1.0 BACKGROUND

1.1 Introduction

The United States Environmental Protection Agency (EPA) administers funds for water and wastewater infrastructure projects within 100 kilometers of the international boundary between the U.S. and Mexico. Funds were appropriated to EPA under the Omnibus Consolidated Rescissions and Appropriations Act (OCRAA) of 1996, Public Law 104-134. The OCRAA funds are known as the Border Environmental Infrastructure Fund (BEIF). The City of Tecate, Baja California, Mexico is seeking funds from the BEIF to implement the proposed project.

EPA policy for border funds requires certification by the Border Environment Cooperation Commission (BECC) as a condition for grant award. As part of BECC certification, the proposed projects must comply with (1) Mexican environmental regulations and (2) the National Environmental Policy Act (NEPA). The EPA requires compliance with NEPA before BEIF funds can be authorized. The project under consideration for funding consists of the improvements to the water and wastewater systems in the City of Tecate, Baja California, Mexico.

In order to consider the environmental impacts to Mexico of the proposed action, a *Manifestación de Impacto Ambiental* (MIA) was prepared to comply with Mexican environmental review regulations. The MIA was developed in two parts, one for potable water projects and one for wastewater projects. The MIA was prepared by the Comisión Estatal de Servicios Públicos de Tecate (CESPTe) and submitted to the State *Dirección General de Ecología* for review and approval in October 1999. The MIA was approved by such agency on November 26, 1999. CESPTe is the project applicants for the proposed project.

This Environmental Assessment (EA) is an addendum to the MIA, which was completed for the project under Mexican regulations. The EA analyzes the transboundary environmental impacts of the project on the U.S., as required under the National Environmental Policy Act (NEPA).

1.2 Environmental Assessment Process

The lead agency for the preparation and review of the EA is the U.S. Environmental Protection Agency (EPA). The EPA's National Environmental Policy Act (NEPA) regulations are established in 40 CFR Part 6 for environmental impacts to the U.S. from projects located in the U.S. or Mexico (USEPA 1997a). The EPA also follows the Council of Environmental Quality (CEQ) regulations found in 40 CFR Parts 1500-1508. Finally, EPA is also guided by the U.S. Agency for International Development (AID) regulations when issuing environmental assessments for environmental review of projects in Mexico. These regulations are summarized in 22 CFR 216.1-216.10.

This EA presents the environmental impacts to the U.S. of the proposed federal action of providing grant funds for a project in Mexico. In developing this document, all appropriate agencies were consulted to identify potential transboundary impacts associated with the proposed action.

Transboundary impacts to the U.S. are included in this EA to satisfy AID regulations pertaining to environmental analysis outside the U.S.

1.3 Purpose and Need For Proposed Action

The City of Tecate is located in the State of Baja California, approximately 40 km east of Tijuana. To the north of the city lies the community of Tecate, California. Currently, the population of Tecate, Baja California, Mexico is estimated to be 67,006 with an expected population in 2020 of 246,738. The proposed action will expand the coverage of the water and wastewater systems to nearly 100 percent of the population of Tecate. Currently, approximately 92 percent of the population has access to the City's water supply system and 84 percent has access to the City's sewer system.

The purpose of the proposed action is to improve the water and wastewater systems of the City of Tecate, Baja California by providing service to areas that lack service and by rehabilitating existing infrastructure. The implementation of this action will result in: 1) reduction in soil and surface and groundwater pollution arising from the use of latrines, septic systems and open ditches by project

area residents not currently connected to the wastewater collection system; 2) adequate water supply

and wastewater infrastructure to meet current and projected demands; 3) a reduction in soil and surface and groundwater pollution arising from wastewater collection pipelines in poor or overloaded conditions; and 4) an improvement to the quality of the Tecate River by improving the quality of effluent discharged from the City of Tecate, Baja California's Wastewater Treatment Plant. Achieving these results will translate into an improvement to human health conditions for area residents, as well as an improvement to the environment.

Under the proposed action, EPA intends to authorize the use of Border Environmental Infrastructure Funds (BEIF) administered by the North American Development Bank (NADB) for the City of Tecate, Baja California. These funds will be used to finance a portion of the proposed action.

1.4 Scope of EA

This document focuses on a project proposed for construction in Tecate, Baja California, Mexico and its potential environmental impacts to the United States. The following general topics are included in the scope of this EA:

- Project Description
- Climate and Air Quality;
- Geology and Soils;
- Water Resources;
- Vegetation and Wetlands;
- Wildlife and Threatened and Endangered Species;
- Historic and Archeological Resources;
- Land Use and Infrastructure;
- Population and Economics; and
- Cumulative Effects.

The Mexican MIA was used in part for the preparation of this document, especially the sections related to the description of the environmental setting and the expected environmental impacts in Mexico.

In preparing an EA, EPA examines various federal cross-cutting laws and Executive Orders (EO) in accordance with 40 CFR 6.300. These laws and EOs are described below:

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). No natural landmarks listed on the National Registry of Natural Landmarks are located within the project area.

Historical, Architectural, Archeological, and Cultural Sites - If an EPA action affects any property with historic, architectural, archeological, or cultural value that is listed on or eligible for listing on the National Register of Historic Places, the responsible official is required to comply with the procedures for consultation and comment promulgated by the Advisory Council on Historic Preservation (ACHP) in compliance with Section 106 USC 470, and EO 11593. No historic, architectural, archeological, or cultural sites are located within the project area or stand to be impacted by the proposed action in the project area.

Historic, Prehistoric, and Archeological 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. The State Historic Preservation Office in California has determined that no significant data exist within the U.S. side of the project area.

Wetland 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 regulated under Section 404 of the Clean Water Act. No wetlands in the U.S. will be filled or otherwise impacted by this project.

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. The proposed action does not alter the direct or indirect development of a floodplain.

Important Farmlands - EPA Policy to Protect Environmentally Significant Agricultural Lands requires EPA to consider the protection of the nation's significant/important agricultural lands from irreversible conversion to uses that result in their loss as an environmental or essential food production resource. Moreover, the Farmland Protection Policy Act (FPPA), 7 USC 4201 *et seq.*, and the U.S. Department of Agriculture's (USDA) implementing procedures require federal agencies to evaluate the adverse effects of their actions on prime and unique farmland, including farmland of statewide and local importance. The project does not involve conversion or, or otherwise affect, prime, unique, or important farmland within the U.S.

Coastal Zone Management Act - The Coastal Zone Management Act (CZMA), 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. The proposed action will not affect a U.S. coastal zone area.

Coastal Barrier Resources Act - The Coastal Barrier Resources Act (CBRA), 16 USC 3501 *et seq*., generally prohibits new federal expenditures and financial assistance for development within the Coastal Barrier Resources System (CBRS) and therefore protects ecologically sensitive U.S. coastal barriers. This project does not affect any barrier islands.

Wild and Scenic Rivers - The Wild and Scenic Rivers Act (WSRA), 16 USC 271 *et seq*., establishes requirements applicable to water resource projects affecting wild, scenic, or recreational rivers within the National Wild and Scenic Rivers System, as well as rivers designated on the National Rivers Inventory. No designated wild and scenic rivers occur within the U.S. side of the project area.

Fish and Wildlife Protection - The Fish and Wildlife Coordination Act (FWCA), 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. No U.S. streams or water bodies will be modified by this project.

Endangered Species Protection - The Endangered Species Act (ESA), 16 USC 1536 *et seq*., prohibits agencies from jeopardizing threatened or endangered species or adversely modifying habitats essential to their survival. Discussion of threatened and endangered species is included in Section 3.0 of this document.

Wilderness Protection - The Wilderness Act (WA), 16 USC 1131 *et seq*., establishes a system of National Wilderness Areas. The WA establishes a policy for protecting this system by generally prohibiting motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport. No U.S. wilderness areas occur within the project area.

Air Quality - The Clean Air Act (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. Although San Diego County is a non-attainment area for ozone and particulate matter, air quality will not be impacted, since construction and operational emissions will occur in Mexico.

Environmental Justice – EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," 1994, and accompanying Presidential memorandum, advise federal agencies to identify and address, whenever feasible, disproportionately high and

adverse human or environmental effects on minority communities and/or low –income communities. Because the proposed action serves to enhance human and environmental conditions in the Tecate, Baja California, Mexico, interests of environmental justice are served by this project.

2.0 Project Description and Alternatives

2.1 Current Conditions

2.1.1 Drinking Water Supply

Data from 1997 identifies the main water source for the City of Tecate, Baja California comes from 22 wells with a total production of 160 lps. Treated water from El Carrizo Dam and a bypass to La Nopalera Water Treatment Plant, provides an additional 30.59 lps. Approximately 92 percent of the population of Tecate (5,360) is connected to the water supply system, while the remaining 8 percent relies on municipal or private delivery trucks and on-site storage. Municipal water trucks deliver water at no cost, while private trucks charge up to 180 pesos by cubic meter. Water storage in residences can be inadequate, as water storage drums often lack appropriate covers.

In areas of the City where the water distribution system exists, portions of the system are in poor condition, especially in the older areas. Modifications to the City's drinking water chlorination system are also required.

According to reports generated by Comisión Estatal de Servicios Públicos de Tecate (CESPTe), the physicochemical quality of the drinking water supplied to the City of Tecate complies with the Norma Oficial Mexicana NOM-127SSAI-1994, which establishes the standards for drinking water. However, one of the sampled wells showed a count of 27 MPN/100 ml of total coliform and 25 MPN/100 ml of fecal coliform. Such result indicates a probable infiltration of raw wastewater either from a broken sewer line or from a septic tank, cesspool, or privy. The proposed improvements to the wastewater system will reduce the risk of contamination of water sources.

2.1.2 Wastewater Collection and Treatment

The City of Tecate's wastewater collection and treatment system services 84 percent of the City's population of 56,285 inhabitants. There are 119 km of primary sewer system and two pumping stations. In areas where both water supply and wastewater collection services are present, it is estimated that only 75 percent of the water provided reaches the sewer system due to deficiencies in the collection system.

Approximately, 10,720 residents of Tecate are not connected to the sewer system. These residents dispose of their wastewater through latrines and open ditches. Given the relatively hilly landscape of Tecate, any uncontrolled flows of raw sewage can make its way to the Tecate River, which runs across the City and eventually into the United States. Currently, uncontrolled raw sewage flows are contaminating Tecate River creating a health threat to residents. Additionally, the contamination of

the Tecate River reduces its water quality impacting natural resources on both sides of the border.

Currently, the City of Tecate's Wastewater Treatment Plant has the capacity to treat an average flow of 200 liters per second (lps). The Tecate Wastewater Treatment Plant has two treatment trains of 100 lps each. The treatment process includes the following:

- Three Screens
- Three grit separator channels
- One Imhoff tank (operating as a primary sedimentation tank)
- One primary sedimentation tank
- Two trickling filters (rock media)
- Two secondary sedimentation tanks
- Disinfection process with chlorine (gas)
- One contact tank for disinfection
- One sludge digester tank
- Two sludge thickeners
- Four sludge drying beds

The Tecate Wastewater Treatment Plant has mechanical and unit capacity deficiencies. Furthermore, it is suspected that the presence of toxic contaminants in the wastewater inhibits the biological process and affects the quality of the sludge generated in the Tecate Wastewater Treatment Plant.

CESPTe carried out a sampling program of the Tecate Wastewater Treatment Plant's influent on January 10, 11, and 12; February 7, 8, and 9; and March 7, 8, and 9, 1999.

Table 2-1: WWTP Influent Quality

Parameter	Observed Maximum Conc.	Observed minimum Conc.	Observed Average Conc.	Threshold inhibitory level for Trickling Filters*	
				Avg. Conc.	Max. Conc.
Cyanide (mg/l)	5.82	0.005	0.75	0.34	0.5
Copper (mg/l)	0.925	0.0557	0.23	0.05	0.48
Nickel (mg/l)	2.601	0.143	0.91	0.25	0.5

**Source: "Pretratamiento de Aguas Residuales para Funcionarios Mexicanos," Manual de Referencia, U.S. Environmental Protection Agency, Office of Wastewater Enforcement and Compliance.*

As shown above, three pollutants were detected above the standard threshold inhibitory level for trickling filters. Additional sampling date identified the following results:

Table 2-2: WWTP Influent Quality (Additional Data)

Parameter	Maximum	Minimum	Average
BOD_5 (mg/l)	260	128	188

COD (mg/l)	605	129	437
TSS (mg/l)	302	97	176
Oils and grease (mg/l)	82	28	46
Detergents	14	3	11
Fecal coliform (MPN/100 ml)	2.40E+10	2.40E+06	1.13E+10

The wastewater treated (effluent) at the Tecate Wastewater Treatment Plant on January 10, 11, and 12; February 7, 8, and 9; and March 7, 8, and 9, 1999. Based upon discharged standards mandated by Mexico's *Condiciones Particulares de Descarga* (Specific Discharge Standards), Table 2-3 illustrates that the Tecate Wastewater Treatment Plant exceeds many of the parameters tested.

Table 2-3: Comparison of WWTP Effluent Quality and Discharge Limits

Parameter	Maximum	Minimum	Average	Discharge Limit	
				Daily	Instant.
BOD_5 (mg/l)	99	63	80	30	45
COD (mg/l)	287	91	227	100	140
TSS (mg/l)	66	38	46	30	40
Oils and grease (mg/l)	36	9	18	-	20
Detergents (mg/l)	11		8	5	8
Fecal coliforms (MPN/100 ml)	2.40E+10	2.10E+05	5.19E+09	1,000	1,000

The expansion of the wastewater system to areas of the City without service will increase the volume of the wastewater collected and treated by approximately 29 lps. It is important to note, however, that although the Tecate Wastewater Treatment Plant will discharge this additional 29 lps into the Tecate River, the flow of the river itself will not be increased by that amount. Currently, there are continuous uncontrolled flows of raw sewage into Tecate River. The additional infrastructure proposed as part of this project will improve the conditions in the river by collecting and treating the uncontrolled flows of raw sewage.

The proposed project will not significantly affect the capacity of the river diversion structure located downstream in the Tijuana River. The river diversion structure, located at the international border and referred to as PB-CILA, has a capacity to convey 1,500 lps of dry-weather flow from the Tijuana River to the South Bay International Wastewater Treatment Plant in the U.S. Flow monitoring records indicate that dry-weather flows are well below the capacity of the diversion structure (i.e. 1,500 lps).

The sludge produced in the Tecate Wastewater Treatment Plant was also tested. The analyzed parameters were Corrosivity, Reactivity, Explosivity, Flammability, Toxicity, as well as a Biological Infectious test. The results of the test showed that the sludge is toxic due to concentrations of nickel above the Maximum Allowable Limit (*Norma Oficial Mexicana* NOM-052-ECOL-1993). Although other pollutants such as arsenic and lead were detected, their concentration was not above the Maximum Allowable Limit. The sludge is currently being stored at the Tecate Wastewater Treatment Plant.

2.1.3 Quality Of Receiving Waters

CESPTe carried out a sampling of different points of the Tecate River downstream of the Tecate Wastewater Treatment Plant's discharge on November 25, 1999. The location of the sampling points and the results of the sampling are shown as follows:

Table 2-4: Water Quality of Tecate River

Parameter	Sampling site							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PH	7.9	8.5	8.6	8.6	8.3	8	7.9	7.7
Dissolved Oxygen (mg/l)	0	0	0	0	0	0.1	0.3	0.8
BOD_5 (mg/l)	176	236	225	210	152	125	105	65
COD (mg/l)	569	980	820	685	590	542	436	236
TSS (mg/l)	120	250	232	225	146	126	109	92

- Sample 1, taken at 0.5 km from WWTP discharge (Puente Rincon Tecate).
- Sample 2, taken at 1.0 km from WWTP discharge (Puente La Puerta).
- Sample 3, taken at 1.5 km from WWTP discharge (Rancho Hoyos).
- Sample 4, taken at 2.0 km from WWTP discharge (before crossing into USA).
- Sample 5, taken after crossing back into Mexico.
- Sample 6, taken at 0.5 km after crossing into Mexico.
- Sample 7, taken at 0.5 km before Valle Redondo.
- Sample 8, taken at Valle Redondo.

In addition, the International Boundary and Water Commission (IBWC) conducted sampling in the Tecate River in 1992. Samples were taken at a point within the U.S., before the river crosses back into Mexico. The results of the sampling show a high concentration of total and fecal coliform, as detailed in the table below:

Table 2-5: Results of Sampling in the Tecate River Conducted by IBWC in 1992

Date	BOD_5 (mg/l)	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
03/06/92	141	54E+06	2.2E+06
06/02/92	216		
08/12/92	156		
09/01/92	139		
11/05/92	181	54E+06	3.5E+06
12/02/92	216	16E+07	11E+06

It is evident from the results of the sampling programs conducted in 1992 and 1999, that the quality of the Tecate River is poor from both an environmental and a human health standpoint. Fecal coliform in the river are an indication of the presence of other enteric organisms, which poses a threat on both sides of the border to residents and to other species and their habitat. High levels of BOD indicate that dissolved oxygen concentrations in the river are depleted, significantly impacting aquatic life. The implementation of the proposed wastewater collection and treatment projects will reduce the

contamination to the river.

2.2. Description of Alternatives (Including Proposed Action)

The project area is located in the urban area of the municipality of Tecate, Baja California. The City is located in a mountainous portion of Baja California, approximately 4,000 feet above sea level. A more detailed description of the geographic setting of the area is presented in Section 3.0. The project area also includes a 3.8-mile stretch of Tecate River, which travels through the U.S. before converging with the Alamar and Tijuana Rivers in Mexico.

2.2.1. Proposed Action

The proposed action includes the following tasks to improve the existing water distribution system, and wastewater collection and treatment system:

- Improvements to the water system including the replacement, relocation, and installation of water meters; rehabilitation of distribution lines in poor condition; construction of water distribution systems in unserviced areas; installation of chlorination equipment; and construction of storage facilities.

- The improvements to the wastewater system consist of installing approximately 32,600 m (107,000 ft) of new wastewater collection lines and 424 manholes. The project also entails improvements to the Tecate Wastewater Treatment Plant and acquisition of operation/maintenance machinery and equipment.

It is important to point out that the proposed improvements are part of a 3-year capital improvements program for the period of 1999-2001. The Comisión Estatal de Servicios Públicos de Tecate (CESPTe) has to date implemented those projects programmed for 1999, utilizing exclusively Mexican Federal and State funds. Thus, the 1999 projects are not being considered for BECC certification, and Border Environmental Infrastructure Funds (BEIF) are not being pursued for their implementation.

The proposed water supply projects (i.e. 2000 and 2001) are summarized in Table 2-6 through 2-7:

Table 2-6: Description of the Potable Water Projects for the Year 2000

PROJECT NUMBER **	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED
17	Relacement of the Distribution Systems in the Downtown Area	794 m of distribution lines; 30 m of 4", and 764 m of 6".	1,635
18	Meter Replacement	2,030 ½"Ø meters that are in poor condition.	6,500
19	Meter Relocation	1,700 ½"Ø meters.	7,310
20	Meter Installation	750 ½"Ø meters	3,716

PROJECT NUMBER **	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED
21	Construction of Distribution System in the Colonias Colosio	4,735 m of PVC distrubution lines (3,923 m of 4" Ø and 812 m of 8" Ø).	3,315
22	Construction of the Distribution System at the Fundadores Subdivision	5,522 m of PVC C-900 distribution lines.	1,776
23	Construction of Distribution System at Colonia Valle Verde	1,379 m of 4" Ø PVC lines.	288
24	Construction of Distribution System for Colonia Lombardo Toledano	1,203 m of 4" Ø PVC lines	430
25	Construction of Distribution System at the Escudero Subdivision	2,889 m of 4" Ø PVC and 914 m 6" Ø conveyance line	1,440
26	Replacement of the Pumping Equipment at the 'Centro Urbano' Tank	Replacement of the pumping equipment at the 'Centro Urbano'	2,500
27	Construction of the Distribution System at Colonia Granjas Garzón	2,281 m will be constructed	348
28	Construction of the Distribution System at Colonia Maclovio Herrera	2,413 m in length and will be constructed of 4" Ø PVC pipe.	1,350

** Project numbers are based on the nomenclature utilized in the BECC Step II document

Table 2-7: Description of the Water Projects for the Year 2001

PROJECT NUMBER	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED
38	Meter Replacement	1,500 ½" Ø meters	6,519
39	Meter Relocation	1,516 ½" Ø meters	6,450
40	Meter Installation	750 ½" Ø meters	3,225
41	Replacement of ' Callejón Madero' distribution lines	885 m of lines with 4" Ø PVC lines.	279
42	Construction of a Water Recovery Tank at La Nopalera	Construction of a 250 m^3 concrete tank. 220 m 6" Ø and 8" Ø PVC recirculation line.	64,000
43	Construction of the Garzón Regulating Tank	The capacity of the reinforced concrete tank will be 500 m^3	5,000
44	Construction of the Conveyance Line and Lift Station at Granjas Garzón	The line will be 2,062 m in length and will be constructed of 6" Ø PVC pipe.	5,000

Tables 2-8 and 2-9 summarize the proposed project for the Tecate's wastewater treatment system:

Table 2-8: Description of the Sewage Projects for the Year 2000

PROJECT NUMBER	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED

PROJECT NUMBER	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED
29	Construction of the Maclovio Herrera Subcollector and Lift Station	1,484 m of 8" Ø PVC. A lift station with two 15 HP centrifuge pumps.	1,703
30	Construction of the 'Aeropuerto II' collector	3,670 m collector, 31 manholes.	20,990
31	Construction of the wastewater collection system in Colonia 'La Viñita'	523 m of 8" Ø line, 7 manholes.	121
32	Construction of the Colonia Santa Fe wastewater collection system	1,106 m of 8" Ø PVC pipe, 23 manholes.	340
33	Construction of a wastewater collection system in colonias Rincón Tecate II & III	2,682 m of 8" Ø PVC pipe, 18 manholes.	2,038
34	Construction of the wastewater collection system in the Township of San José	1,156 m of 8" Ø PVC, 18 manholes.	250
35	Construction of a wastewater collection system in Colonia Maclovio Herrera	2,976 m of 8" Ø PVC pipe, 42 manholes.	1,350
36	Aquisition of Operation/Maintenance Machinery and Equipment	Acquisition of 1 cutting and welding machine, a 1 ton capacity pick up truck, 2 pick up trucks, 1 pump and an engine with a 4" baling, 1 compacting machine, 1 compressor, and 1 backhoe.	65,000
37	Improvements to the Wastewater Treatment Plant	Improvements will focus on the following unit processes: screens, influent lift station, primary sediment distributing station, trickling filters, secondary settlers, chlorine contact tank, sludge removal pump station, sludge digestor, and band filter.	65,000

Table 2-11: Description of Sewage Projects for the Year 2001

PROJECT NUMBER	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED
45	Construction of the 'Descanso" collector, Stage III	2,047 m of line and 29 manholes.	1,635
46	Construction of the '1o. de Mayo' Collector	607 m of 12" Ø collector, 13 manholes.	11,820
47	Construction of the 'Norte' Collector	931 m long 18" Ø collector, 13 manholes.	41,631
48	Construction of the Colonia Colosio wastewater collection system	4,555 m of 8" Ø PVC pipe, 69 manholes, and 144 m of 6" Ø conveyance line.	3,315

PROJECT NUMBER	NAME	DESCRIPTION	NUMBER OF RESIDENTS IMPACTED
49	Construction of wastewater collection system in Colonia Valle Verde	1,180 m of 8" Ø PVC, 21 manholes.	288
50	Construction of wastewater collection system in Colonia Lombardo Toledano	354 m of 8" Ø PVC pipe, 7 manholes. 1,006 m 4" in diameter forcemain with a lift station with two 13HP pumps.	430
51	Construction of the wastewater collection system at the Escudero Subdivision	2,489 m of 8" Ø PVC pipe, 38 manholes.	1,440
52	Construction of a wastewater collection system at the Fundadores Subdivision	4,133 m of 8" Ø PVC pipe, 68 manholes.	1,776
53	Construction of a wastewater collection system at Colonia Granjas	1,572 m of 8" Ø PVC pipe, 27 manholes.	890
54	Acquisition of Operation/Maintenance Machinery and Equipment	Acquistion of an AquaTech suction equipment; a crane, and a backtruck.	65,000

2.2.1.1 Population Estimates

In determining the appropriate infrastructure capacity needs for the proposed project, population estimates for the City were calculated based on the following data:

- Data from the 1990 National Census done by the Instituto Nacional de Estadística, Geografía e Informática (INEGI), using the growth rates obtained by INEGI for the periods 1990-2000, 2000-2010, and 2010-2015.

- Data from the City of Tecate Master Plan, which uses data from the Comisión Estatal de Servicios Públicos de Tecate (CESPTe) and the Comisión Federal de Electricidad (CFE). Both agencies consider the number of domestic connections. The average number of inhabitants per household applied were 4.3. Applying these criteria, the estimated population for 1999 were 67,006 inhabitants.

- Data using the growth rates from INEGI for the period 1990-2000; the growth rates obtained by the study "Baja California Hacia la Competitividad," for the period 2000-2010; and growthrates used by the "Programa de las 100 Ciudades," for the period 2010-2018.

- Data obtained using traditional methods such as arithmetic, geometric, last decade growth rate, Malthus, and exponential.

The following are the population projections for water and wastewater infrastructure needs for the City of Tecate:

Table 2-10: Population Estimates

YEAR	POPULATION ESTIMATES
1998	66,164
1999	68,811
2000	71,563
2005	87,067
2010	105,931
2015	128,881
2020	156,804

2.2.1.2 Design Capacity

The design capacity for the proposed project was calculated based on the following information:

Table 2-11: Design Capacity

Potable Water Coverage	92%
Active Residential Connections	14,306
Average water supply (including losses)	258 lpd (liter per person per day)
Sewerage Coverage	84%
Wastewater production (75% of total potable water supply)	233 lpd
Wastewater minimum flow	65 lps (liter per second)
Wastewater medium flow	129 lps
Wastewater maximum instantaneous flow	290 lps

Calculations based on a population projection of 68,811.

The projections for population and water demand expected are detailed in the following table:

Table 2-12: Projections for Population and Water Demand

Concept	Year				
	2000	**2005**	**2010**	**2015**	**2020**
Population projection	71,563	87,067	105,931	128,881	156,804
Water demand (lps)*	214	235	286	348	423
Wastewater Flows (lps)**	128	155	189	230	279

** Includes water losses through leakage*
***Assumes 75% of total supply (excluding water losses) is converted into wastewater.*

The City of Tecate's Wastewater Treatment Plant has sufficient capacity to treat flows from the City through approximately the year 2010. It is expected that the proposed improvements to the WWTP, such as replacing the rock media in the trickling filters with synthetic material, may expand the plant's capacity through increased efficiency. It is important to point out that, upon implementation of the proposed improvements, a facility plan for wastewater treatment will be developed by CESPTe to insure adequate future capacity.

2.2.1.3 Industrial Pretreatment Program

The purpose of an industrial pretreatment program or source control program is to control the toxic pollutants in the wastewater influent. CESPTe is currently in the process of implementing an industrial pretreatment program. To date, CESPTe has developed a "Program for the Control of Discharges," which includes an inventory of all industries in the area. CESPTe is also working with the *Dirección General de Ecología* (State Department of Ecology) to further develop the program.

With the development of this program, the quality of the effluent and sludge should be improved through the reduction of heavy metals and other substances currently found in the wastewater. Additional testing of the sludge will also be conducted to ensure it meets Mexican regulation criteria for disposal in landfills.

2.2.1.4 Proposed Project Compliance With Other Plans Or Programs

The proposed project complies with the following plans and programs:

- Master Plan for the Improvement of the Water, Sewer and Sanitation Services for the City of Tecate, Baja California;
- Tecate Hydraulic Master Plan;
- Municipal Program of Urban Development for the Community of Tecate, Baja California;
- State of Baja California Development Plan; and
- Integral Environmental Program for the Northern Border.

2.2 Alternatives Considered

2.3.1 Alternatives for the Water Distribution and Wastewater Collection Systems

The three alternatives under consideration in this EA are as follows:

- Alternative 1 - No Action: EPA does not fund the project.
- Alternative 2 - EPA funds the project sponsored by BECC.
- Alternative 3 - EPA funds other alternatives not recommended by BECC.

2.2.2 Alternative 1 – No Action

If EPA does not fund the proposed project, the current situation will continue since it is unlikely the project will be constructed without the support of EPA funds. The No-Action Alternative implies that there will be no improvements or expansion of the potable water and wastewater collection systems. This selection was deemed not recommendable, since it would not address the human health an environmental issues that drive the project.

The expansion of the water distribution system is necessary to provide adequate quantities and quality of drinking water. As previously indicated, there are approximately 5,360 people in Tecate that do

not have access to the municipal water system. These residents rely on water trucks that deliver water supplies. Drinking water is usually stored in drums that were not designed for this purpose and which often lacks adequate covers. Furthermore, contamination of these drums with toxic residues has been documented in other border cities. In addition to the health risk associated with the water, private water suppliers charge users a substantial fee for their water supply.

Similarly, the No-Action Alternative entails that areas without wastewater collection system will remain without service. It is estimated that approximately 10,720 people do not have access to the sewer system and rely on the use of latrines or open ditches for their wastewater disposal needs. This type of disposal presents three main problems: 1) uncontrolled raw sewage flows pose a threat to human health by allowing the potential contact of people with enteric pathogens; 2) fugitive flows degrade environmental quality and pose a threat to aquatic life and other forms of wildlife; and 3) the risk of groundwater contamination is exacerbated by the infiltration of raw wastewater and by the use of latrines.

Due to the topography of the area, Tecate is particularly sensitive to the problems described above. Moreover, the impacts of not implementing the proposed action will be felt not only in Mexico, but in the United States as well. Soil and water conditions will continue to be degraded, and are anticipated to worsen as the number of users increase and the system deteriorates.

2.2.3 Alternative 2 – Proposed Action

2.3.3.1 Water Distribution and Wastewater Collection System

The proposed action includes expansion and rehabilitation of the City of Tecate's water distribution and wastewater collection lines as illustrated in Tables 2-6, 2-7, 2-8, and 2-9. It also includes improvements to the City's Wastewater Treatment Plant.

In order to protect human health and the environment, the alignment of pipelines was selected to be in the middle of existing streets or roads. This would facilitate construction, as well as access to the lines for maintenance and repairs. Furthermore, the degree of environmental disruption during construction will be minimized, as these areas have already been previously disrupted. Locating the lines along routes different to existing streets on the other hand, would result in higher construction costs, difficult access, and more environmental disruption.

The pipe material selected was PVC for both water distribution and wastewater collection lines, although different types are recommended for each use. PVC C-900 pipe will be used for water distribution, while the "sanitary" class will be used for wastewater collection. The type of PVC was selected based on the operation pressures expected for each line. The operating pressure was selected based on the results of a hydraulic calculation, which took into consideration topography, water demands (based on population projections), and minimum and maximum recommended operating

pressures.

The dimension of each line was selected based on projected demands (based on population projections), and the results of the hydraulic calculations. These calculations also considered intrinsic characteristics of the pipe, such as friction coefficients.

All materials and dimensions for the proposed piping present nearly identical environmental impacts. However, alignment alternatives vary in their level of environmental impact. The proposed alignment presents the lowest impact, as all construction activities will take place within previously disrupted areas and will not modify the existing landscape.

Two basic types of construction methods were considered: trenching by mechanical means and by the use of explosives. Trenching by mechanical means was selected as the preferred alternative, as it represents the least expensive and safest alternative. Nonetheless, the use of explosives may be necessary in some portions of the alignments where excessive rocks may occur. It is important to point out that the *Manifestación de Impacto Ambiental* (MIA) does address the use of explosives, if they are used during construction. Explosives could be used during the construction of new systems, but will not be required for rehabilitation/replacement activities. New systems will be constructed towards the periphery of the City, in areas where population density is lowest and where potential transboundary impacts are minimal.

The Comisión Nacional del Agua has already approved the conceptual designs proposed by the CESPTe. The conceptual design includes primary and secondary lines, storage tanks, and chlorination equipment at several wells and storage tanks.

2.3.3.2 Rehabilitation of the Tecate Wastewater Treatment Plant

The development of options for the Tecate Wastewater Treatment Plant was limited to modifications to the existing system since the facility is in place. The project does not include an expansion or upgrade. The existing Tecate Wastewater Treatment Plant has a capacity to treat 200 lps, which could satisfy the needs of the community through the year 2005, thus making the expansion of the plant or the construction of a new plant unnecessary.

2.2.4 Alternative 3 – EPA Funds Other Alternatives Not Proposed

Alternatives to the proposed action were limited since water supply and wastewater infrastructure is currently in place. Alignment of the water and wastewater system could be modified from the proposed action and/or areas that are currently without service could be relocated. All of these alternatives would create significant disruption to the population and the environment.

Other technical options in addition to the trickling filters used at the Tecate Wastewater Treatment Plant are available. The trickling filters could be modified or replaced. Instead of replacing the rock media with cross flow plastic media, refinements could be made to the placement of the current rock

media to increase the contact time with the wastewater. However, this option was not considered since the rock media is very sensitive to changes in the wastewater quality. Until an Industrial Pretreatment Program is fully implement, it is likely fluctuations in the pollutant loading to the Tecate Wastewater Treatment Plant will continue.

In addition, vertical flow synthetic media could be used instead of the rock media. Again, this alternative was not selected since it has less contact time with the wastewater than with other media.

Another option available was the use of coagulants to enhance the settling of solids in the wastewater. This alternative would only be viable if the media of the trickling filters is rock. It was determined that the rock media was sensitive to changes in wastewater quality and that cross flow plastic media should be utilized. Thus, the use of coagulants is not feasible.

The existing sludge drying beds could be maintained by changing their filter media and drainage system instead of constructing the proposed belt filter presses. This alternative, however, may not be feasible since the current system (sludge drying beds) is labor intensive and recommended only for small facilities.

Finally, the Tecate Wastewater Treatment Plant could be abandoned and a new facility constructed. Depending upon the siting of the facility, this option could create significant environmental impacts to the population and the environment. This is also not a cost effective option.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Section 3.0 discusses the affected environment and the potential impacts from the proposed action. References for this section includes Mexico's 1999 *Manifestación de Impacto Ambiental* (MIA) and the *Draft 2000 Biological Analysis for Tecate Creek/Tijuana River in Marron Valley, San Diego County* prepared by Merkel and Associates, Inc., which identifies the impacts to the Tecate River in the U.S. Both documents are incorporated by reference into this EA and are available to the public upon request.

3.1 Physical Environment

3.1.1 Climate and Air Quality

The climate of the project area is warm with dry summers and mild winters. Temperatures rarely exceed 95°F from late summer through late fall, while freezing temperatures, below 32°F, are common from November through May. Annual precipitation is about 26 inches with June being the driest month and November through April being the wettest (average four inches). The annual average temperature is 56°F.

Strong winds are associated with the east side of the mountains, which slopes down to the desert. The

strongest winds are usually associated with occasional migrant storms that cross the county in the winter. Three or four times a year, usually in fall or in winter, pressure conditions cause a fairly strong, gusty flow of air from the north or east. This air is usually dry and at times is unseasonably warm.

The San Diego County Air Pollution Control District (SDAPCD) has several monitoring stations throughout the County of San Diego. Table 3-1 presents the federal and state air quality designations for San Diego County.

Table 3-1: San Diego County Air Basin Air Quality Designations

Parameter	Federal Designation	State Designation
Ozone	Non-attainment, Serious	Non-attainment, Serious
Carbon Monoxide	Attainment	Attainment
PM 10	Unclassifiable	Non-attainment
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

Source: San Diego County Air Pollution Control District, 1998

As indicated in Table 3-1, the San Diego County Air Basin is a non-attainment area for ozone and PM-10. The air quality designations are determined from sampling at different monitoring stations throughout San Diego County. No stations are located near the City of Tecate, Baja California. A majority of the air quality monitoring stations are found in the urban areas of San Diego County.

The potential for odors exists due to the presence of raw sewage in the Tecate River. The poor operation of the Tecate Wastewater Treatment Plant could also further exacerbate odors in the area.

Environmental Consequences

The implementation of the project will not impact climatic conditions in the region. In terms of air quality, the proposed action will not increase ozone levels in the environment, either during the construction or operational phase, since it serves an existing population. PM10 concentrations will be impacted in the vicinity of construction activities. Nonetheless, this increase will be limited to hours of construction (i.e. temporary impact).

Furthermore, dust emissions during construction should not significantly affect the U.S., since most construction will take place several miles from the border. Use of best management practices, including dewatering active construction areas, can minimize construction related air quality impacts from fugitive dust emissions. Through the implementation of these best management practices, exceedence of air quality standards in the U.S. is not anticipated from the proposed action.

The potential for odor impacts will be reduced by the implementation of the proposed action.

3.1.2 Geology and Soils

The Baja California peninsula has a series of longitudinal mountains very close to the Sea of Cortez. The mountains of major importance are, from northwest to southeast, Juarez, San Pedro Martir, Santa Isabel, Calmajue and Borjas, but Cacapáh and San Felipe.

The Baja California Peninsula is affected on the east by a fault system that runs from the delta of the Colorado River to the Gulf of California. The earthquakes with epicenters on the Gulf of California are located the San Andres fault, which runs south to the Islas Marias. Another fault of major importance that affects the peninsula is the San Miguel fault located in the Alamo Valley.

The soils of the region are classified according as:

- Chromic Luvisoils - commonly found in semi-humid climates with well-defined dry seasons. These soils originated from meteor granite rocks and are characterized for being very shallow, from 0.60 to 1.00 meters;

- Eutric Regosoils - medium texture or sandy soils with a slight saline frequency. They are susceptible to wind erosion; and

- Lithosoils - rocky and very thin soils. Found on rolling hills, they have low capacity for agriculture. They originate from quaternary alluvial soils and rolling hills.

Environmental Consequences

During construction, some soils will be disturbed in order to install new water and sewer pipelines, as well as to make modifications at the Tecate Wastewater Treatment Plant. Hand excavation will be used for the majority of the work; however for hard soils, mechanical excavation will be used. For rocky soils, mechanical excavation will be used in combination with pneumatic hammer and localized core blasting with explosives. Explosives will be used only on extreme cases where use of conventional excavation procedures is not feasible. Their use will be limited to rock fracturing, and will be followed with the use of a pneumatic hammer and other mechanical equipment to remove the rock and complete the excavation. The excavation work considered in the proposed action is generally located in an area 3 km and 7 km from the border, within the limits of the City of Tecate, Baja California. The excavation will be done in the middle of roadways surrounded by buildings, the core blasting procedure will be performed using all safety measures to protect properties and residents, as required by Mexican regulations. A permit to complete the excavation will be obtained from the Mexican Department of Defense.

The proposed action will also have a positive impact to soils by significantly reducing uncontrolled raw sewage. Some soils maybe temporarily impacted in Mexico by the construction of new water

supply distribution and wastewater collection facilities, although benefits to the environment will offset these impacts. No transboundary impacts to the U.S. are anticipated.

3.1.3. Water Resources

Affected Environment

In the project area is located within the 1,725 square mile drainage area known as the Tijuana River Watershed. Many rivers and streams in the watershed are ephemeral and only flow during the rainy season. In the project area, the main river is Tecate River, which flows through the City of Tecate, Baja California from east to west. The seasonal streams of Las Calabazas, Agua Azul, Las Palmas, Seco and San Pablo form part of the Tecate River basin.

After leaving the City of Tecate, the river flows for approximately 3.8 miles in the U.S. Upon entering the U.S, Tecate River runs through a rural area of southeastern San Diego County in the Marron Valley. While in the U.S., Tecate River is joined by Cottonwood River. Tecate River returns to Mexico, where it merges into the Alamar River, which eventually becomes the Tijuana River.

Subsequently, the main drinking water source for the City of Tecate is ground water. There are 22 wells in Tecate with an average flow of 155.94 lps. The average water production from groundwater sources for 1993, 1994, and 1995 were 150.41 lps, 161.93 lps, and 179.87 lps, respectively. Out of 32 wells constructed for the City, only 22 wells are operating. The remaining wells have been discontinued due to lack of water supply. It is important to point out that the water for the wells is dependent upon the groundwater being recharged by winter rains. The yearly average of 372 mm is not sufficient for consistent recharge. It is also important to mention that the distance between some wells is relatively short affecting the availability of water. The water quality of the aquifer is complies with Mexican standards for drinking water.

Environmental Consequences

Currently, the City's 200 lps wastewater treatment plant discharges treated effluent to Tecate River. Table 3-2 illustrates the effluent quality that is being discharged to Tecate River:

Table 3-2: WWTP Effluent Quality

Parameter	Concentration (mg/l)	Daily load (kg/day)
BOD_5 (Biological Oxygen Demand)	80	1,382
COD (Chemical Oxygen Demand)	227	3,922
TSS (Total Suspended Solids)	46	794

*Based upon effluent testing during January, February, and March of 1999.

Table 3-3 represents the anticipated effluent quality if the proposed action is implemented:

Table 3-3: Anticipated Effluent Quality

Parameter	Concentration	Daily load

	(mg/l)	(kg/day)
BOD_5	30	518
COD	100	1728
TSS	30	276

The current concentrations of BOD, COD, and TSS in the treated effluent are significantly impacting the water quality of Tecate River. Rehabilitating the Tecate Wastewater Treatment Plant will improve the conditions in the river. However, until an industrial source control program is fully implemented by CESPTe, the effluent discharge to Tecate Creek may not consistently meet discharge standards.

The proposed action will not significantly modify the volume of water in Tecate River from the Tecate Wastewater Treatment Plant discharge. The expansion of the wastewater system is to areas without service and will increase wastewater collection and treatment by approximately 29 lps. However, the increased volume discharged by the Tecate Wastewater Treatment Plant is offset by the flows of uncontrolled raw sewage that are currently reaching the river.

Implementation of the proposed action will reduce uncontrolled raw sewage flows, thus lowering concentrations of total and fecal coliforms. Sampling of Tecate River by the International Boundary and Water Commission in 1992 indicates a high concentration of total and fecal coliform. The results of the 1992 sampling are detailed below:

Table 3-4: Results of Sampling in the Tecate River

Date	BOD_5 (mg/l)	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
03/06/92	141	54E+06	2.2E+06
06/02/92	216		
08/12/92	156		
09/01/92	139		
11/05/92	181	54E+06	3.5E+06
12/02/92	216	16E+07	11E+06

This reduction in coliform concentrations in the surface and groundwater will reduce the potential for disease transmittal and reduce public health risks on both sides of the border.

3.2 Biological Environment

The biological environment includes the biotic or living components of the ecosystem present within the project area. Biotic components include vegetation; special aquatic sites such as wetlands; wildlife; and threatened and endangered or special status species. The affected environment and environmental consequences for each of these components are described below:

3.2.1. Vegetation and Wetlands

Affected Environment

A few species of plants mainly bushes, woodplants, and cactaceas make up Tecate's existing natural vegetation. Vegetation types are limited and consist mainly of mezquino, gobernadora, desert bushes, and a forest of pine and oak. Table 3-6 details the vegetation in the Tecate, Baja California area.

Table 3-6 Vegetation Type of Tecate, Baja California

Vegetation Type	Scientific Name	Local Name	Use
Agriculture 4.63% of the municipal surface	*Olea europaea* *Vitis vinifera* *Medicago sativa* *Ordenum vulgare*	Olive Grape Alfalfa Hay	Food Industrial Hay Hay
Grasses 7.48% of the municipal surface	*Bouteloua gracils* *Eragostis sp.* *Aristida sp.*	Navajita Grass Hay	Hay Hay Hay
Woods 22.34% of the municipal surface area	*Pinus jeffreyi* *Pinus quadrifolia* *Quercus palmeri* *Juniperus alifornica*	Ponderosa Pine Pine Oak Guata	Wood Wood Firewood Wood
Bushes 65.09% of municipal surface area	*Adenostoma fasciculatum* *Arctostaphylos durpacia* *Ahus laurina* *Eriogonum fasciculatum* *Cercocarpus spp* *Mimulus spp* *Rhamnus spp* *Yucca whipplei*	Chamizo Manzinita Lentisco	Hay Other Art
Other 0.46% of the municipal surface			

*Source: INEGI. CESPTe 1997

On April 6 and 17, 2000 a general biological survey was conducted on an approximately 3.4 mile stretch of Tecate River in the United States. (The survey results are available in the *Draft Biological Analysis for Tecate Creek/Tijuana River in Marron Valley, San Diego County, April 28, 2000, Merkel and Associates, Inc.)* The survey identified five "reaches" along this stretch of the Tecate River, which retain different riparian plant assemblages and qualities. They include:

- Reach #5: An unusually mature stand of Southern Cottonwood-Willow Riparian Forest situated where the Tecate River widens to 810 feet from bank to bank as it enters the United States. The riparian canopy at this reach consists primarily of unusually tall Goodding Willows (*Salix gooddingii*) of similar size and age class.

- Reach #4: Westward and downstream (as the river enters Marron Valley), the riparian

floodplain widens to 1300 feet near the confluence of Cottonwood River. Large tracts of Arrow Weed (*Pluchea sericea*), Desert Fragrance (*Hymenoclea monogyra*), and Mule Fat (*Baccharis salicifolia*) are interspersed within a more varied and open riparian tree canopy.

- Reach #3: Further downstream near the historical farming area, the riparian floodplain widens again to about 1200 feet across and includes sandy benches with mature Southern Coast Live Oak Riparian Woodland growing on the periphery, as well as sporadic, mature Western Sycamore (*Platanus racemosa*) interspersed within the riparian woodland.

- Reach #2: As the river swings sharply southward around a rocky promontory, the tree cover thins markedly and riparian herb and sandbar habitat dominate.

- Reach #1: The westernmost segment of the study area lies on the southern flank of Otay Mountain. The floodplain here reaches 550 feet across and there is substantial evidence of grazing pressures in the understory of the woodland.

The survey found that this section of Tecate River retains some of the highest quality riparian habitat remaining in Southern California. Evidence of past and current wastewater releases were noticeable within all portions of the active stream, but no obvious deleterious effects were observed for trees and shrubs, although the riparian understory immediately adjacent to and within the stream showed less floristic diversity and cover than would generally be expected of such a high quality riparian habitat.

Particularly evident to the surveyors was a paucity of freshwater marsh elements. Furthermore, the survey identified the area as a primary wildlife corridor in the region, due to the high quality of the riparian woodlands and dearth of surrounding development.

Over 300 plant species were observed. Interestingly, the number of non-native plant species is relatively restricted. This is likely a product of the site's historical isolation. Little Mousetail (*Myosurus minimus)* was observed in a vernal pool in Marron Valley east of Cottonwood River. This vernal pool was beyond the boundary of the study area, but the absence of previous reports for this species in Marron Valley makes this note significant. Other vernal pool species are present near the study area. Peripheral vernal pool species such as Orcutt's Brodiaea (*Brodiaea orcuttii*), as well as pool species such as, San Diego Button Celery (*Eryngium aristulatum* ssp. *parishii*), the federally endangered California Orcutt Grass (*Orcuttia californica*), the federally endangered Otay Mesa Mint (*Pogogyne nudiuscula*), and the federally threatened Spreading Navarretia (*Navarretia fossalis*) grow in some abundance on nearby pools on Otay Mesa, but not in the study area. No well developed vernal pools were observed close to Tecate River.

3.2.1. Wildlife and Threatened and Endangered Species

Due to urbanization, the wildlife of the City of Tecate is scarce and variable due to the different climates of the area. Sine the U.S. side of the project area is far less urban, there is a more abundance

of wildlife including mule deer, pronghorn, bighorn sheep, coyote, bobcat, mountain lion, ground squirrel, and kangaroo rat. Birds include hawks, eagles, owls, quail, mourning dove, mockingbird, jays, gulls, herons, crows, finches and sparrows. Species of concern include cactus wren, California gnatcatcher, Bell's vireo, foothill and mountain yellow-legged frog, orange-throated whiptail and California mountain kingsnake.

A *Draft Biological Analysis for Tecate Creek/Tijuana River in Marron Valley, San Diego California, April 28, 2000, Merkel and Associates,* was directed by BECC. This document was prepared for the project area in the U.S. since forty-three U.S. federal species of concern may be found in the Tijuana Watershed basin. Threatened, endangered, proposed, and candidate species identified by the USFWS include:

Endangered
Arroyo southwestern toad (*Bufo microscaphus californicus*)
Mexican flannelbush (*Fremontodendron mexicanum*)
Willowy Monardella (*Monardella linoides ssp. viminea*)
Otay Mesa Mint (*Pogogyne nudiuscula*)
Least Bell's vireo (*Vireo bellii Pusillus*)
California Orcutt Grass (*Orcutti californica*)
Light Footed Clapper Rail (*Rallus longirostris levipes*)
San Diego fairy shrimp (*Branchinecta sandiegonensis*).
Quino Checkerspot butterfly (*Euphydryas editha quino*)
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Threatened
California gnatcatcher (*Polioptila californica*)
Otay Tarplant (*Hermiziona conjugens*)
San Diego Thornmint (*Acanthomintha ilicifolia*)
Laguna Beach Dudleya (*Dudleya stolonifera*)
Spreading Navarretia (*Navarretia fossalis*)

Federal Species of Concern
Tecate Cypress (*Cupressus forbesii*)
Tecate Tarplant (*Hemizonia floribunda*)

The results of the biological survey found a standard suite of common butterflies near the wetlands on-site. While the Marron Valley is one of the last San Diego County refuges for the federally endangered Quino Checkerspot, and has been observed by the surveyors during previous years on Otay Mountain, it was not observed within during this survey. This butterfly is a predominantly upland species, and the water quality in Tecate River is not expected to seriously disrupt its life cycle.

No fish were observed in the river, and the regionally common Pacific Chorus Frog was heard from numerous places within the study area. Excellent habitat for the federally endangered Arroyo Toad occurs throughout the riparian study area, but it is not known if Arroyo Toads have historically been observed along this portion of river. A focused survey would be necessary to ascertain presence/absence, as it was not observed during this study. The federally endangered San Diego Fairy Shrimp and Riverside Fairy Shrimp were not observed in the study area. These species are potentially found in deep vernal pools, which are not found in the Marron Valley. Vernal pools are found just north and outside the study area.

The area surveyed includes some of the highest quality riparian bird habitat remaining in San Diego County and includes a full suite of songbirds. Among the birds heard during the survey included one Least Bell's Vireo, a federally endangered species. The surveyors could not determine if the bird was merely a migrant or represented a local breeder. The federally endangered Southwestern Willow Flycatcher potentially nests in the study area, but was not heard or observed.

Environmental Consequences

During construction there maybe some clearing of vegetation, mainly shrubs and grasses within the City of Tecate, Baja California. These impacts will be temporary and less than significant, since the areas affected will be restored after construction is completed.

As for the U.S., the biological survey concluded that no endangered, threatened, or plant species of U.S. federal concern are considered impacted by the proposed action. The improvements to the water distribution, wastewater collection and Tecate Wastewater Treatment Plant will improve the quality of the effluent entering Tecate River, and will result in an improvement in the riparian habitat along the riverbank. Implementation of an industrial source control program will improve the quality of the effluent discharged to Tecate River and will aid in improving conditions endangered, threatened, or plant species of U.S. federal concern.

CULTURAL ENVIRONMENT

3.3.1 Historical and Archaeological

Much of the work proposed is in project area was previously disturbed for the installation of water distribution and wastewater collection systems, or for the Tecate Wastewater Treatment Plant. It is unlikely that any historical or archaeological resources would be affected by the proposed action.

3.3.2 Land Use and Infrastructure

Affected Environment

The potentially affected by this project include: the water distribution system, the sewage collection system, the Tecate Wastewater Treatment Plant. The capacities of the City of Tecate, Baja California's infrastructure have been described previously. The proposed action will make

improvements to these systems, reducing the population's dependency on trucked water of drinking water and latrines, ditches, and septic tanks for wastewater conveyance.

The project will serve existing population settlements, thus no land use will be modified due to the proposed action.

3.3.3 Population and Economics

The population of Tecate, Baja California is estimated to be 67,006 inhabitants. There are 694 different commercial activities and 106 industries, mainly maquiladoras or twin industrial plant. It is estimated that the industrial sector of the Tecate economy is growing at a rate of 5 percent a year, resulting in an accelerated population growth to the area.

A portion of the cost of the proposed action maybe passed on to the residents of Tecate through user fees. Funding of the project is as follows:

Table 3-7: Project Funding

Source	Amount (Mx$)
Federal Government of Mexico (CAN)	$16,951,722
State Government of Mexico	$16,951,722
BEIF	$33,903,444
NadBank Loan	$5,949,222
CESPTe	$472,739
TOTAL	$74,228,850

3.3.4 Public Health and Safety

Affected Environment

The population of Tecate, Baja California maybe affected by the increase in noise and vibration levels during construction. There is also a potential risk with the use of explosives for excavation on workers, residents, and the environment if appropriate safety measures are not taken. Due to the distance and the characteristics of the core blasting process, it is unlikely that there will be noise or vibration impacts to the U.S.

There is also the potential for impacts to the City's circulation system since construction will require detours and closed streets. The landscape will also be temporarily impacted due to construction.

Environmental Consequences

Construction work will be well planned and last for a short period of time (6 to 8 weeks) and limited to those times of the day when the impacts are reduced. Required permits and approvals will be obtained for the core blasting process, prior to the start of construction. The project will be completed during off peak periods, thus impacts due to noise, vibration, circulation, and landscape should be limited.

The proposed action will improve the overall health of the community since uncontrolled raw sewage flows will be conveyed to the Tecate Wastewater Treatment Plant. The potential for odors and vectors will also be reduced by the rehabilitation and expansion of the City's wastewater treatment and collection system. Expansion of the municipal water supply system will also improve the health of the community of Tecate, Baja California.

4.0 ENVIRONMENTAL COMMITMENTS

4.1 Mitigation Measures During Construction Phase

The following mitigation measures will reduce the environmental impacts of the proposed project:

Mitigation Measure #1 – To insure worker and public safety, CESPTe will contract with a specialized company for the excavation that requires core blasting. Such company must have a license issued by the National Defense Secretary (NDS) for core blasting. The requirements to obtain the NDS permit to use explosives are:

- Identification of the site where the explosives will be used.
- Safety certification of the facilities where the explosives will be temporarily stored.
- Identification of the nearest officially designated explosives warehouse.
- Safety certification of the officially designated explosives warehouse.
- Recommendation by the State Governor of Baja California.
- Plot plan of the site where the explosives will be used with drawing indicating structures and infrastructure 1,000 meters around the site.
- Detailed plan of the explosives storing facility.
- Monthly log of the quantity and type of explosives.

The contractor holding the license to use explosives must submit a working schedule to the National Defense Department in order to obtain a permit for a specific project (in addition to the general license). The schedule must include: (1) a date when the explosives will be used; (2) the specific site where the explosives will be used; and (3) the type and quantity of explosives that will be used. Also, a military inspector from the Department of Defense will be at the site when the explosives are used to insure the explosives are transported, stored, handled, and used properly.

Additionally, the *Procuraduría Federal de Protección al Ambiente (PROFEPA)* [the agency enforcing federal regulations regarding the environment] and the *Dirección General de Ecología del Estado (DGEE)* [the State of Baja California Department of Ecology] will have inspectors that randomly visit working site areas to ensure the compliance with the terms and conditions of permits and authorizations.

Mitigation Measure #2 – In order to insure worker and public safety, CESPTe will commit to storing

and handling explosives in accordance with the Norma Oficial Mexicana NOM-008-STPS-1993, which defines the labor and safety conditions that must be observed for the production, storage and handling of explosives in working areas.

The arrangement of the explosives in the storage facility and the specific measures to transport them, will be done according to the Norma Oficial Mexicana NOM-009-SCT2-1994, which details the compatibility for the storage and transportation of substances, materials, and hazardous residuals of explosives Class 1. The transportation of the explosives will be done according to the Norma Oficial Mexicana NOM-025-SCT2-1994, which details specific measures to transport substances, materials, and hazardous residuals of explosives Class 1.

Mitigation Measure #3 – In order to reduce air emissions and soil erosion, CESPTe will:

- Remove excavated dirt as quickly as possible during construction.
- Avoid the dispersion of particulate matter by covering the excavation dirt with plastics or by spraying water over the construction area surfaces.

Mitigation Measure #4 – To reduce noise, vibration, and landscape impacts, CESPTe will:

- Develop a work activities program outlining measures intended to avoid noise impacts produced by vehicles and equipment.
- Notify the community when the construction works start to avoid traffic congestion and the impacts of high noise levels.
- Establish and maintain green areas to serve as recreation and buffer zones.
- Develop reforestation and gardening program in the urban area.
- Relocate human developments in zones with slopes larger than 10%.
- Introduce of native plant species.

At the direction of DGEE, the MIA (Mexican Environmental Assessment) committed to protecting the natural resources of the area by relocating any vegetation removed during the construction phase of the project.

4.1 Prevention and Mitigation Measures During Operational Phase

No adverse effects have been identified for the operational phase of the proposed project. Nonetheless, there is the potential for failure at the wastewater collection or treatment systems, which could result in the discharge of raw or inadequately treated wastewater into the environment. However, these impacts would be temporary while CESPTe makes the necessary repairs. Some of the potential problems that could be observed during the operational phase, as well as the mitigation measures to be undertaken, are listed below.

Mitigation #5 – In order to offset the impacts from potential wastewater leaks from the sewer system

and overflow of the lift station, CESPTe will:

- Establish a sewer system and lift station surveillance and maintenance program.
- Have specialized personnel responsible to prevent leaks, overflows or accidents.
- Have a contingency program in case of wastewater leaks or overflows.

Mitigation Measure #6 – Due to the industrial discharges to the sewer system, CESPTe will:

- Implement and enforce an Industrial Pretreatment Program.
- Implement a wastewater influent monitoring program to detect industrial pollutants.
- Monitor and maintain the sewer system operation.
- Comply with all discharge standards.
- Implement a sludge monitoring program to monitor pollutants including nickel.

Mitigation Measure #7 – Due to the continued discharge of wastewater to Tecate River, CESPTe will:

- Monitor the effluent for compliance with discharge standards.
- Have training programs for the personnel of the Tecate Wastewater Treatment Plant.
- Develop and implement contingency programs and personnel training.
- Establish a monitoring program for Tecate River and the hydrologic basin.

5.0 CUMULATIVE EFFECTS

The proposed project will provide new water and wastewater service to areas, which are currently not served. The proposed project will not, however, induce population growth within the City of Tecate. The proposed action is providing services to existing populations. Immigration to Mexican border cities is driven by employment opportunities rather than by the availability of services. New jobs due to the construction activities associated with the proposed action will not induce population migration to the City of Tecate.

There will, however, continue to be population increases which will demand additional services, such as transportation, public services, recreational zones, educational and health centers, and housing. In preparation for the demand for water and wastewater infrastructure, CESPTe and the Municipality of Tecate have identified future programs to protect and preserve the existing infrastructure. These programs include: (1) a program to reduce leakage in the water distribution system and (2) a program to improve the municipal solid waste management system (from collection to disposal).

ECC has authorized the use of Project Development Assistance Program (PDAP) funds for the development of the leak detection study. The end result of this study will be a program to repair water distribution lines. The reduction of leaks will have some environmental benefits related to

water conservation. Moreover, having a more efficient system will enhance CESPTe's institutional capacity.

BECC has also authorized the use of technical assistance funds for the development of a master plan for the City's municipal solid waste. The master plan will make recommendations for the acquisition of the necessary equipment for solid waste management, as well as for the construction of a landfill. The proposed landfill will be designed and constructed following standard engineering procedures and in compliance with all applicable norms.