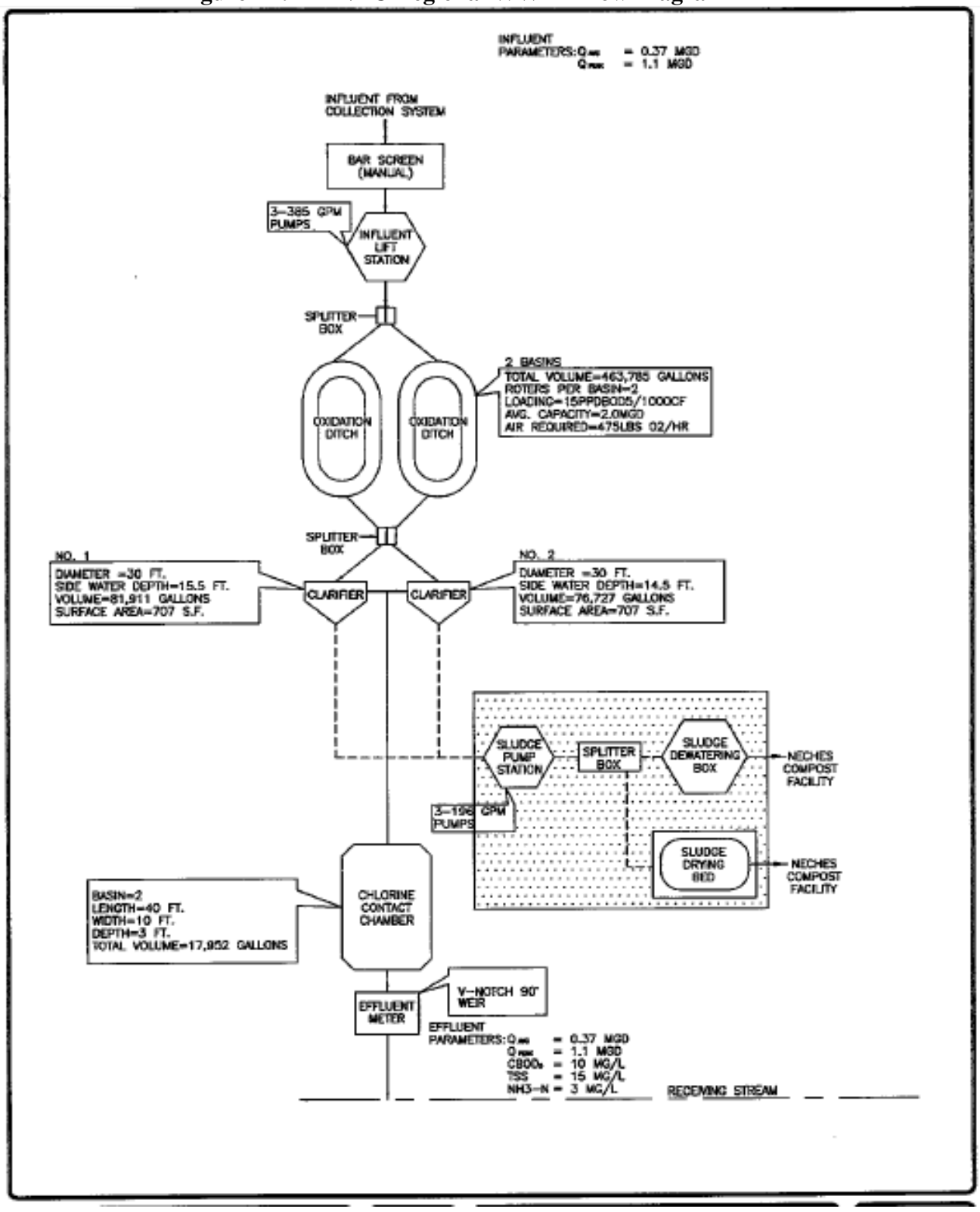
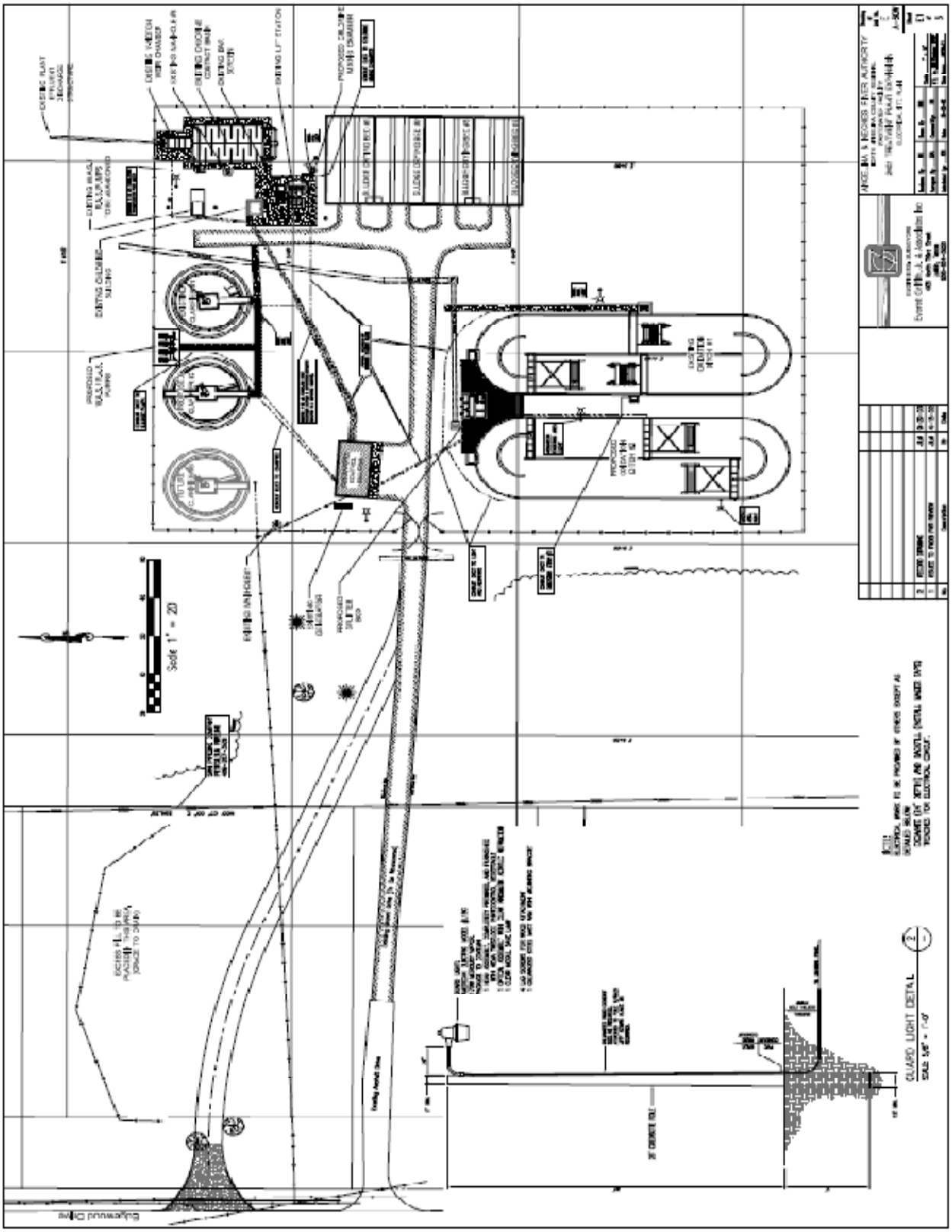


Figure III.15 – NAC Regional WWTF Layout



Five (5) years of daily flow data was analyzed for ANRA's NAC WWTF to verify adequacy and capacity to treat additional wastewater from Phases I and II. Fiscal years 2009 through 2013 are attached as **Exhibit C**, and a summary of flow data is shown below in **Table III.27**.

Table III.27 – NAC WWTF 5-Year Historical Flow Data

Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	0.1823	0.4223
February	0.1755	0.3972
March	0.1786	1.1842
April	0.1681	0.5293
May	0.1473	0.2979
June	0.1636	0.8696
July	0.1515	0.4166
August	0.1560	0.3086
September	0.1651	0.3948
October	0.1724	0.6766
November	0.1681	0.2651
December	0.1778	0.3907
Average	**0.1672**	**0.5127**

As shown above in **Table III.27**, the five (5) year daily average flow at the plant was 0.1672 MGD and the daily average maximum daily flow at the plant was 0.5127 MGD. As noted above in **Table II.5** above, the current projected average daily flow is 69,900 gallons per day (.0699 MGD) and the projected two-hour peak flow is projected to be 279,600 gallons per day (.2796 MGD). Adding current projected daily average flow from **Table II.5** above to five (5) year daily average flow from ANRA's NAC WWTF from **Table III.27** above, the current projected daily average flow at the plant is projected to be .2372 MGD. Similarly, the current two-hour peak flow at the plant is projected to be .7923 MGD. Based upon existing projected conditions, the plant will be at 72% capacity including all Phase I and Phase II improvements. Projecting future flow from existing customers at ANRA's NAC WWTF, in conjunction with the 17.2% projected increase in flow from current flow to year 2040 design flow, as shown above in **Table**

II.5, the 2040 design year flow at the plant is projected to be .2804 MGD (daily average flow) and .939 MGD (two-hour peak flow). Projected flow data includes the total projected design year 2040 average daily wastewater loading of 84,400 gallons per day (.0844 MGD) with a two-hour peak flow of 337,600 gallons per day (.338 MGD) from **Table III.27**. Based upon design year 2040 projected average daily flow, the plant will be at 76% capacity including all projected Phase I and Phase II improvements. ANRA's NAC WWTF was originally constructed to handle additional flow for future regionalization. Therefore, the projected 2040 design year flow from Phases I and II, including all projected flow from existing NAC WWTF customers, will not require additional modifications or permit modifications other than those described below.

The proposed connection for the addition of Redland Estates and all participants in Phases I and II will require basin modifications which will include, construction of plant headworks to replace the existing headworks due to lack of available space to incorporate the proposed connection, construction of a chlorine contact chamber to replace the existing chlorine contact chamber and site fencing of ANRA's North Angelina County Regional Wastewater Treatment Facility to include all designated treatment facility land owned by ANRA.

Three (3) alternatives were considered for the proposed improvements for Phase III, including: 1) relocation of bar screen and chlorine contact chamber, 2) replace existing mechanical bar screen, and 3) do nothing. In order to achieve regionalization and provide regulated treatment of Redland Estates and District existing / proposed sanitary sewer Option 3, cannot be utilized. In each option discussed below a 15' wide entrance drive will be proposed from Phil Jackson Road to the NAC WWTF (approximately 1,460 L.F.) with a proposed eight (8") inch Grade A, Type 2 limestone base course for access and egress to the plant.

Option 1: Relocation of Bar Screen and Chlorine Contact Chamber:

Option 1 proposes to demolish the existing bar screen and chlorine contact chamber and relocate proposed units to provide sufficient room for connection of the proposed 6" PVC sanitary sewer forcemain from Phase II. Currently there is not sufficient room between

the sludge drying beds, chlorine contact chamber and bar screen to provide the connection from Phase II to the existing manhole prior to the bar screen. Additionally Option 1 proposed to install approximately 2,000 L.F. of 6' chain link intruder resistant fence with 3 strand barbed-wire.

Figure III.16 below shows the projected layout of Option 1 for proposed Phase III improvements.

Figure III.16 – Phase III Option 1

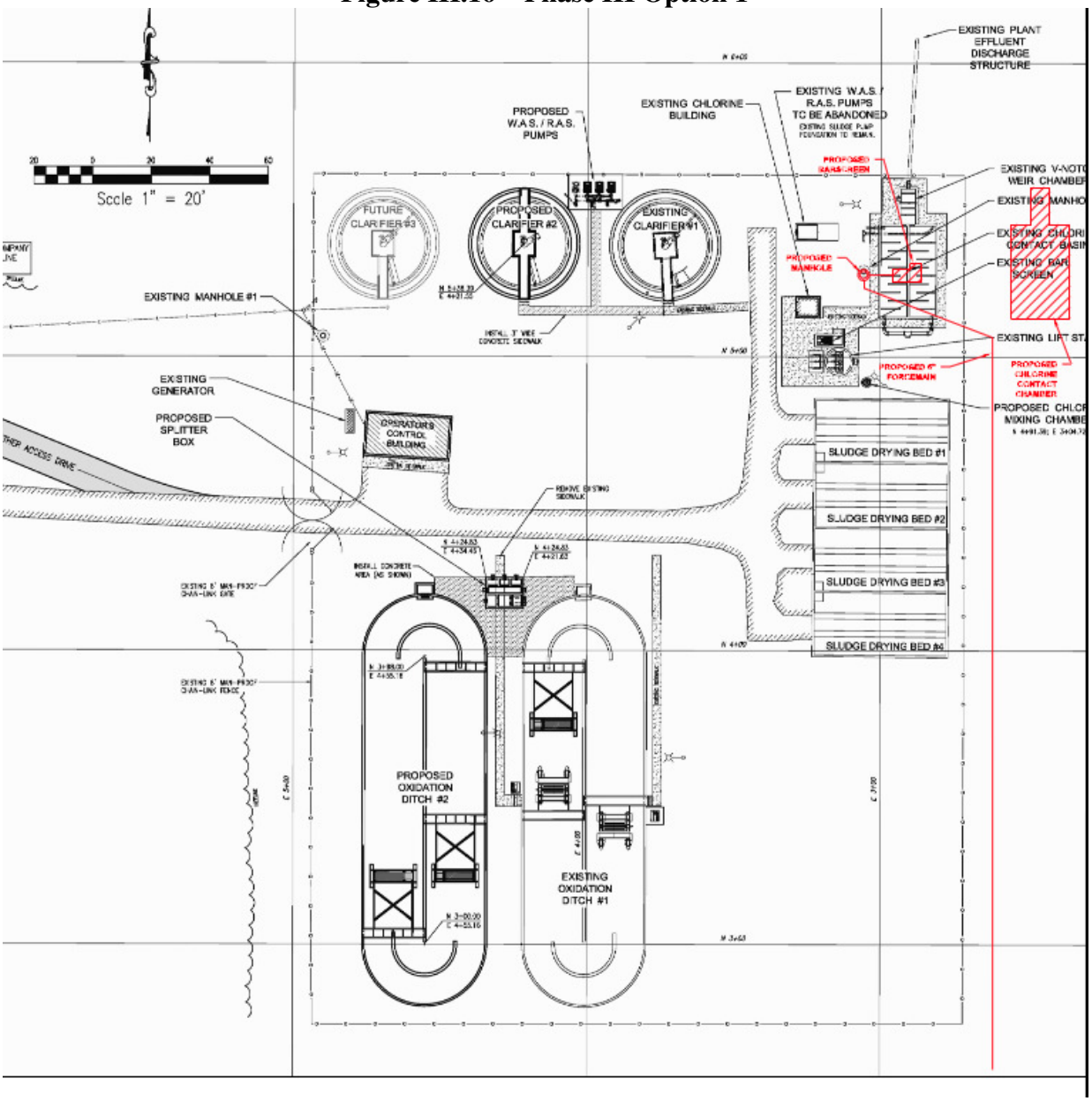


Table III.27: Phase III Option 1 Projected Costs

Item	Description	Units	Quantity	Unit Cost	Cost
1.01	Demolition of Bar Screen	LS	1	$15,000.00	$15,000.00
1.02	Demolition of Chlorine Contact Chamber	LS	1	$20,000.00	$20,000.00
1.03	Proposed Mechanical Bar Screen	LS	1	$418,500.00	$418,500.00
1.04	Proposed Chlorine Contact Chamber	LS	1	$225,000.00	$225,000.00
1.05	6' Chain Link Fence w/ 3-Strand Barbed Wire	LF	2,000	$30.00	$60,000.00
1.06	Entrance Drive	LF	1,460	$75.00	$109,500.00
1.07	Seeding and Fertilizing	ACRE	3	$2,500.00	$7,500.00
1.08	Storm Water Pollution Prevention	LS	1	$3,500.00	$3,500.00
1.08	Mobilization	LS	1	$85,900.00	$85,900.00
				Subtotal Construction Cost	**$944,900.00**
				15% Contingencies	$141,600.00
				Total Projected Construction Cost	**$1,086,500.00**

Table III.27 above provides a detailed breakdown of projected construction costs. As shown in **Table III.27**, the total projected construction cost for Phase III Option 1 is $1,086,500.00 including 15% contingencies. Projected O&M costs for Option 1 will be the same as Option 2 for Phase III.

Option 2: Replace Existing Mechanical Bar Screen:

Option 2 proposes to replace the existing mechanical bar screen with a new mechanical bar screen and to route the proposed 6" PVC sanitary sewer forcemain from Phase II around the west side of the plant to connect to an existing manhole prior to entering the plant. Additionally Option 2 proposed to install approximately 2,000 L.F. of 6' chain link intruder resistant fence with 3 strand barbed-wire.

Figure III.17 below shows the projected layout of Option 1 for proposed Phase III improvements.

Figure III.17 – Phase III Option 2

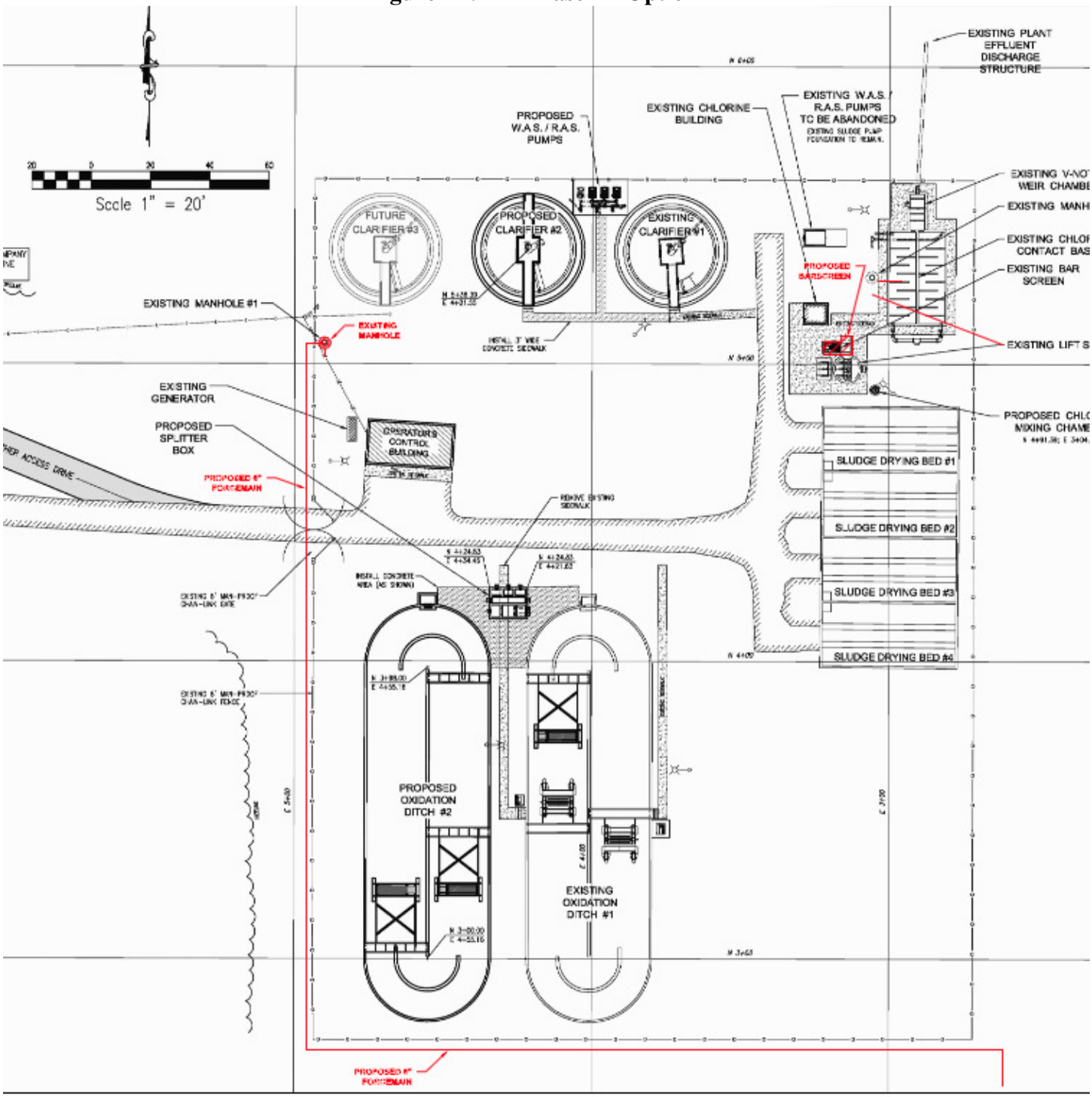


Table III.28: Phase III Option 2 Projected Costs

Item	Description	Units	Quantity	Unit Cost	Cost
2.01	Remove Existing Mechanical Bar Screen	LS	1	$10,500.00	$10,500.00
2.02	Proposed Mechanical Bar Screen	LS	1	$418,500.00	$418,500.00
2.03	6' Chain Link Fence w/ 3-Strand Barbed Wire	LF	2,000	$35.00	$70,000.00
2.04	Entrance Drive	LF	1,460	$75.00	$109,500.00
2.05	Seeding and Fertilizing	ACRE	3	$2,500.00	$7,500.00
2.06	Storm Water Pollution Prevention	LS	1	$3,500.00	$3,500.00
2.07	Mobilization	LS	1	$61,950.00	$61,950.00
				Subtotal Construction Cost	**$681,450.00**
				15% Contingencies	$102,655.00
				Total Projected Construction Cost	**$784,105.00**

Table III.27 above provides a detailed breakdown of projected construction costs. As shown in **Table III.27**, the total projected construction cost for Phase III Option 2 is $784,105.00 including 15% contingencies. Projected O&M costs for Option 2 will be the same as Option 1 for Phase III.

Recommendation

Two (2) different alternatives were presented above for Phase III improvements. Based upon projected capital costs shown above and feasibility to connect Phase I and II improvements to ANRA's NAC WWTF, it is recommended that Option 2 be utilized for Phase III improvements. However, it should be noted that Option 1 will be designed, bid and considered based upon funds availability; the Chlorine Contact Chamber will be bid as an additive alternate.

III.E. Summary of Phase I Through III - Project Alternatives Considered and Recommendations

Sections III.B through III.D above provided project specific discussions for completing Phase I, II and III improvements. **Table III.28** below provides an overall total projected construction cost summary for Phases I, II and III.

As shown below in **Table III.28**, the total projected construction cost for Phase I, II and III improvements is estimated to be $4,283,105, which includes 15% contingencies. Non-construction costs are not included in **Table III.28**; however they will be included in **Section IV**.

Table III.28 – Total Projected Construction Cost

Proposed Project	Total Projected Construction Cost
Phase I - Line A - County Barn Road	$327,500.00
Phase I - Line B and C - Smallwood Road, Joe Road and Ruth Lane	$688,500.00
Phase I - Line D - BBQ Road	$347,000.00
Phase I - Line E - Phil Jackson Road	$972,500.00
Phase II Option 1	$1,163,500.00
Phase III Option 2	$784,105.00
Total Projected Construction Cost	**$4,283,105.00**

Easements and land acquisition costs have not been included in construction or non-construction costs, since they cannot be funded through TWDB CWSRF. However, it should be noted that easements will be required in certain areas where mains cannot be installed within County or State right-of-ways. Based upon a total of 54,325 L.F. of proposed mains to be installed, assuming all mains will be required within private easement, 25-acres of easements or land acquisition may be required. Based upon average land values within the area ($5,500 per acre), utilizing Angelina County Appraisal District appraisal values, the total projected easement and land acquisition cost is projected to be $137,500. Easement preparation, boundary descriptions and land agent acquisition fees are projected to be $71,250. Therefore, total easement and land acquisition costs are projected to be $208,750. As mentioned above, these costs cannot be included in TWDB funding and will be required to be paid through District funds.

SECTION IV
PROPOSED IMPROVEMENTS

The proposed project as described above was presented as three (3) separate phases for clarity. A summary of each proposed Phase is discussed below.

IV.A. Project Summary and Recommendations

Phase I: Phase I improvements consist of providing first time sanitary sewer service to residents within the District's current service area, and will by necessity also include future connections to residential, commercial and industrial connections outside the District's service area who do not have centralized sanitary sewer. Currently there are approximately 238 potential connections within the District's service area, however only 80 residents are currently served with sanitary sewer services. The remaining connections within the District service area utilize on-site sanitary sewer facilities (OSSF). Many of the existing OSSF's no longer meet local and state regulatory requirements and therefore Phase I of the proposed project was initiated to provide first time sanitary sewer service to existing residents within the District's service area. Providing a centralized sanitary sewer collection system will also mitigate future sanitary sewer connections to residents outside the District's service area, within proximity to proposed collection mains. Phase I will provide first time sewer service to approximately 105 connections within the District's service area. Phase I will include elimination of existing on-site sewer facilities for existing connections and provide collection through a proposed sanitary sewer collection system with treatment being provided by the ANRA's North Angelina County Regional Wastewater Treatment Facility.

Three alternatives were considered for providing first-time sanitary sewer to residents within the District's service area, including: 1) pressure sewer system, 2) gravity sanitary sewer mains with lift stations/forcemains, and 3) replacement of individual OSSF's. **Table IV.1** below shows a breakdown of total projected construction costs for each line segment discussed above in **Section III**.

As shown in **Section III**, Phase I, Option 2 (gravity sanitary sewer mains with lift stations/forcemains) was selected for providing first-time sanitary sewer service to residents within the District's service area.

Table IV.1 – Phase I Total Projected Construction Cost

Proposed Project	Total Projected Construction Cost
Line A - County Barn Road	$327,500.00
Line B and C - Smallwood Road, Joe Road and Ruth Lane	$688,500.00
Line D - BBQ Road	$347,000.00
Line E - Phil Jackson Road	$972,500.00
Total Projected Construction Cost	**$2,335,500.00**

Estimates of probable cost were developed for each alternative discussed above and ranked based upon capital cost, O&M cost, technical soundness and design life. As shown above in **Table IV.1**, the total projected construction cost for Phase I Option 2, including 15% contingencies, is estimated to be $2,335,500.

Phase II: Phase II improvements consist of mitigating sanitary sewer overflows from Redland Estates which have continued for the last 20 years due to deficient wastewater treatment facilities. As noted above in **Section II**, the Redland Estates WWTF has discharged untreated wastewater directly into an unnamed tributary, ultimately to Segment No. 0611 of the Angelina River. A Public Health Threat has been issued by TCEQ and the Angelina County Cities and Health District, attached as **Exhibit A**. TWDB has determined that Segment No. 0611 is an Impaired Water Body that has been and will continue to be affected by the direct discharge of untreated wastewater from Redland Estates. Phase II proposes to eliminate the Redland Estates WWTF, via proposed TCEQ closure mitigation measures, and provide regulated sanitary sewer

collection or treatment facilities to pump wastewater from the existing 41 connections to the District's collection system which will ultimately be treated at Angelina & Neches River Authority's North Angelina County Regional Wastewater Treatment Facility, which is described below as Phase III.

Three (3) alternatives were considered for the proposed improvements for Phase II, including: 1) gravity sanitary sewer with lift stations/forcemains, 2) installation of a package wastewater treatment plant, and 3) do nothing. Since Option 3 (do nothing) could not be utilized due to a TCEQ non-compliance agreement and the deficiency and lack of treatment of Redland Estates sanitary sewer, Options 1 and 2 for Phase II improvements were discussed. **Table IV.2** below shows a breakdown of total projected construction costs for Phase II improvements discussed above in **Section III**.

Table IV.2 – Phase II Total Projected Construction Cost

Proposed Project	Total Projected Construction Cost
Option 1	**$1,163,500.00**
Option 2	$1,450,000.00

As shown in **Section III**, Phase II, Option 1 (gravity sanitary sewer mains with lift stations/forcemains) was selected for providing Phase II improvements. Estimates of probable cost were developed for each alternative discussed above and ranked based upon capital cost, O&M cost, technical soundness and design life. As shown above in **Table IV.2**, the total projected construction cost for Phase II Option 1, including 15% contingencies, is estimated to be $1,163,500.

Phase III: Phase III includes modifications to ANRA's North Angelina County Regional Wastewater Treatment Facility, to facilitate design flow and provide connection for the proposed wastewater service area. The North Angelina County Regional Wastewater Treatment Facility currently provides treatment for Central ISD, Idlewood WCID and

DADS-Lufkin State Supported Living Center and is permitted to treat and discharge 370,000 gallons per day. The proposed connection for the addition of Redland Estates and all participants in Phases I and II will provide basin modifications including replacement of the existing bar screen and site fencing of ANRA's North Angelina County Regional Wastewater Treatment Facility to include all designated treatment facility land owned by ANRA.

As shown above in **Table III.27**, the five (5) year daily average flow at the plant was 0.1672 MGD and the daily average maximum daily flow at the plant was 0.5127 MGD. As noted above in **Table II.5** above, the current projected average daily flow is 69,900 gallons per day (.0699 MGD) and the projected two-hour peak flow is projected to be 279,600 gallons per day (.2796 MGD). Adding current projected daily average flow from **Table II.5** above to five (5) year daily average flow from ANRA's NAC WWTF from **Table III.27** above, the current projected daily average flow at the plant is projected to be .2372 MGD. Similarly, the current two-hour peak flow at the plant is projected to be .7923 MGD. Based upon existing projected conditions, the plant will be at 72% capacity including all Phase I and Phase II improvements. Projecting future flow from existing customers at ANRA's NAC WWTF, in conjunction with the 17.2% projected increase in flow from current flow to year 2040 design flow, as shown above in **Table II.5**, the 2040 design year flow at the plant is projected to be .2804 MGD (daily average flow) and .939 MGD (two-hour peak flow). Projected flow data includes the total projected design year 2040 average daily wastewater loading of 84,400 gallons per day (.0844 MGD) with a two-hour peak flow of 337,600 gallons per day (.338 MGD) from **Table III.27**. Based upon design year 2040 projected average daily flow, the plant will be at 76% capacity including all projected Phase I and Phase II improvements. ANRA's NAC WWTF was originally constructed to handle additional flow for future regionalization. Therefore, the projected 2040 design year flow from Phases I and II, including all projected flow from existing NAC WWTF customers, will not require additional modifications or permit modifications other than those described below.

Three (3) alternatives were considered for the proposed improvements for Phase III, including: 1) relocation of bar screen and chlorine contact chamber, 2) replace existing mechanical bar screen, and 3) do nothing. In order to achieve regionalization and provide

regulated treatment of Redland Estates and District existing / proposed sanitary sewer Option 3, cannot be utilized. **Table IV.3** below shows a breakdown of total projected construction costs for Phase II improvements discussed above in **Section III**.

Table IV.3 – Phase III Total Projected Construction Cost

Proposed Project	Total Projected Construction Cost
Option 1	$1,086,500.00
Option 2	**$784,105.00**

As shown in **Section III**, Phase III, Option 2 (replace existing mechanical bar screen) was selected for providing Phase III improvements. As shown above in **Table IV.3**, the total projected construction cost for Phase III Option 2, including 15% contingencies, is estimated to be $784,105.00. However, it should be noted that Option 1 will be designed, bid and considered based upon funds availability; the Chlorine Contact Chamber will be bid as an additive alternate.

Other non-cost factors included for basis of termination for selected alternative for each respective Phase, included:

- Project Longevity (length of time the alternative would provide sufficient capacity from project completion through the 20-year design without major equipment upgrades)
- Environmental Impacts
- Land Requirements (amount of land required for each alternative)
- Construction Problems
- Sophistication of Process (complexity of operations)
- Process Treatment Problems (ability to consistently meet permit conditions)

- Problems with Future Expansion (ease by which plant can be expanded)

IV.B. Financial

The total project costs for the recommended alternatives will be paid through loans and/or grants. ANRA currently has Planning, Acquisition and Design (PAD) funds obligated through TWDB CWSRF funding in the amount of $650,000 with 30% loan and 70% loan forgiveness. Upon completion of PAD phases, ANRA intends to submit for construction funding through TWDB CWSRF to incorporate 30% loan and 70% loan forgiveness. Therefore, currently ANRA proposes to utilize the funding sources mentioned above to complete all proposed improvements.

Other applicable funding options include:

- Loan program governed by United States Department of Agriculture – Rural Development (which could include some grant funds).
- Sale of bonds or certificates of obligation by ANRA.
- Texas Capital Fund or Economic Development Administration (EDA) grants if improvements are tied to wastewater supply needs for attracting a certain industry to the District.

If loan monies are required, a qualified Financial Advisor should be consulted to determine the most advantageous funding means available to ANRA, including any potential impact to sewer rates.

IV.C. Implementation Schedule

Assuming all proposed improvements are completed as one project, the proposed schedule for implementation is presented in **Table VI.4**. This schedule represents the time-frame associated with completing Phases I through III.

The potential exists for delays in the schedule including:

- Funding commitment.

- Environmental clearance (if adverse environmental impacts are identified or if public hearings are requested and required).

These delays may increase the overall schedule from 3 to 9 months. Assuming no unexpected delays occur in any area of the project, initiation of construction for the proposed project is projected to occur approximately 13 months after submission of this EFR.

Table IV.4 – Proposed Implementation Schedule

Item	Day	Approximate Date
Notice to Proceed by ANRA to KSA (after TWDB Loan Commitment)	0	June 12, 2014
Complete Study and Report Phase	102	September 22, 2014
Complete Environmental Assessment and Submit to Agencies for Review	135	October 25, 2014
Approval of Environmental Assessment	210	January 8, 2015
Complete Preliminary Design Phase	365	June 12, 2015
Complete Final Design Phase	425	August 11, 2015
Submit Plans & Specs for Review by Owner/Reviewing Agency	426	August 12, 2015
Approval of Plans & Specs by Owner	440	August 26, 2015
Approval of Plans and Specs by Review Agencies	460	September 15, 2015
Submit Construction Phase to TWDB for Approval	470	September 25, 2015
Bid and Award Construction Contract	500	October 25, 2015
Begin Construction	530	November 24, 2015
Complete Construction	830	September 19, 2016

Table IV.4 assumes the following:

1. Construction requires 10 months.

IV.D. Total Projected Construction Cost for Recommendations

Table IV.5 outlines total projected construction, as discussed above, and non-construction estimates for Phases I through III. **Table IV.5** below provides total projected construction and non-construction costs, in TWDB-1201 Budget format, for submission of Construction funding through TWDB CWSRF funding.

Table IV.5 – Proposed Construction Budget

Uses	TWDB Funds Series 1	TWDB Funds Series 2	TWDB Funds Series 3	Total TWDB Cost	Other Funds	Total Cost
Construction						
Construction	$4,083,105	$0	$0	$4,083,105	$0	$4,083,105
Subtotal Construction	**$4,083,105**	**$0**	**$0**	**$4,083,105**	**$0**	**$4,083,105**
Basic Engineering Fees						
Planning +	$0	$0	$0	$0	$0	$0
Design	$0	$0	$0	$0	$0	$0
Construction Engineering	$85,400	$0	$0	$85,400	$0	$85,400
Basic Engineering Other ** _____	$0	$0	$0	$0	$0	$0
Subtotal Basic Engineering Fees	**$85,400**	**$0**	**$0**	**$85,400**	**$0**	**$85,400**
Special Services						
Application	$0	$0	$0	$0	$0	$0
Environmental	$0	$0	$0	$0	$0	$0
Water Conservation Plan	$0	$0	$0	$0	$0	$0
I/I Studies/Sewer Evaluation	$0	$0	$0	$0	$0	$0
Surveying	$108,500	$0	$0	$108,500	$0	$108,500
Geotechnical	$0	$0	$0	$0	$0	$0
Testing	$29,500	$0	$0	$29,500	$0	$29,500
Permits	$15,500	$0	$0	$15,500	$0	$15,500
Inspection	$33,800	$0	$0	$33,800	$0	$33,800
O&M Manual	$0	$0	$0	$0	$0	$0
Project Management (by engineer)	$0	$0	$0	$0	$0	$0
Pilot Testing	$0	$0	$0	$0	$0	$0
Water Distribution Modeling	$0	$0	$0	$0	$0	$0
Special Services Other **ANRA Project Management	$300,000	$0	$0	$300,000	$0	$300,000

Subtotal Special Services	**$487,300**	**$0**	**$0**	**$487,300**	**$0**	**$487,300**
Other						
Administration	$0	$0	$0	$0	$0	$0
Land/Easements Acquisition	$45,000	$0	$0	$45,000	$0	$45,000
Water Rights Purchase (If Applicable)	$0	$0	$0	$0	$0	$0
Capacity Buy-In (If Applicable)	$0	$0	$0	$0	$0	$0
Project Legal Expenses	$0	$0	$0	$0	$0	$0
Other ** _____	$0	$0	$0	$0	$0	$0
Subtotal Other Services	**$45,000**	**$0**	**$0**	**$45,000**	**$0**	**$45,000**
Fiscal Services						
Financial Advisor	$37,500	$0	$0	$37,500	$0	$37,500
Bond Counsel	$20,000	$0	$0	$20,000	$0	$20,000
Issuance Cost	$4,000	$0	$0	$4,000	$0	$4,000
Bond Insurance/Surety	$0	$0	$0	$0	$0	$0
Fiscal/Legal	$0	$0	$0	$0	$0	$0
Capitalized Interest	$0	$0	$0	$0	$0	$0
Bond Reserve Fund	$0	$0	$0	$0	$0	$0
Loan Origination Fee	$27,695	$0	$0	$27,695	$0	$27,695
Other ** _____	$0	$0	$0	$0	$0	$0
Subtotal Fiscal Services	**$89,195**	**$0**	**$0**	**$89,195**	**$0**	**$89,195**
Contingency						
Contingency	$200,000	$0	$0	$200,000	$0	$200,000
Subtotal Contingency	**$200,000**	**$0**	**$0**	**$200,000**	**$0**	**$200,000**
TOTAL COSTS	**$4,990,000**	**$0**	**$0**	**$4,990,000**	**$0**	**$4,990,000**

As shown above in **Table IV.5**, the total projected construction budget for completion of projects for TWDB CWSRF No. 73677, Phases I, II and III, is estimated to be $4,990,000. The original PAD budget, which was previously approved, was $650,000. Therefore the total projected project cost is estimated to be $5,640,000.

EXHIBIT A

PUBLIC HEALTH THREAT AND NON-COMPLIANCE AGREEMENT

Texas Commission on Environmental Quality

COMPLIANCE AGREEMENT

Angelina County Fresh Water Supply District No. 1
Angelina County, Texas

The Texas Commission on Environmental Quality ("Commission" or "TCEQ") is the state agency charged with enforcing TEX. WATER CODE ch. 26 (the "Code") and the regulations promulgated pursuant to the Code.

On June 2, 2011, Angelina County Fresh Water Supply District No. 1 ("the Respondent") agreed to provide wastewater services to the Redland Estates Subdivision in Angelina County. Wastewater services are currently being provided by a failing wastewater treatment facility located approximately five miles north of downtown Lufkin along United States Highway 59 and 2,000 feet east of the intersection of United States Highway 59 just outside Redland, one mile northeast of the intersection of United States Highway 59 and Farm-to-Market Road 2021 in Angelina County, Texas (the "Facility").

Several ongoing issues have been indentified at the Facility which are substantial violations of the TCEQ's requirements found in the Code. The Respondent will not take ownership or operate the Facility or its associated collection system but has agreed to install an operational lift station and associated collection system main lines necessary to provide wastewater services to the Redland Estates Subdivision. The TCEQ is offering this Compliance Agreement ("CA") in an effort to ensure that appropriate efforts are initiated, pursued with due diligence, and completed within a reasonable time to eliminate the potential threat to public health.

DESCRIPTION OF THE ISSUES

The Facility has been abandoned and is in severe disrepair. No viable responsible party has been able to be identified and no other feasible options have been identified, therefore, the Respondent has agreed to install an operational lift station and associated collection system main lines necessary to provide wastewater services to the Redland Estates Subdivision. Furthermore, the Respondent agrees to make reasonable efforts to perform a proper closure of the Facility as described in the Provisions portion of this Agreement, subject to funding and permission of the then current owner.

In response to these issues the Respondent and the TCEQ have entered into this CA.

PROVISIONS

The provisions of this CA are as follows:

1. The Respondent shall undertake the following corrective measures:

    a. Within 180 days after the effective date of this Agreement, apply for the funding to construct a lift station and associated collection system main lines necessary to provide wastewater services to the Redland Estates Subdivision ("the

Construction Project"), and to properly close the Facility;

b. Within 270 days after the effective date of this Agreement, and on a semi-annual basis thereafter, submit progress reports regarding the status of obtaining the funding for the Construction Project, until funding is obtained, to the addresses listed in Provision No. 1.j below;

c. Within 15 days after funding has been obtained, provide notice to the addresses listed in Provision No. 1.j below that funding has been obtained;

d. Within 60 days after funding has been obtained, submit a summary transmittal letter detailing the plans and specifications of the lift station and associated collection system main lines necessary to provide wastewater services, in accordance with 30 TEX. ADMIN. CODE § 217.6, to:

Wastewater Permitting Section
Water Quality Division, MC 148
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

e. Within 30 days after obtaining TCEQ approval of the summary transmittal letter, begin taking bids for the Construction Project;

f. Within 150 days after obtaining TCEQ approval of the summary transmittal letter, begin the Construction Project. The design and construction of the lift station and main lines shall be conducted in accordance with the design criteria set forth in 30 TEX. ADMIN. CODE ch. 217;

g. Within 30 days after the completion of the Construction Project, and after obtaining permission from the current owner, submit a closure plan for the Facility to:

Wastewater Permitting Section
Water Quality Division, MC 148
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

h. Within 30 days after obtaining TCEQ approval of the closure plan, begin implementing the necessary actions to close the Facility in accordance with the approved closure plan;

i. Within 60 months after the effective date of this Agreement, provide notice to the addresses listed in Provision No. 1.j below that the Construction Project has been completed, and that the Facility has been properly closed, in accordance with the approved closure plan; and

j. The notices shall be submitted to:

Order Compliance Team
Enforcement Division, MC 149A
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

with a copy to:

Water Section, Manager
Beaumont Regional Office
Texas Commission on Environmental Quality
3870 Eastex Freeway
Beaumont, Texas 77703-1892

2. The Executive Director may grant an extension or modification to any provision of this Agreement upon a written and substantiated showing of good cause. All requests for extensions or modifications by the Respondent shall be made in writing to the TCEQ. Extensions or modifications are not effective until the Respondent receives written approval from the TCEQ. The determination of what constitutes good cause rests solely with the TCEQ, the grant of an extension or modification shall not be unreasonably withheld.

3. The Respondent's obligations to secure funding for the Construction Project and properly close the Facility under Provision No. 1 are conditioned upon: (i) the annexation of the Redland Estates Subdivision into Respondent's boundaries; and, (ii) the results of an election to be held in May 2012 confirming the Redland Estates Subdivision's assumption of all or any part of the Respondent's bonds, notes, obligations, or taxes, and the Respondent's authority to levy an ad valorem tax on taxable property within the Redland Estates Subdivision.

4. If the May 2012 election described above in Provision 3 does not result in confirmation of the Redland Estates Subdivision's assumption of Respondent's debt nor the confirmation of the authority of Respondent to levy an ad valorem tax on taxable property within the Redland Estates Subdivision, then the Respondent shall provide notice to the TCEQ and this Agreement will terminate automatically and will be of no further force or effect and Respondent shall have no further obligation with respect to the extension of service to the Redland Estates Subdivision or closure of the Facility.

5. This Agreement shall be in effect for an initial term of five years, or until the Construction Project has been completed and that the Facility has been properly closed, whichever occurs first. If neither party requests termination or renegotiation within 120 days prior to the expiration of this initial term, it will extend for a period of seven years from the effective date of this Agreement.

In return for the Respondent's agreement and adherence to these terms, the Commission will withhold enforcement actions related to the Facility and associated collection system. The Respondent's responsibilities are limited to complying with the terms of this Agreement and for any violations that may occur within the wastewater collection or transmission system once completed. Should unforeseen circumstances indicate a need to alter the above mentioned schedule, the Respondent must immediately notify the Commission so that an amendment can be discussed.

The effective date of this Agreement is the signature date of the Respondent's authorized representative. Acceptance of the terms of this Agreement is indicated by the signature below.

Authorized representative of
Angelina County Fresh Water Supply District No. 1

12-20-11
Date

Richard Jones
Printed name of authorized representative
for Angelina County Fresh Water Supply District No. 1

Board President
Title

Susan Johnson, Manager
Water Section, Enforcement Division

12/14/11
Date

Instructions: Send this signed, original Agreement to Samuel Short, Enforcement Division, MC 169, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 17, 2012

Mr. Kelly Holcomb
Angelina & Neches River Authority
P.O. Box 387
Lufkin, Texas 75902

Re: Redland Estates Wastewater Treatment Plant - Located approximately 5 miles north of Lufkin approximately 2000 feet east of Highway 59 just outside of Redland, Angelina County, Texas

Dear Mr. Holcomb:

The Texas Commission on Environmental Quality (TCEQ) Beaumont Region Office has conducted several investigations of the above-referenced regulated entity to evaluate compliance with applicable requirements for wastewater treatment. The Redland Wastewater Treatment plant has been in a state of severe disrepair for a number of years. On November 20, 2009 an investigation was conducted at the facility, and it was documented that the treatment plant was in severe disrepair and raw sewage was bypassing the non-operational treatment plant creating a nuisance condition. Due to issues in transferring or dissolving the Certificate of Convenience and Necessity (CCN) held by Mr. St. Clair, Redland Water Supply Corporation cancelled their wastewater permit and their plans to build a new treatment plant on January 5, 2010. During a site visit on June 8, 2011, it was again documented that untreated raw sewage, creating nuisance conditions, was discharging from a point at the end of the collection system, bypassing the inactive wastewater treatment plant, and entering the unnamed creek. On December 20, 2011, Angelina County Freshwater Supply District No. 1 entered into a compliance agreement to provide wastewater services to Redland Estates.

If you or members of your staff have any questions or concerns with this matter, please feel free to contact me at (409)898-3838.

Sincerely,

Ronald Hebert
Water Section Manager
Beaumont Region 10

RH/km

ANGELINA COUNTY & CITIES
HEALTH DISTRICT

February 17, 2012

Richard Jones

Angelina County Fresh Water Supply District #1

Re: Redland Estates, Jackson Road, Barbeque Road Wastewater Concerns:

Mr. Jones,

I am writing this letter in reference to the Redland Estates, Jackson Road and Barbeque Road Wastewater concerns. Angelina County & Cities Health District has worked numerous complaints in the above mentioned areas. Redland Estates is a major problem and the wastewater concerns need to be addressed. There are over 40 homes in this subdivision and the wastewater disposal system is under the jurisdiction of TCEQ. However, in my 23 years with the Health District I have worked many complaints in this area. The wastewater treatment system on this subdivision has not worked properly for many years. This creates a great environmental concern in the fact that all of the wastewater from this subdivision is not being treated before being surface discharged to the creek behind the subdivision which then drains into the Angelina River.

Jackson Road and Barbeque Road has many wastewater concerns as well. In fact, our office has several court cases filed on residents that live in this area. A wastewater system that would include the above mentioned areas would go great lengths in protecting the environment and the citizens of these areas.

Thank you for allowing me to express my environmental concerns and if I can be of any assistance please feel free to contact my office @ 936-632-9109.

Respectfully,

Terry Free R.S. Environmental Director, Angelina County & Cities Health District

503 Hill Street • Lufkin, TX 75904 • 936-632-1139

EXHIBIT B

ANRA NORTH ANGELINA COUNTY REGIONAL WWTF
DISCHARGE PERMIT

TPDES PERMIT NO. WQ0011620001
[For TCEQ office use only - EPA I.D. No. TX0056154]

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

This is a renewal that replaces TPDES Permit No. WQ0011620001 issued August 4, 2006.

PERMIT TO DISCHARGE WASTES
under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

Angelina and Neches River Authority

whose mailing address is

P. O. Box 387
Lufkin, Texas 75902

is authorized to treat and discharge wastes from the North Angelina County Regional Wastewater Treatment Facility, SIC Code 4952

located at 734 Edgewood Circle, approximately 0.6 mile northeast of U.S. Highway 69, approximately 1.5 miles northwest of the City of Lufkin, and 1.9 miles southeast of the intersection of U.S. Highway 69 and Farm-to-Market Road 2021 in Angelina County, Texas 75904

to an unnamed tributary; thence to Mill Creek; thence to Paper Mill Creek; thence to Angelina River/Sam Rayburn Reservoir in Segment No. 0615 of the Neches River Basin

only according with effluent limitations, monitoring requirements and other conditions set forth in this permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ), the laws of the State of Texas, and other orders of the TCEQ. The issuance of this permit does not grant to the permittee the right to use private or public property for conveyance of wastewater along the discharge route described in this permit. This includes, but is not limited to, property belonging to any individual, partnership, corporation or other entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This permit shall expire at midnight, **August 1, 2016.**

ISSUED DATE: August 5, 2011

For the Commission

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the date of issuance and lasting through the date of expiration, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.37 million gallons per day (MGD); nor shall the average discharge during any two-hour period (2-hour peak) exceed 771 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg mg/l (lbs/day)	7-day Avg mg/l	Daily Max mg/l	Single Grab mg/l	Report Daily Avg. & Max. Single Grab Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Five/week	Instantaneous
Carbonaceous Biochemical Oxygen Demand (5-day)	10 (31)	15	25	35	One/week	Grab
Total Suspended Solids	15 (46)	25	40	60	One/week	Grab
Ammonia Nitrogen	3 (9.2)	6	10	15	One/week	Grab
E. coli, CFU or MPN/100 ml	126	N/A	N/A	394	One/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

DEFINITIONS AND STANDARD PERMIT CONDITIONS

As required by Title 30 Texas Administrative Code (TAC) Chapter 305, certain regulations appear as standard conditions in waste discharge permits. 30 TAC § 305.121 - 305.129 (relating to Permit Characteristics and Conditions) as promulgated under the Texas Water Code (TWC) §§ 5.103 and 5.105, and the Texas Health and Safety Code (THSC) §§ 361.017 and 361.024(a), establish the characteristics and standards for waste discharge permits, including sewage sludge, and those sections of 40 Code of Federal Regulations (CFR) Part 122 adopted by reference by the Commission. The following text includes these conditions and incorporates them into this permit. All definitions in TWC § 26.001 and 30 TAC Chapter 305 shall apply to this permit and are incorporated by reference. Some specific definitions of words or phrases used in this permit are as follows:

1. Flow Measurements

   a. Annual average flow - the arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months. The annual average flow determination shall consist of daily flow volume determinations made by a totalizing meter, charted on a chart recorder and limited to major domestic wastewater discharge facilities with one million gallons per day or greater permitted flow.

   b. Daily average flow - the arithmetic average of all determinations of the daily flow within a period of one calendar month. The daily average flow determination shall consist of determinations made on at least four separate days. If instantaneous measurements are used to determine the daily flow, the determination shall be the arithmetic average of all instantaneous measurements taken during that month. Daily average flow determination for intermittent discharges shall consist of a minimum of three flow determinations on days of discharge.

   c. Daily maximum flow - the highest total flow for any 24-hour period in a calendar month.

   d. Instantaneous flow - the measured flow during the minimum time required to interpret the flow measuring device.

   e. 2-hour peak flow (domestic wastewater treatment plants) - the maximum flow sustained for a two-hour period during the period of daily discharge. The average of multiple measurements of instantaneous maximum flow within a two-hour period may be used to calculate the 2-hour peak flow.

   f. Maximum 2-hour peak flow (domestic wastewater treatment plants) - the highest 2-hour peak flow for any 24-hour period in a calendar month.

2. Concentration Measurements

   a. Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar month, consisting of at least four separate representative measurements.

      i. For domestic wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values in the previous four consecutive month period consisting of at least four measurements shall be utilized as the daily average concentration.

ii. For all other wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.

b. 7-day average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar week, Sunday through Saturday.

c. Daily maximum concentration - the maximum concentration measured on a single day, by the sample type specified in the permit, within a period of one calendar month.

d. Daily discharge - the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the sampling day.

The daily discharge determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily discharge determination of concentration shall be the arithmetic average (weighted by flow value) of all samples collected during that day.

e. Bacteria concentration (*E. coli* or Enterococci) - Colony Forming Units (CFU) or Most Probable Number (MPN) of bacteria per 100 milliliters effluent. The daily average bacteria concentration is a geometric mean of the values for the effluent samples collected in a calendar month. The geometric mean shall be determined by calculating the nth root of the product of all measurements made in a calendar month, where n equals the number of measurements made; or, computed as the antilogarithm of the arithmetic mean of the logarithms of all measurements made in a calendar month. For any measurement of bacteria equaling zero, a substituted value of one shall be made for input into either computation method. If specified, the 7-day average for bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

f. Daily average loading (lbs/day) - the arithmetic average of all daily discharge loading calculations during a period of one calendar month. These calculations must be made for each day of the month that a parameter is analyzed. The daily discharge, in terms of mass (lbs/day), is calculated as (Flow, MGD x Concentration, mg/l x 8.34).

g. Daily maximum loading (lbs/day) - the highest daily discharge, in terms of mass (lbs/day), within a period of one calendar month.

3. Sample Type

a. Composite sample - For domestic wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (a). For industrial wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (b).

b. Grab sample - an individual sample collected in less than 15 minutes.

4. Treatment Facility (facility) - wastewater facilities used in the conveyance, storage, treatment, recycling, reclamation and/or disposal of domestic sewage, industrial wastes, agricultural wastes, recreational wastes, or other wastes including sludge handling or disposal facilities under the jurisdiction of the Commission.

5. The term "sewage sludge" is defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in 30 TAC Chapter 312. This includes the solids that have not been classified as hazardous waste separated from wastewater by unit processes.

6. Bypass - the intentional diversion of a waste stream from any portion of a treatment facility.

MONITORING AND REPORTING REQUIREMENTS

1. Self-Reporting

Monitoring results shall be provided at the intervals specified in the permit. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall conduct effluent sampling and reporting in accordance with 30 TAC §§ 319.4 - 319.12. Unless otherwise specified, a monthly effluent report shall be submitted each month, to the Enforcement Division (MC 224), by the 20th day of the following month for each discharge which is described by this permit whether or not a discharge is made for that month. Monitoring results must be reported on an approved self-report form that is signed and certified as required by Monitoring and Reporting Requirements No. 10.

As provided by state law, the permittee is subject to administrative, civil and criminal penalties, as applicable, for negligently or knowingly violating the Clean Water Act (CWA); TWC §§ 26, 27, and 28; and THSC § 361, including but not limited to knowingly making any false statement, representation, or certification on any report, record, or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, or falsifying, tampering with or knowingly rendering inaccurate any monitoring device or method required by this permit or violating any other requirement imposed by state or federal regulations.

2. Test Procedures

a. Unless otherwise specified in this permit, test procedures for the analysis of pollutants shall comply with procedures specified in 30 TAC §§ 319.11 - 319.12. Measurements, tests, and calculations shall be accurately accomplished in a representative manner.

b. All laboratory tests submitted to demonstrate compliance with this permit must meet the requirements of 30 TAC § 25, Environmental Testing Laboratory Accreditation and Certification.

3. Records of Results

a. Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), monitoring and reporting records, including strip charts and records of calibration and maintenance, copies of all records required by this permit, records of all data used to complete the application for this permit, and the certification required by 40 CFR § 264.73(b)(9) shall be retained at the facility site, or shall be readily available for review by a TCEQ representative for a period of three years from the date of the record or sample, measurement, report, application or certification. This period shall be extended at the request of the Executive Director.

c. Records of monitoring activities shall include the following:

i. date, time and place of sample or measurement;

ii. identity of individual who collected the sample or made the measurement.

iii. date and time of analysis;

iv. identity of the individual and laboratory who performed the analysis;

v. the technique or method of analysis; and

vi. the results of the analysis or measurement and quality assurance/quality control records.

The period during which records are required to be kept shall be automatically extended to the date of the final disposition of any administrative or judicial enforcement action that may be instituted against the permittee.

4. 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 above, all results of such monitoring shall be included in the calculation and reporting of the values submitted on the approved self-report form. Increased frequency of sampling shall be indicated on the self-report form.

5. Calibration of Instruments

All automatic flow measuring or recording devices and all totalizing meters for measuring flows shall be accurately calibrated by a trained person at plant start-up and as often thereafter as necessary to ensure accuracy, but not less often than annually unless authorized by the Executive Director for a longer period. Such person shall verify in writing that the device is operating properly and giving accurate results. Copies of the verification shall be retained at the facility site and/or shall be readily available for review by a TCEQ representative for a period of three years.

6. Compliance Schedule Reports

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later

than 14 days following each schedule date to the Regional Office and the Enforcement Division (MC 224).

7. Noncompliance Notification

   a. In accordance with 30 TAC § 305.125(9) any noncompliance which may endanger human health or safety, or the environment shall be reported by the permittee to the TCEQ. Report of such information shall be provided orally or by facsimile transmission (FAX) to the Regional Office within 24 hours of becoming aware of the noncompliance. A written submission of such information shall also be provided by the permittee to the Regional Office and the Enforcement Division (MC 224) within five working days of becoming aware of the noncompliance. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.

   b. The following violations shall be reported under Monitoring and Reporting Requirement 7.a.:

      i. Unauthorized discharges as defined in Permit Condition 2(g).

      ii. Any unanticipated bypass that exceeds any effluent limitation in the permit.

      iii. Violation of a permitted maximum daily discharge limitation for pollutants listed specifically in the Other Requirements section of an Industrial TPDES permit.

   c. In addition to the above, any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the Regional Office and the Enforcement Division (MC 224) within 5 working days of becoming aware of the noncompliance.

   d. Any noncompliance other than that specified in this section, or any required information not submitted or submitted incorrectly, shall be reported to the Enforcement Division (MC 224) as promptly as possible. For effluent limitation violations, noncompliances shall be reported on the approved self-report form.

8. In accordance with the procedures described in 30 TAC §§ 35.301 - 35.303 (relating to Water Quality Emergency and Temporary Orders) if the permittee knows in advance of the need for a bypass, it shall submit prior notice by applying for such authorization.

9. Changes in Discharges of Toxic Substances

   All existing manufacturing, commercial, mining, and silvicultural permittees shall notify the Regional Office, orally or by facsimile transmission within 24 hours, and both the Regional Office and the Enforcement Division (MC 224) in writing within five (5) working days, after becoming aware of or having reason to believe:

   a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D,

Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i. One hundred micrograms per liter (100 µg/L);

ii. Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

iv. The level established by the TCEQ.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i. Five hundred micrograms per liter (500 µg/L);

ii. One milligram per liter (1 mg/L) for antimony;

iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

iv. The level established by the TCEQ.

10. Signatories to Reports

All reports and other information requested by the Executive Director shall be signed by the person and in the manner required by 30 TAC § 305.128 (relating to Signatories to Reports).

11. All Publicly Owned Treatment Works (POTWs) must provide adequate notice to the Executive Director of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to CWA § 301 or § 306 if it were directly discharging those pollutants;

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit; and

c. For the purpose of this paragraph, adequate notice shall include information on:

i. The quality and quantity of effluent introduced into the POTW; and

ii. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

PERMIT CONDITIONS

1. General

   a. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application or in any report to the Executive Director, it shall promptly submit such facts or information.

   b. This permit is granted on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked, in whole or in part, in accordance with 30 TAC Chapter 305, Subchapter D, during its term for good cause including, but not limited to, the following:

      i. Violation of any terms or conditions of this permit;

      ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

      iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

   c. The permittee shall furnish to the Executive Director, upon request and within a reasonable time, any information to determine whether cause exists for amending, revoking, suspending or terminating the permit. The permittee shall also furnish to the Executive Director, upon request, copies of records required to be kept by the permit.

2. Compliance

   a. Acceptance of the permit by the person to whom it is issued constitutes acknowledgment and agreement that such person will comply with all the terms and conditions embodied in the permit, and the rules and other orders of the Commission.

   b. The permittee has a duty to comply with all conditions of the permit. Failure to comply with any permit condition constitutes a violation of the permit and the Texas Water Code or the Texas Health and Safety Code, and is grounds for enforcement action, for permit amendment, revocation, or suspension, or for denial of a permit renewal application or an application for a permit for another facility.

   c. It shall not be a defense for a 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 the permit.

   d. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal or other permit violation that has a reasonable likelihood of adversely affecting human health or the environment.

   e. Authorization from the Commission is required before beginning any change in the permitted facility or activity that may result in noncompliance with any permit requirements.

f. A permit may be amended, suspended and reissued, or revoked for cause in accordance with 30 TAC §§ 305.62 and 305.66 and TWC§ 7.302. The filing of a request by the permittee for a permit amendment, suspension and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

g. There shall be no unauthorized discharge of wastewater or any other waste. For the purpose of this permit, an unauthorized discharge is considered to be any discharge of wastewater into or adjacent to water in the state at any location not permitted as an outfall or otherwise defined in the Other Requirements section of this permit.

h. In accordance with 30 TAC § 305.535(a), the permittee may allow any bypass to occur from a TPDES permitted facility which does not cause permitted effluent limitations to be exceeded or an unauthorized discharge to occur, but only if the bypass is also for essential maintenance to assure efficient operation.

i. The permittee is subject to administrative, civil, and criminal penalties, as applicable, under TWC §§ 7.051 - 7.075 (relating to Administrative Penalties), 7.101 - 7.111 (relating to Civil Penalties), and 7.141 - 7.202 (relating to Criminal Offenses and Penalties) for violations including, but not limited to, negligently or knowingly violating the federal CWA §§ 301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under the CWA § 402, or any requirement imposed in a pretreatment program approved under the CWA §§ 402 (a)(3) or 402 (b)(8).

3. Inspections and Entry

a. Inspection and entry shall be allowed as prescribed in the TWC Chapters 26, 27, and 28, and THSC § 361.

b. The members of the Commission and employees and agents of the Commission are entitled to enter any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to the quality of water in the state or the compliance with any rule, regulation, permit or other order of the Commission. Members, employees, or agents of the Commission and Commission contractors are entitled to enter public or private property at any reasonable time to investigate or monitor or, if the responsible party is not responsive or there is an immediate danger to public health or the environment, to remove or remediate a condition related to the quality of water in the state. Members, employees, Commission contractors, or agents acting under this authority who enter private property shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials. If any member, employee, Commission contractor, or agent is refused the right to enter in or on public or private property under this authority, the Executive Director may invoke the remedies authorized in TWC § 7.002. The statement above, that Commission entry shall occur in accordance with an establishment's rules and regulations concerning safety, internal security, and fire protection, is not grounds for denial or restriction of entry to any part of the facility, but merely describes the Commission's duty to observe appropriate rules and regulations during an inspection.

4. Permit Amendment and/or Renewal

   a. The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility if such alterations or additions would require a permit amendment or result in a violation of permit requirements. Notice shall also be required under this paragraph when:

      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in accordance with 30 TAC § 305.534 (relating to New Sources and New Dischargers); or

      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements in Monitoring and Reporting Requirements No. 9;

      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

   b. Prior to any facility modifications, additions, or expansions that will increase the plant capacity beyond the permitted flow, the permittee must apply for and obtain proper authorization from the Commission before commencing construction.

   c. The permittee must apply for an amendment or renewal at least 180 days prior to expiration of the existing permit in order to continue a permitted activity after the expiration date of the permit. If an application is submitted prior to the expiration date of the permit, the existing permit shall remain in effect until the application is approved, denied, or returned. If the application is returned or denied, authorization to continue such activity shall terminate upon the effective date of the action. If an application is not submitted prior to the expiration date of the permit, the permit shall expire and authorization to continue such activity shall terminate.

   d. Prior to accepting or generating wastes which are not described in the permit application or which would result in a significant change in the quantity or quality of the existing discharge, the permittee must report the proposed changes to the Commission. The permittee must apply for a permit amendment reflecting any necessary changes in permit conditions, including effluent limitations for pollutants not identified and limited by this permit.

   e. In accordance with the TWC § 26.029(b), after a public hearing, notice of which shall be given to the permittee, the Commission may require the permittee, from time to time, for good cause, in accordance with applicable laws, to conform to new or additional conditions.

   f. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under CWA § 307(a) for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be

modified or revoked and reissued to conform to the toxic effluent standard or prohibition. The permittee shall comply with effluent standards or prohibitions established under CWA § 307(a) for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. Permit Transfer

   a. Prior to any transfer of this permit, Commission approval must be obtained. The Commission shall be notified in writing of any change in control or ownership of facilities authorized by this permit. Such notification should be sent to the Applications Review and Processing Team (MC 148) of the Water Quality Division.

   b. A permit may be transferred only according to the provisions of 30 TAC § 305.64 (relating to Transfer of Permits) and 30 TAC § 50.133 (relating to Executive Director Action on Application or WQMP update).

6. Relationship to Hazardous Waste Activities

   This permit does not authorize any activity of hazardous waste storage, processing, or disposal that requires a permit or other authorization pursuant to the Texas Health and Safety Code.

7. Relationship to Water Rights

   Disposal of treated effluent by any means other than discharge directly to water in the state must be specifically authorized in this permit and may require a permit pursuant to TWC Chapter 11.

8. Property Rights

   A permit does not convey any property rights of any sort, or any exclusive privilege.

9. Permit Enforceability

   The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

10. Relationship to Permit Application

    The application pursuant to which the permit has been issued is incorporated herein; provided, however, that in the event of a conflict between the provisions of this permit and the application, the provisions of the permit shall control.

11. Notice of Bankruptcy.

    a. Each permittee shall notify the Executive Director, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 Bankruptcy) of the United States Code (11 USC) by or against:

i. the permittee;

ii. an entity (as that term is defined in 11 USC, § 101(14)) controlling the permittee or listing the permit or permittee as property of the estate; or

iii. an affiliate (as that term is defined in 11 USC, § 101(2)) of the permittee.

b. This notification must indicate:

i. the name of the permittee and the permit number(s);

ii. the bankruptcy court in which the petition for bankruptcy was filed; and

iii. the date of filing of the petition.

OPERATIONAL REQUIREMENTS

1. The permittee shall at all times ensure that the facility and all of its systems of collection, treatment, and disposal are properly operated and maintained. This includes, but is not limited to, the regular, periodic examination of wastewater solids within the treatment plant by the operator in order to maintain an appropriate quantity and quality of solids inventory as described in the various operator training manuals and according to accepted industry standards for process control. Process control, maintenance, and operations records shall be retained at the facility site, or shall be readily available for review by a TCEQ representative, for a period of three years.

2. Upon request by the Executive Director, the permittee shall take appropriate samples and provide proper analysis in order to demonstrate compliance with Commission rules. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall comply with all applicable provisions of 30 TAC Chapter 312 concerning sewage sludge use and disposal and 30 TAC §§ 319.21 - 319.29 concerning the discharge of certain hazardous metals.

3. Domestic wastewater treatment facilities shall comply with the following provisions:

a. The permittee shall notify the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, in writing, of any facility expansion at least 90 days prior to conducting such activity.

b. The permittee shall submit a closure plan for review and approval to the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, for any closure activity at least 90 days prior to conducting such activity. Closure is the act of permanently taking a waste management unit or treatment facility out of service and includes the permanent removal from service of any pit, tank, pond, lagoon, surface impoundment and/or other treatment unit regulated by this permit.

4. The permittee is responsible for installing prior to plant start-up, and subsequently maintaining, adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures by means of alternate power sources, standby generators, and/or retention of inadequately treated wastewater.

5. Unless otherwise specified, the permittee shall provide a readily accessible sampling point and, where applicable, an effluent flow measuring device or other acceptable means by which effluent flow may be determined.

6. The permittee shall remit an annual water quality fee to the Commission as required by 30 TAC Chapter 21. Failure to pay the fee may result in revocation of this permit under TWC § 7.302(b)(6).

7. Documentation

   For all written notifications to the Commission required of the permittee by this permit, the permittee shall keep and make available a copy of each such notification under the same conditions as self-monitoring data are required to be kept and made available. Except for information required for TPDES permit applications, effluent data, including effluent data in permits, draft permits and permit applications, and other information specified as not confidential in 30 TAC §§ 1.5(d), any information submitted pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted in the manner prescribed in the application form or by stamping the words confidential business information on each page containing such information. If no claim is made at the time of submission, information may be made available to the public without further notice. If the Commission or Executive Director agrees with the designation of confidentiality, the TCEQ will not provide the information for public inspection unless required by the Texas Attorney General or a court pursuant to an open records request. If the Executive Director does not agree with the designation of confidentiality, the person submitting the information will be notified.

8. Facilities that generate domestic wastewater shall comply with the following provisions; domestic wastewater treatment facilities at permitted industrial sites are excluded.

   a. Whenever flow measurements for any domestic sewage treatment facility reach 75% of the permitted daily average or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the domestic wastewater treatment and/or collection facilities. Whenever the flow reaches 90% of the permitted daily average or annual average flow for three consecutive months, the permittee shall obtain necessary authorization from the Commission to commence construction of the necessary additional treatment and/or collection facilities. In the case of a domestic wastewater treatment facility which reaches 75% of the permitted daily average or annual average flow for three consecutive months, and the planned population to be served or the quantity of waste produced is not expected to exceed the design limitations of the treatment facility, the permittee shall submit an engineering report supporting this claim to the Executive Director of the Commission.

      If in the judgment of the Executive Director the population to be served will not cause permit noncompliance, then the requirement of this section may be waived. To be effective, any waiver must be in writing and signed by the Director of the Enforcement Division (MC 149) of the Commission, and such waiver of these requirements will be reviewed upon expiration of the existing permit; however, any such waiver shall not be interpreted as condoning or excusing any violation of any permit parameter.

b. The plans and specifications for domestic sewage collection and treatment works associated with any domestic permit must be approved by the Commission and failure to secure approval before commencing construction of such works or making a discharge is a violation of this permit and each day is an additional violation until approval has been secured.

c. Permits for domestic wastewater treatment plants are granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment, and disposal systems. The Commission reserves the right to amend any domestic wastewater permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, should such be developed; to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

9. Domestic wastewater treatment plants shall be operated and maintained by sewage plant operators holding a valid certificate of competency at the required level as defined in 30 TAC Chapter 30.

10. For Publicly Owned Treatment Works (POTWs), the 30-day average (or monthly average) percent removal for BOD and TSS shall not be less than 85%, unless otherwise authorized by this permit.

11. Facilities that generate industrial solid waste as defined in 30 TAC § 335.1 shall comply with these provisions:

a. Any solid waste, as defined in 30 TAC § 335.1 (including but not limited to such wastes as garbage, refuse, sludge from a waste treatment, water supply treatment plant or air pollution control facility, discarded materials, discarded materials to be recycled, whether the waste is solid, liquid, or semisolid), generated by the permittee during the management and treatment of wastewater, must be managed in accordance with all applicable provisions of 30 TAC Chapter 335, relating to Industrial Solid Waste Management.

b. Industrial wastewater that is being collected, accumulated, stored, or processed before discharge through any final discharge outfall, specified by this permit, is considered to be industrial solid waste until the wastewater passes through the actual point source discharge and must be managed in accordance with all applicable provisions of 30 TAC Chapter 335.

c. The permittee shall provide written notification, pursuant to the requirements of 30 TAC § 335.8(b)(1), to the Environmental Cleanup Section (MC 127) of the Remediation Division informing the Commission of any closure activity involving an Industrial Solid Waste Management Unit, at least 90 days prior to conducting such an activity.

d. Construction of any industrial solid waste management unit requires the prior written notification of the proposed activity to the Registration and Reporting Section (MC 129)

of the Registration, Review, and Reporting Division. No person shall dispose of industrial solid waste, including sludge or other solids from wastewater treatment processes, prior to fulfilling the deed recordation requirements of 30 TAC § 335.5.

e. The term "industrial solid waste management unit" means a landfill, surface impoundment, waste-pile, industrial furnace, incinerator, cement kiln, injection well, container, drum, salt dome waste containment cavern, or any other structure vessel, appurtenance, or other improvement on land used to manage industrial solid waste.

f. The permittee shall keep management records for all sludge (or other waste) removed from any wastewater treatment process. These records shall fulfill all applicable requirements of 30 TAC § 335 and must include the following, as it pertains to wastewater treatment and discharge:

i. Volume of waste and date(s) generated from treatment process;
ii. Volume of waste disposed of on-site or shipped off-site;
iii. Date(s) of disposal;
iv. Identity of hauler or transporter;
v. Location of disposal site; and
vi. Method of final disposal.

The above records shall be maintained on a monthly basis. The records shall be retained at the facility site, or shall be readily available for review by authorized representatives of the TCEQ for at least five years.

12. For industrial facilities to which the requirements of 30 TAC § 335 do not apply, sludge and solid wastes, including tank cleaning and contaminated solids for disposal, shall be disposed of in accordance with THSC § 361.

TCEQ Revision 08/2008

SLUDGE PROVISIONS

The permittee is authorized to dispose of sludge only at a Texas Commission on Environmental Quality (TCEQ) authorized land application site or co-disposal landfill. **The disposal of sludge by land application on property owned, leased or under the direct control of the permittee is a violation of the permit unless the site is authorized with the TCEQ. This provision does not authorize Distribution and Marketing of sludge. This provision does not authorize land application of Class A Sludge. This provision does not authorize the permittee to land apply sludge on property owned, leased or under the direct control of the permittee.**

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

3. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

B. Testing Requirements

1. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other method that receives the prior approval of the TCEQ for the contaminants listed in 40 CFR Part 261.24, Table 1. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal. Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division and the Regional Director (MC Region 10) within seven (7) days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Registration, Review, and Reporting Division (MC 129), Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 10) and the Water Quality Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30 of each year.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Section I.C.

TABLE 1

Pollutant	Ceiling Concentration (Milligrams per kilogram)*
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following methods to ensure that the sludge meets either the Class A or Class B pathogen requirements.

a. Six alternatives are available to demonstrate compliance with Class A sewage sludge. The first 4 options require either the density of fecal coliform in the sewage sludge be less than 1000 Most Probable Number (MPN) per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. Below are the additional requirements necessary to meet the definition of a Class A sludge.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at or above a specific value for a period of time. See 30 TAC § 312.82(a)(2)(A) for specific information.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 std. units and shall remain above 12 std. units for 72 hours.

The temperature of the sewage sludge shall be above 52° Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12 std. units.

At the end of the 72-hour period during which the pH of the sewage sludge is above 12 std. units, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50%.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(i-iii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(iv-vi) for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed.

Alternative 5 (PFRP) - Sewage sludge that is used or disposed of shall be treated in one of the processes to Further Reduce Pathogens (PFRP) described in 40 CFR Part 503, Appendix B. PFRP include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 (PFRP Equivalent) - Sewage sludge that is used or disposed of shall be treated in a process that has been approved by the U.S. Environmental Protection Agency as being equivalent to those in Alternative 5.

b. Three alternatives are available to demonstrate compliance with Class B criteria for sewage sludge.

Alternative 1

i. A minimum of seven random samples of the sewage sludge shall be collected within 48 hours of the time the sewage sludge is used or disposed of during each monitoring episode for the sewage sludge.

ii. The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge that is used or disposed of shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR Part 503, Appendix B, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. An independent Texas Licensed Professional Engineer must make a certification to the generator of a sewage sludge that the wastewater treatment facility generating the sewage sludge is designed to achieve one of the PSRP at the permitted design loading of the facility. The certification need only be repeated if the design loading of the facility is increased. The certification shall include a statement indicating the design meets all the applicable standards specified in Appendix B of 40 CFR Part 503;

iii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iv. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review; and

v. If the sewage sludge is generated from a mixture of sources, resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the PSRP, and shall meet the certification, operation, and record keeping requirements of this paragraph.

Alternative 3 - Sewage sludge shall be treated in an equivalent process that has been approved by the U.S. Environmental Protection Agency, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iii. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review;

iv. The Executive Director will accept from the U.S. Environmental Protection Agency a finding of equivalency to the defined PSRP; and

v. If the sewage sludge is generated from a mixture of sources resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the Processes to Significantly Reduce Pathogens, and shall meet the certification, operation, and record keeping requirements of this paragraph.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

ix. Land application of sludge shall be in accordance with the buffer zone requirements found in 30 TAC § 312.44.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following Alternatives 1 through 10 for vector attraction reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30° and 37° Celsius. Volatile solids must be reduced by less than 17% to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20° Celsius. Volatile solids must be reduced by less than 15% to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20° Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40° Celsius and the average temperature of the sewage sludge shall be higher than 45° Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours at the time the sewage sludge is prepared for sale or given away in a bag or other container.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75% based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 - i. Sewage sludge shall be injected below the surface of the land.

ii. No significant amount of the sewage sludge shall be present on

the land surface within one hour after the sewage sludge is injected.

iii. When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10- i. Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

ii. When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test	- once during the term of this permit
PCBs	- once during the term of this permit

All metal constituents and fecal coliform or Salmonella sp. bacteria shall be monitored at the appropriate frequency shown below, pursuant to 30 TAC § 312.46(a)(1):

Amount of sewage sludge (*) metric tons per 365-day period	Monitoring Frequency
0 to less than 290	Once/Year
290 to less than 1,500	Once/Quarter
1,500 to less than 15,000	Once/Two Months
15,000 or greater	Once/Month

(*) *The amount of bulk sewage sludge applied to the land (dry wt. basis).*

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 30 TAC § 312.7

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below listed in Table 3, the following conditions apply:

A. Pollutant Limits

Table 2

Pollutant	Cumulative Pollutant Loading Rate (pounds per acre)*
Arsenic	36
Cadmium	35
Chromium	2677
Copper	1339
Lead	268
Mercury	15
Molybdenum	Report Only
Nickel	375
Selenium	89
Zinc	2500

Table 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report Only
Nickel	420
Selenium	36
Zinc	2800

*Dry weight basis

B. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, shall be treated by either Class A or Class B pathogen reduction requirements as defined above in Section I.B.3.

C. Management Practices

1. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters in the State.

2. Bulk sewage sludge not meeting Class A requirements shall be land applied in a manner which complies with the Management Requirements in accordance with 30 TAC § 312.44.

3. Bulk sewage sludge shall be applied at or below the agronomic rate of the cover crop.

4. An information sheet shall be provided to the person who receives bulk sewage sludge sold or given away. The information sheet shall contain the following information:

   a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

   b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instruction on the label or information sheet.

   c. The annual whole sludge application rate for the sewage sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Section II above are met.

D. Notification Requirements

1. If bulk sewage sludge is applied to land in a State other than Texas, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

   a. The location, by street address, and specific latitude and longitude, of each land application site.

   b. The approximate time period bulk sewage sludge will be applied to the site.

   c. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk sewage sludge.

2. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

E. Record keeping Requirements

The sludge documents will be retained at the facility site and/or shall be readily available for review by a TCEQ representative. The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at

the facility site and/or shall be readily available for review by a TCEQ representative for a period of five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply.

1. The concentration (mg/kg) in the sludge of each pollutant listed in Table 3 above and the applicable pollutant concentration criteria (mg/kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (lbs/ac) listed in Table 2 above.

2. A description of how the pathogen reduction requirements are met (including site restrictions for Class B sludge, if applicable).

3. A description of how the vector attraction reduction requirements are met.

4. A description of how the management practices listed above in Section II.C are being met.

5. The following certification statement:

   "I certify, under penalty of law, that the applicable pathogen requirements in 30 TAC § 312.82(a) or (b) and the vector attraction reduction requirements in 30 TAC § 312.83(b) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

6. The recommended agronomic loading rate from the references listed in Section II.C.3. above, as well as the actual agronomic loading rate shall be retained. The person who applies bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply:

   a. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii), as applicable, and to the permittee's specific sludge treatment activities.
   b. The location, by street address, and specific latitude and longitude, of each site on which sludge is applied.

   c. The number of acres in each site on which bulk sludge is applied.

   d. The date and time sludge is applied to each site.

   e. The cumulative amount of each pollutant in pounds/acre listed in Table 2 applied to each site.

f. The total amount of sludge applied to each site in dry tons.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

F. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 10) and Water Quality Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30 of each year the following information:

1. Results of tests performed for pollutants found in either Table 2 or 3 as appropriate for the permittee's land application practices.
2. The frequency of monitoring listed in Section I.C. that applies to the permittee.
3. Toxicity Characteristic Leaching Procedure (TCLP) results.
4. Identity of hauler(s) and TCEQ transporter number.
5. PCB concentration in sludge in mg/kg.
6. Date(s) of disposal.
7. Owner of disposal site(s).
8. Texas Commission on Environmental Quality registration number, if applicable.
9. Amount of sludge disposal dry weight (lbs/acre) at each disposal site.
10. The concentration (mg/kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/kg) listed in Table 3 above, or the applicable pollutant loading rate limit (lbs/acre) listed in Table 2 above if it exceeds 90% of the limit.
11. Level of pathogen reduction achieved (Class A or Class B).
12. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met.
13. Vector attraction reduction alternative used as listed in Section I.B.4.
14. Annual sludge production in dry tons/year.
15. Amount of sludge land applied in dry tons/year.
16. The certification statement listed in either 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii) as applicable to the permittee's sludge treatment activities, shall be attached to the annual reporting form.
17. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the annual reporting form.

a. The location, by street address, and specific latitude and longitude.

b. The number of acres in each site on which bulk sewage sludge is applied.

c. The date and time bulk sewage sludge is applied to each site.

d. The cumulative amount of each pollutant (i.e., pounds/acre) listed in Table 2 in the bulk sewage sludge applied to each site.

e. The amount of sewage sludge (i.e., dry tons) applied to each site.

The above records shall be maintained on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION III. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

A. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 330 and all other applicable state and federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

B. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a municipal solid waste landfill (MSWLF) for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

C. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

D. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I (Toxicity Characteristic Leaching Procedure) or other method, which receives the prior approval of the TCEQ for contaminants listed in Table 1 of 40 CFR § 261.24. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal.

Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division and the Regional Director (MC Region 10) of the appropriate TCEQ field office within 7 days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Registration, Review, and Reporting Division (MC 129), Texas Commission on Environmental Quality, P. O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 10) and the Water Quality Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30 of each year.

E. Sewage sludge shall be tested as needed, in accordance with the requirements of 30 TAC Chapter 330.

F. Record keeping Requirements

The permittee shall develop the following information and shall retain the information for five years.

1. The description (including procedures followed and the results) of all liquid Paint Filter Tests performed.

2. The description (including procedures followed and results) of all TCLP tests performed.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

G. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 10) and Water Quality Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30 of each year the following information:

1. Toxicity Characteristic Leaching Procedure (TCLP) results.

2. Annual sludge production in dry tons/year.

3. Amount of sludge disposed in a municipal solid waste landfill in dry tons/year.

4. Amount of sludge transported interstate in dry tons/year.

5. A certification that the sewage sludge meets the requirements of 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

6. Identity of hauler(s) and transporter registration number.

7. Owner of disposal site(s).

8. Location of disposal site(s).

9. Date(s) of disposal.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

OTHER REQUIREMENTS

1. The permittee shall employ or contract with one or more licensed wastewater treatment facility operators or wastewater system operations companies holding a valid license or registration according to the requirements of 30 TAC Chapter 30, Occupational Licenses and Registrations and in particular 30 TAC Chapter 30, Subchapter J, Wastewater Operators and Operations Companies.

   This Category C facility must be operated by a chief operator or an operator holding a Category C license or higher. The facility must be operated a minimum of five days per week by the licensed chief operator or an operator holding the required level of license or higher. The licensed chief operator or operator holding the required level of license or higher must be available by telephone or pager seven days per week. Where shift operation of the wastewater treatment facility is necessary, each shift which does not have the on-site supervision of the licensed chief operator must be supervised by an operator in charge who is licensed not less than one level below the category for the facility.

2. The facility is not located in the Coastal Management Program boundary.

3. The permittee is hereby placed on notice that this permit may be reviewed by the TCEQ after the completion of any new intensive water quality survey on Segment No. 0615 of the Neches River Basin and any subsequent updating of the water quality model for Segment No. 0615, in order to determine if the limitations and conditions contained herein are consistent with any such revised model. The permit may be amended, pursuant to 30 TAC § 305.62, as a result of such review. The permittee is also hereby placed on notice that effluent limits may be made more stringent at renewal based on, for example, any change to modeling protocol approved in the TCEQ Continuing Planning Process.

4. The permittee shall comply with the requirements of 30 TAC § 309.13 (a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

5. The permittee shall provide facilities for the protection of its wastewater treatment facilities from a 100-year flood.

6. In accordance with 30 TAC §319.9, a permittee that has at least twelve months of uninterrupted compliance with its bacteria limit may notify the commission in writing of its compliance and request a less frequent measurement schedule. To request a less frequent schedule, the permittee shall submit a written request to the TCEQ Wastewater Permitting Section (MC 148) for each phase that includes a different monitoring frequency. The request must contain all of the reported bacteria values (Daily Avg. and Daily Max/Single Grab) for the twelve consecutive months immediately prior to the request. If the Executive Director finds that a less frequent measurement schedule is protective of human health and the environment, the permittee will be given a less frequent measurement schedule. For this permit, 1/month will be reduced to 1/quarter. **A violation of any bacteria limit by a facility that has been granted a less frequent measurement schedule will require the permittee to return to the standard frequency schedule**, and the permittee may not apply for another reduction in measurement frequency for at least 24 months from the date of the last violation. The Executive Director may establish a more frequent measurement schedule if necessary to protect human health or the environment.

CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS

1. The following pollutants may not be introduced into the treatment facility:

   a. Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Celsius) using the test methods specified in 40 CFR § 261.21;

   b. Pollutants which will cause corrosive structural damage to the POTW, but in no case shall there be discharges with pH lower than 5.0 standard units, unless the works are specifically designed to accommodate such discharges;

   c. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW, resulting in Interference;

   d. Any pollutant, including oxygen demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW;

   e. Heat in amounts which will inhibit biological activity in the POTW resulting in Interference but in no case shall there be heat in such quantities that the temperature at the POTW treatment plant exceeds 104 degrees Fahrenheit (40 degrees Celsius) unless the Executive Director, upon request of the POTW, approves alternate temperature limits;

   f. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause Interference or Pass Through;

   g. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; and

   h. Any trucked or hauled pollutants, except at discharge points designated by the POTW.

2. The permittee shall require any indirect discharger to the treatment works to comply with the reporting requirements of Sections 204(b), 307, and 308 of the Clean Water Act, including any requirements established under 40 CFR Part 403*[rev. Federal Register/ Vol. 70/ No. 198/ Friday, October 14, 2005/ Rules and Regulations, pages 60134-60798].*

3. The permittee shall provide adequate notification to the Executive Director care of the Wastewater Permitting Section (MC 148) of the Water Quality Division within 30 days subsequent to the permittee's knowledge of either of the following:

   a. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the Clean Water Act if it were directly discharging those pollutants; and

   b. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

Any notice shall include information on the quality and quantity of effluent to be introduced into the treatment works, and any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

Revised July 2007

EXHIBIT C

ANRA NORTH ANGELINA COUNTY REGIONAL WWTF
FLOW DATA

Treatment Plant Flow: from 2008-09-01 to 2009-08-31

Report Generated 9/16/2014 at 2:08:35 PM

Day	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug
1	0.178300	0.172500	0.181933	0.232300	0.216800	0.186567	0.188600	0.187100	0.132633	0.078400	0.167100	0.258767
2	0.177800	0.205800	0.181933	0.194200	0.209867	0.187800	0.145500	0.229900	0.132633	0.175900	0.208200	0.258767
3	0.170200	0.176967	0.160200	0.204000	0.209867	0.149200	0.172100	0.173833	0.132633	0.355900	0.205633	0.168450
4	0.199500	0.176967	0.154200	0.181500	0.209867	0.164300	0.150400	0.173833	0.244300	0.160700	0.205633	0.168450
5	0.104300	0.176967	0.229400	0.206467	0.314900	0.195400	0.282400	0.173833	0.194800	0.173233	0.205633	0.192300
6	0.158800	0.203600	0.192500	0.206467	0.227000	0.194300	0.169800	0.166800	0.218000	0.173233	0.188600	0.200300
7	0.158800	0.174400	0.191200	0.206467	0.214900	0.194300	0.169800	0.174000	0.158800	0.173233	0.155500	0.184100
8	0.207200	0.185500	0.191200	0.215800	0.179000	0.194300	0.169800	0.178800	0.193200	0.181900	0.260100	0.218500
9	0.162800	0.187200	0.191200	0.320600	0.189033	0.247000	0.199500	0.158300	0.193200	0.153100	0.163200	0.218500
10	0.127800	0.166133	0.263650	0.219100	0.189033	0.241000	0.194100	0.223733	0.193200	0.256400	0.204033	0.214200
11	0.215600	0.166133	0.263650	0.186800	0.189033	0.168100	0.231400	0.223733	0.227700	0.134300	0.204033	0.204700
12	0.091800	0.166133	0.218200	0.219567	0.193400	0.206100	0.255100	0.223733	0.283900	0.185367	0.204033	0.180000
13	0.091800	0.237800	0.198700	0.219567	0.198400	0.162800	0.267633	0.161300	0.101800	0.185367	0.210000	0.203300
14	0.091800	0.244500	0.163600	0.219567	0.160000	0.162800	0.267633	0.168200	0.168100	0.185367	0.152400	0.175567
15	0.091800	0.198100	0.224550	0.219300	0.211600	0.162800	0.267633	0.200400	0.192767	0.221200	0.149000	0.175567
16	0.085300	0.193900	0.224550	0.206100	0.174100	0.212000	0.165400	0.169900	0.192767	0.219300	0.166900	0.175567
17	0.206200	0.192500	0.161100	0.249900	0.174100	0.174400	0.159000	0.397100	0.192767	0.122100	0.251500	0.229100
18	0.153775	0.192500	0.182500	0.245300	0.174100	0.188200	0.143500	0.397100	0.218200	0.242100	0.251500	0.172400
19	0.153775	0.192500	0.204300	0.197967	0.198100	0.130200	0.159500	0.397100	0.183300	0.175133	0.251500	0.207600
20	0.153775	0.156800	0.183300	0.197967	0.193400	0.185900	0.174633	0.188100	0.127900	0.175133	0.255400	0.180500
21	0.153775	0.178900	0.204733	0.197967	0.201600	0.185900	0.174633	0.198800	0.199100	0.175133	0.178300	0.177767
22	0.193600	0.180700	0.204733	0.229600	0.187600	0.185900	0.174633	0.150700	0.157733	0.212100	0.186300	0.177767
23	0.207800	0.166900	0.204733	0.186500	0.191267	0.182700	0.202800	0.169500	0.157733	0.209100	0.149900	0.177767
24	0.187100	0.165100	0.196600	0.185900	0.191267	0.184400	0.239900	0.208500	0.157733	0.170400	0.181167	0.243000
25	0.175500	0.165100	0.177900	0.229650	0.191267	0.161300	0.275000	0.208500	0.179800	0.189300	0.181167	0.220200
26	0.162433	0.165100	0.198750	0.229650	0.207000	0.207300	0.213300	0.208500	0.279500	0.188900	0.181167	0.254100
27	0.162433	0.225500	0.198750	0.185100	0.184000	0.188600	0.171733	0.274700	0.159000	0.188900	0.257400	0.280000
28	0.162433	0.173900	0.255300	0.185100	0.181000	0.188600	0.171733	0.207100	0.151200	0.188900	0.155200	0.205300
29	0.147500	0.219600	0.225900	0.202600	0.168600		0.171733	0.173600	0.181233	0.189400	0.265900	0.205300
30	0.217200	0.175900	0.225900	0.167900	0.186567		0.216000	0.193500	0.181233	0.192600	0.058600	0.205300
31		0.181933		0.175500	0.186567		0.148800		0.181233		0.258767	0.154800

Total	4.750900	5.765533	6.055167	6.524400	6.103233	5.192167	6.093700	6.360200	5.668100	5.632100	6.113767	6.287933
Min	0.085300	0.156800	0.154200	0.167900	0.160000	0.130200	0.143500	0.150700	0.101800	0.078400	0.058600	0.154800
Max	0.217200	0.244500	0.263650	0.320600	0.314900	0.247000	0.282400	0.397100	0.283900	0.355900	0.265900	0.280000
Average	0.158363	0.185985	0.201839	0.210465	0.196878	0.185435	0.196571	0.212007	0.182842	0.187737	0.197218	0.202837

Treatment Plant Flow: from 2009-09-01 to 2010-08-31

Report Generated 9/16/2014 at 2:08:09 PM

Day	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug
1	0.158300	0.210800	0.213900	0.313800	0.171633	0.168400	0.308100	0.149400	0.171300	0.166400	0.215200	0.148200
2	0.158500	0.187133	0.165000	0.192000	0.171633	0.159200	1.184200	0.174033	0.171300	0.211300	0.183900	0.238800
3	0.222400	0.187133	0.183100	0.209200	0.171633	0.226800	0.821700	0.174033	0.168000	0.177100	0.183900	0.135500
4	0.161725	0.187133	0.171700	0.152167	0.173400	0.246500	0.188600	0.174033	0.166200	0.154967	0.183900	0.202300
5	0.161725	0.200600	0.205600	0.152167	0.191400	0.173233	0.176233	0.207100	0.214800	0.154967	0.203600	0.162000
6	0.161725	0.197900	0.167333	0.152167	0.237700	0.173233	0.176233	0.129700	0.149800	0.154967	0.141600	0.183967
7	0.161725	0.206000	0.167333	0.186900	0.134100	0.173233	0.176233	0.264400	0.156600	0.192100	0.223000	0.183967
8	0.190800	0.236400	0.167333	0.247600	0.287433	0.336000	0.425600	0.151800	0.156600	0.149300	0.199900	0.183967
9	0.163700	0.229233	0.227100	0.165900	0.287433	0.181400	0.179100	0.382667	0.156600	0.263000	0.167167	0.181900
10	0.211400	0.229233	0.146000	0.244300	0.287433	0.159400	0.250300	0.382667	0.212900	0.132100	0.167167	0.184700
11	0.162000	0.229233	0.223200	0.186033	0.153300	0.397200	0.179800	0.382667	0.135500	0.179300	0.167167	0.194400
12	0.204900	0.298200	0.187500	0.186033	0.185400	0.227733	0.164233	0.529300	0.215300	0.179300	0.209300	0.136500
13	0.204900	0.313800	0.201233	0.186033	0.159000	0.227733	0.164233	0.170700	0.172200	0.179300	0.211000	0.203600
14	0.244000	0.213500	0.201233	0.203400	0.207500	0.227733	0.164233	0.151200	0.167567	0.155600	0.173800	0.203600
15	0.182583	0.172900	0.201233	0.160500	0.159833	0.219500	0.175300	0.252000	0.167567	0.170400	0.180000	0.203600
16	0.182583	0.156100	0.151600	0.211500	0.159833	0.196500	0.177200	0.166400	0.167567	0.183200	0.176600	0.167800
17	0.182583	0.156100	0.185100	0.121700	0.159833	0.175500	0.170700	0.166400	0.172700	0.127000	0.176600	0.201000
18	0.182583	0.156100	0.162900	0.159433	0.220400	0.175300	0.162900	0.166400	0.178500	0.230900	0.176600	0.308600
19	0.182583	0.182000	0.181100	0.159433	0.182200	0.174867	0.174933	0.226100	0.191600	0.230900	0.191200	0.136600
20	0.182583	0.184700	0.182633	0.159433	0.200000	0.174867	0.174933	0.144700	0.160100	0.230900	0.170500	0.180033
21	0.191900	0.391400	0.182633	0.169900	0.151800	0.174867	0.174933	0.163600	0.165333	0.161800	0.181300	0.180033
22	0.186600	0.221000	0.182633	0.190100	0.167800	0.195300	0.164100	0.178500	0.165333	0.184400	0.103100	0.180033
23	0.173100	0.240800	0.192700	0.390700	0.167800	0.213600	0.207500	0.210767	0.165333	0.185000	0.194667	0.239800
24	0.212900	0.240800	0.162400	0.284600	0.167800	0.171600	0.186900	0.210767	0.155600	0.136700	0.194667	0.121400
25	0.174500	0.240800	0.114600	0.171900	0.171400	0.185000	0.142800	0.210767	0.158100	0.177567	0.194667	0.184100
26	0.174500	0.338000	0.171100	0.171900	0.158800	0.195133	0.162033	0.194700	0.174100	0.177567	0.235000	0.227900
27	0.174500	0.214800	0.215233	0.171900	0.182200	0.195133	0.162033	0.120400	0.127700	0.177567	0.149500	0.199033
28	0.174000	0.284600	0.215233	0.175800	0.288400	0.195133	0.162033	0.153700	0.166400	0.194500	0.215300	0.199033
29	0.156600	0.676600	0.215233	0.285000	0.195067		0.157200	0.185000	0.166400	0.236200	0.212000	0.199033
30	0.174100	0.213900	0.207000	0.222400	0.195067		0.126400	0.171300	0.166400	0.228900	0.148200	0.199200
31		0.213900		0.151800	0.195067		0.211400		0.164900		0.148200	0.163100

Total	5.456000	7.410800	5.550900	6.135700	5.942300	5.720100	7.452100	6.345200	5.228300	5.483200	5.678700	5.833700
Min	0.156600	0.156100	0.114600	0.121700	0.134100	0.159200	0.126400	0.120400	0.127700	0.127000	0.103100	0.121400
Max	0.244000	0.676600	0.227100	0.390700	0.288400	0.397200	1.184200	0.529300	0.215300	0.263000	0.235000	0.308600
Average	0.181867	0.239058	0.185030	0.197926	0.191687	0.204289	0.240390	0.211507	0.168655	0.182773	0.183184	0.188184

Treatment Plant Flow: from 2010-09-01 to 2011-08-31

Report Generated 9/16/2014 at 2:07:32 PM

Day	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug
1	0.238500	0.144433	0.265100	0.166900	0.065567	0.229000	0.116000	0.133967	0.158867	0.100300	0.121200	0.163400
2	0.296400	0.144433	0.174200	0.173000	0.065567	0.219400	0.132000	0.133967	0.078000	0.154600	0.121200	0.108200
3	0.160900	0.144433	0.219300	0.160067	0.200000	0.214900	0.167000	0.133967	0.105600	0.112167	0.121200	0.125600
4	0.160900	0.167000	0.140100	0.160067	0.183400	0.140167	0.121000	0.124600	0.140200	0.112167	0.166200	0.179400
5	0.160900	0.137000	0.138600	0.160067	0.163200	0.140167	0.121000	0.109400	0.120900	0.112167	0.126500	0.125400
6	0.249100	0.167100	0.138600	0.158600	0.121500	0.140167	0.121000	0.168800	0.119200	0.154300	0.105500	0.125400
7	0.240200	0.166900	0.138600	0.200900	0.227633	0.153900	0.182000	0.127500	0.119200	0.107400	0.128500	0.125400
8	0.237500	0.145500	0.136200	0.119600	0.227633	0.130000	0.141000	0.123567	0.119200	0.162500	0.123367	0.142200
9	0.223200	0.145500	0.200000	0.168000	0.227633	0.152330	0.163000	0.123567	0.161500	0.146400	0.123367	0.115100
10	0.190233	0.145500	0.135400	0.168000	0.153700	0.124190	0.093000	0.123567	0.138600	0.106600	0.123367	0.149400
11	0.190233	0.248400	0.224200	0.168000	0.153300	0.132493	0.123333	0.149500	0.175300	0.106600	0.031200	0.124500
12	0.190233	0.178600	0.193133	0.168000	0.126100	0.132493	0.123333	0.100900	0.149900	0.106600	0.253200	0.134633
13	0.187900	0.176300	0.193133	0.148600	0.212900	0.132493	0.123333	0.148000	0.113300	0.114900	0.143200	0.134633
14	0.173400	0.146100	0.193133	0.217000	0.271725	0.139940	0.119000	0.119100	0.113300	0.137500	0.114800	0.134633
15	0.186100	0.147433	0.206600	0.150400	0.271725	0.195600	0.140000	0.129267	0.113300	0.114500	0.139100	0.153400
16	0.133000	0.147433	0.177100	0.191100	0.271725	0.134800	0.150000	0.129267	0.136700	0.204000	0.139100	0.119900
17	0.172767	0.147433	0.148600	0.179900	0.271725	0.182160	0.131000	0.129267	0.134000	0.105700	0.139100	0.130900
18	0.172767	0.146800	0.184600	0.179900	0.164000	0.128820	0.123667	0.150200	0.131200	0.105700	0.131600	0.134400
19	0.172767	0.195600	0.152333	0.179900	0.164200	0.128820	0.123667	0.094100	0.133100	0.105700	0.130100	0.121333
20	0.183700	0.133600	0.152333	0.148500	0.217500	0.128820	0.123667	0.138700	0.157967	0.137700	0.135700	0.121333
21	0.173300	0.194400	0.152333	0.204900	0.137500	0.180200	0.135000	0.121400	0.157967	0.209900	0.119400	0.121333
22	0.175000	0.168333	0.200700	0.162600	0.137500	0.138130	0.120000	0.140033	0.157967	0.215500	0.127333	0.166000
23	0.243000	0.168333	0.162000	0.258700	0.137500	0.161190	0.148500	0.140033	0.108600	0.206200	0.127333	0.113200
24	0.159733	0.168333	0.197500	0.203333	0.410900	0.198200	0.157300	0.140033	0.162400	0.104000	0.127333	0.176100
25	0.159733	0.232500	0.170400	0.203333	0.169500	0.141293	0.129367	0.185000	0.121000	0.104000	0.117400	0.149900
26	0.159733	0.183600	0.170033	0.203333	0.173500	0.141293	0.129367	0.250200	0.118300	0.104000	0.126300	0.136600
27	0.136200	0.168700	0.170033	0.134600	0.155700	0.141293	0.129367	0.113900	0.137133	0.111500	0.162200	0.136600
28	0.154300	0.129700	0.170033	0.165400	0.206867	0.194000	0.139100	0.083100	0.137133	0.130000	0.108300	0.136600
29	0.149000	0.162500	0.217600	0.234200	0.206867		0.119200	0.158867	0.137133	0.118600	0.125867	0.102600
30	0.184800	0.162500	0.143500	0.120900	0.206867		0.140500	0.158867	0.154200	0.121300	0.125867	0.133900
31		0.162500		0.065567	0.254400		0.147700		0.135800		0.125867	0.186800

Total	5.615500	5.076900	5.265400	5.323367	5.957833	4.376260	4.133400	4.082633	4.146967	3.932500	4.010700	4.228800
Min	0.133000	0.129700	0.135400	0.065567	0.065567	0.124190	0.093000	0.083100	0.078000	0.100300	0.031200	0.102600
Max	0.296400	0.248400	0.265100	0.258700	0.410900	0.229000	0.182000	0.250200	0.175300	0.215500	0.253200	0.186800
Average	0.187183	0.163771	0.175513	0.171722	0.192188	0.156295	0.133335	0.136088	0.133773	0.131083	0.129377	0.136413

Treatment Plant Flow: from 2011-09-01 to 2012-08-31

Report Generated 9/15/2014 at 2:21:17 PM

Day	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug
1	0.089000	0.104600	0.120800	0.121100	0.111667	0.182500	0.126100	0.103900	0.182800	0.119633	0.124233	0.133100
2	0.136767	0.104600	0.118900	0.196700	0.139200	0.242900	0.123567	0.165100	0.098500	0.119633	0.149200	0.130100
3	0.136767	0.117500	0.136200	0.196700	0.099700	0.268000	0.123567	0.134500	0.133900	0.119633	0.118000	0.151800
4	0.136767	0.096500	0.111533	0.196700	0.129800	0.268000	0.123567	0.159400	0.125467	0.149700	0.194300	0.151800
5	0.119800	0.146500	0.111533	0.149100	0.090800	0.268000	0.155200	0.106000	0.125467	0.140100	0.131100	0.151800
6	0.111200	0.130000	0.111533	0.149500	0.209333	0.148400	0.137700	0.122233	0.125467	0.200600	0.108067	0.071700
7	0.148200	0.129800	0.174400	0.092900	0.209333	0.097600	0.127900	0.122233	0.120600	0.106800	0.108067	0.136700
8	0.138200	0.129800	0.190100	0.105400	0.209333	0.229300	0.462800	0.122233	0.139400	0.463133	0.108067	0.147200
9	0.092867	0.129800	0.123400	0.121467	0.295500	0.036600	0.356500	0.114700	0.143700	0.463133	0.171200	0.127600
10	0.092867	0.145200	0.125600	0.121467	0.137300	0.127900	0.356500	0.139000	0.132400	0.463133	0.128400	0.146200
11	0.092867	0.120300	0.128600	0.121467	0.138000	0.127900	0.356500	0.156600	0.142333	0.869600	0.224700	0.146200
12	0.127400	0.141100	0.128600	0.105500	0.203200	0.127900	0.204600	0.129600	0.142333	0.146500	0.118000	0.146200
13	0.169000	0.133100	0.128600	0.101400	0.093633	0.153000	0.132200	0.147767	0.142333	0.231200	0.164900	0.129900
14	0.103100	0.125067	0.117700	0.170600	0.093633	0.141300	0.147500	0.147767	0.124500	0.107800	0.164900	0.129900
15	0.166800	0.125067	0.185100	0.260000	0.093633	0.163200	0.163900	0.147767	0.164100	0.129400	0.164900	0.098600
16	0.129000	0.125067	0.140100	0.114733	0.143900	0.145900	0.127567	0.119700	0.098400	0.129400	0.155100	0.162700
17	0.129000	0.143100	0.122700	0.114733	0.132100	0.262000	0.127567	0.151300	0.119300	0.129400	0.132200	0.094700
18	0.129000	0.127700	0.138167	0.114733	0.145500	0.262000	0.127567	0.119700	0.141167	0.154500	0.140900	0.124400
19	0.123800	0.132400	0.138167	0.159800	0.136100	0.262000	0.323500	0.133800	0.141167	0.128800	0.118900	0.124400
20	0.136900	0.122700	0.138167	0.131800	0.127967	0.142100	0.272100	0.140767	0.141167	0.188100	0.139567	0.148500
21	0.142600	0.144667	0.214100	0.226600	0.127967	0.144700	0.189700	0.140767	0.093500	0.095100	0.139567	0.089400
22	0.120800	0.144667	0.108800	0.171700	0.127967	0.165700	0.215200	0.140767	0.138600	0.149367	0.139567	0.145800
23	0.126400	0.144667	0.106100	0.229700	0.153200	0.139800	0.106967	0.125300	0.184400	0.149367	0.117800	0.109300
24	0.126400	0.138400	0.143300	0.229700	0.115200	0.135067	0.106967	0.157600	0.048400	0.149367	0.134500	0.132833
25	0.126400	0.137000	0.158933	0.229700	0.296400	0.135067	0.106967	0.110700	0.115567	0.141600	0.141600	0.132833
26	0.155900	0.134800	0.158933	0.195300	0.156600	0.135067	0.116000	0.128800	0.115567	0.124000	0.141700	0.132833
27	0.121000	0.149600	0.158933	0.111500	0.120200	0.108600	0.111300	0.162733	0.115567	0.085500	0.136867	0.118100
28	0.138000	0.110400	0.133900	0.173800	0.120200	0.172900	0.133800	0.162733	0.137500	0.122500	0.136867	0.148500
29	0.180200	0.110400	0.106900	0.077600	0.120200	0.153100	0.247400	0.162733	0.125800	0.124233	0.136867	0.135600
30	0.104600	0.110400	0.126500	0.111667	0.170800		0.103900	0.051600	0.127200	0.124233	0.099300	0.137300
31		0.140000		0.111667	0.159700		0.103900		0.147600		0.118900	0.114667

Total	3.851600	3.994900	4.106300	4.714733	4.608067	4.946500	5.618500	4.027800	4.034200	5.825467	4.308233	4.050667
Min	0.089000	0.096500	0.106100	0.077600	0.090800	0.036600	0.103900	0.051600	0.048400	0.085500	0.099300	0.071700
Max	0.180200	0.149600	0.214100	0.260000	0.296400	0.268000	0.462800	0.165100	0.184400	0.869600	0.224700	0.162700
Average	0.128387	0.128868	0.136877	0.152088	0.148647	0.170569	0.181242	0.134260	0.130135	0.194182	0.138975	0.130667

Treatment Plant Flow: from 2012-09-01 to 2013-08-31

Report Generated 9/15/2014 at 2:21:54 PM

Day	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug
1	0.114667	0.121600	0.120700	0.144700	0.174700	0.127233	0.122567	0.115300	0.297900	0.219867	0.096500	0.220200
2	0.114667	0.154800	0.161567	0.144700	0.145600	0.127233	0.122567	0.258700	0.040600	0.219867	0.094000	0.081067
3	0.167300	0.148300	0.161567	0.153700	0.140400	0.127233	0.122567	0.183300	0.102300	0.109300	0.102800	0.081067
4	0.132600	0.140900	0.161567	0.162500	0.159800	0.164100	0.175000	0.147700	0.102300	0.107200	0.104500	0.081067
5	0.138400	0.125500	0.105300	0.154300	0.159800	0.140000	0.138200	0.132700	0.102300	0.111500	0.107800	0.113600
6	0.143400	0.125500	0.097900	0.168500	0.159800	0.231200	0.141900	0.132700	0.134600	0.230100	0.107800	0.127200
7	0.122600	0.125500	0.167800	0.161900	0.105700	0.167400	0.131500	0.132700	0.135100	0.102133	0.107800	0.121900
8	0.122600	0.186000	0.158000	0.161900	0.353900	0.204267	0.183100	0.147800	0.128000	0.102133	0.114100	0.122600
9	0.122600	0.127800	0.147400	0.161900	0.422300	0.204267	0.183100	0.138000	0.182700	0.102133	0.108700	0.134233
10	0.117300	0.131500	0.147400	0.132500	0.186700	0.204267	0.183100	0.171200	0.150800	0.114500	0.120100	0.134233
11	0.110400	0.237300	0.147400	0.128500	0.319067	0.220000	0.121500	0.165800	0.150800	0.091300	0.126400	0.134233
12	0.183600	0.136867	0.135400	0.129600	0.319067	0.211700	0.107200	0.114433	0.150800	0.126700	0.008267	0.086000
13	0.149900	0.136867	0.160200	0.147900	0.319067	0.152400	0.125900	0.114433	0.146300	0.097800	0.008267	0.100400
14	0.185433	0.136867	0.136400	0.187267	0.175300	0.141900	0.126500	0.114433	0.138800	0.137533	0.008267	0.147700
15	0.185433	0.162500	0.116300	0.187267	0.211200	0.129000	0.132233	0.142500	0.209000	0.137533	0.416600	0.107900
16	0.185433	0.126200	0.130100	0.187267	0.144000	0.129000	0.132233	0.141500	0.115200	0.137533	0.113800	0.103667
17	0.156400	0.178900	0.130100	0.185700	0.144000	0.129000	0.132233	0.149600	0.081600	0.138800	0.086500	0.103667
18	0.175700	0.129100	0.130100	0.111900	0.102400	0.196600	0.134700	0.176100	0.081600	0.086600	0.103950	0.103667
19	0.137700	0.132100	0.162500	0.149200	0.102400	0.159800	0.132100	0.114167	0.081600	0.147400	0.103950	0.132100
20	0.127600	0.132100	0.103200	0.143100	0.102400	0.134300	0.125700	0.114167	0.099000	0.119000	0.103950	0.147600
21	0.135833	0.132100	0.127500	0.141950	0.102400	0.213300	0.147600	0.114167	0.116200	0.099200	0.103950	0.121117
22	0.135833	0.168700	0.153900	0.141950	0.139000	0.146833	0.132067	0.140700	0.096700	0.099200	0.103950	0.121117
23	0.135833	0.147900	0.130100	0.194667	0.131000	0.146833	0.132067	0.149700	0.084500	0.099200	0.103950	0.121117
24	0.133200	0.185600	0.130100	0.194667	0.137800	0.146833	0.132067	0.141900	0.082033	0.108200	0.107200	0.121117
25	0.168300	0.089300	0.130100	0.194667	0.193400	0.175200	0.128200	0.157133	0.082033	0.107800	0.108400	0.121117
26	0.167100	0.141500	0.199100	0.065000	0.195450	0.101000	0.112500	0.157133	0.082033	0.107900	0.112233	0.121117
27	0.129400	0.141500	0.098000	0.144500	0.195450	0.153600	0.128900	0.157133	0.083100	0.127400	0.112233	0.135700
28	0.394767	0.141500	0.170700	0.126000	0.168900	0.121200	0.136300	0.157133	0.086800	0.092400	0.112233	0.155600
29	0.394767	0.122300	0.173600	0.125350	0.155600		0.186333	0.157133	0.094100	0.092400	0.119000	0.148200
30	0.394767	0.124800	0.144700	0.125350	0.135600		0.186333	0.157133	0.095500	0.092400	0.126600	0.113500
31		0.179300		0.302900	0.138100		0.186333		0.219867		0.121300	0.113500

Total	5.083533	4.470700	4.238700	4.861300	5.640300	4.505700	4.382600	4.396500	3.754167	3.665033	3.375100	3.777300
Min	0.110400	0.089300	0.097900	0.065000	0.102400	0.101000	0.107200	0.114167	0.040600	0.086600	0.008267	0.081067
Max	0.394767	0.237300	0.199100	0.302900	0.422300	0.231200	0.186333	0.258700	0.297900	0.230100	0.416600	0.220200
Average	0.169451	0.144216	0.141290	0.156816	0.181945	0.160918	0.141374	0.146550	0.121102	0.122168	0.108874	0.121848

Treatment Plant Flow: from 2013-09-01 to 2014-08-31

Report Generated 9/15/2014 at 2:45:33 PM

Day	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug
1	0.113500	0.141600	0.189100	0.199767	0.192800	0.234433	0.211267	0.242300	0.281400	0.309733	0.265100	0.268600
2	0.280400	0.148700	0.189100	0.212100	0.191300	0.234433	0.211267	0.222100	0.258267	0.272900	0.299800	0.268600
3	0.144500	0.144300	0.189100	0.217900	0.195367	0.258000	0.250500	0.243700	0.258267	0.256800	0.303500	0.268600
4	0.126600	0.210300	0.226800	0.236700	0.195367	0.261200	0.236200	0.317367	0.258267	0.258600	0.238933	0.245900
5	0.136200	0.210300	0.226900	0.239400	0.195367	0.208100	0.206600	0.317367	0.245200	0.257100	0.238933	0.274400
6	0.084367	0.210300	0.210700	0.194933	0.213500	0.213800	0.218500	0.317367	0.267000	0.253333	0.238933	0.276900
7	0.084367	0.119500	0.211300	0.194933	0.186400	0.210700	0.228100	0.237500	0.252800	0.253333	0.269000	0.279600
8	0.084367	0.152700	0.208233	0.194933	0.220400	0.210700	0.228100	0.209700	0.318000	0.253333	0.244200	0.254200
9	0.138600	0.197100	0.208233	0.225200	0.360400	0.210700	0.228100	0.204700	0.269700	0.663100	0.252800	0.254200
10	0.128100	0.231000	0.208233	0.179300	0.213500	0.217500	0.214000	0.214600	0.269700	0.299100	0.242800	0.254200
11	0.171100	0.235767	0.210700	0.208500	0.213500	0.282300	0.183800	0.227033	0.269700	0.248900	0.248333	0.286100
12	0.128400	0.235767	0.225400	0.193400	0.213500	0.204200	0.191900	0.227033	0.780700	0.292300	0.248333	0.243300
13	0.132633	0.235767	0.186800	0.249733	0.218200	0.221900	0.199400	0.227033	0.506700	0.252933	0.248333	0.348800
14	0.132633	0.233100	0.202400	0.249733	0.182100	0.204700	0.344067	0.294200	0.297600	0.252933	0.294100	0.261000
15	0.132633	0.331100	0.197600	0.249733	0.182700	0.204700	0.344067	0.210700	0.280400	0.252933	0.267200	0.244767
16	0.093200	0.289700	0.197600	0.213900	0.239100	0.204700	0.344067	0.211400	0.236667	0.266300	0.289200	0.244767
17	0.179100	0.197100	0.197600	0.194500	0.184233	0.232800	0.211700	0.208500	0.236667	0.281100	0.616500	0.244767
18	0.072900	0.194500	0.193800	0.230600	0.184233	0.251100	0.221500	0.199967	0.236667	0.262500	0.284867	0.288500
19	0.500200	0.194500	0.189000	0.230100	0.184233	0.204300	0.198200	0.199967	0.282500	0.233400	0.284867	0.250200
20	0.086667	0.194500	0.206800	0.297867	0.198400	0.239600	0.200500	0.199967	0.239700	0.254633	0.284867	0.265000
21	0.086667	0.188600	0.285000	0.297867	0.188300	0.192200	0.219067	0.240600	0.267000	0.254633	0.267300	0.298700
22	0.086667	0.197800	0.293000	0.297867	0.210600	0.192200	0.219067	0.266000	0.249300	0.254633	0.250100	0.249667
23	0.130300	0.196000	0.293000	0.198700	0.257100	0.192200	0.219067	0.158200	0.249533	0.321200	0.240700	0.249667
24	0.134400	0.217100	0.293000	0.187700	0.211667	0.227100	0.199800	0.226900	0.249533	0.507300	0.251300	0.249667
25	0.133900	0.229200	0.410100	0.187400	0.211667	0.237700	0.194900	0.250567	0.249533	0.314400	0.252500	0.279300
26	0.136000	0.229200	0.475600	0.195700	0.211667	0.215200	0.214900	0.250567	0.321700	0.262400	0.252500	0.273900
27	0.175300	0.229200	0.252400	0.189400	0.216400	0.200100	0.260100	0.250567	0.598400	0.261300	0.252500	0.298800
28	0.175300	0.226900	0.179100	0.189400	0.206600	0.211267	0.228933	0.213600	0.307400	0.261300	0.282100	0.283200
29	0.175300	0.228200	0.199767	0.189400	0.208600		0.228933	0.089200	0.315800	0.261300	0.248800	0.289500
30	0.230100	0.640800	0.199767	0.204800	0.220000		0.228933	0.244200	0.309733	0.264200	0.246600	0.289500
31		0.292600		0.193500	0.234433		0.248800		0.309733		0.303400	0.289500

Total	4.414400	6.983200	6.956133	6.744967	6.541633	6.177833	7.134333	6.922900	9.473567	8.637933	8.508400	8.373800
Min	0.072900	0.119500	0.179100	0.179300	0.182100	0.192200	0.183800	0.089200	0.236667	0.233400	0.238933	0.243300
Max	0.500200	0.640800	0.475600	0.297867	0.360400	0.282300	0.344067	0.317367	0.780700	0.663100	0.616500	0.348800
Average	0.147147	0.225265	0.231871	0.217580	0.211020	0.220637	0.230140	0.230763	0.305599	0.287931	0.274465	0.270123