TOWN OF EDGEWOOD
WATER RECLAMATION FACILITY
PRELIMINARY ENGINEERING REPORT
PHASE 1 – EFFLUENT DISPOSAL SYSTEM

November 2016

Prepared for:

EDGEWOOD NEW MEXICO

Prepared by:

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PHASE 1 – EFFLUENT DISPOSAL SYSTEM

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Prepared By:

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LIST OF ACRONYMS

BOD	Biochemical Oxygen Demand
CFU	Colony Forming Units
DP	Discharge Permit
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit (per Edgewood Sewer Ordinance)
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FOG	Fats, Oils, and Grease
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
HP	Horsepower
kWh	kilowatt hours
MBR	Membrane Bioreactor
MGD	Million gallons per day
N	Nitrogen
NaOCl	Sodium hypochlorite
NMED	New Mexico Environment Department
NPV	Net Present Value
NTU	Nephelometric Turbidity Units
O&M	Operating and Maintenance
PER	Preliminary Engineering Report
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
UV	Ultraviolet
WRF	Water Reclamation Facility

EXECUTIVE SUMMARY

PURPOSE AND SCOPE

The purpose of this document is to perform an evaluation of the existing effluent disposal system and to provide recommendations for improvements in order to provide comply with the requirements of the New Mexico Environment Department (NMED) Discharge Permit (DP-1654) dated September 4, 2015. The requirement for an emergency storage impoundment or an alternative effluent disposal method is detailed in Terms and Conditions 5 through 7 of the DP.

HISTORY OF THE FACILITY AND EXISTING SYSTEM

The Edgewood Water Reclamation Facility (WRF) is owned by the Town of Edgewood and its operations are currently contracted to EPCOR Water New Mexico. The WRF currently serves 52 businesses along the commercial corridor of NMSR 333 and NMSR 344. The facility was constructed in 2008 as a Membrane Bioreactor (MBR) with a belt filter press for sludge dewatering. It is operating under a Discharge Permit (DP-1654) from the New Mexico Environment Department (NMED). Effluent is reused for dust control on roads and Town-owned properties. The remainder of the effluent is stored in a lagoon and/or evaporated. Dewatered sludge is transported to the Estancia Valley Solid Waste Authority Regional Landfill.

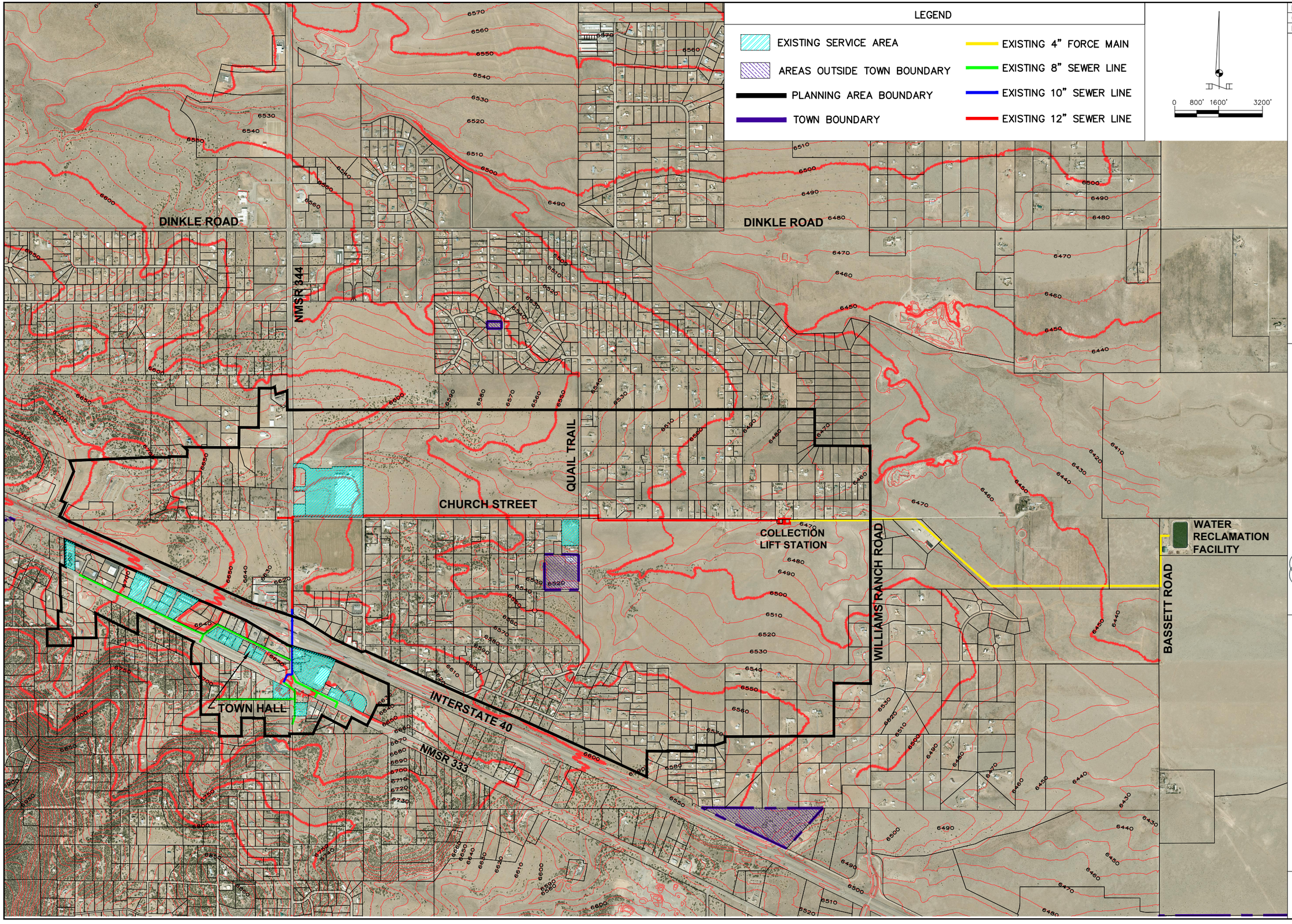
DESCRIPTION OF THE ALTERNATIVES

The following alternatives are evaluated in this PER:

- Disinfection System: Continued use of sodium hypochlorite or installation of new UV disinfection units
- Effluent Disposal System: Installation of complete evaporation lagoon, or land application area with center pivot irrigation system, or land application area with permanent pipe network and sprinklers

DESIGN BASIS

The existing and future service area boundaries defined in this PER are shown in Figure EX-1. The wastewater flowrates from the planning area were estimated based on actual count of currently developed commercial and residential customers. The design basis used in developing the alternatives and the recommended project is presented in Table EX-1. The effluent quality is based on Class 1A to continue reuse of effluent for dust control and road maintenance, and Class 2 for disposal on new land application area within the WRF site.



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TITLE
EXISTING WASTEWATER SERVICE AREA
AND PLANNING AREA BOUNDARY

FIGURE
EX-1

Table EX-1. Design Basis for the Disposal System Improvements

Parameter	Value
FLOWRATES	
Average design flowrate, gpd	250,000
Average amount of reclaimed water, gpd	100,000
CLASS 1A RECLAIMED WATER	
Disposal method / location	Town-owned properties, dust control on roads
Effluent BOD	≤ 10 mg/L 30-day average ≤ 15 mg/L maximum
Effluent Turbidity	≤ 3 NTU 30-day average ≤ 5 NTU maximum
Effluent fecal coliform	≤ 5 CFU/100 mL 30-day geometric mean ≤ 23 CFU/100 mL maximum
CLASS 2 RECLAIMED WATER	
Disposal method / location	Land application area at existing site
Effluent BOD	≤ 30 mg/L 30-day average ≤ 45 mg/L maximum
Effluent TSS	≤ 30 mg/L 30-day average ≤ 45 mg/L maximum
Effluent fecal coliform	≤ 200 CFU/100 mL 30-day geometric mean ≤ 400 CFU/100 mL maximum

RECOMMENDED PROJECT

The proposed project includes construction of an effluent disposal area with a center pivot within the existing Edgewood WRF site. A summary of the recommended project elements are presented in Table EX-2. All construction will be within the existing WRF site owned by the Town and no additional land or right-of-way will be required.

Table EX-2. Summary of the Recommended System Improvements

Item	Unit	Recommended Improvement
1	Sodium hypochlorite disinfection	Install a new chemical storage area and dosing pumps to chlorinate effluent. Install effluent pipe to provide contact time before discharging to Class 2 storage lagoon and Class 1A storage tank.
2	Class 1A storage	Install a new 300,000 gallon Class 1A effluent storage tank.
3	Class 2 storage	Convert the existing lagoon to Class 2 storage
4	Existing booster pumps	Reconnect effluent booster pumps to a new Class 1A water tank, to pump reclaimed water for reuse.
5	Effluent disposal area	Install floating pumps in the Class 2 storage lagoon. Install a center pivot irrigation system.

TOTAL PROJECT COST ESTIMATE

The capital cost summary for the recommended improvements is given in Table EX-3. It is estimated that the total capital cost for the project will be approximately $1.43 million.

Table EX-3. Preliminary Opinion of Cost Summary for the Project

Unit / Cost Item		Preliminary Opinion of Cost
Construction soft costs[1]		$123,000
Sodium hypochlorite disinfection system		$209,000
Class 1A effluent storage		$393,000
Class 2 effluent storage and disposal[2]		$213,000
Construction contingency	15%	$141,000
NMGRT on construction	8%	$86,000
Construction Subtotal		**$1,165,000**
Land acquisition and ROW		$0
Legal		$10,000
Funds administration		$0
Interest		$0
Equipment		$0
Refinancing		$0
Engineering - PER/Environmental[3]		$0
Engineering - Design, Surveying, Geotechnical		$165,000
Engineering - Construction Admin & Inspection		$70,000
Engineering - Reimbursables		$0
NMGRT on non-construction costs	8%	$20,000
Subtotal for Non-Construction Costs		**$265,000**
Project Total		**$1,430,000**

[1] Construction soft costs include mobilization / demobilization, construction staking, testing, permitting, general overhead and bonds, Storm Water Pollution Prevention Plan (SWPPP) preparation and implementation.

[2] The recommended project in this PER will include effluent disposal system (with sodium hypochlorite disinfection system, floating pumps, and one center pivot) to comply with the current DP requirements. A second center pivot may be necessary as flowrates increase in the future phases.

[3] Cost of this PER and Environmental documents necessary for funding applications were paid by a grant and hence are not included as part of project costs.

All costs are based on 2016 dollars.

It is estimated that the proposed project will increase the current operating and maintenance costs by approximately $35,000 annually for design flowrates of 0.25 MGD. The total income requirements for the recommended improvements described in this PER is summarized in Table EX-4. The annual income requirements for the project are approximately $456,515.

Table EX-4. Total Annual Income Requirements

Item	Annual Amount
O&M costs	$367,580
Debt service	$80,850
Reserve	$8,085
TOTAL	$456,515

CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the Town should seek funding for the construction of an effluent disposal area with a center pivot within the existing Edgewood WRF site in order to comply with the NMED Discharge Permit requirements. The following recommendations are made in this PER:

- Install a more efficient and robust sodium hypochlorite disinfection system to serve the facility for the next several years, until the flowrates reach 100,000 gpd. At that time, the need for a second pipeline or a UV disinfection system should be evaluated.
- Install one center pivot effluent disposal area with provisions to add a second pivot when the flowrates increase or as necessary.
- Promote use of Class 1A reclaimed water within Town for dust control as well as other approved uses, including green space and median irrigation.

1 PROJECT PLANNING

1.1 LOCATION

The Town of Edgewood is located in southern Santa Fe County, in the central part of the State of New Mexico. The Town is located between I-40, NMSR 333, and NMSR 344. It is approximately 30 miles from downtown Albuquerque and approximately 10 miles from Moriarty. The topographic map showing the location of the Town and its municipal boundaries is presented in Figure 1-1.

The Edgewood Water Reclamation Facility (WRF) provides service to the commercial corridor along NMSR 333. The existing wastewater service area and the planning area boundaries defined in this PER are shown in Figure 1-2. The planning area is bordered by the Williams Ranch Rd on the East and Dinkle Rd on the North while it extends to South of NMSR 333 to include the commercial corridor.

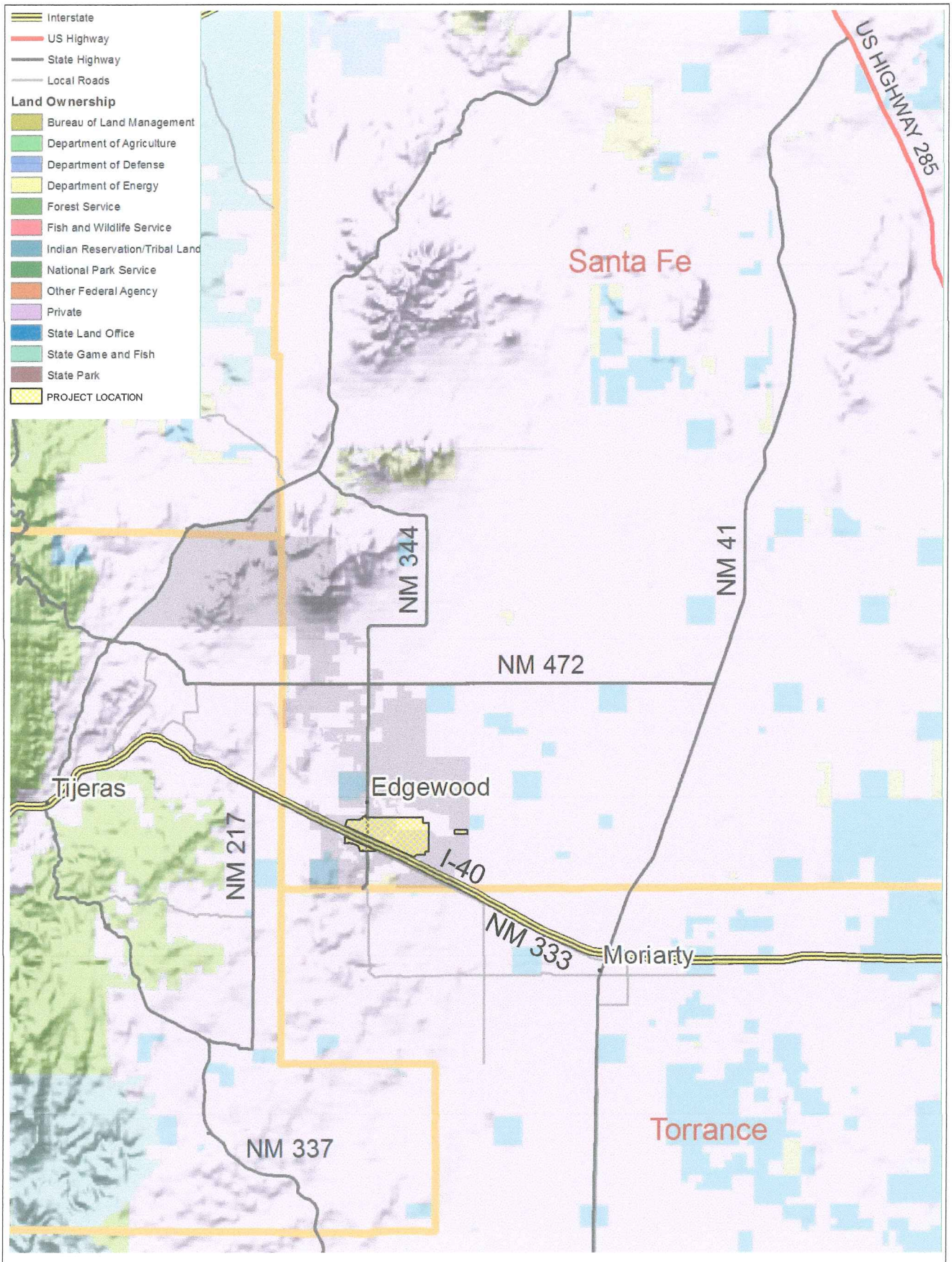
1.2 ENVIRONMENTAL RESOURCES PRESENT

This project is focused on effluent disposal system and all construction will be located within the existing treatment plant site owned by the Town. There are no significant environmental resources within the site. The environmental resources present will be more fully described in the Environmental report.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the WRF site is in Zone X, which is defined as the area outside of 500-year flood levels.

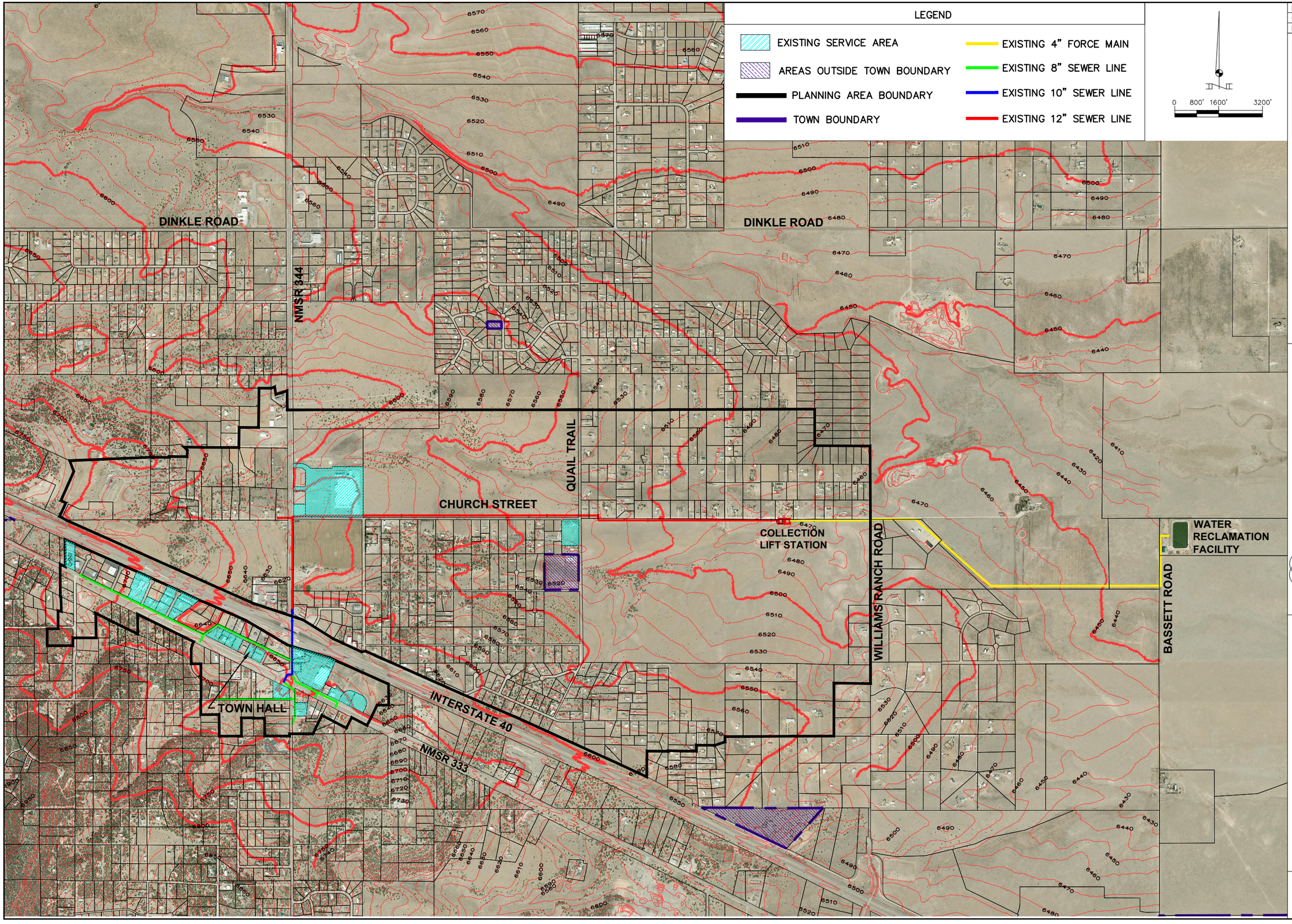
Based on the data obtained from EPCOR, groundwater depth in the area is about 300 feet below ground surface.

The soils at the site are classified as Hyer-Witt complex with 1 to 3 percent slopes. These soils are typically silty clay loam on the upper layers and loam or sandy loam as it gets deeper. They are classified as well-drained with low runoff potential (USDA, 2016). It is possible that rock formations may exist at deeper elevations. The East Mountain Wastewater Feasibility Study (NMERI, 1995) cited bedrock in the East Mountain area as a disadvantage to conventional gravity sewers.



Prepared by the Mid-Region Council of Governments

PROJECT		TITLE	
TOWN OF EDGEWOOD WATER RECLAMATION FACILITY-PH I PRELIMINARY ENGINEERING REPORT	dennis ENGINEERING company po box 909 21 main st suite 201 edgewood, nm 87015 o) 505.281.2880 f) 505.281.3640 AEGEAN CONSULTING	PROJECT LOCATION MAP	DRAWN: AD CHECKED: TJM DATE: 11/22/2016 FIGURE 1-1



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TITLE
EXISTING WASTEWATER SERVICE AREA
AND PLANNING AREA BOUNDARY

FIGURE
1-2

1.3 POPULATION TRENDS

1.3.1 EXISTING POPULATION

According to the census data, the Town of Edgewood population grew 97% between 2000 and 2010, from 1893 to 3735 people. The Town of Edgewood was not incorporated at the time of 1990 Census.

Since the Edgewood WRF currently serves only the commercial customers along the commercial corridor, the overall population of Edgewood and/or the population within the planning area does not directly impact the project. Currently, there are 26 commercial customers (and 52 businesses) connected to the facility, and the existing service area covers 59 acres (see Figure 1-2).

1.3.2 POPULATION PROJECTIONS

Throughout the project planning period of 20 years, the Edgewood WRF will continue to serve commercial customers along and around the commercial corridor. It is the Town's intent to gradually include residential connections within the boundaries of the planning area presented in Figure 1-2. Even though currently, the Town is actively working on expanding the customer base and increasing the number of residential and commercial customers connected to the WRF, there are no plans to expand the wastewater service area to include the entire Town. As such, the future population of the Town does not directly impact the project, and was excluded from evaluation in this report.

In lieu of population projections for the entire Town using an anticipated growth rate, different land use categories and an actual count of currently existing developments within the planning area were determined. The zoning area and acreage for each type of customer is presented in Table 1-1.

Table 1-1. Residential and Commercial Acreage within the Planning Area

Customer Type	Zoning Area	Acreage
Residential customers	Currently developed areas of R-1, R-4, and R-5	775 acres
Residential customers	Currently undeveloped areas of R-1 and A-G	607 acres
Commercial customers	Currently developed areas of C-1, C-2, R-S, and S-U	119 acres
Commercial customers	Currently undeveloped areas of C-1, C-2, R-S, and S-U	134 acres
TOTAL		1,635 acres

The number of residential and commercial customers that can be readily connected to the sewer system was determined using aerial photography and site visits. The residential and commercial customers that can be connected to the system are 260 dwelling units and 43 new commercial acres, as indicated in Figure 1-3. Based on an average household size of 2.8 for Edgewood, this is equivalent to about 728 people. This population includes count of the existing developments and does not include any growth that is expected to occur within the planning area.

1.3.3 WASTEWATER FLOW PROJECTIONS

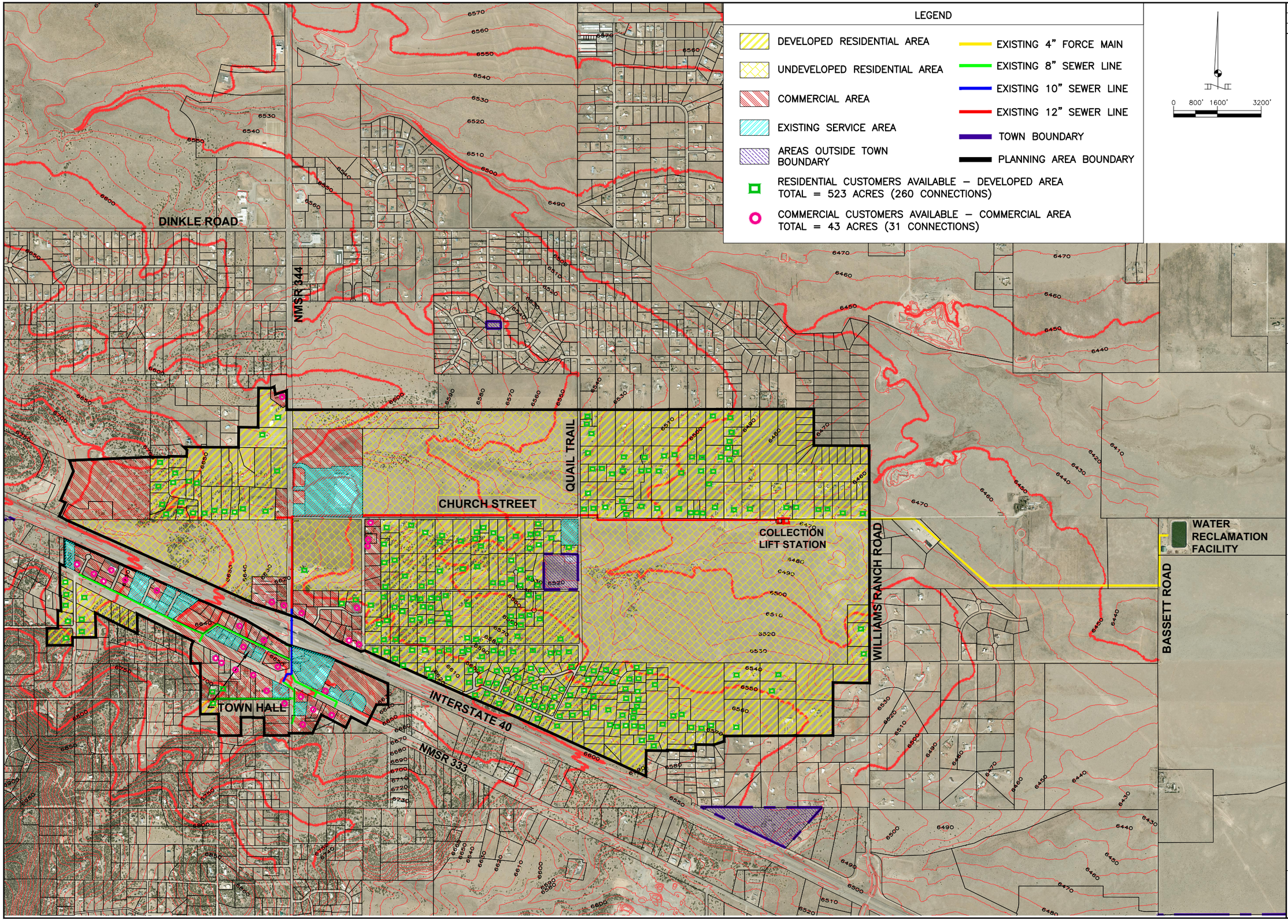
For the entire planning area identified in Figure 1-3, the anticipated future flowrates may be as high as 1 MGD (see Table 1-2), which includes currently developed and undeveloped land. However it is unlikely that the entire planning area will be connected and/or developed by the design year of this PER, which is 2037.

Table 1-2. Projected Wastewater Flowrates

	Acreage (from Table 1-1)	Wastewater Generation Rate* (gpd/acre)	Projected Wastewater (gpd)
ENTIRE PLANNING AREA			
Residential – Developed	775	375	290,625
Residential – Undeveloped	607	750	455,250
Commercial – Developed	119	1000	119,000
Commercial – Undeveloped	134	1000	134,000
TOTAL	1,635	---	998,875
DEVELOPED PORTION OF THE PLANNING AREA (SEE FIGURE 1-3)			
Residential – 260 new units	525	375	97,125
Commercial	102**	1000	102,000
TOTAL	623	---	199,125

** Based on information presented in Appendix B.*
*** Based on 59 existing acres plus 43 additional acres identified in Figure 1-3.*

For the portion of the planning area that is currently developed, when the 260 residential units and 43 acres of new commercial customers identified in Figure 1-3 are connected, the flows approximate 200,000 gpd, without considering any new growth within the planning area. Typically, it is desirable to accept 20 percent of the design flow at start-up for new treatment plants. On the other hand, if the ultimate flowrate can be as high as 1 MGD, minimizing the



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TITLE
FUTURE SERVICE AREA
FOR EDGEWOOD WRF

FIGURE
1-3

number of phases will create a more cost effective construction. Based on this data, the design flowrate for the new WRF was determined as 250,000 gpd for the next 20 years.

1.4 COMMUNITY ENGAGEMENT

The Town of Edgewood will be publishing the public notice in December which will be copied to USDA, once it is advertised. A public meeting will be held accordingly to inform the citizens about the project in accordance with the requirements of RD Instruction 1780.

2 EXISTING FACILITIES

Evaluation of the condition and capacity of the existing wastewater treatment and collection system is outside the scope of this PER. Only the disposal system components of the Edgewood WRF are included in the following sections.

2.1 SERVICE AREA AND LOCATION MAP

The existing Edgewood WRF is located west of the Town. As described in Section 2.1, the existing wastewater service area covers approximately 59 acres of 52 commercial customers along NMSR 333 and NMSR 344. The existing and future service areas of the WRF are indicated in Figures 1-2 and 1-3, respectively. The remainder of Edgewood is individual septic tanks and leachfield systems installed for single family dwellings. All major components of the wastewater system are located within the Town of Edgewood.

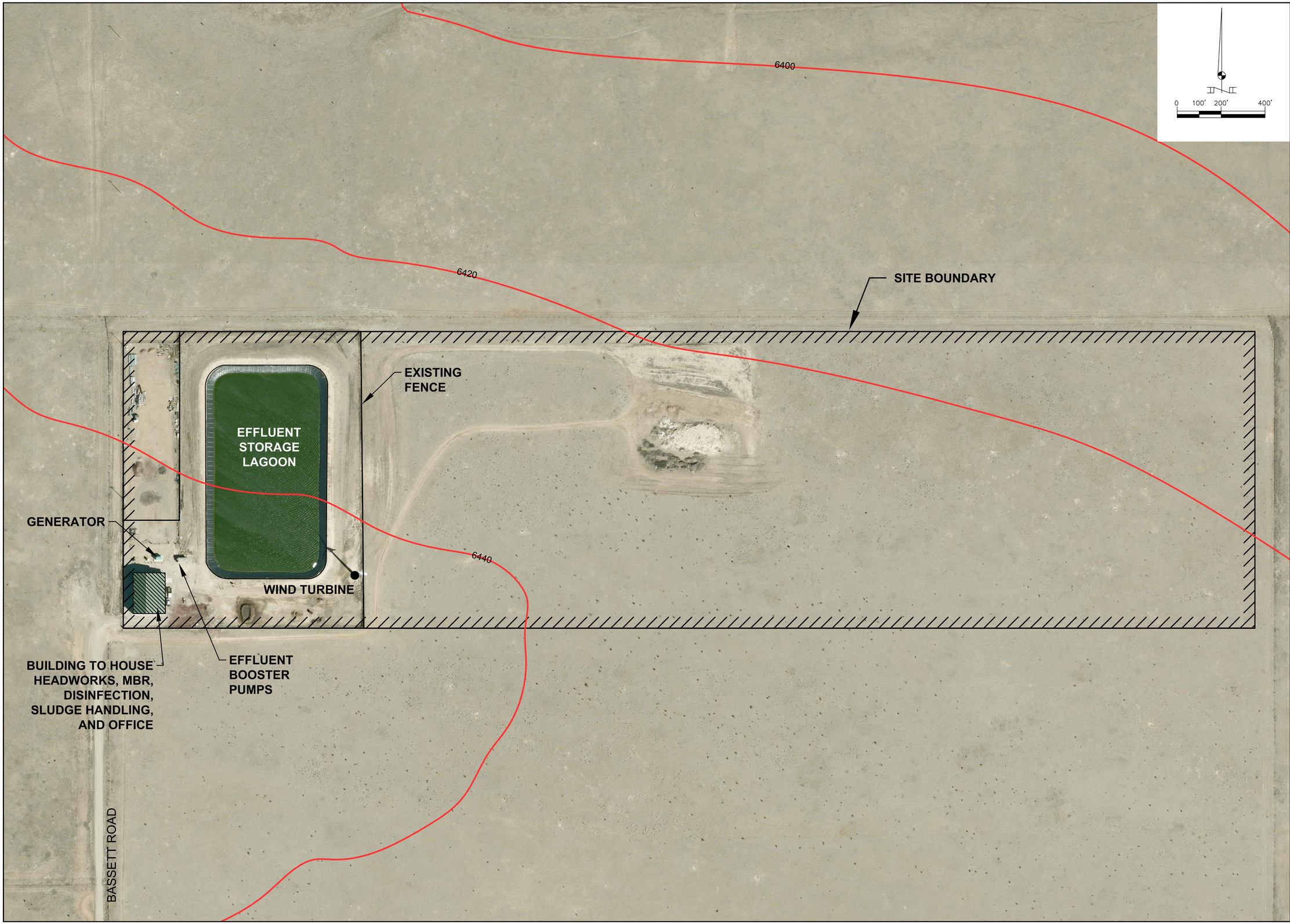
2.2 HISTORY

The Edgewood WRF system with treatment and disposal components were constructed in 2008. The facility started receiving wastewater in 2010 from a limited number of commercial customers along NMSR 333. The flowrates has been increasing slowly and steadily since then as a result of new commercial customers connecting to the system. The treated effluent is being used for dust control or is stored in the existing storage pond and evaporated.

No major renovations / upgrades were completed at the facility since its construction in 2008. The latest Discharge Permit (DP-1654) issued by NMED on September 4, 2015 required the Town to install an emergency storage impoundment or an alternative effluent disposal method. A time extension was requested from NMED, and was granted, as the PER is finalized (see Appendix A, Terms and Conditions 5 through 7).

2.3 CONDITION OF EXISTING FACILITIES

A site layout of the existing facility and the effluent storage lagoon is presented in Figure 2-1. The existing process flow diagram schematic is presented in Figure 2-2. Except for a number of hydrants located throughout the Town, all effluent system components (disinfection system, effluent storage lagoon, effluent pumps, and hydrants) are located within the existing treatment plant site owned by the Town. Based on the information provided in the record drawings and O&M manuals, the design basis of the existing facility is given in Table 2-1.



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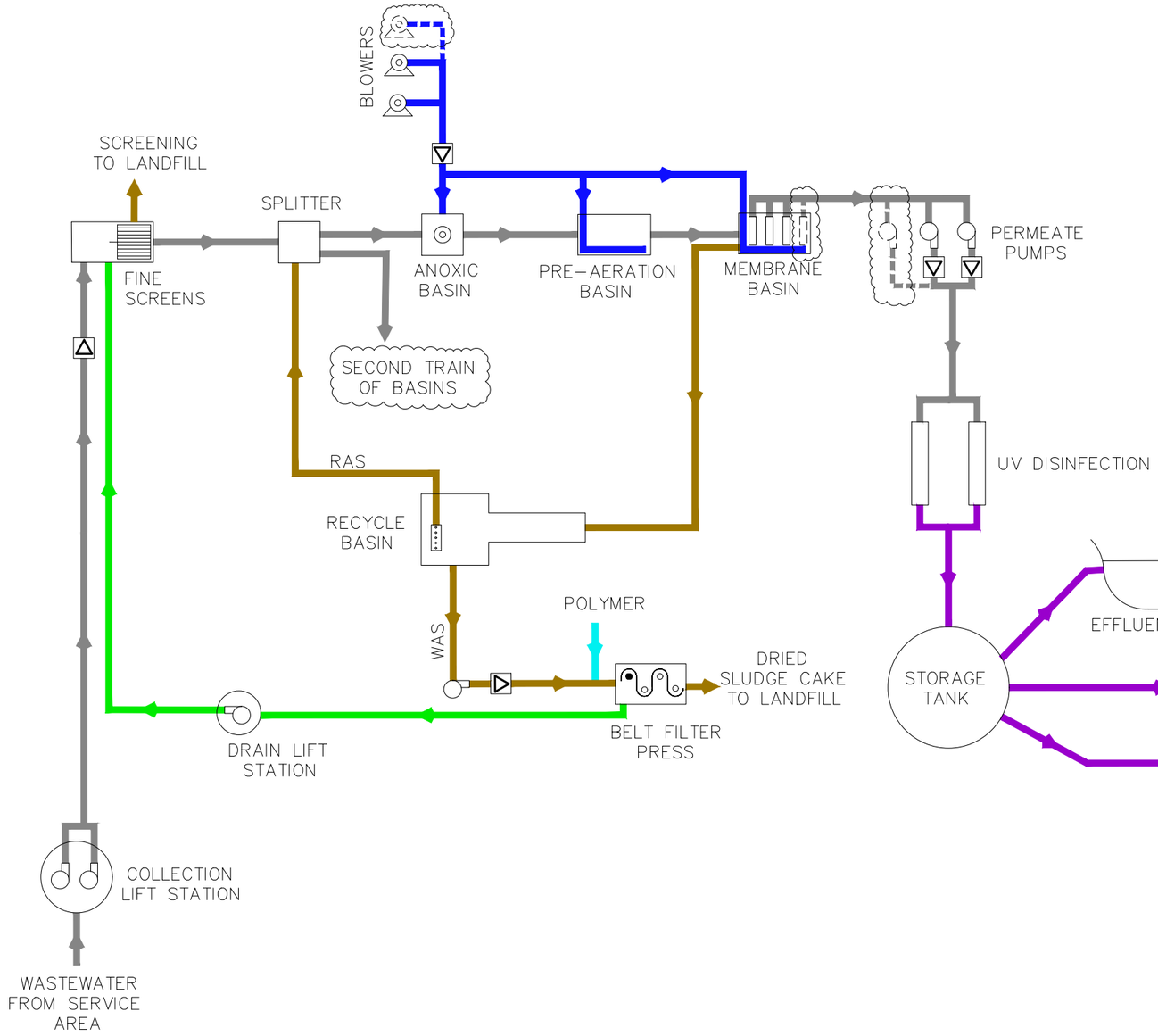
TITLE
EXISTING EDGEWOOD WRF
SITE LAYOUT

FIGURE
2-1

LEGEND

- EXISTING
- FUTURE
- WASTEWATER
- RECLAIMED WATER
- SLUDGE/SOLIDS
- AIR
- DRAIN/RECYCLE
- CHEMICAL
- FLOW DIRECTION
- COMPONENT NOT YET EQUIPPED
- FLOW METER
- PUMP
- BLOWER
- AIR LIFT PUMP
- EDUCTOR TUBE MIXER



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TITLE
EXISTING EDGEWOOD WRF
PROCESS FLOW DIAGRAM

FIGURE
2-2

Table 2-1. Design Basis of the Existing Edgewood WRF

Parameter	Phase 1
FLOWRATES	
Average design flowrate, gpd	56,250
Peak monthly design flowrate, MGD*	84,375
Peak hourly design flowrate, MGD**	112,500
WASTEWATER CHARACTERISTICS	
Influent Biochemical Oxygen Demand (BOD), mg/L	300
Effluent BOD, mg/L	< 5
Total Suspended Solids (TSS), mg/L	200
Effluent TSS, mg/L	< 5
Influent ammonia nitrogen, mg/L	45
Effluent Total Nitrogen, mg/L	< 10
Effluent Fecal Coliform, CFU/100 mL	--
Minimum water temperature, deg F	54
SITE INFO	
Site elevation, ft	6600

** Daily peaking factor of 1.5.*

*** Hourly peaking factor of 2.0.*

The wastewater is collected from the customers via 20,500 ft of gravity collection lines and one main collection system lift station which pumps the wastewater from the Town to the Edgewood WRF. The collection system complies with applicable regulations and is adequately serving the existing customers. The Town is interested in expanding the collection system to increase the number of customers, however the collection system expansion is not included in this PER.

The treatment facility includes fine screens, Membrane Bioreactor (MBR) and disinfection system which provides BOD, TSS, and nitrogen removal. The treatment facility has a number of significant operational concerns and is in need of improvements. The treatment facility improvements are not included in this PER, but is addressed in a separate document.

The treated effluent is reused for dust control around Town or is stored in an effluent lagoon. The effluent disposal system is adequate for the current flowrates, however is in need of improvements due to the requirements listed in NMED Discharge Permit (see Appendix A Terms and Conditions 5 through 7). An emergency storage or an alternative disposal system is required in order to comply with the NMED Regulations. The major effluent disposal components of the existing facility that are included in this PER for improvements are described in the following sections.

2.3.1 EXISTING DISINFECTION

The original design included two closed pipe UV disinfection vessels operated in parallel. The operation of the UV disinfection system has been troublesome since 2014. The lamps overheat as a result of intermittent flow of water. Currently, the UV disinfection system is not operational and disinfection is achieved using liquid sodium hypochlorite. The operators have obtained a small dosing pump to chlorinate the effluent after the effluent booster pumps. Small containers of sodium hypochlorite are currently stored outside. A more adequate disinfection system with a separate storage unit is necessary at the facility.

2.3.2 EFFLUENT DISPOSAL

A majority of the existing components of the disposal system described in this section are adequate and will continue to be in use. These units will be repurposed as part of the proposed project.

At the current facility, permeate pumps transfer the disinfected effluent to a small storage tank, from where the effluent can:

- Be reused for process equipment and washwater (see Section 2.3.2)
- Be pumped directly to water trucks for reuse
- Overflow to the 7.5 million-gallon capacity storage lagoon from where
    - two 60 gpm pumps with 5-HP motors pump the effluent to hydrants throughout the Town for reuse, or
    - the effluent is evaporated through natural means or the wastewater evaporator can be utilized, if necessary.

2.3.3 EXISTING PERMITS

The Town of Edgewood WRF is operated under a Discharge Permit (DP-1654) issued on September 4, 2015 by NMED Groundwater Quality Bureau. The permit requires the Town to install an emergency storage impoundment or an alternative effluent disposal method. A time extension was requested from NMED, and was granted, as the PER is finalized (see Appendix A, Terms and Conditions 5 through 7). There is no NPDES Permit issued for the Town.

2.3.4 ENERGY CONSUMPTION OF THE EFFLUENT DISPOSAL SYSTEM

It is not possible to separate the electricity consumption of the effluent disposal system from the entire wastewater system, which includes collection, treatment, and disposal. The kWh consumption for the entire wastewater system is presented in Table 2-2. Data suggests that the

average power consumption at the facility is 45 kWh/1000 gal for the flowrates currently treated at the facility.

Table 2-2. Monthly Power Consumption

Period	Flow (gal/mo)	kWh Used	kWh Generated*	kW	Total Charge	$/kWh	kWh Used per 1000 gal
Apr 2015	525,093	23,200	6,335	86.4	$2,955.90	$0.18	44.2
May 2015	710,331	27,560	5,931	90.4	$3,408.56	$0.16	38.8
Jun 2015	720,886	25,400	2,173	99.2	$3,697.02	$0.16	35.2
Jul 2015	742,839	33,320	2,358	94.8	$4,233.58	$0.14	44.9
Aug 2015	638,297	36,760	2,805	94.8	$4,472.08	$0.13	57.6
Sep 2015	749,487	36,440	2,977	90.4	$4,351.97	$0.13	48.6
Oct 2015	701,114	46,280	4,448	90.4	$5,108.23	$0.12	66.0
Nov 2015	935,746	30,520	8,486	96.4	$3,552.53	$0.16	32.6
Dec 2015	857,977	40,360	8,096	96.4	$4,367.75	$0.14	47.0
Jan 2016	671,525	33,040	12,004	91.2	$3,464.18	$0.16	49.2
Feb 2016	715,250	34,840	7,417	84.4	$3,871.91	$0.14	48.7
Mar 2016	801,652	34840	7,417	84.4	$3,871.91	$0.14	43.5
Apr 2016	803,077	26,840	7,899	94.4	$3,320.79	$0.18	33.4
Average		33,031	6,027	91.8		$0.15	45.4
Min		23,200	2,173	84.4		$0.12	32.6
Max		46,280	12,004	99.2		$0.18	66.0

** By the wind turbine at the site*

2.3.5 ASSET MANAGEMENT

An Asset Management Plan was prepared for the existing WRF in April 2015 by EPCOR. The report included all treatment & disposal system components and concluded that the effluent disposal system components are in adequate condition. A summary of the effluent disposal system assets listed in the Plan is included in Table 2-3.

Table 2-3. Effluent Disposal System Assets Identified in Asset Management Plan

Asset	Condition	Remaining Life in Years	Anticipated Total Life
Piping to pond	Good	45	50
Pond and Liner	Good	35	40
Pumps and Valves	Good	15	20
Resue piping	Good	45	50

For the treatment system, the Asset Management Plan concluded that the next 20 years will require an investment of $5,900,000 to maintain the current assets in a working condition. The cost of replacement of assets in the first eight year period of 2015 – 2022 was estimated as $28 per 1000 gallons treated, which is very high compared to industry standards for the cost of wastewater service. The report recommended that alternatives for wastewater treatment that are compatible with the groundwater quality in the area should be investigated along with additions or modifications to the existing treatment system to reduce equipment replacement costs.

2.4 FINANCIAL STATUS OF EXISTING FACILITIES

2.4.1 SOURCE OF REVENUE

System operations and maintenance costs are partly supported by the revenue collected through monthly sewer service charges paid by the customers. As of December 2016, there is a total of 26 commercial customers (total of 52 businesses since some customers have more than one business in operation at the serviced location). There are currently no residential customers connected to the system.

The monthly sewer charges have not been sufficient to cover the cost of operations, and hence the Town has adopted a new Wastewater Ordinance in February 2016 that identified increased rates for the monthly sewer fees, connection charges, and tapping fees. The new Ordinance also identified a new formula to charge the commercial customers based on volume of wastewater discharged as well as the wastewater strength. For this purpose, the Town is currently in the process of sampling the wastewater strength for each customer and the new sewer rates are expected to be in effect by the beginning of 2017. The current monthly sewer rate structure is presented in Table 2-4.

Table 2-4. Wastewater Service Rate Schedule per Wastewater Ordinance in Effect

Customer Type	Old Ordinance		New Ordinance		
	Connection Fee	Monthly Fee	Service Tap Fee	Capacity Tap Fee	Monthly Fee
Residential	$1,000	$25	$750	$3500*	$25
Commercial - Industrial					
< 500 gpd	$1,000	$35	$750	$3500*	**
500 - 1500 gpd	$2,000	$100	$750	$3500*	**
1500 - 5000 gpd	$3,000	$200	$750	$3500*	**
> 5000 gpd	$6,000	$300	$750	$3500*	**

** Per ERU (Equivalent Residential Unit) calculated by dividing the volume of wastewater by 375 gpd*

*** Calculated based on flow and BOD / TSS / TKN concentrations*

Since the water system is owned and operated by a private utility, the water usage data for the customers is not available. Based on a typical ERU of 375 gpd wastewater per residential customer as identified in the Ordinance, and existing wastewater flowrates of 30,000 gpd (see Appendix B for existing flow data), the total flowrate currently observed at the WRF is equivalent to 80 ERU, generated entirely from commercial customers.

2.4.2 ANNUAL OPERATING AND MAINTENANCE (O&M) COSTS

Operations and maintenance of the wastewater system are performed under contract by EPCOR Water. During the last fiscal year, the O&M cost of the existing wastewater collection, treatment, and disposal system was around $347,000, with approximately $45,000 being the energy cost. It is not possible to separate the O&M cost for the effluent system only.

2.4.3 OTHER CAPITAL IMPROVEMENTS PROJECTS

There is a second wastewater system capital improvement project other than the effluent disposal system improvements project identified in this Phase 1 PER. The Town is experiencing significant operational problems with their existing wastewater treatment system and is need of major improvements at the treatment facility. The recommended improvements for the treatment system will be submitted under separate cover as Phase 2 PER.

2.4.4 EXISTING DEBT

Table 2-5 summarizes the existing debt service for the Town of Edgewood related to wastewater system. These funds were used to finance the construction of the existing wastewater collection, treatment, and disposal system.

Table 2-5. Existing Debt Service

Item	Debt Details
Lender	NMED Construction Programs Bureau
Loan amount	$419,211.42
Maturity date	03/24/2031
Existing debt @ 7/22/2016 (Principal & interest)	$336,382.27
Debt payments - Principal	$17,559.34
Debt payments - Interest	$10,618.25
Reserve amount	$0

3 NEED FOR PROJECT

3.1 HEALTH, SANITATION AND SECURITY

The health and sanitation concern with the existing effluent disposal system is related to providing an emergency system for unforeseen conditions. In accordance with the NMED regulations, if the treatment system fails to achieve the required effluent quality or if the existing effluent storage lagoon becomes excessively full to the extent of causing overflow, an alternative system must be in place in order to avoid spills and cause health hazards.

The current NMED Discharge Permit dated September 4, 2015 (see Appendix A) requires the Town to submit plans for an emergency storage impoundment or alternate disposal method during periods when conditions are unfavorable for approved uses or when the wastewater quality requirements of the permit cannot be met. A letter was sent to NMED in February 2016, asking for a time extension to comply with this requirement. Recommendations of this PER will be used to prepare a plan that will be submitted to NMED.

3.2 AGING INFRASTRUCTURE

The Edgewood WRF was constructed in 2008 and has been in operation since 2010. The effluent disposal system components do not show any significant aging. There are no concerns with inflow, infiltration, and water loss.

3.3 REASONABLE GROWTH

Even though the project need is mainly originating from the requirements of NMED, the new effluent disposal system should incorporate the anticipated future flowrates identified in Section 1.3.3.

4 TREATMENT SYSTEM ALTERNATIVES

Evaluation of primary and secondary treatment alternatives is outside the scope of this PER. Disinfection system alternatives are included since the existing UV disinfection system is not operational and the facility is in need of a better disinfection system configuration before final disposal in order to achieve adequate disinfection and comply with the NMED guidelines for Above-Ground Use of Reclaimed Water.

4.1 PROJECT DESIGN BASIS

4.1.1 DESIGN FLOWRATES

As discussed in Section 1.3.3, the future design flow of the Edgewood WRF was determined as 250,000 gpd. A daily peaking factor of 2 was accepted based on the existing flow measurements at the plant. The maximum hourly flows were based on a peaking factor of 4, as suggested in the Recommended Standards for Wastewater Facilities (2014) for communities with small number of customers.

4.1.2 EFFLUENT QUALITY

As described in Section 2.3, the treated water from the Edgewood facility is currently used for dust control and irrigation of Town-owned properties in accordance with the Discharge Permit DP-1654. Even though the Above-Ground Use of Reclaimed Water Guidelines of NMED requires Class 2 quality water for dust control, the setback requirements for this quality limit its use. As such, the Town would like to treat up to 100,000 gpd of Class 1A quality water which will continue to be reused for dust control and will also be available for future irrigation of Town-owned properties.

In accordance with the Above-Ground Use of Reclaimed Water Guidelines of NMED, land application of treated effluent via spray irrigation at the existing treatment plant site can be permitted under Class 2 or Class 3 reclaimed water category. However, the 500-ft setback requirement of Class 3 may be harder to implement. Hence, the design of the effluent disposal system was based on the criteria of achieving Class 2 reclaimed water, which requires 100-ft set back from nearest dwelling unit and access restricted by perimeter fencing using 4-strand barbed wire and locking gate.

The design basis used for the effluent disposal system improvements project presented in this PER is given in Table 4-1.

Table 4-1. Design Basis for the Disposal System Improvements

Parameter	Value
FLOWRATES	
Average design flowrate, gpd	250,000
Average amount of reclaimed water, gpd	100,000
CLASS 1A RECLAIMED WATER	
Disposal method / location	Town-owned properties, dust control on roads
Effluent BOD	≤ 10 mg/L 30-day average ≤ 15 mg/L maximum
Effluent Turbidity	≤ 3 NTU 30-day average ≤ 5 NTU maximum
Effluent fecal coliform	≤ 5 CFU/100 mL 30-day geometric mean ≤ 23 CFU/100 mL maximum
CLASS 2 RECLAIMED WATER	
Disposal method / location	Land application area at existing site
Effluent BOD	≤ 30 mg/L 30-day average ≤ 45 mg/L maximum
Effluent TSS	≤ 30 mg/L 30-day average ≤ 45 mg/L maximum
Effluent fecal coliform	≤ 200 CFU/100 mL 30-day geometric mean ≤ 400 CFU/100 mL maximum

4.2 DISINFECTION SYSTEM ALTERNATIVES

Although disinfection using chlorine is a well-established technology for municipal wastewater because it destroys target organisms very effectively, it has health and safety limitations. Due to the effectiveness of UV against *Cryptosporidium* and *Giardia* as well as increasingly stringent regulations against disinfection by-products, the use of UV disinfection is recommended at the Edgewood WRF for the long-term. The two alternatives are compared in the following sections for this project for the short-term.

4.2.1 DISINFECTION ALTERNATIVE 1: UV DISINFECTION

4.2.1.1 *Description*

Closed pipe UV systems are not considered for the new Edgewood facility. The most common UV disinfection systems are UV lamps installed horizontally or vertically in open channels inside concrete basins or in steel tanks. Water level in the UV chamber is typically regulated via an effluent weir that keeps the UV lamps submerged in the channel. Even though these systems are the most common in the industry, the quartz sleeves around the UV lamps experience fouling and scaling, especially at facilities with hard water. These systems are likely to experience scaling and require maintenance if used in Edgewood.

A non-contact UV disinfection system was evaluated. These units incorporate a non-contact approach by passing the water through the inside of a transparent Activated Fluoropolymer tubes (AFP) tube, and arranging UV lamps around the perimeter of the tube (see Figure 4-1). These tubes were specifically developed for non-contact UV applications to replace the quartz sleeves prone to high scaling potential. The system utilizes low pressure high output non-amalgam UV lamps.

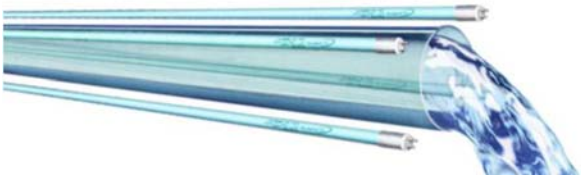


Figure 4-1. Non-Contact UV System Principle

4.2.1.2 *Design Criteria*

Two separate UV units will be required for Class 1A and Class 2 disinfection. The design was based on providing disinfection using 65 percent UV transmittance. Preliminary design information for the UV disinfection unit is presented in Table 4-2.

Table 4-2. Preliminary Design Information for the UV Disinfection

Line Item	Class 1A System	Class 2 System
CHANNEL AND EQUIPMENT INFORMATION		
Number of channels	1	2
Total number of UV lamps	64	48
DESIGN CRITERIA		
Peak hourly design flow (MGD)	100,000	1,000,000
Upstream TSS concentration (mg/L)	< 10	< 10
Maximum effluent fecal coliform (CFU/100 mL)	< 5	< 200
Redundancy (%)	No redundancy	50% of peak hourly flow

Design details for the UV disinfection considers the following points:

- Redundancy: No redundancy is planned for the Class 1A UV system. If the UV unit is out of operation, no Class 1A water will be available. This sizing can be changed and additional redundancy can be considered during the design phase. For Class 2 UV unit, typical design of 50 percent redundancy at peak hourly flow is recommended.
- Hydraulic Profile: The effluent from the MBR basins will flow to a flow splitter / overflow structure, where Class 1A water quantity will be separated from the Class 2 water. Once separated, the two classes of water will need to be kept separate through the final discharge

locations. Preliminary analysis for a hydraulic profile suggests the possibility to gravity flow to and from the UV units. The effluent from the UV units will be pumped to their respective storage units.

4.2.1.3 *Maps and Images*

The new UV units can be installed in the existing building (to replace the existing UV system). A photo of the existing UV unit is included in Figure 4-2. The new units can be placed at the same location.

Figure 4-2. Existing UV Unit to be Removed and Replaced with a New UV System

4.2.1.4 *Environmental Impacts*

No environmental impacts are anticipated (during construction or as part of operations). All construction activities will be carried out within the existing WRF site. An environmental clearance and/or categorical exclusion will be submitted with funding applications, as necessary.

4.2.1.5 *Land Requirements*

There are no additional land requirements. The new UV units can be installed in the existing building (to replace the existing units) within the WRF site boundaries.

4.2.1.6 *Potential Construction Problems*

No significant construction problems are anticipated for the installation of new UV units. Bypass piping or temporary pumping within the building may be necessary in order to sequence construction and continue plant operations.

4.2.1.7 *Sustainability Considerations*

4.2.1.7.1 Water and Energy Efficiency

The flow pacing option provided with the UV systems can increase the energy efficiency of these units significantly. The system will incorporate a level pacing control system which identifies the tubes with water in them and turns on the lamps on and off to provide disinfection only for the tubes that have water in them. The units are not expected to have a significant water demand, other than occasional washwater.

4.2.1.7.2 Green Infrastructure

The UV disinfection system does not incorporate any green infrastructure.

4.2.1.7.3 Resiliency and Ability to Handle Hardness

A non-contact UV unit is recommended in order to minimize scaling problems and improve operational simplicity.

4.2.1.8 *Cost Estimates*

4.2.1.8.1 Capital Cost Estimates

A planning level capital cost estimate for the installation of UV disinfection units is included in Table 4-3. Construction cost for the new UV units, excluding soft costs, contingency, engineering and tax, is estimated at approximately $600,000.

4.2.1.8.2 Operating and Maintenance Cost Estimates

Major operating and maintenance requirements for UV disinfection are power consumption and replacement of the UV lamps. The O&M costs estimated for the non-contact UV units are presented in Table 4-4. Details of the O&M costs and short-lived assets associated with this alternative are presented in Appendix C.

The estimates are based on the maximum power consumption for treating 100,000 gpd of reclaimed water to Class 1A water quality all year long, and for treating the remaining 150,000 gpd of water to Class 2 water quality.

4.2.2 DISINFECTION ALTERNATIVE 2: SODIUM HYPOCHLORITE DISINFECTION

4.2.2.1 *Description*

An alternative to UV disinfection system is the continued use of sodium hypochlorite (NaOCl) disinfection. Typically, sodium hypochlorite disinfection system capital costs are cheaper than UV disinfection systems, however, they can get expensive depending on cost of the chemical, as

the flowrates increase. Sodium hypochlorite disinfection can be utilized to facilitate the phasing of construction costs since the initial flowrates for the new Edgewood WRF are expected to be low for the initial several years. Disinfection using chlorine gas was not considered due to health and safety reasons.

Table 4-3. Preliminary Opinion of Capital Cost for the UV Disinfection Units

Line Item	Unit	Unit Price	Quantity	Extension
CLASS 2				
UV equipment	LS	$157,000	1	$157,000
Isolation gates / valves	EA	$8,000	2	$16,000
Flowmeter	EA	$10,000	1	$10,000
Equipment electrical installation	LS	$20,000	1	$20,000
Lift station, complete with pumps	LS	$125,000	1	$125,000
Yard piping including valves	LF	$100	400	$40,000
Subtotal				$368,000
CLASS 1A				
UV equipment	LS	$94,000	1	$94,000
Isolation gates / valves	EA	$7,000	2	$14,000
Flowmeter	*not needed since the flow will be limited to 100,000 gpd.*			
Equipment electrical installation	LS	$15,000	1	$15,000
Lift station, complete with pumps	LS	$100,000	1	$100,000
Yard piping including valves	LF	$100	50	$5,000
Subtotal				$228,000
TOTAL UV DISINFECTION				$596,000

Note: Contingency and non-construction costs are added in Section 6.

Table 4-4. Preliminary Opinion of Annual O&M Costs for the UV Disinfection Units

Item	O&M Estimate
Power	$14,100
Equipment maintenance and replacement	$9,000
Total O&M cost	$23,100
Present Value of O&M Cost*	$520,200

** O&M costs assumed to increase by 3 percent every year. Present Value calculated at a 1.2 percent interest rate for 20 years.*

4.2.2.2 *Design Criteria*

Disinfection using sodium hypochlorite requires a minimum of 15-minutes of detention time at peak flows. Concrete chlorine contact basins with baffles are common, and pipe lengths can also successfully used to provide this detention time.

For disinfection of Class 1A reclaimed water, sodium hypochlorite can be added before the new Class 1A storage to utilize the tank as the contact time (see Section 4.3 for new Class 1A tank). The Above-Ground Use of Reclaimed Wastewater Guidelines of NMED (2003) indicate Total Residual Chlorine as 'Monitor Only' and does not specify a target value, however, it is recommended to keep a small amount of chlorine residual in the effluent from the Class 1A storage for health and safety purposes.

For disinfection of Class 2 water, the lagoon volume is too large to practically achieve any disinfection once the water is introduced into the lagoon. As such, it is recommended to provide the contact time in a pipeline between the chlorination point and lagoon. Analysis using Manning's Equation and hydraulic elements show that a 24-inch inside diameter pipe with a 0.33 percent slope would be able to provide the necessary contact time for flows up to 93,000 gpd (see Option 4 of Table 4-5). As flowrate to the facility is increased, a second pipeline to increase contact time or a UV system will be needed. A large pipe diameter with a low slope may be adequate to provide contact time up to the design peak day flows, however, the low initial flows could then create problems with less than 10% full pipe flow.

Table 4-5. Possible Chlorine Contact Times Using an Effluent Pipeline

		Option 1	Option 2	Option 3	Option 4	Option 5
Pipe length	ft	250	300	300	300	300
Slope	%	0.4	0.33	0.33	0.33	0.25
Pipe diameter	in	18	18	15	24	24
Flow at full pipe	gpd	620,200	566,200	348,200	1,162,700	1,056,046
Contact time at full pipe	min	7.7	10.1	11.4	9.6	12.8
Flow at 50% full pipe	gpd	310,100	283,100	174,100	581,300	528,023
Contact time at 50% full pipe	min	8.5	11.2	12.7	10.7	14.2
Flow at 20% full pipe	gpd	50,000	45,300	27,900	93,000	84,484
Contact time at 20% full pipe	min	12.4	16.3	18.4	15.5	20.7

4.2.2.3 *Maps and Images*

The new sodium hypochlorite storage unit can be installed within the existing WRF site boundaries. Possible location for the new sodium hypochlorite storage and dosing building is identified in Figure 4-3.

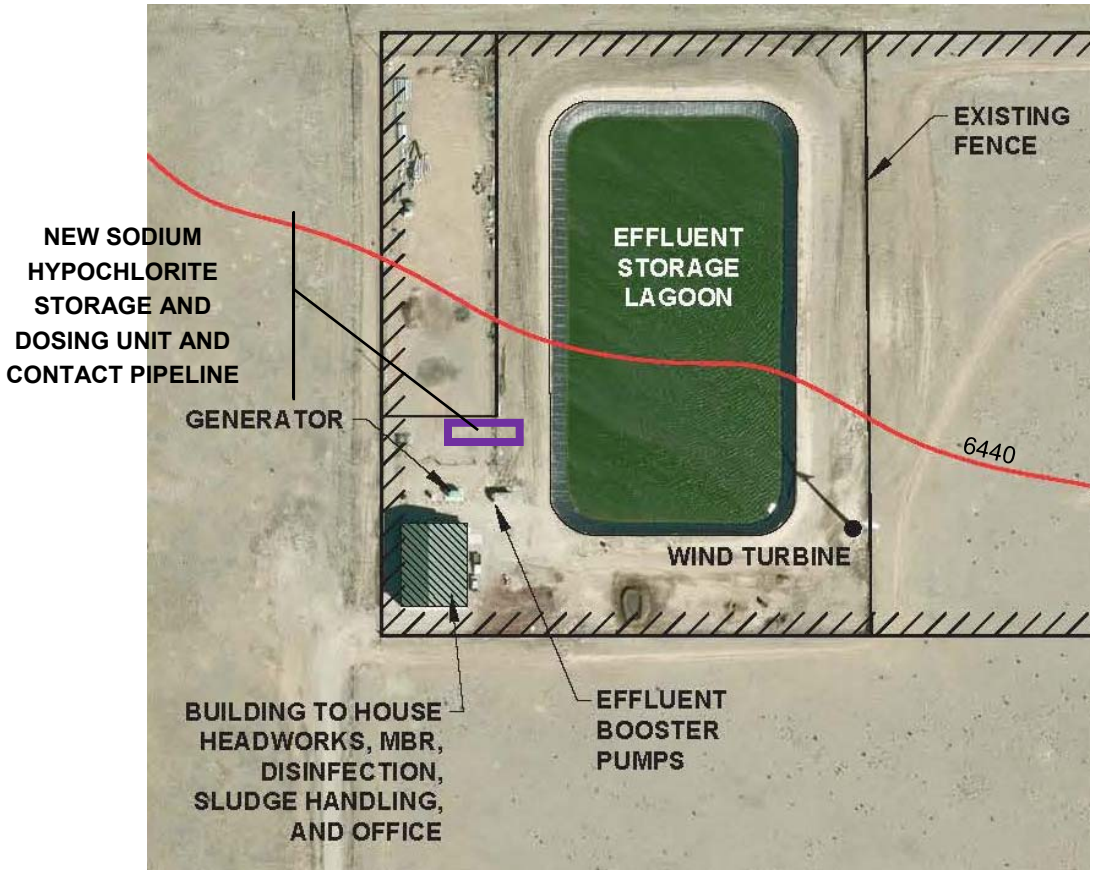


Figure 4-3. Possible Location for the Sodium Hypochlorite Unit at the Existing WRF

4.2.2.4 *Environmental Impacts*

No environmental impacts are anticipated (during construction or as part of operations). All construction activities will be carried out within the existing WRF site. An environmental clearance and/or categorical exclusion will be submitted with funding applications, as necessary.

4.2.2.5 *Land Requirements*

There are no additional land requirements. The new sodium hypochlorite storage unit can be installed within the existing WRF site boundaries.

4.2.2.6 *Potential Construction Problems*

No significant construction problems are anticipated. The potential rock formations at deeper elevations are not expected to affect the construction since foundation of the chemical storage building will be a concrete slab on grade. There are many conduits and pipes around the west and north side of the existing MBR building, and it will be necessary to properly locate them to avoid conflicts. Bypass piping or temporary pumping may be necessary in order to sequence construction and continue plant operations.

4.2.2.7 *Sustainability Considerations*

4.2.2.7.1 Water and Energy Efficiency

The small chemical dosing pump required is the only energy consumption of this alternative and this power cost is minimal. The alternative is considered to be water and energy efficient.

4.2.2.7.2 Green Infrastructure

The sodium hypochlorite disinfection system does not incorporate any green infrastructure.

4.2.2.7.3 Resiliency and Ability to Handle Hardness

The high concentrations of calcium in the treated water may increase the sodium hypochlorite consumption. Scaling is not anticipated to be a significant operational problem for this alternative.

4.2.2.8 *Cost Estimates*

4.2.2.8.1 Capital Cost Estimates

A new fiberglass chemical storage area will be required to store sodium hypochlorite (NaOCl) barrels and also house the dosing pumps. Yard piping will include 24-inch effluent pipeline to provide contact time between the dosing point and the effluent lagoon. A second pipeline may be necessary as flowrates exceed 100,000 gpd. Construction cost for the continued use of sodium hypochlorite system, excluding soft costs, contingency, engineering and tax, is estimated at approximately $120,000 (see Table 4-6).

4.2.2.8.2 Operating and Maintenance Cost Estimates

The main operating and maintenance requirement for sodium hypochlorite disinfection is the cost of chemicals. The estimates were based on chemical cost of $2.75 per gallon including tax and delivery, as obtained from facility records. The water chemistry suggests chlorides can react with the calcium ions in the effluent water, increasing the chloride demand of the system. The O&M costs presented in Table 4-7 were based on a typical activated sludge effluent dosing of 8

mg/L, however, depending on the presence of other chlorine consuming ions, including calcium, actual consumption rates may increase. Details of the O&M costs and short-lived assets associated with this alternative are presented in Appendix C.

Table 4-6. Preliminary Opinion of Capital Cost for NaOCl Disinfection

Line Item	Unit	Unit Price	Quantity	Extension
INITIAL PHASE – THIS PROJECT				
Isolation valves	EA	$8,000	1	$8,000
Chemical storage / containment area	LS	$25,000	1	$25,000
Dosing pumps	EA	$10,000	2	$20,000
Dosing pump electrical installation	LS	$3,000	2	$6,000
Yard piping	LF	$250	600	$150,000
Subtotal				$209,000
FUTURE PHASES TO REACH TO 0.25 MGD				
Yard piping – second contact line	LF	$250	300	$75,000
Subtotal				$75,000
Total for NaOCl Disinfection				$284,000

Note: Contingency and non-construction costs are added in Section 6.

Table 4-7. Preliminary Opinion of Annual O&M Costs for NaOCl Disinfection

Item	O&M Estimate Up to 100,000 gpd	O&M Estimate Up to 250,000 gpd
Power	$500	$500
Equipment maintenance and replacement	$1,000	$1,000
Chemicals	$8,030	$20,100
Total Annual O&M cost	$9,600	$21,600
Present Value of O&M Cost*	$216,200	$486,400

** O&M costs assumed to increase by 3 percent every year. Present Value calculated at a 1.2 percent interest rate for 20 years.*

4.3 EFFLUENT DISPOSAL SYSTEM ALTERNATIVES

This section describes alternatives for disposal of treated effluent and emergency storage / disposal. Effort was made to optimize the current facilities by repurposing existing components. The no action alternative is not included since the current DP requires the implementation of an emergency storage or a backup disposal system for the facility.

4.3.1 DISPOSAL ALTERNATIVE 1: COMPLETE EVAPORATION

4.3.1.1 *Description*

The complete retention alternative includes a series of lagoons to allow adequate storage and subsequent complete evaporation of the effluent. The highlights of this alternative are as follows:

- A new 300,000-gallon storage tank will be installed to store Class1A quality water.
- The existing booster pumps will be reconnected to the new storage tank to allow pumping of reclaimed water.
- Up to 100,000 gpd of Class 1A quality water will be reused around Town.
- Any water that is in excess of Class 1A demand or that cannot meet the Class1A quality requirements will flow to evaporation lagoons.
- The existing evaporator will continue to be in use, as necessary, to promote evaporation.
- The water levels in the evaporation lagoons will be closely monitored to ensure evaporation.

4.3.1.2 *Design Criteria*

Evaporation lagoons are sized to provide the necessary surface area to evaporate the total annual effluent volume plus the precipitation that would fall on the lagoon surface. For this purpose, a water balance analysis was performed using the monthly evaporation and precipitation rates (see Appendices D and E). The design basis for the complete evaporation lagoons considered the following principles:

- The total lagoon surface area must be large enough to evaporate the design flow of 250,000 gpd. Since the lagoons will be a backup / emergency disposal site, they should have the ability to evaporate the entire amount of treated effluent, even though most of the time, the reuse applications will result in volumes less than the design flow.
- The lagoons must have enough storage volume to store the accumulating volume of the water during winter months with low evaporation rates.
- The lagoons do not need to comply with the typical facultative basin aerial loading guidelines given in the literature since the effluent will be treated water with minimal organic and nitrogen constituents.

The preliminary sizing and water balance analysis presented in Appendix E suggest that the net surface area required for the lagoons is approximately 61 acres. It was estimated that an overall area of 70 acres will be required for this alternative including the berms. The design summary of the cells is summarized in Table 4-8. Based on the dimensions of the existing lagoon with 480-ft length and 270-ft width, a total of 21 lagoons of the same size would be required for evaporation of 0.25 MGD water.

4.3.1.3 *Elimination of Complete Evaporation Alternative*

A series of lagoons with 61 acres of surface area is limited in its implementability. In addition, evaporation of 250,000 gpd of water is not a sustainable approach in terms of the water policy for the State. As such, complete evaporation was eliminated as an effluent disposal option.

Table 4-8. Preliminary Design Information for Evaporation Lagoons

Parameter	Design Value
Water surface area required (ft^2)*	2,660,000
Water surface area required (acres)*	61.1
Water depth (ft)	12.0
Minimum storage volume required (gal)*	34,700,000

** Based on an annual precipitation of 12.80 inches and a total evaporation of 54.2 inches presented in Appendix D. Monthly water balance analysis is presented in Appendix E.*

4.3.2 DISPOSAL ALTERNATIVE 2: CENTER PIVOT SYSTEM

4.3.2.1 *Description*

This alternative includes application of the Class 2 quality water on land within the existing site boundary. Since NMED does not permit application of water on frozen ground, a storage lagoon would be required for cold days during which the water cannot be land applied. The highlights of this alternative are as follows:

- A new 300,000-gallon storage tank will be installed to store Class1A quality water.
- The existing booster pumps will be reconnected to the new storage tank to allow pumping of reclaimed water.
- Up to 100,000 gpd of Class 1A quality water will be reused around Town.
- The existing lagoon will be converted to a Class 2 storage lagoon.
- Any water in excess of Class 1A demand or that cannot meet the Class1A quality requirements will flow to the Class 2 storage lagoon.
- Floating pumps will be installed in the lagoon to pump the water to a land application area.
- A center pivot irrigation system will be installed within the boundary of the land application area.

4.3.2.2 *Design Criteria*

4.3.2.2.1 Class 2 Storage

The climate data presented in Appendix D indicates that the maximum number of consecutive days with freezing temperatures was 38 based on historical data between 1998 through 2016.

This data suggests that an effluent storage lagoon with approximately 38-days of storage capacity would provide a conservative amount of storage for Edgewood. The existing lagoon with a storage volume of 7,500,000 gallons provides 30-days of storage capacity for design flows. Considering the unknown timeline of the facility reaching design flow and the unpredictability of the climate, it is recommended to convert the existing lagoon to a Class 2 storage lagoon to utilize the existing 30-day capacity. As flowrates approach the design value, if it appears that additional storage capacity is needed, a second lagoon can be added and/or the reuse capacity can be increased.

4.3.2.2.2 Application Rate

Since the effluent will meet the Total Nitrogen limit of less than 10 mg/L, the application rate will not be dictated by the organic or nitrogen loading, but will be based on the hydraulic loading capability of the soils at the site. A hydraulic conductivity test can be performed at the site, and is recommended before the design phase, to estimate the ability of the area to infiltrate the water without creating runoff.

The NM Administrative Code Title 20 Table 703.1 defines the application rates by soil types for conventional treatment systems. The application rate for loamy soils are listed as 2 ft^2/gpd (or 0.5 gpd/ft^2). USEPA Design Manual for Onsite Treatment of Wastewater (2002) lists the application rate for loam / porous silt loam soils as 0.45 gpd/ft^2, which is one of the lowest application rates cited. Based on an average application rate of 0.5 gpd/ft^2 and an average ultimate design flow of 250,000 gpd, about 500,000 ft^2 (or 11.5 acres) are required for disposal of the treated effluent in Edgewood. It is recommended to perform hydraulic conductivity tests during the design phase to confirm this application rate.

4.3.2.2.3 Disposal Pumps

From the Class 2 storage lagoon, the effluent will have to be pumped to the land application area. For this purpose, two floating pumps are recommended to be installed in the storage lagoon (see Figure 4-4).

Figure 4-4. Photograph of Floating Pumps

For planning purposes, the pumps were sized for a maximum flow of 500 gpm, in order to provide flexibility in dispersal of the water. The effluent can be discharged at a higher rate than is received, if the weather conditions are favorable to maximize storage capacity.

4.3.2.2.4 Type of Application

Infiltration / percolation and spraying / spreading are the most common application techniques. Infiltration using special basins (i.e., Infiltrators™) are common but can get costly as flowrates increase. On the other hand, such systems will be independent of climate and can continue to discharge even under freezing conditions, since the chambers are buried below freezing depths. The main disadvantage of such buried systems is the lack of ability to visually observe the water discharging into the soil, especially since the site soils are expected to be loamy. The operators will not be aware of any problems until the water starts overflowing to the surface. Installation of buried chambers was eliminated from the analysis due to the following considerations:

- Cost of the project can be high. The anticipated length of Infiltrators required for this project is approximately 31,200-ft, which is estimated to be about $375,000 including installation. Due to the long length of the Infiltrators, the system must be pressurized using pumps. The pressurized system will require approximately 4500-ft of irrigation piping plus 31,200-ft of pipe installed inside Infiltrator chambers. The cost of pipe can be as high as $550,000 for this application.
- The amount of water to be infiltrated is fairly large at 250,000 gpd, and considering the loamy soil structure at the site, it is not desirable to rely on a buried system, where the operator cannot visually inspect the application.

Center pivot systems and sprinklers are commonly utilized methods for land application of water and are typically used to irrigate crops. The pivot can be set to complete a revolution at different speeds, which will results in different application rates. Two center pivot irrigation systems to cover the required 11.5 acres of land application area are considered for the facility. A photograph of a center pivot is included in Figure 4-5.

Figure 4-5. Photograph of a Center Pivot Irrigation System

Preliminary design basis for the center pivot system is included in Table 4-9. Highlights of the center pivot system are summarized below:

- Application Rate: For an ultimate design flowrate of 250,000 gpd and based on two circles each with 600-ft diameter, the application rate will be 0.44 gpd/ft^2 or 0.71 inches per day, which complies with the NMAC regulations cited above. Site soils should be tested and classified during the design phase to confirm this rate.

Table 4-9. Preliminary Design Information for Center Pivot Irrigation System

Unit / Parameter	Preliminary Design Value
AREA INFORMATION	
Number of circles	2 for design flows
Diameter (ft)	600
Total area provided (ft^2 / acres)	565,488 / 13
CENTER PIVOT INFORMATION	
Revolution duration at max speed (hrs)	4.1
Percolation rate at max speed (in/rev)	0.752
Revolution duration at 50% speed (hrs)	8.2
Percolation rate at 50% speed (in/rev)	1.5
Max flow capacity (gpm)	500
Machine length (ft)	289
End pivot pressure required (psi)	15
PUMP INFORMATION	
Number of pumps	2 (1 operating and 1 spare)
Type of pumps	Floating
Max flowrate (gpm)	500
Motor HP	15

- Application Frequency: Since two circles will be provided, it is recommended that effluent is alternated between two circles at 50% speed to maximize infiltration. The operation of the two pivots can be controlled automatically to minimize operator labor. It is recommended to reuse the Class 1A quality water as much as possible and decrease the amount that will need to be disposed using the center pivots.
- Application Time: It is recommended that the effluent be applied during the warmer time of the day.
- Flow Patterns: The effluent will be pumped from the storage lagoon to the center pivots.

4.3.2.3 *Maps and Images*

A preliminary layout of the center pivot circles and a new Class 1A storage tank at the existing site is given in Figure 4-6. It should be noted that two pivot circles will be required for ultimate flowrates but this project can include only one pivot circle to accommodate flows up to 125,000 gpd.

4.3.2.4 *Environmental Impacts*

No environmental impacts are anticipated (during construction or as part of operations). All construction activities will be carried out within the existing WRF site. An environmental clearance and/or categorical exclusion will be submitted with funding applications, as necessary.

4.3.2.5 *Land Requirements*

There are no additional land requirements. The new center pivots and the Class 1A storage tank can be installed within the existing WRF site boundaries (see Figure 4-6).

4.3.2.6 *Potential Construction Problems*

No significant construction problems are anticipated. The potential rock formations at deeper elevations are not expected to affect the construction since foundation of the center pivot and storage tank will be a concrete slab on grade. There are many conduits and pipes around the west and north side of the existing MBR building, and it will be necessary to properly locate them to avoid conflicts.

4.3.2.7 *Sustainability Considerations*

4.3.2.7.1 Water and Energy Efficiency

The reuse of Class 1A quality around the Town for dust control and road maintenance is a water efficient method. Both disposal of Class 2 water via the center pivots and pumping of Class 1A water to truck fill stations will require pumping energy.

4.3.2.7.2 Green Infrastructure

The reuse of Class 1A water is considered to be a green technology and is promoted as much as possible.

4.3.2.7.3 Resiliency and Ability to Handle Hardness

High hardness content of the effluent is likely to cause clogging of the sprinklers and will require regular maintenance. Unfortunately, for disposal of treated effluent, maintenance of the

sprinkler heads is a common problem and cannot be avoided if the effluent is spray irrigated on land. With proper maintenance, the center pivot is expected to adequately serve the facility without any significant problems.

4.3.2.8 *Cost Estimates*

4.3.2.8.1 Capital Cost Estimates

A preliminary capital cost estimate for the continued reuse of Class 1A water and land disposal of Class 2 is presented in Table 4-10. It is estimated that the total construction cost for the system, excluding soft costs, contingency, engineering and tax, would be approximately $718,000 for two center pivots, and $213,000 for only one center pivot for the initial flows.

Table 4-10. Preliminary Opinion of Capital Cost for Effluent Disposal - Center Pivot

	Unit	Unit Price	Quantity	Extension
CLASS 2 DISPOSAL AREA – THIS PROJECT				
Site clearing and grubbing	AC	$5,000	1	$5,000
Concrete work	CY	$600	25	$15,000
Center pivot system	EA	$65,000	1	$65,000
Floating pumps from lagoon, installed	EA	$35,000	2	$70,000
Electrical installation	LS	$16,000	1	$16,000
Yard piping incl. valves (from disinfection)	LF	$50	300	$15,000
Irrigation piping with valves	LF	$30	800	$24,000
Relocate the eastern boundary fence	LS	$5,000	1	$5,000
Subtotal Class 2 – Phase 1				$213,000
CLASS 2 DISPOSAL AREA – FUTURE PHASES				
Concrete work – Second pivot	CY	$600	25	$15,000
Center pivot system – Second pivot	EA	$65,000	1	$65,000
Extension of irrigation piping with valves	LF	$30	700	$21,000
Electrical installation	LS	$11,000	1	$11,000
Subtotal Class 2 – Phase 2				$112,000
CLASS 1A STORAGE – THIS PROJECT				
Steel storage tank (300K gal) incl. foundation	LS	$375,000	1	$375,000
Re-connect existing booster pumps	LS	$3,000	1	$3,000
Yard piping including valves	LF	$50	300	$15,000
Subtotal Class 1A				$393,000
TOTAL – Center Pivot Disposal				**$718,000**

Note: Contingency and non-construction costs are added in Section 6.

4.3.2.8.2 Operating and Maintenance Cost Estimates

The O&M requirements for a center pivot are summarized in Table 4-11. Details of the O&M costs and short-lived assets associated with this alternative are presented in Appendix C. The center pivot equipment will need regular maintenance and equipment replacement. It is likely that the high hardness will cause clogging of the sprinklers and will require regular maintenance. Unfortunately, for disposal of treated effluent, maintenance of the sprinkler heads is a common problem and cannot be avoided if the effluent is spray irrigated on land.

One main advantage of the center pivot system is the ability to move the arms of the machine. Application of effluent water will result in natural vegetation growing in the area. The operations staff may need to maintain the area and cut vegetation, as necessary to have access to the equipment. The center pivot arm can be easily moved to facilitate the land maintenance.

Table 4-11. Preliminary Opinion of Annual O&M Cost for Effluent Disposal - Center Pivot

Item	O&M Estimate
Power	$9,800
Equipment maintenance and replacement	$12,900
Total O&M Cost	$22,700
Present Value of O&M Cost*	$511,200

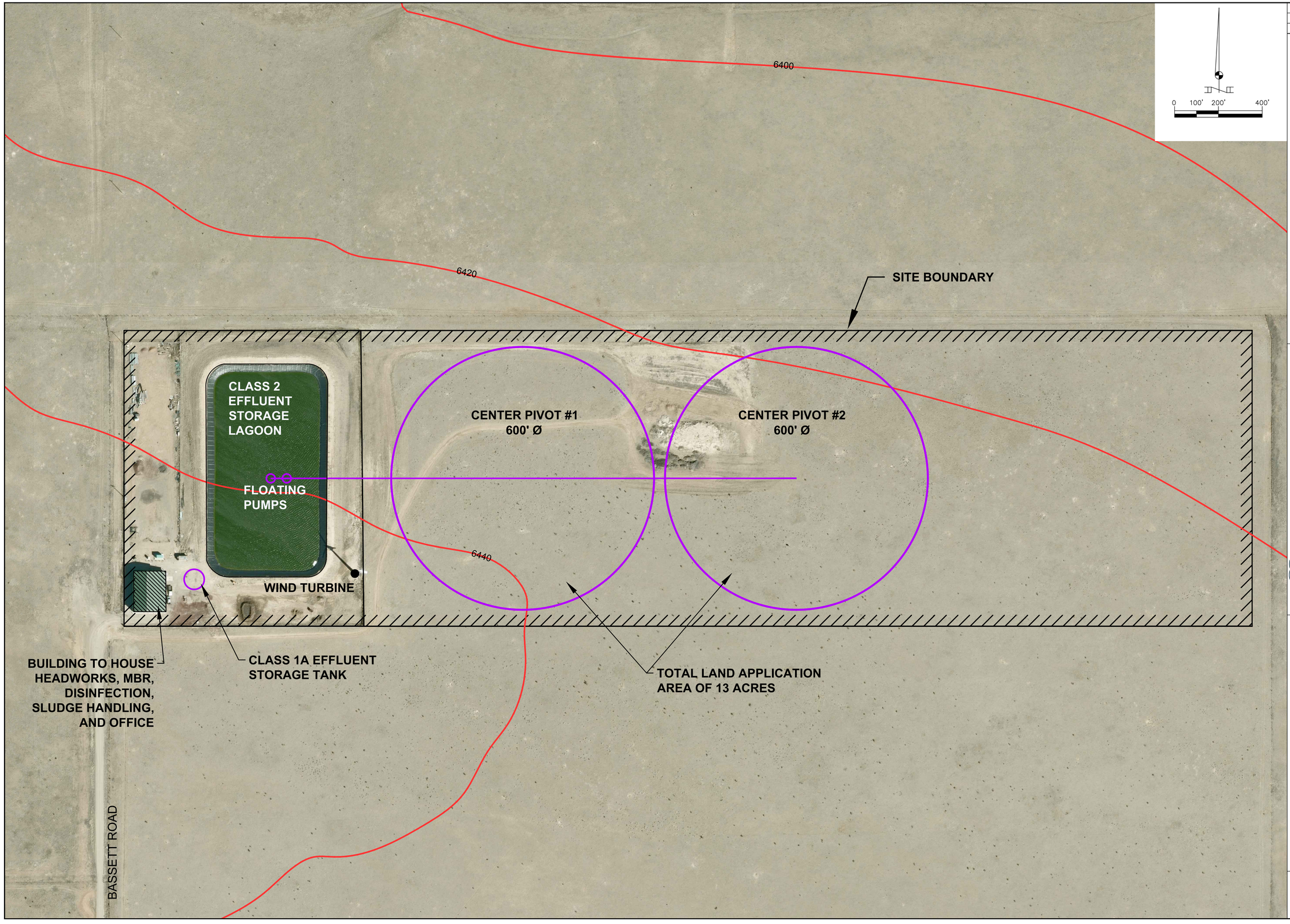
** O&M costs are assumed to increase by 3 percent every year. Present Value calculated for 1.2 percent discount rate for 20 years.*

4.3.3 DISPOSAL ALTERNATIVE 3: PIPE NETWORK WITH SPRINKLERS

4.3.3.1 *Description*

This alternative is similar to Alternative 2, but utilizes a permanent pipe network instead of center pivot irrigation system. The alternative includes land application of the Class 2 quality water within the existing site boundary. Since NMED prohibits application of water on frozen ground, a storage lagoon would be required for cold days when water cannot be land applied. The highlights of this alternative are as follows:

- A new 300,000 gallon storage tank will be installed to store Class1A quality water.
- The existing booster pumps will be reconnected to the new storage tank to allow pumping of reclaimed water.
- Up to 100,000 gpd of Class 1A quality water will be reused around Town.
- The existing lagoon will be converted to a Class 2 storage lagoon.
- Any water that is in excess of Class 1A demand or that cannot meet the Class1A quality requirements will flow to the Class 2 storage lagoon.



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PROJECT
TOWN OF EDGEWOOD
WATER RECLAMATION FACILITY - PH I
PRELIMINARY ENGINEERING REPORT

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TITLE
PRELIMINARY LAYOUT OF
CENTER PIVOTS AND CLASS
1A EFFLUENT STORAGE TANK

FIGURE
4-6

- Floating pumps will be installed in the lagoon to pump the water to a land application area.
- A pipe network with sprinkler heads will be installed within the land application area.

4.3.3.2 *Design Criteria*

The following design criteria will be the same as Alternative 2 (see Section 4.3.2.2):

- Class 2 storage will be the existing lagoon with 7.5 Mgal capacity, providing 30-days of storage.
- Maximum application rate will be 0.5 gpd/ft^2.
- Two 15-HP 500 gpm capacity floating pumps will be installed in the Class 2 storage lagoon and used as disposal pumps.

Instead of utilizing a center pivot, this alternative is based on utilizing a buried pipe network with sprinklers installed on the irrigation laterals. Preliminary design basis for this alternative is included in Table 4-12.

Table 4-12. Preliminary Design Information for Pipe Network Sprinkler System

Unit / Parameter	Preliminary Design Value
AREA INFORMATION	
Overall width (ft)	550
Overall length (ft)	1000
Total area provided (ft^2)	550,000
Total area provided (acres)	12.6
PIPE NETWORK INFORMATION	
Number of zones	8
Length of each lateral (ft)	275
Spacing between laterals (ft)	50
Spacing between sprinkler heads (ft)	50
Sprinkler pressure required (psi)	25
PUMP INFORMATION	
Number of pumps	2 (1 operating and 1 spare)
Type of pumps	Floating
Motor HP	15

Highlights of the pipe network system are as follows:

- Application Rate: Based on the layout of the headers and laterals, the total area provided will be 12.6 acres. This is equivalent to 0.45 gpd/ft^2, which complies with the NMAC regulations cited above. Site soils should be tested during the design phase.
- Application Frequency: Eight disposal zones will be provided, each separated with a solenoid valve. The flow dispersal will be alternated from zone to zone to maximize infiltration efficiency. Similar to Alternative 2, reuse of the Class 1A quality water is encouraged as much as possible.
- Application Time: The effluent should be applied during the warm periods of the day.
- Flow Patterns: Class 2 effluent will be pumped from the storage lagoon.

4.3.3.3 *Maps and Images*

A preliminary layout of the permanent pipe network and a new Class 1A storage tank at the existing site is given in Figure 4-7. It should be noted that 8 zones will be required for ultimate flowrates but this project can be phased to include only four zones to accommodate flows up to 125,000 gpd.

4.3.3.4 *Environmental Impacts*

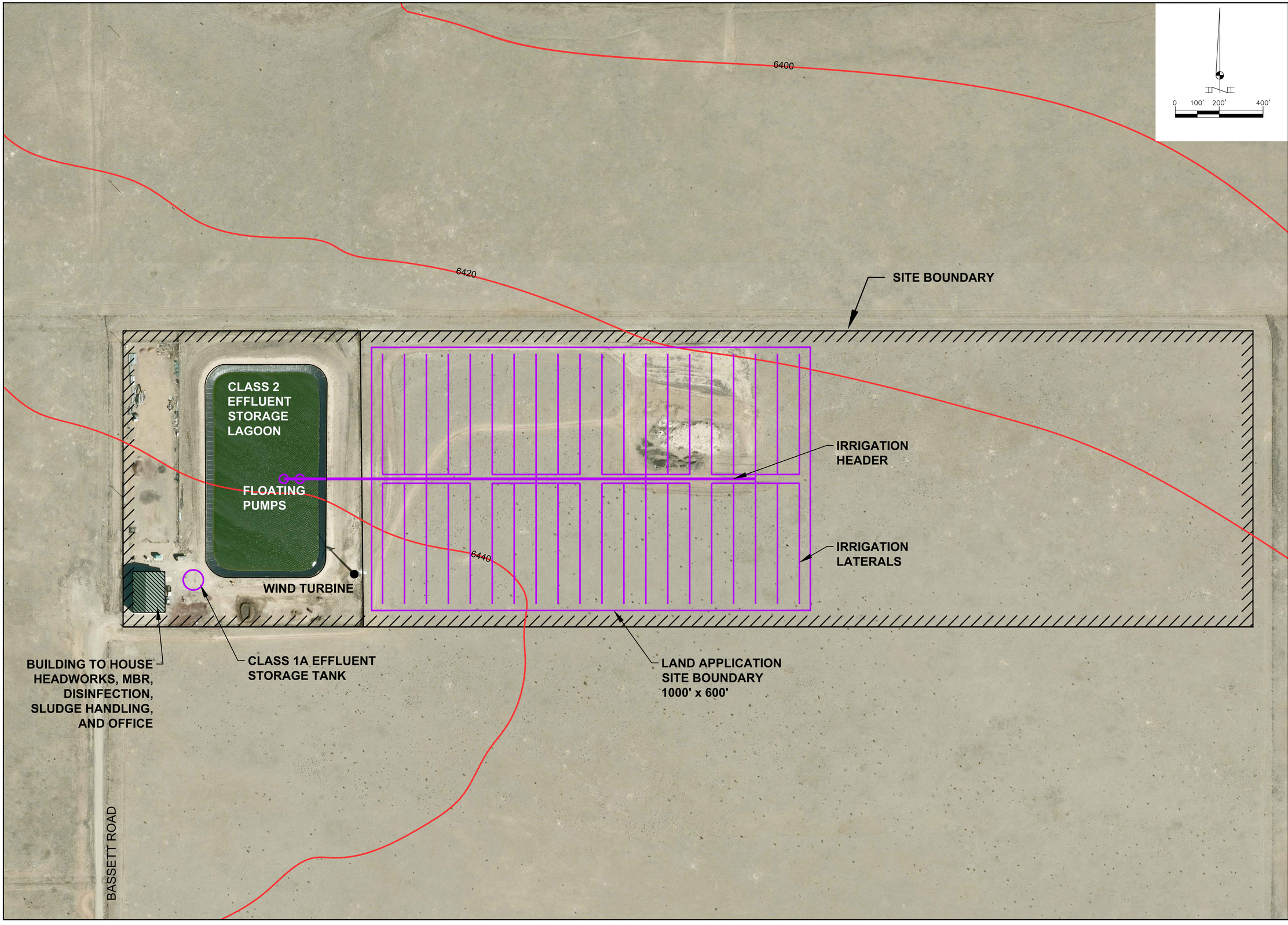
No environmental impacts are anticipated (during construction or as part of operations). All construction activities will be carried out within the existing WRF site. An environmental clearance and/or categorical exclusion will be submitted with funding applications, as necessary.

4.3.3.5 *Land Requirements*

There are no additional land requirements. The new disposal zones and the Class 1A storage tank can be installed within the existing WRF site boundaries (see Figure 4-7).

4.3.3.6 *Potential Construction Problems*

No significant construction problems are anticipated. The potential rock formations are expected to be at deeper elevations and are not expected to affect the construction of pipe network. There are many conduits and pipes around the west and north side of the existing MBR building, and it will be necessary to properly locate them to avoid conflicts.



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TITLE
PRELIMINARY LAYOUT OF PIPE
NETWORK AND CLASS 1A
EFFLUENT STORAGE TANK

FIGURE
4-7

4.3.3.7 *Sustainability Considerations*

4.3.3.7.1 Water and Energy Efficiency

The reuse of Class 1A quality for dust control and road maintenance is a water efficient method. Both disposal of Class 2 water and pumping of Class 1A water to truck fill stations will require pumping energy.

4.3.3.7.2 Green Infrastructure

The reuse of Class 1A water is considered to be a green technology and is promoted as much as possible.

4.3.3.7.3 Resiliency and Ability to Handle Hardness

High hardness content of the effluent is likely to cause clogging of the sprinklers and will require regular maintenance. Unfortunately, for disposal of treated effluent, maintenance of the sprinkler heads is a common problem and cannot be avoided if the effluent is spray irrigated.

4.3.3.8 *Cost Estimates*

4.3.3.8.1 Capital Cost Estimates

A preliminary capital cost estimate for the reuse of Class 1A water and land disposal of Class 2 water using a permanent pipe network with sprinklers is presented in Table 4-13. Construction cost for the system, including engineering and tax, is estimated at approximately $782,000.

4.3.3.8.2 Operating and Maintenance Cost Estimates

The O&M requirements for a land application area are summarized in Table 4-14. Details of the O&M costs and short-lived assets associated with this alternative are presented in Appendix C. Similar to the center pivot equipment, the high hardness in the water will cause clogging of the sprinklers and will require regular maintenance. Unfortunately, for disposal of treated effluent, this is a common problem and cannot be avoided if the effluent is spray irrigated on land.

One main disadvantage of this alternative is the increased requirements for the land maintenance. Application of effluent water will result in natural vegetation growing in the area. The operations staff may need to maintain the area and cut vegetation, as necessary, to have access to the sprinkler heads. Since the pipes and sprinklers are permanent, it may be harder to locate the sprinkler heads under the natural vegetation and maintain the area as compared to the center pivot arm. On the other hand, this alternative will eliminate the requirements for maintenance of the center pivot.

Table 4-13. Preliminary Opinion of Capital Cost for Effluent Disposal - Pipe Network

	Unit	Unit Price	Quantity	Extension
CLASS 2 DISPOSAL AREA				
Site clearing and grubbing	AC	$5,000	1	$5,000
Floating pumps from lagoon, installed	EA	$41,000	2	$82,000
Electrical installation	LS	$25,000	1	$25,000
Yard piping incl. valves (from disinfection)	LF	$50	300	$15,000
Irrigation piping with valves (from lagoon)	LF	$30	1,300	$39,000
Irrigation piping (zone headers)	LF	$20	2,000	$40,000
Irrigation piping (laterals)	LF	$15	11,000	$165,000
Sprinkler heads, installed	EA	$25	280	$7,000
Solenoid valves / valve boxes	EA	$750	8	$6,000
Relocate the eastern boundary fence	LS	$5,000	1	$5,000
Subtotal Class 2				$389,000
CLASS 1A STORAGE				
Steel storage tank (300K gal) incl. foundation	LS	$375,000	1	$375,000
Re-connect existing booster pumps	LS	$3,000	1	$3,000
Yard piping including valves	LF	$50	300	$15,000
Subtotal Class 1A				$393,000
TOTAL – Pipe Network Disposal				**$782,000**

Note: Contingency and non-construction costs are added in Section 6.

Table 4-14. Preliminary Opinion of Annual O&M Cost for Effluent Disposal - Pipe Network

Item	O&M Estimate
Power	$10,900
Equipment maintenance and replacement	$12,900
Total O&M Cost	$23,800
Present Value of O&M Cost*	$536,000

** O&M costs are assumed to increase by 3 percent every year. Present Value calculated for 1.2 percent discount rate for 20 years.*

5 SELECTION OF AN ALTERNATIVE

A life cycle present worth cost analysis was completed to compare the technically feasible alternatives. This analysis met the following requirements and was completed for each technically feasible alternative presented.

1. The analysis converts all costs to present day dollars.
2. The planning period used is 20 years, through year 2037.
3. A discount rate of 1.2% was used. The discount rate is the "real" discount rate taken from Appendix C of OMB circular A-94 dated November 2015 and found at www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.
4. Annual operating and maintenance (O&M) costs were converted to present day dollars using a uniform series present worth (USPW) calculation.
5. Life cycles of short lived assets were based on generally accepted design life and manufacturer's recommendations for maintenance. This cost is included as part of the annual Operating and maintenance (O&M) costs.
6. O&M costs are assumed to increase by 3 percent annually throughout the planning period. This escalation is included as a gradient in the formula to convert the annual O&M expenses to present value.
7. The salvage value of the constructed project was estimated to be zero. Typically, wastewater treatment systems salvage value is negligible.
8. The net present value (NPV) was calculated for each technically feasible alternative as the sum of the capital cost plus the present worth of the uniform series of annual O&M.

A summary table showing the capital cost, annual O&M cost, present worth of each of these values, and the NPV was developed for each of the alternatives.

5.1 LIFE CYCLE COST ANALYSIS

A comparison of the two disinfection system alternatives with their capital and annual O&M costs is presented in Table 5-1. In order to provide a fair comparison between the two alternatives, the costs in the table are presented for the design flow of 0.25 MGD. However, this project will include installation of only one pipeline, as detailed in Project Summary Section 6. A second pipeline for sodium hypochlorite disinfection or a UV disinfection unit may be required when the flowrates exceed 100,000 gpd.

Table 5-1. Life Cycle Cost Summary of Disinfection System Alternatives for Design Flow

Alternatives	Estimated Capital Cost* (A)	Annual O&M Cost	Present Worth of Annual O&M Cost** (B)	Total Capital and O&M Costs (A + B)
UV	$596,000	$23,100	$520,200	$1,116,200
Sodium Hypochlorite	$284,000	$21,600	$486,400	$770,400

** Excludes soft costs, contingency, engineering, and tax. Non-construction costs are added in Section 6.*
** O&M costs are assumed to increase by 3 percent every year. Present Value calculated for 1.2 percent interest rate for 20 years.*

A comparison of the two alternative effluent disposal systems with their capital and annual O&M costs is presented in Table 5-2. Based on the discussion provided in Section 4.3.1, complete evaporation lagoons were excluded from this comparison.

Table 5-2. Life Cycle Cost Summary of Effluent Disposal Alternatives for 0.25 MGD

Alternatives	Estimated Total Capital Cost* (A)	Annual O&M Cost	Present Worth of Annual O&M Cost** (B)	Total Capital and O&M Costs (A + B)
Alternative 1: Center Pivot	$718,000	$22,700	$511,200	$1,229,200
Alternative 2: Permanent Pipe Network	$782,000	$23,800	$536,000	$1,318,000

** Excludes soft costs, contingency, engineering, and tax. Non-construction costs are added in Section 6.*
** O&M costs are assumed to increase by 3 percent every year. Present Value calculated for 1.2 percent interest rate for 20 years.*

5.2 NON-MONETARY FACTORS

The project will accomplish the following non-monetary factors:

- The new effluent disposal system will bring the facility into compliance with the NMED Discharge Permit (DP-1654) requirements.
- Providing a building for sodium hypochlorite storage and dosing will facilitate plant operations and increase safety.
- Storing the Class 1A effluent in a covered tank instead of an open lagoon will improve the water quality, eliminate any potential algae growth.
- The center pivot will get the effluent disposal system ready for the future anticipated capacity increase which is expected in Phase 2 of the project.

5.3 SELECTION OF AN ALTERNATIVE

Alternative technologies were ranked with respect to each other based on the factors defined below. In determining the weighting percentages for each factor, operational requirements and costs were deemed to have a higher significance than the capital costs. The evaluation factors that were used in the comparison matrices are defined below:

- Flexibility (5%): Flexibility of the system to handle low initial flowrates, fluctuating flowrates, and/or increased flowrates.
- Equipment Reliability (10%): Performance of the unit to operate effectively throughout the project's useful life, even under adverse conditions, such as equipment failure as well as likelihood of any equipment failure.
- Performance Reliability (10%): Treatment efficiency and performance of the process to operate effectively throughout the project's useful life.
- Resiliency / Ability to handle high hardness (10%): Performance of the equipment to operate effectively with hard hardness, the ease of maintenance and cleaning procedures to remove accumulated scaling as well as the impact of scaling on process efficiency and reliability.
- Implementability (5%): Ease of construction and realization of the system; suitability of the system to the size and type of community; the community's ability to operate and maintain the system.
- O&M Costs (35%): Intensity of the anticipated operating and maintenance requirements for the proper operation of the system, including power, schedule and ease of maintenance, as well as the complexity of the technology and required instrumentation.
- Construction cost (25%): Quantitative comparison of the overall construction costs of the systems relative to each other.

5.3.1 SELECTION OF A DISINFECTION SYSTEM ALTERNATIVE

The evaluation matrix for the disinfection system alternatives are summarized in Table 5-3. Systems are equal in flexibility since the design and operation of both systems can be adjusted for fluctuating flowrates. The small dosing pumps required for NaOCl system are not costly, and therefore has higher ranking in reliability of equipment as compared to the UV. However, the UV performance reliability is deemed higher since UV is expected to be more effective for a wide range of organisms; and hard water is not expected to affect the UV system efficiency, provided a non-contact system is specified. The installation of a sodium hypochlorite system is easier to implement as compared to the UV system. Based on this comparison, it is recommended to install a sodium hypochlorite system for this project. It is also recommended to re-evaluate installation of a UV disinfection system as the flowrates increase and the improvements to the secondary treatment system are in progress as Phase 2.

Table 5-3. Comparison of Disinfection System Alternatives

	Weight	Relative Scoring		Weighted Totals	
		UV	NaOCl	UV	NaOCl
Flexibility	5%	2	2	10	10
Reliability - equipment	10%	1	2	10	20
Reliability - performance	10%	2	1	20	10
Ability to handle hardness	10%	2	1	20	10
Implementability	5%	1	2	5	10
O&M Requirements	35%	2	2	70	70
Construction Cost	25%	1	2	25	50
TOTAL	100%			160	180

* *1: least preferred; 2: most preferred*

5.3.2 SELECTION OF AN EFFLUENT DISPOSAL ALTERNATIVE

The evaluation matrix for the effluent disposal system alternatives are summarized in Table 5-4. The alternative systems are equal in terms of their ability to handle low initial flows. The zones in the pipe network can allow for use of alternating zones and the movement of the center pivot can be adjusted to match the flows. The reliability of the center pivot is lower since the pivot has more mechanical parts and drives. The reliability of the process is equal since both systems are capable of spreading the effluent effectively. The ability of the two systems to operate under high hardness conditions is equal since both of the systems utilize sprinklers and nozzles, which need regular maintenance. Both systems are equally easy to implement since land is available at the existing site. Based on this comparison, center pivot system is recommended for the project. Since the initial flowrates will be low, it is recommended to install one center pivot, with provisions provided for the second pivot for this project.

Table 5-4. Comparison of Effluent Disposal Alternatives

	Weight	Relative Scoring		Weighted Totals	
		Center Pivot	Pipe Network	Center Pivot	Pipe Network
Flexibility	5%	2	2	10	10
Reliability - equipment	10%	1	2	10	20
Reliability - performance	10%	2	2	20	20
Ability to handle hardness	10%	2	2	20	20
Implementability	5%	2	2	10	10
O&M Requirements	35%	2	1	70	35
Construction Cost	25%	2	1	50	25
TOTAL	100%			190	140

* *1: least preferred; 2: most preferred*

6 PROPOSED PROJECT (RECOMMENDED ALTERNATIVES)

6.1 PRELIMINARY PROJECT DESIGN

The proposed project includes construction of an effluent disposal area with a center pivot within the existing Edgewood WRF site. A summary of the recommended project elements are presented in Table 6-1.

A facility site plan and process flow diagram schematic to include the recommended improvements are presented in Figures 6-1 and 6-2, respectively. All construction will be within the existing WRF site owned by the Town and no additional land or right-of-way will be required.

Table 6-1. Summary of the Recommended System Improvements

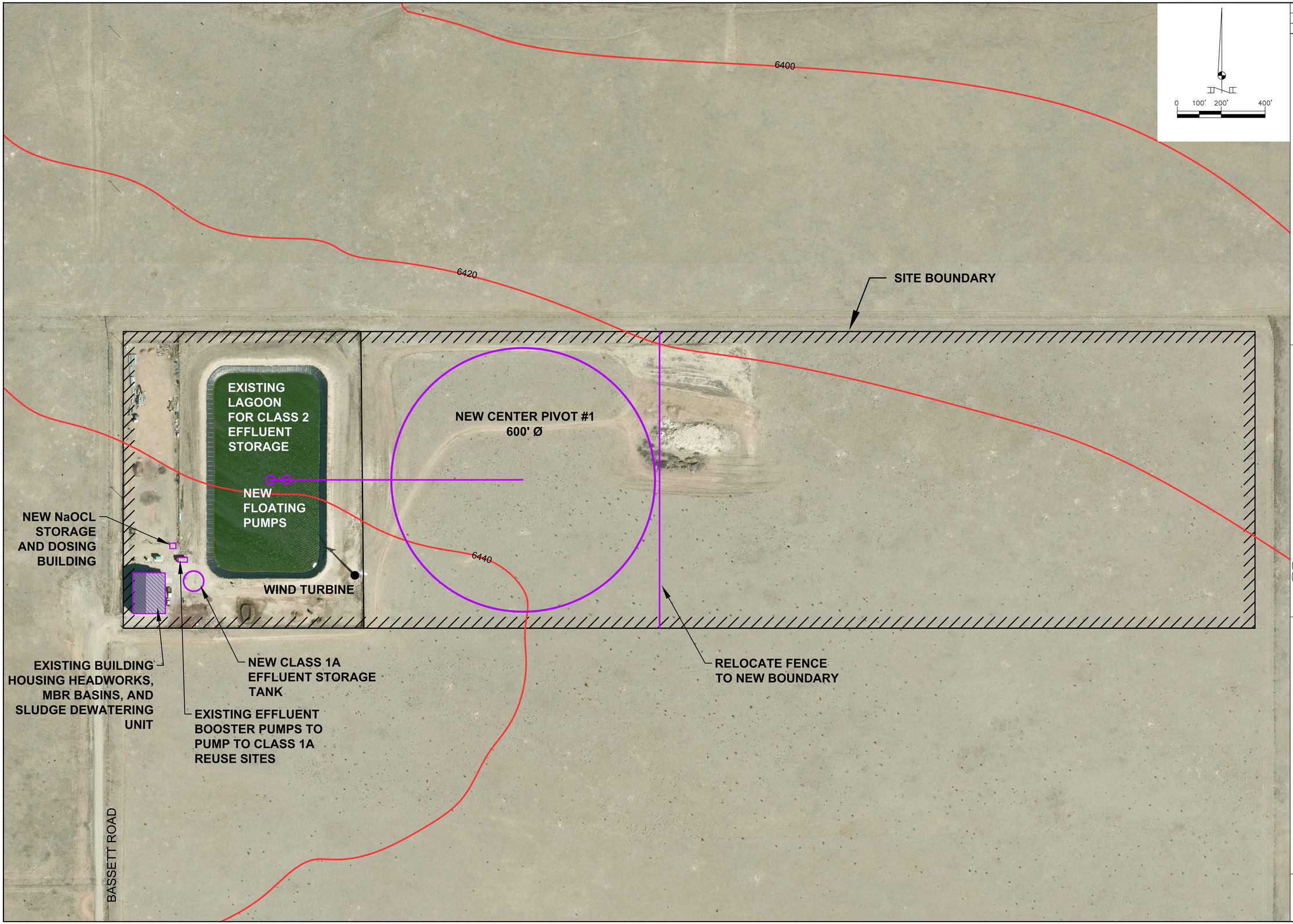
Item	Unit	Recommended Improvement
1	Sodium hypochlorite disinfection	Install a new chemical storage area and dosing pumps to chlorinate effluent. Install effluent pipe to provide contact time before discharging to Class 2 storage lagoon and Class 1A storage tank.
2	Class 1A storage	Install a new 300,000 gallon Class 1A effluent storage tank.
3	Class 2 storage	Convert the existing lagoon to Class 2 storage
4	Existing booster pumps	Reconnect effluent booster pumps to a new Class 1A water tank, to pump reclaimed water for reuse.
5	Effluent disposal area	Install floating pumps in the Class 2 storage lagoon. Install a center pivot irrigation system.

6.2 PROJECT SCHEDULE

Initiation of design of the project elements can begin immediately upon approval of this PER and the availability of funding. There is no need for land and easement acquisition for the project. A possible project schedule that indicates the anticipated timeline after the funding is secured is presented in Table 6-2.

6.3 PERMIT REQUIREMENTS

The Contractor will have to obtain a permit from Construction Industries Division prior to the start of the construction, for both general construction and electrical work to ensure compliance with the International Building Codes.



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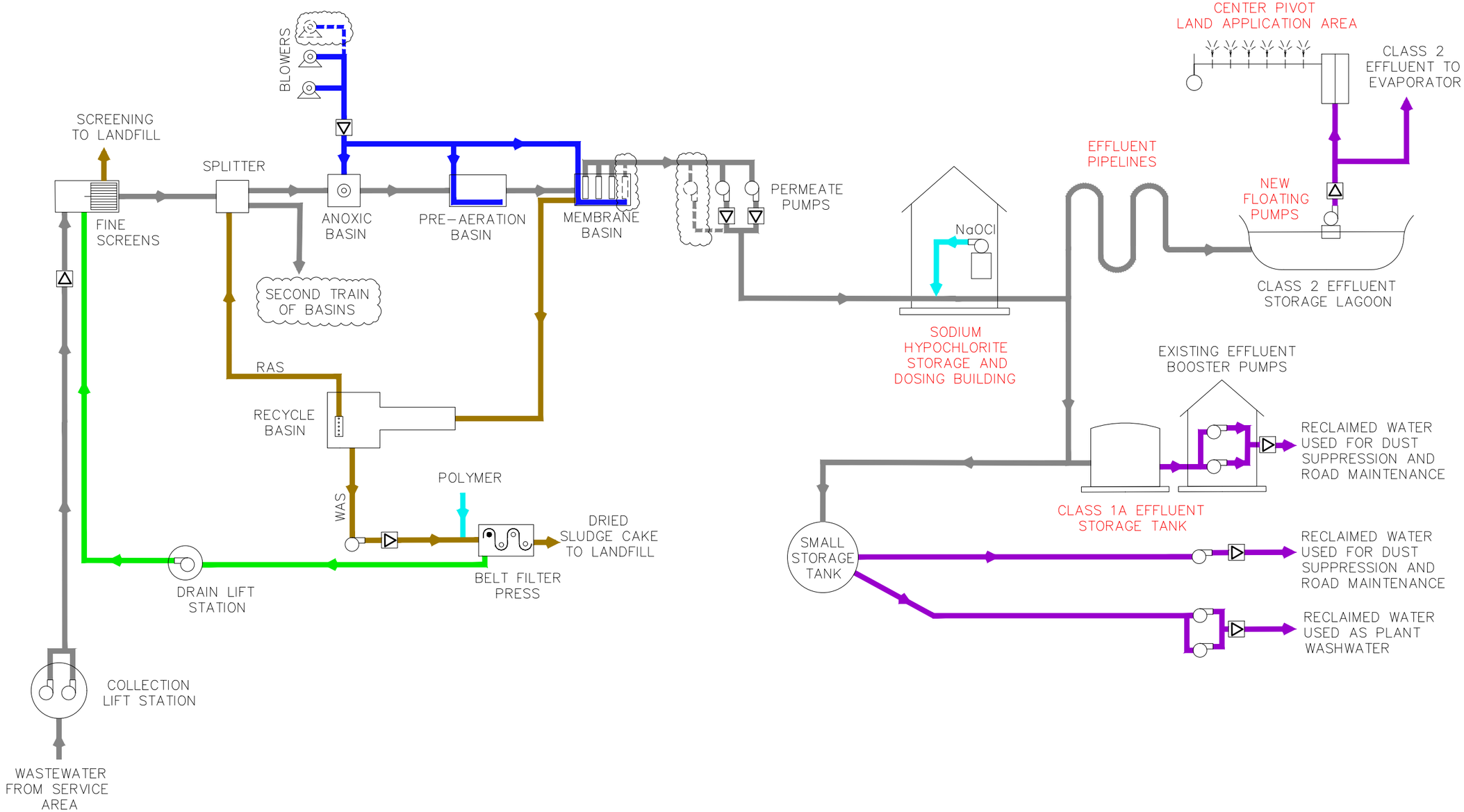
TITLE
PRELIMINARY LAYOUT OF THE RECOMMENDED IMPROVEMENTS

FIGURE
6-1

LEGEND

EXISTING
FUTURE
WASTEWATER
RECLAIMED WATER
SLUDGE/SOLIDS
AIR
DRAIN/RECYCLE
CHEMICAL
FLOW DIRECTION
COMPONENT NOT YET EQUIPPED
FLOW METER
PUMP
BLOWER
AIR LIFT PUMP
EDUCTOR TUBE MIXER

PHASE I IMPROVEMENTS INDICATED IN RED TEXT



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o) 505.281.2880
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dennis ENGINEERING company

TITLE
PROPOSED FLOW DIAGRAM
WITH THE PHASE I
IMPROVEMENTS

FIGURE
6-2

Table 6-2. Possible Project Schedule

Task	Anticipated Timeline
Predesign investigations and asbuilts	1 months
Preparation of construction documents	4 months
Approval of construction documents	2 months
Procurement for construction	3 months
Completion of construction	8 months
Facility start-up & training	1 month
TOTAL	19 months

The current Discharge Permit from NMED will need to be updated. As soon as the PER is approved, the effluent disposal area recommendations of this PER will need to be sent to NMED. Once the funding is secured and the design is completed, a new Discharge Permit application will need to be made.

6.4 SUSTAINABILITY CONSIDERATIONS

6.4.1 WATER AND ENERGY EFFICIENCY

Reuse of water as washwater at the site will continue in addition to above-ground use of reclaimed water around Town for road maintenance and dust control. In terms of power requirements, the project will require pumping energy and design will consider the energy efficient pump selections for this purpose.

6.4.2 GREEN INFRASTRUCTURE

The existing wind turbine will continue to be in use. The effluent disposal system components do not incorporate any other green technology.

6.4.3 RESILIENCY WITH HIGH HARDNESS

High hardness content of the effluent is likely to cause clogging of the sprinklers and will require regular maintenance. Unfortunately, for disposal of treated effluent, maintenance of the sprinkler heads is a common problem and cannot be avoided if the effluent is spray irrigated. Other components of the proposed project are not likely to be affected with high hardness of the water.

6.5 TOTAL PROJECT COST ESTIMATE

The capital cost summary for the recommended improvements is given in Table 6-3. Total project cost will be approximately $1.43 million.

Table 6-3. Preliminary Opinion of Cost Summary for the Project

Unit / Cost Item		Preliminary Opinion of Cost
Construction soft costs[1]		$123,000
Sodium hypochlorite disinfection system		$209,000
Class 1A effluent storage		$393,000
Class 2 effluent storage and disposal[2]		$213,000
Construction contingency	15%	$141,000
NMGRT on construction	8%	$86,000
Construction Subtotal		**$1,165,000**
Land acquisition and ROW		$0
Legal		$10,000
Funds administration		$0
Interest		$0
Equipment		$0
Refinancing		$0
Engineering - PER/Environmental[3]		$0
Engineering - Design, Surveying, Geotechnical		$165,000
Engineering - Construction Admin & Inspection		$70,000
Engineering - Reimbursables		$0
NMGRT on non-construction costs	8%	$20,000
Subtotal for Non-Construction Costs		**$265,000**
Project Total		**$1,430,000**

[1] Construction soft costs include mobilization / demobilization, construction staking, testing, permitting, general overhead and bonds, Storm Water Pollution Prevention Plan (SWPPP) preparation and implementation.

[2] The recommended project in this PER includes sodium hypochlorite disinfection, floating pumps, and one center pivot to comply with the DP requirements. A second center pivot may be necessary as flowrates increase.

[3] Cost of this PER and environmental documents necessary for funding applications were paid by a grant and hence are not included as part of project costs.

All costs are based on 2016 dollars.

6.6 ANNUAL OPERATING BUDGET

6.6.1 ANNUAL O&M COSTS

The estimated annual costs for power consumption, equipment replacement, and chemical consumption are summarized in Table 6-4 based on the discussions presented in Section 5.

These costs are based on a flowrate of 250,000 gpd, and therefore are expected to be higher than the initial costs the facility will incur.

Table 6-4. Estimated Annual O&M Costs for the 0.25 MGD Effluent Disposal System

Item	Yearly Power Cost	Equipment Replacement Cost**	Chemicals*	Annual Total Cost
NaOCl disinfection	$500	$1,000	$20,100	$21,600
Effluent disposal	$9,800	$12,900	$0	$22,700
O&M COSTS	$10,300	$13,900	$20,100	**$44,300**

** It should be noted that a portion of the annual chemical costs is currently being incurred at the existing facility since sodium hypochlorite is utilized for disinfection. It is estimated that the current chemical cost for disinfection is approximately $2,500 annually.*

*** Based on the short-list assets and replacement frequencies identified in Section 6.6.3.*

As discussed in Section 3, the existing facility operations are contracted to EPCOR, and therefore it is not possible to separate costs to itemize salaries, administrative and legal fees, insurance, and other similar items. An estimate for the overall O&M budget for the WRF with the proposed effluent disposal system is presented in Table 6-5 (excluding the short-lived assets reserve).

As presented in Section 2.4.2, the O&M cost of the existing wastewater collection, treatment, and disposal system was around $347,000 during the last fiscal year, with approximately $45,000 being the energy cost. Based on the costs presented in Table 6-5, it is anticipated that the total O&M costs can increase by $35,000 annually for 0.25 MGD.

The electricity and chemical consumption are a function of flowrate, and will be less for lower flowrates that are anticipated initially at facility start-up. The labor requirements may increase slightly as a result of added equipment, however it is anticipated that no additional operator will be necessary for the proposed project.

6.6.2 DEBT REPAYMENTS

As noted in Section 2.4, the Town has one outstanding loan that is specific to the existing wastewater treatment system from NMED Construction Program Bureau. Additional debt service is anticipated as a result of the project. Assuming 100 percent loan at 1.2 percent rate for 20 years, the annual additional debt service will be $80,850 for a total loan amount of $1,430,000.

Table 6-5. Opinion of Annual O&M Budget with the Proposed Project for 0.25 MGD

Expenditures	Estimated Value
Salary/Benefits[3]	$0
Office Supplies/Postage[3]	$0
Insurance (non-employee)[3]	$0
Contractual Services - Tech support	$0
Contractual Services - Operations[1]	$250,000
Chemical Consumption[2]	$20,100
Equipment/Vehicle Maintenance/Fuel[4]	$12,000
Compliance Testing[3]	$0
Employee Training/Travel[3]	$0
Utilities-Electricity[4]	$55,000
Utilities-Phone/Communication[4]	$2,300
Existing debt service[4]	$28,180
Total Expenditures	**$367,580**

[1] It is assumed that facility operations will continue to be contracted to EPCOR. The cost only includes salary and benefits, and it is not an indication of the final price to be negotiated with contract operator.

[2] Represents the additional cost that may be incurred at the facility based on Appendix C.

[3] The cost is currently included in the Contractual Services – Operations.

[4] Values estimated based on the current expenditures, as obtained from the Town of Edgewood.

6.6.3 RESERVES

6.6.3.1 *Debt Service Reserve*

If the recommended improvements are fully financed by loans, reserve requirements are approximately $8,085 (10% of the annual debt payment). This value is estimated based on the USDA loan requirements and may vary depending on the funding source.

6.6.3.2 *Short-Lived Asset Reserve*

The short-lived assets that will be added to be facility as a result of this project is listed in Table 6-6. The replacement costs for these assets are included in the equipment replacement costs presented in Section 5 and Table 6-4. The booster pumps, storage lagoon and storage tank listed in Table 6-6 are existing, and will continue to be in use with the new effluent disposal system after repurposing.

Table 6-6. List of Short-Lived Assets to be Added to the Facility

Item	Repair / Replacement Cost ($/ea)	Useful Life (years)	Quantity	Annual Replacement Cost
DISINFECTION SYSTEM				
NaOCl dosing pumps	$1,500	3	2	$1,000
EFFLUENT DISPOSAL SYSTEM				
Center drive	$1,200	3	2	$800
Floating pumps rebuilt	$15,000	5	2	$6,000
Hose	$3,500	5	2	$1,400
Gear box	$1,500	5	2	$600
Class 1A booster pumps*	$12,000	10	2	$2,400
Drop hoses, nozzles, diffusers	$75	10	136	$1,020
Center pivot tires	$800	10	8	$ 640
Class 1A storage tank*	---	20+	1	---
Class 2 storage lagoon*	---	20+	1	---
TOTAL				$14,000

** Existing system components*

Based on the Asset Management Plan prepared for the existing WRF in April 2015 by EPCOR, a list of short-lived assets were compiled for the existing collection and treatment system. These existing assets are included in Table 6-7. The information provided in this table were compiled from the Asset Management Plan, with the following modifications:

- Disinfection system components were excluded from the table since the UV system is currently not operational, and the proposed project includes the sodium hypochlorite disinfection components.
- Membrane cassettes useful life was changed from 1 year to 2 years, based on latest performance. At the time the Asset Management Plan was prepared, the Town was starting the intensive cleaning procedures and did not have an estimated useful life for the membrane cassettes. Since then, the performance of the cassettes suggest that replacement will be necessary every two years.
- Considering a project life of 20 years, the existing assets with useful life longer than 15 years were excluded from the compilation.

Table 6-7. List of Short-Lived Assets at the Existing WRF

Unit / Location	Asset	Repair / Replacement Cost (each)	Useful Life (years)	Quantity	Annual Cost
Membrane Basin	Membrane cassettes	$40,000	2	3	$60,000
Plant Drain Lift Station	Sampler, Influent	$3,750	5	1	$750
Headworks Ventilation	H2S & Oxygen sensor	$4,500	5	1	$900
Effluent Disposal	Effluent sampler	$6,750	5	1	$1,350
Mechanical HVAC	Mechanical HVAC	$2,025	5	1	$405
Mechanical HVAC	Electric Heater	$2,475	5	6	$2,970
Pre-Air Basins	Fine bubble diffusers	$9,720	7	2	$2,777
Washwater System	Non potable pump	$6,750	7	1	$964
Sludge Disposal	Sludge pump	$4,500	7	1	$643
Sludge Disposal	Polymer injection ring	$6,750	7	1	$964
Sludge Disposal	Water booster pump	$4,500	7	1	$643
Sludge Disposal	Air compressor	$2,250	7	1	$321
Blowers	Blower	$9,179	7	2	$2,623
Plant Drain Lift Station	Plant drain pumps	$4,500	8	2	$1,125
Plant Drain Lift Station	Check valve	$2,250	8	2	$563
Permeate System	Permeate Pumps	$5,250	8	2	$1,313
Effluent Disposal	Effluent system	$1,875	8	1	$234
Collection System	Lift Station Pumps	$24,482	8	2	$6,121
Screens	Influent flow meter	$8,412	10	1	$841
Screens	Influent valve	$3,000	10	1	$300
Effluent Disposal	4600 gallon tank	$4,500	10	1	$450
Washwater System	Magmeter	$4,500	10	1	$450
Sludge Disposal	Magmeter sludge	$4,206	10	1	$421
Sludge Disposal	Polymer feed unit	$2,324	10	1	$232
Sludge Disposal	Belt press	$37,500	10	1	$3,750
Sludge Disposal	Electric control panel	$4,500	10	1	$450
Headworks Ventilation	Exhaust Fan	$4,500	15	1	$300
	Total				$91,860

6.6.4 INCOME

The total income requirements for the recommended improvements described in this PER is summarized in Table 6-8. The annual income requirements for the project are approximately $456,515 (excluding the short-lived assets reserve).

Table 6-8. Total Annual Income Requirements

Item	Annual Amount
O&M costs	$367,580
Debt service	$80,850
Reserve	$8,085
TOTAL	$456,515

The current sources of income for the wastewater operating budget include the customer monthly user rates, connection fees, capacity fees, and support from the Town general fund. As described in Section 2.4, the Town has recently updated its Sewer Ordinance and is currently completing the sampling requirements so that the new billing rates can be in effect in early 2017. In addition, the Town has adopted a new Environmental Services Gross Receipts Tax (Ordinance 2016-05) on August 24, 2016. The income from the new tax will be used for wastewater services and is expected to be in effect in early 2017. The new tax is anticipated to bring approximately $100,000 annually.

The project, when completed, will have approximately the same number of customers as existing. The Town is currently working on connecting additional number of customers, however that project will be prepared as Phase 2 under a separate PER. As such, based on 52 commercial customers, the cost per connection for this project is $8,780.

7 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the Town should seek funding for the construction of an effluent disposal area with a center pivot within the existing Edgewood WRF site in order to comply with the NMED Discharge Permit requirements. The following recommendations are made in this PER:

- Install a more efficient and robust sodium hypochlorite disinfection system to serve the facility for the next several years, until the flowrates reach 100,000 gpd. At that time, the need for a second pipeline or a UV disinfection system should be evaluated.
- Install one center pivot effluent disposal area with provisions to add a second pivot when the flowrates increase or as necessary.
- Promote use of Class 1A reclaimed water within Town for dust control as well as other approved uses, including green space and median irrigation.

8 REFERENCES

Comprehensive Plan, 2008. Edgewood Comprehensive Land Use Plan. Adopted by Town Council February 6, 2008.

Federal Emergency Management Agency (FEMA), Map Service Center. Flood Insurance Rate Map, New Mexico. www.msc.fema.gov.

Metcalf and Eddy, 2003. Wastewater Engineering, Treatment and Reuse. Fourth Edition. Metcalf & Eddy, Inc. Revised by George Tchobanoglous, Franklin Burton, and David Stensel. Mc-Graw Hill, Inc.

NM Climate Center. Period of Record Climate Summary for Moriarty, NM. http://weather2.nmsu.edu/wx-stn-data

NMED, 2003. Recommended Standards for Wastewater Facilities. New Mexico Environment Department Construction Programs Bureau.

NMERI, 1995. East Mountain Wastewater Feasibility Study. New Mexico Engineering Research Institute, December 1995.

NMAC 20.7.3. New Mexico Administrative Code. Title 20 Environmental Protection. Chapter 7 Wastewater and Water Supply Facilities. Part 3 Liquid Waste Disposal and Treatment. Table 703.1.

NMAC 20.7.4.13. New Mexico Administrative Code. Title 20 Environmental Protection. Chapter 7 Wastewater and Water Supply Facilities. Part 4 Utility Operator Certification.

Recommended Standards for Wastewater Facilities (2014). Ten States Standards. http://www.healthresearch.org/store/ten-state-standards

USDA, 2016. Natural Resources Conservation Service. Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/WebSoilsurvey.aspx

USEPA, 1979. Process Design Manual for Sludge Treatment and Disposal. EPA/625/1-79-011.September 1979. Office of Research and Development.

USEPA, 1980. Onsite Wastewater Treatment and Disposal Systems. Design Manual. EPA 625/1-80-012. October 1980.

USEPA, 2002. Onsite Wastewater Treatment Systems Manual. EPA/625/R-00/008. February 2002. Office of Research and Development, Washington DC.

USGS, 1994. Hydrology of Estancia Basin, Central New Mexico. By Robert White. Water Resources Investigations Report 93-4163.

WEF, 1998. Design of Municipal Wastewater Treatment Plants. Volume 3. Fourth Edition. Water Environment Federation Manual of Practice MOP 8. ASCE Manual and Report on Engineering Practice No. 76. Alexandria, VA.

Western Regional Climate Center. Period of Record Monthly Climate Summary for Tijeras, NM. http://www.wrcc.dri.edu/summary

APPENDIX A:

Existing NMED Discharge Permit DP-1654

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
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SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

RYAN FLYNN
Cabinet Secretary

BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 4, 2015

Stephen Shepherd, Town Administrator
Town of Edgewood
P.O. Box 3610
Edgewood, NM, 87015

RE: Discharge Permit Renewal, DP-1654, Town of Edgewood Wastewater Treatment Plant

Dear Mr. Shepherd:

The New Mexico Environment Department (NMED) issues the enclosed Discharge Permit Renewal, DP-1654, to Town of Edgewood (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

The Discharge Permit contains terms and conditions that shall be complied with by the permittee and are enforceable by NMED pursuant to Section 20.6.2.3104 NMAC, WQA, NMSA 1978 §74-6-5 and §74-6-10. Please be aware that this Discharge Permit may contain conditions that require the permittee to implement operational, monitoring or closure actions by a specified deadline. Such conditions are listed at the beginning of the operational, monitoring and closure plans of this Discharge Permit.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Pursuant to Paragraph (4) of Subsection H of 20.6.2.3109 NMAC, the term of the Discharge Permit shall be five years from the effective date. The term of this Discharge Permit will end on September 3, 2020.

NMED requests that the permittee submit an application for renewal (or renewal and modification) at least 180 days prior to the date the Discharge Permit term ends.

An invoice for the Discharge Permit Fee of $4,600.00 is being sent under separate cover. Payment of the Discharge Permit Fee must be received by NMED within 30 days of the date the Discharge Permit is issued.

If you have any questions, please contact Alan Garrido at (505) 827-2713. Thank you for your cooperation during this Discharge Permit review.

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:AG

encs: Discharge Permit Renewal, DP-1654
Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation, Revision 0.0, May 2007

cc: Robert Italiano, District Manager, NMED District II (electronic copy)
NMED Santa Fe Field Office (electronic copy)
John Romero, Office of the State Engineer (electronic copy)
Anne Keller, SWQB, UOCP (electronic copy)
Tom Torres, Operations Manager, EPCOR Water
P.O. Box 370, 38 Cactus Rd., Edgewood, NM 87015
Tappan Mahoney, Dennis Engineering Company
P.O. Box 909, 21 Main Street, Suite 201, Edgewood, NM 875015-0909

GROUND WATER DISCHARGE PERMIT RENEWAL
TOWN OF EDGEWOOD WASTEWATER TREATMENT PLANT, DP-1654

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit Renewal (Discharge Permit), DP-1654, to the Town of Edgewood (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the Town of Edgewood Wastewater Treatment Plant into ground and surface water, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been or will be met. Pursuant to Section 20.6.2.3104 NMAC, it is the responsibility of the permittee to comply with the terms and conditions of this Discharge Permit; failure may result in an enforcement action(s) by NMED (20.6.2.1220 NMAC).

The activities that produce the discharge, the location of the discharge, and the quantity, quality and flow characteristics of the discharge are briefly described as follows:

Up to 150,000 gallons per day (gpd) of domestic wastewater is received and treated in a wastewater treatment facility (WWTF) consisting of a membrane bio-reactor (MBR) treatment system and an evaporative synthetically lined impoundment system. Reclaimed wastewater is discharged from the treatment system and re-used in the Town of Edgewood for dust control and irrigation of Town-owned properties. When irrigation is not occurring, reclaimed wastewater is discharged to one or multiple 7.5-million gallon capacity synthetically lined impoundment(s) for disposal by evaporation. On-site composting of the sludge removed from the treatment system is authorized by this Discharge Permit.

The discharge contains water contaminants that may be elevated above the standards of Section 20.6.2.3103 NMAC and/or the presence of toxic pollutants as defined in Subsection WW of 20.6.2.7 NMAC. This Discharge Permit contains requirements, actions and/or contingencies intended to control the source(s) of documented ground water contamination.

The facility and re-use areas are located approximately one mile east of the intersection of Church Street and Williams Ranch Road, Edgewood, and in Sections 4, 5, 9, 11, 12, 13, 14, 16, 20, 21, 22, 23, 25, 26, 27, 28, 29, 33, 34, 35 and 36, Township 10 N, Range 07 E, and Section 30, Township 10 N, Range 08 E, Santa Fe County. Ground water most likely to be affected is at a depth of approximately 112 feet and has a total dissolved solids concentration of approximately 600 milligrams per liter.

The original Discharge Permit was issued on June 13, 2008. The application (i.e., discharge plan) consists of the materials submitted by the permittee dated December 26, 2015 and materials contained in the administrative record prior to issuance of this Discharge Permit. The

discharge shall be managed in accordance with all conditions and requirements of this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a Discharge Permit Modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of ground water quality, and that more stringent requirements to protect ground water quality may be required by NMED. The permittee may be required to implement abatement of water pollution and remediate ground water quality.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

The following acronyms and abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation		Abbreviation	Explanation
BOD_5	biochemical oxygen demand (5-day)		NMED	New Mexico Environment Department
CFR	Code of Federal Regulations		NMSA	New Mexico Statutes Annotated
CFU	Colony Forming Unit		NO_3-N	nitrate-nitrogen
Cl	chloride		NTU	nephelometric turbidity units
EPA	United States Environmental Protection Agency		TDS	total dissolved solids
gpd	gallons per day		TKN	total Kjeldahl nitrogen
LAA	land application area		total nitrogen	= TKN + NO_3-N
LADS	land application data sheet(s)		TRC	Total Residual Chlorine
mg/L	milligrams per liter		TSS	total suspended solids
mL	milliliters		WQA	New Mexico Water Quality Act
MPN	Most Probable Number		WQCC	Water Quality Control Commission
NMAC	New Mexico Administrative Code		WWTF	Wastewater Treatment Facility

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move directly or indirectly into ground water within the meaning of Section 20.6.2.3104 NMAC.

2. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move into ground water of the State of New Mexico that has an existing

concentration of 10,000 mg/L or less of TDS within the meaning of Subsection A of 20.6.2.3101 NMAC.

3. The discharge from the facility is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

III. AUTHORIZATION TO DISCHARGE

Pursuant to 20.6.2.3104 NMAC, it is the responsibility of the permittee to ensure that discharges authorized by this Discharge Permit are consistent with the terms and conditions herein.

The permittee is authorized to receive and treat up to 150,000 gpd of domestic wastewater in a WWTF consisting of a MBR treatment system and an evaporative synthetically lined impoundment system. Reclaimed wastewater is discharged from the treatment system and re-used in the Town of Edgewood for dust control and for irrigation of Town-owned properties. When irrigation is not occurring, reclaimed wastewater is discharged to one or multiple 7.5-million gallon capacity synthetically lined impoundment(s) for disposal by evaporation. On-site composting of the sludge removed from the treatment system is authorized by this Discharge Permit.

[20.6.2.3104 NMAC, Subsection C of 20.6.2.3106 NMAC, Subsection C of 20.6.2.3109 NMAC]

IV. CONDITIONS

NMED issues this Discharge Permit for the discharge of water contaminants subject to the following conditions:

A. OPERATIONAL PLAN

#	**Terms and Conditions**
1.	The permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 1 and 2 NMAC. [Subsection C of 20.6.2.3109 NMAC]
2.	The permittee shall operate in a manner such that standards and requirements of Sections 20.6.2.3101 and 20.6.2.3103 NMAC are not violated. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, Subsection C of 20.6.2.3109 NMAC]

Operational Actions with Implementation Deadlines

#	**Terms and Conditions**
3.	Prior to discharging reclaimed wastewater to the re-use area, the permittee shall install the infrastructure necessary to transfer, distribute and apply reclaimed wastewater. Documentation confirming installation of the distribution system shall consist of a narrative statement including the system type and location, and the method of backflow prevention employed (if applicable). Documentation shall be submitted to NMED prior to discharging to the re-use area. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
4.	Prior to discharging from the facility, the permittee shall post signs in English and Spanish at all re-use areas. The signs shall be posted at the entrance to re-use areas and at other locations where public exposure to reclaimed wastewater may occur. The signs shall state: **NOTICE: THIS AREA IS IRRIGATED WITH RECLAIMED WASTEWATER - DO NOT DRINK. AVISO: ESTA ÁREA ESTÁ REGADA CON AGUAS NEGRAS RECOBRADAS - NO TOMAR.** Alternate wording and/or graphics may be submitted to NMED for approval. [Subsections B and C of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]
5.	Within 60 days following the effective date of this Discharge Permit (**by November 3, 2015**), the permittee shall submit a written emergency storage impoundment or alternate disposal method proposal for review and approval by NMED. The WWTF shall divert wastewater to an emergency storage impoundment or alternate disposal method during periods when conditions are unfavorable for approved uses or when the wastewater quality requirements of this discharge permit cannot be met. The proposal shall include, at a minimum, the following information. a) A map showing the proposed location of the storage impoundment(s) or alternate disposal area. b) A written description of the specific location and construction material proposed for the storage impoundment(s) or alternate disposal area. All storage impoundment(s) or alternate disposal methods shall be approved by NMED prior to installation. [Subsection A of 20.6.2.3107 NMAC]
6.	A minimum of 90 days prior to construction of the emergency storage impoundment(s) or alternate disposal method, the permittee shall submit final construction plans and specifications for the proposed *system*. The construction plans and specifications shall bear the seal and signature of a licensed New Mexico professional engineer (pursuant to New Mexico Engineering and Surveying Practice Act and the rules promulgated under that authority) and supporting design calculations, and shall be submitted for review by

#	**Terms and Conditions**
	NMED. The submitted documentation shall include the following elements. a) Details for the construction of the emergency storage impoundment(s) or alternate method using a liner consistent with the attachment titled *Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation*, Revision 0.0, May 2007 if applicable. b) Design calculations for the capacity of the emergency storage impoundment(s) or alternative disposal method. The impoundment(s) shall be designed to dispose of the permitted discharge volume such that two feet of freeboard is preserved at all times. Seasonal discharge patterns may be considered in the design calculations. c) Details of all wastewater emergency storage impoundment(s) or alternate disposal system components (e.g., lift stations, valves, transfer lines, process units and associated details). d) Specifications for all equipment, materials and installation procedures to be used in the construction of the wastewater system. e) Fences around the *system* to control access by the general public and animals. The fences shall consist of a minimum of six-foot chain link or field fencing, and locking gates. Where fences are not appropriate, access controls shall be proposed at the *system* to prevent access by the general public and animals. The controls shall consist of locking lids and compartments or other controls proposed for approval by NMED. Prior to constructing the emergency storage impoundment(s) or alternative disposal method and its associated components, the permittee shall obtain written verification from NMED that the plans and specifications meet the requirements of this Discharge Permit. [Subsections A and C 20.6.2.1202 NMAC, Subsection C of 20.6.2.3106 NMAC, Subsection C of 20.6.2.3107 NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]
7.	Within 365 days following the effective date of this Discharge Permit (**by September 3, 2016**), the permittee shall complete construction of the emergency storage impoundment(s) or alternate disposal method in accordance with the final construction plans and specifications required by this Discharge Permit. The permittee shall notify NMED at least five working days prior to commencement of construction to allow NMED personnel to be onsite for inspection. The permittee shall submit record drawings that bear the seal and signature of a licensed New Mexico professional engineer (pursuant to the New Mexico Engineering and Surveying Practice Act and the rules promulgated under that authority) for the constructed *system* to NMED within 30 days of completion. [Subsections A and C of 20.6.2.1202 NMAC, Subsection C of 20.6.2.3109 NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]
8.	Within 90 days following the effective date of this Discharge Permit (**by December 3,**

#	Terms and Conditions
	2015), the permittee shall submit to NMED a proposal including construction plans and specifications to construct an impervious surface for composting of the dewatered sludge. The liquid portion shall be contained and evaporated on the impervious surface protecting ground water from contaminants percolating from the compost pile. The construction plans and specifications shall bear the seal and signature of a licensed New Mexico professional engineer (pursuant to New Mexico Engineering and Surveying Practice Act and the rules promulgated under that authority) and supporting design calculations, and shall be submitted for review by NMED. [Subsections A and C of 20.6.2.1202 NMAC, Subsection C of 20.6.2.3109 NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]
9.	Within 180 days following the effective date of this Discharge Permit (**by March 2, 2016**), the permittee shall complete construction of the impervious surface for composting of the dewatered sludge in accordance with the final construction plans and specifications required by this Discharge Permit. The permittee shall notify NMED at least five working days prior to commencement of construction to allow NMED personnel to be onsite for inspection. The permittee shall submit record drawings that bear the seal and signature of a licensed New Mexico professional engineer (pursuant to the New Mexico Engineering and Surveying Practice Act and the rules promulgated under that authority) for the constructed impervious surface to NMED within 30 days of completion. [Subsections A and C of 20.6.2.1202 NMAC, Subsection C of 20.6.2.3109 NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]

Operating Conditions

#	Terms and Conditions
10.	Treated wastewater discharged from the UV disinfection system shall not exceed the following limitation. **Total Nitrogen: 10 mg/L** [Subsection C of 20.6.2.3109 NMAC]
11.	Reclaimed wastewater discharged from the UV disinfection system shall not exceed the following limitations:

Test	30-day Geometric Mean	30-day Average	Maximum
Fecal coliform bacteria:	**5 MPN/100 mL**	**N/A**	**23 MPN/100 mL**
BOD_5:	**N/A**	**10 mg/L**	**15 mg/L**

<table>
<tr><td>#</td><td>Terms and Conditions</td></tr>
<tr><td></td><td>
<table>
<tr><td>Turbidity:</td><td>N/A</td><td>3 NTU</td><td>5 NTU</td></tr>
<tr><td>UV Transmissivity:</td><td>N/A</td><td>Monitor Only</td><td>Monitor Only</td></tr>
</table>

[Subsections B and C of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]</td></tr>
<tr><td>12.</td><td>The permittee shall meet the following general requirements for above-ground use of reclaimed domestic wastewater.
a) The permittee shall maintain signs in English and Spanish at all re-use areas such that they are visible and legible for the term of this Discharge Permit. The signs shall be posted at the entrance to re-use areas and at other locations where public exposure to reclaimed wastewater may occur. The signs shall state: NOTICE: THIS AREA IS IRRIGATED WITH RECLAIMED WASTEWATER - DO NOT DRINK. AVISO: ESTA ÁREA ESTÁ REGADA CON AGUAS NEGRAS RECOBRADAS - NO TOMAR. Alternate wording and/or graphics may be submitted to NMED for approval.
b) The reclaimed wastewater systems shall have no direct or indirect cross connections with public water systems or irrigation wells pursuant to the latest revision of the New Mexico Plumbing Code (14.8.2 NMAC) and New Mexico Mechanical Code (14.9.2 NAMC).
c) Above-ground use of reclaimed wastewater shall not result in excessive ponding of wastewater, and shall not exceed the water consumptive needs of the crop. Re-use shall not be conducted at times when the re-use area is saturated or frozen.
d) The discharge of reclaimed wastewater shall be confined to the re-use area.
e) The discharge of reclaimed domestic wastewater to crops for human consumption is prohibited.
f) Water supply wells within 200 feet of a re-use area shall have adequate wellhead construction pursuant to 19.27.4 NMAC. Re-use shall be managed to ensure protection of ground water quality.
g) Existing and accessible portions of the reclaimed wastewater distribution system (with the exception of application equipment such as sprinklers or pivots) shall be colored purple or clearly labeled as being part of a reclaimed wastewater distribution system. Piping, valves and outlets that are installed during the term of this Discharge Permit shall be colored purple pursuant to the latest revision of the New Mexico Plumbing Code (14.8.2 NMAC) and New Mexico Mechanical Code (14.9.2 NAMC) to differentiate piping or fixtures used to convey reclaimed wastewater from those intended for potable or other uses. Valves, outlets, and sprinkler heads used in reclaimed wastewater systems shall be accessible only to authorized personnel.

[Subsections B and C of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]</td></tr>
<tr><td>13.</td><td>In the event that a cross-connection with fresh water exists, the permittee shall institute a backflow prevention method to protect wells and public water supply systems from contamination by reclaimed wastewater prior to discharging to the re-use area. Backflow prevention shall be achieved by a total disconnect (physical air gap separation</td></tr>
</table>

#	**Terms and Conditions**
	between the discharge pipe and the liquid surface at least twice the diameter of the discharge pipe), or by a reduced pressure principal backflow prevention assembly (RP) installed on the line between the fresh water supply wells or public water supply and the reclaimed wastewater delivery system. Backflow prevention shall be maintained at all times. RP devices shall be inspected and tested by a certified backflow prevention assembly tester at the time of installation, repair or relocation and at least on an annual basis thereafter. The backflow prevention assembly tester shall have successfully completed a 40-hour backflow prevention course based on the University of Southern California's Backflow Prevention Standards and Test Procedures, and obtained certification demonstrating completion. A malfunctioning RP device shall be repaired or replaced within 30 days of discovery, and use of all supply lines associated with the RP device shall cease until repair or replacement has been completed. Copies of the inspection and maintenance records and test results for each RP device associated with the backflow prevention program shall be maintained at a location available for inspection by NMED. [Subsection C of 20.6.2.3109 NMAC]
14.	The permittee shall maintain fences around the WWTF to control access by the general public and animals. The fences shall consist of a minimum of six-foot chain link or field fencing and locking gates. Fences shall be maintained throughout the term of this Discharge Permit. [Subsections B and C of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]
15.	The permittee shall maintain signs indicating that the wastewater at the WWTF is not potable. Signs shall be posted at the WWTF entrance and other areas where there is potential for public contact with wastewater. All signs shall be printed in English and Spanish remain visible and legible for the term of this Discharge Permit. [Subsections B and C of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]
16.	The permittee shall maintain the impoundment liner(s) in such a manner as to avoid conditions that could affect the structural integrity of the impoundment(s) and/or impoundment liner(s). Such conditions include or may be characterized by the following: • erosion damage; • animal burrows or other damage; • the presence of vegetation including aquatic plants, weeds, woody shrubs or trees growing within five feet of the top inside edge of a sub-grade impoundment, within five feet of the toe of the outside berm of an above-grade impoundment, or within the impoundment itself; • the presence of large debris or large quantities of debris in the impoundment;

#	**Terms and Conditions**
	• evidence of seepage; or • evidence of berm subsidence. Vegetation growing around the impoundment(s) shall be routinely controlled by mechanical removal in a manner that is protective of the impoundment liner. The permittee shall visually inspect the impoundment(s) and surrounding berms on a monthly basis to ensure proper maintenance. In the event that inspection reveals any evidence of damage that threatens the structural integrity of an impoundment berm or liner, or that may result in an unauthorized discharge, the permittee shall enact the contingency plan set forth in this Discharge Permit. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
17.	The permittee shall preserve a minimum of two feet of freeboard between the liquid level in the impoundment(s) and the elevation of the top of the impoundment liner(s). In the event that the permittee determines that two feet of freeboard cannot be preserved in the impoundment, the permittee shall enact the contingency plan set forth in this Discharge Permit. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
18.	The permittee shall meet the following general requirements, setbacks, access restrictions and equipment requirements when operating mechanical evaporators in the storage impoundment(s): • prior to discharging from the facility, the permittee shall install a wind gauge and data logger capable of metering wind speed in the location of the storage impoundment(s); • mechanical evaporation is prohibited at times when wind speed equals or exceeds 20 miles per hour (mph) as indicated by the onsite wind gauge; • mechanical evaporation shall be postponed at times when windy conditions may result in drift of reclaimed wastewater outside of the surface area footprint of the storage impoundment; • a minimum 1,000-foot set-back shall be maintained between any dwellings or occupied establishments and the berm of the storage impoundment(s) designed for the evaporation of reclaimed wastewater; and • the mechanical evaporator system shall be operated at the lowest effective trajectory possible to minimize the spread of aerosolized reclaimed wastewater. [20.6.2.3109 NMAC]
19.	The permittee shall properly manage all solids generated by the treatment system to maintain effective operation by removing solids as necessary in accordance with accepted process control methods. Solids removed from the treatment process shall be

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	contained, transported, and disposed of in accordance with all local, state, and federal regulations. The permittee shall maintain records of solids disposal. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
20.	The permittee shall submit written notification to NMED within 30 days of the date when the average daily influent volume equals or exceeds 75 percent of the design capacity of phase one of the treatment systems or 37,500 gpd. Within one year of the date when the average daily influent volume equals or exceeds 75 percent of the design capacity of phase one of the treatment system the permittee shall incorporate additional Membrane Bioreactor cassettes and related components into the treatment plant to accommodate phase two. [Subsection C of 20.6.2.3109 NMAC]
21.	The permittee shall submit written notification to NMED within 30 days of the date when the average daily influent volume equals or exceeds 75 percent of the design capacity of phase two of the treatment system, or 75,000 gpd. Within one year of the date when the average daily influent volume equals or exceeds 75 percent of the design capacity of phase two of the treatment system, the permittee shall incorporate additional Membrane Bioreactor cassettes and related components into the treatment plant to accommodate phase three. [Subsection C 20.6.2.3109 NMAC]
22.	Within 90 days of the date when the average daily influent volume equals or exceeds 75% of the available 150-day storage capacity, the permittee shall submit, for NMED approval, construction plans and specifications, and supporting design calculations for an additional synthetically lined storage impoundment(s) for the storage of reclaimed domestic wastewater, certified by a New Mexico registered professional engineer. The plans shall demonstrate that the additional storage impoundment capacity is designed to provide 150 days of storage for the given influent volumes while maintaining two feet of freeboard at all times. The design of the storage impoundments(s) shall conform to the attachment titled, "Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons - Liner Material and Site Preparation, Revision 0.0, May 2007." [Subsection C of 20.6.2.3109 NMAC]
23.	Within one year of the date when the average daily influent volume equals or exceeds 75% of the available 150-day storage capacity. The permittee shall construct additional Synthetically lined impoundment(s) for the storage of reclaimed domestic wastewater. The storage impoundment(s) shall be constructed in accordance with construction plans and specifications submitted to NMED as required by this Discharge Permit. The storage impoundment(s) shall be constructed to maintain two feet of freeboard at all times. The permittee shall notify NMED at least five working days prior to impoundment

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	construction to allow NMED personnel to be onsite for inspection. Record drawings of the storage impoundment(s) and impoundment liner(s), final impoundment capacity calculations, and results of field compaction and density testing shall be submitted to NMED within 30 days of liner installation. A New Mexico registered professional engineer must certify construction plans and specifications, supporting design calculations, and record drawings of the storage impoundment(s) and liner(s). [Subsection C of 20.6.2.3109 NMAC]
24.	The permittee shall utilize operators, certified by the State of New Mexico at the appropriate level, to operate the wastewater collection, treatment and disposal systems. The operations and maintenance of all or any part of the wastewater system shall be performed by, or under the direct supervision of, a certified operator. [Subsection C of 20.6.2.3109 NMAC, 20.7.4 NMAC]

B. MONITORING AND REPORTING

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25.	The permittee shall conduct the following monitoring, reporting, and other requirements listed below in accordance with the monitoring requirements of this Discharge Permit. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
26.	METHODOLOGY – Unless otherwise approved in writing by NMED, the permittee shall conduct sampling and analysis in accordance with the most recent edition of the following documents. a) American Public Health Association, Standard Methods for the Examination of Water and Wastewater (18^{th}, 19^{th} or current) b) U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste c) U.S. Geological Survey, Techniques for Water Resources Investigations of the U.S. Geological Survey d) American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31. Water e) U.S. Geological Survey, et al., National Handbook of Recommended Methods for Water Data Acquisition f) Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations g) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods; Part 2. Microbiological and Biochemical Properties; Part 3. Chemical Methods, American Society of Agronomy

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	[Subsection B of 20.6.2.3107 NMAC]
27.	The permittee shall submit quarterly monitoring reports to NMED for the most recently completed quarterly period by the 1st of February, May, August and November each year. Quarterly monitoring shall be performed during the following periods and submitted as follows: a) January 1st through March 31st (first quarter) – **due by May 1st;** b) April 1st through June 30th (second quarter) – **due by August 1st;** c) July 1st through September 30th (third quarter) – **due by November 1st; and** d) October 1st through December 31st (fourth quarter) – **due by February 1st.** [Subsection A of 20.6.2.3107 NMAC]

Facility Monitoring Conditions

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28.	The permittee shall measure the totalized volume of wastewater received by the WWTF each month using a totalizing flow meter located prior to the mechanical bar screen. The totalized volumes for each month and average daily shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
29.	The permittee shall measure the monthly volume of wastewater discharged to the evaporative impoundment system. The permittee shall obtain readings on a monthly basis and calculate the monthly and average daily volume discharged to the impoundment system. The monthly meter readings, and calculated monthly and average daily discharge volumes shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
30.	The permittee shall measure the monthly volume of wastewater discharged to the re-use irrigation areas. The permittee shall obtain readings on a monthly basis and calculate the monthly and average daily volume discharged to the re-use irrigation areas. The monthly meter readings, and calculated monthly and average daily discharge volumes shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
31.	All flow meters shall be capable of having their accuracy ascertained under actual working (field) conditions. A field calibration method shall be developed for each flow

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	meter and that method shall be used to check the accuracy of each respective meter. Field calibrations shall be performed upon repair or replacement of a flow measurement device and, at a minimum, on an annual basis. Flow meters shall be calibrated to within plus or minus 10 percent of actual flow, as measured under field conditions. Field calibrations shall be performed by an individual knowledgeable in flow measurement and in the installation/operation of the particular device in use. A flow meter calibration report shall be prepared for each flow measurement device at the frequency calibration is required. The flow meter calibration report shall include the following information. a) The location and meter identification. b) The method of flow meter field calibration employed. c) The measured accuracy of each flow meter prior to adjustment indicating the positive or negative offset as a percentage of actual flow as determined by an in-field calibration check. d) The measured accuracy of each flow meter following adjustment, if necessary, indicating the positive or negative offset as a percentage of actual flow of the meter. e) Any flow meter repairs made during the previous year or during field calibration. The permittee shall maintain records of flow meter calibration(s) at a location accessible for review by NMED during facility inspections. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
32.	The permittee shall visually inspect flow meters on a monthly basis for evidence of malfunction. If a visual inspection indicates a flow meter is not functioning as required by this Discharge Permit, the permittee shall repair or replace the meter within 30 days of discovery. For *repaired* meters, the permittee shall submit a report to NMED with the next monitoring report following the repair that includes a description of the malfunction; a statement verifying the repair; and a flow meter field calibration report completed in accordance with the requirements of this Discharge Permit. For *replacement* meters, the permittee shall submit a report to NMED with the next monitoring report following the replacement that includes a design schematic for the device and a flow meter field calibration report completed in accordance with the requirements of this Discharge Permit. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
33.	The permittee shall collect 6-hour composite samples of treated wastewater following the UV disinfection system on a quarterly basis and analyze the samples for TKN, NO_3-N, TDS and Cl. Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results shall be submitted to NMED in the quarterly monitoring reports.

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	[Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
34.	The permittee shall perform the following analyses on reclaimed wastewater samples collected following the UV disinfection system using the following sampling method and frequency. a) Fecal coliform bacteria: grab sample at peak daily flow once per week. b) BOD_5: six-hour composite sample once per two weeks. c) Turbidity: continuously monitor reclaimed wastewater for turbidity after the final treatment process and while discharging; record the average and maximum turbidity values for each calendar month. d) UV transmissivity values: record whenever fecal coliform samples are collected. Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results, monthly average and maximum turbidity values, and a copy of the log of UV transmissivity values shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections B, C and H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]
35.	Records of solids disposal, including a copy of all Discharge Monitoring Reports (i.e., DMRs) required to be submitted to the EPA pursuant to 40 CFR 503 for the previous calendar year, shall be submitted to NMED annually in the monitoring report due by August 1st each year. [Subsection A of 20.6.2.3107 NMAC]

C. CONTINGENCY PLAN

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36.	In the event that a ground water quality standard identified in Section 20.6.2.3103 NMAC is exceeded; the total nitrogen concentration in ground water is greater than 10 mg/L; or a toxic pollutant (defined in Subsection WW of 20.6.2.7 NMAC) is present in ground water during the term of this Discharge Permit, upon closure of the facility or during the implementation of post-closure requirements, the permittee shall propose measures to mitigate damage from the discharge including, at a minimum, source control measures and a completion schedule by submitting a corrective action plan to NMED for approval. The permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 through 20.6.2.4115 NMAC, should the corrective action plan not result in compliance with the standards and requirements set forth in Section 20.6.2.4103 NMAC within 180 days of confirmation of ground water contamination. [Subsection A of 20.6.2.3107 NMAC, Subsection E of 20.6.2.3109 NMAC]

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37.	In the event that analytical results of a quarterly treated wastewater sample indicate an exceedance of the total nitrogen limitation set in this Discharge Permit, the permittee shall collect and analyze a second sample within 30 days of the first sample analysis date. In the event the second sample results indicate that the limitation is continuing to be exceeded, the following contingency plan shall be enacted. a) Within 15 days of the second sample analysis date indicating that the limitation is continuing to be exceeded, the permittee shall: i) notify NMED that the contingency plan is being enacted; and ii) submit a copy of the first and second analytical results indicating an exceedance to NMED. b) The permittee shall increase the frequency of total nitrogen wastewater sampling and analysis of treated wastewater to once per month. c) The permittee shall examine the operation and maintenance log, required by the Record Keeping conditions of this Discharge Permit, for improper operational procedures. d) The permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to NMED within 30 days of correction. e) In the event that any analytical results from monthly wastewater sampling indicate an exceedance of the total nitrogen limitation, the permittee shall propose to modify operational procedures and/or upgrade the treatment process to achieve the total nitrogen limit by submitting a corrective action plan to NMED for approval. The plan shall include a schedule for completion of corrective actions and shall be submitted within 90 days of the second sample analysis date indicating that the limitation is continuing to be exceeded. The permittee shall initiate implementation of the plan following approval by NMED. When analytical results from three consecutive months of wastewater sampling do not exceed the limitation, the permittee is authorized to return to a quarterly monitoring frequency. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
38.	In the event that analytical results of a reclaimed domestic wastewater sample indicates an exceedance of any of the maximum limitations for BOD_5, turbidity, or fecal coliform bacteria set by this Discharge Permit, the permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. In the event the second sample results indicate that any maximum limitation is continuing to be exceeded (i.e., confirmed exceedance), the contingency plan below shall be enacted. **AND / OR** In the event that analytical results of a reclaimed domestic wastewater sample indicates an exceedance of any of the 30-day average limitations for BOD_5, turbidity, or fecal

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	coliform bacteria set by this Discharge Permit (i.e., confirmed exceedance), the contingency plan below shall be enacted. Contingency Plan a) Within 24 hours of becoming aware of a confirmed exceedance (as identified above), the permittee shall: i) notify NMED that the contingency plan is being enacted; and ii) submit copies of the recent analytical results indicating an exceedance to NMED. b) The permittee shall immediately cease discharging reclaimed domestic wastewater to the re-use area. c) The permittee shall examine the operation and maintenance log, required by the Record Keeping conditions of this Discharge Permit, for improper operational procedures. d) The permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to NMED within 30 days following correction. When the analytical results from samples of reclaimed domestic wastewater, sampled as required by this Discharge Permit, no longer indicate an exceedance of any of the maximum limitations, the permittee may resume discharging reclaimed wastewater to the re-use area. If a facility is required to enact the contingency plan more than two times in a 12-month period, the permittee shall propose to modify operational procedures and/or upgrade the treatment process to achieve consistent compliance with the maximum and 30-day average limitations by submitting a corrective action plan for NMED approval. The plan shall include a schedule for completion of corrective actions and shall be submitted within 60 days following the second sample analysis date. The permittee shall initiate implementation of the plan following approval by NMED. Prior to recommencing discharge to the re-use area, additional sampling of any stored reclaimed wastewater may be required by NMED in response to the submitted corrective action plan. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
39.	In the event that inspection findings reveal significant damage likely to affect the structural integrity of the lined impoundment(s) or its ability to contain contaminants, the permittee shall propose the repair or replacement of the impoundment liner(s) by submitting a corrective action plan to NMED for approval. The plan shall be submitted to NMED within 30 days after discovery by the permittee or following notification from NMED that significant liner damage is evident. The corrective action plan shall include a schedule for completion of corrective actions and the permittee shall initiate implementation of the plan following approval by NMED.

#	**Terms and Conditions**
	[Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
40.	In the event that a minimum of two feet of freeboard cannot be preserved in the impoundment(s), the permittee shall take actions authorized by this Discharge Permit and all applicable local, state, and federal regulations to restore the required freeboard. In the event that two feet of freeboard cannot be restored within a period of 72 hours following discovery, the permittee shall propose actions to be immediately implemented to restore two feet of freeboard by submitting a short-term corrective action plan to NMED for approval. Examples of short-term corrective actions include: removing excess wastewater from the impoundment through pumping and hauling; or reducing the volume of wastewater discharged to the impoundment. The plan shall include a schedule for completion of corrective actions and shall be submitted within 15 days following the date when the two feet of freeboard limit was initially discovered. The permittee shall initiate implementation of the plan following approval by NMED. In the event that the short-term corrective actions failed to restore two feet of freeboard, the permittee shall propose permanent corrective actions in a long-term corrective action plan submitted to NMED within 90 days following failure of the short-term corrective action plan. Examples include: the installation of an additional storage impoundment, or a significant/permanent reduction in the volume of wastewater discharged to the impoundment. The plan shall include a schedule for completion of corrective actions and implementation of the plan shall be initiated following approval by NMED. [Subsection A of 20.6.2.3107 NMAC]
41.	In the event that a release (commonly known as a "spill") occurs that is not authorized under this Discharge Permit, the permittee shall take measures to mitigate damage from the unauthorized discharge and initiate the notifications and corrective actions required in Section 20.6.2.1203 NMAC and summarized below. Within <u>24 hours</u> following discovery of the unauthorized discharge, the permittee shall verbally notify NMED and provide the following information. a) The name, address, and telephone number of the person or persons in charge of the facility, as well as of the owner and/or operator of the facility. b) The name and address of the facility. c) The date, time, location, and duration of the unauthorized discharge. d) The source and cause of unauthorized discharge. e) A description of the unauthorized discharge, including its estimated chemical composition. f) The estimated volume of the unauthorized discharge. g) Any actions taken to mitigate immediate damage from the unauthorized discharge. Within <u>one week</u> following discovery of the unauthorized discharge, the permittee shall

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	submit written notification to NMED with the information listed above and any pertinent updates. Within 15 days following discovery of the unauthorized discharge, the permittee shall submit a corrective action report/plan to NMED describing any corrective actions taken and/or to be taken relative to the unauthorized discharge that includes the following. a) A description of proposed actions to mitigate damage from the unauthorized discharge. b) A description of proposed actions to prevent future unauthorized discharges of this nature. c) A schedule for completion of proposed actions. In the event that the unauthorized discharge causes or may with reasonable probability cause water pollution in excess of the standards and requirements of Section 20.6.2.4103 NMAC, and the water pollution will not be abated within 180 days after notice is required to be given pursuant to Paragraph (1) of Subsection A of 20.6.2.1203 NMAC, the permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 through 20.6.2.4115 NMAC. Nothing in this condition shall be construed as relieving the permittee of the obligation to comply with all requirements of Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC]
42.	In the event that NMED or the permittee identifies any failures of the discharge plan or this Discharge Permit not specifically noted herein, NMED may require the permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failure(s). Additionally, NMED may require a Discharge Permit modification to achieve compliance with 20.6.2 NMAC. [Subsection A of 20.6.2.3107 NMAC, Subsection E of 20.6.2.3109 NMAC]

D. CLOSURE PLAN

#	Terms and Conditions
43.	In the event a facility, or a component of a facility, is proposed to be permanently closed, upon ceasing discharging, the permittee shall perform the following closure measures. Within 90 days of ceasing discharging to the treatment system, the permittee shall complete the following closure measures. a) The line leading to the system shall be plugged so that a discharge can no longer occur.

#	Terms and Conditions
	b) Wastewater shall be drained or evaporated from the system components and storage impoundment(s) and it shall be disposed of in accordance with all local, state, and federal regulations. The discharge of accumulated solids (sludge) to the re-use area is prohibited. c) Solids removed from the treatment system shall be contained, transported, and disposed of in accordance with all local, state, and federal regulations, including 40 CFR Part 503. The permittee shall maintain a record of all solids transported for off-site disposal. Within 180 days of ceasing discharging to the treatment system (or unit), the permittee shall complete the following closure measures. a) Remove all lines leading to and from the treatment system, or permanently plug them and abandon them in place. b) Remove or demolish all treatment system components, and re-grade area with suitable fill to blend with surface topography, promote positive drainage and prevent ponding. c) Perforate or remove the storage impoundment liner(s); fill the impoundment(s) with suitable fill; and re-grade the impoundment site(s) to blend with surface topography, promote positive drainage and prevent ponding. [Subsection A of 20.6.2.3107 NMAC, 40 CFR Part 503]

E. GENERAL TERMS AND CONDITIONS

#	Terms and Conditions
44.	RECORD KEEPING - The permittee shall maintain a written record of: • information and data used to complete the application for this Discharge Permit; • records of any releases (commonly known as "spills") not authorized under this Discharge Permit and reports submitted pursuant to 20.6.2.1203 NMAC; • records of the operation, maintenance, and repair of all facilities/equipment used to treat, store or dispose of wastewater; • facility record drawings (plans and specifications) showing the actual construction of the facility and bear the seal and signature of a licensed New Mexico professional engineer; • copies of monitoring reports completed and/or submitted to NMED pursuant to this Discharge Permit; • the volume of wastewater or other wastes discharged pursuant to this Discharge Permit; • ground water quality and wastewater quality data collected pursuant to this Discharge Permit; • copies of construction records (well log) for all ground water monitoring wells required to be sampled pursuant to this Discharge Permit;

#	**Terms and Conditions**
	• records of the maintenance, repair, replacement or calibration of any monitoring equipment or flow measurement devices required by this Discharge Permit; and • Data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit including: o The dates, location and times of sampling or field measurements; o The name and job title of the individuals who performed each sample collection or field measurement; o The sample analysis date of each sample; o The name and address of the laboratory, and the name of the signatory authority for the laboratory analysis; o The analytical technique or method used to analyze each sample or collect each field measurement; o The results of each analysis or field measurement, including raw data; o The results of any split, spiked, duplicate or repeat sample; and o A copy of the laboratory analysis chain-of-custody as well as a description of the quality assurance and quality control procedures used. The written record shall be maintained by the permittee at a location accessible during a facility inspection by NMED for a period of at least five years from the date of application, report, collection or measurement and shall be made available to the department upon request. [Subsections A and D of 20.6.2.3107 NMAC]
45.	INSPECTION and ENTRY – The permittee shall allow inspection by NMED of the facility and its operations that are subject to this Discharge Permit and the WQCC regulations. NMED may upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which are located any records required to be maintained by regulations of the federal government or the WQCC. The permittee shall allow NMED to have access to and reproduce for their use any copy of the records, and to perform assessments, sampling or monitoring during an inspection for the purpose of evaluating compliance with this Discharge Permit and the WQCC regulations. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other local, state or federal regulations. [Subsection D of 20.6.2.3107 NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]
46.	DUTY to PROVIDE INFORMATION - The permittee shall, upon NMED's request, allow for NMED's inspection/duplication of records required by this Discharge Permit

#	**Terms and Conditions**
	and/or furnish to NMED copies of such records. [Subsection D of 20.6.2.3107 NMAC]
47.	MODIFICATIONS and/or AMENDMENTS – In the event the permittee proposes a change to the facility or the facility's discharge that would result in a change in the volume discharged; the location of the discharge; or in the amount or character of water contaminants received, treated or discharged by the facility, the permittee shall notify NMED prior to implementing such changes. The permittee shall obtain approval (which may require modification of this Discharge Permit) by NMED prior to implementing such changes. [Subsection C of 20.6.2.3107 NMAC, Subsections E and G of 20.6.2.3109 NMAC]
48.	PLANS and SPECIFICATIONS – In the event the permittee is proposing to construct a wastewater system or change a process unit of an existing system such that the quantity or quality of the discharge will change substantially from that authorized by this Discharge Permit, the permittee shall submit construction plans and specifications to NMED for the proposed system or process unit prior to the commencement of construction. In the event the permittee implements changes to the wastewater system authorized by this Discharge Permit that result in only a minor effect on the character of the discharge, the permittee shall report such changes (including the submission of record drawings, where applicable) as of January 1 and June 30 of each year to NMED. [Subsections A and C of 20.6.2.1202 NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]
49.	CIVIL PENALTIES - Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject the permittee to a civil enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit.

#	**Terms and Conditions**
	[20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10 and 74-6-10.1]
50.	CRIMINAL PENALTIES – No person shall: • make any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the WQA; • falsify, tamper with or render inaccurate any monitoring device, method or record required to be maintained under the WQA; or • fail to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation. Any person who knowingly violates or knowingly causes or allows another person to violate the requirements of this condition is guilty of a fourth degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who is convicted of a second or subsequent violation of the requirements of this condition is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition or knowingly causes another person to violate the requirements of this condition and thereby causes a substantial adverse environmental impact is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition and knows at the time of the violation that he is creating a substantial danger of death or serious bodily injury to any other person is guilty of a second degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10.2.A through 74-6-10.2.F]
51.	COMPLIANCE with OTHER LAWS - Nothing in this Discharge Permit shall be construed in any way as relieving the permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits or orders. [NMSA 1978, § 74-6-5.L]
52.	RIGHT to APPEAL - The permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty days of the receipt of postal notice of this Discharge Permit and shall include a statement of the issues to be raised and the relief sought. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [20.6.2.3112 NMAC, NMSA 1978, § 74-6-5.O]
53.	TRANSFER of DISCHARGE PERMIT - Prior to the transfer of any ownership, control, or possession of this facility or any portion thereof, the permittee shall:

#	**Terms and Conditions**
	• notify the proposed transferee in writing of the existence of this Discharge Permit; • include a copy of this Discharge Permit with the notice; and • deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. Until both ownership and possession of the facility have been transferred to the transferee, the permittee shall continue to be responsible for any discharge from the facility. [20.6.2.3111 NMAC]
54.	PERMIT FEES - Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. Permit fees are associated with issuance of this Discharge Permit. Nothing in this Discharge Permit shall be construed as relieving the permittee of the obligation to pay all permit fees assessed by NMED. A permittee that ceases discharging or does not commence discharging from the facility during the term of the Discharge Permit shall pay all permit fees assessed by NMED. An approved Discharge Permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [Subsection F of 20.6.2.3114 NMAC, NMSA 1978, § 74-6-5.K]

V. PERMIT TERM & SIGNATURE

EFFECTIVE DATE: September 4, 2015
TERM ENDS: September 3, 2020

[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]

MICHELLE HUNTER
Chief, Ground Water Quality Bureau
New Mexico Environment Department

New Mexico Environment Department Ground Water Quality Bureau
Discharge Permit Summary

Facility Information

Facility Name Town of Edgewood
Discharge Permit Number DP-1654

Legally Responsible Party Stephen Shepherd, Town Administrator
Town of Edgewood
P.O. Box 3610
Edgewood, NM, 87015
(505) 286-4518

Treatment, Disposal and Site Information

Primary Waste Type Domestic
Facility Type MUNI- Wastewater

Treatment Methods

Type	Designation	Description & Comments
Wastewater Treatment System	MBR	50,000-gpd capacity; MBR(s) can be added to expand capacity up to 150,000-gpd
Disinfection	UV-1	Two (2) ultraviolet light units, 19-gpm capacity each

Discharge Locations

Type	Designation	Description & Comments
Impoundment	Synthetically Lined Impoundment	7.5-million gallon capacity; reserved area allocated to increase storage capacity if needed.
Re-use Area	Above ground re-use	41.09 miles of roads for dust control; Town-owned properties; Class 1A and TN = 10 mg/L

Depth-to-Ground Water 112 feet
Total Dissolved Solids (TDS) 600 mg/L

Permit Information

Application Received January 26, 2015
Public Notice Published July 24, 2015
Discharge Permit Issued September 4, 2015
Discharge Permit Term Ends September 3, 2020
Permitted Discharge Volume 150,000 gallons per day

NMED Contact Information

Mailing Address	Ground Water Quality Bureau P.O. Box 5469 Santa Fe, New Mexico 87502-5469
GWQB Telephone Number	(505) 827-2900
NMED Lead Staff	Alan Garrido
Lead Staff Telephone Number	(505) 827-2713
Lead Staff Email	alan.garrido@state.nm.us

Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation

These Conditions represent minimum liner material and site preparation requirements for wastewater treatment, storage and evaporation lagoons. These requirements do not apply to lagoons storing hazardous wastes or high strength waste. The Ground Water Quality Bureau may impose additional requirements (e.g., double-lined lagoons with leak detection) for facilities discharging hazardous or high strength waste to lagoons through the development of specific Discharge Permit conditions for such facilities.

Liner Material Requirements:

1. The liner shall be chemically compatible with any material that will contact the liner.
2. The liner material shall be resistant to deterioration by sunlight if any portion of the liner will be exposed.
3. Synthetic liner material shall be of sufficient thickness to have adequate tensile strength and tear and puncture resistance. Under no circumstances shall a synthetic liner material less than 40 mils in thickness be accepted. Any liner material shall be certified by a licensed New Mexico professional engineer and approved by the New Mexico Environment Department (NMED) prior to its installation.

Lagoon Design and Site Preparation Requirements:

1. The system shall be certified by a licensed New Mexico professional engineer and approved by NMED prior to installation.
2. Inside slopes shall be a maximum of 3 (horizontal): 1 (vertical), and a minimum of 4 (horizontal); 1 (vertical).
3. Lagoon volume shall be designed to allow for a minimum of 24 inches of freeboard.
4. The liner shall be installed with sufficient liner material to accommodate shrinkage due to temperature changes. Folds in the liner are not acceptable.
5. To a depth of at least six inches below the liner, the sub-grade shall be free of sharp rocks, vegetation and stubble. In addition, liners shall be placed on a sub-grade of sand or fine soil. The surface in contact with the liner shall be smooth to allow for good contact between liner and sub-grade. The surface shall be dry during liner installation.
6. Sub-grade shall be compacted to a minimum of 90% of standard proctor density.
7. The minimum dike width shall be eight feet to allow vehicle traffic for maintenance.
8. The base of the pond shall be as uniform as possible and shall not vary more than three inches from the average finished elevation.
9. Synthetic liners shall be anchored in an anchor trench in the top of the berm. The trench shall be a minimum of 12 inches wide, 12 inches deep and shall be set back at least 24 inches from the inside edge of the berm.
10. If the lagoon is installed over areas of decomposing organic materials or shallow ground water, a liner vent system shall be installed.
11. Any opening in the liner through which a pipe or other fixture protrudes shall be properly sealed. Liner penetrations shall be detailed in the construction plans and record drawings.
12. A synthetic liner shall not be installed in temperatures below freezing.
13. The liner shall be installed or supervised by an individual that has the necessary training and experience as required by the liner manufacturer.
14. All manufacturer's installation and field seaming guidelines shall be followed.
15. All synthetic liner seams shall be field tested by the installer and verification of the adequacy of the seams shall be submitted to NMED along with the record drawings.
16. Concrete slabs installed on top of the synthetic liner for operational purposes shall be completed in accordance with manufacturer and installer recommendations to ensure liner integrity.

New Mexico Environment Department Ground Water Quality Bureau
Discharge Permit Fee Assessment Form

Discharge Permit: DP-1654

AI ID: AI #26496
Activity ID: PRD20150001
Activity Type: Renewal

Facility Name: Town of Edgewood Wastewater Treatment Plant
Contact Person: Stephen Shepherd, Town Administrator
Primary Billing Party: Town of Edgewood
Mailing Address: P.O. Box 3610, Edgewood, NM 87015
Notes:

Please check applicable fees:
New ☐ Renewal ☒ Renew & Mod ☐
Mod only ☐ Temp Permission ☐
General Permit ☐ Financial Assurance ☐

	Permit Fee for New, Renewal, and Renewal +Modification	Permit Fee for Mod. Only	Applicable Fee
Agriculture <10,000 gpd	$ 1,150	$ 575	
Agriculture 10,000 to 49,999 gpd	$ 2,300	$ 1,150	
Agriculture 50,000 to 99,999 gpd	$ 3,450	$ 1,725	
Agriculture 100,000 gpd or greater	$ 4,600	$ 2,300	
Domestic Waste <10,000 gpd	$ 1,150	$ 575	
Domestic Waste 10,000 to 49,999 gpd	$ 2,300	$ 1,150	
Domestic Waste 50,000 to 99,999 gpd	$ 3,450	$ 1,725	
Domestic Waste 100,000 to 999,999 gpd	$ 4,600	$ 2,300	
Domestic Waste 1,000,000 to 9,999,999 gpd	$ 7,000	$ 3,500	
Domestic Waste 10,000,000 gpd or greater	$ 9,200	$ 4,600	
Food Processing <10,000 gpd	$ 1,150	$ 575	
Food Processing 10,000 to 49,999 gpd	$ 2,300	$ 1,150	
Food Processing 50,000 to 99,999 gpd	$ 3,450	$ 1,725	
Food Processing 100,000 to 999,999 gpd	$ 4,600	$ 2,300	$4,600.00
Food Processing 1,000,000 or greater	$ 7,000	$ 3,500	
Grease/Septage surface disposal <10,000 gpd	$ 1,725	$ 862.50	
Grease/Septage surface disposal 10,000 gpd or greater	$ 3,450	$ 1,725	
Industrial <10,000 gpd; or <10,000 yd^3 of contaminated solids	$ 1,725	$ 862.50	
Industrial 10,000 to 99,999 gpd; or 10,000 to 99,999 yd^3 of contaminated solids	$ 3,450	$ 1,725	
Industrial 100,000 to 999,999 gpd; or 100,000 to 999,999 yd^3 of contaminated solids or greater	$ 6,900	$ 3,450	
Industrial 1,000,000 gpd or greater; or 1,000,000 yd^3 of contaminated solids or greater	$ 10,350	$ 5,175	
Discharge of remediation system effluent - remediation plan approved under separate regulatory authority	$ 1,600	$ 800	
Mining dewatering	$ 3,250	$ 1,625	
Mining leach dump	$ 13,000	$ 6,500	
Mining tailings	$ 13,000	$ 6,500	
Mining waste rock	$ 13,000	$ 6,500	
Mining in-situ leach (except salt) and old stope leaching	$ 13,000	$ 6,500	
Mining other (mines with minimal environmental impact, post closure operation and maintenance, evaporation lagoons and land application at uranium mines)	$ 4,750	$ 2,375	
General permit	$ 600		
Temporary permission	$ 150		
Filing Fee	$ 100		
Financial assurance: approval of instrument	greater of $250 or .01%		
Financial assurance: annual review	greater of $100 or .001%		
		Total Fee	**$4,600.00**

Reviewer: Alan Garrido
DP Approval Date: September 4, 2015

Program Manager:
Invoice Mailing Date:

APPENDIX B:

Existing Wastewater Flows at Edgewood WRF

EXISTING WASTEWATER FLOWS AT EDGEWOOD WRF

EXISTING DAILY AVERAGE AND PEAK FLOWRATES

Daily wastewater flowrates recorded at the existing facility are plotted in Figure B-1 and also given in Table B-1. This data indicates that the flowrates have increased slightly since 2014. The average daily flowrate treated at the treatment facility is currently around 30,000 gallons per day (gpd). The data indicates that the daily peaking factor observed at the facility is about 2.

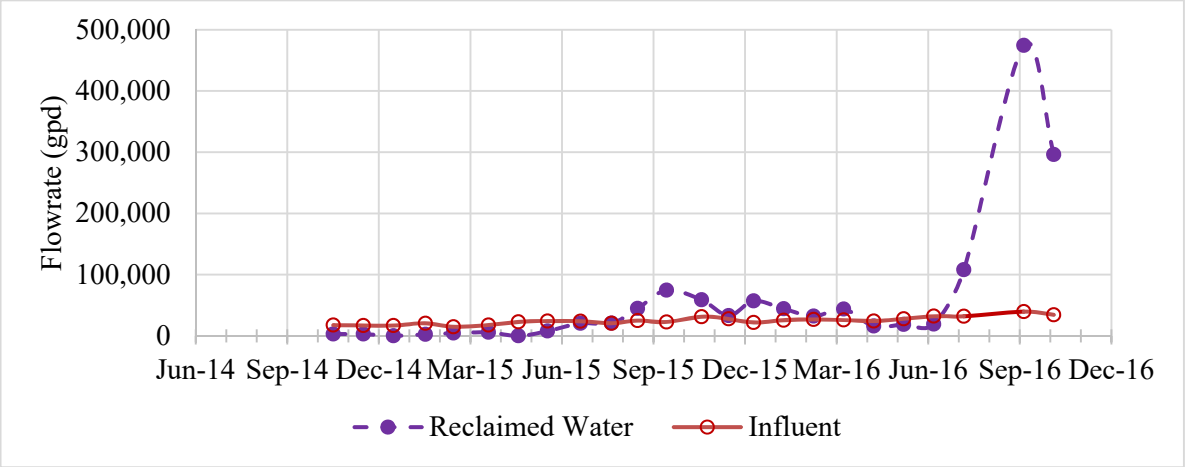

Figure B-1. Influent and Reclaimed Water Flowrates

The amount of effluent that was reclaimed shows a significant variance. The peaks in October 2015 and again in October 2016 were mainly a result of extensive efforts of EPCOR to utilize the available wastewater and get the effluent storage lagoon ready for the winter. The 2015 data and current reuse practices suggest that approximately 25,000 to 30,000 gpd of effluent can be reclaimed on the average, with occasional peaks up to 100,000 gpd during summer months. These numbers do not include the use of treated effluent within the facility as washwater.

Table B-1. Year 2015 Flowrates

	Influent Wastewater	Reclaimed Wastewater*
Average of 2015	22,296 gpd	22,767 gpd
Peak of 2015	43,549 gpd	74,633 gpd
Average of 2016**	28,961 gpd	110,982 gpd
Peak of 2016	39,470 gpd	474,448 gpd
Daily peaking factor	1.4 to 1.9	---

** Does not include facility washwater. The records indicate the amount of reclaimed water given to the trucks for dust control and road maintenance.*

*** January through October.*

COMMERCIAL WATER USAGE AND WASTEWATER GENERATION RATES

The current flowrate of 25,000 gpd is generated from 26 commercial customers, which cover approximately 59 acres. This is equivalent to approximately 423 gpd of wastewater per acre of commercial development. Typically, wastewater generated from commercial developments can range from 800 to 1500 gpd per acre, depending on the type of development and whether wet-processes are included or not (Metcalf and Eddy, 2003). Even though the current average is lower than these typical values, if and when commercial establishments with higher water usage develop in the area (like hotels, laundry mats, car wash), this actual average will increase and approach to typical values. In order to provide a safety factor for the design of the facility, a commercial wastewater generation rate of 1000 gpd per acre was accepted in this PER. This is equivalent to 800 gpd of water usage per acre of development.

RESIDENTIAL WATER USAGE AND WASTEWATER GENERATION RATES

Currently, there are no residential flows received at the facility. However, the Wastewater Ordinance of the Town adopted in February 2016 identifies 375 gpd of wastewater per Equivalent Residential Unit (ERU) which is intended to reflect typical single-family housing with four residents. An evaluation of the planning area suggests that the developed residential areas typically have a density of 1 dwelling unit per acre. It is anticipated that currently undeveloped residential areas may reach a higher density, with 2 dwelling units per acre. For planning purposes of this PER, residential wastewater generation rates of 375 gpd per acre for developed areas and 750 gpd for undeveloped areas were accepted. This is equivalent to a maximum 117 gpd of water usage per residence.

APPENDIX C:

Annual Operating and Maintenance (O&M) Cost Estimates

UV Disinfection Unit O&M Cost Estimate for Design Year Average

POWER COST = $ 0.17 per kWh

Item	Daily Power Cons. (kwh)	Annual Power Cost
UV - Class 1A	113	$ 7,000
UV - Class 2	114	$ 7,080
Total		$ 14,080

EQUIPMENT REPLACEMENT

Item	Replacement Cost* ($/ea)	Useful Life (years)	Quantity	Annual Replacement Cost
UV disinfection lamps	$ 100	2	112	$ 5,600
Ballasts	$ 150	5	112	$ 3,360
TOTAL				$ 8,960

** including installation of equipment.*

Summary of Annual Operation and Maintenance Cost Estimate

Item	Unit	Annual Cost
Power	LS	$ 14,100
Equipment replacement	LS	$ 9,000
Total		$ 23,100

Sodium Hypochlorite Disinfection O&M Cost Estimate for 0.1 MGD Flow

POWER COST = $ 0.17 per kWh

Item	HP	Total run time, hr/day	Daily Power Cons. (kwh/d)	Annual Power Cost
Dosing pump - Class 2	0.25	24	4	$ 300
Dosing pump - Class 1A	0.25	12	2	$ 200
Total				$ 500

EQUIPMENT REPLACEMENT

Item	Replacement Cost* ($/ea)	Useful Life (years)	Quantity	Annual Replacement Cost
Dosing pumps	$ 1,500	3	2	$ 1,000
Total				$ 1,000

** including installation of equipment.*

CHEMICALS

Item	Amount of soln required (gpd)	Cost of solution ($/gal)	Annual Cost
Liquid sodium hypochlorite	8	$ 2.75	$ 8,030
TOTAL			$ 8,030

Summary of Annual Operation and Maintenance Cost Estimate

Item	Unit	Annual Cost
Power	LS	$ 500
Equipment maintenance	LS	$ 1,000
Bulk hypochlorite		$ 8,100
Total		$ 9,600

Sodium Hypochlorite Disinfection O&M Cost Estimate for Design Year Average

POWER COST = $ 0.17 per kWh

Item	HP	Total run time, hr/day	Daily Power Cons. (kwh/d)	Annual Power Cost
Dosing pump - Class 2	0.25	24	4	$ 300
Dosing pump - Class 1A	0.25	12	2	$ 200
Total				$ 500

EQUIPMENT REPLACEMENT

Item	Replacement Cost* ($/ea)	Useful Life (years)	Quantity	Annual Replacement Cost
Dosing pumps	$ 1,500	3	2	$ 1,000
Total				$ 1,000

** including installation of equipment.*

CHEMICALS

Item	Amount of soln required (gpd)	Cost of solution ($/gal)	Annual Cost
Liquid sodium hypochlorite	20	$ 2.75	$ 20,075
TOTAL			$ 20,075

Summary of Annual Operation and Maintenance Cost Estimate

Item	Unit	Annual Cost
Power	LS	$ 500
Equipment maintenance	LS	$ 1,000
Bulk hypochlorite		$ 20,100
Total		$ 21,600

Effluent Disposal - Reuse and Center Pivot Land Application
O&M Cost Estimate for Design Year Average

POWER COST = $ 0.17 per kWh

Item	Number of operating units	HP	Total run time, hr/day	Daily Power Cons. (kwh)	Annual Power Cost
Floating pumps	1	15	9	91	$ 5,630
Center drive	2	1	9	12	$ 750
Class 1A booster pumps	2	5	8	54	$ 3,340
Total					$ 9,720

EQUIPMENT REPLACEMENT

Item	Replacement Cost* ($/ea)	Useful Life (years)	Quantity	Annual Replacement Cost
Center drive	$ 1,200	3	2	$ 800
Pump rebuilt	$ 15,000	5	2	$ 6,000
Hose	$ 3,500	5	2	$ 1,400
Gear box	$ 1,500	5	2	$ 600
Class 1A booster pumps	$ 12,000	10	2	$ 2,400
Drop hoses, nozzles, diffusers	$ 75	10	136	$ 1,020
Tires	$ 800	10	8	$ 640
TOTAL				$ 12,860

** including installation of equipment.*

Summary of Annual Operation and Maintenance Cost Estimate

Item	Unit	Annual Cost
Power	LS	$ 9,800
Equipment replacement	LS	$ 12,900
Total		$ 22,700

Effluent Disposal - Reuse and Pipe Network Land Application
O&M Cost Estimate for Design Year Average

POWER COST = $ 0.17 per kWh

Item	Number of operating units	HP	Total run time, hr/day	Daily Power Cons. (kwh)	Annual Power Cost
Floating pumps	1	20	9	121	$ 7,500
Class 1A booster pumps	2	5	8	54	$ 3,340
Total					$ 10,840

EQUIPMENT REPLACEMENT

Item	Replacement Cost* ($/ea)	Useful Life (years)	Quantity	Annual Replacement Cost
Pump rebuilt	$ 20,000	5	2	$ 8,000
Hose	$ 3,500	5	2	$ 1,400
Sprinklers	$ 20	10	280	$ 560
Class 1A booster pumps	$ 12,000	10	2	$ 2,400
Solenoid valves	$ 250	4	8	$ 500
TOTAL				$ 12,860

** including installation of equipment.*

Summary of Annual Operation and Maintenance Cost Estimate

Item	Unit	Annual Cost
Power	LS	$ 10,900
Equipment replacement	LS	$ 12,900
Total		$ 23,800

APPENDIX D:

Climate Data – Precipitation and Evaporation Rates in the Area

CLIMATE DATA

The climate in the area is generally arid. The area has a continental climate characterized by important annual variation in temperature due to the lack of significant bodies of water nearby. The main features of the climate includes light and variable total precipitation, large diurnal and moderate annual temperature ranges, low relative humidity, and plentiful sunshine. Summer is the rainy season when moisture-laden air from Gulf of Mexico enters the State to bring brief, but often heavy showers.

The climate data for the project area was obtained from the Western Regional Climate Center http://www.wrcc.dri.edu/summary (Tijeras Ranger Station as the closest station to planning area) and New Mexico State University data http://weather2.nmsu.edu/wx-stn-data (Moriarty Weather Station as the closest station to planning area). The climate data can be summarized as follows:

- Based on data collected at Moriarty Weather Station from June 1998 through June 2016, the temperatures within the planning area range from 80-deg F in summer months to less than 15-deg F in winter months (See Figure D-1).

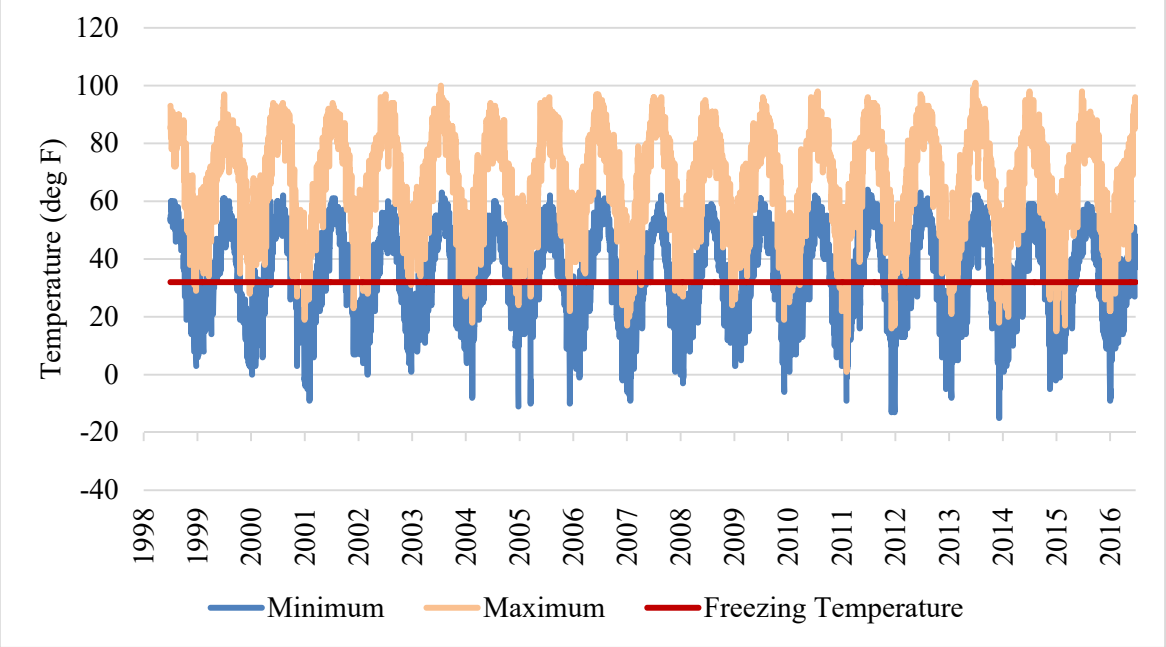

Figure D-1. Minimum and Maximum Temperatures Recorded at Moriarty Weather Station
(Source: http://weather2.nmsu.edu/wx-stn-data/)

- Annual precipitation data was available at the Moriarty Weather Station and Tijeras Ranger Station. Based on the 1962-1974 Moriarty weather data summarized in Figure D-2, the total average precipitation for the area is 12.6-inches per year. For the purposes

of this PER, year 2013 was assumed to be representative of the area, with a total precipitation of 12.8 inches per year.

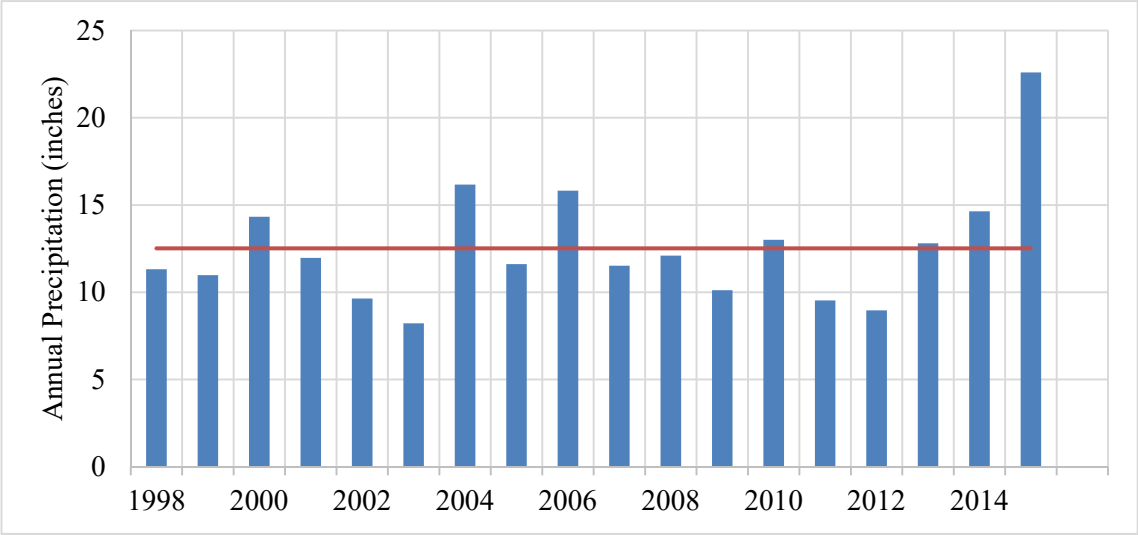

Figure D-2. Annual Precipitation Data Collected at Moriarty Weather Station

- The longest stretch of cold days was experienced in the winter of 2012-2013. The number of days with freezing temperatures during the night (as indicated by minimum temperatures less than 32-deg F) as well as the day (as indicated by maximum temperatures not exceeding 40-deg F) was 38 days, with two to three day days of warm (>40-deg F temperatures) in-between. The second longest stretch occurred in the winter of 2015-2016 with 32 days.
- The monthly distribution of the precipitation data for year 2013 suggests that July, August, and September are the months with the largest amount of precipitation. The monthly distribution of the precipitation data is included in Table D-1. The precipitation data recorded at the Tijeras Weather Station is also included in the table for reference. Since Tijeras is located closer to the Sandia Crest, it is possible that the total precipitation in planning area is less than that in Tijeras.
- The closest pan evaporation data measured is in Santa Fe. The annual evaporation in the area from 1972 to 2005 is reported at approximately 60 inches, with no evaporation recorded from November through March. The monthly distribution of pan evaporation data measured in Santa Fe is included in Table D-1. It was assumed that evaporation in Edgewood area is comparable to that in Santa Fe.

Table D-1. Monthly Distribution of Precipitation and Pan Evaporation (inches)

	Year 2013 Moriarty Weather Station[1]	Average of Years 1962 to 1974 Tijeras Ranger Weather Station[2]	Santa Fe Pan Evaporation Data[3]
Jan	0.25	0.63	0.0
Feb	0.35	0.98	0.0
Mar	0.1	1.07	0.0
Apr	0.09	0.9	7.1
May	0.04	0.78	11.31
Jun	0.06	0.89	10.36
Jul	3.18	2.47	9.2
Aug	1.26	2.45	7.41
Sep	5.05	1.59	5.08
Oct	0.33	1.56	0.0
Nov	1.74	0.81	0.0
Dec	0.35	1.19	0.0
TOTAL	12.8	15.31	60.22

[1] *http://weather2.nmsu.edu/wx-stn-data*

[2] *http://www.wrcc.dri.edu/summary*

[3] *http://www.wrcc.dri.edu/htmlfiles/westevap.final.html Data of Santa Fe 2, from 1972 through 2005.*

APPENDIX E:

Water Balance for Complete Evaporation Lagoons

DISPOSAL OF 250,000 GPD TREATED EFFLUENT FROM EDGEWOOD WRF
WATER BALANCE FOR COMPLETE EVAPORATION

Wastewater flow = 250,000 gpd

Total surface area = 2,660,000 sq ft
Total surface area = 61.1 acres

Month	Influent wastewater Domestic (gpd)	Influent wastewater Days of flow	Total inf volume (gal/mo)	Precip. (in/mo)	Average Evap Rate Santa Fe 2 (in/mo)	Evap Rate including 10% safety factor (in/mo)	Net Evap (ft/mo)	25% Evap via Evaporator (gal/mo)	Evap from full basins (gal/mo)	Net volume remaining (gal/mo)	Cumulative net volume (gal/mo)
September	250,000	30	7,500,000	5.05	7.41	6.669	0.135	1,875,000	2,684,769	2,940,231	2,940,231
October	250,000	31	7,750,000	0.33	5.08	4.572	0.354	1,937,500	7,034,459	-1,221,959	1,718,272
November	250,000	30	7,500,000	1.74	0	0	-0.145	1,875,000	-2,885,422	8,510,422	10,228,694
December	250,000	31	7,750,000	0.35	0	0	-0.029	1,937,500	-580,401	6,392,901	16,621,595
January	250,000	31	7,750,000	0.25	0	0	-0.021	1,937,500	-414,572	6,227,072	22,848,667
February	250,000	28	7,000,000	0.35	0	0	-0.029	1,750,000	-580,401	5,830,401	28,679,068
March	250,000	31	7,750,000	0.1	0	0	-0.008	1,937,500	-165,829	5,978,329	34,657,397
April	250,000	30	7,500,000	0.09	7.1	6.39	0.525	1,875,000	10,447,217	-4,822,217	29,835,180
May	250,000	31	7,750,000	0.04	9.76	8.784	0.729	1,937,500	14,500,073	-8,687,573	21,147,607
June	250,000	30	7,500,000	0.06	11.31	10.179	0.843	1,875,000	16,780,220	-11,155,220	9,992,387
July	250,000	31	7,750,000	3.18	10.36	9.324	0.512	1,937,500	10,188,524	-4,376,024	5,616,364
August	250,000	31	7,750,000	1.26	9.2	8.28	0.585	1,937,500	11,641,184	-5,828,684	-212,320
TOTAL	3,000,000			12.80	60.22	54.20	3.45				
Max											34,657,397
Average	250,000										