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# Implementation Plan for Two Total Maximum Daily Loads for Total Dissolved Solids and Chloride in Clear Creek Above Tidal

Segment 1102

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Prepared by the:  
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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Implementation Plan for Two TMDLs for Clear Creek Above Tidal

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**Implementation Plan for Two TMDLs for Clear Creek Above Tidal**



# Implementation Plan for Two TMDLs for TDS and Chloride in Clear Creek Above Tidal

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## EXECUTIVE SUMMARY

On April 12, 2006, the Texas Commission on Environmental Quality (TCEQ) adopted *Two Total Maximum Daily Loads for Total Dissolved Solids and Chloride in Clear Creek Above Tidal*. The total maximum daily loads (TMDLs) address elevated concentrations of chloride and total dissolved solids (TDS) in Clear Creek Above Tidal (Segment 1102). The U.S. Environmental Protection Agency (USEPA) approved the TMDLs on June 26, 2006.

This implementation plan, or I-Plan:

- describes the steps the TCEQ and its stakeholders will take to achieve the pollutant reductions identified in the TMDL report, and
- outlines the schedule for implementation activities.

The ultimate goal of this I-Plan is to reduce instream concentrations of chloride and total dissolved solids to levels that meet the criteria defined in the state's water quality standards.

The source characterization in the TMDL report identified a single discharge from a sand mining operation as responsible for the elevated pollutant concentrations observed in the creek. Based on the existing allocations, compliance with the water quality standards requires reductions of 51% for chloride and 43% for TDS. Controlling the discharge from the sand mining operation will result in long-term average concentrations of chloride and TDS that comply with the criteria.

The TCEQ has initiated formal enforcement actions to eliminate the discharge from the sand mining operation and will perform follow-up field inspections to verify that the discharge has ceased. Through the storm water permitting process, the TCEQ will also take steps to ensure that additional mining activities in the watershed will not cause a water quality problem by requiring these organizations to sample their discharges and report the results to the TCEQ.

The TCEQ will also track the progress of programmatic activities specified in this I-Plan using field inspection reports, administrative reviews of enforcement, and permit requirements. Indicators of water quality will be tracked by collecting samples from several sites in Clear Creek downstream of the sand mine discharge. Ambient water quality data will be collected at least quarterly for two to three years to determine compliance with applicable water quality standards. If standards are not attained by the end of the three-year monitoring period, the TCEQ will reevaluate the TMDL and the I-Plan. The TCEQ will report the results of the implementation, tracking, and evaluation activities in its TMDL program report and at regional forums.

## **INTRODUCTION**

In order to keep Texas' commitment to restore and maintain water quality in impaired rivers, lakes, and bays, the TCEQ recognizes that it must establish implementation plans for each TMDL. The TMDL is a technical analysis that:

- determines the amount of a particular pollutant that a water body can receive and still meet applicable water quality standards, and
- estimates how much the pollutant load must be reduced to comply with water quality standards.

This I-Plan is designed to achieve the pollutant reductions identified in the TMDL as necessary to restore the impaired use of a water body. The plan is a flexible tool that governmental and nongovernmental organizations involved in implementation use to guide their program management. The participating organizations may accomplish the activities described in this I-Plan through rule, order, guidance, or other appropriate formal or informal action.

This I-Plan contains the following components:

- 1) a description of control actions and management measures<sup>1</sup> that will be implemented to achieve the water quality target;
- 2) a schedule for implementing activities to achieve TMDL objectives;
- 3) the legal authority under which the participating agencies may require implementation of the control actions;
- 4) a follow-up tracking and monitoring plan to determine the effectiveness of the control actions and management measures undertaken;
- 5) identification of measurable outcomes and other considerations the TCEQ will use to determine whether the I-Plan has been properly executed, water quality standards are being achieved, or the plan needs to be modified; and
- 6) identification of the communication strategies the TCEQ will use to disseminate information to stakeholders and other interested parties.

This I-Plan also includes all of the nine key elements for watershed-based plans as prescribed in the *FY 2004 Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories* (USEPA, 2004). Consequently, projects developed to implement nonpoint source elements of the control actions of this plan and which meet the grant program conditions are eligible for funding under the USEPA's Section 319(h) incremental grant program.

This I-Plan is designed to guide activities that will reduce chloride and TDS in Clear Creek Above Tidal in Fort Bend, Harris, Brazoria, and Galveston Counties, as defined in the adopted TMDLs. The ultimate goal of the I-Plan is to restore the beneficial general

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<sup>1</sup> Control actions refer to regulated point source pollutant reduction strategies, generally TPDES permits. Management measures refer to nonpoint source pollutant reduction strategies, generally voluntary best management practices.

uses of Clear Creek Above Tidal by reducing the average concentrations of TDS and chloride to levels that meet the criteria established in the state’s water quality standards.

This I-Plan was prepared by the TMDL Program in the Chief Engineer’s Office of the TCEQ. The TCEQ approved the I-Plan on August 23, 2006. The TCEQ has primary responsibility for restoring water quality standards in impaired water bodies.

## **SUMMARY OF TMDLS**

In April 2006, the TCEQ adopted two TMDLs for chloride and TDS in Clear Creek Above Tidal (Segment 1102). Clear Creek Above Tidal is a freshwater, third order stream approximately 24.5 miles long, with a contributing watershed of 115 square miles. The creek originates in the eastern portion of Fort Bend County and flows east to become the boundary of Harris and Brazoria counties, and then of Harris and Galveston counties, before entering the tidal portion of Clear Creek (Figure 1). The *2002 Texas Water Quality Inventory and 303(d) List* identified average ambient TDS and chloride values as exceeding the criteria for the support of general uses. Average concentrations of chloride and TDS exceeded the segment’s criteria of 200 milligrams per liter (mg/L) and 600 mg/L respectively (Table 1).

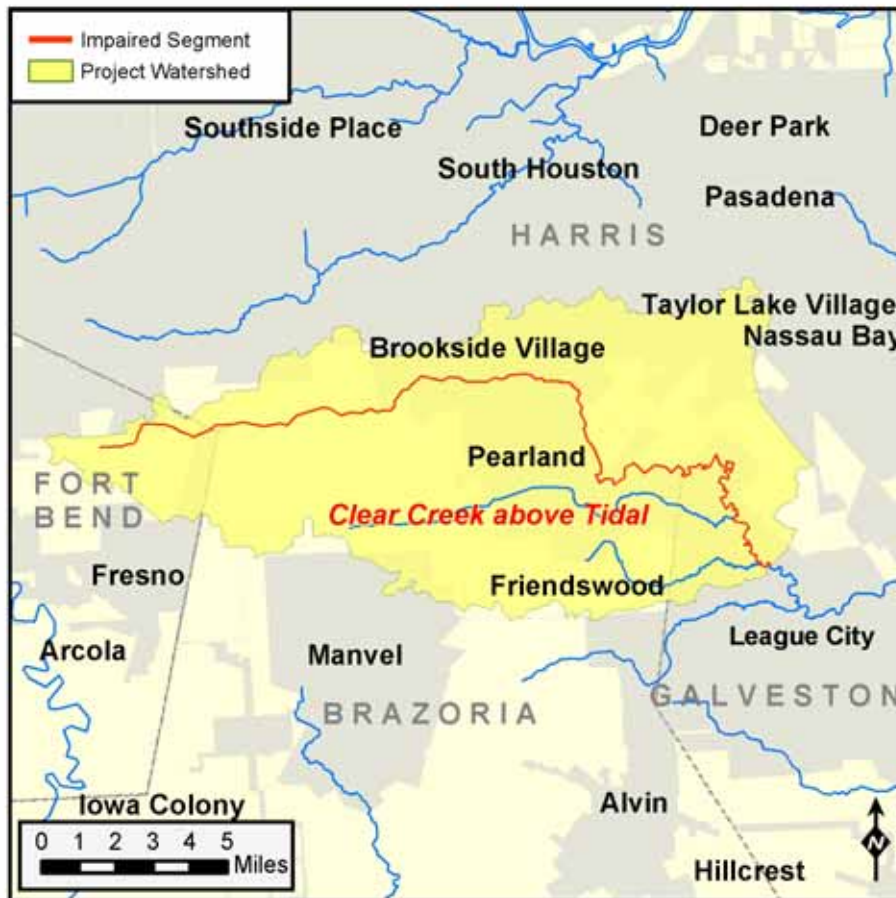


Figure 1. Project Area

In the mid to late 1990s, levels of dissolved salts in the creek increased dramatically and remain elevated compared to established criteria. The dramatic increase could be attrib-

## Implementation Plan for Two TMDLs for Clear Creek Above Tidal

uted to several factors, including drought, petroleum industry activities, ongoing highway development in the area, or new discharges in the watershed. TMDL project personnel evaluated all of these possible sources and described the methods by which the sources could be linked to the elevated levels of salts.

Staff identified a single discharge associated with a sand mine as the source responsible for the impairment. This operation was pumping water that resulted from groundwater seepage in one of its mining pits into roadside ditches that eventually discharged to Clear Creek. Removal of excess storm water from this property is authorized under Sector J of the Multi-Sector General Storm Water Permit (MSGP), provided that the discharge does not cause or contribute to a water quality impairment. The groundwater appears to accumulate additional salts from either geologic salt formations or historic brine disposal wells.

Table 1. 2002 State Water Quality Inventory Assessment Data for Segment 1102

Use	Parameter	Number of Samples	Average (mg/L)	Water Quality Standard (mg/L)
General	Chloride	33	361.6	200
General	TDS	195	1055.4	600

Staff employed an empirical approach in the load allocation to determine the percent reduction that would be required to comply with water quality criteria. Based upon calculations made with ambient data, staff determined that reductions of 51% for chloride and 43% for TDS would be required (Table 2). The reductions for these TMDLs can be taken entirely from the Wasteload Allocation (WLA) since a single storm water discharge was found to be the most significant contributor to the impairment. Controlling the discharge from the sand mining operation will result in ambient levels of chloride and TDS that comply with existing criteria.

Table 2. TMDL Calculation for Chloride and TDS in Clear Creek Above Tidal

	LA	WLA	Standard Load TMDL (WQS)	Existing Load	Percent Reduction
<b>Chloride</b>	1653.84	3677.02	5330.86	10874.95	<b>51%</b>
<b>TDS</b>	9192.28	6800.29	15992.58	27987.01	<b>43%</b>

## IMPLEMENTATION STRATEGY

The implementation strategy describes the actions that the TCEQ and its stakeholders will undertake to achieve water quality standards. The strategy specifies actions to meet the load allocations assigned to all point sources and nonpoint sources identified in the TMDL report. Action strategies may be selected from a menu of possible measures based



on an evaluation of feasibility, costs, support, timing, and other factors. Activities may be implemented in phases based on the TCEQ's assessment of progress.

### Control Action 1.0

The reduction goals specified in the TMDL report can be achieved entirely by eliminating the effluent from the sand mine. The TCEQ can fund this control action with its general appropriation from the Texas Legislature. The TCEQ has the legal authority to implement these actions under Chapter 26 of the Texas Water Code.

The TCEQ is taking formal enforcement measures to limit the storm water discharge that is causing the impairment. The commission approved an Agreed Order (Docket Number 2005-1267-WQ-E) at its meeting on February 21, 2006. Hill Sand, Inc., the operator of the sand mine, has consented to the Agreed Order, has ceased the release of contaminated water, and has submitted the required documentation to the TCEQ as stipulated in the Agreed Order. The TCEQ Office of Compliance and Enforcement will continue to follow up and verify that the discharge has ceased.

### Control Action 2.0

The TCEQ will take steps to ensure that additional mining activities in the watershed do not cause additional water quality impairments. Dischargers permitted to release storm water to Clear Creek (Segment 1102) under authorization from Section J of the Multi-Sector General Permit (TPDES General Permit No. TXR050000) will be required to sample storm water discharges two times per year, conduct analyses for TDS and chloride, and submit these results to the TCEQ.

The renewal of the Multi-Sector General Permit (MSGP) will include revisions to Paragraph 4, Limitations on Permit Coverage, of Section J, specifically requiring sampling of effluent from mining activities in the watershed of Clear Creek Above Tidal. The renewed permit is expected to become effective in August 2006.

The TCEQ Office of Compliance and Enforcement will conduct routine field inspections and administrative reviews to verify that the required sampling is conducted and submitted. The TCEQ Office of Permitting, Remediation and Registration, with support from the Small Business and Environmental Assistance Division, will conduct training classes and provide other forms of assistance to the regulated community to facilitate their compliance with this provision in the MSGP.

## IMPLEMENTATION TRACKING

This I-Plan includes provisions to track the progress of the plan using both programmatic and water quality indicators. These terms are further defined as:

- **Programmatic Indicator** – A measure of administrative actions undertaken to effect an improvement in water quality.
- **Water Quality Indicator** – A measure of water quality conditions for comparison to pre-existing conditions, constituent loadings, and water quality standards.

Implementation tracking provides information that can be used to determine if progress is being made toward meeting goals. Tracking also allows stakeholders to evaluate actions

taken, identify those which may not be working, and make any changes that may be necessary to get the plan back on target. Personnel in the TCEQ Region 12 Office and in the TMDL Program will track each action specified in this I-Plan.

### Programmatic Indicators

For Control Action 1.0, the TCEQ will use the Agreed Order between the TCEQ and Hill Sand, Inc. and subsequent field inspection reports prepared by the TCEQ's Office of Compliance and Enforcement to track this action.

For Control Action 2.0, the programmatic indicators include the revision of the MSGP with provisions for the watershed of Clear Creek, and the results of field inspections and administrative reviews conducted by the Office of Compliance and Enforcement.

### Water Quality Indicators

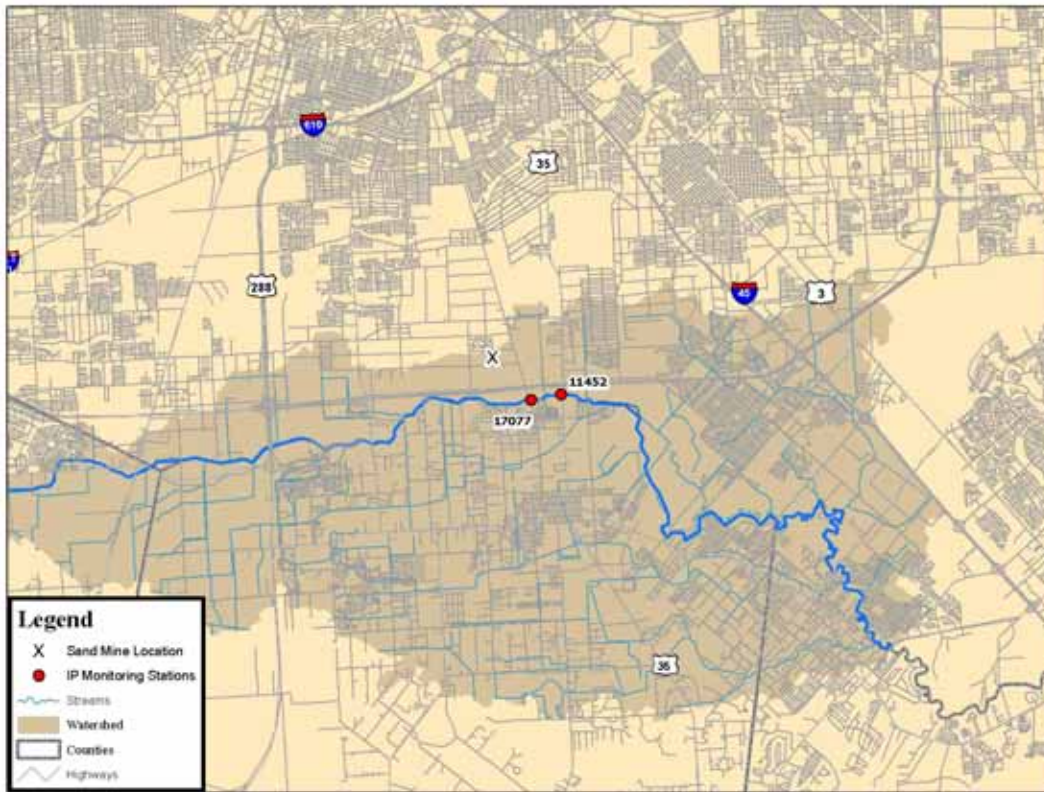
The water quality monitoring staff of TCEQ's Region 12 office will track the progress of water quality improvement. Region 12 personnel will collect quarterly samples in Clear Creek to track levels of TDS and chloride (in mg/L) under the state's coordinated monitoring program. This should provide sufficient data to track changes in the levels of dissolved salts following the removal of the discharge to Clear Creek. Region 12 staff will focus its data collection activities on several sites downstream of the discharge from the sand mine (see Figure 2). Data will be collected at least quarterly for a minimum of two to three years in order to determine whether appreciable changes to the average TDS and chloride levels are achieved.

The TCEQ will monitor the loadings and reductions and compare them to the goals established in the TMDL report. The TMDLs require reductions of at least 51% or 5,544 lbs/day of TDS, and 43% or 11,994 lbs/day of chloride. This entire reduction can be realized through removal or limitation of the sand mine effluent contained within the Waste Load Allocation established in the TMDL. Reductions in the Load Allocation were determined to be unnecessary since the impairment could be associated with a single discharge.

The TCEQ TMDL program will review sampling data submitted as required under Section J of the Multi-Sector General Permit to determine if elevated levels of TDS and/or chloride are present in discharges to the segment. The TCEQ will use this information to support its evaluation of the I-Plan.

## REVIEW STRATEGY

This I-Plan is a flexible tool that permits stakeholders to adapt to changing circumstances and to apply the lessons learned from experience. The TCEQ and stakeholders in TMDL implementation projects periodically assess the results of the planned activities and other sources of information to evaluate the adequacy of the I-Plan. Project stakeholders evaluate several factors, such as the pace of implementation, the effectiveness of best management practices, load reductions, and progress toward meeting water quality standards.



Station Number	Location
17077	Clear Creek at Mykawa Road, South of Sam Houston Parkway, in Brookside Village
11452	Clear Creek at Telephone Rd (SH35) in South Houston

Figure 2. Sampling Site Location for Implementation Tracking

The I-Plan presents a general process and timetable that specifies how and when the I-Plan will be evaluated and may be revised. The TCEQ will document the results of these evaluations and its rationale for maintaining or revising elements of the I-Plan, and will present them as part of the state’s normal reporting processes.

The ultimate goal of the I-Plan for Clear Creek is to reduce average concentrations of TDS and chloride to levels that are below criteria and to restore the designated use. After the cause of the impairment has been removed, the TCEQ will annually evaluate the data collected during routine monitoring. This data will provide an indication of the instream response to the removal and/or limitation of the discharge. In the absence of the discharge, the average annual concentrations of chloride and TDS should fall below the applicable criteria (200mg/L and 600 mg/L respectively) within two to three years.

The TCEQ will also review the results of sampling of mine discharges conducted under Section J of the Multi-Sector General Permit annually. The TCEQ will use this information to guide additional investigations and possible revisions to the TMDL or the I-Plan if quarterly monitoring does not demonstrate progress in achieving water quality standards.

## **COMMUNICATION STRATEGY**

Communication is necessary to ensure that stakeholders understand the I-Plan and its progress in restoring water quality conditions. The TCEQ will disseminate the information derived from tracking I-Plan activities to interested parties, including watershed stakeholders, state leadership, government agencies, nongovernmental organizations, and individuals.

The TCEQ's TMDL Program will document the status of the programmatic and water quality indicators for Clear Creek Above Tidal in its annual report. The report will summarize all actions taken to address the impairment and the water quality data collected during each year of the project. The TCEQ will report trends demonstrated by the data and evaluate compliance with water quality standards.

The Houston-Galveston Area Council will report the progress of this I-Plan locally in its Basin Highlights report, which it prepares and publishes annually under provisions of the Texas Clean Rivers Program.