EXPANSION OF THE WASTEWATER COLLECTION SYSTEM TO UNSERVED AREAS IN THE CITIES OF TIJUANA AND PLAYAS DE ROSARITO, BAJA CALIFORNIA

TRANSBOUNDARY ENVIRONMENTAL ASSESSMENT

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Prepared for:

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1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Environmental Protection Agency (EPA) administers the Border Environmental Infrastructure Fund (BEIF), which provides grant funding for water and wastewater infrastructure projects within 100 kilometers (km) of the international boundary between the United States (U.S.) and Mexico. EPA policy for use of border infrastructure funds requires the evaluation and certification of projects by the Border Environment Cooperation Commission (BECC) as a condition for grant award. As part of the BECC certification process, the proposed project must comply with both EPA National Environmental Policy Act (NEPA) regulations, as well as Mexican environmental regulations.

The purpose of this document is to comply with NEPA documentation requirements for the proposed federal action under consideration, which consists of expanding the public wastewater collection system in Tijuana and Playas de Rosarito, Baja California, Mexico, to serve areas that currently lack this service and rely on septic tanks, latrines or open discharges for their wastewater disposal.

1.1.1 Legal Framework

EPA has determined that it will follow the NEPA and EPA regulations for environmental impacts in the U.S. from projects located in the U.S. or Mexico. The EPA follows the U.S. Agency for International Development (AID) approach as summarized in Title 22 CFR Part 216.1-216.10 as guidance for assessing environmental impacts in Mexico. The AID regulations envision collaboration with affected countries to the maximum extent practicable in developing an EA. AID regulations authorize use of either a study prepared by an international body in which the U.S. is a participant, or a concise review of the relevant environmental issues, with appropriate documentation, as a substitute for an EA.

This EA was prepared using Council of Environmental Quality (CEQ) regulations 40 CFR Parts 1500-1508 and EPA regulations (40 CFR Part 6) as guidance. This EA documents the environmental consequences in the U.S. of the proposed federal action. Transboundary impacts to the U.S. are included in this EA to satisfy AID regulations pertaining to environmental analysis outside the U.S. A separate *Manifestación de Impacto Ambiental* (MIA) document will be completed to evaluate the environmental impacts of the proposed federal actions in Mexico. This process will be coordinated by the the Secretariat of Environmental Protection of the state of Baja California (SPA, by its initials in Spanish).). The SPA will review the significance of any environmental impacts in Mexico from implementation of the proposed action.

This EA is extensively based on information contained in the Potable Water and Wastewater Master Plan for Tijuana and Playas de Rosarito (CDM, 2003); the Environmental Assessment for the Potable Water and Wastewater Master Plan for Tijuana and Playas de Rosarito (CDM, 2003), and; the *Manifestación de Impacto Ambiental* (CDM, 2003) prepared for the Master Plan to comply with environmental review requirements of the SPA (former Baja California State Ecology Department). Additional information was obtained from previous environmental impact statements and other sources, as referenced. A description of the project alternatives was provided by the Commisión Estatal de Servicios Públicos de Tijuana (CESPT), including projected flows, pipeline alignments, diameters, and wastewater treatment and effluent disposal methods.

Potential adverse and beneficial environmental impacts of several action alternatives, as well as the “no action” alternative are described in the EA. The document was prepared in general accordance with the BEIF Environmental Assessment Guidelines developed by BECC. It includes an evaluation of current

conditions, and potential impacts including, but not limited to, near-term, long-term and cumulative. The main objective of this document is to describe transboundary impacts (i.e., impacts in the United States) associated with the alternatives evaluated in the planning documents previously described, although reference is also made to potential impacts in Mexico to the extent that they may influence effects in the U.S.

1.2 PROJECT LOCATION AND AREA OF CONCERN

The Cities of Tijuana and Playas de Rosarito are located in the northwestern part of the State of Baja California, Mexico. Tijuana is located south of City of San Diego, California on the U.S.-Mexico border and Rosarito is located approximately 18 miles south of the U.S./Mexico border. Both Cities (Tijuana/Rosarito) are adjacent to the Pacific Ocean. The City of Rosarito is bordered to the north and east by the municipality of Tijuana; to the south by the municipality of Ensenada; and by the Pacific Ocean to the west (Figure 1-1 – Location Map).

According to 2008 projections from the population council of Baja California (CONEPO, by its initials in Spanish), the municipalities of Tijuana and Playas de Rosarito have a combined population of 1,941,204 residents[1], of which 83,433 live in the municipality of Playas de Rosarito, (Figure 1-2 – Project Area Setting). The proposed action would provide wastewater collection service to one community in the southwestern part of Tijuana and four communities in Playas de Rosarito. These communities are located approximately 8 to 10 miles (12-16 km) southwest of the US-Mexico International border.

The study area for this EA is defined as the areas in the United States adjacent to the border that may be adversely affected by the proposed projects in Mexico. BECC guidelines state that special attention should be paid to areas within a 6-mile radius of the proposed project. In this case, the area of concern is extended beyond the six-mile radius in order to examine impacts in the United States. Figures 1-2 and 1-3 shows the locations of the proposed projects in relation to the areas of concern (Figure 1-3 – Area of Concern).

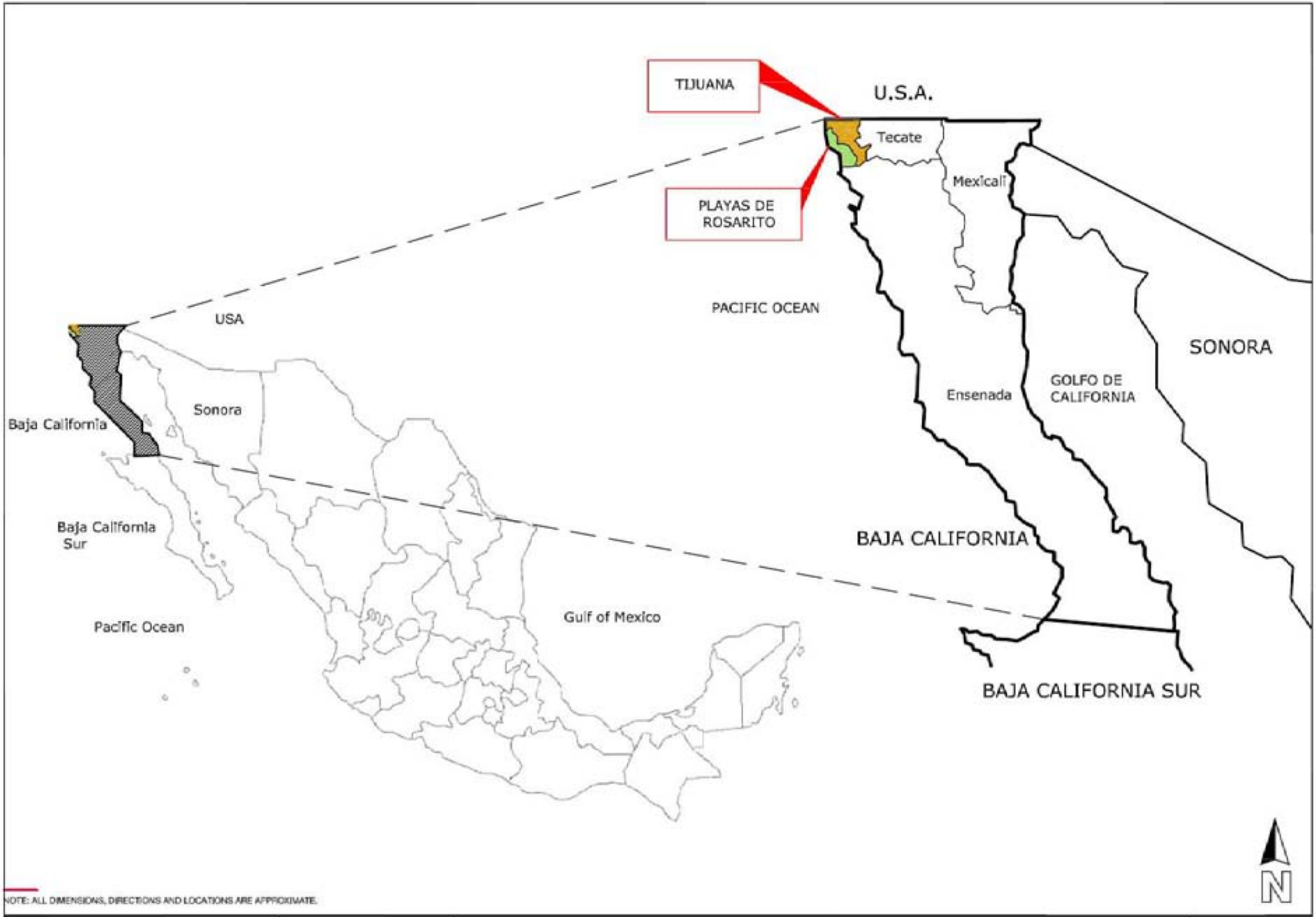
1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The "Comision Estatal de Servicios Publicos de Tijuana" (CESPT) is the Baja State utility agency responsible for providing water and sanitation service to the municipalities of Tijuana and Playas de Rosarito. CESPT officials have determined that infrastructure improvements are required to address wastewater collection system deficiencies and for compliance with federal and state regulatory requirements.

CESPT is seeking certification from BECC for the expansion of the wastewater collection service to serve areas in Tijuana and Playas de Rosarito that currently rely on septic tanks, latrines or open discharges for their wastewater disposal. The CESPT will seek funding from various agencies such as the Comisión Nacional del Agua (CONAGUA, formerly known as CNA) and the Border Environment Infrastructrure Fund (BEIF).

BECC certification is required to become eligible for funding from the BEIF administered by the North American Development Bank (NADB). The purpose of the proposed action is to address environmental and public health risks associated with inadequate collection, treatment and disposal of wastewater.

[1] Consejo Estatal de Población del Estado de Baja California, Indicadores Estratégicos, Junio 2008.



NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	DATE 10/03/08	LOCATION MAP	FIGURE 1-1
BECC COCEF	PROJECT NO. 302 715 001	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California	

Ninyo & Moore	DATE	PROJECT AREA SETTING	FIGURE
	10/03/08		1-2
BECC COCEF	PROJECT NO.	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California	
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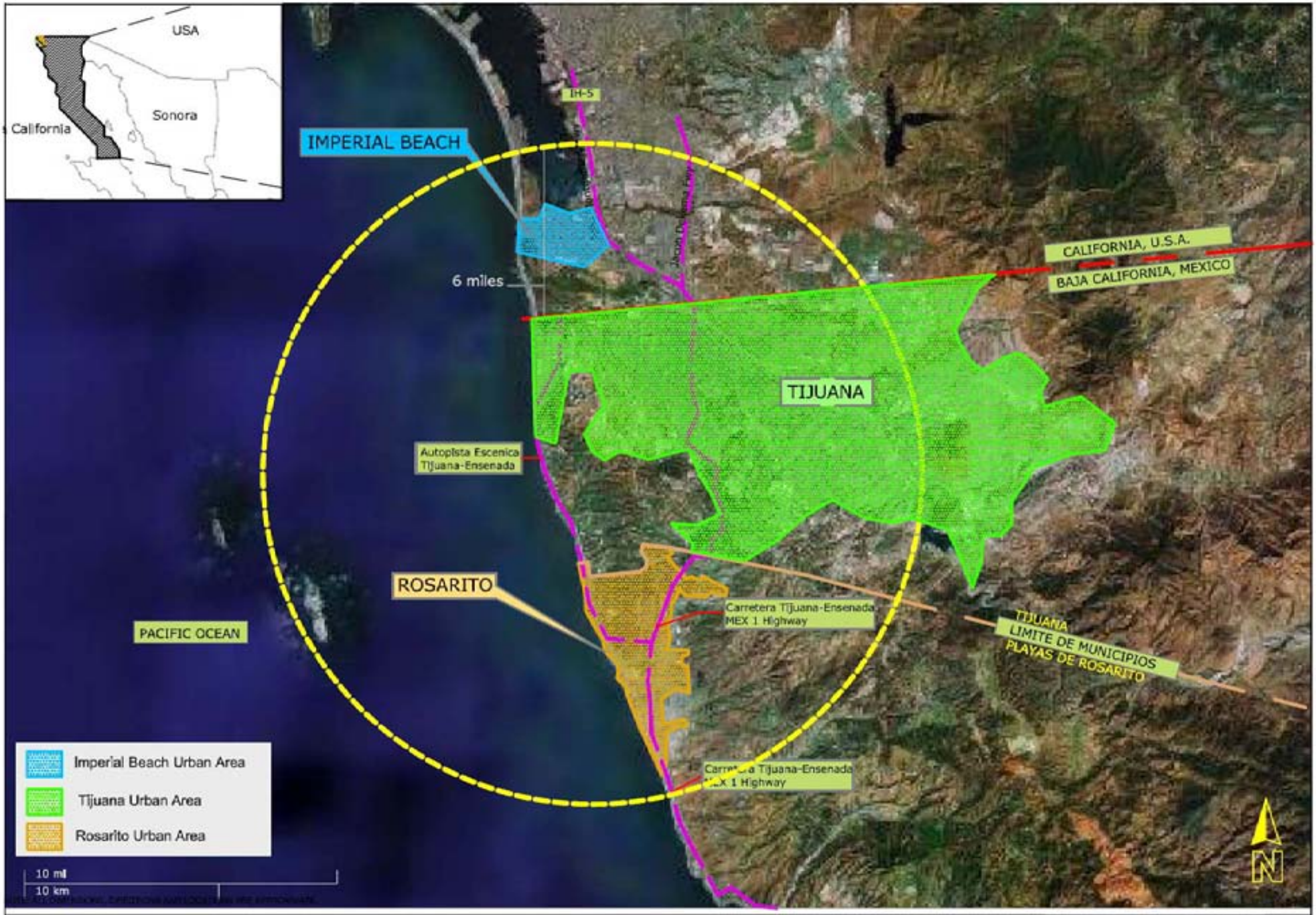


Ninyo & Moore	DATE	AREA OF CONCERN	FIGURE
	10/03/08		1-3
BECC COCEF	PROJECT NO.	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California	
	302 715 001		

The proposed project will address environmental and public health risks associated with inadequate collection, treatment and disposal of wastewater by eliminating untreated sewage discharges in areas of Tijuana and Playas de Rosarito that are not currently served nor connected to a wastewater treatment facility. The proposed action will significantly reduce or eliminate inappropriate wastewater disposal, resulting in improved environmental and sanitation conditions.

The CESPT developed a preliminary engineering analysis to estimate wastewater flows and benefitted population resulted from the construction of wastewater collection infrastructure in the unserved areas Alcatraces, Aztlan, Independencia, Lomas de Rosarito and Ejido Plan Libertador y Ampliacion, which are located in the municipalities of Tijuana and Playas de Rosarito. The analysis also considered the implementation of three alternatives, which will be described in more detail in Section 2 of this document.

Currently, these areas lack wastewater collection infrastructure and rely on septic tanks, cesspools or open discharges for their wastewater disposal.

Table 1-1 Summary of the Proposed Action: Expansion of the Wastewater Collection Service to Unserved Areas in Tijuana and Playas de Rosarito

Proped Action	Area	Location	Population Served	WW Flows Generated (lps)	Pipe length (m) - inches	WWTP	Treatment system
Wastewater Collection Services	Alcatraces	**Tijuana**	845	1.72	8624 m - 4-8"	Rosarito Norte	AS/EA
	Aztlán	**Playas de Rosarito**	6806	13.86	2340 m - 8"		
	Independencia	**Playas de Rosarito**	4528	9.22	9962 m - 8"		
	Lomas de Rosarito	**Playas de Rosarito**	2014	4.10	5172.80m - 8" 1062 m - 10"		
	Ejido Plan Libertador y Ampliación	**Playas de Rosarito**	26078	53.12	25601m -8"-12"		

lps: liters per second
AS/EA: Activated Sludge Extended Aeration

The proposed action would be implemented in the southern areas of Tijuana and the northern areas of Playas de Rosarito and consist of the installation 33 miles (53,108 meters) of sewer lines ranging in diameter from 8 to 12 inches (20-30 cm). The wastewater generated will be treated at the existing Rosarito Norte WWTP which has enough capacity to serve these areas.

The proposed project will provide wastewater collection and treatment services to approximately 40,271 residents living in the colonias Alcatraces, Aztlan, Independencia, Lomas de Rosarito, Ejido Plan Libertador y Ampliacion.

Throughout the past 30 years, the border region between the U.S. and Mexico has experienced a surge in population and industrialization. This growth often exceeded the existing infrastructure, leading to inadequate potable water distribution, wastewater collection, and wastewater treatment.
Human health and environmental impacts associated with the wastewater collection and treatment deficiencies currently existing in some unserved areas of Tijuana and Rosarito are summarized below:

- Human health and environmental issues are related to contamination of surface and groundwater. Cesspools on individual lots allow wastewater to flow into ditches and low-lying areas where surface water collects. As a result, the potential for contact by area residents is high.

- The large number of cesspools and open discharges throughout the unserved areas in both cities, coupled with the proximity to the Pacific Ocean, allow for potential surface water contamination.

- Due to the lack of wastewater collection and treatment systems in the unserved areas in both cites, a large number of cesspools exist that can contaminate groundwater. Continuing population growth will exacerbate this problem

- The low income of the residents prohibits frequent maintenance of the cesspools (operation and maintenance costs for the existing systems include cesspool pumping, wastewater transportation and treatment).

1.4 SCOPE OF THE TRANSBOUNDARY ENVIRONMENTAL ASSESSMENT

The purpose of this EA is to document and make public the potential transboundary environmental impacts that may arise from the implementation of the proposed action, the no action, or any other action alternative considered by CESPT for the expansion of the wastewater collection system to unserved areas in Playas de Rosarito and Tijuana. As defined in CEQ regulations (§ 1508.25), the scope of this EA is limited to the transboundary environmental resources and services within the area of interest in the U.S. that may be affected by the no action alternative or one of the action alternatives. This EA was prepared following the scope of work presented under BECC's "BEIF Environmental Assessment Guidelines" for Mexican environmental infrastructure projects for which BEIF funding is sought. The organization of this document follows that established by the BECC scope of work.

The following general topics are included in the scope of this EA:

- Description of Alternatives

- Environmental Setting

- Transboundary Impacts Analysis

- Cumulative Impacts Analysis

1.4.1 Relevant Environmental Issues

In accordance with CEQ regulations (§ 1500.4 and § 1501.7) and BECC-BEIF environmental requirements, issues to be addressed relating to this proposal are land use, air quality, water resources, biological resources, cultural resources, noise, socio-economic and public health conditions and cumulative effects. Specific attention is given to non-land based issues, such as air and water, and to resources where there may be project-induced effects, such as public health and socio-economic resources.

Environmental issues relevant to all alternatives, including the preferred alternative, are discussed in greater detail in Section 3. Environmental issues not relevant to the project are not discussed beyond this section, or are covered in minimal detail. Environmental issues and resources are identified as relevant or not relevant based on the possibility of any of the alternatives affecting that particular issue or resource.

The following list of environmental issues was initially considered for inclusion in the detailed evaluation:

- Land Use
- Water Resources
- Groundwater
- Coastal Resources
- Cultural Resources
- Socio-economics
- Air Quality and Climate
- Surface Water
- Pacific Ocean
- Biological Resources
- Noise
- Public Health

The construction for the proposed action would occur in Mexico. Construction activities could generate noise and air quality emissions that could potentially affect the U.S. Any construction within Mexico could affect historic or cultural resources in the immediate vicinity of the project. However, all construction would occur along existing disturbed areas in Mexico, furthermore, if previously unidentified cultural resources are discovered during the project activities, the contractor will stop working immediately at the location and the proper municipal or state authorities as well as the Instituto Nacional de Antropología e Historia (INAH) will be contacted.

Any hazardous or solid waste existing in the study area, produced or found during project construction would not affect the U.S. territory. All waste would remain, be handled, and disposed of in Mexico, according to applicable Mexican regulations. Although considered for detailed study, land use in Mexico will not be affected because all of the construction activity would take place on previously disturbed land and mostly along streets. The project would not affect land use in the U.S.

Project activities would take place approximately 8-10 miles away from the U.S., therefore, there would not be any odor impacts in the U.S. caused by the project implementation. In Mexico, the implementation of the proposed actions would provide service to residences lacking connection to the wastewater collection system, thereby eliminating odor and wastewater disposal problems for local residents.

The alternatives could affect surface water and groundwater resources by ground seepage and/or wastewater discharges to any of the intermittent rivers (Arroyo Huahuatay and Arroyo Reforma) or ephemeral washes in Playas de Rosarito. The alternatives could affect surface water quality by the quality and quantity of wastewater discharged to the Pacific Ocean. Changes in coastal water quality could indirectly affect biological and coastal resources in the U.S. If water quality along U.S. beaches changes, the public health of swimmers and beach-goers could be affected. Additionally, if beaches are closed for public health reasons, recreation and tourism industries could be affected. The project would improve public health in Mexico, and because of frequent border crossings, this could reduce potential health threats to the U.S. The U.S. border region shares close economic ties with the Tijuana region. This border economy could improve if the proposed action is implemented. Environmental justice in the U.S. would not be an issue because construction activities that could affect low income and minority populations would not occur within the U.S. Terrestrial biological resources would not be directly affected because of the distance of the projects to the U.S.

The Rosarito River valley groundwater basin is recharged by the Rosarito River, Las Palmas River and Descanso River particularly in areas outside of the city of Rosarito. Groundwater impacts in Mexico are not anticipated. The proposed alternatives may provide benefits to groundwater by reducing or eliminating the discharge of wastewater to the environment. Project activities would take place approximately 8-10miles away from the U.S., therefore, Groundwater impacts in the United States are not anticipated.

Construction activities would not affect biological resources because these activities would take place in previously disturbed areas. Biological resources in the U.S. could potentially be slightly affected by changes in ocean water quality; in case considerable amounts of untreated wastewater effluent makes it to the Pacific Ocean. The alternatives would not affect national landmarks, wetlands, floodplains, as well as wild and scenic rivers because of their distance from the projects. Coastal resources in the U.S. could be indirectly affected by construction activities and wastewater discharges in Mexico.

In summary, land use, air quality, water resources, biological resources, cultural resources, noise, socioeconomics, and public health may be relevant environmental issues linked to the alternatives evaluation, and are assessed in greater detail in this EA.

1.4.2 Issues Eliminated from Detailed Study

Odor, floodplains, wetlands, farmlands, national landmarks, scenic rivers, environmental justice, hazardous and solid waste, and municipal services are not relevant environmental issues in the study area with respect to the evaluated alternatives. They have therefore been excluded from additional evaluation.

2.0 PROJECT DESCRIPTION AND ALTERNATIVES

In accordance with CEQ regulations (§ 1502.14), this section of the EA evaluates all alternatives, including alternatives that were eliminated from detailed study and the reasons for elimination with substantial discussion of each alternative to include any potential environmental impacts and appropriate mitigation measures.

A preliminary engineering analysis identified and evaluated three alternatives to provide wastewater collection service for the colonias Alcatraces, Aztlan, Independencia, Lomas de Rosarito and Ejido Plan Libertador y Ampliacion located in Tijuana and Playas de Rosarito. These areas currently lack wastewater collection and treatment service and rely on open ditches, latrines and cesspools for their wastewater disposal needs.

The proposed alternatives to be analyzed in the present study are as follows:

1) The No Action Alternative, which means that the current situation will remain without change, and the proposed action will not be implemented.

2) The expansion of the wastewater collection system by the installation of a piping system, which includes wastewater collectors, sub-collectors, laterals installation and residential hook-ups.

3) The installation of on-site septic tanks for each household within the unserved areas.

2.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action consists of the construction of wastewater collection infrastructure for the unserved areas Alcatraces, Aztlan, Independencia, Lomas de Rosarito and Ejido Plan Libertador y Ampliacion. Currently these areas lack adequate wastewater collection and treatment services and rely on open ditches or latrines for their wastewater disposal needs.

Wastewater flows from the proposed areas are estimated to be 82.03 (1.87 MGD)[2] and will be treated at the existing Rosarito Norte WWTP which has enough capacity to serve these areas. Approximately 40,271 residents will receive wastewater treatment service if the entire proposed action is implemented (see section 1.3).

The preliminary engineering analysis recommended the installation of approximately 33 miles (53,108 meters) of 8 to 12 inch diameter gravity collection lines, to service the six zones of established unserved housing. The new lines would be installed within existing right-of-way and would tie-in to the existing collection system at predetermined locations (Figure 2-1 – Proposed Wastewater Collection System Improvements).

2.2 EXISTING TREATMENT INFRASTRUCTURE

Rosarito Norte Wastewater Treatment Plant

The Rosarito Norte WWTP is located approximately 11 miles south of the U.S.-Mexico border in the northwest corner of the City of Rosarito. The plant includes an extended aeration/activated sludge treatment process (EA/AS) with an oxidation ditch system within a total area of 5 hectares (12.3-acres). The WWTP has capacity to treat up to 210 lps (4.79 MGD).

[2] Update flow projections from Master Plan, CESPT 2008

Currently Rosarito Norte WWTP is treating an average flow of 38 lps (0.8 MGD) and has treatment capacity to accommodate additional flows resulted from the expansion of the wastewater collection system which are estimated to be 82.03 (1.87 MGD)[3].

Around 7 lps (0.15 MGD) of the treated effluent is being reused for landscape irrigation in the neighboring areas. The remainder is discharged into the "Arroyo Reforma" and flows 200 meters before reaching the Pacific Ocean approximately at 11.5 miles south from the border.

Future flows from the Rosarito Norte WWTP are expected to remain in compliance with the Mexican Norms: NOM-001-ECOL-1997 for discharges into the Ocean and NOM-003-ECOL-1997 for reclaimed water use for non-potable uses. The following table indicates the permitted discharge limits and the current water quality:

Table 2.0 Rosarito Norte WWTP discharge limits and current effluent water quality

Parameter	Units	Average Monthly Limit	Daily Maximum Limit	Actual median effluent value from January to October 2008
Biochemical Oxygen Demand	mg/l	30	150	7
Oil and Grease	mg/l	15	25	4
Total Coliform	MPN/100	1000	2000	30
Total Suspended Solids	mg/l	30	125	10
Settleable Solid	mg/l	1	2	0.1
Floating matter	mg/l	Ausente	Ausente	N/A
Temp	°C	40	40	21
pH	Units	5-10	5-11	7
Phopshorous	mg/l	20	30	8
Nitrogen	mg/l	40	60	4
Arsenic	mg/l	0.1	0.2	N/A
Cadmium	mg/l	0.1	0.2	N/A
Cyanide	mg/l	1	2	N/A
Copper	mg/l	4	6	N/A
Cr	mg/l	0.5	1	N/A
Hg	mg/l	0.005	0.01	N/A
Ni	mg/l	2	4	N/A
Pb	mg/l	0.2	0.4	N/A
Zn	mg/l	10	20	N/A

Currently, the sludge (solids) generated by all treatment plants operated by CESPT, as well as the sludge generated at the South Bay International Treatment Plant in San Diego, are being disposed at a location called Punta Bandera, approximately 4.2 miles (6.8 km) south of the international border. The site started operation in 2001. This facility has a surface area of approximately 400,000 m^2 , and includes 8 sludge monofill disposal cells with a disposal capacity of 23,726 m^3/year (dry base) each. Prior to final disposal the sludge is subject to a drying process where it loses up 30% of its humidity, (the sludge typically arrives with 60-70% humidity). During 2008, this facility received approximately 34,368 m^3 of wet sludge that was reduced to approximately 12,274 m^3. [4]

[3] Update flow projections from Master Plan, CESPT 2008
[4] CESPT, WW Treatment Department.

Sludge volumes generated by the Rosarito Norte WWTP in 2008 were 1026 m^3. The sludge will continue to be disposed at Punta Bandera, including additional volumes generated by the proposed project.

The increase in sludge is not expected to have environmental impacts since according to generation projections, calculated by the project sponsor, the current facilities will have enough capacity for the next 20 years to receive digested sludge generated by the South Bay IWTP and all the treatment plants operated by CESPT in Tijuana and Playas de Rosarito. Also, a feasibility study to reuse digested sludge was developed by the project sponsor and alternatives are being studied.

2.3 WASTEWATER COLLECTION SYSTEM

The Playas de Rosarito's wastewater collection system and treatment facilities serve approximately 57% of the residents. [5] In Tijuana, service is provided to about 80% of the residents. According to CONAPO projections Rosarito's population is approximately 83,433 and it is expected to increase approximately to 196,982 by the year 2030. Tijuana's population is approximately 1,590,420 and is expected to reach 2,725,286 by the year 2030. [6]

Continuing population growth has resulted in the need for expanding the wastewater collection and treatment systems to efficiently meet sanitation conditions and enhance environmental conditions. There is a project to expand the Rosarito I wastewater treatment plant in the near future[7]. This project is analyzed in a separate EA.

2.4 ALTERNATIVE 1 – NO ACTION

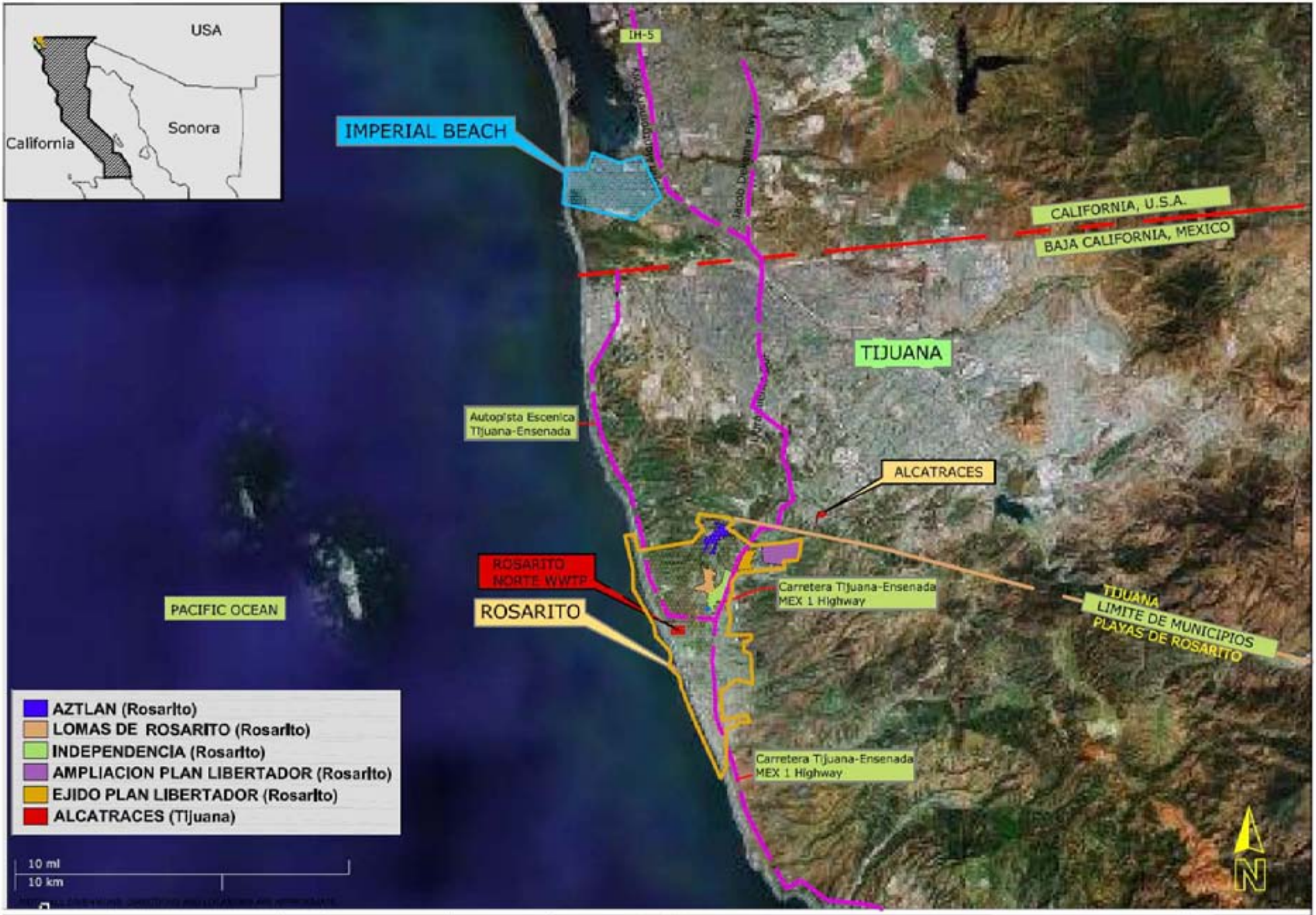
Under the No-Action Alternative, wastewater collection and treatment would not be provided. The unserved areas would continue to rely on cesspools, latrines and open discharges to meet their wastewater disposal needs. As a result the No Action Alternative would not eliminate the health hazards associated with human contact due to raw sewage discharges onto the streets.

Part of these untreated discharges would likely reach surface water or groundwater resources, creating potential public health and environmental problems. Population growth within these areas will aggravate this problem.

Water quality in nearby creeks and in the Pacific Ocean would continue to decrease, because of the projected increase in population and resulting increases of untreated sewage. Aquatic communities in the Pacific Ocean may decline if water quality decreases. Furthermore, the bacteriological quality of the ocean waters may be affected in U.S. waters by means of marine currents that could carry these pathogens northward[8]. Ocean currents close to the area of concern typically experience a south flow regime, although there are some exceptions in which the ocean currents flow northward or overall weak current conditions cause a plume to spread in both directions (Ocean Imaging, 2002).

Groundwater within the area of concern could become contaminated because of continued use of malfunctioning septic systems and cesspools for wastewater disposal.

[5] CESPT Service Statistics, 2008
[6] Consejo Estatal de Población (CONAPO), 2005.
[7] Border Environment Cooperation Comission, December 9, 2008.
[8] Shore and Ocean Discharge Modeling Report, Prepared for the IBWC and EPA by Parsons (October, 2004)



Ninyo & Moore	DATE	SITE LOCATION FOR THE PROPOSED WASTEWATER COLLECTION SYSTEM IMPROVEMENTS	FIGURE
	10/03/08		2-1
BECC COCEF	PROJECT NO.	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California	
	302 715 001		

2.5 ALTERNATIVE 2 – CONVENTIONAL GRAVITY (CG) WASTEWATER COLLECTION SYSTEM (PREFERRED)

Proposed Action Alternative 2 would provide wastewater collection services to the currently unserved areas in Tijuana and Rosarito (Section 1.3 and 2.1of the EA). Construction and installation of new wastewater collection pipelines may involve removal of soils contaminated by malfunctioning septic tank sewage and transportation of impacted soils to an approved local landfill.

The majority of these proposed wastewater collection lines will be constructed under unpaved streets, while the remainder will be placed under paved right-of-ways and existing utility easements (CESPT, 2008). Table 1 presents a summary of proposed Alternative 2 wastewater collection expansion improvement projects, including year of planned implementation, estimated costs for the Proposed Actionm and the designed WWTP that will be receiving the collected wastewater.

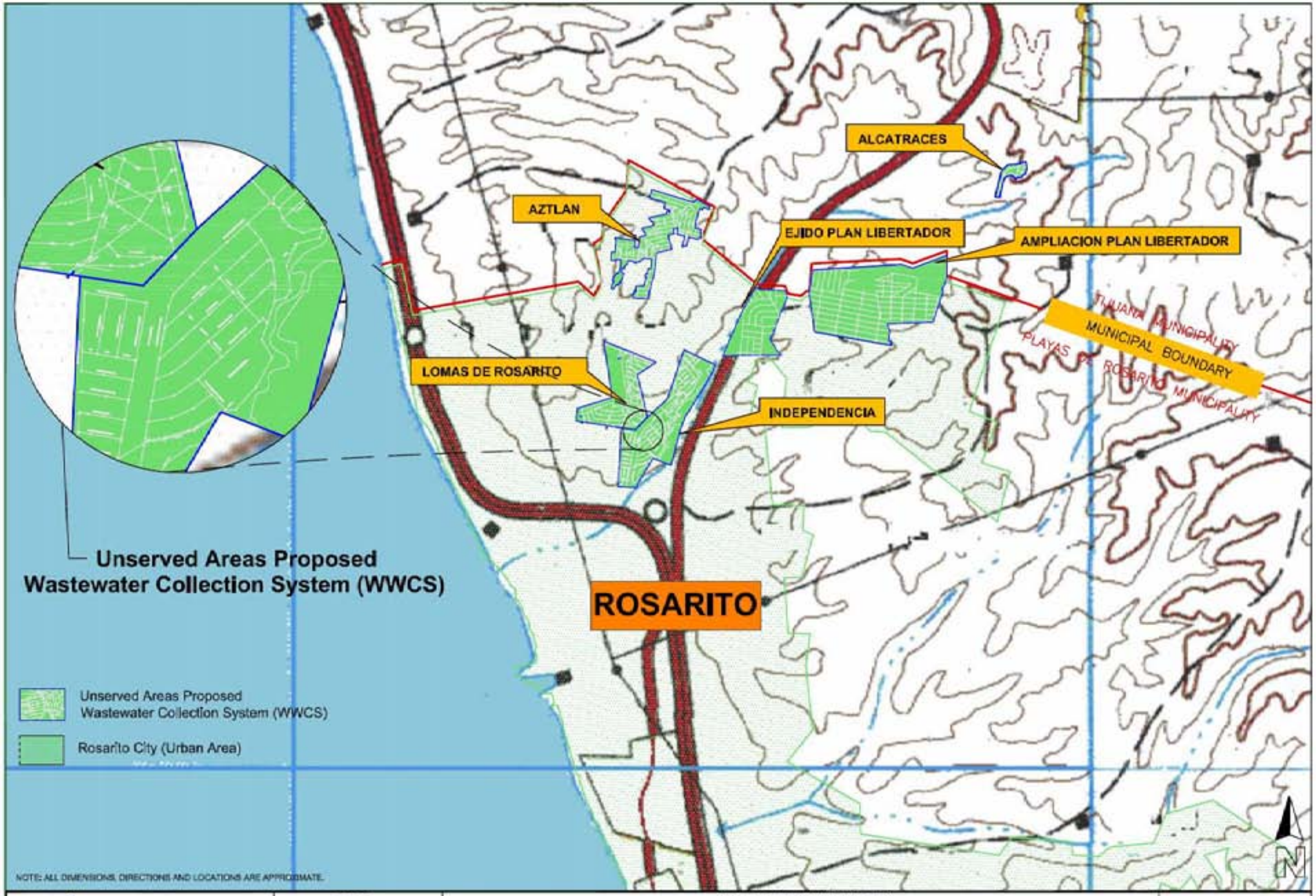
Under Alternative 2, wastewater collection would be extended to approximately 39,426 Rosarito residents and 845 Tijuana residents; the total benefited population from the implementation of the proposed action would be 40,271inhabitans. Daily average residential wastewater flow would average approximately 82 lps (1.87 MGD), assuming a daily wastewater production rate of 46.5 gallons per capita per day (gpcd) [176 liters per capita a day], (Figure 2-2 – Alternative 2 - Conventional Gravity WW Collection System).

Table 2-1. Wastewater Collection System Expansion Improvements—Summary of Alternative 2, Projects

Area	Location	Population Served	Connections	WW Flows Generated (lps)	WWTP	Treatment system	Pipe length
Alcatraces	Tijuana	845	205	1.72	Rosarito Norte	AS/EA	8624 4-8"
Aztlán	Playas de Rosarito	6806	1652	13.86			2340 m - 8"
Independencia	Playas de Rosarito	4528	1099	9.22			9962 m - 8"
Lomas de Rosarito	Playas de Rosarito	2014	490	4.10			5172.80m - 8" 1062 m - 10"
Ejido Plan Libertador y Ampliación	Playas de Rosarito	26078	6330	53.12			25601m -8"-12"
Total		**40271**	**9776**	**82.03**			**52761 m**

lps: liters per second

AS/EA: Activated Sludge Extended Aeration

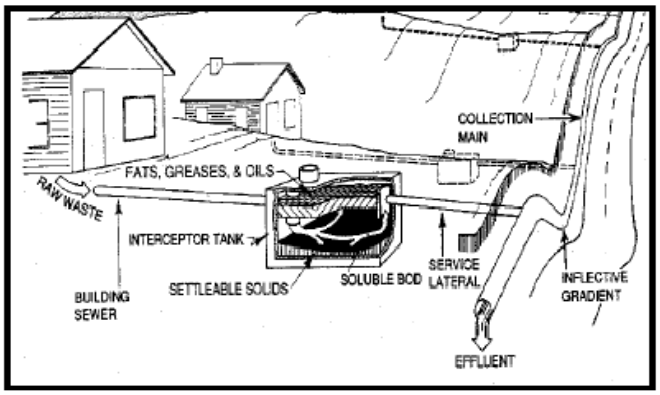


Ninyo & Moore	DATE 10/03/08	ALTERNATIVE 2 CONVENTIONAL GRAVITY WASTEWATER COLLECTION SYSTEM
BECC COCEP	PROJECT NO. 302 715 001	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California

2.6 ALTERNATIVE 3 – NEW INSTALLATION OF ON-SITE SEPTIC TANKS AND SMALL DIAMETER GRAVITY (SDG) SEWER SYSTEM

An SDG system uses gravity to transport sewage, much like conventional sewers do. However, small diameter gravity sewers are always preceded by a septic tank. The settling that first occurs in the septic tank eliminates much of the solid matter from the wastewater. This enables the collection pipes to have a smaller diameter and a more gradual incline. The pipes used are made of lightweight plastic and can be buried at a relatively shallow depth.

The SDG system does not utilize pumps at individual septic tanks as other more sophisticated systems do. Therefore, the SDG sewers are laid at a relatively constant grade, to match the terrain. Manholes are not required for small diameter gravity systems; instead, clean out ports are used to service collector pipes.

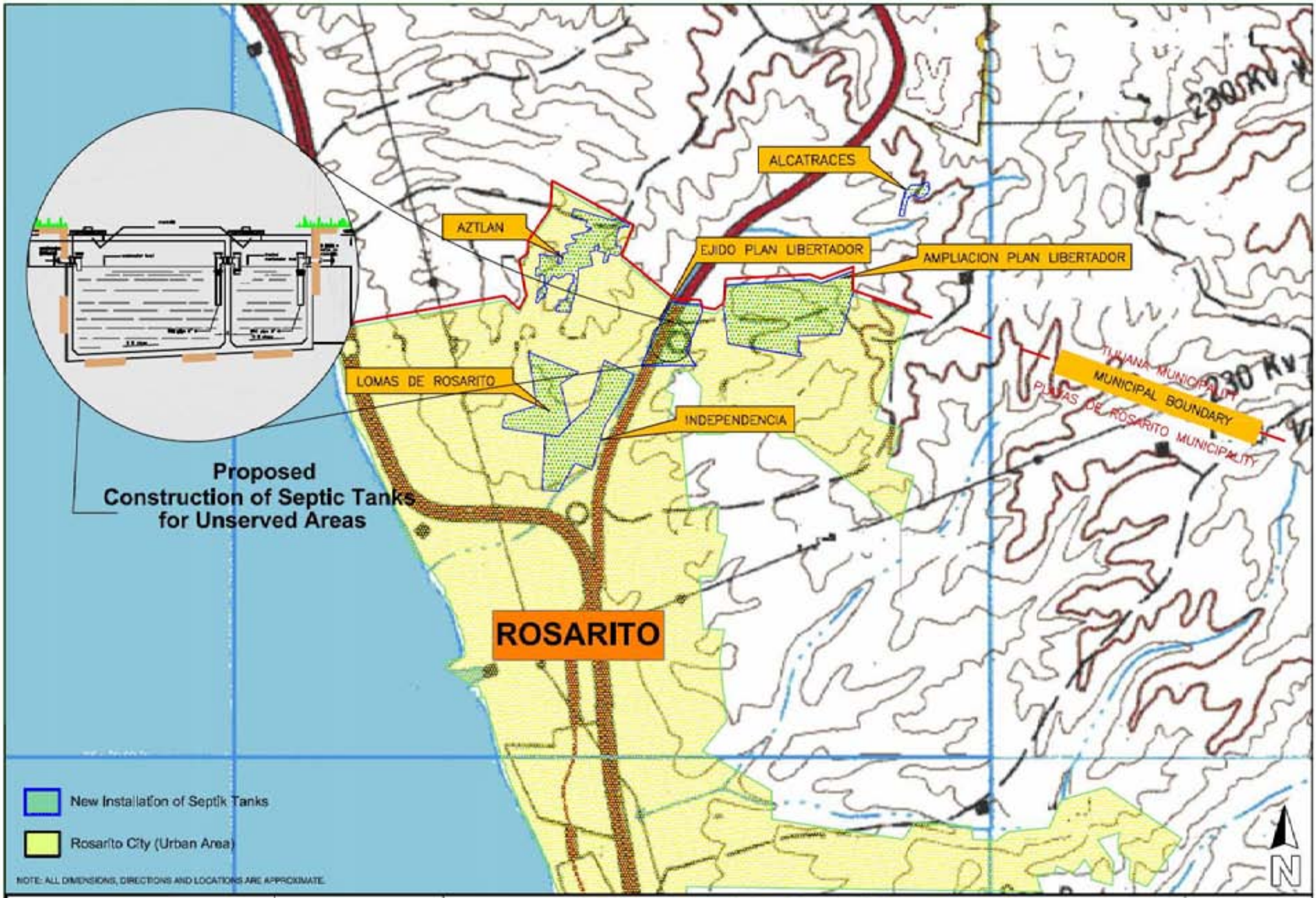


Septic Tanks and Small Diameter Gravity Sewer System

The main advantage of the SDG sewer system over the CG sewer system is low capital cost due to reduced pipe costs, cleanouts in place of manholes, reduced lift station sizes due to peak flow attenuation by septic tanks, and potential reduction in treatment costs due to septic tank pretreatment. However, construction costs for the septic tank system in the unserved areas of Tijuana and Rosarito, in order to be in compliance with CNA regulations and acceptable construction guidelines are estimated to be around $12,500.00 pesos ($1,200.00 U.S. Dollars) per household[9]. The total number of households to be served is 9,800; therefore, the total cost to implement this alternative would be approximately $122,500,000.00 (11.66 million U.S. dollars).

Poor design and construction has yielded some situations where SDG systems have performed inadequately. SDG systems cannot handle commercial wastewater with high grit or settleable solid levels. Odors are the most common problem and are caused by inadequate ventilation systems, mainline manholes, or venting structures. Lastly, SDG systems must be buried deep enough so that they will not freeze, in case of extreme weather in the area of concern (Figure 2-3 – Alternative 3 - Septic Tanks and Small Diameter Gravity Sewer System).

[9] CESPT, Planning Department, August 19, 2008



Ninyo & Moore	DATE 10/03/08	ALTERNATIVE 3 SEPTIK TANKS AND SMALL DIAMETER GRAVITY SEWER SYSTEM
BECC COCEF	PROJECT NO. 302 715 001	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California

2.7 COMPARISON OF THE ALTERNATIVES

Table 2-2 compares the potential environmental transboundary impacts to the project area of the proposed alternatives carried forward for analysis. Refer to *Chapter3 (Affected Environment and Environmental Consequences)* for further discussion of these potential environmental impacts.

Table 2-2. Comparative Matrix Summary

Alternatives: / Receptors:	No Action	Proposed Action Conventional Gravity (CG) Alternative	Septic Tanks (SDG) Alternative
Land Use	Expansion of the Cities, within the project areas, due to urbanization and industrialization would not be adequately supported by its current wastewater collection system capacity.	If this alternative is adequately implemented, the system will be able to support the existing population and potential industrialization in the south sector of Tijuana and the north sector of Rosarito. Locations of the proposed wastewater collection system will be constructed / installed in already disturbed areas of existing streets and right-of-ways; therefore, not disturbing additional resources.	If this alternative is adequately implemented, the system will be able to support the existing population of the south sector of Tijuana and the north sector of Rosarito. Locations of the proposed sewer disposal system will be constructed / installed in private property and in already disturbed areas of the existing streets and ROWs, therefore, not disturbing additional resources.
Air Quality	Air quality in the area of concern would not be impacted by implementation of the No Action Alternative.	Construction improvements associated with this alternative have the potential of some temporary pollution to the air resources in the proposed project area (unserved areas and adjacent surroundings).	Construction improvements associated with this alternative have the potential of some temporary pollution to the air resources in the proposed project area (nearby neighborhoods). In addition, there is a potential effect, especially with odors, if some of the septic tanks are removed and the contaminated soil is transported to a nearby landfill.
Water Resources	Without access to an adequate sewer system, the population would continue discharging wastewater into overloaded and failing on-site treatment units, adding to the risk	The implementation of the proposed action would provide service to residences lacking connection to the wastewater collection system, thereby avoiding potential contamination of the groundwater by fecal coliform and parasites resulting from the continued and increased use of cesspools for wastewater disposal. Resulting access to wastewater	Same as the previous action alternative. However, under this alternative resulting access to wastewater treatment would not guarantee the complete elimination of contamination of groundwater via infiltration. Action would prevent flows

Water Resources	of surface pooling of contaminated untreated wastewater in the communities (colonias). These flows could potentially contribute to contamination of Mexican and U.S. beaches.	treatment would potentially eliminate sources of contamination of groundwater via infiltration and surface water via run-offs. Action would prevent flows from entering Pacific Ocean untreated and contaminating Mexican and U.S. beaches.	from entering Pacific Ocean untreated and contaminating Mexican and U.S. beaches.
Biological Resources	No potential impact	No potential impact	No potential impact
Cultural Resources	No potential impact	No potential impact	No potential impact
Noise	No potential impact	Construction noises tend to be short in duration and concentrated around the immediate work area. Construction related noise would be mitigated through the use of standard procedures.	Same as the previous action alternative. Construction noises, short in duration, would be concentrated around the immediate work area adjacent to a household where the septic tanks are to be built.
Traffic and Transportation	No potential impact	The closing of roads or streets may be required during construction and will inconvenience the users' roads in the project area.	Same as the previous action alternative. Although potential effects would be minimal since related construction would take less time and part of it would be on private property (households).
Socio-economics	No potential impact	The implementation of the proposed action alternative would have minor positive impacts on either city's economy. The number of temporary jobs that the project would generate would be relatively low.	Same as the previous action alternative.
Public Health	The health risk of waterborne disease in the project area would continue at current levels or could increase with this alternative because of the expected increase in population and the lack of efficient wastewater service.	With proposed action implementation, infectious waterborne diseases originating in Tijuana/Rosarito will be significantly reduced, thus, would minimize the effect on residents in the U.S. Potentially contaminated surface water and groundwater resulting from the leakage and infiltration from cesspools would be alleviated with the implementation of this proposed action alternative.	Same as the previous action alternative. However, limited experience with SDG technology has yielded cases where systems have performed inadequately, resulting in increased risk of untreated water causing infectious diseases from leakage and infiltration cesspools.

Table 2-3 evaluates monetary and non-monetary aspects of the considered alternatives. Under monetary items, the construction cost, O&M cost, and life cycle cost were taken into account. The life cycle cost accounted for 20 years of the project life, 6% inflation/interest rate and 3% rate of return.

The non-monetary evaluation criteria included items such as ease of operation and maintenance, sludge generation, dependability, complexity, operator skill level requirements, and impacts on groundwater, surface water, biological resources, public health and cumulative impacts.

All evaluation criteria were assigned the weight factors depending on their relative importance, and rating was done on a scale of 1 to 3. The scale allowed for non-integer ratings to differentiate further between the alternatives.

All the alternatives are ranked in an evaluation matrix in Table 2-3. Table 2-4 presents the tabulation of construction (capital cost) and present worth cost per cubic meter of treated effluent. The alternatives are ranked in the order of increasing cost. Thus, the lowest ranking number represents the lowest life cycle cost.

Table 2-3. Monetary and Non-Monetary Evaluation Matrix for Wastewater Treatment Proposed Action Alternatives - Rosarito I WWTP

Evaluation Items	Weight Factor	Alternative 1 No Action		Alternative 2 CG / WWCS		Alternative 3 Septic Tanks	
		Rate	Subtotal	Rate	Subtotal	Rate	Subtotal
Monetary Criteria							
Construction Cost	3	1	3	2.5	7.5	2	6
O&M Cost	2	1	2	2.5	5	3	6
Life Cycle Cost	2	1	2	3	6	1.5	3
Subtotal			**7**		**18.5**		**15**
Non-Monetary Criteria							
Ease of Operation and Maintenance	3	1	3	2.5	7.5	3	9
Sludge generation	2	1	2	2	4	3	6
Dependability	3	1	3	3	9	2	6
Complexity	3	1	3	2.5	7.5	3	9
Operator skill level requirements	3	1	3	3	9	2.5	7.5
Impact on:							
Groundwater	3	1	3	3	9	2	6
Surface water	3	1	3	3	9	2.5	7.5
Biological Resources	3	1	3	3	9	3	9
Public Health	3	1	3	3	9	3	9
Cumulative Effects	2.5	1	2.5	3	7.5	3	7.5
Subtotal			**28.5**		**80.5**		**76.5**

Weight Factors:
3 - Highly Important
2 - Important
1 - Less Critical

Rate:
3 - Excellent
2 - Good
1 - Not Desirable

Alternative 1 - No Action
Alternative 2 - Conventional Gravity Wastewater Collection System
Alternative 3 - Septic Tanks and Small Diameter Gravity Sewer

CG/WWCS = Conventional Gravity Wastewater Collection System

The cost associated with each alternative is summarized in Table 2-4.

Table 2-4. Proposed Alternatives Implementation Estimated Cost

Alternative	Capital Cost		Present Worth	Rank Increasing Cost
	US Dollar (Million)	Mexican Peso (Million)	US Dollar/ m^3	
Alternative 1 – No Action	$0.00	$0.00	$0.00	**N/A**
Alternative 2 – Conventional WWCS	$10.74	$112.8	$0.09	**1**
Alternative 3 – On-site Septic Tanks	$11.66	$122.5	$0.10	**2**

Source: Preliminary Engineering Report (PER) – Playas de Rosarito Wastewater Collection System Improvements Proyecto Ejecutivo (CESPT, 2006). Based on peso-dollar exchange rate of 1 dollar: 10.50 pesos.

2.8 IDENTIFICATION OF PREFERRED ALTERNATIVE

From the three proposed alternatives previously described in this section, based on the Preliminary Engineering Report (PER) – Tijuana and Playas de Rosarito Wastewater Collection System Improvements (CESPT, 2006)- Alternative 2 (Conventional Gravity Wastewater Collection System), was selected as the preferred action alternative due to the following factors:

- Conventional gravity wastewater collection systems were designed to serve high density urban/suburban areas.
- Conventional gravity wastewater collection systems have proven to be reliable and require minimal maintenance.
- A conventional gravity wastewater collection system was selected as the preferred alternative due to favorable soil and groundwater conditions and the proximity of dwellings requiring service.
- Conventional gravity wastewater collection systems do not require any kind of solids settlement and separation processes (no need for septic tanks or pumps for individual connections) before entering into the system, thereby avoiding potential contamination of groundwater and water bodies or soils within the proposed project areas.
- The proposed conventional gravity wastewater collection system meets O&M costs associated with the selection criteria.

The CESPT technical team recommended a preferred alternative for building a wastewater collection system in the Tijuana/Rosarito unserved areas. The recommendation was based on engineering feasibility, responsiveness to community concerns, and compliance with regulatory requirements, preliminary cost estimates, and environmental considerations. The CESPT, along with the Tijuana/Rosarito municipal authorities, approved the preferred wastewater collection system alternative.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The potential environmental impacts on the Coastal areas in San Diego County in southern California, and Playas de Rosarito, Baja California, Mexico, near the proposed project are addressed in this section (See Figure 1 - 3 – Area of Concern).

3.1 LAND USE

3.1.1 Environmental Setting

The environmental setting in the vicinity of the border in the U.S. is characterized by a combination of industrial, agriculture, rural and open space land uses. Important features of this area include the Pacific Ocean; the Tijuana River National Estuarine Research Reserve and Imperial Beach Naval Air Station in the City of Imperial Beach; the Tijuana River Valley; and the communities of San Ysidro and other border areas within the City of San Diego. San Ysidro is the main urban border community in the U.S. within the study area. Across the border in Mexico lie highly urbanized portions of the city of Tijuana and Playas de Rosarito that extend fully to the international border.

Topographic features include the relatively flat alluvial plain of the Tijuana River with tributary canyons and hillsides extending up into Mexico. The Tijuana River and the Pacific Ocean are the most notable hydrologic features of the area. Biological resources range from the diverse flora and fauna of the Tijuana River estuary to scrub habitats adjacent to the estuary. Climate and meteorological influences include the cool semiarid steppe climate of the area with warm dry summers, mild winters, and ocean breezes. The air quality is generally characterized as being fair to good, although the San Diego Air Basin (SDAB) is in nonattainment with federal standards for ozone (SDAPCD, 2005)

The Tijuana Estuary is the end-point of the 1,739 square-mile Tijuana River Watershed. Nearly three-fourths of the watershed lies in Mexico, encompassing 2,500 acres; the Tijuana Estuary has been designated as a wetland of international importance.[10]

Tijuana with an area of 339.46 square-miles (879.2 km^2) is bordered to the North by the San Diego County area, in the state of California, in the United States, to the south by the municipalities of Playas de Rosarito and Ensenada, and by the municipality of Tecate to the east. Rosarito is bordered by Tijuana to the north and east, Ensenada to the south, and the Pacific Ocean to the west; the municipal territory consists of an area of 198.19 square-miles (513.32 km^2).

Tijuana consists of a series of elevations forming plateaus and hills. These features bring difficulty to provide basic services to the community, and may cause risk of flooding and slides. Playas de Rosarito is shaped by five miles of sandy beaches, including some plateaus and staggered hills.

3.1.2 Environmental Consequences for Land Use

3.1.2.1 No Action Alternative 1

If the proposed projects were not implemented, land characteristics under the No Action Alternative would not substantially change. There would be no significant direct, indirect, or cumulative impacts on land use by the No Action Alternative.

[10] Tijuana Estuary http://trnerr.org

3.1.2.2 Action Alternative 2 (Preferred Alternative)

The projects are located approximately 8-10 miles (12-16 km) of the U.S./Mexican border; therefore, would not directly, indirectly, or cumulatively impact land use in the United States.

Implementation of the Action Alternative regarding the Conventional Gravity WWCS would not be expected to promote any significant conversion or alteration of land. The proposed CGWWCS system project would be constructed in already disturbed areas of existing streets and right-of-ways in Tijuana and Playas de Rosarito and would not directly or indirectly impact land use.

Implementation of the WWCS Action Alternative 2 would not be expected to promote any significant conversion of farmland to other uses.

Under the Action Alternative 2 (Preferred Alternative), it is expected that additional effluent would be treated at the Rosarito Norte WWTP and conveyed to the Pacific Ocean for final disposal, increasing the flows that are currently sent to the Pacific Ocean. A portion of this treated effluent would be used for municipal irrigation services (purple line).

3.1.2.3 Action Alternative 3

The projects are located approximately 8-10 miles (12-16 km) of the U.S./Mexican border; therefore, would not directly, indirectly, or cumulatively impact land use in the United States.

There would not be any significant impact to land use since construction and installation of the septic tanks would take place on already disturbed private property; however, considerations such as household size, type of soil and near water structures should be included. In addition, periodic pumping, maintenance and monitoring are needed to keep the system working properly; the distribution area should be protected from excessive rainwater runoff to avoid potential clogging of the system and/or excessive wastewater volume that would result in system failures.

Implementation of this Action Alternative regarding the installation of on-site septic tanks and Small Diameter Gravity (SDG) sewer systems would not be expected to promote any significant conversion or alteration of land. However, under this alternative resulting access to wastewater treatment by septic tanks would not guarantee the complete elimination of contamination of groundwater via infiltration, adding the potential risk for contaminated water to reach surface water and groundwater resources including the Pacific Ocean.

3.2 AIR QUALITY

3.2.1 Environmental Setting

The area of influence for this project would, in general, include the SDAB, although only those areas directly adjacent to the international border would be subject to potential localized air quality impacts such as those related to dust or odors arising from the construction and operation of wastewater infrastructure in Mexico.

Climate

The climate in San Diego County is influenced by the Pacific Ocean and its high-pressure systems, which result in dry, warm summers and mild, occasionally wet winters. The normal wind pattern throughout the County is predominantly westerly to northwesterly (i.e.,blows predominantly towards the east and

southeast) (City of San Diego Metropolitan Wastewater Department (MWWD), 1996). This pattern is occasionally disrupted by the Santa Ana wind conditions, during which offshore winds blow pollutants out to the ocean, resulting in clear days. If the Santa Ana conditions are combined with a low pressure system in Baja California, a pollutant laden air mass is drawn southward from Los Angeles and Orange Counties to produce some of the highest levels of air pollution found in the SDAB.
During the winter, afternoon temperatures vary from 60 ºF to 80 ºF, summer temperatures range from 80ºF to 100ºF. The average annual precipitation in the area is 9.5 inches, falling predominantly from November through April (CH2M HILL, 1998).

In Tijuana, the weather is described as a Mediterranean type, with temperature ranging from 35°F (1.5^{o}C) up to 97°F (36°C). There is an annual average precipitation of 7.72 inches (196.2 mm), and the predominant winds go from southwest to northeast.[11] Mild humid Mediterranean weather predominates in Playas de Rosarito, with rains on winter, mainly on January and February. The annual precipitation shows an average of 10.74 inches (273 mm). The annual average temperature is 62.6^{o}F (17°C). Regularly, winds come from the northwest and southwest with a mean speed of 6.2 miles/hr (10 km/hr).[12]

Air Quality

An area is designated "in attainment" when it is in compliance with the National and/or California Ambient Air Quality Standards. These standards are set by the federal Environmental Protection Agency (EPA) or the California Air Resources Board (ARB) for the maximum level of a given air pollutant which can exist outdoors without detrimental effects on human health or public welfare.

Both the United States Government and the State of California have enacted legislation designed to improve air quality. The 1970 Federal Clean Air Act covers the entire country. This law (and its amendments in 1977 and 1990) allows individual states to have stronger standards, but states cannot have weaker standards than those set for the entire country. California adopted its own stricter standards in its Clean Air Act in 1988.

Table 3-1 shows San Diego County's federal and state designations for each of the criteria pollutants:

Table 3-1. San Diego County's designations for criteria pollutants

Criteria Pollutant	Federal Designation	State Designation
Ozone (one hour)	Attainment*	Nonattainment
Ozone (eight hour)	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Attainment
PM 10	Unclassifiable**	Nonattainment
PM 2.5	Attainment	Nonattainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen Sulfide	(no federal standard)	Unclassified
Visibility	(no federal standard)	Unclassified

* The federal 1-hour standard of 12 pphm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in State Implementation Plans.
** At time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable. Source: Air Quality in San Diego County, 2007 Annual Report

[11] Enciclopedia de los Municipios de Mexico (Mexican Municipalities Encyclopedia) http://www.e-local.gob.mx/wb2/ELOCAL/ELOC_Enciclopedia
[12] idem

Ambient air quality monitoring data on the criteria pollutants in the San Diego Air Basin area are available from a monitoring network operated by the San Diego Air Pollution Control District (APCD). The District conducts its air sampling at ten monitoring stations in the western region. [13]

In Tijuana and Playas de Rosarito, as in other communities, air quality problems are due to the volume of suspended particles (PM_{10}) emissions resulting from the traveling of automotive vehicles on the soil surface, as well as from wind currents that frequently blow in this area.

Table 3-2. Summary of Air Quality Data of the San Diego Air Basin

Pollutant		**Number of Days Over Standard**				
		2003	**2004**	**2005**	**2006**	**2007**
Ozone (1-hr)	Federal	1	1	0	0	1
	State	23	12	16	23	18
Ozone (8-hr)	Federal	6	8	5	14	7
	State	n/a*	n/a*	n/a*	68	43
Carbon Monoxide (1-hr)	State and Federal	0	0	0	0	0
Carbon Monoxide (8-hr)	State and Federal	1	0	0	0	0
Sulfur Dioxide	State and Federal	0	0	0	0	0
Nitrogen Dioxide	State and Federal	0	0	0	0	0
Lead		**	**	**	**	**
Particulate Matter		**Particulate Matter Exceedances (yes/no)**				
		2003	**2004**	**2005**	**2006**	**2007**
Particulates (PM10)	Federal Annual Arithmetic Average (µ/m3)	yes	yes	yes	yes	no
	Federal 24-Hour	no	no	yes	no	no
	State Annual Arithmetic Average (µ/m3)	yes	yes	yes	yes	yes
	State 24-Hour	yes	yes	yes	yes	yes
Particulates (PM2.5)	Federal Annual Arithmetic Average (µ/m3)	yes	no	yes	no	no
	Federal 24-Hour	yes***	yes	yes	yes	yes
	State Annual Arithmetic Average (µ/m3)	yes	yes	yes	yes	yes

* State 8-Hour Standard adopted in 2006
** Data not available
*** High levels due to wildfires in 2003

Source: County of San Diego, Air Pollution Control District

Another significant problem is the large amount of pollution produced by mobile sources (cars, trucks and buses) that travel through the city, especially during peak traffic hours, and the constant year-round vehicle border crossing. The problem is compounded by the large number and poor condition of the vehicles traveling through the cities.

[13] County of San Diego, Air Pollution Control District http://wwww.sdapcd.org/index.html

Particles of less than 10 micrometers have an indirect effect on the respiratory system, because they absorb microbiological agents (virus, bacteria, pollen, etc.) on their surface and transport them to the lung. There are a numerous other area emission sources that may potentially occur in the area of concern including residential fuel combustion, waste disposal (refuse burning), fires (wild fires, prescribed burning, structural fires), agricultural production, wire reclamation, manure burning, and manufacturing industries.

3.2.2 Environmental Consequences for Air Quality

3.2.2.1 No Action Alternative 1

The No Action alternative would not directly, indirectly or cumulatively impact climate and/or air quality in the United States and Mexico. There would be no effect on air resources related to emissions, dust, and particulates produced by construction-related activities.

Inhabitants in the area of concern would still rely on latrines and open ditches to dispose of their wastewater; however, cumulatively, there is the possibility that during rainy season, raw sewage overflow, allowing the wastewater to reach the streets and public places, thus, increasing the risk of parasites and pathogenic microorganisms, spreading throughout the soil. This would allow for potential transmission by wind currents (airborne particulates/pollutants) within the area of concern.

Additionally, health hazards risk would increase for nearby residents, as is discussed further in this section.

3.2.2.2 Action Alternative 2 (Preferred Alternative)

Site preparation and construction activities would result in the emission of sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide, and particulate matter from equipment exhaust, and particulate matter from fugitive dust. These emissions would be generated from earthwork activities (i.e. grading, trenching/excavation, filling, etc.) and from major hauling operations, if necessary, to remove excavated material or to bring in supplies. Of particular potential concern would be nitrogen oxide emission, which are a precursor to ozone and are associated with diesel engine exhaust.

During construction, emissions would be produced on-site by earthmoving equipment and by vehicular traffic traveling throughout the construction site. The quantity of these emissions would also vary depending upon the types and level of activities occurring and the weather conditions. The fugitive dust emissions could potentially impact ambient PM10 concentrations and visibility in the immediate vicinity of excavations. Construction of these alternatives has the potential for temporary adverse impacts to air quality in the proposed project area in Tijuana and Playas de Rosarito. However, significant air quality degradation in US is unlikely since the proposed action would take place approximately 8-10 miles (12-16 km) south of the U.S./Mexico border, and noise, dust, and exhaust emissions would not be perceived in the U.S.

The quantity of these emissions would also vary depending upon the types and level of activities occurring and the weather conditions. These impacts would be minor and would be limited to the construction period. Standard dust suppression techniques such as watering of active construction areas, aggregate piles, and cleared areas would substantially minimize these potential air quality impacts.

3.2.2.3 Action Alternative 3

Site preparation and construction activities would result in the emission of sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide, and particulate matter from equipment exhaust, and particulate matter from fugitive dust. These emissions would be generated from earthwork activities (i.e. grading, trenching/excavation, filling, etc.) and from major hauling operations, if necessary, to remove excavated material or to bring in supplies. Of particular potential concern would be nitrogen oxide emission, which are a precursor to ozone and are associated with diesel engine exhaust.

During construction, emissions would be produced on-site by earthmoving equipment and by vehicular traffic traveling throughout the construction site. The quantity of these emissions would also vary depending upon the types and level of activities occurring and the weather conditions. The fugitive dust emissions could potentially impact ambient PM10 concentrations and visibility in the immediate vicinity of excavations. Construction of these alternatives has the potential for temporary adverse impacts to air quality in the proposed project area in Tijuana and Playas de Rosarito. However, significant air quality degradation in US is unlikely since the proposed action would take place approximately 8-10 miles (12-16 km) south of the U.S./Mexico border, and noise, dust, and exhaust emissions would not be perceived in the U.S.

The quantity of these emissions would also vary depending upon the types and level of activities occurring and the weather conditions. These impacts would be minor and would be limited to the construction period. Standard dust suppression techniques such as watering of active construction areas, aggregate piles, and cleared areas would substantially minimize these potential air quality impacts.

No significant impacts other than the fugitive dust and emissions produced during the construction stage would be anticipated; however, the sludge and wastewater may pose an odor problem if the sewage remains untreated for an extended period of time.

3.3 WATER RESOURCES

3.3.1 ENVIRONMENTAL SETTING

Surface waters

For many years, untreated wastewater originating in Tijuana, Mexico contaminated beaches in the United States on a continuous basis. Much of the city's wastewater drained, untreated, into the Tijuana River, where it flowed across the border, into the Tijuana Estuary, and onto the beach just south of Imperial Beach, CA. Currently, as a result of wastewater treatment facilities including the International Treatment Plant in San Ysidro, CA, and San Antonio de Los Buenos in Tijuana, nearly all dry-weather flows in the Tijuana River are captured, thereby avoiding the daily contamination of California beaches. However, during large storms, flows in the river exceed the treatment plants' capacities and contamination of California beaches occur.

The project covered by this EA, however, falls outside of the Tijuana River drainage basin, so this project has no effect on flows in the Tijuana River.

The drainage basin covered by this project does not cross into the U.S. The 48.2 km^2 watershed that covers this area drains into the Pacific Ocean through any of the intermittent rivers and canyons exiting in the area such as the Huahuatay, Reforma and Rosarito whose flows are intermittent and occur during rainy season. (See Figure 1 - 4 –water bodies in the area of concern in Playas de Rosarito).

The Huahuatay creek, located at 32° 21' N and 117° 00' W, runs east to west for 13 miles. Flows consist of agricultural drainage, stormwater, sewage from houses not connected to the sewer system, and treated effluent from the Rosarito I wastewater treatment plant. The stream empties into the Pacific Ocean 13.5 miles south of the international border. The Rosarito I WWTP discharges treated wastewater into this creek approximately 1.5 miles away from the coast. Stormwater runoff and untreated wastewater from the east part of the city also flow into this creek. The entire creek discharges out the ocean outfall.

The Rosarito creek, located at latitude 32° 19' N 117° 00' W, runs east to west for 15 miles and empties into the Pacific Ocean. Flows consist primarily of stormwater and agricultural drainage, since there are not many urban areas nearby. The river is located outside of the city limits however some housing area can be observed next to the river as it approximates to the coast shoreline.

The Reforma or "Arroyo Seco" creek, located at a 32° 22' N 117° 4' W, runs east to west for 8 miles and empties into the Pacific Ocean. Flows consist of stormwater and sewage from houses not connected to the sewer system. The creek also receives treated effluent from the Rosarito Norte WWTP about 200 meters from the shoreline. Stormwater runoff and untreated wastewater from the north part of the city flows to this creek.

Ocean water quality in the vicinity of the international border may be affected by surface runoff and by discharges from wastewater plants, and untreated wastewater released to local water bodies (Camp Dresser and McKee, 2006). The fate of point sources wastewater discharged into offshore waters is determined by oceanographic conditions and other events that impact horizontal and vertical mixing. Changes in current patterns, water temperatures, salinity, and density can affect the fate of the wastewater plume. These types of changes can also affect the distribution of turbidity (or contaminant) plumes that originate from various non-point sources.[14]

Southern California weather can generally be classified into wet (winter) and dry (spring-fall) seasons (NOAA/NWS 2008a), and differences between these seasons affect certain oceanographic conditions (e.g., water column stratification, current patterns and direction). Understanding patterns of change in such conditions is important in that they can affect the transport of distribution of wastewater, storm water, or other types of turbidity plumes that may arise from various point and non-point sources (e.g. ocean outfalls, storm drains, outflows from rivers and bays, surface runoff from coastal watersheds). Winter conditions typically prevail in southern California from December through February during which time higher wind, rain and wave activity often contribute to the formation of a well-mixed or relatively homogeneous (non-stratified) water column. The chance that the wastewater from any given ocean outfall may surface is highest during such times when there is little, if any, stratification of the water column. These conditions often extended into March as the frequency of winter storm decreases and the seasons begin to transition from wet to dry. In late March or April the increasing elevation of the sun and lengthening of days begin to warm surface waters, mixing conditions diminish with decreasing storm activity, and seasonal thermoclines and pycnoclines become re-established. Once the water column becomes stratified again by late spring, minimal mixing conditions typically remain throughout the summer and early fall months. In October or November, cooler temperatures associated with seasonal changes in isotherms, reduced solar input, along with increases in stormy weather, begin to cause the return of well-mixed or non-stratified water column conditions.[15]

The currents along the California coast are dominated by the offshore, southward-flowing California current. The California current system consists of (1) a broad southerly flowing surface and near surface current that flows at the edge of and beyond the continental shelf, (2) a northerly flowing undercurrent

[14] City of San Diego Ocean Monitoring Program
[15] City of San Diego Ocean Monitoring Program

that flows under the southerly current, and (3) northerly countercurrents at the surface and near-surface which flow near the coast (Recon 1994, U.S. Army Corps of Engineers, 1998, CDM 2008). The California current varies in position and intensity based on the season, shifting onshore during the spring and summer. The northward flowing countercurrent is found at a depth of 90 feet and flows from Baja California to northern California, bringing warm, high salinity Equatorial Pacific water. There is an equatorial coastal flow that occurs with the northerly undercurrent from early spring to fall caused by wind stresses. Once the wind stresses subside (September) a broad northward surface current called the Davidson current begins to develop approximately 62 miles offshore. The dynamics of the flows are influenced by the interactions of coastal currents within the California system and the seasonal upwelling events that bring cool, dense water to the surface (CDM 2003).

Modeling of the flow patterns found the principal pattern to be a relatively uniform long shore flow north and south along the coastline, and a recurring eddy with counterclockwise circulation south of Point Loma of varying intensity found anywhere from 6.2 to 9.3 miles (9.92 to 14.88 km) offshore and roughly 10.6 miles (16.96 km) alongshore (CH2M HILL, 1998).

Ocean water quality in the vicinity of the international border may be affected by surface runoff and by discharges from wastewater plants. A brief description of these treatment plants is provided below.

Groundwater

The Tijuana Groundwater Basin underlies the portion of the Tijuana River Valley that lies within California. The basin's southern boundary is the international border with Mexico. The eastern and northern boundaries are the contacts with semi-permeable Pleistocene and Pliocene marine deposits. The western boundary is the Pacific Ocean. The intermittent Tijuana River and several ponds are hydrologic surface features in the basin.

The water-bearing units in the basin are the San Diego Formation (SDCWA, 1997) and Quaternary age alluvium. The marine terraces can also be water bearing; however, these deposits are frequently above the regional groundwater surface.

Quaternary Alluvium - The most productive unit in the basin which consists of river and stream deposits of gravel, sand, silt, and clay. The thickness of the alluvium is less than 150 feet (Izbicki, 1985) and averages about 80 feet thick (SDCWA, 1997), wells yield as much as 2,000 gpm (gallons per minute), but the average yield is 1,000 gpm (SDCWA, 1997). Groundwater in this unit is unconfined, and the specific yield is about 15 percent (SDCWA, 1997). San Diego Formation – This unit consists of Pliocene age well-sorted, medium to coarse sand, silty and clayey sand, sandy silt, and sandy clay (Huntley and others 1996). Thickness of this unit ranges to at least 1,700 feet in the basin (Dudek and Associates 1994). Well yields average about 350 gpm with discharges as high as 1,000 gpm being recorded. Groundwater in the San Diego Formation is confined with a storage coefficient of about 0.001 (SDCWA 1997).

The aquifer in this area is unconfined and can potentially store up to 65,000 acre-feet of water. The aquifer rests atop a bedrock surface and, on the average, consists of 50 to 90 feet (15 to 27 meters) of sand and silt overlying 10 to 35 feet (3 to 11 meters) of interbedded layers of gravel and sand, which are tapped by production wells (MWWD, 1996). The primary source of aquifer recharge appears to be the Alamar River, which originates in the coastal San Ysidro Mountains and confluences with the Tijuana River. Other likely sources of recharge are winter rainfall (particularly on undeveloped land north of the border and in Alamar Valley), water line leakage in Tijuana, and discharge from surrounding sedimentary bedrock terraces. Recharge to the alluvial aquifer from the Tijuana River surface flow is more prominent in the U.S. than Mexico, since the Tijuana River is a concrete lined channel from the international border to Rodriguez reservoir. The primary aquifer discharge zone is the Pacific Ocean (USDOE, 2003).

Historically, groundwater consumption was related to potable water extraction for export and agricultural use. The high levels of pumping during the 1950s resulted in a lowering of groundwater levels of 23 to 30 feet (7 to 9 meters). By the 1960's, groundwater levels had dropped below sea level, allowing highly saline groundwater and seawater to flow into the water (Recon, 1994).

Several factors, including imported irrigation water, reduced pumping due to degraded groundwater quality, and the abandonment of farming activities have contributed to the decline in groundwater usage since 1952 (MWWD, 1996). This has allowed groundwater levels to recover to within 0 to 15 feet (0 to 4.5 meters) of the ground surface (CH2M HILL, 1998). There is currently no known extraction of groundwater from the Tijuana River basin in the U.S. for any purpose except limited agricultural use (MWWD, 1996). Groundwater extraction in the Tijuana River valley north of the international border was 1,500 acre-feet per year (DWR, 2006).

Currently, the quality of groundwater in the basin is characterized by high levels of total dissolved solids and sodium chloride, which prevents the use of groundwater for salt-sensitive crops. Water quality has been rated generally inferior for domestic use due to high sulfate and fluoride concentrations. In addition, it was rated inferior for irrigation purposes because of high electrical conductivity, high chloride levels, and a high percentage of sodium (Recon, 1994). Table 3-4 shows a summary of water quality data collected by the U.S. Department of Energy for the Groundwater Flow Model for the Tijuana River Basin Project.

Due to the location of the unserved areas, the Tijuana River Groundwater Basin will not be impacted.

3.3.2 Environmental Consequences for Water Resources

3.3.2.1 No Action Alternative 1

The No Action Alternative would result in the continued disposal of untreated wastewater to the environment, particularly to surface water courses near the unserved areas such as the Arroyo Reforma.

Areas in both cities would continue to operate cesspools and discharge to open ditches. Under the No-Action Alternative, these areas would continue to rely on existing wastewater disposal methods. Part of this untreated discharge would likely reach bodies of water or surface channels, creating potential public health and environmental problems.

A portion of this wastewater will reach the environment in coastal areas of Playas de Rosarito and the Pacific Ocean approximately 11.5 miles (18.5 km) south of the U.S./Mexico border with the potential to impact groundwater formations and the Pacific Ocean. Population growth without the construction of sewer lines in these areas will aggravate this problem.

Raw wastewater discharges to the ocean would increase concentrations of bacteria, biochemical oxygen demand (BOD), nutrients, toxic constituents, and metals in the areas of discharge. Combined with stormwater runoff, the raw wastewater could contribute to degradation of coastal water quality.

Indirect impacts to U.S. coastal waters could occur if ocean currents carry contaminants north past the international border. Ocean currents in this region typically experience a southward flow regime, although there are some exceptions in which the ocean currents flow northward or overall weak current conditions cause a plume to spread in both directions (Ocean Imaging, 2002). During these times, discharges from Playas de Rosarito may reach US waters; however, considering the distance to the border, natural attenuation and dilution, the potential incremental impact of the No Action Alternative on water resources and water quality in the US would not be significant.

Untreated wastewater discharges to the ocean would increase bacteria concentrations in the areas of discharge. As mentioned before, combined with stormwater runoff, the raw wastewater would cause degradation of coastal water quality near Playas de Rosarito. This would have a direct adverse impact to water quality in inland streams and coastal waters of Rosarito. It would have no impact on the water quality of the Tijuana River.

Untreated wastewater could negatively impact groundwater resources in the area.

3.3.2.2 Action Alternative 2 (Preferred Alternative)

The implementation of the proposed action would allow adequate wastewater collection and treatment instead of being directly disposed into the streets and water bodies that could eventually reach the Pacific Ocean. This would eliminate potential surface water and groundwater contamination by fecal coliform bacteria and other parasites commonly associated with the continued and increased use of open ditches and failing septic tanks for wastewater disposal and from infiltration.

It is estimated that 1.87 mgd (82 lps) of raw sewage from the unserved areas will be collected and treated in the Rosarito Norte WWTP, located approximately 12 miles south of the US/Mexico border, thus improving water quality in surface water streams and the ocean in the coastal areas of Playas de Rosarito.

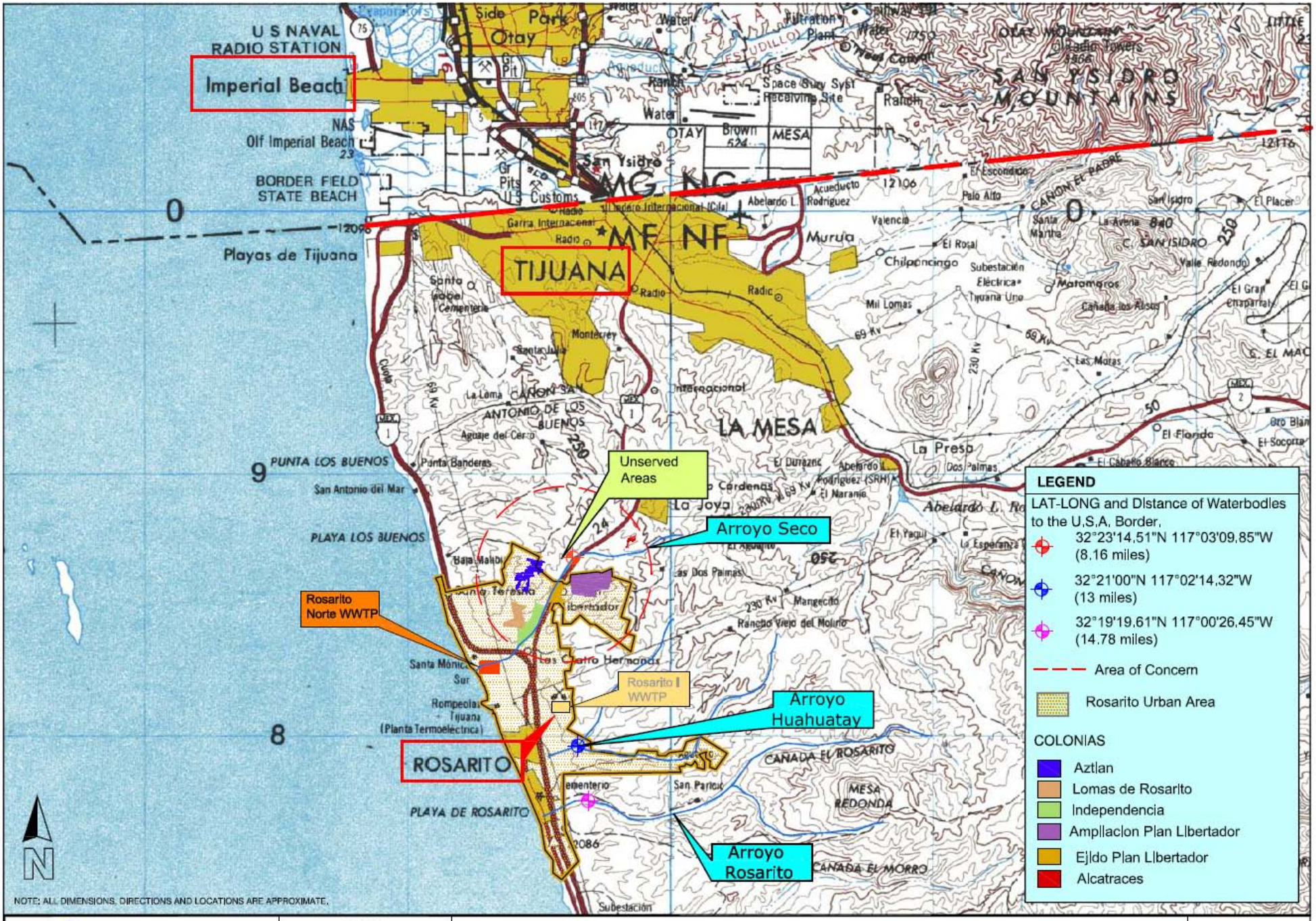
The increased flows would not pose any thread to the environment since, the WWTPs would discharge treated effluent in the ocean, in compliance with Mexican norms. The high quality of the treated effluent, combined with natural dilution of the effluent in the ocean water, would prevent any harm to U.S. coastal resources.

This alternative could also improve groundwater resources in Mexico by reducing the infiltration of raw wastewater into the groundwater basin. However, these beneficial effects to groundwater would not be realized in the U.S.

3.3.2.3 Alternative 3

Impact of the proposed alternative of the on-site septic tank construction would not significantly affect coastal areas of San Diego due to the distance of the project from the U.S.

Septic tank systems must be properly maintained; otherwise they provide a direct route for contaminants to enter aquifers below the surface as well as surface waters by means of overflowing events due to failure of septic tanks. Poorly maintained systems may contaminate shallow freshwater aquifers. With careful planning and responsible day-to-day operations and maintenance, on-site wastewater treatment systems should not threaten nearby waterbodies.



Ninyo & Moore	DATE 02/20/09	HYDROGRAPHY OF THE AREA OF CONCERN IN PLAYAS DE ROSARITO
BECC COCEF	PROJECT NO. 302 715 001	Proposed Expansion of the Wastewater Collection System to Unserved Areas in the Cities of Tijuana and Playas de Rosarito, Baja California

3.4 BIOLOGICAL RESOURCES

3.4.1 Environmental Setting

The U.S./Mexico border region supports a particularly high biodiversity of flora and fauna, including many endemic species that have evolved within the diverse physical and climatic conditions of the region (Stebbins and Major 1965; Raven 1988; Mittermeier, et al. 1999). Biological resources are organized into biological communities characterized of specific biophysical and climatic conditions. For example, lower elevations within the border region support coastal scrub and grassland communities whereas higher elevation areas support chaparral; conifer, oak, and cypress forests; and woodlands.
Willows and cottonwoods dominate coastal-draining stream systems where water is abundant, and sycamores and oaks populate dryer areas. Eastern draining streams and oases often support native palms. Community diversity in the border region is similarly high. For example, nearly a dozen different chaparral communities are distributed along different elevation and climate gradients and among different soil types. Many communities, such as vernal pools, are highly restricted in distribution and their species compositions are unique to the border region.[16]

The South Coast Eco-region, which encompasses part of the border region, is one of the most species-rich regions of the California Floristic Province (Stebbins and Major 1965; Raven 1995). This statistic is particularly notable because the California Floristic Province is recognized as one of the world's richest floristic regions (Mittermeier, et al. 1999). Within the California/Baja California border region, endemic plant species live in isolated habitats, such as vernal pools (e.g., Otay Mesa mint), peaks of metavolcanic and gabbro rock (e.g. Tecate cypress), and high elevation "islands" (e.g. Cuyamaca cypress). Many plant species are listed as threatened or endangered or are otherwise considered sensitive, primarily due to habitat loss and fragmentation from development (Flores Villela and Gerez 1994; Minnich and Franco Vizcaino 1998; Stephenson and Calcarone 1999).

Although levels of animal endemism are not as high as the levels of plant endemism, many resident and migratory wildlife species in the border region are listed as threatened or endangered or are otherwise considered sensitive. These species include invertebrates (e.g. Thornes's hairstreak, Quino checkerspot butterfly, and San Diego fairy shrimp), herpetofauna (e.g. arroyo southwestern toad, San Diego horned lizard, and San Diego pond turtle), birds (e.g. California gnatcatcher, coastal cactus wren, and least Bell's vireo), and mammals (e.g. bighorn sheep, mountain lion, and American badger). It is particularly difficult to sustain viable populations of mammalian species because they require large areas of unfragmented habitat.

In summary, the border region's high topographic, geologic, and climatic variations produce conditions that support the region's diverse unique flora and fauna. Many of these species are found nowhere else in the world and are threatened with extinction. The ecosystems that support these species were historically continuous across landscape. Today, however, the U.S. - Mexican border bisects these ecosystems. Without proactive efforts to develop a binational conservation network, they may be irretrievably isolated from each other.[17]

Natural habitats enclosed in the area of concern might be affected by construction activities; however, much of the local biological resources, especially on the south side of the border have been already disturbed, except for the Tijuana Estuary in southern California, where the Tijuana River meets the Pacific Ocean.

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[16]Designing And Establishing Conservation Areas In The Baja California-Southern California www.scerp.org/pubs/mono15.htm
[17]Designing And Establishing Conservation Areas In The Baja California-Southern California www.scerp.org/pubs/mono15.htm

The tidal flushing of the Tijuana Estuary maintains a variety of habitats, which in turn support a broad range of organisms. A listing of plant and animal species with state or federal listing as threatened or endangered is provided in Appendix A. The following provides an overview of habitats and describes the status of regionally significant resources:[18] [19]

3.4.2 Environmental Consequences for Biological Resources

3.4.2.1 No Action Alternative 1

The implementation of the No Action Alternative will not directly, indirectly, or cumulatively impact the transboundary flora, fauna and threatened and endangered species in the United States.

Untreated wastewater discharges to streams and the Pacific Ocean have the potential to adversely affect aquatic life in Mexico. Discharges from Rosarito would not usually reach coastal waters of the US because of the 22 km (13.5 miles) distance and the natural southward flow of currents in the Pacific Ocean. During times of northward current flow, discharges from Playas de Rosarito may reach US waters but would experience natural attenuation and dilution given the considerable distance to the border. Therefore, raw wastewater from Rosarito would not indirectly or directly affect coastal vegetation, wildlife, and fish.

Under the No Action Alternative, raw wastewater discharges would continue to affect streams and coastal areas in Mexico. Effects on migratory bird habitat in Playas de Rosarito would likely be minor as the project area is highly developed and offers little bird habitat.

3.4.2.2 Action Alternative 2 (Preferred Alternative)

The proposed Action Alternative will not directly, indirectly or cumulatively impact on flora, fauna and threatened and endangered species in the United States, because the proposed construction activities will be located 8-10 miles south of the U.S./Mexico border in already disturbed areas within the municipalities of Tijuana and Playas de Rosarito.

The primary effect of this action alternative would be the potential loss of any existing vegetation and wildlife habitat during construction an operation activities. Vegetation and wildlife communities in the project area would not be significantly affected by habitat loss because the expansion construction, conveyance and treatment systems would occur in areas that are previously disturbed.

Cumulatively, with the implementation of the Preferred Alternative in Tijuana and Playas de Rosarito, higher quantity of treated water will be released to local streams (Arroyo Reforma) and/or the ocean, (instead of raw wastewater); therefore, it is anticipated that positive effects would be observed in areas near the discharging points, contributing with the conservation of local vegetation, aquatic species, and migratory birds.

This could result in indirect benefits to biological resources in the coastal waters of the US. However, the proposed action would be 13 miles south from the US-Mexico border; therefore, potential indirect beneficial impacts that may be observed in the aquatic biological resources in the US would be marginal

[18] Tijuana Esturary http://trnerr.org/
[19] Tijuana River National Estuary Reaearch Reserve TRNERR Comprehensive Management Plan, 2007-2012 //trnerr.org/l

3.4.2.3 Action Alternative 3

The proposed Action Alternative will not directly, indirectly or cumulatively impact on flora, fauna and threatened and endangered species in the United States, because the proposed construction activities will be located 8 to 10 miles south of the U.S./Mexico border in already disturbed areas within the municipality of Tijuana and Playas de Rosarito.

The replacement of existing wastewater disposal units and the construction of new on-site septic tanks would occur at sites and properties that are currently in use, therefore, long-term and short-term direct/indirect impacts to wildlife communities with the implementation of the action alternatives would not be significant

3.5 CULTURAL RESOURCES

Four tribal groups make up the indigenous Indians of San Diego County; The Kumeyaay/Diegueño, the Luiseño, the Cupeño, and the Cahuilla. The Diegueño, which is the largest group, once encompassed the lands from northern San Diego to the dunes of the Imperial valley and south beyond Ensenada, Mexico.[20] In the U.S., close Kumeyaay reservations to the construction affected zone include Jamul, Sycuan, Campo, La Posta, Manzanita and Cuyapaipe. The Kumeyaay in Baja California, Mexico, are called Kumiai. Several Kumiai villages or communities exist, including San Jose de la Zorra, San Antonio Necua, La Huerta, and Juntas de Neji.[21] None of these reservations will be affected by any of the proposed alternatives.

3.5.1 Environmental Consequences for Cultural Resources

3.5.1.1 No Action Alternative 1

Implementation of the No Action Alternative will not directly nor indirectly affect transboundary historic and cultural resources in the United States or Mexico since construction alternatives related to the proposed action would not occur in this country.

3.5.1.2 Action Alternative 2 (Preferred Alternative)

The proposed project will be constructed and operated in Mexico and will not directly nor indirectly impact transboundary historic and cultural resources of the United States. The proposed projects are located 8-10 miles from the U.S. border. Construction and its associated activities, if the proposed action is implemented, will be executed in Playas de Rosarito and Tijuana, Baja California, Mexico.

Under the Preferred Alternative, the WWCS would be installed on already disturbed areas located within the Playas de Rosarito and Tijuana Municipality. In accordance with best management practices on behalf of the of the Instituto Nacional de Antropologia e Historia (INAH), if previously unidentified cultural resources are discovered during the project activities, the contractor will stop work immediately at that location.

The contractor will take all responsible steps to secure the preservation of those features, and notify the State of Baja California-INAH. If deemed necessary, INAH officials in Mexico City would evaluate the significance of the resources before any further construction activities.

[20] Campo Kumeyaay Nation http://www.campo-nsn.gov/index.html
[21] SDSU Library http://infodome.sdsu.edu/research/guides/calindians/insdcnty.shtml

3.5.1.3 Action Alternative 3

The proposed project will be constructed and operated in Mexico and will not directly nor indirectly impact transboundary historic and cultural resources of the United States. The proposed projects are located 18.8 miles from the U.S. border. Construction and its associated activities, if the proposed action is implemented, will be executed in Playas de Rosarito and Tijuana, Baja California, Mexico.

Under the Action Alternatives 3, construction of the on-site septic tanks will occur on already disturbed areas located within the Playas de Rosarito and Tijuana Municipalities. In accordance with best management practices on behalf of the of the Instituto Nacional de Antropologia e Historia (INAH), if previously unidentified cultural resources are discovered during the project activities, the contractor will stop work immediately at that location.

The contractor will take all responsible steps to secure the preservation of those features, and notify the State of Baja California-INAH. If deemed necessary, INAH officials in Mexico City would evaluate the significance of the resources before any further construction activities.

3.6 NOISE

3.6.1 Environmental Setting

The area of influence with respect to noise is limited to those areas in the US that are immediately adjacent to the international boundary. Due to the highly urbanized nature of Tijuana near the international border and the existing noise environment throughout much of the urbanized area immediately adjacent to the border within the US, the study area is characterized primarily by vehicular noise from car and truck travel, commercial aircraft noise from operations at the Tijuana Airport, and general urban activities. Local noise sources from within the area of influence include vehicular noise on Interstate 5 and local roads, aircraft operations associated with Brown Field and the Imperial Beach Naval Auxiliary Landing Field, and general urban activities within the more developed pockets along the border such as around the border crossing stations. Ambient noise levels are estimated to range from approximately 45 decibels A-weighted (dBA) in remote undeveloped areas to over 70 dB near freeways and highly urbanized areas.

Noise Standards

The City of San Diego established noise ordinances that regulate construction and operation noise levels on specific types of land uses. Although these noise ordinances do not apply to activities occurring outside of the US, they provide a reasonable basis for evaluating the significance of potential noise impacts associated with the proposed action. Ordinance 59.5.0404 states that construction noises may not exceed 75 decibels equivalent sound level (dB Leq) between 7:00 A.M. and 7:00 P.M. in residential areas. Operational noise levels (established in Ordinance 59.5.0401) vary by land use type, and are lower during the nighttime. Residential uses range from 45 dB Leq to 60 db Leq, commercial ranges from 60 dB Leq to 65 dB Leq, and industrial uses have a limit of 75 dB Leq (Recon, 1994).

Sensitive Noise Receptors

Sensitive noise receptors typically include residential development, schools, and hospitals. Under certain conditions, habitat areas can also be considered to be sensitive receptors, such as when noise levels exceed 60 dBA in nesting areas for least Bell's vireo (*Vireo bellii*) and California gnatcatcher(*Polioptila california*) during the respective breeding seasons. Federal regulatory guidelines establish the following breeding seasons for these two species: February 15 through August 30 for the least Bell's vireo, and April 10 through July 31 for the California gnatcatcher.

Residential subdivisions occur to the north of the Tijuana River between Dairy Mart Road and Interstate 5, as does a public school located southwest of the Interstate 5/Via de San Ysidro interchange. With the exception of areas immediately adjacent to Interstate 5, the area of influence east of Interstate 5 is generally undeveloped or is occupied by non-sensitive uses such as agricultural or industrial/business park development. Existing background noise levels within the area of concern in US are unlikely to be affected by the implementation of the proposed action. However, Playas de Rosarito, Baja California is more likely to be affected by the following sources: wind, traffic, occasional construction activities, and other common city noises.

3.6.2 Environmental Consequences for Noise

3.6.2.1 No Action Alternative 1

There would be no noise generation impacts because construction activities of the proposed action would not take place

3.6.2.2 Action Alternative 2 (Preferred Alternative)

The City of San Diego prohibits excessive and annoying noise levels within the city limits to prevent harm to health and welfare of citizens. The City's Noise Ordinance (San Diego Municipal Code, Section 56.5.01) defines noise and regulates it by type, land-use zone, and time of day. Events or actions may be prohibited if they cause a noise disturbance. Loud construction noise is permitted from 7 a.m. to 7 p.m., Monday through Saturday, but not on Sundays or legal holidays.

Noise levels at the proposed construction sites will be within regulated levels. Due to attenuation and the location of the project in Mexico over 8 miles away from the border, there will be no negative impacts on ambient noise levels in the United States. Therefore, this Action Alternative is not expected to generate transboundary noise impacts in the U.S.

The Preferred Alternative is not expected to impose significant long-term noise impacts on the proposed project area. Background noise levels may be elevated during construction activities associated with the proposed action. Construction noises tend to be short in duration and concentrated around the immediate work area. Construction-related noise would be mitigated using standard procedures such as specific weekday hours of operation and the use of mufflers on construction equipment.

3.6.2.3 Action Alternative 3

Noise levels at the proposed construction sites will be within regulated levels. Due to attenuation and the location of the project in Mexico over 18.8 miles away from the border, there will be no negative impacts on ambient noise levels in the United States. Therefore, this Action Alternative is not expected to generate transboundary noise impacts in the U.S.

Action Alternative 3 is not expected to impose significant long-term noise impacts on the proposed project area. Background noise levels may be elevated during construction activities associated with the proposed action. Construction noises tend to be short in duration and concentrated around the immediate work area. Construction-related noise would be mitigated using standard procedures such as specific weekday hours of operation and the use of mufflers on construction equipment. If Alternative 3 would be implemented, a significant part of all construction activities would take place in private residences.

3.7 SOCIOECONOMICS

3.7.1 Demographics

According to the "Economic Impacts of Wait Times at the San Diego – Baja California Border"(SANDAG, 2006) over 60 million people cross the San Diego County – Baja California border annually. Approximately half of these trips are for shopping and recreation, while approximately 10 million trips per year are made to and from work. In addition, 730,000 trucks cross this border annually from Mexico.

Given the high interrelationship between people in Tijuana and San Diego, public health issues on one side of the border may impact residents on the other side. Improving sanitary and environmental conditions and public health conditions in Tijuana would be beneficial to San Diego County.

Playas de Rosarito municipality consists of a territorial extension of 513.32 km2 (198.19 square miles) with 83,433 (CONEPO, 2008) inhabitants. There are 116 subdivisions in the Playas de Rosarito municipality, 113 of them rural communities with 8,560 inhabitants, the other three are urban cities with more than 2,500 people each, totaling 74,873 metropolitan residents.

In recent years, Playas de Rosarito has experienced the greatest growth percentage of all Baja California municipalities, with 4.91 percent growth in 2008.
The service industry represents the main economic activity for this region, having a great variety of tourism attraction for national and international visitors. Commerce is other important activity for Playas de Rosarito, generating a great number of employments and capturing a significant amount of foreign currency (U.S. dollars).

According to the CONEPO estimations, the inhabitants of Tijuana represent 50.01 percent of the total state population, with 1,941,204 people.[22]

The population of Tijuana municipality is distributed through 405 subdivisions, according to CONAPO (Consejo Nacional de Poblacion) estimations in 2008, 396 are rural communities representing only 1.47 percent of the population; the remaining 9 are urban locations containing 98.53 percent.

Recent information obtained from the CESPT which is, the "Indices de Gestión" (*Basic Utility Information Sheet*) document from December 2007, from 462,191 total households, 93% had access to drinking water and 81% had access to wastewater collection services.[23] It is assumed that this data includes Playas de Rosarito indicators since CESPT is administrating water and wastewater utilities services for both Cities/Municipalities.

3.7.2 Environmental Consequences for Socioeconomics

3.7.2.1 No Action Alternative 1

With the implementation of the No Action Alternative, the number of jobs and the total workforce in the area of concern would remain the same. The daily border crossing for tourism and commercial purposes would continue as usual. Therefore, no direct, indirect, or cumulative impact on the local economy in the study area would occur with the implementation of the No Action Alternative.

The No Action Alternative would not have any indirect impacts to recreation and tourism at US beaches because ocean currents tend to experience a southward flow regime and contaminants from the proposed

[22] CONEPO 2008 - CESPT Indices de Gestion, Diciembre 2007
[24] Pan American Health Organization, Health in the Americas, 2007 www.fep.paho.org/eng/Portals/US-MexicoBorderArea

areas sewage discharges would not reach US beaches. Therefore, visitation to beaches would not decline as a result of raw sewage discharges from the unserved areas.

With the No Action Alternative, the total workforce and living conditions of the local residents in Tijuana/Playas de Rosarito would remain about the same. Therefore, no direct, indirect or cumulative impact on the local employment or the economy would occur with this selection. Demand for housing and vacancy rates would not be expected to change with the implementation of the No Action Alternative.

3.7.2.2 Action Alternative 2 (Preferred Alternative)

Implementation of the proposed Action Alternative will not have direct, indirect or cumulative impact on the United States. An estimated 50 workers, mainly of Baja California residents, would be employed during construction. The influx of jobs to the Rosarito Area due to the implementation of the preferred Alternative, although relatively low compared with the total employed population in Tijuana and Playas Rosarito, may slightly impact the Imperial Beach (San Diego County) economy.

The number of jobs generated from the proposed projects would be minimal, and it is unlikely that a large number of workers and their families would relocate to the region as a result of the implementation of the proposed action. Therefore, the regional population would not be impacted. Improvements to the wastewater collection system may create a more desirable place to live, which could result in a slight increase in population, but this increase would likely be insignificant.

The implementation of the Preferred Alternative would have minor positive impact on the Tijuana and Playas de Rosarito economy. Under the implementation of the Preferred Alternative, the number of temporary jobs that the project would generate would be relatively low. It is speculated that the local labor is sufficient, and relocation of construction workers from other areas would not be required; consequently, the housing demand will remain unaffected.

3.7.2.3 Action Alternative 3

Implementation of the proposed Action Alternative 3 will not have direct, indirect or cumulative impact on the United States. An estimated 50 workers, mainly of Baja California residents, will be employed during construction. The influx of jobs to the Rosarito Area due to the implementation of the Action Alternative 3, although relatively low compared with the total employed population in Tijuana and Playas Rosarito, may slightly impact the Imperial Beach (San Diego County) economy.

The implementation of the proposed Action Alternative 3 would have minor positive impact on the Tijuana and Playas de Rosarito economy. Under the implementation of the Action Alternative 3, the number of temporary jobs that the project would generate would be relatively low. It is speculated that the local labor is sufficient, and relocation of construction workers from other areas would not be required; consequently, the housing demand will remain unaffected.

Cumulatively, the maintenance costs that would be incurred with implementation of Action Alternative 3 should be considered. Although the proper studies, surveys, permits and design specifications were met before and during the construction phase, there would be the need for the system maintenance, clean up, and periodic sludge pumping. The necessary personnel and resources from CESPT should be available to accomplish these tasks.

3.8 PUBLIC HEALTH

Environmental health issues are by far the most pressing problems in the border area, including poor air quality, water scarcity and contamination, lead contamination, and improper waste disposal to name a few. Water is the most precious resource in a large portion of the border that is primarily arid.[24]

The wastewater generated in the unserved areas of established housing is either untreated of inadequately treated. Most of the untreated wastewater seeps into the ground as a result of cesspools and discharges to open ditches.

The ever-growing population in the border region of Baja California, Mexico, and California, in the United States has dramatically increased the utilization of marine resources and the types and amounts of contaminants produced and released to streams, rivers and the Pacific Ocean waters. These contaminants stem from sewage discharges, land runoff, industrial disposal, agricultural waste, and petroleum waste among others. Sewage, particularly, if partially treated or untreated, brings high microbe concentrations into the ocean[25].

It is speculated that wastewater runoffs into the intermittent streams eventually reach the Pacific Ocean and diluted with ocean waters at the discharge point (Rosarito beach). Additionally, it is anticipated that these ocean waters containing certain waterborne pollutants move to the north through marine currents into the U.S. territory (Imperial Beach).

Although winds, ground, and surface water direction disperse odors and contaminants away from the area of concern, untreated wastewater has the potential to support a variety of microscopic and submicroscopic organisms and parasites, resulting in infectious and communicable diseases, many of which are potentially fatal.

Human diseases can be caused by waterborne pathogens that contact the skin or eyes; waterborne pathogens that are accidentally ingested when water is swallowed; or foodborne pathogens found in the tissues of fish and shellfish consumed as seafood. Beach pollution consequently is a persistent public health problem. Cumulatively, swimming advisories and beach closings are experienced because high levels of disease-causing microbes are found in the water. It is anticipated that untreated wastewater could be responsible for potential harmful microbial levels.[26]

Some common microorganisms found in domestic wastewater and the diseases associated with them are presented in Table 3-6.

Table 3-3. Infectious Agents Potentially Present in Untreated Domestic Wastewater

Organism	Disease Caused
Bacteria	
Escherichia coli (enterotoxigenic)	Gastroenteritis
Leptospira (spp.)	Leptospirosis

[24] Pan American Health Organization, Health in the Americas, 2007 www.fep.paho.org/eng/Portals/US-MexicoBorderArea
[25] Water Encyclopedia Ocean Pollution http://www.waterencyclopedia.com/Po-Re/Pollution-of-the-Ocean-by-Sewage
[26] Water Encyclopedia Ocean Pollution http://www.waterencyclopedia.com/po-re/pollution-of-the-ocean-by-sewage

Bacteria	**Disease Caused**
Salmonella typhi	Typhoid fever
Salmonella (=2,100 serotypes)	Salmonellosis
Shingella (4 spp.)	Shingellosis (bacillary dysentery)
Vibrio cholerae	Cholera
Protozoa	
Balantidium coli	Balantidiasis
Cryptosporidium parvum	Cryptosporidiosis
Entanoeba histolyca	Amebiasis (amoebic dysentery)
Giardia lamblia	Giardiasis
Helminths	
Ascaris lumbricoides	Ascariasis
Taenia solium	Taeniasis
Trichuris trichiura	Trichuriasis
Viruses	
Enteroviruses (72 types, e.g., polio, echo, and coxsackie viruses)	Gastroenteritis, heart anomalies, meningitis
Hepatitis A virus	Infectious hepatitis
Norwalk agent	Gastroenteritis
Rotavirus	Gastroenteritis

Source: EPA Municipal Technologies Fact Sheets.

People may become ill by drinking water contaminated with these organisms or parasites, by eating raw or undercooked food that have bee in contact with contaminated water, and by poor personal sanitation that allows the spread of diseases either directly or indirectly through inter-human contact. Current health concerns are associated with discharges of raw sewage in the Tijuana/Rosarito unserved areas, either from failing septic tanks or open cesspools.

Intestinal diseases that may be caused by coliform pathogens are the most common agent of disease worldwide. In rural areas of Mexico, where untreated wastewater is used for irrigation, different studies show that significant percentage of the population in those areas has intestinal diseases.

The potential risk to human health in the area of concern is exhibited by data that indicates residents from rural and semi-rural Mexican border communities were almost three times as likely to die from communicable diseases as residents of the United States border communities between 1990 and 1994, according to information from the Pan American Health Organization.

The close association between the population of the area of concern and the significant number of tourists traveling to Tijuana, Playas de Rosarito and other cities in Baja California is of certain concern. The potential communicable infectious diseases originating in untreated wastewater in Tijuana and Playas de Rosarito would not affect only the local residents but also potentially impact the continuous traffic of tourists in the area.

3.8.1 Environmental Consequences for Public Health

3.8.1.1 No Action Alternative 1

The health risk effect for waterborne disease in the area of concern would continue at current levels, or could increase with the implementation of the No Action Alternative. In the long-term, waterborne disease outbreaks could increase in the area of concern because of the expected increase in population and the lack of efficient wastewater control systems. Because the current available wastewater collection and/or disposal units does not support existing and future demands, implementation of the No Action Alternative could result in a potential long-term negative indirect impact to public health in the area of concern. Cumulatively, implementation of the No Action Alternative may adversely impact the health of U.S. residents.

Implementation of the No Action Alternative would result in a continuation of public health and safety concerns within the project area in Tijuana and Playas de Rosarito municipalities. Insufficient wastewater collection systems, adding the improper maintenance of septic tanks, and the continued use of cesspools would likely result in additional sewage overflow in the unserved areas of both Cities that might potentially reach the ocean through intermittent streams.

Other potential negative impacts to public health in the area of concern may increase during the rainy season, as the latrines and waste ditches may overflow. This would cause wastewater to reach streets and roads, potentially spreading bacteria and parasites. Cumulatively, implementation of the No Action Alternative may adversely impact public health, decreasing the quality of life among existing and future residents.

3.8.1.2 Action Alternative 2 (Preferred Alternative)

Impacts to public health are difficult to assess due to the lack of sufficient data to identify the initial source and vectors of the disease/illness. Untreated wastewater may support a variety of organisms and parasites responsible for potentially fatal infectious and communicable diseases. Impact to the transboundary populations from the waterborne communicable diseases resulting from exposure to contaminated water could be significantly reduced if the proposed action (Preferred Alternative) is implemented.

Implementation of the proposed project would likely decrease the health risk in the area of concern. Untreated wastewater supports a variety of organisms that can cause infectious diseases. Potentially contaminated surface water and groundwater resulting from the leakage and infiltration from failing septic tanks and cesspools would be alleviated with the construction of wastewater collection resources through the implementation of the preferred alternative.

3.8.1.3 Action Alternative 3

Impact to the transboundary populations from the waterborne communicable diseases resulting from exposure to contaminated water could be significantly reduced if the proposed action is implemented. However, with the implementation of SDG septic tank systems, periodic maintenance and monitoring would be needed; otherwise, surface and groundwater may get contaminated through infiltration and other possible septic tank failures.

With the implementation of Action Alternative 3, septic systems must be properly designed, constructed, and maintained, so they effectively reduce or eliminate most human health or environmental threats posed by pollutants in household wastewater. However, they would require regular maintenance or they might fail. Septic systems need to be monitored to ensure that they work properly throughout their service lives. The systems would need periodical pumping of generated sludge depending on how many people live in the house and the size of the system.

Implementation of proposed Alternative 3 for safe on-site treatment of wastewater would be preventing the spread of infection and disease and protecting water resources. Typical pollutants in household wastewater are nitrogen, phosphorus, and diseases causing bacteria and viruses. If a septic tank is working properly, it will effectively remove most of these pollutants.

Inadequately treated sewage from septic systems can be a cause of groundwater and surface water contamination. It poses significant threat to drinking water and human health because it can contaminate drinking water wells and cause diseases and infections in people and animals.[27]

3.9 CUMULATIVE IMPACTS

The combined, incremental effects of human activity, referred to as cumulative impacts, pose a threat to the environment. While they may be insignificant by themselves, these impacts accumulate over time, from one or more sources. The cumulative impacts of an action are the total effects on a resource, ecosystem, or human community of that action no matter what entity (federal, non-federal, or private) is taking the actions.[28] Because federal projects cause or are affected by cumulative impacts, they must be assessed in documents prepared under the National Environmental Policy Act.

3.9.1 Overview of Cumulative Impacts on the U.S./Mexico Border Areas

Urban populations along the border have increased significantly over the past 20 years, due in part to the maquiladora program begun in 1965, which provided economic incentives to foreign (mostly U.S.-owned) assembly plants located in the border region, and the North American Free Trade Agreement (NAFTA). Compared to other regions of Mexico, unemployment rate is low and wages are high along the Mexican border region. While economic growth has contributed to employment, the region's infrastructure has not kept up. As a result, natural resources are strained, and the environment and public health are adversely affected on both sides of the border.[29]

Rapid population growth has also led to increased demand for land, resulting in poorly planned development, greater demand for energy, amplified traffic congestion and waste generation, as well as overburdened or unavailable waste treatment and disposal facilities. Rural border communities are also confronted with illegal dumping, agricultural drainage, airborne dust and pesticides exposure, inadequate water supplies, insufficient or nonexistent waste facilities and degradation of natural resources and ecosystems.

Because of regional environmental degradation, many border residents suffer from environmental health problems, including waterborne and respiratory diseases. The elderly and children are especially at risk, as well as residents in rural communities, as they are more likely to have inadequate water supply and treatment systems.[30]

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[27] EPA Homeowner Guide to Septic Systems http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf
[28] Considerations of Cumulative Impacts in EPA Review of NEPA Documents www.epa.gov/compliance/resources/policies/nepa
[29] U.S. - Mexico Border 2012 Program http://www.epa.gov/usmexicoborder/framework/people.html#popgrowth

[30] U.S. - Mexico Border 2012 Program http://www.epa.gov/border2012/issues.html

3.9.2 Tijuana, Playas de Rosarito, and San Diego County

In order to prepare for the cumulative effects, the population growth of the areas of concern must be considered, including the temporary visitors during summer and vacation breaks, the present and developing industry, as well as commerce and tourism facilities. The current water supply and wastewater treatment capacity have to be compared to the projected growth of population. It is important to mention that water supply and treatment is not only limited by the availability of the natural resources, but also by the access to infrastructure. The projected increase of inhabitants of the area of concern will require a major supply of drinking water; therefore, wastewater generation will also increase.

Between 1995 and 2000, Tijuana observed an annual growth rate of 4.7 percent, while Playas de Rosarito grew at a rate of 7.2 percent. It is estimated that the dynamics of the population growth of Playas de Rosarito will resemble that of Tijuana in the future. (CDM 2003, Potable Water and Wastewater Master Plan for Tijuana and Playas de Rosarito: Executive Summary).

3.9.3 Effects of Alternatives on the Environment

Under the No Action Alternative, no improvements would be made to the current wastewater treatment systems; some communities would remain unserved, and population and wildlife would continue to be exposed to raw sewage and its health risks. Untreated water would reach streams, rivers, groundwater reserves, and potentially the Pacific Ocean, affecting nearby natural habitats, and increasing the amount of diseases. The U.S. population would also be affected by the daily border-crossing traffic of workers and visitors, increasing the risk of spread of disease on both sides of the border.

Depending on the Action Alternative to be implemented throughout the area of concern, there would be many positive, direct and indirect, impacts on the environment. These would include improvement of the quality of life for residents of Tijuana and Playas de Rosarito and neighboring communities. The construction and enhancements to the wastewater collection system within the area of concern would provide additional water treatment services to fulfill the increasing needs in Tijuana and Playas de Rosarito. Cumulatively, these projects would improve the quality of the water along waterbodies in Mexico and the U.S. such as the Arroyo Huahuatay and the Pacific Ocean. Biological resource conservation would also be improved by reducing untreated wastewater discharges, thus, improving the conditions of the nearby ecosystems and its local and migratory species.

Economy and health would also be improved throughout the region. The economy will be greatly improved by the influx of additional tourists that will be drawn by the improvement in the quality of water and decrease in the potential for waterborne diseases. The construction and improvement of wastewater collection systems would prevent the local communities and visitors from exposure to raw sewage and untreated wastewater, in addition, contamination of drinking water lines and wells would be avoided, resulting in a decreasing amount of people getting infectious diseases caused by waterborne parasites. The increase of health rates would positively affect the tourists and workers crossing the border, helping Baja California's economy to prosper, and making its municipalities more attractive to visit.

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5.0 ACRONYMS

ACHP	Advisory Council on Historic Preservation
AGI	Agricultural Irrigation
AGL	Agricultural and Livestock
AHPA	Archeological and Historic Preservation Act
ALK	Alkalinity
AID	Agency for International Development
a.m.	ante meridiem
A&W	Aquatic and Wildlife
A&We	Aquatic and Wildlife cold water
A&Ww	Aquatic and Wildlife warm water
AQCR	Air Quality Control Region
ARB	Air Resource Board
BCC	Birds of Conservation Concern
BECC	Border Environment Cooperation Commission
BEIF	Border Environment Infrastructure Fund
BMPs	Best Management Practices
BOD	Biological oxygen demand
C	Candidate
C^{O}	Degree Celsius
Ca	Calcium
CAA	Clean Air Act
CARB	California Air Resources Board
CDM	Camp Dresser & McKee Inc.
CEC	Commission for Environmental Cooperation
CEQ	Council on Environmental Quality
CESPT	Commisión Estatal de Servicios Públicos de Tijuana
CFU	Colony Forming Units
CFU/100ml	Colony Forming Units per 100 mililiters
CFR	Code of Federal Regulations
CG	Conventional Gravity
Cl	Chloride

CO	Carbon monoxide
COD	Chemical Oxygen Demand
CONEPO	Consejo Estatal de Poblacion
CONAGUA	Comision Nacional de Agua
CNA	Comision Nacional del Agua (National Water Commission)
CWA	Clean Water Act
CWS	Community Water Systems
dB	decibels
dB Leq	decibels equivalent sound level
dBA	decibels A-weighted
BOD^5	Biochemical Oxygen Demand
DFG	Department of Fish and Game
DO	Dissolved Oxygen
DWS	Domestic Water Source
E	Endangered
EA	Environmental Assessment
EAP	Economically Active Population
E. Coli	Escherichia coli
EID	Environmental Information Document
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FBC	Full Body Contact
Fe	Iron
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FNSI	Finding of No Significant Impact
FR	Federal Register
FSN	Fixed Station Network
FWCA	Fish and Wildlife Coordination Act
FWPCOA	Federal Water Pollution Control Act
gal/min	Gallon/minute
gmp	Gallons per minute

GIS	Geographic Information System
HR	Highly Restricted
HS	Hydrogen Sulfide
HC	Hydrocarbons Hr
IAQCR	Intrastate Air Quality Control Regions
IBC	International Boundary Commission
IBEP	Integrated Border Environmental Plan
INAH	Instituto Nacional de Antropologia
INE	Instituto Nacional de Ecologica
IBWC	International Boundary of Water Commission
in	inches
INEGI	Instituto Nacional de Estadistica Geografia e Informacion
K	Potassium
km	Kilometer
Km^2	Square Kilometers
L	Liter
lps	Liters per second
m	Meters
mm	millimeter
m^3	cubic meter
MBTA	Migratory Bird Treaty Act
MCL	Minimum Contamination Level
mg/l	Milligrams per liter
mgd	Million gallons per day
MIA	Manifestacion de Impacto Ambiental
ml	Milliliters
ml/1	Milliliters per liter
msl	Mean sea level
MSCP	Multiple Species Conservation Program
MWWD	Metropolitan Wastewater Department
Na	Sodium
NAAQS	National Ambient Air Quality Standards
NADBank	North American Development Bank
NAFTA	North American Free Trade Agreement

NBEP	Northern Border Environmental Program
NERR	National Estuarine Research Reserve
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
NOM	Norma Oficial Mexicana
NNS	No Numeric Data
NPS	National Park Service
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source performance standards
NTU	Nephelometric Turbidity Units
NWPCP	National Wetlands Priority Conservation Plan
O_3	Ozone
Pb	Lead
PBC	Partial Body Contact
PER	Preliminary Engineering Report
pg/m^3	Micrograms per cubic meter
pH	Measure of acidity
p.m.	post meridiem
PLC	Programmable logic controller
PM10	Particulate matter under 10 micorns
POTWs	Publicity Owned Treatment Works
ppm	Parts per million
PSD	Prevention of Significant Deterioration
PSI	Pollutant Standard Index
R.C.	Rio Colorado
SA	Salvage assessed
SDG	Small Diameter Gravity
SEMARNAT	Secretaria de Medio Ambiente y Recursos Naturales
SBIWTP	International Water Treatment Plant
SBOO	South Bay Ocean Outfall
SDAB	San Diego Air Basin

SDCWA	San Diego County Water Authority
SDSU	San Diego State University
SHPO	State Historic Preservation Officer
SNA	State Natural Area
SO_2	Sulfur Dioxide
SO_4	Sulfate
SPC	Species of concern
Sr	Strontium
SSC	Species of Special Concern
STAT	Statute
SWMU	Surface water monitoring units
TDS	Total Dissolved Solids
T	Threatened
TSP	Total Suspended Particles
TSS	Total Suspended Solids
U.S.	United States
USC	United States Code
USDOC	United States Department of Commerce
USDOE	United States Department of Energy
USFWS	US Fish and Wildlife Service
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UV	Ultraviolet
VOCs	Volatile organic compounds
XMS	Transmissivity
W	Water Alternatives
WA	Wilderness Act
WMA	Wildlife Management Area
WQA	Water Quality Act
WTP	Water Treatment Plant
WW	Wastewater
WWCS	Wastewater Collection System
WWTP	Wastewater Treatment Plants

6.0 APPENDIX A – WILDLIFE, THREATENED AND ENDANGERED SPECIES

6.1 WILDLIFE AND THREATENED AND ENDANGERED SPECIES

The origin of the fauna in Baja California is directly related to the climatic changes during the tertiary era, particularly during the glacial periods, causing modification in the distribution of the flora, therefore, the fauna distribution changed as well.

The Baja California Peninsula consists of five districts for the fauna, one of them located in Baja California Sur, and the other four in the Baja California State. The area of concern falls within the regions described below.

The San Pedro Martir District is formed by a stretch belt located through the Sierra de Juarez and San Pedro Martir, reaching the 1,200 meters over the sea level at the occidental size and 1,400 to 1,500 at the oriental size. It abuts the U.S. to the north. Some of the characteristic species of the area include: Baja California rattlesnake (Crotalus enyo), Western rattlesnake (Crotalus viridus), Peninsular Bighorn sheep (Ovis canadiensis cremnobates), mule deer (Odocoileus hemionus), red-tailed hawk (Buteo jamaicensis), cougar (Felix concolor) and gray fox (Urocyon cinereoargenteus).

The San Dieguense District is located in the Northwest part of the state, including a section of the South California area. This region reaches the 1,200 meters over sea level by the Sierra de Juarez and 1,400 meters on the San Pedro Martir area, going south up to the Rosario arroyo. Some of the common species in this district are coast horned lizard (Phrinosoma corohatum), pine snake (Pituophis melanoleucus) common teal (Anas crecca), northern pintail (Anas Acuta), American wigeon (Anas americana), northern shoveler (anas clypeata), cinnamon teal (Anas cyanoptera), blue winged teal (Anas discors), mallard (Anas platynhynchos), gadwall (Anas strepera), california quail (Lophortix california), white-winged dove (Zenaida asiática), mourning dove (Zenaida macroura), coyote (Canis latrans), San Quintin kangaroo rat (Dipodomys gravipes), and kangaroo rat (Dipodomys merriam).[31]

6.1.1 Invertebrates

Invertebrates, which include intertidal organisms such as aquatic insects, worms, clams, and crabs, and terrestrial insects and spiders, are likely major consumers in the salt marsh food chain and in turn are an important food source for the fishes and birds of the marsh (Zedler, 1982d).

Crabs are perhaps the most conspicuous invertebrates in southern California coastal salt marshes. This is also true of the Tijuana Estuary. Burrows of several species of crab occur throughout the lower marsh. Another common and relatively conspicuous inhabitant of the estuary's tidal channels is the horn snail. Many other invertebrate species are just as numerous but less obvious because of their size or location within the sediments. These include several species of clams and mud worms.

Continuing recent studies have helped characterize the benthic community at the Tijuana Estuary. The species composition and dominance change with the distance from the River's mouth. Captellid and spionid polycheates are found in both the estuary's northern and southern arms. Protothaca staminea and Tagelus californianus are the most common bivalves in the tidal channels (Williams et al 1996). California horn snail (Cerithidea californica) is abundant especially in the winter.

Relatively little research has been done on the terrestrial invertebrates of the estuary and their ecological role, except for the recent work on invasive Argentine ants. This non-native species forms extremely

[31] Baja California Government www.Baja California.Gob.Mx/Portal/Nuestro_Estado/Recursos/Fauna.Jsp

aggressive colonies, forcing out native ants and depleting the key food source of the horned lizard, which des not eat the Argentine ants. Installation of new irrigation lines has been blamed for Argentine ant invasion, as the ants require a year-round water source. In general, as in other salt marshes, most insects here probably feed on vascular plants, algae, and decaying plants, while others are carnivores. They serve as a food source for birds and other marsh vertebrates. Marsh insects are also important to the pollination of marsh flowering plants. The endangered salt marsh bird's beak, for example, is pollinated by native bees (Zedler, 1982d).

Rove beetles (Staphylinidae) burrow in mud and salt flats. They are abundant in the estuary and appear to play a role in aerating soils and in reversing soil compaction resulting from off-road vehicles. Studies suggest that the largest population of the wandering skipper (Panoquina errans) in the United States may be at the Tijuana Estuary (Zedler, 1982d). The estuary also supports a diverse and abundant population of coastal tiger beetles (Cicindela sp.), of which four species may be threatened (U.S. Fish and Wildlife Service, 1982). The Reserve is also a location for the globose dune beetle (Coelus globosus), a federal Category 2 species.

At least 11 species of salt marsh mosquitoes breed in the saline and brackish pools of the estuary (U.S. Fish and Wildlife Service, California Department of Parks and Recreation, and Department of the Navy, 1983). Three species (Aedes taeniorhynchus, Anopheles hermsi, and Culex tarsalis) are of particular concern because of their potential as pests and possible disease vectors. Currently, biochemical control methods are being used to combat larvae and adults in areas where there is a high concentration of these mosquitoes.

6.1.2 Fish

The small tidal creeks and channels of the estuary support a relatively diverse population of fish including at least 29 species representing 19 families (U.S. Department of Commerce and California Coastal Commission, 1981; U.S. Fish and Wildlife Service, 1982, Zedler et al. 1992). Since 1987, fish assemblages have been sampled in the estuary. Catches are often dominated by topsmelt (Atherinops affinis), longjaw mudsucker (Gillichthys mirabilis), arrow goby (Clevelandia ios), and California killifish (Fundulus parvipinnis). Adult striped mullet (Mugil cepalus) are also common. Abundance varies year to year, but total density tends to peak in the summer and declines in the winter.

The tidal channels have been shown to function as a nursery for commercially important fish, such as the California halibut. Nordby (1982) found abundant eggs of the croaker family, topsmelt, and northern anchovy. Hence, the estuary appears to be providing nursery habitat for marine fishes; therefore, it may be important for sport and commercial fisheries. Game fish such as kelp and sand bass (Paralabrax spp.), opaleye (Girella nigricans), and white croaker (Genyonemus lineatus) have also been found in the estuary (U.S. Department of Commerce and California Coastal Commission, 1981).

6.1.3 Reptiles and Amphibians

The habitats within the Reserve support at least 29 species of reptiles and amphibians (Espinoza 1991, USGS 2001). These include the San Diego horned lizard (Phrynosoma coronatum blainvillei), and the Coronado skink (Eumeces skiltonianus interparietalis). Both are species of special concern.

California kingsnakes (Lampropeltis getulus californiae) and San Diego gopher snakes (Pituophis melanoleucus annectens) are common in transitional habitats, but are also found in the drier areas of the salt marsh. Side blotched lizards (Uta stansburiana) are abundant on the dry ground of the reconstructed

dunes and other sandy areas. Dunes are also home to the San Diego horned lizard and silvery legless lizard (Annielia pulchra pulchra).

Riparian area and freshwater ponds are home to the California toad (Bufo boreas halophilus) and the Pacific tree frog (Hyla regilla). Coastal sage scrub is habitat for the San Diego alligator lizard (Gerrhonotus multicarinatus webbi) and the Great Basin fence lizard (Sceloporus occidentalis biseriatus).

Management of reptiles and amphibians focuses on protecting the remaining open space in the Reserve and restricting horse, vehicle, and foot traffic to designated areas. The maintenance of the few freshwater ponds is important to life cycles of the amphibians (Espinoza 1991).

6.1.4 Birds

Southern California's bird populations have been an important factor in the special protective status attributed to the Tijuana Estuary. Over 370 bird species are reported for the area. Birds use the side array of habitats present in the lower and upper estuary, including the ocean beach and dunes, mudflats, mudbanks, salt marshes, and riparian areas.

Six federally listed threatened or endangered birds occur regularly in the Reserve: the light-footed clapper rail (Rallus longirostris levipes), the California least tern (Sternulae antillarum), least Bell's vireo (Vireo belli pusillus), the California gnatcatcher, the western snowy plover (Charadrius alexandrinus nivosus), and the California brown pelican (Pelecanus occidentalis californicus). Belding's sparrow (Passerculus sandwichensis beldingi) is listed as endangered in the State of California. Other regionally or locally rare species include the elegant tern (Sterna elegans), black skimmer (Rynchops niger), and northern harrier (Circus cyaneus). The light-footed clapper rail (Rallus longirostris levipes), California least tern (Sterna antillarum browni), western snowy plover (Charadrius alexandrinus nivosus), least Bell's vireo (Vireo bellii pusillus), and Belding's Savannah Sparrow (Passerculus sandwichensis beldingi) nest in the estuary.

The decline of the light-footed clapper rail population in southern California is associated with the encroachment and destruction of coastal salt marshes. Recent censuses indicate that the entire U.S. population of this subspecies may be as low as 325. In recent years, 80-90 pairs were recorded at the Tijuana Estuary, making it the second largest population of this endangered species in the United States.

A total of 305 California least tern pairs were reported in the Reserve for 2006, with 57-80 chicks fledged. Fences and temporary enclosures have been built to protect the nesting areas. However, nests and fledglings are vulnerable to vehicle, horse, and foot traffic on the beach. Tern reproduction can be severely impacted by predation from an array of predator species.

A small number of western snowy plover also nest in the river mouth areas and dunes from mid-March to mid-September. Peak nesting occurs from April through June. A total of 16 nests were attempted in 2006 with about five chicks fledged. Nest success, formerly reduced by trampling by undocumented immigrant traffic, is now limited by avian predators, such as gull-billed terns (Sterna nilotica vanrossemi), and extremely rare federally listed species.

Belding's Savannah sparrow uses the higher salt marsh habitats, particularly pickleweek communities, for nesting. Nesting occurs anywhere from March to August (Masey, 1979). In 2006, 169 Belding's savannah sparrow territories were found in the Oneonta Lagoon section north of the River, and 105 were found south, although the extreme southern portion of the wetland below the beach trail were not surveyed. The long breeding season of this species, coupled with its sensitivity to disturbance, requires that human activities in the upper marsh be restricted for most of the year to avoid further declines in the population (Zedler, 1982b).

Least Bell's vireo nests in the riparian vegetation adjacent to intermittent streams and channels of the Tijuana River. Willow thickets are the main territorial sites both in the southern and eastern portions of the Reserve. A 2004 survey found there were approximately 300 pairs of least Bell's vireo in the Valley, with nine pairs in Goat Canyon.

The Tijuana River Estuary is located along the Pacific Flyway and is used for migration and wintering habitat for a variety of waterfowl and shorebirds. Wintering waterfowl include pintail (Anas acuta), cinnamon teal (Anas cyanoptera), American widgeon (Anas americana), surf scoter (Melanitta perspicillat), and ruddy duck (Oxyura jamaicensis). Reserve wetlands are important habitats for a large number of shorebirds (shorebirds account for the majority of the migratory bird population).While about 20 species occur regularly along the sand flats and mudflats of the estuary, four species – willet (Catoptrophorus semipalmatus), dowitcher (Limnodromus spp.), western sandpiper (Calidris mauri), and marbled godwit (Limosa fedoa) – account for most of the shorebird population throughout the year (Boland, 1981).
Abundance and species composition fluctuate seasonally. Intertidal sand and mudflats support the largest numbers of individuals and species.

6.1.5 Mammals

In Southern California, the estuary supports a mammal population typical of fields and lowland habitats. Rodents, including mice, the California ground squirrel, and rabbits are most common, providing an important food source for the raptor population of the upper estuary. Coyotes, raccoons, bobcats, striped skunks, and long-tailed weasel are present in the Reserve (Taylor & Tiszler, 1989). The San Diego black-tailed jackrabbit, a California species of special concern, inhabits the southern portion of the Reserve.

7.0 APPENDIX B- REGULATORY DRIVERS AND GUIDANCE

The purpose of this appendix is to summarize international agreements and U.S. and Mexican environmental protection regulations applicable to this EA.

International Agreements

The BECC BEIF Environmental Assessment Guidelines identify and describe the following five major bilateral agreements between Mexico and the U.S. related to environmental protection:

- The 1889 International Boundary Convention
- The Water Treaty of 1944
- The 1983 La Paz Agreement (or Border Environmental Agreement)
- The 1992 Integrated Border Environmental Plan (IBEP)
- The 1994 North American Free Trade Agreement (NAFTA)

"The 1889 International Boundary Convention established the International Boundary Commission (IBC). The Water Treaty of 1944 replaced the IBC with the International Boundary and Water Commission (IBWC) and granted the U.S. Section of the IBWC enhanced authority to address water quality, conservation, and use issues within the U.S. All international border and water treaties with respect to Mexico are coordinated through the IBWC. "

"The IBWC was created by the governments of the U.S. and Mexico to apply the provisions of various border and water treaties and settle differences arising from such applications through a joint international commission. IBWC coordinates the exchange of information between the U.S. and Mexico for all program activities that involve watersheds or aquifers crossing into Mexico. The IBWC jurisdiction extends along the U.S./Mexico International Border, and inland into both countries where international border and water projects may exist. The IBWC has encouraged and coordinated the establishment of cooperative relationships with federal, state, and local agencies, both in the U.S. and Mexico, in carrying out its border projects and activities."

The 1944 Treaty also specifies the way in which water rights of the Rio Grande, from Fort Quitman in Texas to the Gulf of Mexico, are allotted. In summary, the Treaty states that all of the water reaching the Rio Grande from the San Juan and Alamo Rivers belongs to Mexico, as wells as two thirds of the flow from the Conchos, San Diego, San Rodrigo, Escondido, and Salado rivers and Las Vacas Arroyo. Flows not-allotted by the treaty are equally owned by both countries.

The "Agreement for the Protection and Improvement of the Environment in the Border Area", known as La Paz Agreement, was signed in 1983. The main objective of the Agreement is to protect, improve, and conserve the environment of the border area. The La Paz Agreement defines the border region as the area lying 100 km (62 miles) to the north and south of the U.S./Mexico International Border. In 1992, the IBEP was released, and building on this, the Border XXI Program increased the scope of concern to include environmental health and natural resources issues.

"As part of NAFTA, a bilateral agreement was signed to address the deficiencies in water and wastewater infrastructure in the border area. A second environmental agreement negotiated to augment NAFTA is the

1994 U.S./Mexico Agreement Concerning the Establishment of a BECC and a NADB (BECC-NADB Agreement). The BECC-NADB Agreement targets certain environmental problems in the border region to remedy international border environmental or health problems. The BEIF was created by NADB and EPA to make environmental infrastructure projects affordable for communities throughout the U.S./Mexico border region by combining grant funds with loans or guaranties for projects that would otherwise be financially unfeasible."

U.S. National Environmental Policy Act of 1969

NEPA was passed in 1969 "to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment." NEPA requires all federal agencies to prepare Environmental Information Documents (EIDs), EAs and/or Environmental Impact Statements (EISs) to assess environmental impacts from project alternatives.

The purpose of NEPA is "to declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality."

According to NEPA, it is the continuing responsibility of the federal government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate federal plans, functions, programs, and resources.

NEPA, as amended in 1970, requires federal agencies to: (a) utilize a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment; (b) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by Title II of this Act, which will ensure that presently un-quantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations; (c) include in every recommendation a detailed statement on the environmental impact of the Proposed Action; any adverse environmental effects which cannot be avoided should the proposal be implemented; alternatives to the Proposed Action; the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and; any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented.

U.S. Air Regulations

The Clean Air Act (CAA) was enacted in 1970 to address air pollution at the federal level. The CAA requires the EPA administration to set national ambient air quality standards and emission standards. Furthermore, the act established auto emission standards. Prior to the passage of the CAA, regulations for air quality control were defined and enforced at the state level. The CAA still allows states to have more stringent standards than those required by the federal government.

The CAA was amended in 1977. The amendment relaxed auto emission standards, and established provisions for the deterioration of areas. The CAA was further amended in 1990. The 1990 Clean Air Act provides for interstate commissions on air pollution control, which are to develop regional strategies for

cleaning up air pollution. The 1990 Clean Air Act includes other provisions to reduce interstate air pollution. The CAA also acknowledges that air pollution moves across national borders, and the law addresses pollution that originates in the U.S. and reaches Canada and Mexico.

The 1990 CAA Amendment also created the framework for the creation of a permit program for large point sources of air contaminants. The CAA requires federal actions to conform to any state implementation plan approved or promulgated under Section 110 of the Act. For EPA actions, the applicable conformity requirements specified in 40 CFR Part 51, Subpart W; 40 CFR Part 93, Subpart B; and the applicable state implementation plan must be met. Under the Federal Rule on General Conformity, 40 CFR Part 93, a conformity determination is required only when emissions occur in a non-attainment area. Much of the work necessary to carry out the Clean Air Act is delegated to the states.

Mexican Air Regulations

Two air quality regulations and two noise regulations relevant to this EA have been incorporated into the *Normas Oficiales Mexicanas,* or Mexican Official Regulations:

- *Límites Máximos Permisibles de Emisiones para Vehículos con Gasolina,* or Maximum Permissible Emission Limits for Vehicles Using Gasoline (NOM-041-SEMARNAT-1999)
- *Límites Máximos Permisibles de Emisiones para Vehículos con Diesel,* or Maximum Permissible Emission Limits for Vehicles Using Diesel (NOM-045-SEMARNAT-1996)
- *Límites Máximos Permisibles de Emisión de Ruido de Vehículos Automotores,* or Maximum Permissible Emission Limits for Noise from Motor Vehicles (NOM-080-SEMARNAT-1994)
- *Emisiones de Ruido de Fuentes Fijas,* or Noise Emissions from Fixed Sources (NOM-081-SEMARNAT-1994)

U.S. Water Quality Regulations

The Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into the waters of the U.S. It gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA also continued requirements to set water quality standards for contaminants of concern in surface waters. The Act made it unlawful for any person to discharge a pollutant from a point source into navigable waters, unless a permit was obtained under its provisions. It also funded the construction of sewage treatment plants under the construction grants program and recognized the need for planning to address the critical problems posed by non-point source pollution.

Mexican Water Quality Regulations

There are five water quality regulations relevant to this EA in the *Normas Oficiales Mexicanas,* or Mexican Official Regulations:

- *Limites Máximos Permisibles de Contaminantes en las Descargas de Aguas Residuales en Aguas y Bienes Nacionales,* or Maximum Permissible Limits of Contaminants in Wastewater Discharges into National Waters and Natural Resources (NOM-001-SEMARNAT-1996)

- *Límites Máximos Permisibles de Contaminantes Para las Aguas Residuales Tratadas que se Reusen en Servicios al Público,* or Maximum Permissible Limits of Contaminants for Treated Wastewaters that are Reused in Services to the Public (NOM-003-SEMARNAT-1997)

- *Límites Permisibles de Calidad y Tratamiento a que Debe Someterse el Agua Para su Potabilización,* or Permissible Quality and Treatment Limits for Potable Water (NOM-127-SSA1-1994)

- *Vigilancia y Evaluación del Control de Calidad del Agua Para Uso y Consumo Humano Distribuida por Sistemas de Abastecimiento Público,* or Monitoring and Evaluation of Quality Control of Water for Human Use and Consumption through Public Supply Systems (NOM-179-SSA1-1998)

- *Requisitos Sanitarios que Deben Cumplir los Sistemas de Abastecimiento de Agua para Uso y Consumo Humano Públicos y Privados,* or Sanitary Requirements to Which Public and Private Water Supply Systems for Human Use and Consumption Must Comply (NOM-012-SSA1-1993)

U.S. Biological Resource Regulations

The Endangered Species Act (ESA), 16 USC 1536 *et seq*., protects threatened and endangered plants and animals and their habitats. The U.S. Fish and Wildlife Service (USFWS) of the Department of the Interior implement the ESA at a national level. California Department of Fish and Game (DFG) implements the California ESA. DFG maintains a list of special status species within the state.

The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

In the context of this study, the ESA must be observed for any potential impacts to terrestrial habitat in the U.S. resulting from construction activities, as well as impacts to aquatic habitat resulting from changes in water quality.

Mexican Biological Resource Regulations

The *Norma Oficial Mexicana,* or Mexican Official Regulation having to do with protection of species is NOM-059-SEMARNAT-2001. The regulation includes a list of native Mexican species, and their status as either endangered, threatened, afforded special protection, or likely to be extinct. Of the 569 amphibians, birds, fungi, invertebrates, mammals, fish, plants, and reptiles listed, 104 are endangered, 164 are threatened, 10 are considered probably extinct, and the rest are afforded special protection.

Federal Cross-Cutting Laws and Regulations

This EA addresses the following laws within its scope as well.

National Natural Landmarks - The Secretary of the Interior is authorized to designate areas as National Natural Landmarks for listing on the National Registry of Natural Landmarks pursuant to the Historic Act of 1935, 16 U.S. Code (USC) 461 et seq. In conducting the environmental review of the Proposed Action, EPA is required to consider the existence and location of natural landmarks, using information provided by the National Park Service (NPS) pursuant to 36 CFR 62.6(d). The Tijuana River Estuary is a National Natural Landmark.

Cultural Resources Data - The Archeological and Historic Preservation Act (AHPA) of 1974, 16 USC 469 et seq. provides for the preservation of cultural resources if an EPA activity may cause irreparable loss or destruction of significant scientific, prehistoric, or archeological data. In accordance with the AHPA, the responsible official or the Secretary of the Interior is authorized to undertake data recovery and preservation activities.

Cultural Resources - The *National Historic Preservation Act* (NHPA), as amended, 16 SC. 470, directs federal agencies to integrate historic preservation into all activities which either directly or indirectly involving land use decisions. The NHPA is administered by the NPS, the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and each federal agency. Implementing regulations include 36 CFR Part 800: *Regulations of the Advisory Council on Historic Preservation Governing the NHPA Section 106 Review Process*. Section 106 of the NHPA requires federal agencies to take into consideration the impact that an action may have on historic properties which are included on, or are eligible for inclusion on, the National Register of Historic Places. The Section 106 review process is usually carried out as part of a formal consultation with the SHPO, the ACHP, and other parties, such as Indian tribes, that have knowledge of, or a particular interest in, historic resources in the area of the undertaking.

Wetlands Protection - EO 11990, "Protection of Wetlands" of 1977, requires federal agencies conducting certain activities to avoid, to the extent possible, adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands, if a practicable alternative exists. Discharge of dredge or fill material into wetlands and other waters of the U.S. are also regulated under Section 404 of the Clean Water Act.

Floodplain Management - EO 11988, "Floodplain Management" of 1977, requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, any adverse effects associated with the direct and indirect development of a floodplain.

Coastal Zone Management Act - The Coastal Zone Management Act, 16 USC 1451 *et seq.*, requires that federal agencies in coastal areas be consistent with approved State Coastal Zone Management Programs, to the maximum extent possible. If an EPA action may affect a coastal zone area, the responsible official is required to assess the impact of the action on the coastal zone.

Fish and Wildlife Protection - The Fish and Wildlife Coordination Act, 16 USC 661 *et seq*., requires federal agencies involved in actions that will result in the control or structural modification of any natural stream or body of water for any purpose, to take action to protect the fish and wildlife resources that may be affected by the action.

Wilderness Protection - The Wilderness Act, 16 USC 1131 *et seq*., establishes a system of National Wilderness Areas. The act establishes a policy for protecting this system by generally prohibiting motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport. Otay Mountain Wilderness, designated in 1999, is the nearest wilderness site to the study area.

Environmental Justice - EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and the accompanying presidential memorandum, advise federal agencies to identify and address, whenever feasible, disproportionately high and adverse human health or environmental effects on minority communities and/or low-income communities.

8.0 AGENCIES AND PERSONS CONTACTED

Agency	Agency Contact	Summary of Comments
State Historic Preservation Office (SHPO)	Milford Donaldson	No comments provided
Coastal Commission	Sherilyn Sarb	No comments provided
US Fish and Wildlife Services (USFWS)	Ren Lohoefener	No comments provided