



December 6, 2011  
FINAL

# October 2011 Update to the Texas Water Quality Management Plan

Prepared by the:  
Office of Water, Water Quality Division

---

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



# October 2011 Update to the Texas Water Quality Management Plan

Compiled and distributed by the  
Water Quality Assessment Section  
Water Quality Division  
Texas Commission on Environmental Quality  
P.O. Box 13087, MC-150  
Austin, Texas 78711-3087

December 2011

WQMP updates are also available on the TCEQ web site at:

< [www.tceq.texas.gov/waterquality/assessment/WQmanagement\\_updates.html](http://www.tceq.texas.gov/waterquality/assessment/WQmanagement_updates.html) >

Developed in accordance with Sections 205(j)  
and 208 of the Federal Clean Water Act  
and applicable regulations thereto.



**Bryan W. Shaw PhD.,** *Chairman*  
**H.S. Buddy Garcia,** *Commissioner*  
**Carlos Rubinstein,** *Commissioner*  
**Mark R. Vickery, P.G.,** *Executive Director*

Authorization for use or reproduction of any original material contained in this publication—that is, not obtained from other sources—is freely granted. The commission would appreciate acknowledgement.

The TCEQ is an equal opportunity/affirmative action employer. The agency does not allow discrimination on the basis of race, color, religion, national origin, sex, disability, age, sexual orientation or veteran status. In compliance with the Americans with Disabilities Act, this document may be requested in alternate formats by contacting the TCEQ at (512) 239-0028, Fax 239-4488, or 1-800-RELAY-TX (TDD), or by writing P.O. Box 13087, Austin, TX 78711-3087.

**Table of Contents**

Introduction ..... 1  
Projected Effluent Limit Updates ..... 3  
Planning Information Summary ..... 6  
Designated Management Agencies ..... 9  
Total Maximum Daily Load Updates ..... 10

**Tables**

Table 1. Projected Effluent Limit Updates ..... 4  
Table 2. Service Area Population Updates ..... 8  
Table 3. Designated Management Agencies Updates ..... 9

**Appendixes**

Appendix I. Withdrawal of Two Total Maximum Daily Loads for Total Dissolved Solids and Chlorides in Clear Creek Above Tidal: Segment 1102 ..... 11  
Appendix II. Four Total Maximum Daily Loads for Indicator Bacteria in Halls Bayou and Tributaries For Segment Numbers 1006D, 1006I, and 1006J ..... 18  
Appendix III. Fifteen Total Maximum Daily Loads for Indicator Bacteria in Watersheds Upstream of Lake Houston For Segment Numbers 1004E, 1008, 1008H, 1009, 1009C, 1009D, 1009E, 1010, and 1011 ..... 20  
Appendix IV. One Total Maximum Daily Load for Bacteria in Upper Oyster Creek for Segment Number 1245 ..... 22



# Introduction

The Texas Water Quality Management Plan (WQMP) is the product of a wastewater treatment facility planning process developed and updated in accordance with provisions of Sections 205(j), 208, and 303 of the federal Clean Water Act (CWA), as amended. The WQMP is an important part of the State's program for accomplishing its clean water goals.<sup>1</sup>

The Texas Department of Water Resources, a predecessor agency of the Texas Commission on Environmental Quality (TCEQ), prepared the initial WQMP for waste treatment management during the late 1970s. The Clean Water Act mandates that the WQMP be updated as needed to fill information gaps and revise earlier certified and approved plans. Any updates to the plan need involve only the elements of the plan that require modification. The original plan and its subsequent updates are collectively referred to as the State of Texas Water Quality Management Plan.

The WQMP is tied to the State's water quality assessments that identify priority water quality problems. The WQMPs are used to direct planning for implementation measures that control and/or prevent water quality problems. Several elements may be contained in the WQMP, such as effluent limitations of wastewater facilities, total maximum daily loads (TMDLs), nonpoint source management controls, identification of designated management agencies, and ground water and source water protection planning. Some of these elements may be contained in separate documents which are prepared independently of the current WQMP update process, but may be referenced as needed to address planning for water quality control measures.

This document, as with previous updates<sup>2</sup>, will become part of the WQMP after completion of its public participation process, certification by the TCEQ on behalf of the Governor of Texas, and approval by the Environmental Protection Agency (EPA).

The materials presented in this document revise only the information specifically addressed in the following sections. Previously certified and approved water quality management plans remain in effect.

The October 2011 WQMP update addresses the following topics:

1. Projected Effluent Limits Updates for water quality planning purposes
2. Service Area Population for Municipal Wastewater Facilities
3. Designation of Management Agencies for Municipal Wastewater Facilities
4. Total Maximum Daily Load Updates

The Projected Effluent Limit Update section provides information compiled from August 1, 2011 through October 31, 2011, and is based on water quality standards, and may be used for water quality planning purposes in Texas Pollutant Discharge Elimination System (TPDES) permit actions.

---

<sup>1</sup> A formal definition for a water quality management plan is found in 40 Code of Federal Regulations (CFR) 130.2(k).

<sup>2</sup> Fiscal Years 1974, 1975, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984/85, 1986/88, 1989, 1990, 1991, 1992, 1993/94, 1995, 1996, 1997/98, 02/1999, 05/1999, 07/1999, 10/1999, 01/2000, 04/2000, 07/2000, 10/2000, 01/2001, 04/2001, 07/2001, 10/2001, 01/2002, 04/2002, 07/2002, 10/2002, 01/2003, 04/2003, 07/2003, 10/2003, 01/2004, 04/2004, 07/2004, 10/2004, 01/2005, 04/2005, 07/2005, 10/2005, 01/2006, 04/2006, 07/2006, 10/2006, 01/2007, 04/2007, 07/2007, 10/2007, 01/2008, 04/2008, 07/2008, 10/2008, 01/2009, 04/2009, 07/2009, 10/2009, 01/2010, 04/2010, 07/2010, 10/2010, 01/2011, 04/2011, and 07/2011.

The Service Area Population and Designation of Management Agencies sections for municipal wastewater facilities has been developed and evaluated by the TCEQ in cooperation with the Texas Water Development Board (TWDB) and regional water quality management planning agencies.

The Total Maximum Daily Load (TMDL) Update section provides information on proposed waste load allocations for new dischargers and revisions to existing TMDLs and has been developed by the Water Quality Planning Division, TMDL Program.

## Projected Effluent Limit Updates

Table 1 reflects proposed effluent limits for new dischargers and preliminary revisions to original proposed effluent limits for preexisting dischargers (MGD-Million Gallons per Day, CBOD<sub>5</sub> – 5 Day Carbonaceous Biochemical Oxygen Demand, NH<sub>3</sub>-N – Ammonia-Nitrogen, BOD<sub>5</sub> – 5 Day Biochemical Oxygen Demand and DO – Dissolved Oxygen).

Effluent flows indicated in Table 1 reflect future needs and do not reflect current permits for these facilities. These revisions may be useful for water quality management planning purposes. The effluent flows and constituent limits indicated in the table have been preliminarily determined to be appropriate to satisfy the stream standards for dissolved oxygen in their respective receiving waters. These flow volumes and effluent sets may be modified at the time of permit action. These limits are based on water quality standards effective at the time of the TCEQ production of this update. Water Quality Standards are subject to revision on a triennial basis.

Table 1. Projected Effluent Limit Updates

State Permit Number	Segment Number	EPA ID Number	Permittee Name County	Flow (MGD)	CBOD <sub>5</sub> (mg/L)	CBOD <sub>5</sub> (lbs/day)	NH <sub>3</sub> -N (mg/L)	NH <sub>3</sub> -N (lbs/day)	BOD <sub>5</sub> (mg/L)	BOD <sub>5</sub> (lbs/day)	DO (mg/L)	Months/ Comments
10236-001	1006	0021253	Sunbelt FWSD Harris	2.10	7	122.60	2	35.03			6	Apr-Oct
				2.10	10	175.14	5	87.57			5	Nov-Mar
10348-001	0838	0025011	Trinity River Authority of Texas Ellis  *Combined flow for Outfalls 001 & 002 not to exceed permitted flow for Outfall 002	0.9*	5	37.53	2	15.01			5	May – Sep (Outfall 001)
				0.9*	10	75.06	4	30.02			6	Oct – Apr (Outfall 001)
				6.0*	5	250.20	2	100.08			5	May – Sep (Outfall 002)
				6.0*	10	500.40	4	200.16			6	Oct – Apr (Outfall 002)
10749-008	1903	0133094	San Antonio River Authority Bexar	0.050	10	4.17	3	1.25			4	
10788-001	0610	0023701	Rayburn Country MUD Jasper	0.60	10	50.04	2	10.01			6	May-Sep
				0.60	10	50.04	3	15.01			5	Oct-Apr
10923-001	0824	0025097	City of Lindsay Cooke	0.20					10	16.68	4	
11959-001	0814	0075191	Texas Department of Transportation Ellis	0.015	10	1.25	19	2.38			6	

State Permit Number	Segment Number	EPA ID Number	Permittee Name County	Flow (MGD)	CBOD <sub>5</sub> (mg/L)	CBOD <sub>5</sub> (lbs/day)	NH <sub>3</sub> -N (mg/L)	NH <sub>3</sub> -N (lbs/day)	BOD <sub>5</sub> (mg/L)	BOD <sub>5</sub> (lbs/day)	DO (mg/L)	Months/ Comments
12512-001	0203	0035211	U.S. Department of the Air Force & Petrus Environmental Services Inc. Grayson	0.030					10	2.50	4	
13735-001	2432	0118001	Estate of Robert Edward Pine & Catherine deBlieux Brazoria	0.035	10	2.92	3	0.88			4	
14476-001	1009	0126161	Harris County MUD No. 418 Harris	3.60	7	210.17	2	60.05			6	
14714-001	2422	0128783	John Broyles Chambers	0.010	10	0.83	3	0.25			4	
14769-001	0817	0129348	TA Operating LLC Hill	0.045					10	3.75	4	
15008-001	1001	0129917	VAM USA, LLC Harris	0.005	10	0.42	3	0.13			4	
15010-001	0807	0133116	Abraxas Corporation Parker	0.030	10	2.50	2	0.50			4	

## Planning Information Summary

The Water Quality Planning Division of the TCEQ coordinated with the TWDB and regional planning agencies to compile the wastewater facility information in this section. Domestic facility financing decisions under the State Revolving Loan Fund (SRF) program must be consistent with the certified and approved WQMP.

The purpose of this section is to present data reflecting facility planning needs, including previous water quality management plan needs requiring revision. Data are also presented to update other plan information for the TWDB's SRF projects. Table 2 contains the updated Service area population information. The table is organized in alphabetical order and includes the following 10 categories of information:

1. Planning Area – Area for which facility needs are proposed. The facility planning areas are subject to change during the facility planning process and any such changes will be documented in a later water quality management plan update. All planning areas listed are also designated management agencies (DMAs) unless otherwise noted in the “Comments” column.
2. Service Area – Area that receives the provided wastewater service.
3. Needs – A “T” indicates a need for either initial construction of a wastewater treatment plant, additional treatment capacity, or the upgrading of a wastewater treatment plant to meet existing or more stringent effluent requirements. A “C” indicates a need for improvements to, expansion of, rehabilitation of, or the initial construction of a wastewater collection system in the facility planning area. “T/C” indicates a need for both treatment and collection system facilities. More detailed facility planning conducted during a construction project may define additional needs and those needs will be reflected in a future update to the WQMP.
4. Needs Year – The year in which the needs were identified for the planning area.
5. Basin Name – The river basin or designated planning area where the entity is located. The seven water quality management planning areas designated by the Governor are Corpus Christi [Coastal Bend Council of Governments (CBCOG)], Killeen-Temple [Central Texas Council of Governments (CTCOG)], Texarkana [Ark-Tex Council of Governments (ATCOG)], Southeast Texas [South East Texas Regional Planning Council (SETRPC)], Lower Rio Grande Valley [Lower Rio Grande Valley Development Council (LRGVDC)], Dallas-Fort Worth [North Central Texas Council of Governments (NCTCOG)] and Houston [Houston-Galveston Area Council (H-GAC)]. Basin names are shown for agencies outside one of these areas.
6. Segment – The classified stream segment or tributary into which any recommended facility may discharge existing or projected wastewater. In the case of no-discharge facilities, this is the classified stream segment drainage area in which the facilities are located.
7. County – The county in which the facility planning area is located.
8. Date – The date the planning information was reviewed by the TCEQ.

9. Comments – Additional explanation or other information concerning the facility planning area.
10. Population – The base year and projected populations for each facility planning area. Population projections presented are consistent with the latest available statewide population projections or represent the most current information obtained from facility planning analyses.

The facility information in this section is intended to be utilized in the preparation of facility plans and the subsequent design and construction of wastewater facilities. Design capacities of the treatment and collection systems will be based upon the population projections contained in this document plus any additional needed capacity established for commercial/industrial flows and documented infiltration/inflow volumes (treatment or rehabilitation). The probable needs shown under the “Needs” heading are preliminary findings; specific needs for an area shall be as established in the completed and certified detailed engineering studies conducted during facility planning under the SRF and other state loan programs.

Specific effluent quality for any wastewater discharges resulting from any of the facilities recommended in this document will be in accordance with the rule on the Texas Surface Water Quality Standards in effect at the time of permit issuance for the specific facility.

Table 2. Service Area Population Updates

Planning Agency	Service Area	Needs	Needs Year	Basin Name / COG	Segment	County	WQMP Date	Comments	Year	Population
City of Bedford	Bedford city limits (Served by TRA Central Regional)	C	2011	Trinity/NCTCOG	0841	Tarrant	11/01/2011	collection system upgrade	2010	12,850
									2015	13,850
									2020	14,850
									2025	14,850
City of Cameron	Cameron city limits	T/C	2011	Brazos Basin	1213	Milam	11/01/2011	collection system rehabilitation and plant upgrade	2010	6,230
									2020	6,900
									2030	7,330
									2040	7,596
Cibolo Creek Municipal Authority	District boundaries	T/C	2011	San Antonio Basin	1913	Bexar, Comal, Guadalupe	11/01/2011	wastewater treatment plant expansion and improvements	2010	68,310
									2020	84,105
									2030	98,485
Great Texoma Utility Authority/City of Krum	Krum city limits	T/C	2011	Trinity/NCTCOG	0841	Denton	11/01/2011	wastewater treatment plant expansion and improvements	2010	3,271
									2020	4,212
									2030	5,222
									2040	7,000
Harris County Municipal Utility District #33	District boundaries	T/C	2011	San Jacinto Basin/H-GAC	1016	Harris	11/01/2011	collection system rehabilitation and improvements	2010	7,987
									2020	7,987
									2030	7,987
									2040	7,987
City of Houston	Houston city limits	T/C	2011	San Jacinto Basin/H-GAC	1007 & 1102	Harris	11/01/2011	collection system rehabilitation and improvements	2010	2,099,451
									2020	2,463,884
									2030	2,630,430
City of Keller	Keller city limits	T/C	2011	Trinity/NCTCOG	0841	Tarrant	11/01/2011	collection system expansion to decommission septic systems	2010	39,450
									2020	47,657
									2030	55,000
City of Marlin	Marlin city limits	T/C	2011	Brazos Basin	1242	Falls	11/01/2011	collection system improvements	2010	6,862
									2020	7,155
									2030	7,455

## Designated Management Agencies

In order to be designated as a management agency for wastewater collection or treatment, an entity must demonstrate the legal, institutional, managerial and financial capability necessary to carry out the entity's responsibilities in accordance with Section 208 (c) of the Clean Water Act (see below list of requirements). Before an entity can apply for a state revolving fund loan, it must be recommended for designation as the management agency in the approved WQMP. Designation as a management agency does not require the designated entity to provide wastewater services, but enables it to apply for grants and loans to provide the services. The facilities listed in Table 3 have submitted Designated Management Agencies (DMA) resolutions to the TCEQ. The TCEQ submits this DMA information to the EPA for approval as an update to the WQMP.

### Section 208 (c)(2) Requirements for Management Agency:

208(c)(2)(A): to carry out portions of an area-wide waste treatment plan.

208(c)(2)(B): to manage waste treatment works.

208(c)(2)(C): directly or by contract to design and construct new works.

208(c)(2)(D): to accept and utilize grants.

208(c)(2)(E): to raise revenues, including assessment of waste treatment charges.

208(c)(2)(F): to incur short and long term indebtedness.

208(c)(2)(G): to assure community pays proportionate cost.

208(c)(2)(H): to refuse to receive waste from non-compliant dischargers.

208(c)(2)(I): to accept for treatment industrial wastes.

Table 3. Designated Management Agencies Updates

Planning Agency	Service Area	DMA Needs	DMA Date	DMA Area/Comments
City of Cameron	City Limits	T/C	4/18/2011	
Cibolo Creek Municipal Authority	District Boundary	T/C	2/11/2010	
Harris County Municipal Utility District #33	District Boundary	T/C	4/19/2011	
City of Keller	City Limits	T/C	1/18/2011	

## **Total Maximum Daily Load Updates**

The Total Maximum Daily Load (TMDL) Program works to improve water quality in impaired or threatened waters bodies in Texas. The program is authorized by and created to fulfill the requirements of Section 303(d) of the federal Clean Water Act.

The goal of a TMDL is to restore the full use of a water body that has limited quality in relation to one or more of its uses. The TMDL defines an environmental target and based on that target, the State develops an implementation plan with waste load allocations for point source dischargers to mitigate anthropogenic (human-caused) sources of pollution within the watershed and restore full use of the water body.

The development of TMDLs is a process of intensive data collection and analysis. After adoption by the TCEQ, TMDLs are submitted to the U.S. Environmental Protection Agency for review and approval.

The attached appendixes may reflect proposed waste load allocations for new dischargers and revisions to TMDLs. To be consistent, updates will be provided in the same units of measure used in the original TMDL document. And note that for bacteria TMDLs, loads may be expressed in counts for day, organisms per day, colony forming units per day, or similar expressions. These typically reflect different lab methods, but for the purposes of the TMDL program, these terms are considered synonymous.

# **Appendix I. Withdrawal of Two Total Maximum Daily Loads for Total Dissolved Solids and Chlorides in Clear Creek Above Tidal: Segment 1102**

---

## **Introduction**

The Texas Commission on Environmental Quality (TCEQ) adopted the total maximum daily loads (TMDLs) *Two Total Maximum Daily Loads for Total Dissolved Solids and Chlorides in Clear Creek Above Tidal For Segment 1102* (TCEQ 2005) on 8/10/2005. The TMDLs were revised in response to comments received from the United States Environmental Protection Agency and then re-adopted by the TCEQ on 4/12/2006 (TCEQ 2006a) and approved by the EPA on 6/26/2006. An implementation plan (I-Plan) for this project, *Implementation Plan for Two Total Maximum Daily Loads for Total Dissolved Solids and Chloride in Clear Creek Above Tidal: Segment 1102*, was approved by the TCEQ on 8/23/2006 (TCEQ 2006b). This Water Quality Management Plan (WQMP) update withdraws the TMDL document.

## **Project Information**

(Much of the information in this section is taken from the original TMDL document and the I-Plan.)

Clear Creek Above Tidal (Figure 1) was placed on Texas's 303(d) List in 2002 (TCEQ 2002) because average chloride and total dissolved solids (TDS) concentrations exceeded the segment's criteria set in the Water Quality Standards of 200 milligrams per liter (mg/L) and 600 mg/L, respectively (TCEQ 2010b), causing an impairment to the general water quality use.

Assessment data showed that levels of TDS and chloride increased dramatically in Segment 1102 during the mid- to late 1990s, and remained elevated when compared to the relevant criteria. The cause of this increase was not immediately clear. Figure 2 shows the annual averages for chloride and TDS for the entire segment from 1973 through 2010. For assessment purposes, specific conductance can be multiplied by a factor of 0.65 to give a value for TDS in cases where actual TDS measurements were not taken (TCEQ 2010a). Figure 2 only uses actual TDS data. It clearly illustrates the spike in chloride and TDS concentrations in the 1990s, with continued exceedances of the criteria through 2005. Since that time, water quality with respect to TDS and chloride has been restored with both constituents below those criteria.

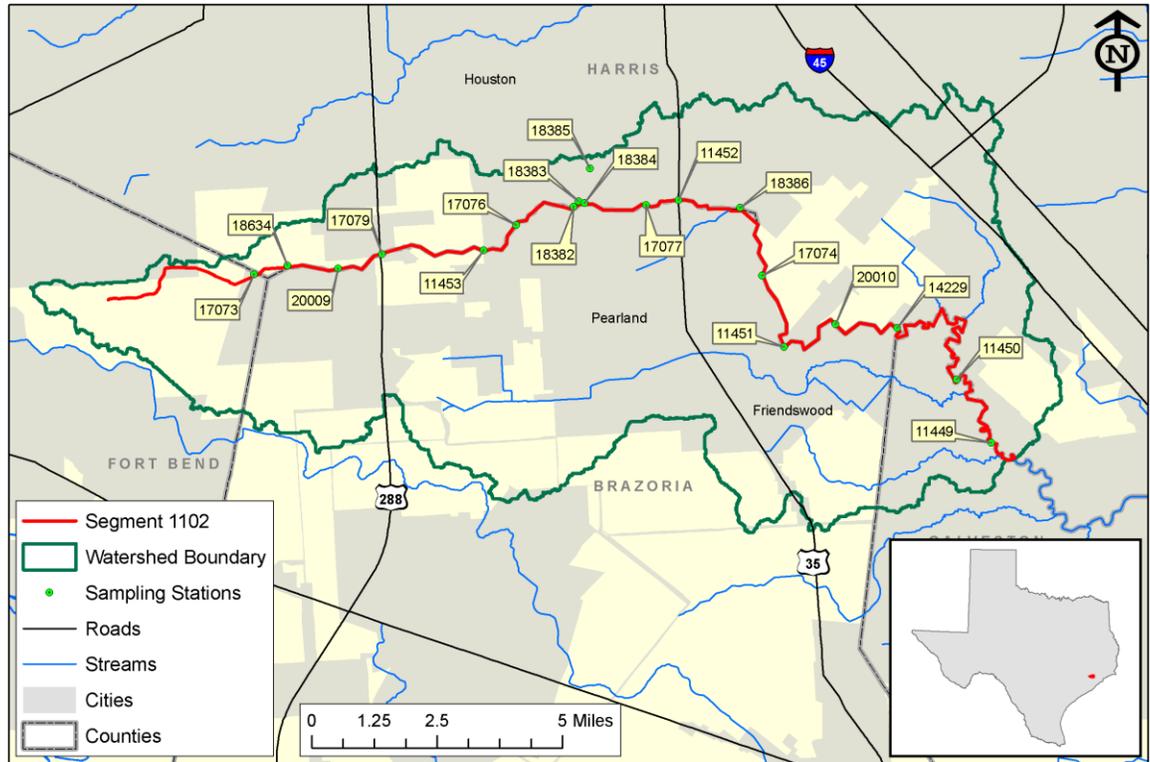


Figure 1. Clear Creek Above Tidal

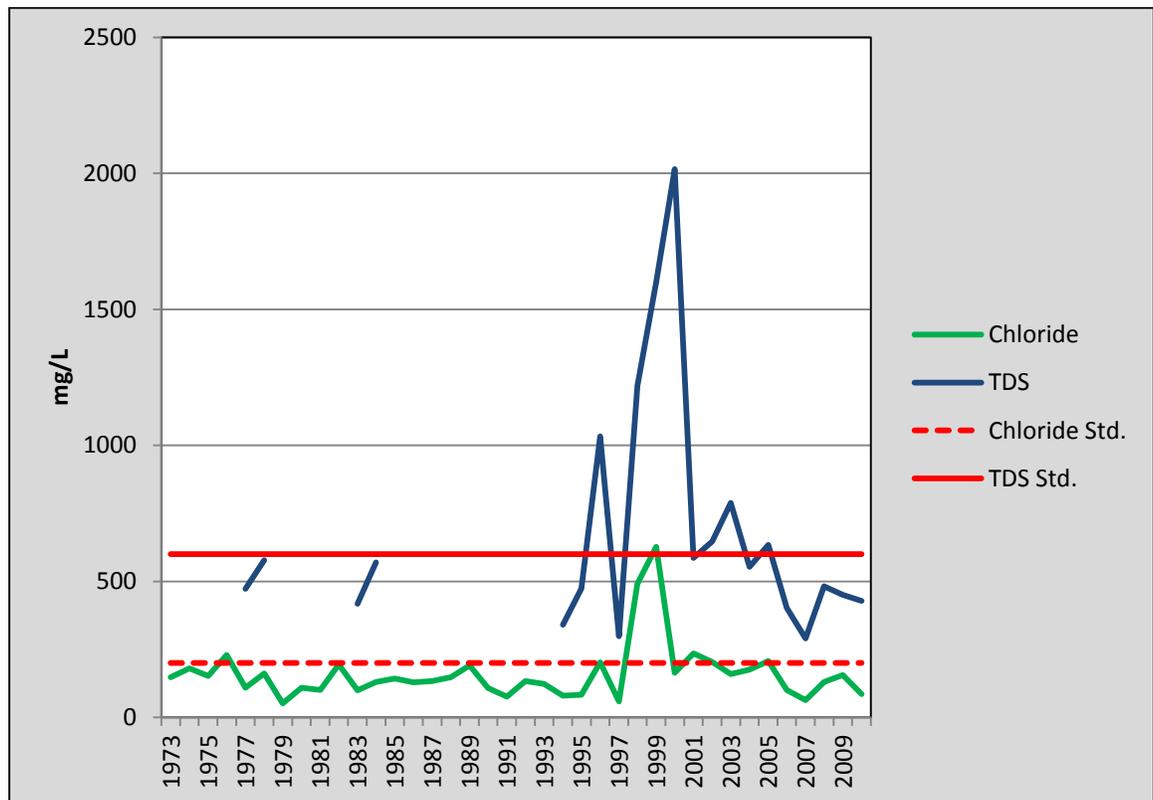


Figure 2. Annual Chloride and TDS Averages in Segment 1102

Figure 3 demonstrates a large increase in chloride and TDS concentrations in measurements taken at Station 17077, indicating a source of these constituents between this station and Station 17076, located farther upstream. Targeted monitoring during the TMDL study revealed that the excessive TDS and chloride levels were the result of a single discharge associated with dewatering of a sand and gravel quarry. This quarry (Hill Sand, Inc.) was located on top of the Mykawa Salt Dome. Salty ground water was seeping into one of its mining pits and was discharged through roadside ditches into Clear Creek Above Tidal.

The TCEQ took formal enforcement measures to limit the discharge that caused the impairment. The TCEQ approved an Agreed Order (Docket Number 2005-1267-WQ-E) at a Commission meeting on February 21, 2006. Hill Sand, Inc. consented to the Agreed Order, ceased the release of contaminated water, and submitted the required documentation to the TCEQ as stipulated in the Agreed Order.

Figure 4 shows two aerial photos of the area around Hill Sand, Inc. (Google Earth 2011). The top photo was taken in 1995, shortly before the first large increases in the chloride and TDS concentrations were detected. The sand pit can be clearly seen in the photo. The bottom photo was taken in 2011, about five years after the Agreed Order stopped the release of the contaminated water. A large pond is located where the sand pit had been. The facility is no longer in operation at this site.

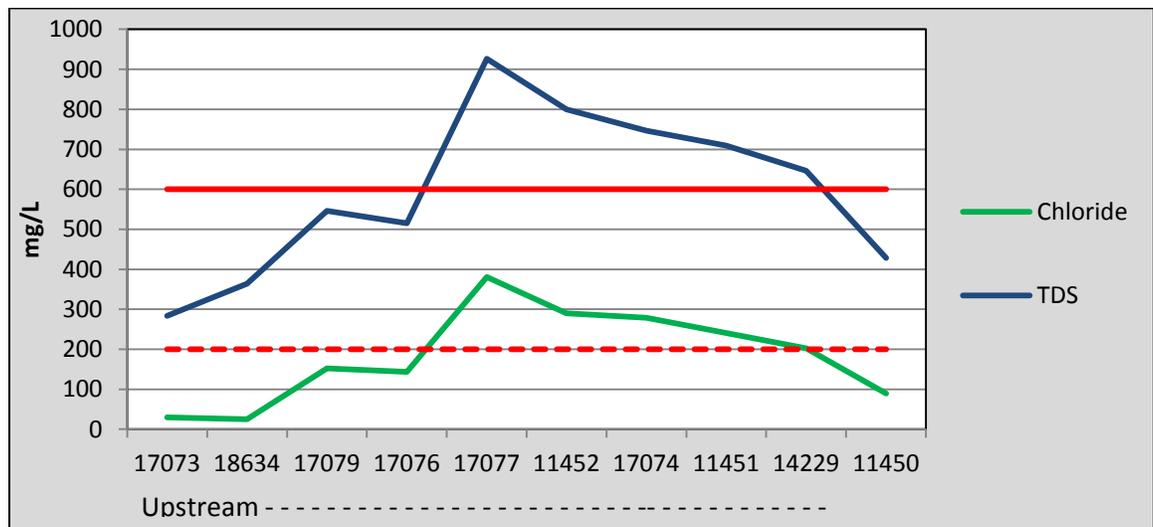


Figure 3. Chloride and TDS Averages in Segment 1102 in 2005

Figure 4 also shows the locations of four stations sampled on August 15, 2004, in an attempt to pinpoint the source of the impairment. The data from this event are presented in Table 1. Station 18385, located where the water was being pumped from the sand pit, had the highest concentrations of chloride and TDS. Very high levels were also noted where the ditch system empties into Clear Creek. The station immediately downstream of the ditch (18384) shows a significant increase in the concentration of both constituents over what was found at the station immediately upstream of the ditch (18382).

Table 1. Targeted Monitoring Results (August 15, 2004)

<b>Sampling Station</b>	<b>Chloride Concentration (mg/L)</b>	<b>Chloride Water Quality Standard (mg/L)</b>	<b>TDS Concentration (mg/L)</b>	<b>TDS Water Quality Standard (mg/L)</b>
18382	86	200	478	600
18383	1350	200	3060	600
18384	408	200	1050	600
18385	1690	200	4000	600

### **Previous WQMP Update**

An earlier WQMP update (July 2009) addressed permitting related to this TMDL. The original TMDL document appeared to give individual waste load allocations to wastewater treatment facilities (WWTFs) in the segment's watershed. However, the discharges from the WWTFs did not contribute to the impairments addressed by the TMDL. The earlier update clarified this point, removing the individual waste load allocations. The withdrawal of this TMDL will have no effect on permit limits or waste load allocations. TDS and chloride will be addressed using standard protocols for future permitting in this watershed.

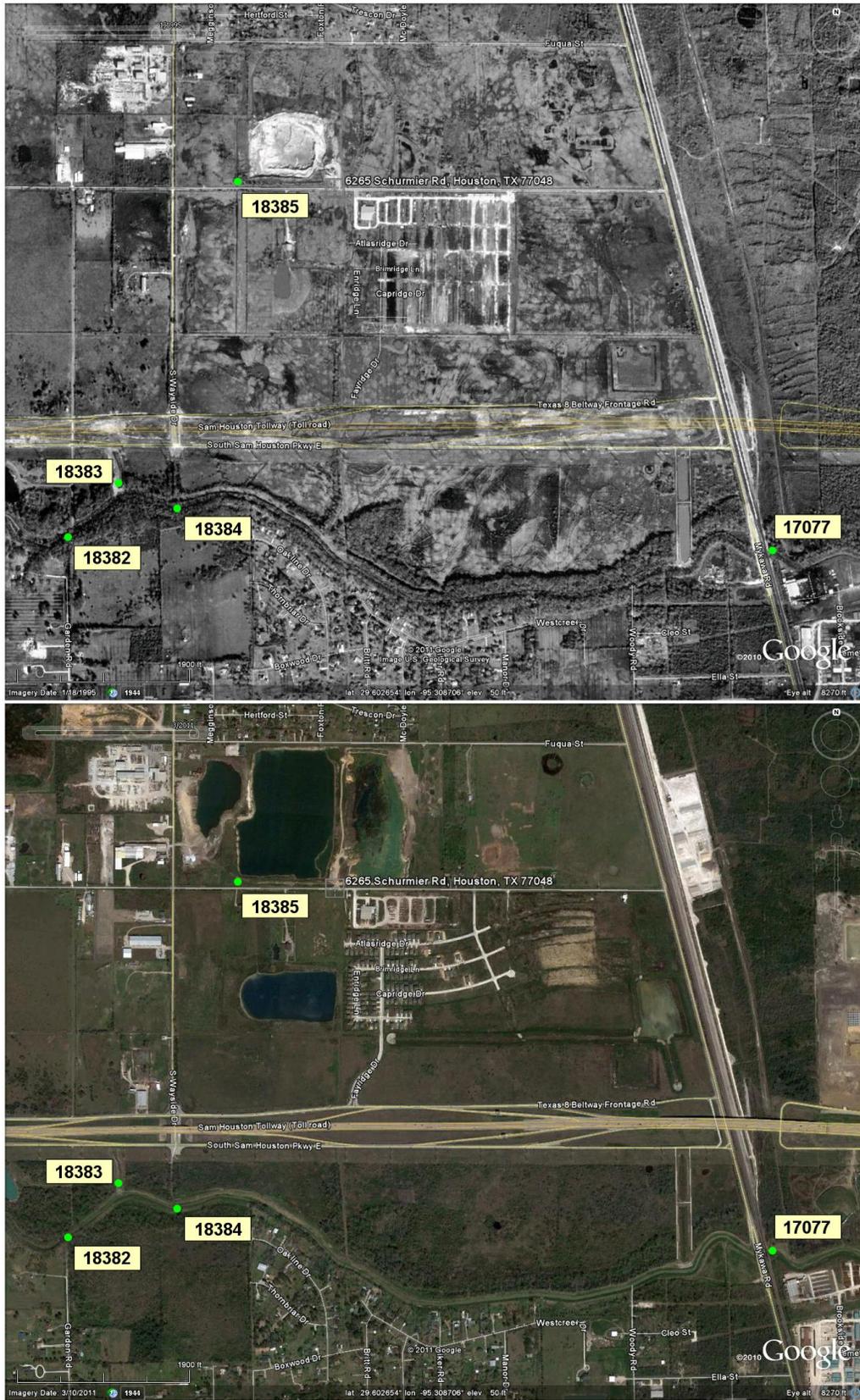


Figure 4. 1995 (Top) and 2011 (Bottom) Aerial Photos of the Area that Caused the Impairment to Segment 1102

## Withdrawal of the TMDL

This WQMP update withdraws the TMDL, which was rendered unnecessary after the enforcement action halted the discharge that was the cause of the impairment. The source of the impairment was a single illicit discharge that was permanently resolved, as the facility is no longer in operation at this site. No additional controls are needed to be in place to maintain water quality standards for TDS and chloride.

Subsequent assessments have demonstrated that the segment is now meeting the established criteria for TDS and chloride. Table 2 shows the averages for chloride and TDS used in 303(d) lists since 2002. A simulated assessment was conducted for 2012 with data found in the Surface Water Quality Monitoring Information System (SWQMIS) database as of 6/1/2011. This simulated assessment (which includes specific conductance values converted to TDS in cases when TDS samples were not collected) is unlikely to perfectly match the actual assessment to be conducted in 2012, but shows that the segment should continue to meet the state's water quality standards for chloride and TDS. TDS and chloride would be addressed through routine Texas Pollutant Discharge Elimination System screening procedures for permitting after the TMDL is withdrawn.

Table 2. 303(d) Assessments for Chloride and TDS in Segment 1102

303(d) List	Period Covered	# Chloride Samples	Average Chloride Concentration (mg/L)	Chloride Water Quality Standard (mg/L)	# TDS Samples	Average TDS Concentration (mg/L) <sup>d</sup>	TDS Water Quality Standard (mg/L)
2002	03/01/1996 to 02/28/2001	33	361.6	200	195	1055.4	600
2004 <sup>a</sup>	03/01/1996 to 02/28/2001	33	361.6	200	195	1055.4	600
2006	12/01/1999 to 11/30/2004	157	<b>185.0</b>	200	345	677.0	600
2008	12/01/1999 to 11/30/2006	239	<b>119.2</b>	200	427	627.8	600
2010 <sup>b</sup>	12/01/2001 to 11/30/2008	320	<b>152.1</b>	200	345	<b>511.3</b>	600
2012 <sup>c</sup>	12/01/2003 to 11/30/2010	242	<b>141.9</b>	200	251	<b>496.4</b>	600

<sup>a</sup> This was a targeted assessment year, and Segment 1102 was not reassessed. The same data from the 2002 assessment were used.

<sup>b</sup> This draft assessment was being reviewed by EPA at the time this document was written.

<sup>c</sup> This is a simulated assessment conducted with data found in the SWQMIS database as of 6/1/2011. This simulated assessment is unlikely to perfectly match the actual assessment to be conducted in 2012.

<sup>d</sup> Assessment data for TDS may include samples for specific conductance converted to TDS.

Green shading indicates that water quality standard is met.

## References

- Google Earth 2011. Version 6.0.2.2074. <<http://Earth.google.com>>. Retrieved 06/10/2011.
- TCEQ 2002. 2002 Texas Water Quality Inventory and 303(d) list. <[www.tceq.texas.gov/assets/public/compliance/monops/water/02twqmar/02\\_303d.pdf](http://www.tceq.texas.gov/assets/public/compliance/monops/water/02twqmar/02_303d.pdf)>.
- TCEQ 2005. Two Total Maximum Daily Loads for Total Dissolved Solids and Chlorides in Clear Creek Above Tidal For Segment 1102. Texas Commission on Environmental Quality. <[www.tceq.texas.gov/assets/public/implementation/water/tmdl/43ccsalts/43-clearcreektmdladopted.pdf](http://www.tceq.texas.gov/assets/public/implementation/water/tmdl/43ccsalts/43-clearcreektmdladopted.pdf)>.
- TCEQ 2006a. Two Total Maximum Daily Loads for Total Dissolved Solids and Chlorides in Clear Creek Above Tidal For Segment 1102. Texas Commission on Environmental Quality. <[www.tceq.texas.gov/assets/public/implementation/water/tmdl/43ccsalts/43-clearcreek-tds-revisedtmdlApril2006.pdf](http://www.tceq.texas.gov/assets/public/implementation/water/tmdl/43ccsalts/43-clearcreek-tds-revisedtmdlApril2006.pdf)>.
- TCEQ 2006b. Implementation Plan for Two Total Maximum Daily Loads for Total Dissolved Solids and Chloride in Clear Creek Above Tidal for Segment 1102. Texas Commission on Environmental Quality. <[www.tceq.texas.gov/assets/public/implementation/water/tmdl/43ccsalts/43\\_clearcreek\\_final\\_08-06.pdf](http://www.tceq.texas.gov/assets/public/implementation/water/tmdl/43ccsalts/43_clearcreek_final_08-06.pdf)>.
- TCEQ 2010a. Guidance for Assessing and Reporting Surface Water Quality in Texas. Texas Commission on Environmental Quality. <[www.tceq.texas.gov/assets/public/compliance/monops/water/10twqi/2010\\_guidance.pdf](http://www.tceq.texas.gov/assets/public/compliance/monops/water/10twqi/2010_guidance.pdf)>.
- TCEQ 2010b. Texas Surface Water Quality Standards. Texas Commission on Environmental Quality. <[www.tceq.texas.gov/waterquality/standards/2010standards.html](http://www.tceq.texas.gov/waterquality/standards/2010standards.html)>.

## **Appendix II. Four Total Maximum Daily Loads for Indicator Bacteria in Halls Bayou and Tributaries For Segment Numbers 1006D, 1006I, and 1006J**

---

TMDL Updates to the Water Quality Management Plan (WQMP): Halls Bayou and Tributaries (1006D, 1006I, and 1006J)

The document *Four Total Maximum Daily Loads for Indicator Bacteria in Halls Bayou and Tributaries For Segment Numbers 1006D, 1006I, and 1006J* was adopted by the TCEQ on 09/15/10 and approved by EPA on 09/27/10, and became an update to the state's WQMP. Previous WQMP updates made corrections and changes to the original Waste Load Allocations (WLAs) for bacteria in the watershed.

The purpose of this update is to adjust the individual WLA for a permit with an increased discharge (Table 1) and to update the name for another facility (Table 2).

In addition, the changes reflected in this update resulted in the shifting of allocations between the sum of the individual WLAs and the allowance for future growth within two assessment units, as is reflected in Table 18 of the TMDL, and presented in Table 3 here. In Table 19 of the TMDL, the WLAs for permitted facilities are the sum of the individual WLAs and the allowance for future growth within each assessment unit. Therefore, these overall numbers did not change, and Table 19 of the TMDL remains the same.

Table 1 - Waste Load Allocation for Amended Permit (Table 16, pp. 35-36 in original TMDL document)

State Permit Number	Outfall	EPA Permit Number	Segment Number	Permittee Name	Flow (MGD)	Waste Load Allocation (WLA) - <i>E. coli</i> in Billion MPN/day	TMDL Comments
10236-001	001	TX0021253	1006D_02	Sunbelt FWSD	2.1	5.008	Increased flow

Table 2 – Change to Name of Facility (Table 16, pp. 35-36 in original TMDL document); No Change to Discharge

State Permit Number	Outfall	EPA Permit Number	Segment Number	Permittee Name	Flow (MGD)	Waste Load Allocation (WLA) - <i>E. coli</i> in Billion MPN/day	TMDL Comments
11255-001	001	TX0032034	1006D_02	Aqua Utilities Inc.	0.393	0.937	Change to permittee name; no change to flow or WLA

Table 3 - *E. coli* TMDL Summary Calculations for Halls Bayou Assessment Units (Only equations that have changed are included; Table 18, p. 41 in original TMDL document)

Assessment Unit	Sampling Location	Stream Name	TMDL (Billion MPN/day)	WLA <sub>WWTF</sub> (Billion MPN/day)	WLA <sub>StormWater</sub> (Billion MPN/day)	LA (Billion MPN/day)	MOS (Billion MPN/day)	Future Growth (Billion MPN/day)
1006D_01	20023	Halls Bayou below US 59	463	46.5	382	3.4	23.2	8.1
1006D_02	11126	Halls Bayou above US 59	280	29.4	233	0	14	2.94

### **Appendix III. Fifteen Total Maximum Daily Loads for Indicator Bacteria in Watersheds Upstream of Lake Houston For Segment Numbers 1004E, 1008, 1008H, 1009, 1009C, 1009D, 1009E, 1010, and 1011**

---

TMDL Updates to the Water Quality Management Plan (WQMP): Watersheds Upstream of Lake Houston (1004E, 1008, 1008H, 1009, 1009C, 1009D, 1009E, 1010, and 1011)

The document *Fifteen Total Maximum Daily Loads for Indicator Bacteria in Watersheds Upstream of Lake Houston For Segment Numbers 1004E, 1008, 1008H, 1009, 1009C, 1009D, 1009E, 1010, and 1011* was adopted by the TCEQ on 04/06/11 and approved by EPA on 06/29/11, and became an update to the state's Water Quality Management Plan (WQMP). A previous WQMP update was completed in July 2011.

The TMDL document included individual Waste Load Allocations (WLAs) for bacteria for entities within these watersheds. The purpose of this update is to make the following changes to the TMDL (all in Table 1):

- Adjust the individual WLAs for two permits being amended to increase or decrease their discharges.
- Correct the individual WLA for one permit that had the incorrect flow in the original TMDL.

The changes reflected in this update resulted in the shifting of allocations between the sum of the individual WLAs and the allowance for future growth (AFG) in five assessment units (AUs). This was originally presented in Table 18 in the TMDL document, and the five affected AUs are included here as Table 2.

In Table 19 of the TMDL, the WLAs for permitted facilities are the sum of the individual WLAs and the allowance for future growth within each assessment unit. Therefore, these overall numbers did not change, and Table 19 of the TMDL remains the same.

Table 1 – Changes to Individual Waste Load Allocations (Updates Table 16, pp. 49-56 in the TMDL document.)

State Permit Number	Outfall	EPA Permit Number	Segment Number	Permittee Name	Flow (MGD)	Waste Load Allocation (WLA) – <i>E. coli</i> in Billion MPN/day	TMDL Comments
14476-001	001	TX0126161	1009_02	Harris County MUD # 418	3.6	8.59	Increase discharge
12025-002	001	TX0077941	1009D_01	Bilma PUD	0.74	1.76	Correct discharge
13753-001	001	TX0113107	1009E_01	Harris County MUD #360	0.4	0.95	Decrease discharge

Table 2 - *E. coli* TMDL Summary Calculations for Lake Houston Assessment Units (Updates Table 18, pp. 61 in the TMDL document.)

Assessment Unit	Sampling Location	Stream Name	TMDL (Billion MPN/day)	WLA WWTF (Billion MPN/day)	WLA Storm Water (Billion MPN/day)	LA (Billion MPN/day)	MOS (Billion MPN/day)	Future Growth (Billion MPN/day)
1009_02	11331	Cypress Creek	615	71.7	141	325	30.8	46.8
1009_03	11328	Cypress Creek	1340	157	299	690	67.0	126
1009_04	11324	Cypress Creek	1550	194	338	779	77.4	160
1009D_01	17481	Spring Gully	20.5	3.42	4.09	8.13	1.02	3.83
1009E_01	14159	Little Cypress Creek	91.1	8.16	5.16	59.4	4.56	13.9

## **Appendix IV. One Total Maximum Daily Load for Bacteria in Upper Oyster Creek for Segment Number 1245**

---

TMDL Updates to the Water Quality Management Plan (WQMP): Bacteria in Upper Oyster Creek (Segment 1245)

The document *One Total Maximum Daily Load for Bacteria in Upper Oyster Creek for Segment Number 1245* was adopted by the TCEQ on 08/08/07 and approved by EPA on 09/28/07, and became an update to the state's Water Quality Management Plan.

The purpose of this update is to:

- Provide clarification regarding the WLA for a permitted discharge for one facility in Allocation Reach 1 (the lower portion) of Upper Oyster Creek. (Table 1)

Table 1 - Permitted Bacteria Allocation for Amended Discharge (PP. 35-37 in original TMDL document)

<b>State Permit Number</b>	<b>EPA Permit Number</b>	<b>Segment Number</b>	<b>Permittee Name</b>	<b>Flow (MGD)</b>	<b>Waste Load Allocation (WLA)</b>	<b>TMDL/ Comments</b>
13873-003	TX0133159	1245	City of Missouri City (Missouri City Regional/ Surface WTP)	1.0	N/A	New permit

This facility is a water treatment plant, which will discharge off-channel reservoir sedimentation, sedimentation basin underflow, strainer backwash, neutralized tank waste and membrane backwash and cleaning water. As these are not considered to be likely sources of bacteria (and, in particular, human sources of bacteria), no WLA is required for the facility.