FORT WORTH®

Biosolids Program & Environmental Management System (EMS) Annual Performance Report

City of Fort Worth Water Department
Plant Operations Division

Village Creek Water Reclamation Facility
4500 Wilma Ln.
Arlington, TX 76012
817-392-4960
biosolids@fortworthtexas.gov

2017-2018

TABLE OF CONTENTS

INTRODUCTION 3
Annual Performance Report (APR) 3
ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) 3
National Biosolids Partnership (NBP) 3
Beneficial Reuse and Disposal 4
Goals and Objectives 4
Audits 5
Public Outreach 5
Pretreatment Services 5
ACCOMPLISHMENTS FOR 2017-2018 REPORTING YEAR 6
BIOSOLIDS MANAGEMENT PROGRAM 7
Biosolids Production 7
Beneficial Reuse Options and Management Practices 7
Contractor Performance 7
City Oversight/Inspections 8
Monitoring and Measurement 8
EMS Activities and Timeline 11
EMS Timeline 11
Goals and Objectives 11
Corrective Action Notices (CANs) 11
LEGAL REQUIREMENTS 11
SPILLS, EMERGENCY ACTIONS, AND RESPONSE 11
PUBLIC OUTREACH AND PARTICIPATION PROGRAM 12
FUTURE PLANS/ADVANCES IN BIOSOLIDS TECHNOLOGY 12
CONTACT INFORMATION 13
APPENDIX A: CORRECTIVE ACTION NOTICES 2017-2018 14
APPENDIX B: CURRENT GOALS AND OBJECTIVES 16

INTRODUCTION

The City of Fort Worth's Biosolids Program is a public/private partnership where the contractor, Renda Environmental, Inc. (REI), is responsible for processing, dewatering, transporting and performing beneficial land application of biosolids produced from the Village Creek Water Reclamation Facility (VCWRF). REI is under contract to provide these services until March 31, 2020.

Biosolids, the nutrient-rich organic material produced from properly treated wastewater at VCWRF, is an excellent fertilizer and soil conditioner that is land applied in several neighboring counties on farm and ranch land. The City's Biosolids Program has over 85 land application sites in 8 different counties, which include: Denton, Ellis, Hill, Hood, Johnson, Parker, Tarrant and Wise. For the 2017-2018 reporting year, land application occurred in Hill, Johnson, Tarrant, and Wise counties with a small amount applied in Ellis County.

Annual Performance Report (APR)

This APR summarizes Fort Worth's Biosolids Program performance, biosolids production and reuse, goals and objectives, Environmental Management System (EMS) activities, public outreach, and the commitment towards continual improvement. This report and other biosolids information on operations and activities are detailed on the City's website.

ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The Biosolids Program's EMS is a systematic approach that helps the City to continually improve activities that are associated with environmental performance. The National Biosolids Partnership (NBP) sets standards and guidelines that the City's EMS must achieve in order to receive and maintain NBP certification. A properly implemented EMS assists the City's Biosolids Program with the following:

- Identifying the overall goals and objectives of the Biosolids Program
- Creating a series of management practices to meet the goals and objectives
- Managing biosolids activities and monitoring and measuring the effectiveness of the program
- Taking corrective and preventative measures if the management practices are not operating correctly
- Conducting audits of the Biosolids EMS Program
- Requiring management involvement to make changes to the program as needed

National Biosolids Partnership (NBP)

The National Biosolids Partnership is a voluntary partnership between the National Association of Clean Water Agencies (NACWA) and Water Environment Federation (WEF). NBP is committed to developing and advancing environmentally sound and sustainable biosolids best management practices through comprehensive management systems. The mission of the NBP is to advance the understanding and adoption of effective practices in biosolids management and offer:

- Education and training;
- Technical assistance;
- An information clearinghouse; and
- An EMS-based third-party certification program for biosolids management systems.

Figure 1. The City of Fort Worth's EMS has been certified by the NBP since July 2005.

Due to the maturity of the Fort Worth Biosolids Program, the City continues to certify at the Platinum Level with the NBP and has recently acted as a mentor for a local water utility as they navigate the early stages of developing their own NBP certified EMS.

PROGRAM SUMMARY

The following information summarizes the breadth of the Biosolids Program and its environmental management system. During 2017-2018 reporting year, the Biosolids Program utilized approximately 20% of the total Plant Operations Division budget. Isolating the wastewater budget from the total budget for the Plant Operations Division, biosolids utilized 39%.

Beneficial Reuse and Disposal

During the past reporting year (August 1, 2017-July 31, 2018), the City of Fort Worth's Biosolids Program beneficially reused and recycled 99.06% (excluding lime) of its Class AB biosolids and landfilled 0.94%.

Goals and Objectives

Every quarter, goals and objectives for the biosolids program are updated. During the reporting year, the biosolids program has been making progress towards 5 goals. These goals include:

- **Increasing digested feed sludge to 5%**
  The purpose of this goal was to look into new thickening technology that could replace the Dissolved Air Flotation Thickeners (DAFTs). In April 2017, the scope of the thickening project associated with this goal changed to include improvements to the Gravity Belt Thickeners (GBTs) and replacing the Gravity Thickeners. As of September 2018, the City and the approved contractor had settled design issues and are currently discussing a schedule to move the project forward.
- **Increasing percent solids of biosolids (prior to lime addition) by 3%**
  This goal was created in December 2014 during a year the biosolids program was experiencing dewatering and odor issues and after the ferric chloride system was brought online to mitigate these issues. The average percent solids for biosolids (prior to lime addition) for 2014 was 15.25%. The effectiveness of the ferric chloride addition (along with chlorine dioxide) has been apparent with relatively consistent yearly averages for percent solids of 16.90, 17.10, 16.62, and 16.86 for 2015, 2016, 2017 and 2018 (year to date) respectively. In June 2018, the optimization of the 6th belt press was complete and was performing as well as the 5 other belt presses. City Council approved a refurbishment project of the original 5 belt presses on August 7, 2018. Work is tentatively scheduled to being in late November 2018.
- **Increasing biosolids storage capacity from 1.3MG to 6.3 MG**
  This goal was developed in June 2015 for the purpose of increasing sludge storage capacity to allow for more flexibility during inclement weather and operational and maintenance situations, which, in effect, will help improve biosolids management practices. This goal has made considerable progress in 2018. City Council approved the storage tank project on September 11, 2018 and a construction schedule is slated to be in place by early November 2018.
- **Identifying four public concerns regarding biosolids**
  This goal was developed in September 2015. The four public concerns were identified early on and several action plans were added in an effort to continue to identify concerns regarding biosolids. On September 23, 2017 the Fort Worth Water Department made the first post relating to biosolids on its Facebook page. Several additional posts on the Water Department's social media accounts have been made since a Communication Specialist with the Customer Care Division has partnered with staff in the Biosolids Program. Posts have been published in both English and Spanish highlighting various aspects of the Biosolids Program. A video detailing how biosolids are made was posted on Facebook in August 2018. A Biosolids Communication Plan was drafted in July 2018 and outlines strategies for the Biosolids Program to increase its public outreach efforts.
- **Reducing the amount of lime (tons) used per month by 50%**
  In late 2016, chlorine dioxide was formally approved to be used for improving odor performance of the biosolids as well as eliminating pathogens. The addition of chlorine dioxide (working in tandem with ferric chloride) has improved odors as well as increased percent solids of the biosolids. In March 2018, a lime reduction study was conducted to determine if lowering the pH from 12 to 11 would allow for effective pathogen control. The results from the study indicated that odors weren't greatly affected by lime reduction, but pathogen reduction was effective at a pH 11. An additional study is to be conducted in order to solidify the results when the sludge only landfill is suitable for application. Due to staff and equipment availability, as well as the use of the Peak Flow Basin, land application of test material has been delayed.

Audits

An internal audit was conducted on August 30th and 31st, 2018. The internal audit found that the City and REI continue to train their respective personnel and understand their roles and responsibilities throughout the biosolids value chain. REI has utilized numerous strategies to manage odors at land application sites over the course of the reporting year. In addition, the City has dedicated considerable resources to help improve odor performance and dewatering activities. Only one minor nonconformance was found relating to the chlorine dioxide system. The chlorine dioxide system experienced unscheduled shutdowns when feed chemicals were not available due to lack of storage capacity for Purate. While this deficiency was identified by staff and is currently in the process of being corrected, a goal and objective using SMART criteria was never put in place. Overall, the internal audit found that the continual improvement philosophy is evident throughout the organization.

A third-party EMS external audit was held on October 10th through 13th, 2017. The results of the audit were very positive, specifically in regards to the detailed requirements of the goals and objectives and corrective actions. The implementation of a corrective action plan (CAP) process that establishes projects or resolves plant issue that are long-term in nature, do not yet have a known solution, or are receiving ongoing troubleshooting and evaluation received special recognition. Two minor nonconformances were identified, one relating to Public Outreach efforts and the other relating to Roles and Responsibilities (Element 7.0). These minor nonconformances were addressed with corrective action notices. Nine opportunities for improvement were identified and most have been implemented during the reporting year.

Public Outreach

The 2017-2018 reporting year saw a continuation of public outreach efforts for the Fort Worth Biosolids Program. Infotubes with Frequently Asked Question (FAQs) sheets continued to be available at the land application site entrances. From August 2017 to July 2018, 34 land application sites received biosolids application and approximately 27% of the FAQ sheets that were made available at these sites were taken.

From August 2017 to July 2018, 176 individuals experienced a tour at VCWRF. These tours include information regarding the biosolids program. Tour numbers were down compared to last year due to limited available manpower (position vacancies). However, with the position vacancies now filled, it is likely that tour numbers will increase for the next reporting year.

Pretreatment Services

Every December, Pretreatment Services recognizes those industrial facilities that have achieved compliance excellence and performance by complying with regulatory and permit requirements. In December 2017, 98 of 120 industries were 100% compliant. Of these industries, 5 facilities received a Stewardship award (11 or more years of 100% compliance), 51 received a Partnership award (3-10 years of 100% compliance), 16 received an Associate award (2 years of 100 % compliance) and 26 received a Star award (1 year of 100% compliance). Four industries received Pollution Prevention awards for their efforts in using materials, processes, or practices that reduce or eliminate wastes.

Pretreatment Services continues to have success with their Fats, Oil, and Grease (FOG) Abatement Program that regulates Food Services Establishments (FSEs). The following graphs illustrate the decline in sanitary sewer overflows the City has experienced as a result of the FOG Abatement Program and the quantity of grease removed from grease traps.

Pretreatment services also has a comprehensive monitoring program that samples the collection system, as well as the influent and effluent of the Village Creek Water Reclamation Facility on a monthly basis. Any abnormal data from the monthly monitoring at VCWRF can be investigated using data from the system-wide sampling. A follow-up plan that segregates the locations of interest is used to conduct investigations, inspections and monitoring of facilities in the surrounding areas. Heavy metals have consistently been under the Maximum Allowable Headworks Loadings (MAHL).

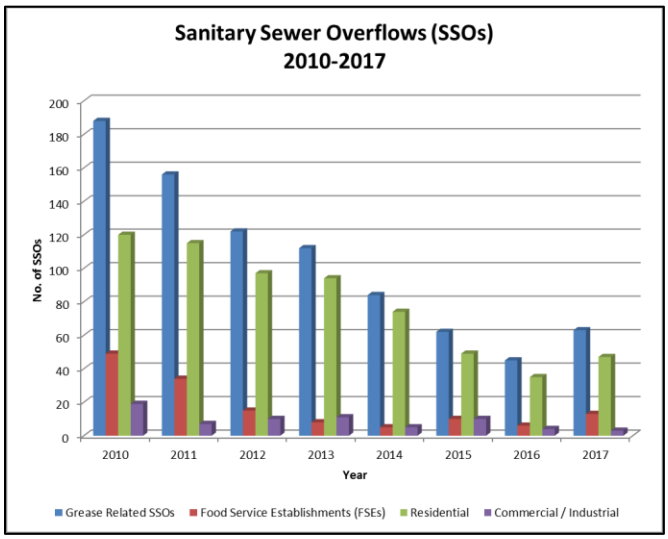

Figure 2. Sanitary Sewer Overflows for years 2010-2017 illustrate an overall decline.

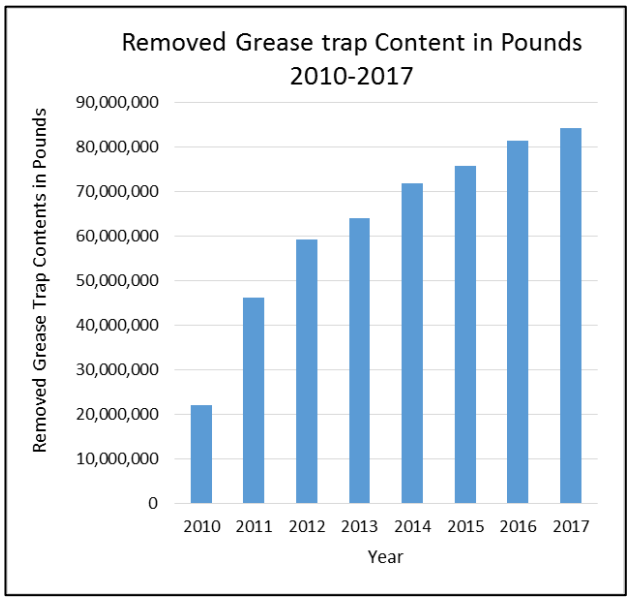

Figure 3. Data illustrates and increase in removal of grease trap contents from 2010-2017.

All of Pretreatment Service's efforts protect the Village Creek Water Reclamation Facility and ensure that effluent discharges comply with state and federal requirements. In turn, this protects the quality of the biosolids as, it too, is tested monthly for heavy metals and other pollutants of concern.

ACCOMPLISHMENTS FOR 2017-2018 REPORTING YEAR

- Since the last reporting year, the Biosolids Program has made progress toward achieving its current 5 goals and objectives. The *Increase percent solids of biosolids (prior to lime addition) by 3%* and *Increase biosolids storage capacity from 1.3MG to 6.3 MG* goals saw great progress as both had action plans that required City Council approval. Since the projects associated with these goals have been approved, tentative work/construction schedules can be developed. Also, while the percent solids of biosolids has ultimately increased by 3%, there is still one active action plan, the belt press refurbishment, that still needs to be completed in order to officially complete and close the goal.

- The *Identify four public concerns regarding biosolids identify four public concerns regarding biosolids* goal saw the most progress this past summer. With the addition of a Communication Specialist to the Customer Care Division team, Biosolids Program personnel have received more input and assistance on ways in which public outreach can be improved. Increased social media content relating to biosolids has been one of the biggest changes for the Biosolids Program. A Biosolids Communication Plan, which is still in draft form, will serve as a living document to be revised and expanded as public outreach strategies change or are implemented. The overall objectives of the Plan is to inform the public of the existence of the program, educate them on its process and scope, and correct misinformation regarding the safety and environmental aspects of biosolids.

- The Biosolids Program saw an addition of 11 new land application sites this past reporting year. This is the largest number of site additions in one reporting year since 2005. It's evident that the biosolids that the City produces are still an attractive fertilizer/soil amendment option for local farmers and ranchers.

- The Biosolids Master Plan, which will outline future strategies and implementation for biosolids related activities, is nearing completion. Once completed, it will serve as a roadmap for biosolids operations for the next 20 years with potentially new processes and new infrastructure to carry out said processes. Ultimately, it will serve as comprehensive review for updating the Biosolids Program.

- Most Corrective Action Notices (CANs) that were created during the reporting year were for minor issues. One CAN in particular, addressed an ongoing issue related to the ferric chloride system that eventually caused odor and dewatering-related concerns. Maintenance and the replacement of certain parts of the system were completed as a result. The need for SOPs regarding the chemical systems that are part of the Biosolids Program was identified. While an SOP exists for the Ferric Chloride system, it was determined that the contractors used to maintain the chemical systems, should provide guidance on the SOPs. An additional CAN was created to update/create these SOPs to prevent future system failures so the biosolids quality is not affected.

BIOSOLIDS MANAGEMENT PROGRAM

Annual Biosolids Reporting Period	August 1st, 2017 to July 31st, 2018
Registration/Permit Number:	TPDES #10494-013
Transporter No.:	TCEQ--#21942(Renda Environmental, Inc.) TXDOT--#45267C (Renda Environmental, Inc.)
Type of biosolids produced:	Class AB (TCEQ)
Amount of biosolids beneficially reused/recycled:	31,294 dry tons (without lime)
Amount of biosolids beneficially reused/recycled:	28,389 dry metric tonnes (without lime)
Percentage of biosolids beneficially reused/recycled:	99.06%

Biosolids Production

The City of Fort Worth produces biosolids at the City's dewatering facility located north VCWRF. During 2017-2018, 31,294 dry tons (without lime) of biosolids were produced. Due to inclement weather and odor concerns, 323 dry tons were landfilled.

The biosolids that have been produced have been anaerobically digested and dewatered by belt filter press to produce a cake product that is 16% to 18% solid (without lime). Lime is added to the biosolids after dewatering to ensure compliance with the pathogen requirements in the Texas Pollutant Discharge Elimination System (TPDES) permit. The biosolids are then land applied by Renda Environmental, Inc.; the City's contractor.

Beneficial Reuse Options and Management Practices

Biosolids produced at VCWRF were properly processed, monitored, and agronomically land applied to thousands of acres of farm and pasture land in neighboring counties. The biosolids serve as an excellent soil amendment and add to the nutrient value to crops and grasses. For the 2017-2018 reporting year, Wise, Tarrant, Johnson, and Hill counties received land application of biosolids. In January 2018, site JCWM2, located in Johnson County, received 960 dry tons of biosolids. It is estimated that 48 acres of the site (which totals 893 acres) spans adjacent Ellis County and received approximately 300 dry tons of biosolids.

Contractor Performance

Biosolids operations in Fort Worth are handled by REI. REI operates and maintains the belt filter presses and all auxiliary equipment and continually monitors and tracks the amount of biosolids applied to each land application site.

REI is responsible for:

- Operation of the dewatering facility and further processing of the biosolids by belt-filter press dewatering;
- Transportation of biosolids material;
- Land application to beneficially reuse the biosolids produced at VCWRF;
- Posting signage at land application sites that include contact information;
- Daily odor monitoring at land application sites and
- Performing necessary biosolids sampling for permit compliance.

Table 1. Number of Biosolids Program landowners per county plus site acreage.

Landowner Participation by County				
Counties	**Landowners**	**Noticed Sites**	**Noticed Acres**	**Percent of Total Acreage**
Denton	2	2	250	0.5%
Ellis	2	2	1,994	4%
Hill	8	20	6,600	13%
Hood	2	2	291	1%
Johnson	18	38	15,988	32%
Parker	4	4	12,389	25%
Tarrant	5	5	2,192	4%
Wise	13	16	9,989	20%
TOTAL	**54**	**89**	**49,693**	**100%**

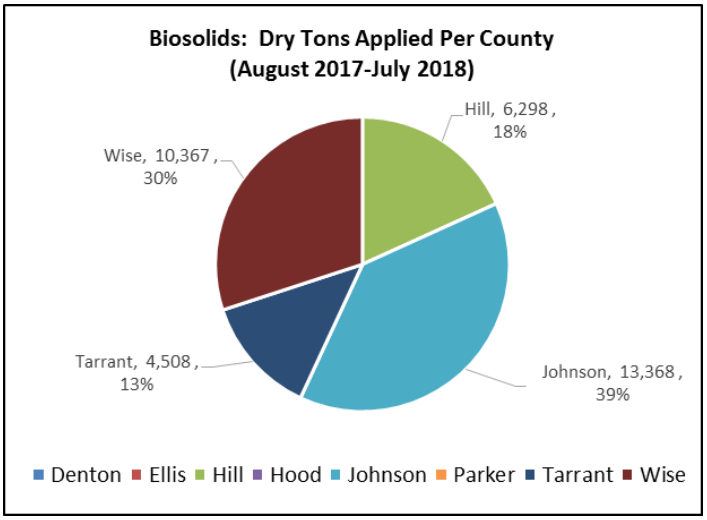

Figure 4. Percent of dry tons applied in each county during August 2017-July 2018.

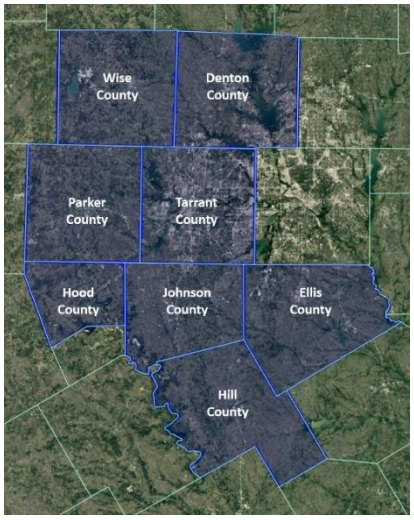

Figure 5. Counties in the City's Biosolids Program that can receive land application.

City Oversight/Inspections

City personnel perform daily visits and inspections to the dewatering facility and land application sites to ensure that the contractor is following best management practices concerning biosolids dewatering, transportation and land application.

While a site is undergoing land application, City personnel will perform a site inspection detailing weather conditions, truck conditions, haul road conditions, and overall site conditions. An olfactometer is used to help quantify odors and establish an odor monitoring history at the land application sites.

When a land application site reaches completion, a final close-out visit is conducted by City personnel. This final site visit is performed to ensure that all biosolids material has been properly applied and all equipment has been removed. From August 1, 2017 to July 31, 2018, city personnel performed 297 land application site visits.

Monitoring and Measurement

By City contract, REI uses an independent certified laboratory to analyze the biosolids produced at VCWRF. Samples of biosolids are taken from the process areas and analyzed for fecal coliform, pathogens, metals,

Polychlorinated Biphenyls (PCBs), Toxicity Characteristic Leaching Procedure (TCLP), pH, percent solids, and vector attraction reduction. Sampling frequency is established by the TPDES permit for VCWRF. By contract, REI must meet or exceed regulatory requirements detailed in the TPDES permit which can be found summarized in Table 2.

Biosolids samples are analyzed monthly for metals and PCBs. For 2017-2018, all metal concentrations were significantly below Table 1 ceiling concentration limits and Table 3 pollutant concentrations as required by 40 CFR 503 and 30 TAC 312, for the use or disposal of sewage sludge. The metals and PCB concentrations are shown in Table 3. In addition, the City and REI collect biosolids samples which undergo Toxicity Characteristic Leaching Procedure (TCLP) analysis. Three TCLP samples were collected during the 2017-2018 reporting year. All samples were compliant with TCLP standards.

Table 2. Monitoring Requirements associated with the City's Biosolids Program

TPDES CLASS AB BIOSOLIDS MONITORING METHODS AND FREQUENCY	
Pathogen Control	30 TAC 312.82 (a) Alternative 4
	• Fecal Coliform Density <1000 MPN* • Enteric Virus Density <1 Plaque-forming unit per 4 gram total solids** • Viable Helminth Ova Density <1 per 4 grams total solids**
Vector Attraction Reduction	30 TAC 312.83 (b) (1-8) Alternative 1 or 4
	• Alternative 1: The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.
MONITORED ITEM	**FREQUENCY**
Fecal Coliform	Two (2) times per month
Pathogens	Two (2) times per month
Metals	Monthly
PCBs	Monthly
TCLP	Two (2) times per year
pH	Operation Process-Daily; Regulatory Compliance- Weekly (if using Alternative 6 for Vector Attraction Reduction)
% Total Solids	Daily
* Most Probable Number	
** Dry Weight Basis	

During the 2017-2018 reporting period the Fort Worth Biosolids Program was compliant with the following TPDES monitoring requirements:

- Helminth Ova
- Enteric Virus
- Metals
- Toxicity Characteristic Leaching Procedure (TCLP)
- Polychlorinated Biphenyl (PCB)
- Odor Log Monitoring Requirements
- Vector Attraction Reduction Alternative #1 Requirements

A fecal sample collected on October 9th, 2017 exceeded the TPDES permit limit. Upon learning of the issue the City and its Contractor promptly responded and notified TCEQ of the issue. Upon becoming aware of the issue the result was promptly reported to TCEQ as required by permit. A root cause analysis was performed to determine what may have contributed to the issue. At this time the city believes the elevated concentration was the result of a sampling anomaly.

An excessively heavy rain event during the week of February 19th created a flooding event that washed a small amount of land applied biosolids into a pond located within the boundary of the land application site. Approximately 100 fish died as a result of low oxygen levels in the pond. It is important to note that the Contractor met all TCEQ Class AB land application setbacks and that no biosolids were washed off the property.

Table 3. VCWRF's permit required metal sampling results from August 2017 to July 2018.

METAL AND PCB CONCENTRATION (REPORTED IN MG/KG DRY WEIGHT BASIS)											
Year 2017-2018	As mg/kg	Cd mg/kg	Cr mg/kg	Cu mg/kg	Pb mg/kg	Hg mg/kg	Mo mg/kg	Ni mg/kg	Se mg/kg	Zn mg/kg	PCB mg/kg
NPDES Permit Limits (Table 1)	*75*	*85*	*3000*	*4300*	*840*	*57*	*75*	*420*	*100*	*7500*	*n/a*
NPDES Permit Limits (Table 3)	*41*	*39*	*1200*	*1500*	*300*	*17*	*****	*420*	*36*	*2800*	*n/a*
August	14.60	1.80	38.70	443.00	26.70	0.34	25.10	25.90	4.30	713	0.00
September	17.10	4.10	48.70	504.00	27.60	0.46	ND	33.90	5.20	788	0.00
October	10.90	1.60	29.20	350.00	13.30	0.37	23.30	21.90	5.50	448	0.00
November	13.60	1.90	36.80	481.00	17.60	0.38	ND	29.70	6.90	602	0.00
December	ND	ND	35.70	387.00	17.10	0.41	ND	24.70	ND	502	0.00
January	6.40	ND	32.50	382.00	16.60	0.20	31.80	22.90	ND	526	0.00
February	9.30	ND	43.60	467.00	17.70	0.44	34.60	29.50	5.90	604	0.00
March	6.60	ND	52.90	379.00	22.40	0.69	ND	35.90	ND	499	0.00
April	12.00	ND	39.80	347.00	18.80	0.40	ND	26.30	6.40	461	0.00
May	6.60	ND	35.70	371.00	17.10	0.34	ND	25.20	6.50	537	0.00
June	ND	ND	27.90	373.00	17.70	0.15	ND	20.40	8.00	448	0.00
July	ND	ND	32.00	441.00	20.20	0.34	ND	23.60	11.40	559	0.00
Yearly Avg. Metals Conc.	**10.79**	**2.35**	**37.79**	**410.42**	**19.40**	**0.38**	**28.70**	**26.66**	**6.68**	**557.25**	**ND**
Highest Monthly Conc.	**17.10**	**4.10**	**52.90**	**504.00**	**27.60**	**0.69**	**34.60**	**35.90**	**11.40**	**788.00**	**ND**
***No limit established by federal regulations											
Pathogen Requirement Achieved: Class AB				Pathogen Reduction Alternative Used: Alternative 4				Vector Attraction Reduction Alternative Used: Alternative 1			

EMS Activities and Timeline

The EMS manual was updated periodically throughout the reporting year. The following table indicates additional biosolids EMS activities conducted during the past year.

EMS Timeline

Table 4. EMS activities and associated dates.

2017-2018 EMS Activities	Date
Goals and Objectives updates	Quarterly (September, December, March, June)
Corrective Action Notices and Corrective Action Plan Review	Quarterly (September, December, March, June)
EMS Internal Audit	August 30-31, 2018
EMS Performance Report	October 12, 2018
EMS Management Review	October 09, 2018
EMS External Third-Party Audit	October 24-26, 2018

Goals and Objectives

The City has established goals and objectives to help improve selected biosolids management activities. These goals are updated every quarter in order to track their progress and to establish new goals and objectives when appropriate. The list of goals and objectives, which were last updated on September 27, 2018, are included in Appendix B of this report. A summary of these goals is on pages 3 and 4.

Corrective Action Notices (CANs)

As defined in EMS Element 14, Corrective Actions are "specific actions and steps taken to correct an organization's nonconformance(s) to environmental policies, procedures, and other requirements, and to mitigate any residual impacts to the environment." It is the policy of the Fort Worth Biosolids EMS Program to create a CAN for any identified nonconformance as well as any identified opportunities for improvement, which are those changes that are recommended but not required. The City has been diligent in developing CANs for noncompliance issues as they relate directly to the biosolids program. Due to the maturity of the City's Biosolids Program, the number of CANs has decreased in the last few years. All CANs for the 2017-2018 year have been summarized in Appendix A.

LEGAL REQUIREMENTS

A minor nonconformance issued during the third-party audit in 2016 detailed that certain VCWRF Standard Operating Procedures (SOPs) need to have regulatory requirements incorporated into the procedure. A CAN was developed for this issue and all biosolids program related SOPs were updated to reflect any regulatory requirement necessary. VCWRF SOPs have since been reviewed and those SOPs relating to processes or activities tied to a regulatory or permit requirement have been updated to include the pertinent information. New SOPs that have been created since, have included the regulatory or permit requirements if necessary.

In July 2018, a new TPDES permit was issued to the Village Creek Water Reclamation Facility. Only minor changes to the permit were identified and the Biosolids Program will continue to function as it has been under the previous permit.

SPILLS, EMERGENCY ACTIONS, AND RESPONSE

There were no spills during the 2017-2018 reporting year.

PUBLIC OUTREACH AND PARTICIPATION PROGRAM

The 2017-2018 year saw improvements in the Biosolids Program's public outreach efforts. The addition of a Communication Specialist within the Customer Care Division has proven helpful in trying to implement outreach efforts that have been delayed in past years. Several posts regarding biosolids have been made to the City's Water Department Facebook and Twitter accounts. Posts have been published in both English and Spanish to accommodate the diversity of the City's residents.

In addition, a Biosolids Communication Plan was drafted in July 2018 that details strategies the Biosolids Program can use to increase public outreach efforts and elicit additional feedback from the public. This plan has not been finalized, but it is hoped that it will act as a guideline that is continuously updated in order for public outreach to be a priority for the Biosolids Program.

In August 2018, a video detailing how biosolids are produced was published to the City's Water Department Facebook account. In the future, an additional video featuring a landowner in the program speaking to the benefits of biosolids will be produced.

Tour survey continues to be collected. During 2017-2018, 14 university classes, 6 high school classes and 7 other interested parties, experienced a tour of VCWRF. Tour surveys, given to gauge how much the general public knows about biosolids prior to the tour and after, elicits data that has been used to track the different perception among age, educational, and gender demographics.

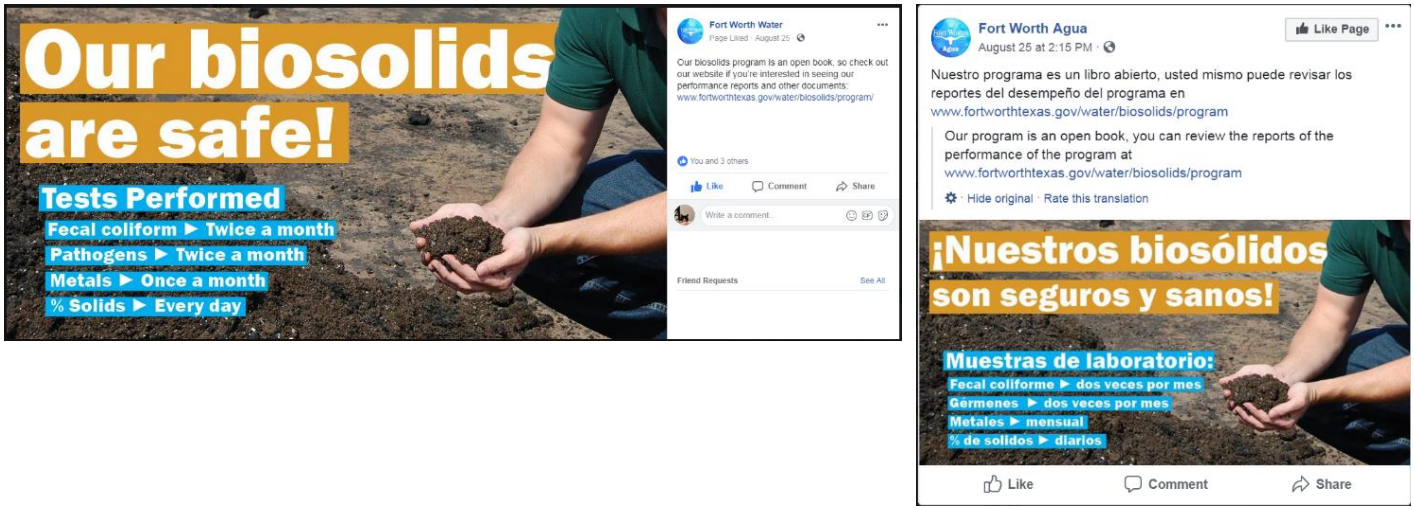

Figure 6. Facebook postings in English and Spanish educating users that biosolids are safe and analyzed regularly.

FUTURE PLANS/ADVANCES IN BIOSOLIDS TECHNOLOGY

Belt-Filter Press Refurbishment: Four of the existing belt presses are past their service life and need to be rebuilt. In September 2018, City Council approved the refurbishment project. By late November 2018, work should begin on refurbishing belt press 2.

Liquid Sludge Storage Tank: City Council approved the storage tank project in September 2018. This project consists of a 5 million gallon liquid sludge storage tank that will allow the City to halt biosolids production during extended wet weather events. The increased storage volume and aeration will help improve the odor performance of biosolids during land application. A construction schedule is to be developed before the end of the year so the project can move forward with construction.

Biosolids Master Plan

The Biosolids Master Plan aims to identify and implement those activities that will optimize biosolids production, improve biosolids quality, and hopefully reduce costs associated with the Biosolids Program. The plan is nearing completion and based on its results, requests for proposals for activities associated with the Plan will be sought. An attempt at incorporating the Biosolids Master Plan into the Goals and Objectives was made, however, it was determined that the goal is not able to meet SMART criteria due to its early development. When a more substantial goal can be developed, it will be incorporated during a future quarterly update and hopefully address cost reduction associated with the Biosolids Program.

CONTACT INFORMATION

If you have comments on this report or any other biosolids related items please call or email.

Village Creek Water Reclamation Facility	817-392-4960
Biosolids EMS Manager	817-392-4965
Biosolids Program Email	biosolids@fortwortexas.gov

To find out more information about the City of Fort Worth Biosolids Beneficial Reuse/Recycling program and the EMS visit our website: http://fortworthtexas.gov/water/biosolids/

To find out more information on biosolids in general, biosolids facts, regulation requirements, and about the national Biosolids Partnership EMS program, visit the website: http://www.biosolids.org

APPENDIX A: CORRECTIVE ACTION NOTICES 2017-2018

CORRECTIVE ACTION NOTICES AUGUST 1, 2017-JULY 31, 2018					
CAN #	**Date**	**Non-Conformance Issue**	**Scheduled Completion Date**	**Actual Completion Date**	**Close-Out Date**
2017-03	09/18/17	CAP 17-01 Primary Sludge Grit System	09/26/17	09/28/17	09/28/17
2017-04	09/18/17	CAP 17-02 Energy Saving Performance Contract	09/26/17	09/28/17	09/29/17
2017-05	09/18/17	CAP 17-03 MCC Switchgear Replacement	09/26/17	09/28/17	09/30/17
2017-06	09/18/17	CAP 17-04 Digester Cleaning	09/26/17	09/28/17	10/01/17
2017-07	09/18/17	CAP 17-05 New FeCl3 Pump Station	09/26/17	09/28/17	10/02/17
2017-08	09/18/17	CAP 17-06 ClO2 mixing-repairs, upgrades, improvements	09/26/17	09/28/17	10/03/17
2017-09	09/18/17	CAP 17-07 Prepare facility for next contract cycle, including possible Dewatering Facility Expansion	09/26/17	09/28/17	10/04/17
2017-10	09/28/17	Requirement 10.1: On September 28, 2017 at 1:05 pm, Renda Environmental, Incorporated was land applying biosolids at WSCT2, despite recent rains having saturated the soil.	02/28/18	04/09/18	04/09/18
2017-11	09/28/17	Requirement 8.1: During Sludge Year 2016-2017, a biosolids newsletter was not provided to the VCWRF on a semi-annual basis, as required.	02/28/18	04/25/18	05/03/18
2017-12	09/28/17	Requirement 14.4: Ferric chloride is now an established treatment process that is used to improve biosolids dewatering and odor characteristics. However, this process experienced various operational and maintenance related issues during late August and early September of 2017.	10/02/17	10/04/17	10/09/17
2017-13	11/08/17	Requirement 7.2: Appoint an individual with overall responsibility for ensuring that the Biosolids Management Program (BMP) is implemented and maintained.	05/31/18	01/09/18	01/12/08
2017-14	11/08/17	The City of Fort Worth has not fully implemented the requirements from Elements 6 and 9	03/21/18	10/01/18	10/01/18
2017-15	12/05/17	Requirement 8.1: Establish and maintain a training program to ensure that employees responsible for specific biosolids management activities and for the implementation of various BMP functions are competent in performing their assigned tasks and duties. The training program shall provide general awareness of the BMP and how each employee's assigned roles and responsibilities relate to the entire biosolids value chain.	12/06/17	12/14/17	12/14/17
2018-01	03/14/18	Requirement 10.1: Village Creek Procedures do not include a requirement to notify the state in the event of any noncompliance with TPDES Permit No. WQ0010494013.	03/31/18	04/09/18	04/09/18
2018-02	03/22/18	Element 5 -- Consider using the Biosolids Master Plan as a source of near-term Goals and Objectives	06/30/18	06/28/18	07/09/18
2018-03	07/09/18	Requirement 10.1 Develop and implement standard operating procedures, work management practices or other appropriate methods at all critical control points throughout the biosolids value chain to effectively manage potential environmental impacts. (Chemical System Failure--Ferric chloride, Chlorine dioxide)	09/30/18	Not complete	

APPENDIX B: CURRENT GOALS AND OBJECTIVES

GOAL: Increase digested feed sludge to 5%

Objective: Increase digested feed sludge to 5%

ACTION PLAN: VCWRF Thickening Project	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
1. Hire Consultant For Design Work	Ana Peña, Engineering Mgr.	June 15, 2015	Complete (June 15, 2015)	• Environmental Performance • Improve Biosolids Management Practices
2. Finalize Scope of Work	Ana Peña, Engineering Mgr.	July 15, 2015	Complete (July 15, 2015)	
3. Finish conceptual design	Russell Redder, PE	June 30, 2018	Complete (August 31, 2018)	
4. Final design phase	Russell Redder, PE	June 31, 2019	Not complete	
5. Begin construction	Russell Redder, PE	November 30, 2019	Not complete	

Notes/Comments:

- The purpose is to look into a new thickening technology that will replace the DAFTs.
- March 2016: No changes.
- June 2016: Conceptual design date moved forward as it has not been completed.
- September 2016: Conceptual design date moved forward as it has not been completed.
- December 2016: A pilot project has been completed and the City is currently waiting for recommendations for which thickening technology would be best to implement.
- March 2017: Scope of the project changed after the initial pilot study. The conceptual design changed as a result and therefore VCWRF is still awaiting a finished conceptual design.
- June 2017: In April 2017 the scope of the project changed to include improvements to the GBTs and replacement of the gravity thickeners. The project is still in the conceptual design phase and VC is waiting for the PER (preliminary engineering report).
- September 2017: The contract for the design phase was completed in September 2017 and includes finalizing the PER.
- December 2017**:** The consultant has moved into the final design phase and the estimated completion is December 2018. There are no other updates at this time.
- March 2018: The conceptual design phase was delayed due to the consultant having to recalculate sludge flows so as not to over/under design the dewatering equipment (GBTs, rotary drum thickeners).
- June 2018: Preliminary Engineering Report (PER) is expected by the end of the month.
- **September 2018:** A workshop was held on September 11, 2018, with Freese & Nichols to settle design issues and discuss a schedule to move the project forward.

GOAL: Increase percent solids of biosolids (prior to lime addition) by 3%				
Objective: Increase percent solids of biosolids (prior to lime addition) by 3%				
ACTION PLAN: **Dewatering Facility Upgrades**	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	**KEY OUTCOMES**
1. Hire consultant	Steven L. Nutter-Biosolids EMS Mgr.	April 18, 2014	Complete (April 18, 2014)	• Environmental Performance • Regulatory Compliance • Improve Biosolids Management Practices
2. Electrical System Evaluation	Steven L. Nutter-Biosolids EMS Mgr.	July 11, 2014	Complete (August 27, 2014)	
3. Final Design	Steven L. Nutter-Biosolids EMS Mgr.	September 30, 2014	Complete (August 29, 2014)	
4. Funding approved by City Council	Steven L. Nutter-Biosolids EMS Mgr.	October 16, 2015	Complete (October 16, 2015)	
5. Start construction on 6th belt press, polymer, and lime systems.	Steven L. Nutter-Biosolids EMS Mgr.	August 01, 2016	Complete (May 2, 2016)	
6. Finish construction of 6th belt press, new polymer and lime systems.	Steven L. Nutter-Biosolids EMS Mgr.	January 31, 2017	Complete (March 24, 2017)	
7. Optimize polymer system	Steven L. Nutter-Biosolids EMS Mgr.	April 30, 2018	Complete (April 30, 2018)	
8. Optimize 6th belt press	Steven L. Nutter-Biosolids EMS Mgr.	July 31, 2018	Complete (July 17, 2018)	
ACTION PLAN: **Replace/Refurbish Belt Presses**	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
1. Develop Bid Specifications	Steven L. Nutter-Biosolids EMS Mgr.	September 12, 2017	Completed	
2. Award bid and obtain funding by City Council	Steven L. Nutter-Biosolids EMS Mgr.	August 7, 2018	Completed (August 2, 2018)	
3. Finish onsite rehab of one belt press	Steven L. Nutter-Biosolids EMS Mgr.	February 28, 2019	Not complete	
4. Finish onsite rehab of second belt press	Steven L. Nutter-Biosolids EMS Mgr.	May 31, 2019	Not complete	
ACTION PLAN: COMPLETED **Increase dewaterability at the belt presses**	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
1. Corroborate the presence of struvite (collect samples)	Steven L. Nutter-Biosolids EMS Mgr. Ana Peña, Engineering Mgr.	July 7, 2014	Complete (July 7, 2014)	
2. Install ferric sulfate addition station	Steven L. Nutter-Biosolids EMS Mgr. Ana Peña, Engineering Mgr.	August 18, 2014	Complete (August 18, 2014)	
3. Install ferric chloride addition station	Steven L. Nutter-Biosolids EMS Mgr. Ana Peña, Engineering Mgr.	November 25, 2014	Complete (November 24, 2014)	
4. Installation of Total Solids and Total Suspended Solids meters	Steven L. Nutter-Biosolids EMS Mgr. Ana Peña, Engineering Mgr.	April 30, 2015	Complete (April 30, 2015)	
5. Optimize dosage of ferric chloride	Steven L. Nutter-Biosolids EMS Mgr. Ana Peña, Engineering Mgr.	June 1, 2016	Complete (June 10, 2016)	

Notes/Comments
• After ferric sulfate was added, it was determined that the dosage and the chemical itself were not as effective as needed. Therefore a switch was made to ferric chloride, which resulted in a different feed station being built to accommodate the volume necessary to achieve an effective dosage. The addition of ferric chloride should result in the added benefits of minimizing struvite buildup at the dewatering facility and reducing odors. • Dosage optimization was supposed to be complete by May, but because the HRC was in use (which adds Ferric sulfate), an increase in percent solids could not be attributed to the ferric chloride alone. Therefore, the milestone complete date was changed. • The TSS meter was relocated in August 2015. As of September 2015, the ferric chloride contract is being extended through the end of the year. Ferric Chloride dose optimization is still being determined. • As of December 2015, the ferric chloride contract has been extended through the end of January. • March 2016: Ferric chloride has not been optimized yet because VCWRF operations are getting ready to start feeding ferric sulfate in the primaries. This will alter the post-digestion treatment with ferric chloride. • June 2016: During the spring of 2016 ferric sulfate was fed into primary clarifiers 1-6. During this period VC personnel were collecting data to evaluate the effectiveness of the chemical treatment activities. On June 10th, 2016 Tech Services presented the data to senior management at VC. Based on this information the decision was made to perform post digestion treatment with ferric chloride at a concentration of 2 gallons ferric chloride per 1,000 gallons of liquid sludge. If ferric sulfate treatment in the primary area is expanded or reduced then post digestion treatment activities will be reevaluated. • September 2016: Installation of a 6th belt press, lime mixing system, and polymer system has been completed. However, not all of the supporting equipment (pumps, etc.) have arrived on site, and electrical and instrumentation work continues. • December 2016: The 6th belt press, lime system and polymer system are undergoing troubleshooting. • March 2017: Construction on the 6th belt press, polymer system and lime pug mill have been completed. However, troubleshooting activities are still underway. These include 1) 6th belt press tracking and distribution issues, and 2) polymer system performance evaluation is still underway. • June 2017: Work continues to optimize both the newly installed belt press and automated polymer feed system • September 2017**:** Bid specifications for belt press refurbishment completed. Polymer system optimization delayed due to equipment problems with flow meters. Replacement parts have been ordered and equipment is scheduled to be repaired by November 1, 2017. 6th belt press continues to have issues with tracking and servo motors and drives. Andritz is working to troubleshoot these issues. • December 2017: Additional work is being performed on the polymer system to improve reliability with the addition of float switches and a new enclosure. The expected completion date is February 28th, 2018. Work has continued on the newly installed 6th belt press. Due to performance issues, Andritz is in the process of converting the 6th press from the electric-mechanical combined tensioning and tracking to a separate hydraulic tensioning and tracking. This should improve performance and reliability. The conversion should be completed by the end of January with an additional two months for troubleshooting. • March 2018: 6th Belt press – The belt press is operational, however, Andritz continues to work on it to optimize performance. This includes installation of tension shaft guide pins, fixing the hydraulic pressure switch wiring issue, installation of the HMI program and the modification of the lifter for the sludge leveler. Work will be performed on the polymer system to improve reliability with the addition of float switches and a new enclosure. Additional polymer parts have been shipped to the Dewatering facility and installation work is scheduled to be completed by April 30th, 2018. Refurbish Belt Presses – bid specifications have been submitted to Purchasing Department for processing prior to bid issuance. • June 2018: 6th Belt press: Conversion to hydraulic tensioning/tracking is complete. Sludge and polymer flows to the press are being optimized. The project is expected to be completed by July 2018. Polymer Feed System: A float control system was added to the new polymer system in April 2018. The system is working as expected and optimization is complete. Refurbish Belt Presses: Andrtiz was the only bidder for the belt press refurbishment project, which is expected to go to City Council for approval on August 7, 2018. Refurbishment work on two of the belt presses will commence soon thereafter. • **September:** City Council approved Refurbishment project on August 7, 2018. The City is currently working with Andritz to invoice some of the replacement parts before the end of the fiscal year (Sept 30, 2018). Andritz is tentatively scheduled to begin work on one of the belt presses in late November 2018.

GOAL: Increase biosolids storage capacity from 1.3MG to 6.3 MG

Objective: ***Increase biosolids storage capacity from 1.3MG to 6.3 MG***

ACTION PLAN: Install liquid sludge storage tanks	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	
1. Hire Consultant for Design Work	Steven L. Nutter-Biosolids EMS Mgr.	April 20, 2015	Complete (April 20, 2015)	• Environmental Performance • Improve Biosolids Management Practices
2. Finalize Scope of Work	Steven L. Nutter-Biosolids EMS Mgr.	July 10, 2015	Complete (July 10, 2015)	
3. City Council Approval	Steven L. Nutter-Biosolids EMS Mgr.	March 31, 2016	Completed (March 29, 2016)	
4. Finish Conceptual design	Steven L. Nutter-Biosolids EMS Mgr.	March 01, 2017	Complete (March 01, 2017)	
5. Final design phase	Steven L. Nutter-Biosolids EMS Mgr.	May 30, 2018	Complete (June 8, 2018)	
6. Project bid closes	Steven L. Nutter-Biosolids EMS Mgr.	June 21, 2018	Complete (June 21, 2018)	
7. Project Awarded (City Council Approval)	Steven L. Nutter-Biosolids EMS Mgr.	September 30, 2018	Complete (September 11, 2018)	
8. Begin construction	Steven L. Nutter-Biosolids EMS Mgr.	December 01, 2018	Not complete	
9. Finish construction	Steven L. Nutter-Biosolids EMS Mgr.	February 28, 2020	Not complete	

Notes/Comments:

- March 2016: Completion dates have been moved forward.
- June 2016: The sixth belt press has been put in place, but is not fully installed/online.
- September 2016**:** Liquid sludge storage tank project has completed the preliminary design phase (conceptual design completed).
- December 2016: Facility expansion-Dewatering technologies are being evaluated.
  Liquid storage tanks-Tank capacities are being evaluated.
- March 2017: The City is in the process of reevaluating its long-term biosolids strategy due to the changing regulatory environment and potential cost drivers. The belt press facility expansion is on hold until this evaluation is complete.
- June 2017: Currently work is underway to achieve 60% design phase on the tank project.
- September 2017: Consultant is still working to achieve 60% design.
- December 2017: Sixty percent (60%) design drawings were delivered to the City at the end of December 2017. City staff is reviewing the drawings and preparing comments. The next step is the 90% design phase.
- March 2018: Ninety percent design phase was completed March 19, 2018. The next step is to finalize the design.
- June 2018: The 100% design phase is complete. The bid phase closed on June 21, 2018, and will be presented to City Council for approval by September 2018.
- **September 2018:** City Council approved the storage tank project on September 11, 2018. A construction schedule has not been created yet, but one should be in place by early November 2018.

GOAL: Identify four public concerns regarding biosolids				
Objective: ***Identify four public concerns regarding biosolids***				
ACTION PLAN: A- COMPLETED Determine concerns based on feedback received from interested parties.	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	**KEY OUTCOMES**
1. Identify four (4) public/third party concerns	VCWRF Biosolids personnel	September 15, 2015	Complete (September 23, 2015)	• Improve Public Relations
Concern #1= "The City of Fort Worth biosolids web pages are out of date." *Concern #2= "The EPA and TCEQ standards are not strict enough."* Concern #3= "Too much about biosolids are unknown." Concern #4= "Are there pharmaceuticals and personal care products (PPCPs) in biosolids?"				
2a. For each concern, either contact three (3) interested parties or conduct presentation with one (1) interested party*	VCWRF Biosolids personnel	September 30, 2017	**Concern #1 -**Complete (January 13, 2016) **Concern #2** –Complete (March 30, 2017) **Concern #3-**Complete (November 10, 2015) **Concern #4-**Complete (November 10, 2015)	
2b. Create a biosolids specific tour presentation that addresses concerns 2-4.	VCWRF Biosolids personnel	September 30, 2017	Complete (March 30, 2017)	
ACTION PLAN: B- COMPLETED Improve ability to identify concerns via ~~mail outs~~ FAQs placed in information tubes at land application sites	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
1. Contact the communication and outreach division to determine if mail outs (surveys, fact sheets, etc.) are feasible	VCWRF Biosolids personnel	July 31, 2015	Complete (June 12, 2015)	
2. Determine if the GIS department can acquire mailing addresses for residents around land sites	VCWRF Biosolids personnel	August 7, 2015	Complete (September 14, 2015)	
3. Develop information FAQ to be mailed to interested parties	VCWRF Biosolids personnel	October 15, 2015	Complete (December 21, 2015)	
4. Determine if addresses can be purchased to mail out FAQ	VCWRF Biosolids personnel	October 31, 2015	Complete (December 21, 2015)	
5. Determine if FAQ can be mailed to addresses surrounding land application sites	VCWRF Biosolids personnel	October 31, 2015	Complete (December 21, 2015)	
6. Begin placing FAQ in information tubes attached to site notification signs at land application site entrances	VCWRF Biosolids personnel	March 25, 2016	Complete (March 25, 2016)	
7. Evaluate the effectiveness of the information tubes by tracking the amount of FAQ taken	VCWRF Biosolids personnel	November 30, 2016	Complete (December 29, 2016)	
ACTION PLAN: C-COMPLETED	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
Improve ability to identify concerns using the Water Department's social media accounts				
1. Contact the Communication and Outreach division to determine what content can be posted to the Water Department's social media accounts (Facebook & Twitter)	VCWRF Biosolids personnel	July 31, 2015	Complete (June 12, 2015)	
2. Begin posting biosolids information to Water Department's Facebook account (this will include any facts not listed on the FAQ sheet)	VCWRF Biosolids personnel	March 31, 2017	Complete (September 23, 2017)	

GOAL: Identify four public concerns regarding biosolids				
Objective: ***Identify four public concerns regarding biosolids***				
ACTION PLAN: A- COMPLETED Determine concerns based on feedback received from interested parties.	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	**KEY OUTCOMES**
2. Identify four (4) public/third party concerns	VCWRF Biosolids personnel	September 15, 2015	Complete (September 23, 2015)	• Improve Public Relations
Concern #1= "The City of Fort Worth biosolids web pages are out of date." *Concern #2= "The EPA and TCEQ standards are not strict enough."* Concern #3= "Too much about biosolids are unknown." Concern #4= "Are there pharmaceuticals and personal care products (PPCPs) in biosolids?"				
2a. For each concern, either contact three (3) interested parties or conduct presentation with one (1) interested party*	VCWRF Biosolids personnel	September 30, 2017	**Concern #1** -Complete (January 13, 2016) **Concern #2** –Complete (March 30, 2017) **Concern #3**-Complete (November 10, 2015) **Concern #4**-Complete (November 10, 2015)	
2b. Create a biosolids specific tour presentation that addresses concerns 2-4.	VCWRF Biosolids personnel	September 30, 2017	Complete (March 30, 2017)	
ACTION PLAN: B- COMPLETED Improve ability to identify concerns via ~~mail outs~~ FAQs placed in information tubes at land application sites	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
8. Contact the communication and outreach division to determine if mail outs (surveys, fact sheets, etc.) are feasible	VCWRF Biosolids personnel	July 31, 2015	Complete (June 12, 2015)	
9. Determine if the GIS department can acquire mailing addresses for residents around land sites	VCWRF Biosolids personnel	August 7, 2015	Complete (September 14, 2015)	
10. Develop information FAQ to be mailed to interested parties	VCWRF Biosolids personnel	October 15, 2015	Complete (December 21, 2015)	
11. Determine if addresses can be purchased to mail out FAQ	VCWRF Biosolids personnel	October 31, 2015	Complete (December 21, 2015)	
12. Determine if FAQ can be mailed to addresses surrounding land application sites	VCWRF Biosolids personnel	October 31, 2015	Complete (December 21, 2015)	
13. Begin placing FAQ in information tubes attached to site notification signs at land application site entrances	VCWRF Biosolids personnel	March 25, 2016	Complete (March 25, 2016)	
14. Evaluate the effectiveness of the information tubes by tracking the amount of FAQ taken	VCWRF Biosolids personnel	November 30, 2016	Complete (December 29, 2016)	
ACTION PLAN: C-COMPLETED	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
Improve ability to identify concerns using the Water Department's social media accounts				
3. Contact the Communication and Outreach division to determine what content can be posted to the Water Department's social media accounts (Facebook & Twitter)	VCWRF Biosolids personnel	July 31, 2015	Complete (June 12, 2015)	
4. Begin posting biosolids information to Water Department's Facebook account (this will include any facts not listed on the FAQ sheet)	VCWRF Biosolids personnel	March 31, 2017	Complete (September 23, 2017)	

ACTION PLAN: D Improve ability to address public concerns by updating Biosolids webpage	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	**KEY OUTCOMES**
1 Update grammar and typographical errors	VCWRF Biosolids personnel	August 31, 2015	Complete (August 17, 2015)	
1 Remove outdated information	VCWRF Biosolids personnel	August 31, 2015	Complete (September 17, 2015)	
1 Update tables on web pages	VCWRF Biosolids personnel	August 31, 2015	Complete (January 13, 2016)	
2 Add additional webpage for biosolids brochure	VCWRF Biosolids personnel	December 31, 2018	Not complete	
2 Add additional webpage for FAQ (developed from 2nd action plan above)	VCWRF Biosolids personnel	December 31, 2018	Not complete	
2 ~~Add additional webpage for facts not listed in the FAQ~~	~~VCWRF Biosolids personnel~~	~~January 31, 2017~~	~~Not complete~~	
ACTION PLAN: E -Completed Improve ability to address or identify concerns via tour survey	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	• Improve Public Relations
1. Develop a survey to gauge the public's general knowledge/feelings about biosolids	VCWRF Biosolids personnel	December 31, 2015	Complete (October 29, 2015)	
2. Preliminary implementation of a survey to determine what metrics can be obtained and used for quantifying public outreach responses	VCWRF Biosolids personnel	December 31, 2015	Complete (November 15, 2015)	
3. Begin using survey on a regular basis during tours when possible	VCWRF Biosolids personnel	December 31, 2015	Complete (November 15, 2015)	
4. Evaluate metrics and plot data to determine the effectiveness of survey and tour presentations	VCWRF Biosolids personnel	July 31, 2016	Complete (July 13, 2016)	
ACTION PLAN: F Develop 2 educational videos relating to biosolids.	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
1. Meeting with Water Department public outreach personnel to determine video options	Glory Walker, Biosolids Public Outreach Coordinator	February 01, 2017	Complete (February 01, 2017)	
2. Brainstorming meeting among biosolids personnel to discuss options and approach	VCWRF Biosolids personnel	February 02, 2017	Complete (February 02, 2017)	
3. Determine themes of videos	VCWRF Biosolids personnel	February 02, 2017	Complete (February 02, 2017)	
4. Determine the method of production	VCWRF Biosolids personnel	April 31, 2018	Complete (March 14, 2018)	
5. Start video production (General Biosolids Information)	VCWRF Biosolids personnel, Communications Specialist	August 31, 2018	Complete (March 14, 2018)	
6. Finalize video for viewing (General Biosolids Information)	VCWRF Biosolids personnel, Communications Specialist	July 31, 2018	Complete (August 13, 2018)	
7. Start video production (Farmer-site in Biosolids Program)	VCWRF Biosolids personnel, Communications Specialist	November 30, 2018	Not Complete	
8. Finalize video for viewing (Farmer-site in Biosolids Program)	VCWRF Biosolids personnel, Communications Specialist	December 31, 2018	Not Complete	

Notes/Comments:

•*Contact may involve providing literature or documentation regarding the City's biosolids program or inviting interested parties for tours of the Village Creek Water Reclamation Facility and Dewatering Facility.
•Additional steps may be added to the action plans once feasibility of the outreach activity has been determined.

Action Plan A

- The FAQ addresses Concerns #1 and # 3 and will be available to the public via tours or information tubes attached to land application signs at site entrances.
- March 2016: Concern #1 has been completed, but the date is not known. When details can be acquired, the date will be inserted.
- July 2016: Concern #2 will be addressed in a presentation to be developed by the end of 2016 that will be specific to the biosolids program that can be used for special tour groups or interested parties. Concern #4 was addressed in a brochure that was completed in November but not printed until April 2016.
- September 2016: Concern #2 will be addressed in a presentation to be developed by the end of 2016 that will be specific to the biosolids program that can be used for special tour groups or interested parties.
- December 2016: The tour presentation that will address concern #2 (as well as #3 and #4) is still being developed. This presentation may be incorporated into the tours at Village Creek.
- **March 2017:** The four concerns identified have all been addressed in various public outreach materials.

Action Plan B

- The GIS department was contacted on August 7th regarding whether they were able to gather mailing addresses for residents surrounding land application sites. On September 14, 2015, the GIS department notified biosolids personnel that they were unable to acquire the addresses.
- On December 21, 2015, it was determined that mailing fact sheets is not a viable option for the biosolids program. Instead, fact sheets will be placed in an information tube and attached to the site notification signs located at site entrances. Placing a certain amount of fact sheets in the tubes and counting them during inspections will allow us to keep track of how many are taken introducing a potential metric with which to measure this outreach effort.
- March 2016: Information tubes were attached to site notification signs on 03-25-16 and a certain number of ~~factsheets~~ Frequently Asked Questions were placed inside. This information will be tracked to determine how effective the Information tubes are. Two more steps were added to reflect the change to this action plan.
- July 2016**:** Since Infotubes with FAQs have been posted on land application signs; approximately 34% of them have been taken. Sign/Infotube visibility, site entrance location, and number of FAQs taken per person are all variables that can affect the percent of FAQ taken at land application sites. Data collection for FAQs will be ongoing even after the action plan is completed.
- September 2016: No changes.
- **December 2016:** Since March 2016, 250 FAQs have been placed in infotubes at 19 land application sites. Of those 250 FAQs, 66 (or 26%) have been taken by citizens. As previously mentioned, sign/infotube visibility, site entrance location, and number of FAQs taken per person are all variables that can affect the percent of FAQ taken at land application sites. New infotubes were purchased in November 2016 that allows for higher placement on land application signs, which will increase their visibility and hopefully lead to more FAQs taken by citizens. This action plan is complete. However, data collection for FAQs will continue.

Action Plan C

- When lime is removed, and it can be confirmed that the biosolids odors have improved for the long term, information will begin being posted to the Water Department's Facebook page (where the application is occurring, general information about the biosolids program, etc.)
- March 2016: Completion date has been moved forward for social media postings.
- July 2016: Currently waiting for Chlorine dioxide to be approved for long-term biosolids treatment before posting information to social media regarding biosolids program and biosolids quality.
- September 2016: No changes.
- December 2016: The usage of chlorine dioxide is now in place and biosolids odors have improved. Posting biosolids information to the Water Department's social media accounts is still under evaluation.
- March 2017: The City of Fort Worth is in the process of finalizing its published materials criteria. Once this has been completed, biosolids personnel can revisit posting biosolids related material to the Water Department's social media accounts.
- June 2017: The position responsible for posting information to the Water Department's social media accounts is currently vacant. A public outreach meeting is scheduled for mid-July to discuss whether biosolids information will be able to be posted in the interim.
- September 2017: On September 21, 2017, staff from the Water Department's Communication and Outreach division drafted several biosolids social media posts. After obtaining our approval on the proposed social media posts, the Water Department began posting biosolids information to the department's Facebook account, along with #FWBiosolids on September 23, 2017.

Action Plan D

- Due to changes to the City's website policies the Water Department's Communication and Outreach division informed biosolids personnel that posting PDF documents to the City's web pages should be avoided as much as possible to comply with the Americans with Disabilities Act (ADA) requirements. Therefore, new information will be added as additional web pages if possible. See Action Plan: Add additional biosolids webpages.
  March 2016: Completion dates have been moved forward due to complications in posting information to the City's website. Step 1c has been completed, but the date is not known. When details can be acquired, the date will be inserted.
- July 2016: Reference material that was used to develop facts not listed in the FAQ is being acquired to be made available to the public when new biosolids web pages can be posted.
- September 2016: No Changes.
- December 2016: Action Plan D-2c is being absorbed by Action Plan C-1. Public Outreach personnel within the Water Department will eventually use biosolids facts on the Water Department's social media accounts to extend biosolids information to the general public.
- March 2017: The City of Fort Worth is in the process of finalizing its published materials criteria. Once this has been completed, biosolids personnel can revisit posting biosolids related material to the ~~Water Department's social media accounts~~ City's website.
- June 2017: In April 2017, the City completed its new Branding and Style Guide for published materials. Biosolids materials will need to be rebranded to abide by the City's requirements before they are posted on the City's website.
- September 2017: The FAQ sheet and About Biosolids sheet were redesigned to comply with the City's Branding and Style Guide. On July 17 and 18, 2017, these outreach materials were emailed to the Water Department's Communication and Outreach division with the understanding that these items would be posted to the website as soon as possible. However, to date, these items have not been posted to the City's website.
- December 2017: Organizational changes to the Water Department have delayed this action item. An additional employee has been hired to work on public outreach efforts in the Water Department. When this individual has been familiarized with the wastewater treatment and biosolids processes, it is anticipated that he/she will be able to assist the Biosolids Program with public outreach efforts.
- March 2018: A new Communications Specialist with the Water Department met with the Biosolids Public Outreach Coordinator on March 14, 2018, to take a wastewater and dewatering plant tour to become familiar with the processes. The future of biosolids public outreach efforts was discussed during this time as well. In the near future, the Communications Specialist will visit a land application site to get more insight into the biosolids program. The intent is to start posting content on social media as soon as the Communications Specialist is familiar with the Biosolids Program.
- **June 2018**: The Communications Specialist in the Customer Care Division met with the Biosolids Public Outreach Coordinator on May 31, 2018, to visit a land application site and observe biosolids land application activities. With more familiarity with the Biosolids Program, the Communications Specialist has begun compiling content for the biosolids pages on the City's website.
- **September 2018**: While progress has been made in regards to public outreach efforts, availability of public outreach personnel has delayed the posting of additional biosolids information for the City's web pages.

Action Plan E

- It is anticipated that possible metrics stemming from the responses gathered from the survey will include: how familiar people are with the term "biosolids,' what people's general attitude is towards biosolids, and if their general attitude changes after seeing a presentation on wastewater treatment and biosolids.
- March 2016: The completion date has been moved forward to accumulate more tour data.
- **July 2016:** Since surveys began being distributed during Village Creek tours in November, 103 comments have been elicited from tour participants. Past tours that did not include a biosolids survey, rarely garnered any feedback about biosolids. Surveys have been an effective tool at eliciting comments and questions, and different metrics have been gathered based on the survey responses. This action plan is complete, but tour data will continue to be collected. Additional notes are available upon request.

Action Plan F

- March 2017: New action plan.
- June 2017: A meeting will occur in July to discuss the direction of this action plan.
- September 2017: The biosolids video project has been delayed due to limited manpower. However, the Village Creek Water Reclamation Facility (VCWRF) recognizes the value in this type of public outreach activity. VCWRF should be able to dedicate more resources to this project in the upcoming year.
- December 2017: A meeting was held on 12-14-17 amongst the biosolids personnel to discuss the feasibility of the educational videos. Additional themes were discussed. It is anticipated that additional resources from the Water Department's public outreach personnel will be available in the near future to assist with this project.
- March 2018: Water Conservation Specialists recorded a short video with an overview of Village Creek and the Biosolids Program. This video was posted to the City's Water Department Facebook page on World Water Day (3-22-18). This video, along with the Water Conservation Specialists and new Communication Specialist, may serve as a reference for the Biosolids Personnel when developing the educational videos for the Biosolids Program.
- June 2018: During the March 14, 2018 meeting, it was decided to use a GoPro to shoot a video for the biosolids educational videos. The Communication Specialist began shooting video on this day while touring VCWRF and the Dewatering Facility. The content of this video will focus on general information regarding the Biosolids Program.
- **September 2018**: A video highlighting the production of biosolids was completed and posted to the City's Water Department Facebook account for public viewing on 08/13/2018. The video was "Liked" 16 times and shared 3 times. The same video was shared on the City's Water Department Twitter account and "Liked" 2 times and viewed 56 times. An additional biosolids video featuring a landowner in the Biosolids Program is still being planned. Due to the availability of personnel and inclement weather, it has been delayed.

GOAL: ***Reduce the amount of lime (tons) used per month by 50%***

Objective: ***Reduce the amount of lime (tons) used per month by 50%***

ACTION PLAN: Add chlorine dioxide to biosolids to meet pathogen requirements	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
1. Obtain approval for a pilot project	Steven L. Nutter-Biosolids EMS Mgr.	December 31, 2015	Complete (December 1, 2015)	• Environmental Performance • Improve Biosolids Management Practices
2. Begin pilot project	Steven L. Nutter-Biosolids EMS Mgr.	March 1, 2016	Complete (March 15, 2016)	
3. Conduct pathogen sampling	Steven L. Nutter-Biosolids EMS Mgr.	May 1, 2016	Complete (May 10, 2016)	
4. Evaluate effectiveness	Steven L. Nutter-Biosolids EMS Mgr.	June 1, 2016	Complete (June 16, 2016)	
5. Award contract for long-term usage	Steven L. Nutter-Biosolids EMS Mgr.	December 31, 2016	Complete (November 21, 2016)	
6. Modify the lime dosage system to allow for better control and lower dosages	Steven L. Nutter-Biosolids EMS Mgr.	June 01, 2017	Complete (March 01, 2017)	
7. Modify the ClO_2 system to improve mixing, redundancy and overall performance (See CAP-17-07)	Steven L. Nutter-Biosolids EMS Mgr.	October 31, 2017	Complete (November 1, 2017)	
8. Determine if lime usage can be decreased after ClO_2 has been online	Steven L. Nutter-Biosolids EMS Mgr.	November 02, 2018	Not complete	

Notes/Comments:

- July 2016: To reduce odors, which are primarily caused by lime, Chlorine dioxide was found to be a feasible option for improving biosolids quality. Chlorine dioxide can also be utilized for pathogen reduction, which would allow for a reduction in lime usage. Currently, the City is waiting for a long-term contract to be put in place to feed chlorine dioxide to SOL storage tank #1. Chlorine dioxide was found to be most effective at eliminating pathogens and reducing odors at 100ppm.
- September 2016: Working with Purchasing Department to complete bid specifications.
- December 2016: The lime transfer auger is only able to operate at certain speeds. Therefore, the gears and gear ratios are being evaluated for improved operation.
- March 2017: Modifications to pug mill have been completed to allow for lower lime dosages.
- June 2017: Coordinating activities with sludge storage tank project to make sure ClO_2 generators are not interfering with operations.
- September 2017: ClO_2 mixing and piping improvements have been completed. Testing for reduced lime dosages has been delayed until pond dredging activities are completed.
- December 2017: A second ClO_2 generator has been installed to improve operational redundancy. Both generators, the pump, and the control panel have been mounted on a covered metal skid.
- March 2018: A lime reduction study was conducted in February 2018 to determine if lowering the pH from 12 to 11 (reducing the amount of lime) would allow for effective pathogen control. The results from the study indicated that odors weren't greatly affected by the lime reduction, but pathogen reduction was effective at pH11. An additional study will be conducted by the end of spring 2018 to obtain additional results.
- June 2018: An additional study has been rescheduled to be completed by the end of summer 2018.
- **September 2018:** The study has been delayed due to staff and equipment availability, recent rain, and the use of the Peak Flow Basin making the SOL field inaccessible for land application. A second attempt will be made later this year.

GOAL: ***Reduce costs associated with producing biosolids by 10%***				
Objective: ***Reduce costs associated with producing biosolids by 10%***				
ACTION PLAN: **Biosolids Master Plan**	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	**KEY OUTCOMES**
1. Finalize Biosolids Master Plan	Steven L. Nutter-Biosolids EMS Mgr.	October 1, 2018	Not complete	• Environmental Performance • Improve Biosolids Management Practices • Regulatory compliance
2. Issue RFP based on results from Master Plan	Steven L. Nutter-Biosolids EMS Mgr.	November 21, 2018	Not complete	
ACTION PLAN: **Develop Biosolids Contract Documents**	**RESPONSIBLE PARTY**	**MILESTONE COMPLETION DATE**	**STATUS**	
1. Develop RFP Documents	Steven L. Nutter-Biosolids EMS Mgr.	November 1, 2018	Not complete	
2. Develop Draft Contract	Steven L. Nutter-Biosolids EMS Mgr.	September 1, 2019	Not complete	
Notes/Comments: • June 2018: The Biosolids Master Plan is expected to be completed in two months. • **September 2018:** Upon further review, it was determined that this goal could not meet SMART criteria (specifically time-bound). As such, this goal will be removed during the next quarterly update. Activities associated with the Biosolids Master Plan will be tracked on the CAP master list until a more substantial Goal and Objective can be developed.				