UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service

**BULLETIN 1780-2**

**SUBJECT:** **Preliminary Engineering Reports for the Water and Waste Disposal Program**

**TO:** Rural Development State Directors, RUS Program Directors, and State Engineers

**EFFECTIVE DATE:** Date of approval.

**OFFICE OF PRIMARY INTEREST:** Engineering and Environmental Staff, Water and Environmental Programs

**INSTRUCTIONS:** This bulletin replaces existing RUS Bulletins 1780-2 (September 10, 2003), 1780-3 (October 2, 2003), 1780-4 (October 2, 2003), and 1780-5 (October 2, 2003).

**AVAILABILITY:** This bulletin and all the exhibits, as well as any Rural Development instruction or Rural Utilities Service instructions, regulations, or forms referenced in this bulletin are available at any Rural Development State Office. The State Office staff is familiar with the use of the documents in their States and can answer specific questions on Agency requirements.

This bulletin is available on the Rural Utilities Service website at http://www.rurdev.usda.gov/RDU_Bulletins_Water_and_Environmental.html.

**PURPOSE:** This bulletin assists applicants and their consultants with instructions on how to prepare a Preliminary Engineering Report as part of an application for funding as required by 7 CFR 1780.33(c) and 7 CFR 1780.55.

**MODIFICATIONS:** Rural Development State Offices may modify this guidance when appropriate to comply with State statutes and regulations in accordance with the procedures outlined at Rural Development Instruction 2006-B (2006.55).

4/4/13

JACQUELINE M. PONTI-LAZARUK
Assistant Administrator
Water and Environmental Programs

Date

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ABBREVIATIONS

CDBG – Community Development Block Grant
CFR – Code of Federal Regulations
EDU – Equivalent Dwelling Unit
EPA – Environmental Protection Agency
GAO – Government Accountability Office
GPCD – Gallons per Capita per Day
HUD – Department of Housing and Urban Development
O & M – Operations and Maintenance
PER – Preliminary Engineering Report
RD – Rural Development
RUS – Rural Utilities Service
SRF – State Revolving Fund
USDA – United States Department of Agriculture
WEP – Water and Environmental Programs
WWD – Water and Waste Disposal

## 1 GENERAL

A PER is a planning document required by many state and federal agencies as part of the process of obtaining financial assistance for development of drinking water, wastewater, solid waste, and stormwater projects. An applicant for funding from the WWD program must submit a PER as required by 7 CFR 1780.33(c) and 1780.55. The PER describes the proposed project from an engineering perspective, analyzes alternatives to the proposal, defines project costs, and provides information critical to the underwriting process.

In 2012 the USDA, Rural Development (RD), Rural Utilities Service, Water and Environmental Programs formed a working group to develop an interagency template for PERs for use by both federal agencies and state administering agencies. The USDA-led working group included 36 individuals representing 4 federal agencies, 16 state agencies, the Border Environment Cooperation Commission, and the North Carolina Rural Center. Also, the effort was supported by the Small Community Water Infrastructure Exchange. On January 16, 2013, the principals of the federal participants executed an interagency memorandum supporting use of the interagency template, attached as Exhibit One.

## 2. PURPOSE

This bulletin provides information and guidance for applicants and professional consultants in developing a PER for submittal with an application for funding. RD State Offices should provide a copy of the Bulletin to applicants and consulting engineers upon request or refer them to the website listed on the Bulletin's cover sheet for an electronic copy.

## 3 HOW TO USE THE INTERAGENCY TEMPLATE

There has been increasing interest throughout the government at both state and federal levels to improve coordination between funding agencies in the processes involved in applications for infrastructure funding. A recent GAO report, "Rural Water Infrastructure: Additional Coordination Can Help Avoid Potentially Duplicative Application Requirements" (GAO-13-111), released October 16, 2012, called the effort of the working group led by USDA to develop the attached Interagency PER Template "encouraging" and stated that it would "help communities".

Content of a PER: The attached Interagency PER Template describes the content of a PER and should be used without modification, except for items noted below. Often an applicant will initially consider only a single funding source and later determine that an application to additional funding agencies is necessary. To avoid having to revise the PER to meet the additional agencies' needs, the consulting engineer should provide

responses to all sections of the PER outline, unless specific sections do not apply to a proposed project.

Short-Lived Assets: The short-lived asset table in Appendix A is a list of examples of short-lived assets. Depending on local practices and applicants, some of these items may not be considered short-lived assets if they are considered part of O&M or long-term capital financing. Consulting engineers and applicants should coordinate with each other and with the Agency to determine which items should be considered short-lived assets for specific projects.

Engaging State Partners: State Offices should engage funding partners to encourage state-wide adoption of the attached template as a standard for all state leveraging partners. Existing state-level agreements resulting from previous coordinated efforts for adopting a standard PER outline must be modified or replaced with this template. Efforts underway to adopt new state-level PER outlines must use this template. State-level agreements implementing this template between various leveraging partners should keep additional requirements to a minimum, but should not remove any required sections from the template.

Income Projections for Underwriting Purposes:

The State Office uses some of the information from the PER, especially Sections 6 (e) and (f), for underwriting purposes. Note that for income projection purposes, every effort should be made to identify actual data regarding water usage or wastewater generation. For metered systems, actual data should be used.

When financing construction of a new system or improvements to an existing system without any existing usage data, water use and wastewater generation approximations for income projection purposes should, if at all possible, be based on information from surrounding similar communities and systems. The source of data used should be documented in the PER.

The value of 100 GPCD shown in Section 6 is a general value and may not be appropriate for many rural systems financed with WWD funds, so in the absence of reliable data, a value of 5000 gallons per EDU per month (approximately 67 GPCD or 167 GPD per EDU) should be used.

Exhibit One: Interagency Preliminary Engineering Report Template

January 16, 2013

INTERAGENCY MEMORANDUM

Attached is a document explaining recommended best practice for the development of Preliminary Engineering Reports in support of funding applications for development of drinking water, wastewater, stormwater, and solid waste systems.

The best practice document was developed cooperatively by:

- US Department of Agriculture, Rural Development, Rural Utilities Service, Water and Environmental Programs;
- US Environmental Protection Agency (EPA), Office of Water, Office of Ground Water and Drinking Water and Office of Wastewater Management;
- US Department of Housing and Urban Development (HUD), Office of Community Planning and Development;
- US Department of Health and Human Services, Indian Health Service (IHS);
- Small Communities Water Infrastructure Exchange;

Extensive input from participating state administering agencies was also very important to the development of this document.

Federal agencies that cooperatively developed this document strongly encourage its use by funding agencies as part of the application process or project development. State administered programs are encouraged to adopt this document but are not required to do so, as it is up to a state administering agency's discretion to adopt it, based on the needs of the state administering agency.

A Preliminary Engineering Report (Report) is a planning document required by many state and federal funding agencies as part of the process of obtaining financial assistance for development of drinking water, wastewater, solid waste, and stormwater facilities. The attached Report outline details the requirements that funding agencies have adopted when a Report is required.

In general the Report should include a description of existing facilities and a description of the issues being addressed by the proposed project. It should identify alternatives, present a life cycle cost analysis of technically feasible alternatives and propose a specific course of action. The Report should also include a detailed current cost estimate of the recommended alternative. The attached outline describes these and other sections to be included in the Report.

Projects utilizing direct federal funding also require an environmental review in accordance with the National Environmental Policy Act (NEPA). The Report should indicate that environmental issues were considered as part of the engineering planning and include environmental information pertinent to engineering planning.

For state administered funding programs, a determination of whether the outline applies to a given program or project is made by the state administering agency. When a program or agency adopts this outline, it may adopt a portion or the entire outline as applicable to the program or project in question at the discretion of the agency. Some state and federal funding agencies will not require the Report for every project or may waive portions of the Report that do not apply to their application process, however a Report thoroughly addressing all of the contents of this outline will meet the requirements of most agencies that have adopted this outline.

The detailed outline provides information on what to include in a Report. The level of detail required may also vary according to the complexity of the specific project. Reports should conform substantially to this detailed outline and otherwise be prepared and presented in a professional manner. Many funding agencies require that the document be developed by a Professional Engineer registered in the state or other jurisdiction where the project is to be constructed unless exempt from this requirement. Please check with applicable funding agencies to determine if the agencies require supplementary information beyond the scope of this outline.

Any preliminary design information must be written in accordance with the regulatory requirements of the state or territory where the project will be built.

Information provided in the Report may be used to process requests for funding. Completeness and accuracy are therefore essential for timely processing of an application. Please contact the appropriate state or federal funding agencies with any questions about development of the Report and applications for funding as early in the process as practicable.

Questions about this document should be referred to the applicable state administering agency, regional office of the applicable federal agency, or to the following federal contacts:

| Agency | Contact | Email Address | Phone |
|---|---|---|---|
| USDA/RUS | Benjamin Shuman, PE | ben.shuman@wdc.usda.gov | 202-720-1784 |
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| IHS | Dana Baer, PE | dana.baer@ihs.gov | 301-443-1345 |

Sincerely,

1/16/13

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USDA, Rural Development, Rural Utilities Service, Water and Environmental Programs

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1/16/13

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Division of Sanitation Facilities Construction, Indian Health Service

1-16-13

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Attachment

# WORKING GROUP CONTRIBUTORS

| Federal Agency Partners | |
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| | |
| USDA, Rural Development, Rural Utilities Service (Chair) | Benjamin Shuman, PE |
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| EPA, Office of Water, Office of Wastewater Management | Matt King |
| EPA, Office of Water, Office of Wastewater Management | Joyce Hudson |
| EPA, Region 1 | Carolyn Hayek |
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| State Agency and Interagency Partners | |
|---|---|
| | |
| Arizona Water Infrastructure Finance Authority | Dean Moulis, PE |
| Border Environment Cooperation Commission | Joel Mora, PE |
| Colorado Department of Local Affairs | Barry Cress |
| Colorado Department of Public Health & Environment | Michael Beck |
| Colorado Department of Public Health & Environment | Bret Icenogle, PE |
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| Kentucky Division of Water | Shafiq Amawi |
| Kentucky Department of Local Government | Jennifer Peters |
| Louisiana Department of Environmental Quality | Jonathan McFarland, PE |
| Maine Department of Health and Human Services | Norm Lamie, PE |
| Minnesota Pollution Control Agency | Amy Douville |
| Minnesota Pollution Control Agency | Corey Mathisen, PE |
| Missouri Department of Natural Resources | Cynthia Smith |
| Montana Department of Commerce | Kate Miller, PE |
| North Carolina Department of Commerce | Olivia Collier |
| North Carolina Rural Center | Keith Krzywicki, PE |
| North Carolina Department of Commerce | Vickie Miller, CPM |
| Rhode Island Department of Health | Gary Chobanian, PE |
| Rhode Island Department of Health | Geoffrey Marchant |

## ABBREVIATIONS

NEPA – National Environmental Policy Act
NPV – Net Present Value
O&M – Operations and Maintenance
OMB – Office of Management and Budget
Report – Preliminary Engineering Report
SPPW – Single Payment Present Worth
USPW – Uniform Series Present Worth

GENERAL OUTLINE OF A PRELIMINARY ENGINEERING REPORT

1) PROJECT PLANNING
   a) Location
   b) Environmental Resources Present
   c) Population Trends
   d) Community Engagement

2) EXISTING FACILITIES
   a) Location Map
   b) History
   c) Condition of Existing Facilities
   d) Financial Status of any Existing Facilities
   e) Water/Energy/Waste Audits

3) NEED FOR PROJECT
   a) Health, Sanitation, and Security
   b) Aging Infrastructure
   c) Reasonable Growth

4) ALTERNATIVES CONSIDERED
   a) Description
   b) Design Criteria
   c) Map
   d) Environmental Impacts
   e) Land Requirements
   f) Potential Construction Problems
   g) Sustainability Considerations
      i) Water and Energy Efficiency
      ii) Green Infrastructure
      iii) Other
   h) Cost Estimates

5) SELECTION OF AN ALTERNATIVE
   a) Life Cycle Cost Analysis
   b) Non-Monetary Factors

6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)
   a) Preliminary Project Design
   b) Project Schedule
   c) Permit Requirements
   d) Sustainability Considerations
      i) Water and Energy Efficiency
      ii) Green Infrastructure

iii) Other

e) Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

f) Annual Operating Budget
   i) Income
   ii) Annual O&M Costs
   iii) Debt Repayments
   iv) Reserves

7) CONCLUSIONS AND RECOMMENDATIONS

DETAILED OUTLINE OF A PRELIMINARY ENGINEERING REPORT

1) PROJECT PLANNING

Describe the area under consideration. Service may be provided by a combination of central, cluster, and/or centrally managed individual facilities. The description should include information on the following:

a) Location. Provide scale maps and photographs of the project planning area and any existing service areas. Include legal and natural boundaries and a topographical map of the service area.

b) Environmental Resources Present. Provide maps, photographs, and/or a narrative description of environmental resources present in the project planning area that affect design of the project. Environmental review information that has already been developed to meet requirements of NEPA or a state equivalent review process can be used here.

c) Population Trends. Provide U.S. Census or other population data (including references) for the service area for at least the past two decades if available. Population projections for the project planning area and concentrated growth areas should be provided for the project design period. Base projections on historical records with justification from recognized sources.

d) Community Engagement. Describe the utility's approach used (or proposed for use) to engage the community in the project planning process. The project planning process should help the community develop an understanding of the need for the project, the utility operational service levels required, funding and revenue strategies to meet these requirements, along with other considerations.

2) EXISTING FACILITIES

Describe each part (e.g. processing unit) of the existing facility and include the following information:

a) Location Map. Provide a map and a schematic process layout of all existing facilities. Identify facilities that are no longer in use or abandoned. Include photographs of existing facilities.

b) History. Indicate when major system components were constructed, renovated, expanded, or removed from service. Discuss any component failures and the cause for the failure. Provide a history of any applicable violations of regulatory requirements.

c) Condition of Existing Facilities. Describe present condition; suitability for continued use; adequacy of current facilities; and their conveyance, treatment, storage, and disposal capabilities. Describe the existing capacity of each component. Describe and reference compliance with applicable federal, state, and local laws. Include a brief analysis of overall current energy consumption. Reference an asset management plan if applicable.

d) Financial Status of any Existing Facilities. (Note: Some agencies require the owner to submit the most recent audit or financial statement as part of the application package.) Provide information regarding current rate schedules, annual O&M cost (with a breakout of current energy costs), other capital improvement programs, and tabulation of users by monthly usage categories for the most recent typical fiscal year. Give status of existing debts and required reserve accounts.

e) Water/Energy/Waste Audits. If applicable to the project, discuss any water, energy, and/or waste audits which have been conducted and the main outcomes.

3) NEED FOR PROJECT

Describe the needs in the following order of priority:

a) Health, Sanitation, and Security. Describe concerns and include relevant regulations and correspondence from/to federal and state regulatory agencies. Include copies of such correspondence as an attachment to the Report.

b) Aging Infrastructure. Describe the concerns and indicate those with the greatest impact. Describe water loss, inflow and infiltration, treatment or storage needs, management adequacy, inefficient designs, and other problems. Describe any safety concerns.

c) Reasonable Growth. Describe the reasonable growth capacity that is necessary to meet needs during the planning period. Facilities proposed to be constructed to meet future growth needs should generally be supported by additional revenues. Consideration should be given to designing for phased capacity increases. Provide number of new customers committed to this project.

4) ALTERNATIVES CONSIDERED

This section should contain a description of the alternatives that were considered in planning a solution to meet the identified needs. Documentation of alternatives considered is often a Report weakness. Alternative approaches to ownership and management, system design (including resource efficient or green alternatives), and sharing of services, including various forms of partnerships, should be considered. In addition, the following alternatives should be considered, if practicable: building new centralized facilities, optimizing the current facilities (no construction), developing centrally managed decentralized systems, including small cluster or individual systems, and developing an optimum combination of centralized and decentralized systems. Alternatives should be consistent with those considered in the NEPA, or state equivalent, environmental review. Technically infeasible alternatives that were considered should be mentioned briefly along with an explanation of why they are infeasible, but do not require full analysis. For each technically feasible alternative, the description should include the following information:

a) Description. Describe the facilities associated with every technically feasible alternative. Describe source, conveyance, treatment, storage and distribution

facilities for each alternative. A feasible system may include a combination of centralized and decentralized (on-site or cluster) facilities.

b) Design Criteria. State the design parameters used for evaluation purposes. These parameters should comply with federal, state, and agency design policies and regulatory requirements.

c) Map. Provide a schematic layout map to scale and a process diagram if applicable. If applicable, include future expansion of the facility.

d) Environmental Impacts. Provide information about how the specific alternative may impact the environment. Describe only those unique direct and indirect impacts on floodplains, wetlands, other important land resources, endangered species, historical and archaeological properties, etc., as they relate to each specific alternative evaluated. Include generation and management of residuals and wastes.

e) Land Requirements. Identify sites and easements required. Further specify whether these properties are currently owned, to be acquired, leased, or have access agreements.

f) Potential Construction Problems. Discuss concerns such as subsurface rock, high water table, limited access, existing resource or site impairment, or other conditions which may affect cost of construction or operation of facility.

g) Sustainability Considerations. Sustainable utility management practices include environmental, social, and economic benefits that aid in creating a resilient utility.

i) Water and Energy Efficiency. Discuss water reuse, water efficiency, water conservation, energy efficient design (i.e. reduction in electrical demand), and/or renewable generation of energy, and/or minimization of carbon footprint, if applicable to the alternative. Alternatively, discuss the water and energy usage for this option as compared to other alternatives.

ii) Green Infrastructure. Discuss aspects of project that preserve or mimic natural processes to manage stormwater, if applicable to the alternative. Address management of runoff volume and peak flows through infiltration, evapotranspiration, and/or harvest and use, if applicable.

iii) Other. Discuss any other aspects of sustainability (such as resiliency or operational simplicity) that are incorporated into the alternative, if applicable.

h) Cost Estimates. Provide cost estimates for each alternative, including a breakdown of the following costs associated with the project: construction, non-construction, and annual O&M costs. A construction contingency should be included as a non-construction cost. Cost estimates should be included with the descriptions of each technically feasible alternative. O&M costs should include a rough breakdown by O&M category (see example below) and not just a value for each alternative. Information from other sources, such as the recipient's accountant or other known technical service providers, can be incorporated to assist in the development of this section. The cost derived will be used in the life cycle cost analysis described in Section 5 a.

| Example O&M Cost Estimate | |
|---|---|
| | |
| Personnel (i.e. Salary, Benefits, Payroll Tax, Insurance, Training) | |
| Administrative Costs (e.g. office supplies, printing, etc.) | |
| Water Purchase or Waste Treatment Costs | |
| Insurance | |
| Energy Cost (Fuel and/or Electrical) | |
| Process Chemical | |
| Monitoring & Testing | |
| Short Lived Asset Maintenance/Replacement* | |
| Professional Services | |
| Residuals Disposal | |
| Miscellaneous | |
| Total | |

* See Appendix A for example list

## 5) SELECTION OF AN ALTERNATIVE

Selection of an alternative is the process by which data from the previous section, "Alternatives Considered" is analyzed in a systematic manner to identify a recommended alternative. The analysis should include consideration of both life cycle costs and non-monetary factors (i.e. triple bottom line analysis: financial, social, and environmental). If water reuse or conservation, energy efficient design, and/or renewable generation of energy components are included in the proposal provide an explanation of their cost effectiveness in this section.

a) Life Cycle Cost Analysis. A life cycle present worth cost analysis (an engineering economics technique to evaluate present and future costs for comparison of alternatives) should be completed to compare the technically feasible alternatives. Do not leave out alternatives because of anticipated costs; let the life cycle cost analysis show whether an alternative may have an acceptable cost. This analysis should meet the following requirements and should be repeated for each technically feasible alternative. Several analyses may be required if the project has different aspects, such as one analysis for different types of collection systems and another for different types of treatment.

1. The analysis should convert all costs to present day dollars;
2. The planning period to be used is recommended to be 20 years, but may be any period determined reasonable by the engineer and concurred on by the state or federal agency;
3. The discount rate to be used should be the "real" discount rate taken from Appendix C of OMB circular A-94 and found at (www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html);
4. The total capital cost (construction plus non-construction costs) should be included;

5. Annual O&M costs should be converted to present day dollars using a uniform series present worth (USPW) calculation;
6. The salvage value of the constructed project should be estimated using the anticipated life expectancy of the constructed items using straight line depreciation calculated at the end of the planning period and converted to present day dollars;
7. The present worth of the salvage value should be subtracted from the present worth costs;
8. The net present value (NPV) is then calculated for each technically feasible alternative as the sum of the capital cost (C) plus the present worth of the uniform series of annual O&M (USPW (O&M)) costs minus the single payment present worth of the salvage value (SPPW(S)):

$$NPV = C + USPW\ (O\&M) - SPPW\ (S)$$

9. A table showing the capital cost, annual O&M cost, salvage value, present worth of each of these values, and the NPV should be developed for state or federal agency review. All factors (major and minor components), discount rates, and planning periods used should be shown within the table;
10. Short lived asset costs (See Appendix A for examples) should also be included in the life cycle cost analysis if determined appropriate by the consulting engineer or agency. Life cycles of short lived assets should be tailored to the facilities being constructed and be based on generally accepted design life. Different features in the system may have varied life cycles.

b) Non-Monetary Factors. Non-monetary factors, including social and environmental aspects (e.g. sustainability considerations, operator training requirements, permit issues, community objections, reduction of greenhouse gas emissions, wetland relocation) should also be considered in determining which alternative is recommended and may be factored into the calculations.

## 6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

The engineer should include a recommendation for which alternative(s) should be implemented. This section should contain a fully developed description of the proposed project based on the preliminary description under the evaluation of alternatives. Include a schematic for any treatment processes, a layout of the system, and a location map of the proposed facilities. At least the following information should be included as applicable to the specific project:

a) Preliminary Project Design.

i) Drinking Water:

Water Supply. Include requirements for quality and quantity. Describe recommended source, including site and allocation allowed.

Treatment. Describe process in detail (including whether adding, replacing, or rehabilitating a process) and identify location of plant and site of any process discharges. Identify capacity of treatment plant (i.e. Maximum Daily Demand).

Storage. Identify size, type and location.

Pumping Stations. Identify size, type, location and any special power requirements. For rehabilitation projects, include description of components upgraded.

Distribution Layout. Identify general location of new pipe, replacement, or rehabilitation: lengths, sizes and key components.

ii) Wastewater/Reuse:

Collection System/Reclaimed Water System Layout. Identify general location of new pipe, replacement or rehabilitation: lengths, sizes, and key components.

Pumping Stations. Identify size, type, site location, and any special power requirements. For rehabilitation projects, include description of components upgraded.

Storage. Identify size, type, location and frequency of operation.

Treatment. Describe process in detail (including whether adding, replacing, or rehabilitating a process) and identify location of any treatment units and site of any discharges (end use for reclaimed water). Identify capacity of treatment plant (i.e. Average Daily Flow).

iii) Solid Waste:

Collection. Describe process in detail and identify quantities of material (in both volume and weight), length of transport, location and type of transfer facilities, and any special handling requirements.

Storage. If any, describe capacity, type, and site location.

Processing. If any, describe capacity, type, and site location.

Disposal. Describe process in detail and identify permit requirements, quantities of material, recycling processes, location of plant, and site of any process discharges.

iv) Stormwater:

Collection System Layout. Identify general location of new pipe, replacement or rehabilitation: lengths, sizes, and key components.

Pumping Stations. Identify size, type, location, and any special power requirements.

Treatment. Describe treatment process in detail. Identify location of treatment facilities and process discharges. Capacity of treatment process should also be addressed.

Storage. Identify size, type, location and frequency of operation.

Disposal. Describe type of disposal facilities and location.

Green Infrastructure. Provide the following information for green infrastructure alternatives:

- Control Measures Selected. Identify types of control measures selected (e.g., vegetated areas, planter boxes, permeable pavement, rainwater cisterns).
- Layout: Identify placement of green infrastructure control measures, flow paths, and drainage area for each control measure.
- Sizing: Identify surface area and water storage volume for each green infrastructure control measure. Where applicable, soil infiltration rate, evapotranspiration rate, and use rate (for rainwater harvesting) should also be addressed.
- Overflow: Describe overflow structures and locations for conveyance of larger precipitation events.

b) Project Schedule. Identify proposed dates for submittal and anticipated approval of all required documents, land and easement acquisition, permit applications, advertisement for bids, loan closing, contract award, initiation of construction, substantial completion, final completion, and initiation of operation.

c) Permit Requirements. Identify any construction, discharge and capacity permits that will/may be required as a result of the project.

d) Sustainability Considerations (if applicable).

i) Water and Energy Efficiency. Describe aspects of the proposed project addressing water reuse, water efficiency, and water conservation, energy efficient design, and/or renewable generation of energy, if incorporated into the selected alternative.

ii) Green Infrastructure. Describe aspects of project that preserve or mimic natural processes to manage stormwater, if applicable to the selected alternative. Address management of runoff volume and peak flows through infiltration, evapotranspiration, and/or harvest and use, if applicable.

iii) Other. Describe other aspects of sustainability (such as resiliency or operational simplicity) that are incorporated into the selected alternative, if incorporated into the selected alternative.

e) Total Project Cost Estimate (Engineer's Opinion of Probable Cost). Provide an itemized estimate of the project cost based on the stated period of construction. Include construction, land and right-of-ways, legal, engineering, construction program management, funds administration, interest, equipment, construction contingency, refinancing, and other costs associated with the proposed project. The construction subtotal should be separated out from the non-construction costs. The non-construction subtotal should be included and added to the

construction subtotal to establish the total project cost. An appropriate construction contingency should be added as part of the non-construction subtotal. For projects containing both water and waste disposal systems, provide a separate cost estimate for each system as well as a grand total. If applicable, the cost estimate should be itemized to reflect cost sharing including apportionment between funding sources. The engineer may rely on the owner for estimates of cost for items other than construction, equipment, and engineering.

f) Annual Operating Budget. Provide itemized annual operating budget information. The owner has primary responsibility for the annual operating budget, however, there are other parties that may provide technical assistance. This information will be used to evaluate the financial capacity of the system. The engineer will incorporate information from the owner's accountant and other known technical service providers.

i) Income. Provide information about all sources of income for the system including a proposed rate schedule. Project income realistically for existing and proposed new users separately, based on existing user billings, water treatment contracts, and other sources of income. In the absence of historic data or other reliable information, for budget purposes, base water use on 100 gallons per capita per day. Water use per residential connection may then be calculated based on the most recent U.S. Census, American Community Survey, or other data for the state or county of the average household size. When large agricultural or commercial users are projected, the Report should identify those users and include facts to substantiate such projections and evaluate the impact of such users on the economic viability of the project.

ii) Annual O&M Costs. Provide an itemized list by expense category and project costs realistically. Provide projected costs for operating the system as improved. In the absence of other reliable data, base on actual costs of other existing facilities of similar size and complexity. Include facts in the Report to substantiate O&M cost estimates. Include personnel costs, administrative costs, water purchase or treatment costs, accounting and auditing fees, legal fees, interest, utilities, energy costs, insurance, annual repairs and maintenance, monitoring and testing, supplies, chemicals, residuals disposal, office supplies, printing, professional services, and miscellaneous as applicable. Any income from renewable energy generation which is sold back to the electric utility should also be included, if applicable. If applicable, note the operator grade needed.

iii) Debt Repayments. Describe existing and proposed financing with the estimated amount of annual debt repayments from all sources. All estimates of funding should be based on loans, not grants.

iv) Reserves. Describe the existing and proposed loan obligation reserve requirements for the following:

Debt Service Reserve – For specific debt service reserve requirements consult with individual funding sources. If General Obligation bonds are proposed to be used as loan security, this section may be omitted, but this should be clearly stated if it is the case.

Short-Lived Asset Reserve – A table of short lived assets should be included for the system (See Appendix A for examples). The table should include the asset, the expected year of replacement, and the anticipated cost of each. Prepare a recommended annual reserve deposit to fund replacement of short-lived assets, such as pumps, paint, and small equipment. Short-lived assets include those items not covered under O&M, however, this does not include facilities such as a water tank or treatment facility replacement that are usually funded with long-term capital financing.

## 7. CONCLUSIONS AND RECOMMENDATIONS

Provide any additional findings and recommendations that should be considered in development of the project. This may include recommendations for special studies, highlighting of the need for special coordination, a recommended plan of action to expedite project development, and any other necessary considerations.

Appendix A: Example List of Short-Lived Asset Infrastructure

| **Estimated Repair, Rehab, Replacement Expenses by Item within up to 20 Years from Installation)** | |
|---|---|
| **Drinking Water Utilities** | **Wastewater Utilities** |
| **Source Related** | **Treatment Related** |
| Pumps | Pump |
| Pump Controls | Pump Controls |
| Pump Motors | Pump Motors |
| Telemetry | Chemical feed pumps |
| Intake/ Well screens | Membrane Filters Fibers |
| Water Level Sensors | Field & Process Instrumentation Equipment |
| Pressure Transducers | UV lamps |
| **Treatment Related** | Centrifuges |
| Chemical feed pumps | Aeration blowers |
| Altitude Valves | Aeration diffusers and nozzles |
| Valve Actuators | Trickling filters, RBCs, etc. |
| Field & Process Instrumentation Equipment | Belt presses & driers |
| Granular filter media | Sludge Collecting and Dewatering Equipment |
| Air compressors & control units | Level Sensors |
| Pumps | Pressure Transducers |
| Pump Motors | Pump Controls |
| Pump Controls | Back-up power generator |
| Water Level Sensors | Chemical Leak Detection Equipment |
| Pressure Transducers | Flow meters |
| Sludge Collection & Dewatering | SCADA Systems |
| UV Lamps | **Collection System Related** |
| Membranes | Pump |
| Back-up power generators | Pump Controls |
| Chemical Leak Detection Equipment | Pump Motors |
| Flow meters | Trash racks/bar screens |
| SCADA Systems | Sewer line rodding equipment |
| **Distribution System Related** | Air compressors |
| Residential and Small Commercial Meters | Vaults, lids, and access hatches |
| Meter boxes | Security devices and fencing |
| Hydrants & Blow offs | Alarms & Telemetry |
| Pressure reducing valves | Chemical Leak Detection Equipment |
| Cross connection control devices | |
| Altitude valves | |
| Alarms & Telemetry | |
| Vaults, lids, and access hatches | |
| Security devices and fencing | |
| Storage reservoir painting/patching | |