

# Border Environment Cooperation Commission Wastewater Collection System Expansion to Unserved Areas (Phase III) of San Luis Rio Colorado, Sonora

## 1. General Criteria

### 1.a Project Type

**Project Name:** Wastewater Collection System Expansion to Unserved Areas (Phase III) of San Luis Rio Colorado, Sonora.

**Project Sector:** Residential Water and Wastewater Hookups.

### 1.b Project Category

**Category:** Community Environmental Infrastructure Project –  
Community-wide Impact

### 1.c Project Location and Community Profile

**Community:** San Luis Rio Colorado, Sonora

**Location:** San Luis Rio Colorado is located in northwestern Sonora. It is adjacent to the south of San Luis, Arizona.

**Location within the border:** The project is located within the 62-mile [100 km] border area.

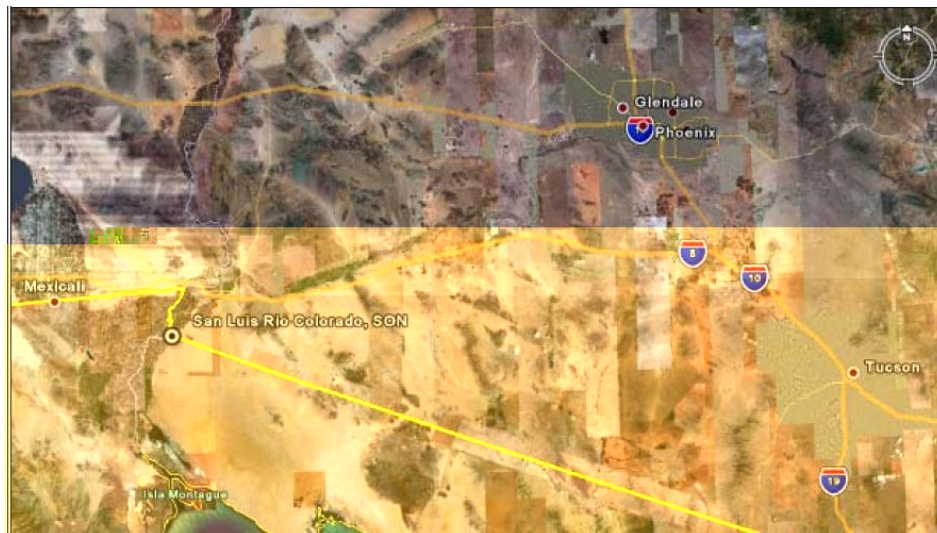


Figure 1. Location of San Luis Rio Colorado, at the north of Sonora state

<b>Demographics</b>	
<b>Current population:</b>	164,342 residents
<b>Growth rate:</b>	0.60 %
Reference:	INEGI Year: 2005 and CONAPO Year: 2009
<b>Median per capita income:</b>	US \$ 11,803
Reference:	BECC estimation based on INEGI statistics and the National Commission on Minimum Wages.
<b>Primary economic activity:</b>	Service and trade.
<b>Marginalization rate:</b>	-1.569, Very Low
<b>Services</b>	
<b>Community:</b>	San Luis Rio Colorado
<b>Water System</b>	
Drinking water service coverage:	98%
Current length of water pipelines:	613 km
Number of residential hookups:	52,627
Source of water supply:	21 deep wells
<b>Wastewater Collection System</b>	
Wastewater collection service coverage:	62%
Number of residential connections:	32,350
<b>Wastewater Treatment</b>	
Wastewater treatment coverage:	61%
Capacity (lps)	400
<b>Solid Waste</b>	
Solid waste collection coverage:	98%
Final disposal:	Sanitary landfill
<b>Street Paving</b>	
Street paving coverage:	44%
<b>1.d Legal Authority</b>	
<b>Project Sponsor:</b>	The Water and Wastewater Utilities of San Luis Rio Colorado, Sonora – <i>Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento</i> (OOMAPAS).
<b>Legal representative:</b>	Sergio Islas Ponce, General Director, OOMAPAS

**Legal instrument to demonstrate legal authority:**

The project sponsor is OOMAPAS San Luis Rio Colorado. The utility's legal authority has been established pursuant to Decree No. 1, III Legislature of the State of Sonora.

**Date of instrument:**

December 29, 1993.

**Compliance with agreements:**

- 1889 International Boundary Convention
- 1944 Water Treaty
- 1994 North American Free Trade Agreement (NAFTA)
- Border 2012 Program
- 1990 Integrated Border Environmental Plan (IBEP)
- 1983 La Paz Agreement, or Border Environment Agreement

## 1.e Project Summary

**Project description and scope:**

The project submitted for certification is part of the Comprehensive Project to Improve Water, Wastewater Collection and Treatment Services in San Luis Rio Colorado, and consists of the expansion of the existing wastewater collection system. Wastewater generated and collected in the different project areas will be treated at the local wastewater treatment facility, which has sufficient treatment capacity.

The tasks proposed for certification as part of this project are as follows:

- Subcollectors within the "Calle 9" sewer gravity main influence area.
  - Ejido Oriente Subcollector
  - Ejido Poniente Subcollector
  - Calle 18 Subcollector
  - Calle 13 Subcollector
  - Las Flores Subcollector
  - Jazmín Subcollector
- Sewer lines and residential sewer connections included in the project area.

Project costs include supply and installation of residential connections to the sewerage system.

**Components:**

Wastewater collection

The project consists of the following:

- Construction of sewer lines
- Construction of discharge connections:

Project components include:

- Construction of 48.18 miles (77.08 km) of 8-inch PVC SDR-35 sewer pipelines.
- Construction of 1.63 miles (2.60 km) of 10-inch PVC SDR-35 sewer pipelines.
- Construction of 2.11 miles (3.38 km) of 12-inch PVC SDR-35 sewer pipelines.
- Construction of 2.84 miles (4.55 km) of 15-inch PVC SDR-35 sewer pipelines.
- Construction of 0.20 miles (0.32 km) of 18-inch PVC ASTM F-794 sewer pipelines
- Construction of 0.71 miles (1.14 Km) of 24-inch PVC ASTM F-794 sewer pipelines

Domestic discharge connections

Number of total connections: 13,120

**Population served:**

55,129 residents

**Project cost:**

US \$6.9 million

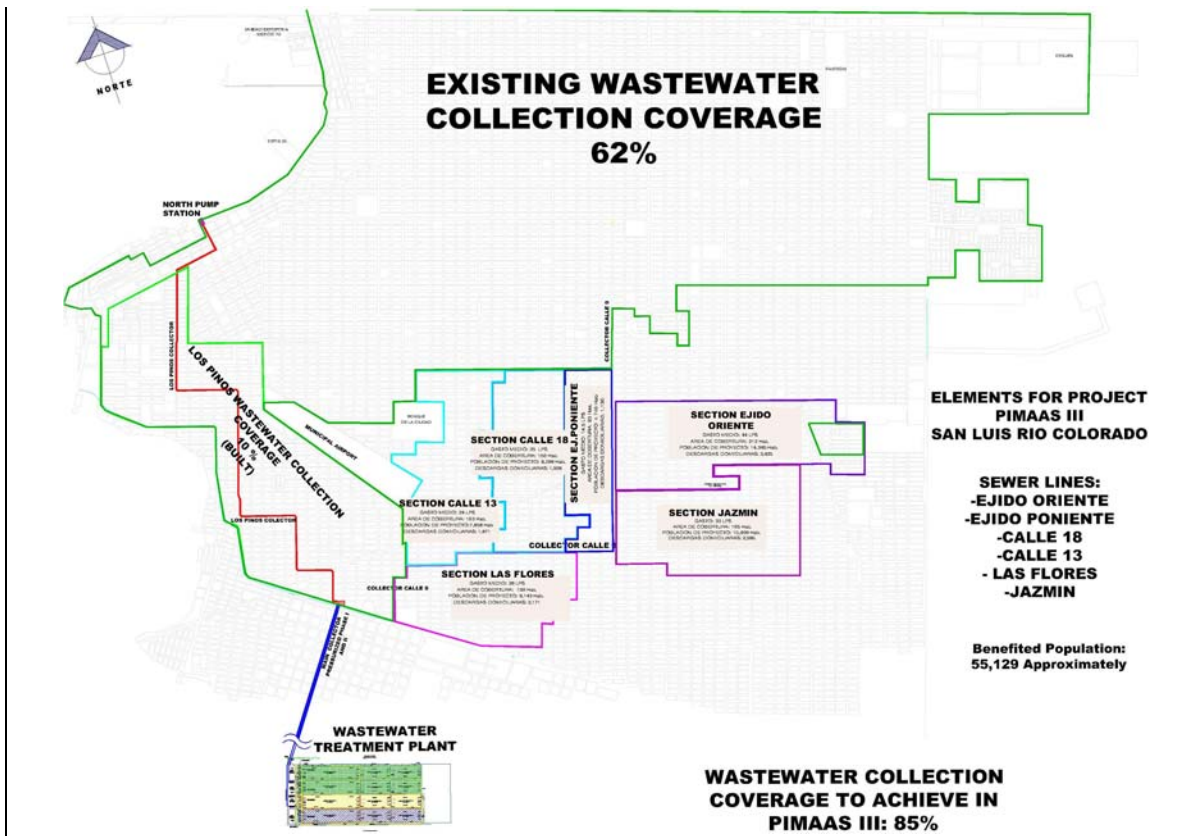


Figure 2. Location of the project components

## 1.f Project Justification

### Project justification:

- The proposed tasks will help provide wastewater collection services to the Federal, Altar, Mexico, Mezquite, and Reforma subdivisions, as well as sections of Solidaridad, Del Bosque, and Libertad subdivisions, which currently lack this type of service and dispose their wastewater on latrines or septic tanks.
- The proposed project implementation will provide appropriate wastewater collection services to approximately 55,129 residents in the project area; this action will reduce human contact with raw wastewater, as well as contact with vectors for associated diseases.
- The municipality of San Luis Rio Colorado has an estimated 38% wastewater collection deficiency. The implementation of the project will help reduce the backlog by installing approximately 13,120 new sewer connections.

	<ul style="list-style-type: none"><li>• Approximately 2.7 MGD (118 l/s) of wastewater generated in the project areas will be collected and treated. By eliminating the use of latrines and septic tanks, the proposed project will contribute to reduce the potential for groundwater contamination resulting from the inappropriate discharge of untreated wastewater.</li></ul>
<b>Urgency of the project or consequences of no action:</b>	The lack of this service jeopardizes the health of project area residents; leaving them exposed to contact with untreated wastewater and thus, at risk for contracting associated diseases.
<b>Prioritization process category:</b>	Category 1

**Pending Issues:**

None.

**Criterion Summary:**

The proposed project will reduce the risk of contact with untreated wastewater; in addition it falls within BECC priority sectors and meets its general criteria.

## 2. Human Health and Environment

### 2.a Compliance with Applicable Environmental Laws and Regulations.

**Environmental and public health needs addressed by the proposed project:**

- Reduce the risk for transmittable waterborne diseases caused by human contact with raw wastewater runoffs resulting from the lack of wastewater collection in the project area.
- Appropriate wastewater collection and treatment. Project area residents currently lack sewage services and discharge their wastewater to latrines or septic tanks.
- Reduce soil and groundwater contamination

**The project meets the following applicable environmental laws and regulations:**

The Final Design for the proposed sewers was based on the water, wastewater collection, and treatment manual developed by Mexico's National Water Commission, and meets with the provisions of Official Mexican Standard NOM-002-SEMARNAT-1996, which establishes the maximum permissible levels of contaminants for wastewater discharges into urban or municipal wastewater collection systems.

### 2.b Human Health and Environmental Impacts.

#### Human Health Impacts

**Direct and indirect benefits:**

- The project will reduce groundwater contamination.
- The project will reduce soil contamination.
- The project will eliminate residents' exposure to untreated wastewater.

**Health statistics:**

Waterborne diseases are caused by pathogenic microorganisms that are directly transmitted as a result of inadequate wastewater disposal practices and unhealthy water supplies. An individual may become ill after drinking water that has been contaminated with these organisms; eating uncooked foods that have been in contact with contaminated water; or having poor hygiene habits, contributing then to the dissemination of diseases by direct or indirect human contact. Water borne diseases may be caused by protozoan, viruses, bacteria, and intestinal parasites.

**Supporting figures:**

The following figure shows waterborne disease statistics for the city of San Luis Rio Colorado.

Projects to improve water services, such as the provision of wastewater collection service contribute to improve the communities' public health.

<b>No. of Cases</b>			
<b>Disease</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Intestinal Diseases by other organisms	1670	2766	1962
Paratyphoid and other Salmonellosis	123	95	136
Intestinal Amoebiasis	5	17	25
Giardiasis	7	16	10
Hepatitis A (acute)	2	5	6
Other Helminthiasis	-	5	1
Shigellosis	1	2	-
Ascariasis	1	-	2
Typhoid Fever	1	-	-

Table 1. Waterborne Disease Statistics for San Luis Rio Colorado  
 Source: Secretariat of Health of Sonora, General Morbidity, New Cases. San Luis Rio Colorado

**Environmental Impacts**

**Direct and indirect benefits:**

The construction of new wastewater collection systems will reduce health and environmental risks associated to inadequate wastewater collection. The proposed project will help OOMAPAS San Luis Rio Colorado to collect and treat the wastewater generated in the project areas in compliance with existing federal and state laws and regulations.

The project's implementation will help eliminate wastewater discharges to latrines or septic tanks, which may positively impact groundwater bodies.

**Environmental impacts:**

Minor environmental impacts are anticipated from the development of the different project phases, provided that the project tasks are implemented in accordance with the specifications of the Environmental Impact Statement (MIA, for Spanish) and taking into account the mitigation measures established therein.



Potential impacts include:

Construction Phase:

- Fugitive dust emissions.
- Gas emissions from construction machinery.
- Temporary roadway blockages, presence of workers in the area.

**Mitigation measures:**

Mitigation measures will include:

- Applying water to reduce fugitive dust emissions.
- Tuning up vehicles to reduce emissions.
- Installing warning signs to prevent potentially hazardous situations.

**Impacts:**

The environmental impact resulting from the project will be positive overall, given that:

- The project will increase wastewater collection coverage, reducing environmental contamination and improving the quality of life of area residents by curtailing potential health hazards.

**Transboundary Impacts**

No negative transboundary impacts are anticipated:

- Due to the proximity of San Luis Rio Colorado with the community of San Luis, Arizona in the United States, there are frequent border crossings between the two cities. The proposed project will have a positive impact on the health of San Luis, Arizona residents, since it will help reduce the risk of waterborne diseases resulting from inappropriate wastewater management and human contact with raw wastewater.
- Additionally, the implementation of the project will reduce the potential for contamination of local bodies of water, including the Colorado River and regional water tables. According to the Transboundary Environmental Assessment there are no transboundary impacts to consider with the implementation of this project.

**Formal Environmental Clearance**

**Environmental clearance:**

Pursuant to the provisions of the General Law on Ecological Balance and Environmental Protection regarding Environmental Impact Statements, the Sonora State Commission for Ecology and Sustainable

Development (*Comisión de Ecología y Desarrollo Sustentable del Estado de Sonora*, CEDES) through official letter No. 10-0383-00 of February 18, 2000, determined that, based on the Environmental Impact Statement (MIA, for spanish) submitted by the project sponsor, the project meets environmental requirements applicable to this type of tasks. Additionally, CEDES issued a two-year extension of the above finding through official communication DG-414/09; said extension will be effective as of April 25, 2009.

Pursuant to the U.S. National Environmental Policy Act (NEPA), a transboundary impact study was developed and submitted for consideration to the United States Environmental Protection Agency (EPA). A 30-day public review period was opened on 09/13/2008 to receive questions or requests for clarifications. Ultimately, a Finding of No Significant Impact (FNSI) was issued by the EPA on 10/22/2008, establishing that the project will not result in significant environmental impacts that may affect the United States border area.

**Pending Issues:**

None.

**Criterion Summary:**

The project complies with BECC's Human Health and Environment criteria.

## 3. Technical Feasibility

### 3.a Technical Aspects

#### Project Development Requirements

**Design criteria:**

The project was developed on the basis of Wastewater Collection Technical Standards issued by Sonora's Secretariat of Infrastructure and Urban Development, in addition to technical specifications contained in the Water, Wastewater Collection and Treatment Manual prepared by CONAGUA, and Official Mexican Standard NOM-001-CNA-1995 "Sanitary Sewage System – Specifications for Hermeticity." Final designs were validated by CONAGUA and reviewed by BECC and NADB.

Wastewater Collection

The project includes the following components:

- Construction of sewer lines
- Construction of discharge connections

Project components include:

- Construction of 48.18 miles (77.08 km) of 8-inch PVC SDR-35 sewer pipelines.
- Construction of 1.63 miles (2.60 km) of 10-inch PVC SDR-35 sewer pipelines.
- Construction of 2.11 miles (3.38 km) of 12-inch PVC SDR-35 sewer pipelines.
- Construction of 2.84 miles (4.55 km) of 15-inch PVC SDR-35 sewer pipelines.
- Construction of 0.20 miles (0.32 km) of 18-inch PVC ASTM F-794 sewer pipelines
- Construction of 0.71 miles (1.14 Km) of 24-inch PVC ASTM F-794 sewer pipelines

Domestic discharge connections

Number of total connections: 13,120

Construction of sewer lines Ejido Oriente

Length: 11.30 miles (18.08 km)

Connections: 3,425

Diameter: 8 to 15 inches

Material: PVC SDR-35

Construction of sewer lines Ejido Poniente

Length: 6.23 miles (9.97 km)

Connections: 1,130

Diameter: 8 to 10 inches

Material: PVC SDR-35

Construction of sewer lines Calle 18

Length: 9.69 miles (15.50 km)  
Connections: 1,928  
Diameter: 8 to 15 inches  
Material: PVC SDR-35

Construction of sewer lines Calle 13

Length: 9.51 miles (15.21 km)  
Connections: 1,871  
Diameter: 8 to 15 inches  
Material: PVC SDR-35

Construction of sewer lines Las Flores

Length: 8.48 miles (13.57 km)  
Connections: 2,171  
Diameter: 8 to 15 inches  
Material: PVC SDR-35

Construction of sewer lines Jazmin

Length: 10.50 miles (16.80 km)  
Connections: 2,595  
Diameter: 8 to 24 inches  
Material: PVC SDR-35 and ASTM F-794

The final design includes the implementation of green building practices as part of the technical construction specifications. For example, the final design considers the use of construction materials that will ensure a good cost-benefit ratio, and local materials will be used to avoid transportation costs.

### **Appropriate Technology**

#### **Assessment of alternatives:**

As part of the development process for the wastewater collection system expansion project, several alternatives were assessed based on the following parameters:

- Investment cost
- Operation cost
- Ease of operation
- Environmental impact
- Community acceptance
- Environmentally acceptable materials technology

The Assessment of Alternatives considered the use of different materials and pipes in compliance with job specifications and current standards. High-density polyethylene, PVC, and asbestos-cement pipes were assessed considering their characteristics for the soil type.

In order to reduce costs and make the best use of the area's natural topography, the shortest routes for wastewater pipe alignments were considered to cover the service area. Crossings through paved roads and with existing utilities were minimized.

Pipe diameters were selected according to CONAGUA design criteria, considering appropriate slopes and velocities to prevent sludge deposits in the system (septic conditions), over-excavation, and/or the need to install lift stations at an additional cost. Maximum flow rate, full build-out in the project areas, and treatment capacity were also considered in the assessment of pipe diameters to avoid oversized pipelines.

The sewer pipe layout was designed based on existing rights-of-way, according to the Municipal Development Plan.

Once the applicable CONAGUA design criteria was identified, the project was developed in an effort to maintain the pre-established scope and goals, ease of operation, administrative costs, and mitigation of negative environmental impacts, which were determined to be negligible, according to the EIS authorized by CEDES.

### **Property and Right-of-Way Requirements**

#### **Requirements:**

- Since wastewater collection lines will be laid on existing municipal rights-of-way and easements, the project does not require the purchase of additional land.
- The sponsoring utility must request and obtain all applicable permits and licenses for the construction of the project and required street closures in San Luis Rio Colorado.

### **Project Tasks and Timelines**

#### **Project timeline:**

The construction of the wastewater collection system expansion will begin in March 2010 and is expected to be completed by December 2012, including the operation startup.

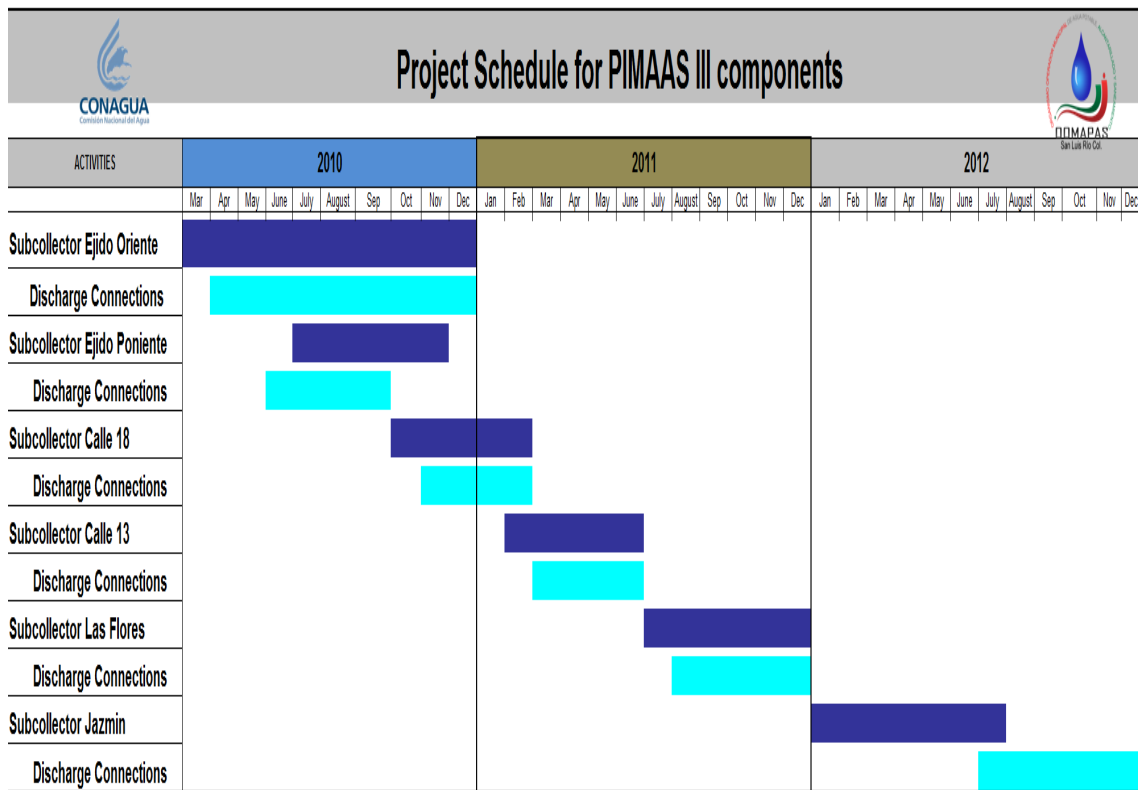


Fig. 3 Project Task Schedule.

### 3.b Management and Operations

#### Project Management

**Resources:**

The management, construction, and operation of the proposed project will be the responsibility of the sponsor. The utility has available sufficient resources and staff for this purpose.

#### Operation and Maintenance

**Organization:**

OOMAPAS serves approximately 55,636 wastewater connections in the San Luis Rio Colorado metropolitan area, and has a satisfactory operation and maintenance program in place.

The utility is organized into various departments, including: Administration, Project Coordination, and Commercial and Technical Areas.

**Pretreatment:**

Wastewater flowing through the city's sewage collection system must comply with Official Mexican Standard NOM-002-SEMARNAT-1997, which regulates the quality of the wastewater until it is conveyed to the treatment facility. Additionally, the project sponsor has implemented an industrial

	and commercial pretreatment program for wastewater quality monitoring.
<b>Operation plan:</b>	Final designs incorporate an operation and maintenance manual that includes the primary tasks needed to ensure a proper operation of the system and to prevent breakdowns in the proposed infrastructure.
<b>Permits, licenses, and other regulatory requirements:</b>	The project sponsor has obtained the following documentation: <ul style="list-style-type: none"><li>- Water withdrawal permit (CONAGUA)</li><li>- Wastewater discharge permit (CONAGUA)</li><li>- Technical File Validation issued by CONAGUA</li><li>- State Environmental Clearance</li></ul>
<b>Reviewing agencies:</b>	BECC, CONAGUA, EPA and NADB.

**Pending Issues:**

None.

**Criterion Summary:**

The project complies with BECC's Technical Feasibility criteria.

## 4. Financial Feasibility

### 4.a Verification of Financial Feasibility

#### Financial Conditions

**Information presented:** OOMAPAS' financial statements.

**Summary of financial analysis:** OOMAPAS has enough revenues to operate and maintain the system and service existing debt.

#### Project total cost, financial structure and other capital investment plans

**Concept:** Expansion of the wastewater collection system to unserved areas (PIMAAS Phase III).

**Total Cost:** \$6,994,027 USD

#### Financial structure:

Source	Type	Amount (USD\$)	%
Mexico	Grant	4,294,027	61.40
NADB-BEIF	Grant	2,700,000	38.60
<b>Total:</b>		\$6,994,027	100%

#### Dedicated Revenue Source

**Revenue source:** San Luis Rio Colorado - OOMAPAS' revenues.

### 4.b Legal Considerations

**Project Administration:** The project will be managed by the OOMAPAS of San Luis Rio Colorado, which has adequate staff to manage the proposed infrastructure, as well as the capacity to address any potential emergency related to the project's operation and maintenance.

**Financing status:** N/A

#### Pending Issues:

None.

#### Criterion Summary:

The project complies with Financial Feasibility criteria.



## 5. Public Participation

### 5.a Community Environmental Infrastructure Projects – Community-wide impact

#### Local Steering Committee

**Date of establishment:** The Local Steering Committee was formally installed on July 15, 2009.

**Steering Committee members:** At this meeting, a Board of Directors was selected, comprised of the following members:

**Chairperson:** Fabyola Gutierrez Villegas

**Secretary:** Hector Acevedo Elías

**Alternates:** Victor Manuel Quiroga Soberanes

Juan Villarreal

Víctor Palma Arnold

Agustin Diaz Armenta

Sergio Armando Aceves Urzua

Dr. Patricia Cervantes Ortega

**Date of approval of Public Participation Plan:** The Comprehensive Community Participation Plan developed by the Local Steering Committee was approved by BECC on June 20, 2009.

#### Public Access to Project Information

**Public access to project information:** The project's technical and financial information was made available to the public for review. The Local Steering Committee, with assistance from the project sponsor, prepared the following:

- Flyers
- Brochures
- Newspaper articles

The above was used to inform the community about the project.

**Additional outreach activities:** Meetings with local organizations.

**First Public Meeting:** Advance notice for the First Public Meeting was published on "La Tribuna," a local newspaper, on July 8, 2009.

The first meeting was used to inform the public about the technical aspects of the project. The meeting was held at 10:30 hrs. on August 7th at El Herradero Restaurant in San Luis Rio Colorado, Sonora. The meeting was attended by 110 residents who answered project surveys. 100% of those surveyed said they were able to fully understand the project and explicitly expressed their support.

**Second Public Meeting:**

A second public meeting was held on December 18, 2009 at the "Hector Chavez Fontes" cultural center in San Luis Rio Colorado. This meeting was used to inform the community about the project's technical and financial components.

The meeting was attended by 80 residents who answered a project survey. 100% of those surveyed said they were able to fully understand the project and explicitly expressed their support.

**Final Public Participation Report**

**Final Report:**

The local Steering Committee and the project sponsor prepared and submit a Final Public Participation Report to demonstrate that the proposed objectives were fully met to BECC's satisfaction.

**Post-Certification Public Participation Activities**

**Post-Certification Activities:**

The project sponsor, in coordination with the Local Steering Committee, provided a general description of public participation activities that may be carried out after the project's certification to support its implementation and long-term feasibility.

**Pending Issues:**

None.

**Criterion Summary:**

The project's Local Steering Committee is the same one that was established for the Phase II of the project, in view of the fact that this project is located in the same community and consequently, it is the responsibility of the same utility and sponsor. The project complies with BECC's Public Participation Criteria.

## 6. Sustainable Development

### 6.a Human and Institutional Capacity Building

**Project operation and maintenance:**

The project sponsor will be the agency responsible for operating and maintaining the following systems:

- Wastewater treatment.
- Water supply.
- Wastewater collection.

The sponsor has the basic institutional and human capacity to operate and maintain the following:

- Proposed wastewater treatment system
- The sponsor has as pretreatment program

**Human and institutional capacity building:**

Actions within the scope of the projects that contribute to improve the institutional and human capacity of OOMAPAS include:

- Providing and improving wastewater collection services under a continuous, efficient, and cost-effective approach.
- Providing basic technical training to the operations and maintenance staff responsible for the new infrastructure that will be built as a result of the project's implementation.
- Training and capacity building for the utility's operating staff throughout its different areas to provide essential services that meet the needs of the community.

### 6.b Conformance to applicable Local, State, and Regional Regulations and Conservation and Development Plans.

**Local and Regional Plans addressed by the project:**

The proposed project conforms to applicable plans and actions described in the following documents:

- Master Plan for Improvements to Water, Wastewater Collection, and Treatment Services.
- Sonora State Development Plan.
- San Luis Rio Colorado Municipal Development Plan.

### 6.c Natural Resource Conservation

- The project contributes to reduce environmental deterioration by expanding the existing wastewater collection system and providing the necessary means to connect 100% of the community to this service. Wastewater will be collected and conveyed to the existing WWTP to improve its quality, so as to reduce aquifer contamination and human health hazards resulting from the discharge of raw wastewater to streams or agricultural drains.

- The final design includes the implementation of green building practices as part of the technical construction specifications.

#### **6.d Community Development**

- The completion of these projects is crucial for the development of the community. The tasks proposed by the projects will contribute to the appropriate disposal of wastewater, which in turn will reduce the conditions that favor the proliferation of waterborne and arboviral diseases.
- The wastewater collection system improvements will promote community development, as it will reduce contamination in the city and improve the quality of life of local residents.
- Treated wastewater will be available for other uses, including infiltration, agricultural and urban public purposes.
- The project will help the city achieve greater wastewater collection coverage, which will enhance the development of the community, since it will reduce contamination on the streets caused by wastewater runoff. In addition, it supports integrated development in areas that currently lack wastewater collection services by promoting the development of other infrastructure such as street paving.

#### **Pending Issues:**

None.

#### **Criterion Summary:**

The project complies with Sustainable Development criteria.

**Available Project Documents.**

- Final Design for the construction of subcollectors included in the Comprehensive Water, Wastewater Collection, and Treatment Project Phase III. March 03, 2008.
- Technical and financial validation of the Final Design for the expansion of the wastewater collection system, issued by NADB and CONAGUA. 2009.
- Improvements to the Wastewater Treatment and Wastewater Collection System San Luis Rio Colorado, Sonora, Mexico. Supplemental Environmental Assessment. May 01, 2007. Prepared for the U.S. Environmental Protection Agency, Region 9. Zia Engineering.
- Ruling of the Environmental Impact Statement (MIA), No. 10-0383-00, February 18, 2000. Prepared by SIUE.
- Extension of Ruling of the Environmental Impact Statement (MIA), Log Entry DG-414/09, April 17, 2009. Prepared by CEDES.