Guidance for the Preparation of Wastewater Engineering Feasibility Reports

Applies to all funding programs, except EDAP

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Guidance for the Preparation of Wastewater Project Engineering Feasibility Reports

Overview

This document provides guidance to applicants about Texas Water Development Board (TWDB) requirements for submission of Engineering Feasibility Report (EFR) for wastewater related projects financed through TWDB funding programs, except for the Economically Distressed Areas Program (EDAP). EDAP applicants must follow directives from the EDAP Facility Engineering Plan/Scope of Services (WRD-023A).

Applicants seeking financial assistance under the Pre-design Funding option are required to submit a Preliminary Engineering Feasibility Report (PEFR) as required in question 47a of the application form. During the planning phase of the project these applicants must provide the material in this document or a report that contains similar details. Note: applicants that have already completed detailed planning can submit a complete Engineering Feasibility Report with the application in lieu of PEFR.

Note: The applicant may create one Engineering report combining the aspects of the Engineering Feasibility Report (EFR) with the requirements for a Final Engineering Report (FER) as required in ***30 TAC 217.10***. For new facilities such as a new Wastewater Treatment Plant (WWTP) or expansion of a WWTP, a complete FER will be required with submittal of the plans and specifications (P&S). In some instances, such as facilities rehabilitation, a more brief discussion of the needs, alternatives considered, and proposed project will be adequate. Keep in mind that creating a combination report EFR/FER may not be practical as design funds cannot be released until the planning documents are approved.

This guidance is consistent with the following Texas Administrative Code (TAC) and Texas Commission on Environmental Quality (TCEQ) rules pertaining to wastewater collection, treatment, and disposal:

30 TAC Chapter 210 – Use of Reclaimed water

1. 30 TAC Chapter 213 – Edwards Aquifer
2. 30 TAC Chapter 217 – Design Criteria for Domestic Wastewater Systems
3. 30 TAC Chapter 285 – On-Site Sewage Facilities
4. 30 TAC Chapter 308 – Criteria and Standards for the National Pollutant Discharge Elimination System
5. 30 TAC Chapter 309 – Domestic Wastewater Effluent Limitation and Plant Siting
6. 30 TAC Chapter 312 – Sludge Use, Disposal and Transportation
7. 30 TAC Chapter 332 – Composting
8. 31 TAC Chapter 375 – TWDB Clean Water State Revolving Fund Rules
    - Chapter 375.81 – Engineering Feasibility Report
9. 31 TAC Chapter 363 – TWDB's Financial Assistance Programs

- Chapter 363.13 – Preliminary Engineering Feasibility Report
- Chapter 363.16 – Pre-design Funding Option

10. 31 TAC 365 TWDB's Rural Water Assistance Fund
    - Chapter 365.23 – Pre-design Funding Option

TAC rules can be accessed online at: https://texreg.sos.state.tx.us/public/readtac$ext.viewtac

This guidance is intended to assist applicants in addressing all relevant project issues during the planning of the project. TWDB approval does not negate the need for permits required by the TCEQ or any other agencies.

Engineering Feasibility Report

The Engineering Feasibility Report (EFR) should form the conceptual basis for the wastewater collection, treatment, and/or disposal system proposed. Smaller systems proposing substantial improvements to a system should address all of the outlined issues as applicable. Larger systems addressing a particular portion of the system should include enough information to provide sufficient description of the need and proposed solution within the context of the larger system.

Please submit an electronic copy of the EFR. The EFR shall be in a high quality, fully searchable PDF format and be sealed, signed, and dated by the engineer responsible for the report. The consulting engineer's firm's Registration Number must also be included. The remainder of this document identifies minimum information which should be included in the EFR.

General Description

1. List the project's sponsoring political subdivision, address, telephone number and legal owner.

2. List the consulting engineer's name, address, and telephone number.

3. Identify the program(s) from which financial assistance is sought.

4. Identify entities to be served and current and future population

5. Provide a general description of the existing system.

6. Provide a complete statement explaining the wastewater problems and needs within the planning area, including the following:
    a. The domestic population of the area to be served (present through 20-year projection) and the design population of the project.
    b. Projections should agree with TWDB water plan projections. Where local data is different, provide an explanation of procedures, methodologies, and underlying assumptions employed in the formulation of those estimates.
    c. A discussion of any operational problems, at the wastewater treatment plant or within the collection system.

    d. A discussion of any applicable Environmental Protection Agency or TCEQ enforcement actions.

e. A discussion of other service areas or entities being joined into the project.
f. Adequate maps to locate existing facilities and service areas.
g. The plans should describe and justify the chosen planning horizon. Typically, communities plan for the 20-year needs (or match the term of the funding).

7. Provide a description of the proposed project including an explanation of any proposed phasing of construction. Also provide maps and drawings as necessary to locate and describe the project area to be served such as:
   a. geographic limits
   b. general location of proposed improvements
   c. water and wastewater treatment plant sites
   d. existing and proposed streets, parks, drainage ditches, creeks, streams, and water mains
   e. drainage area should be clearly defined by contour map at intervals of not more than ten *(10)* feet

8. For Clean Water State Revolving Fund (CWSRF) projects: provide sufficient detail to document that the project will remedy the issues and problems that were evaluated for rating on the Intended Use Plan (IUP).

9. Provide information regarding the source, ownership, and adequacy of water supply for the planning period.

Alternatives

Provide a description of the proposed project alternatives considered, and reasons for the selection of the project proposed.

1. The selection of the type of project must be fully described and the reasons for the selection clearly outlined.

2. The selection process should include evaluation of appropriate technologies and full consideration of their costs for the specific project and the environmental compatibility of the project. See Environmental Data Form TWDB-0800 (for State Programs) and Federal Environmental Review Form TWDB-0801(for Federal Programs).

3. Alternatives to be considered could include those involving the reduction of infiltration and inflow (I /I), modifying existing operation and maintenance (O&M) practices, phasing of the project, on-site systems, cluster systems, or various collection system routing alternatives. If alternatives for reusing effluent have been evaluated in compliance with TCEQ rules, include a description of the alternatives considered.

4. Cost and Effectiveness Analysis:
   a. Alternatives analysis should include information showing the project is cost effective. In addition, for projects that implement new systems or significantly alter current systems, a detailed cost-effectiveness analysis, including detailed O&M costs, may be requested.

   b. The Present Worth Method is a viable alternative to provide a cost effectiveness analysis. The Present Worth is the sum which, if invested now at a given interest rate, would provide exactly the funds required to pay all present and future costs.

Total project cost, used to compare alternatives, is the sum of the initial capital cost, plus the present worth of operation, maintenance, and repair (OM&R) costs, minus the present worth of the salvage value at the end of the 20-year planning period. For CWSRF projects, indicate the source of the discount rate to be utilized in the preparation of a Present Worth Analysis.

c. For CWSRF Projects: If the application was submitted on or after October 1, 2015, and the applicant is a municipality[1], the Engineering Feasibility Report must include a certification that states that the recipient:

   i. has studied and evaluated the cost and effectiveness of the processes, materials techniques, and technologies for carrying out the proposed project or activity for which financial assistance is being sought
   ii. has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation
   iii. The cost effectiveness analysis should take into account:
      - the cost of constructing the project or activity,
      - the cost of operating and maintaining the project or activity over the life of the project or activity, and
      - the cost of replacing the project or activity.

NOTE: The certification must be provided prior to the approval of CWSRF assistance for final design or construction. If the applicant receives financial assistance for Planning, Acquisition, Design and Construction (PAD/C), the agreement will be conditioned to read that release of funds for design and construction will be contingent upon submittal of such certification (§375.3(d)).

Project Specific Requirements

1. Proposed Collection System

The following information shall be provided in the engineering feasibility report if applicable to the project:

a. present area served and future areas to be served
b. general description of existing system
c. terrain data in sufficient detail to establish general topographical features of present and future areas to be served
d. lift stations existing and/or proposed
e. effect of proposed system expansion on existing system capacity
f. amount of infiltration/inflow existing and anticipated, and how it is to be addressed in the collection system design

[1] Municipality includes a city, town, borough, county, parish, district, association, or other public body created by or pursuant to state law, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under 33 U.S.C. §1288.

2. *On-site Systems*

For on-site systems, demonstrate compliance with *On-Site Sewage Facilities Standards 30 TAC* 285.

3. *Proposed Treatment Plant*

The following information is required in the preliminary engineering report.

a. Quantity and quality of existing sewage influent and changes in the characteristics anticipated in the future. If adequate records are not available, analyses shall be made for the existing conditions and such information included in the report.

b. Provide the names of industries contributing any significant wastes, types of industry (standard industry codes), volume of wastes, characteristics and strength of wastes, population equivalent, and other pertinent information. It should be emphasized that if significant amounts of wastes other than normal domestic sewage are to be treated at the wastewater treatment plant, sufficient data on such wastes must be presented to allow an evaluation of the effect on the treatment process. This would include but not be limited to heavy metals and toxic materials such as polychlorinated biphenyls, organic chemicals, and pesticides.

c. Design flow is defined as the average daily flow for a treatment facility permitted by the TCEQ. For a facility equal to or greater than 1.0 million gallons per day (MGD), the design flow is determined according to the data and method by TCEQ 217.32(1). For a facility less than 1.0 MGD, the design flow is the maximum 30-day average flow estimated by multiplying the average annual flow by a factor of at least 1.5.

   Peak flow is defined as the highest two-hour flow expected under any operational conditions, including times of high rainfall based on a 2-year 24- hour storm or a prolonged period of wet weather. Peak flow is determined according to TCEQ 217.32(2). When site-specific data is unavailable, the instantaneous two-hour peak flow must be estimated by multiplying the permitted flow by a factor of 4.0. If a facility experiences unusual periodic flow variations, a higher multiplier may be used to calculate the peak flow. In a facility with flow equalization, the facility may be designed for a lower estimated peak flow, if the supporting data included in the report supports the estimate.

   If the wet weather maximum 30-day average flow rate exceeds 125 gpcd, or bypasses and/or overflows occur, consideration should be given to examining the collection system for areas where infiltration/inflow can be controlled.

   It is important to verify the accuracy of flow and rainfall records used to make flow determinations. If the flow measuring device appears to be inaccurate or contributing flows exceed the above referenced amount, further guidance from the TWDB staff should be requested before proceeding.

   Therefore, when determining design and peak flow rates, consideration should be given to parameters such as:

   i. domestic base flow
   ii. industrial flow

iii. infiltration based on flow data from a 7-14 day average dry weather high groundwater period
iv. inflow based on flow data resulting from a 2-year 24-hour storm for the area
v. infiltration and inflow reduction not exceeding 50 percent resulting from proposed line repairs
vi. proposed flow reduction measures projected from the existing or proposed water conservation plan

d. Type of treatment plant proposed, and effluent quality expected. The information should include basis of design, flow, organic loading, infiltration allowance, and treatment efficiencies.
   i. describe the existing permit and parameters
   ii. discuss the proposed permit status and parameters

e. Type of units proposed and their capacities, considering the *Design Criteria for Domestic Wastewater Systems, 30 TAC 217*. The information should include detention times, surface loadings, weir loadings, flow diagram, and other pertinent information regarding the design of the plant, including sludge processing units required for the selected ultimate sludge disposal.

f. Treatment plant site information and the siting analysis. The location of the plant, the area included in the plant site, dedicated buffer zone, and a description of the surrounding area including a map or a sketch of the area.

   Reference should be made as to the plant's proximity to present and future housing developments, industrial sites, prevailing winds, highways and/or public thoroughfares, water plants, water supply wells, parks, schools, recreational areas, and shopping centers. If the effluent is to be discharged to the waters of the State, the immediate receiving stream, canal, major water course, etc., shall be designated.

   The siting analysis shall include:
   i. flood hazard analysis; provide the one-hundred-year flood plain elevation. Proposed treatment units which are to be located within the one-hundred-year flood plain will require protective measures satisfactory to the TCEQ (such as levees or elevation of the treatment units). See also item 6 below.

   ii. buffer zone analysis; demonstrate that the location of each proposed treatment unit is consistent with the buffer zone criteria specified in 30 TAC 309

4. Sludge Management

The preliminary engineering report shall include a discussion of the method of sludge disposal to be utilized. The report shall assess the following factors

a. estimated quantity of sludge that must be handled which includes future sludge loads based on flow projections;
b. quality and sludge treatment requirements for ultimate disposal;

c. sludge storage requirements for each alternative considering normal operating requirements and contingencies;
d. transportation of sludge;
e. land use and land availability;
f. reliability of the various alternatives, contingencies and mitigation plans to ensure reliable capacity and operational flexibility;
g. other applicable information such as pathogen reduction level, proximity to airports, and groundwater contamination potential; conforming with *30 TAC 309, Domestic Wastewater Effluent Limitations and Plant Sitting; 30 TAC 312, Sludge Use, Disposal and Transportation; and 30 TAC 330, Municipal Solid Waste;*
h. status of any permits or authorization required for ultimate disposal of sludge.

5. Control of Bypassing

Units or equipment which are needed to provide standby capability, provide flexibility of operation, or prevent discharges of partially treated or untreated wastewater during construction are eligible for TWDB funding. Provide a description of such units or equipment and include the costs in the cost estimate.

6. Special Permits

a. Special Flood Hazard Area
The Federal Emergency Management Agency (FEMA) establishes minimum floodplain management requirements for communities participating in the National Flood Insurance Program (NFIP). Communities are encouraged to enforce standards that are higher than the minimum standards by adopting more comprehensive floodplain management regulations. A community that exceeds the minimum requirements of the NFIP may be eligible to participate in FEMA's Community Rating System (CRS).

For projects that are to be located in or near a Special Flood Hazard Area, please confirm that the project design and construction will equal or exceed NFIP construction requirements. The engineer should discuss any proposed higher standards and document how the project meets the requirements.

b. Wastewater Discharge Permit
The EFR should also discuss the need for, and status of any new or amended wastewater discharge permits by the Commission.

Alternative Methods for Project Delivery

An applicant considering the use of alternative delivery methods of construction, should discuss this with the team as early in the process as possible, preferably before an application for funding is submitted. Design build, construction manager at risk and other alternative methods of project delivery are eligible for available financial assistance, including combinations of planning, design, and construction funding, in accordance with programmatic requirements. However, during the planning process, if the community is interested in utilizing an alternative delivery method, the EFR should discuss the benefits of the alternative methods of delivery over the traditional design-bid-build method,

and taking into account the size and complexity of the project as well as all programmatic requirements. For additional information on alternative delivery project requirements, see TWDB guidance regarding modifications of the type of financial assistance, review, approval, and release of funds processes (TWDB-0570)

American Iron & Steel or U.S. Iron & Steel Requirements

Federally funded projects must comply with the American Iron & Steel requirements as described in TWDB-1106. State funded projects must comply with the U.S. Iron & Steel requirements as described in TWDB-1105. Please provide a discussion of any known issues or special considerations that may affect the design or construction because of the applicable iron and steel requirements. In addition, include a discussion of any potential waivers that are being considered.

Cost of the Project

Provide the total project cost for each project or project phase. Include all sources of funding. The ***Project Budget Form (TWDB-1201)*** is available to complete or download online at: http://www.twdb.texas.gov/financial/instructions/index.asp. Enter TWDB-1201 (or the number 1201) in the search box found under **Finance and Construction Assistance Guidance and Forms Library**

PROJECT BUDGET - Entity Name _____						
Uses	TWDB Funds Series 1	TWDB Funds Series 2	TWDB Funds Series 3	Total TWDB Cost	Other Funds	Total Cost
Construction						
Construction	$0	$0	$0	$0	$0	$0
Subtotal Construction	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Basic Engineering Fees						
Planning +	$0	$0	$0	$0	$0	$0
Design	$0	$0	$0	$0	$0	$0
Construction Engineering	$0	$0	$0	$0	$0	$0
Basic Engineering Other **	$0	$0	$0	$0	$0	$0
Subtotal Basic Engineering Fees	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Special Services						
Application	$0	$0	$0	$0	$0	$0
Environmental	$0	$0	$0	$0	$0	$0
Water Conservation Plan	$0	$0	$0	$0	$0	$0

Project Schedule

Include a detailed project schedule with timelines for each phase of the project (as applicable). The projected target dates should include, but are not limited to the following:

1. requested loan closing date
2. completion of planning activities (EFR approval)
3. submit plans and specifications for TWDB approval
4. advertise for bids on contract(s)
5. open bids and contingently execute contract(s)

6. final project completion

As necessary, include time for unforeseen delays to obtain easements for land, buffer zones, or right-of-way easements.

Environmental Assessment

If the Environmental Assessment is to be included within the EFR, provide the information required in the Environmental Data Form TWDB-0800 (for State Programs) or Federal Environmental Review Form TWDB-0801(for Federal Programs).

Preliminary Engineering Feasibility Report (PEFR)

As required in TWDB's Administrative Rules, a PEFR is required when the applicant has not completed planning activities or is requesting pre-design funding and an EFR has not been prepared. The PEFR shall be in a high quality, fully searchable PDF format and be sealed, signed, and dated by the engineer responsible for the report. The consulting engineer's firm's Registration Number must also be included. The format of a PEFR should follow the EFR format discussed above, and should address, as a minimum, the following components

a. a description and purpose of the project;
b. the entities to be served and current and future population;
c. the cost of the project;
d. a description of alternatives considered and reasons for the selection of the project proposed;
e. sufficient information to evaluate the engineering feasibility of the project;
f. maps and drawings as necessary to locate and describe the project area; and
g. any other information the executive administrator determines is necessary to evaluate the project.

References

Texas Administrative Code rules as listed in the overview section of this guidance can be accessed online at: https://texreg.sos.state.tx.us/public/readtac$ext.viewtac.

Environmental Data Form for State Programs (TWDB-0800)
Federal Environmental Review Form for Federal Programs (TWDB-0801)

Guidance for use of Construction Manager at Risk and Design-Build Project Delivery Methods (TWDB-0570)

United States Iron and Steel (U.S. I&S) Guidance for Projects Funded Through State Programs (TWDB-1105)

American Iron and Steel (AIS) Guidance for Clean Water & Drinking Water State Revolving Fund Projects (TWDB-1106)

Budget Template for Projects (TWDB-1201)