CEP Technical Report: 87

ANNEX 1: CHARACTERIZATION FORM AND TECHNICAL SUMMARY TEMPLATES

UN environment
United Nations Environment Programme

CARIBBEAN ENVIRONMENT PROGRAMME

ANNEX 1: CHARACTERIZATION FORM AND TECHNICAL SUMMARY TEMPLATES

Annex 1 provides two templates - the Characterization Form (for collecting information about the study area) and a template for development of a summary of results. These templates can be used directly and can also be edited per guidance from Part II of the Resource Guide.

Characterization Form for Defining the Costs and Benefits of Domestic Wastewater Management

==========

STUDY SITE:

==========

RESPONDENT INFORMATION

This report was completed by:

Name:

Organization

Date:

==========

TABLE OF CONTENTS:

==========

I. DEFINE THE STUDY AREA

Objective: Define and map the study area including key geographic and land use data to identify wastewater pollution and other water pollution pathways and populations of interest.

Possible data sources: National environmental, water, and/or marine agencies; non-profit organizations (NGOs); Academic institutes with marine/environmental centers that conduct research within the study site.

1. Please define the study area by providing a detailed description.

The study area should include the sewage catchment name(s) and geographic area, the populated area to be served by improved wastewater treatment, the area downstream which is expected to be influenced by the change in wastewater management (including receiving water bodies (e.g., rivers, lakes, oceans) and water catchments), and the upstream catchment (which might be contributing pollutants to the water body of focus).

2. Can you put it on a map? (with GIS; Google Earth; or participatory mapping)

If possible, indicate on a map the information provided in Question 1. This can be done in GIS, using Google Earth, and/or working with stakeholders using a participatory mapping approach to highlight on a hard copy map the response to Question 1.

3. What are the major land uses (such as residential, commercial, agricultural, open space / natural) in the study area?

- **Could you do rough estimates of percentages of each major land use?**

==========

II. POPULATION

Objective: Population data is critical for understanding current and future wastewater supply as well as the number of people who may swim in or eat from waters contaminated with untreated wastewater.

Possible data sources: Government census data; International population datasets from multilateral, intergovernmental, or NGOs (e.g., World Bank, United Nations).

1. How many <u>people</u> live in the study area? (Approximate if necessary.)

2. Can you disaggregate this by neighborhood / area / housing development / smaller administrative unit?

3. **How many <u>households</u> are in the study area? (Approximate if necessary.)**

4. **What is the population projection for the study area over the next 20, 30, and/or 50 years (for each period if data are available)?**

==========

III. ECONOMIC ACTIVITIES

Objective: Economic data are important for understanding the economic activities that are important for the local economy that rely on ecosystems (especially those potentially impacted by water pollution.)

Possible data sources: Government census data; International population datasets from multilateral, intergovernmental, or NGOs (e.g., World Bank, United Nations).

1. **Are the following sectors important for the local economy (ideally for the study area)? Can you estimate the relative contribution from each sector to the local economy (use scale below)? If quantitative data are not available, please rate the sector's importance based on the following scale:**

   <u>Importance Scale</u>:
   - **Not important:** The sector is not relevant as it does not contribute much to local GDP (e.g., through jobs or financial contribution)
   - **Moderate importance:** The sector is important, but is not the main contributor to local GDP.
   - **Very important:** The sector contributes substantially to local GDP.
   - **Critical:** The sector contributes the largest amount of any sector to local GDP

   - **Tourism? (Note types of tourism)**
   - **Agriculture? (Note types of agriculture)**
   - **Fisheries? (Note major fish species)**
   - **Industry? (Note what industry/ies)**
   - **Other?**

==========

IV. KEY ECOSYSTEMS

Objective: To understand potential benefits to ecosystem health from wastewater management improvements, it is necessary to identify a) key ecosystems in the study sites, b) their economic contribution in terms of key goods and services they provide, c) their contribution to key economic sectors. This will help to characterize the dependence of these sectors on healthy ecosystems, and as a result, the value of these ecosystems to the study population and the nation.

Possible data sources: Government environmental/water/natural resource agencies or ministries; Academic institutes and environmental NGOs conducting research or working towards the protection or conservation of ecosystems; Peer-reviewed and grey literature on key ecosystems both within and outside of the study area; Government reports including environmental impact statements, water quality permits, or benefit-cost analyses;

1. **What are the key ecosystems in the study area (e.g., coral reefs, mangroves, seagrass beds, beaches, forests, wetlands), especially downstream from population, sewage discharge, or treated wastewater discharge? Key ecosystems are those which are important to the local economy or those which provide important cultural services.**

2. **Please rank (using the scale below) how important these ecosystems are to the economic sectors previously listed in Section III (within the study area) (e.g., is tourism in the area dependent on healthy ecosystems?). Please indicate in Table 1 below the relative importance based on this scale:**

   Importance Scale:
   - **Not important**: The ecosystem has no relevance to the economic sector.
   - **Moderate importance**: The economic sector is dependent on resources/services provided by the ecosystem but substitutes for natural resources are available (e.g., forest ecosystems provide water filtration services that can improve the health of fisheries, but water filtration systems are also available to filter water).
   - **Very important:** The economic sector is dependent on the resources/services provided by the ecosystem and substitutes are not available or are exorbitantly expensive (e.g., mangroves provide important coastal protection services, guarding some shoreline industries from flooding and hurricanes. While options exist to improve coastal protection like dikes jetties, this type of infrastructure can be costly to build and maintain).
   - **Critical:** The ecosystem is vital to the economic sector in that the sector would not profit or exist without the ecosystem (e.g., tourism in a coastal community may be completely dependent on coral reefs for scuba diving, snorkeling, and sand creation as these activities provide the most income to the local economy).

Table 1: Ranking of ecosystem(s) important to key economic sectors

ECOSYSTEM	AGRICULTURE	FISHERIES	INDUSTRY	TOURISM	COMMERICAL	
Example: Coral reefs	*Not important*	*Critical*	*Moderate*	*Very important*	*Very important*	

3. **What goods and services do these key ecosystems provide (i.e., what are each of the ecosystems used by people for?). Please fill out Table 2 below and add or delete ecosystems as needed. You may refer to Table 3, which provides a general list of ecosystem services for major Caribbean ecosystem types, for guidance.**

Table 2: Ecosystem goods and services

Ecosystem Goods and Services	CORAL REEFS	MANGROVES	BEACHES	SEAGRASSES	
Provisioning services					
Food					
Raw materials					
Medicinal resources					
Genetic resources					
Other…					
Regulating services					
Flood/storm/erosion regulation					
Climate regulation					
Other…					
Cultural services					
Tourism and recreation					
History, culture, traditions					

Science, knowledge, education					
Other…					
Supporting services					
Primary production					
Nutrient cycling					
Species/ecosystem protection					
Other…					

Table 3: Examples of coastal ecosystem goods and services

ECOSYSTEM GOODS AND SERVICES	CORAL REEFS	MANGROVES	BEACHES	SEAGRASSES
Provisioning services				
Food (e.g., fisheries)	X	X	X	X
Raw materials	X	X	X	X
Medicinal resources	X	X		X
Genetic resources	X	X		X
Regulating services				
Flood/storm/erosion regulation	X	X	X	X
Climate regulation	X	X	X	X
Cultural services				
Tourism and recreation	X	X	X	
History, culture, traditions	X	X	X	X
Science, knowledge, education	X	X	X	X
Supporting services				
Primary production	X	X	X	X
Nutrient cycling	X	X		X
Species/ecosystem protection	X	X	X	X

Source: WRI Coastal Capital Guidebook (Waite et al. 2013)

4. **Are there any <u>existing estimates of the economic values</u> of these uses of ecosystems for this study area or nearby (e.g., through peer-reviewed or grey literature)? If so, please list these values, describe the methodology used to develop them, and provide a citation.**

5. **Do you have statistics on visitation/tourism (both foreign and national) to key ecosystems and/or statistics on visitation/tourism for the country for eco-tourism? For example, do you have data on the number of tourists (including cruise ship passengers, national and international tourists, and others) that visit the key ecosystems identified above?**

==========

V. CURRENT WASTEWATER MANAGEMENT SITUATION

Objective: To understand how wastewater is currently treated within the study site to allow comparison against future wastewater management alternatives in terms of population served, untreated wastewater, pollution removal effectiveness for key pollutants, and capital and recurring costs.

Possible data sources: Wastewater authorities; Consultants or engineers that work with the wastewater authority; Environmental/water/natural resource agencies or ministries that issue wastewater permits; Wastewater experts; Historical costs; National price books.

1. **On-site wastewater treatment coverage:**
   - **Please estimate the percentage of the total domestic wastewater sector within the study that uses each type of on-site system below. For example: 30% of the total population uses on-site treatment. Of this 30%, 10% uses septic system, 10% uses pit latrines, and 10% uses soakaway systems).**
     - **Septic systems**
     - **Pit latrines**
     - **Soakaway systems**
     - **Other?**

   - **What percentage of on-site systems (septic systems, pit latrines, soakaway systems, etc.) are properly maintained (i.e., regularly pumped out, drain fields not clogged, etc.)?**

2. **Wastewater collection system (i.e., sewerage):**
   - **Please describe the coverage of the current sewage collection system in terms of length of pipelines and the ultimate treatment point.**

   - **Please estimate the percentage of the total population and commercial and industrial establishments within the study that are connected to a centralized sewerage system.**

3. **Wastewater treatment plants:**
   - **Please describe the number and type of wastewater treatment plants (WWTP) currently in place in the study area.**

   - **For each WWTP, please fill in Table 4 to the best extent possible. Please see Annex 2 for a glossary of wastewater terminology. Please copy and paste this table as needed if more than one treatment plant exists within the study site:**

Table 4: Wastewater Treatment Plant information for current situation

Data need	Data
Design	
Location	
Design capacity - Nominal design capacity for dry and wet weather flows.	
Treatment technology (e.g., waste stabilization pond; oxidation lagoon)	
Effluent limits	
Sludge treatment and disposal	
Discharge location (receiving water body). If coastal, identify the outfall locations.	
Ease of operation (description of the no. of staff needed to operate; the technical complexity of operation; and overall ease of operating and maintaining the infrastructure)	
Performance	
Current flows (annual average flow, monthly average peak flow)	
Annual energy usage (kW hours, total cost)	
Occurrence of bypassing at the treatment plant for the period 2010-2014 due to high flows, equipment failures, or power outages (list date, cause, and estimated bypassed volume for each event).	

Occurrence of overflows in the collection system due to heavy rain, equipment failures, or blockages (average per year)	
Annual average discharged concentrations and loads of:	
BOD_5 (mg/l, kilograms per year)	
Dissolved oxygen (mg/l)	
Total Nitrogen (mg/l, kilograms per year)	
Ammonia Nitrogen (mg/l, kilograms per year)	
Total Phosphorus (mg/l, kilograms per year)	
Total Suspended Solids (mg/l, kilograms per year)	
Faecal coliforms (units as reported)	
Enterococci (units as reported)	

4. **What is the estimated annual percentage of total wastewater generated that is <u>untreated</u> and released into water bodies? What is the estimated annual volume?**

5. **If there is <u>untreated sewage</u>, where does this go? If possible, please also note on a map the receiving water bodies and ecosystems that receive the untreated sewage – either directly, or via an outfall.**

6. **Is there an interest in improving, upgrading, or expanding the current wastewater management system in the area? If so, please describe who is interested and why.**

7. **Current wastewater treatment costs - What capital and annual operating and maintenance costs are associated with the current wastewater management situation? Please fill in Table 5 to the best extent possible. If you do not have specific cost data, please provide a description of the *likely* costs associated with the current scenario by referring to Annex 2, section D.**

Table 5: Current wastewater scenario costs

Data need	Current wastewater management situation
Year of installation	
Life expectancy (years)	
Total land area occupied by the plant (hectares)	
Recurring capital expenses (e.g., please list which infrastructure components will need to be replaced within the next 20 years and the total capital cost, including likely year of replacement and the frequency of replacement)	
Annual recurring expenses: -Salary/wages for all personnel plus personnel of any contracts associated with operation of the WWTP. -Operational and maintenance costs (e.g., chemicals, consumables, maintenance, etc.) -Energy costs (annual energy costs only for the operation of the selected project)	
External services costs (if applicable, net value of total costs of external services including outsourcing, costs for construction)	
Discount rate (please list the discount rate(s) typically used by the wastewater management authority for infrastructure projects)	
Other costs?	
Net present value over infrastructure's lifetime	

==========

VI. WATER QUALITY

Objective: To identify and list water quality standards and requirements that are applicable to the wastewater sector and identify and provide historic data (over the past five years) on water quality within wastewater receiving bodies and key ecosystems in the study area.

Possible data sources: Environmental/water/natural resources agencies or ministries; Wastewater authorities; Consultants or engineers that work with the wastewater authority

1. **What water quality standards/requirements apply for the study area?**

    - **National/Regional and Local water quality standards?**
        - **Designated uses (e.g., bathing/swimming) or water body classification (e.g. fisheries, recreation)**
        - **Numeric criteria?**

    - **Bathing/swimming standards**

    - **International standards (e.g., LBS Protocol)**
        - **Designated uses (e.g., bathing/swimming) or water body classification (e.g. fisheries, recreation)**
        - **Numeric criteria?**

2. **What data or information do you have about water quality in the study area? Can you provide:**
    - **Ambient water quality monitoring data in freshwater bodies?**
    - **Ambient water quality monitoring data in coastal waters?**

3. **Please compare these data to water quality standards/requirements:**
    - **Are any water quality standards being violated in lakes, non-tidal streams and rivers, and coastal areas? Please provide frequency and severity.**
    - **What are the pollutants causing the violation and what are their sources (e.g., untreated wastewater, WWTP effluent, onsite septic systems, soakaways, pit latrines, sources from other sectors such as mining or agriculture)**

4. **If any water quality standards are being violated, have the violations been linked to wastewater discharges? If so, please provide specific information on the linkage.**

==========

VII. ECOSYSTEM IMPACTS

Objective: To understand if there is a demonstrated link between wastewater pollution and ecosystem health.

Possible data sources: Environmental/water/natural resources agencies or ministries; Wastewater authorities; Consultants/engineers working with the wastewater authority; Environmental impact statements; Environmental/marine NGOs and government agencies; Academic and grey literature.

1. **Within the study area, are any of the following causing ecological impacts, such as algal blooms or damage to coral reefs:**
   - **Discharge of untreated or partially treated sewage?**
   - **Discharge of treated wastewater effluent?**
   - **Irregular release of wastewater from a WWT system due to overflow, rainwater events, or power failure, etc.?**

2. **Have any studies been conducted within the study site or your country or region that link wastewater pollution to ecosystem health? If so, what are the findings?**

3. **Is there evidence of the following in any of the key ecosystems present in the study area: (e.g., freshwater, wetlands, mangroves, beaches, coral reefs, forests, wetlands):**
   - **Is it unsightly due to pollution? Are there algal blooms or obvious evidence of pollution?**
   - **Is there odor due to pollution?**
   - **Are there impacts to fish or other aquatic life (e.g., fish kills, overgrowth of algae on coral reefs)?**
   - **Are you seeing a change in ecosystem health and/or growth?**

4. **Beyond wastewater, are there any other sources of water pollution contributing to these problems? If so, please indicate the relative contribution to total water pollution using the following scale:**

   No contribution – Minor contribution – Moderate contribution – Significant contribution

   - **Runoff from croplands?**
   - **Runoff from livestock?**
   - **Runoff from aquaculture?**
   - **Industrial discharge?**

- **Cruise ships/yachts?**
- **Others?**
- **Do you have a sense of the relative contribution from wastewater to overall pollution of key ecosystems compared to these other sources? If so, please describe.**

5. **Are there any economic or cultural uses of the key ecosystems that are in decline due to wastewater discharge issues (from untreated or improperly treated wastewater)? Please refer to Annex 2, section B for examples of Caribbean coastal ecosystems and impacts that have been documented from exposure to untreated or improperly treated wastewater.**

6. **Do tourists have any awareness of water quality issues and do they modify activities / visitation? Are you able to quantify or describe the change in visitation (e.g., reduced annual snorkeling rates or reduced number of visitors to recreational beaches)?**

==========

VIII. HUMAN HEALTH IMPACTS

Objective: To understand if there is a link between wastewater pollution and key human health illnesses including gastroenteritis, ear and eye infections, and other illnesses (as listed in Annex 2, section C); and to estimate the impacts on the local economy due to human health impacts (e.g., from hospitalization, medication, time taken off work, and death).

Possible data sources: Health agencies or ministries; Hospitals or doctor's offices; National statistics/census data; International statistics from multilateral, intergovernmental or NGOs (e.g., World Bank or World Health Organization); Peer-reviewed or grey-literature.

1. **Please describe any known human health impacts, such as gastrointestinal illness, respiratory illness, ear infections, eye infections, or skin rashes/lesions that are occurring in the study site that relate to wastewater. Please see Annex 2, section C for a list of human illnesses related to swimming in, drinking from, or eating seafood from water contaminated with wastewater.**

- **Are health data recorded on any of these key illnesses? If so, who collects this data? What can you say about the average frequency and duration of occurrence for each type of illness (e.g., 50 cases per year; 1 case per resident person per year)?**

- **Do reported incidences of these illnesses result in doctors' visits, hospitalization, or death? Do you have statistical data on illnesses and hospital data?**

- **What activities seem to be contributing (e.g., swimming; eating contaminated seafood)?**

- **How specific can you be about location?**

- **Is wastewater pollution the main cause of these health issues? If not, what are the main causes of these diseases?**

2. **Have any studies been conducted within the study site or your country or region that link wastewater pollution to human health?**

3. **Do any of these studies estimate a dose-response relationship between a given wastewater pollutant and a human health illness (e.g., gastroenteritis)? (See the BCA methods section for more detail.)**

4. **Beyond wastewater, are there any other sources of water pollution contributing to these problems? (If so, please note how large of a contribution.)**
   - **Runoff from agriculture?**
   - **Runoff from livestock?**
   - **Runoff from aquaculture?**
   - **Industrial discharge?**
   - **Cruise ships/yachts?**
   - **Others?**

5. **Do you have a sense of the relative contribution from wastewater to overall health impacts compared to these other sources? If so, please describe.**

==========

IX. FUTURE WASTEWATER MANAGEMENT SCENARIO(S)

Objective: To identify and define at least one future wastewater management scenario to compare against the current infrastructure situation in terms of population served, untreated wastewater, pollution removal efficiency for key pollutants, and capital and recurring costs.

Possible data sources: Wastewater authorities; Wastewater consultants or engineers that work with the wastewater authority; Environmental/water/natural resource agencies or ministries that issue wastewater permits.

1. **What option or options are under consideration for improving wastewater management in the pilot area? Please provide a description and fill in Table 6 for each major wastewater treatment**

plant or infrastructure element. Please add columns as necessary if more than two alternatives are being considered.

Table 6: Future wastewater management scenarios description

Data need	Alternative 1	Alternative 2
Design		
Location		
Design capacity - annual average and peak (if actual capacity is lower, that will be covered below under performance)		
Treatment technology (e.g., waste stabilization pond; oxidation lagoon)		
Will effluent and water quality standards be met?		
Sludge treatment and disposal		
Discharge location (receiving water body). If coastal, is there an outfall(s)?		
Ease of operation (description of the no. of staff needed to operate; the technical complexity of operation; and overall ease of operating and maintaining the infrastructure)		
Performance		
Flows (annual average, peak)		
Annual energy usage (kW hours, total cost)		
Occurrence of bypassing at the treatment plant for the period 2010-2014 due to high flows, equipment failures, or power outages (list date, cause, and estimated bypassed volume for each event).		
Occurrence of overflows in the collection system due to heavy rain, equipment failures, or blockages (average per year)		

Annual average discharged concentrations and loads of:		
• BOD_5 (mg/l, kilograms per year)		
• Dissolved oxygen (mg/l)		
• Total Nitrogen (mg/l, kilograms per year)		
• Ammonia Nitrogen (mg/l, kilograms per year)		
• Total Phosphorus (mg/l, kilograms per year)		
• Total Suspended Solids (mg/l, kilograms per year)		
• Faecal coliforms (units as reported)		
• Enterococci (units as reported)		

2. **What are the evaluation criteria for choosing an infrastructure option and who decides what these criteria are? For example, criteria may include cost-effectiveness, pollutant removal efficiency, and/or environmental impacts.**

3. **What sort of improvements are expected from each future wastewater management scenario?**
   - **Increased coverage in terms of population treated?**
   - **Improvement in water quality of receiving water bodies and downstream water bodies?**
   - **Reduced levels of:**
     - **BOD5**
     - **Dissolved oxygen**
     - **Total nitrogen**
     - **Ammonia nitrogen**
     - **Total phosphorus**
     - **Total suspended solids**
     - **Faecal coliforms**
     - **Enterococci**

4. **Will the new wastewater treatment technology allow any reuse of water?**
   - **Where does the treated water go – back in a river, out an outfall, or into a specific use (e.g. irrigation, industrial use, or drinking water)?**
   - **Has anyone estimated the potential cost savings associated with reuse of this wastewater?**

5. **Have any engineering or financial analyses been conducted for future wastewater management alternatives? Do they provide cost data?**

6. **Please fill in Table 7 to the best extent possible based on either engineering/financial reports from the wastewater authority and relevant consultants, OR by referring to Annex 2 which provides information on relative cost by infrastructure type.**

Table 7: Cost estimates for future wastewater management scenarios

Parameter	**Alternative 1**	**Alternative 2**
Year of installation		
Life expectancy (years)		
Total area of the plant (please list the area that will need to be purchased for the treatment facility)		
Capital/Investment expenses (This includes one-time construction, planning, and design costs; costs for new development; and cost for replacement and renovation of existing assets – including external or consulting services)		
Recurring capital expenses (e.g., please list which infrastructure components will need to be replaced sooner than the life expectancy of the treatment facility and the recurring capital cost, including likely year of replacement and the frequency of replacement)		
Annual recurring expenses: -Salary/wages for all personnel -Land rental value for land purchased (i.e., the value of land purchased to install the wastewater infrastructure)		

-Operational and maintenance costs (e.g., chemicals, consumables, maintenance, etc.) -Energy costs (annual energy costs only for the operation of the selected project)		
Discount rate (please list the discount rate(s) typically used by the wastewater management authority for infrastructure projects)		
Other costs		
Net present value over infrastructure's lifetime		

==========

X. CHANGES TO ECOSYSTEM AND HUMAN HEALTH UNDER IMPROVED WASTEWATER MANAGEMENT SCENARIOS

Objectives: To quantify and/or describe how ecosystems and the goods and services they provide will change under each future wastewater management scenario, and the potential impacts on the local economy in terms of costs;

To quantify and/or describe how human health will be impacted under each future wastewater management scenario in terms of numbers of reported illnesses and costs.

Possible data sources: Peer-reviewed and grey literature; Government documents including environmental impact statements.

1. **Have any evaluations, studies, or environmental impact statements been conducted that estimate the impact on key ecosystems and human health under each new wastewater management scenario *compared to the current wastewater management situation*? Do you know of any experts that are currently studying potential impacts? If so, please describe these findings, including how likely management under each scenario is to:**

   - **Reduce the annual loading of pollutants on receiving water bodies?**
   - **Reduce odor?**
   - **Reduce the incidence of harmful algal blooms and/or nutrient over-enrichment?**
   - **Reduce human health risk and/or the number of cases for illnesses previously identified?**

- **Improve ecosystem health conditions for the key ecosystems identified previously?**
- **Improve the provision of key ecosystem goods and services identified previously (e.g., increased likelihood of tourist visits, increased productivity of fisheries due to improved coral reef and mangrove health)**

2. **Can you establish a quantitative relationship between an improvement in water quality due to the future wastewater management alternative and a change in provision of ecosystem services for each key ecosystem? If so, please list your assumptions and quantitatively describe these changes (e.g., by reducing the amount of untreated wastewater entering the coral reef ecosystem, total nitrogen levels will decrease by 30% surrounding the reef which will improve coral reef health such that fisheries production increased by 20%).**

3. **Can you monetize or value the change in ecosystem service provision (e.g., what is the economic value of reduced coral reef degradation in terms of fisheries improvement – this is often quantified by estimating the market value of fish sold in a marketplace)?**

==========

XI. OTHER INFORMATION

1. **Please list any additional data or information you think would be useful to the study that might not have been discussed previously in this characterization form.**

==========

XII. REFERENCES

==========

TEMPLATE FOR SHORT TECHNICAL SUMMARY OF MCDA RESULTS

Summary for Study Site: Insert study site name here

Site Location:	Insert map here

Key ecosystems in the area: •	**Key ecosystem services and their values:** •

Population and Wastewater treatment •	Insert pie chart here

Current WW treatment situation / technology	**Condition / Issues /limitations**	**Operating Costs**
	-	

Observed or likely impacts due to WWT situation: •	**Potential Economic loss:**

WW Improvement Option 1	**Anticipated impacts**	**Cost (Capital and annual O&M costs)**
•	•	

Comparing Wastewater Improvement Option(s) with Business as Usual

This multi-criteria evaluation matrix allows weighting and integration of a range of important factors or criteria identified by key stakeholders.

- List details of scoring and weighting system used (e.g., Scale of 1- 5?)
- Describe how/when/where the evaluation matrix was compelted.

- Summarize findings (e.g., which scenario had the highest score?; which criteria seemed to be most important to stakeholders?)

MCDA results for: Insert study site name

Criteria	**Weight**	**Score**	
		Current Situation	**Future Scenario**
List all criteria identified by stakeholders			