Implementation Strategy 3.0: On-site Sewage Facilities

An on-site sewage facility (OSSF, commonly referred to as a septic system) does not send waste through a system of pipes to be treated elsewhere. Instead, it uses a combination of physical and chemical methods to treat the waste at the owner's location.

A study sponsored by the Texas On-Site Wastewater Treatment Research Council indicates that as many as 19 percent are failing in eastern Texas.[62] Estimates based on census data and OSSF permit records suggest the project area has at least 70,000 systems. However, the actual number and distribution of OSSFs in the region is unknown, and inventories of OSSFs are piecemeal.[63] Enforcement is not uniform throughout the region. Furthermore, enforcement efforts often cease if owners of failing OSSFs do not have the resources to repair or replace their systems or to pay fines associated with violations.

Because properly functioning and maintained OSSFs contribute little to no bacteria to waterways, this I-Plan primarily focuses on OSSFs that are unpermitted, failing, or poorly maintained. The following implementation activities are intended to address these systems.

Based on estimates presented in the TMDL reports, OSSFs contribute bacteria loading in the TMDL Project areas as follows:

- Clear Creek project area: Estimate of 91 failing OSSFs[64]
- Buffalo Bayou and Whiteoak Bayou project area: Estimate of 23 failing OSSFs[65]
- Houston Metro project area: Estimate of 1093 failing OSSFs[66]
- Lake Houston project area: Estimate of 860 failing OSSFs[67]

[62] (Reed, Stowe, and Yanke, LLC 2001)

[63] (Reed, Stowe, and Yanke, LLC 2001)

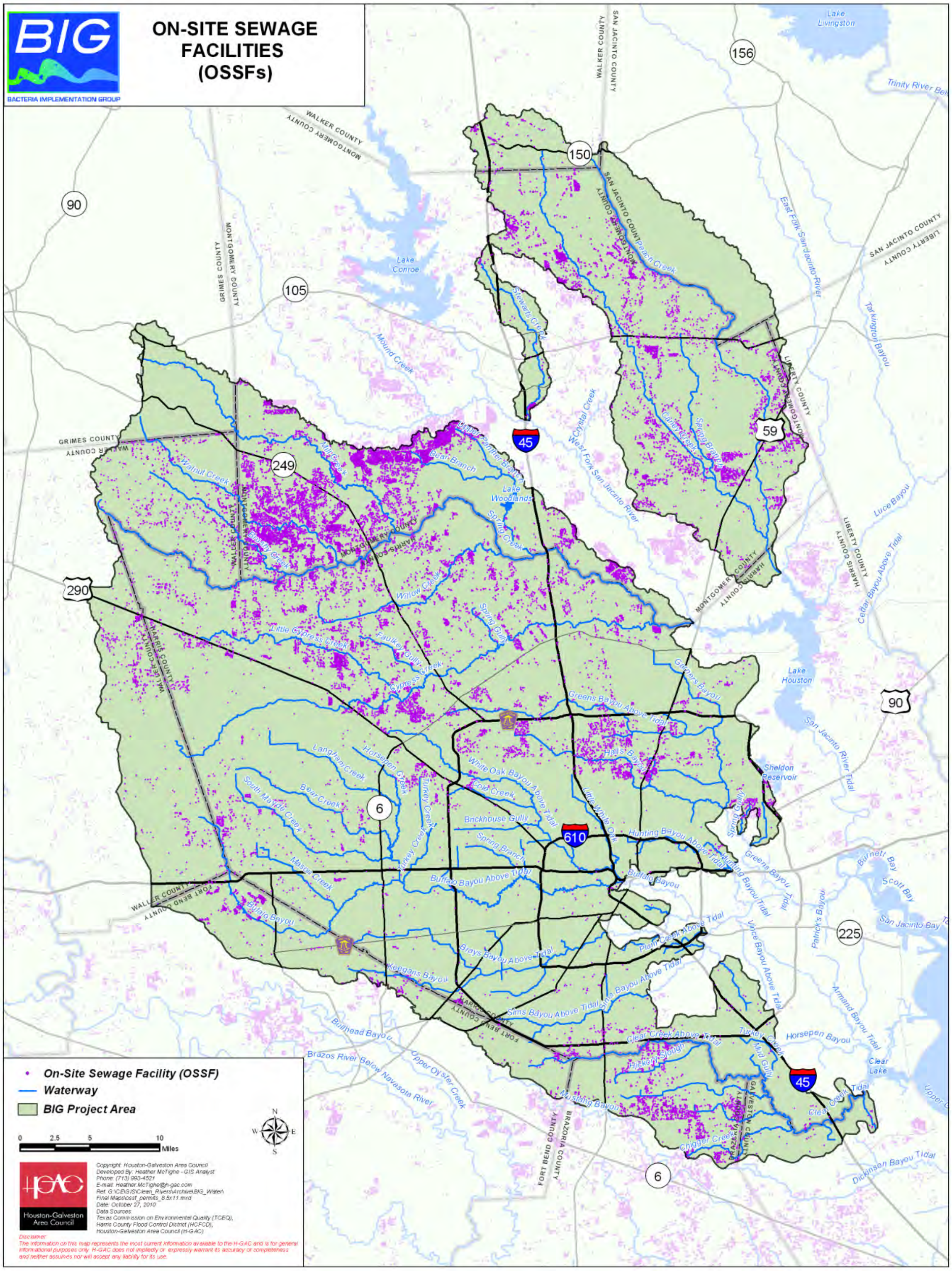
[64] (TCEQ 2008b)

[65] (TCEQ 2009a)

[66] Derived from the five technical documents for the Houston Metro TMDL Projects. (University of Houston & Parsons 2009)

[67] (James Miertschin & Associates, Inc. 2009)

Figure 4: Map of Permitted OSSF



Implementation Activity 3.1: Identify and Address Failing Systems

H-GAC will work with the TCEQ, authorized agents,[68] and other interested parties to create an inventory and map of OSSFs with particular focus on areas with known or suspected failing systems. The inventory is a crucial component in the development of priorities, budgets, and timelines for repairing or replacing failing OSSFs.

3.1.1: Map permitted and unpermitted OSSFs in the H-GAC and BIG Regions

H-GAC began mapping OSSFs in the region in 2009 and continues to work with the TCEQ and the region's authorized agents to inventory and map permitted OSSFs and reported OSSF violations. As part of the study, H-GAC will identify unpermitted OSSFs by analyzing data from appraisal districts, wastewater treatment plant service areas, census data, and other sources of information. Initial efforts, including data collection and standardization and mapping, were completed in November of 2010.

Ongoing data collection should be continued by H-GAC as resources are available. Authorized agents or the TCEQ shall submit information about OSSF locations as frequently as reporting requirements are specified in 30 Tex. Admin. Code § 285.11(e)(2). Currently, reporting requirements are monthly.

3.1.2: Identify target areas, timelines, and costs

H-GAC, working with stakeholders, will analyze the initial mapping data and prepare a report of recommended target areas, timelines, and budgets. H-GAC will solicit input from authorized agents and other interested parties. When possible, target areas will be identified using the geographical prioritization framework described in Implementation Strategy 11.0. Additional criteria to select target areas will include proximity to an impaired waterway and density of failing systems. The report will be used to facilitate grant applications and identify appropriate resources.

3.1.3: Address target areas and pursue funding

Local governments or other agencies will seek to address failing systems in target areas with appropriate actions which may include enforcement, owner education, repair, replacement, connection to municipal treatment works, and public education. Local governments and H-GAC shall seek to secure funding to address failing OSSFs, particularly in target areas. In addition to local funding, a variety of funding sources may be available.

[68] An authorized agent is defined in the Tex. Health & Safety Code Ann. § 366.002(1) (Definitions) as "a local governmental entity authorized by the commission to implement and enforce rules [related to OSSF regulations in Chapter 366 of the Health and Safety Code]" (TCEQ 2009b)

3.1.4: Reevaluate plan

Annually, as resources allow, H-GAC or other appropriate entity shall convene representatives of the TCEQ, authorized agents, and other stakeholders to review progress, priority areas, funding opportunities, and other elements of the regional plan.

Implementation Activity 3.2: Address Inadequate Maintenance of OSSFs

Authorized agents and other stakeholders are concerned that homeowners do not know enough about maintaining an OSSF to identify problems and solutions in order to prevent failures.

3.2.1: Homeowner education

As resources are available, H-GAC will create or adapt a website to provide homeowner education. An interactive function of this website will encourage OSSF owners to sign up for automatic reminders of required maintenance activities. This interaction not only benefits the homeowner, but it also serves as an information gathering tool for H-GAC regarding ownership, permitting and maintenance of OSSFs. Other possible elements of the website could include an online pumpout and maintenance log for homeowners and a list of licensed maintenance providers. Municipalities, counties, communities, homeowner associations and other interested parties can post a link to the website from their websites, creating a familiar portal for residents.

H-GAC will create or adapt collateral material, such as flyers, advertisements, mailers, and other marketing pieces for distribution at schools, in newspapers and publications, and to real estate agents and property inspectors.

3.2.2: Encourage repair and pumpout logs be kept by homeowners and/or maintenance providers

Authorized agents are encouraged to persuade homeowners and/or maintenance providers to maintain repair and pumpout logs, which may consist of proof of a valid maintenance contract, for their facilities. The logs should describe repair and pumpout data for the previous five years. Authorized agents may choose to require such logs by way of updates to their permit regulations. Homeowners and/or maintenance providers are encouraged to allow potential homebuyers to review the logs upon request. Homeowners and/or maintenance providers are encouraged to provide the logs or a copy of the logs to new homeowners upon transfer of property. Homebuyers will be given flyers or information sheets, possibly by real estate agents or property inspectors, that provide information about what a homebuyer or new owner should look for in the logs.

3.2.3: Coordinate with real estate industry

H-GAC, authorized agents, and other entities shall, as resources are available, provide education opportunities to real estate agents, property inspectors, and consumers about identification and consequences of inadequate maintenance and the failure of OSSFs. The Texas Real Estate Commission requires property inspections at the time of sale, specifies education and certification requirements for licensed real estate salespersons and inspectors, and develops forms for use during sales and inspections. Each of these items can be modified to provide additional resources for homeowners related to their septic systems.

3.2.4: Additional actions

The TCEQ, authorized agents, and other parties are encouraged to develop actions to increase maintenance of OSSFs, including more inspections, incentives for proper maintenance, and requirements that systems must be maintained by a maintenance company or a trained homeowner. The TCEQ is encouraged to suspend or revoke licenses and registrations of poorly performing installers and maintenance providers.[69] As resources are available, H-GAC and other stakeholders shall work to develop continuing education opportunities regarding OSSF regulations and enforcement for district attorneys and justices of the peace to increase prosecution of OSSF violations.

Implementation Activity 3.3: Legislation and Other Regulatory Actions

The BIG recommends consideration of the following changes to Texas legislation, rules, and agency policy.

3.3.1: Model Order, Ordinance, or Resolution

The TCEQ is required to provide a model order, ordinance, and resolution that can be used by authorized agents to meet the minimum requirements of OSSF laws and rules.[70] The TCEQ should maintain a list of more stringent local rules that have been adopted. Authorized agents are encouraged to adopt more stringent local rules as appropriate.

3.3.2: Biennial Review

The TCEQ shall consider providing a biennial forum to consider changes to legislation, rules, policies, and guidance relating to management of OSSFs. As part of this forum, the TCEQ shall discuss and consider appropriate mechanisms for funding OSSF programs.

[69] See 30 Tex. Admin. Code § 285.65 (2011) (Suspension or Revocation of License or Registration)

[70] See 30 Tex. Admin. Code § 285.10

Note: Appendix E provides information about more stringent regulations enacted by authorized agents in the Houston-Galveston region.

Appendix J: Load Reduction Value Information

Due to the large number of TMDLs covered by this I-Plan and the imprecise bacteria loading values from various sources, estimated load reductions more specific than those given in the following sections could not be determined. Load reductions for each source will vary from segment to segment based on a variety of factors including, but not limited to, the existing land uses in the watersheds and the current loadings from each source.

These load reduction percentages are not based on results of any direct, peer-reviewed, or technically supported studies performed on pathogens or fecal indicators in waterways in the greater Houston area. Many of the estimated reductions are presumptions based on the broad application of the referenced pollutant studies and behavior predictions, some of which are not specifically water related. Also, as this is only a presumed reduction in fecal load; it is still undetermined how this estimated reduction in fecal load would translate to reduction in fecal indicators or the level of pathogens in the water body. Given the untested nature of this information in our area, these estimated potential load reduction percentages should be considered as broad approximations based on limited information and subject to a large margin of error. More due diligence and validation should be required prior to obligating resources based on them.

Although the load reductions presented in the following sections may be less than the load reductions required by the TMDLs, the BIG intends that greater load reductions may be achieved through the iterative process of implementation. The ultimate goal of this I-Plan is continued progress toward greatly reduced bacteria levels.

Implementation Strategy 1.0: Wastewater Treatment Facilities (IS1)

10 percent-20 percent reduction in load assigned to WWTFs

The estimated load reductions for the seven main activities within IS1 range from zero to 45 percent of the load assigned to WWTF. Based on studies of compliance and enforcement in other fields, the hypothesis is that the strategy with the greatest potential for reducing loads would be improved compliance and enforcement, although concerns exist that resources available are insufficient to attain the full reduction estimate. Over 25 years these seven activities could result in a reduction of up to 20 percent in the load assigned to WWTF.

Implementation Activity 1.1: Impose More Rigorous Bacteria Monitoring Requirements is expected to reduce the waste load allocation assigned to WWTFs by 2-4 percent. The hypothesis is that this action will function in a manner similar to mass communication to change public behavior, which is typically

about 2 percent for public health campaigns.[145] In this instance, the behavior changes are mandated by permits, and so participation is expected to be greater than for campaigns directed at the general public.

Implementation Activity 1.3: Increase Compliance and Enforcement by the TCEQ is expected to reduce the waste load allocation assigned to WWTFs by up to 45 percent. In a study of random unannounced inspections of tobacco retailers over seven years regarding underage sales, compliance increased to approximately 90 percent when compliance began at 33 percent.[146] Targeted inspections at WWTFs may not show such a marked increase in compliance because they go after the repeat offenders and will start to leave out those consistently in compliance. Additionally, WWTF inspections look at numerous regulations as opposed to the one considered in the tobacco studies, which results in a greater opportunity for noncompliance. If only compliance with bacteria limits were considered for when measuring compliance trends would likely behave closer to the tobacco study results than otherwise.

Implementation Activity 1.5: Upgrade Facilities is expected to reduce the waste load allocation assigned to WWTFs by 12 percent. TCEQ data indicates that, at any one time, samples from 5-10 percent of select WWTFs in the BIG area do not meet the single grab sample limit of 197 *E. coli*/100 mL. This estimate of a 12 percent reduction, as a result of the implementation of 1.5, was based on a 6 percent non-compliance rate for WWTFs and the average concentration of *E. coli* samples during sampling of WWTFs between 2001 and 2006 in the Buffalo and Whiteoak Bayou watersheds.[147] In actuality, the loading from many plants would not be reduced at all by updates, while for some WWTFs, the load reduction from making updates would be far more substantial than 12 percent. Load reductions will probably not be 12 percent for any individual plant.

Implementation Activity 1.6: Consider Regionalization of WWTFs is estimated to produce no reduction in the waste load allocation assigned to WWTFs except in segments where chronically non-compliant WWTFs are identified and subsequently made compliant or regionalized. In these particular segments the reduction will be estimated after identification of the chronically non-compliant facilities is complete.

Implementation Strategy 2.0: Sanitary Sewer Systems (IS2)

75 percent reduction of calculated load from reported SSOs

The estimated load reduction for the six main activities within IS2 range from zero to 75 percent of the load from reported SSOs. Based on staff estimates, UAMP may substantially reduce the number of SSOs

[145] (Abroms and Maibach 2008)

[146] (Lally 2000)

[147] (TCEQ 2009a)

and the causes of those violations. Reported SSOs represent only a portion of the loading from sanitary sewer systems, however it should be possible to address most SSOs.

Implementation Strategy 3.0: On-Site Sewage Facilities (IS3)

75 percent reduction of current load from OSSF

The estimated load reduction from the three main activities within IS3 is a 75 percent reduction of the current load from OSSFs over 25 years. The TMDL projects identify approximately 2,100 failing OSSFs in the BIG region. Replacing or repairing 100 failing systems each year over 25 years is possible. Other measures should compensate for the expected increase in the number of systems that fail within the next 25 years. Of particular note is a Galveston County study that indicated that 20-46 percent of surveyed participants changed their behavior based on educational material.[148]

Implementation Strategy 4.0: Storm Water and Land Development (IS4)

20 percent reduction in loading from storm water each year, compounded

The estimated annual load reduction from the six main activities within IS4 is 20 percent. Studies indicate that individual activities can range from increasing bacterial loads to a 99 percent reduction. In the absence of better data, analogous studies pertaining to other constituents in large scale development, as documented in *The Practice of Low Impact Development* sponsored by the U.S. Department of Housing and Urban Development, suggest a range of values in various situations, but can be conservatively be averaged to be about 20 percent.[149] Implementation activities related to storm water are expected to reduce bacteria loading from storm water and land development by up to 20 percent over the entire implementation process.

Implementation Strategy 5.0: Construction (IS5)

Up to 85 percent reduction in loading from construction sites

Up to an 85 percent annual load reduction is estimated from the main activity within IS5. Effectiveness studies for construction site best management practices have largely focused on removal of sediment from runoff. Subsequently, information regarding the effectiveness of erosion and sediment control measures at removing bacteria from runoff is lacking and sediment removal efficiencies are often used as a surrogate for bacteria removal efficiencies. A Virginia Implementation Plan, *A Total Maximum Daily*

[148] (Galveston County Health District 1998)

[149] (NAHB Research Center, Inc. 2003)

Table 23: Implementation Strategy 3.0: On-site Sewage Facilities

(a) Causes/ Sources	(b) Implementation Activities and Targeted Critical Areas	(c) Estimated Potential Load Reduction	(d) Technical and Financial Assistance Needed for Each Activity	(e) Education Component for Each Activity	(f) Schedule of Implementation for Each Activity	(g) Interim, Measureable Milestones for Each Activity	(h) Indicators to Measure Progress	(i) Monitoring Component	(j) Responsible Entity
Nonpoint sources from malfunctioning On-site Sewage Facilities (OSSFs).	Implementation Activity 3.1 (IA 3.1): Identify and address failing systems.	In conjunction with IAs 3.2 and 3.3, a 75% reduction in bacteria loading from failing OSSFs as identified in the TMDL projects is expected over 25 years.	Technical- data and cooperation from Authorized Agents and TCEQ must be provided. Financial- existing local funding and grant funding when available	Annual meeting for Authorized Agents, TCEQ, H-GAC, and other stakeholders. Occasional e-mails between stakeholders. Development of educational material as appropriate.	Year One: Initial map Year Two: Target areas identified Ongoing: Collect data from Authorized Agents and TCEQ, fix/replace failing systems	Map created. Identification of target areas. 500 OSSFs repaired/replaced every five years for 25 years.	Reports provided by stakeholders to the BIG regarding progress. The number of OSSFs repaired or replaced.	H-GAC will collect reports from Authorized Agents and TCEQ.	Authorized Agents and TCEQ: Identify, seek to require replacement and/or repair of failing systems; participate in annual meeting; provide permit, violation, and enforcement data; report progress to BIG. Owners of failing OSSF: Replace or repair OSSFs. H-GAC: create and update map; facilitate annual meeting; collect and share information on the progress made each year BIG: Evaluate progress
Nonpoint sources from malfunctioning On-site Sewage Facilities (OSSFs).	Implementation Activity 3.2 (IA 3.2): Address inadequate maintenance of OSSFs.	In conjunction with IAs 3.1 and 3.3, a 75% reduction in bacteria loading from failing OSSFs as identified in the TMDL projects is expected over 25 years.	Technical- regulations, ordinances, and orders of other Authorized Agents, as collected and shared by HGAC and/or TCEQ, may serve as models. Legal assistance may be necessary. TCEQ, EPA, H-GAC, Texas Real estate Council, and other agencies offer some technical resources. Financial- existing local funding and grant funding as available	Annual meeting for Authorized Agents, TCEQ, H-GAC, and other stakeholders. Occasional e-mails between stakeholders. Provision of example regulations provided on website Jurisdictions who choose to change or add regulations will need to offer public comment and participation as appropriate. Website and collateral educational material.	As resources are available, implementation of this activity will begin immediately and will continue for the entire implementation process.	Each community shall examine their regulations and policies within five years Compile and share all existing regulations in project area within five years One community shall revise or adopt new regulations every five years By year five, flyers or other collateral material distributed Number of website visits	Information included in annual reports to the BIG Number of new regulations Number of flyers or other collateral material distributed Number of website visits	H-GAC will collect reports from Authorized Agents and TCEQ.	Authorized Agents and TCEQ: Examine relevant regulations and make changes as appropriate; report progress H-GAC: collect and share information about communities' regulations; collect and share information on the progress made each year BIG: Evaluate progress

(a) Causes/ Sources	(b) Implementation Activities and Targeted Critical Areas	(c) Estimated Potential Load Reduction	(d) Technical and Financial Assistance Needed for Each Activity	(e) Education Component for Each Activity	(f) Schedule of Implementation for Each Activity	(g) Interim, Measureable Milestones for Each Activity	(h) Indicators to Measure Progress	(i) Monitoring Component	(j) Responsible Entity
Nonpoint sources from malfunctioning On-site Sewage Facilities (OSSFs).	Implementation Activity 3.3 (IA 3.3): Legislation and other regulatory actions	In conjunction with IAs 3.1 and 3.2, a 75% reduction in bacteria loading from failing OSSFs as identified in the TMDL projects is expected over 25 years.	Technical- regulations, ordinances, and orders of other communities, as collected and shared by HGAC, may serve as models. Legal assistance may be necessary. Financial- existing local funding and grant funding as available	Annual meeting for Authorized Agents, TCEQ, H-GAC, and other stakeholders.Occasional e-mails between stakeholders. Jurisdictions who choose to change or add regulations will need to offer public comment and participation as required by law.TCEQ shall provide samples of more stringent local rules.	As resources are available, implementation of this activity will begin immediately and will continue for the entire implementation process.The TOWTRC will have a sunset review in 2011. Stakeholders are encouraged to participate in this process. Starting in 2012, TCEQ shall begin hosting biennial meetings to review OSSF regulations.	Compile and share all existing regulations in project area within five years Each community shall examine their regulations and policies within five years One community shall revise or adopt new regulations every five years Starting in 2012, TCEQ shall begin hosting biennial meetings to review OSSF regulations Changes to TOWTRC rules updated within five years	Information included in annual reports to the BIG Number of new regulations Updated TOWTRC rules	H-GAC will collect reports from Authorized Agents and TCEQ.	Authorized Agents: Examine and share relevant regulations and make changes as appropriate; report progress H-GAC: collect and share information about communities' regulations; collect and share information on the progress made each year BIG: Evaluate progress TCEQ: Host biennial meeting