

Border Environment Cooperation Commission

Solid Waste Collection Equipment Project in Tijuana, Baja California

1. General

1.1 Project Type

The City of Tijuana, Baja California plans to purchase approximately 59 solid waste collection vehicles to adequately manage their municipal solid waste collection. The project falls under the BECC priorities as it relates to municipal solid waste management.

1.2 Project Location

The equipment will be used by the City of Tijuana, Baja California, a city which has a northern border with San Diego California, to the west by the Pacific Ocean, and to the east by the Municipality of Tecate, Baja California.

Tijuana's population in the year 2000 was 1,238,057 people, according to information provided by INEGI (INEGI 2000). The project area of influence is limited to the city of Tijuana. Figure 1 presents the general location of the city.

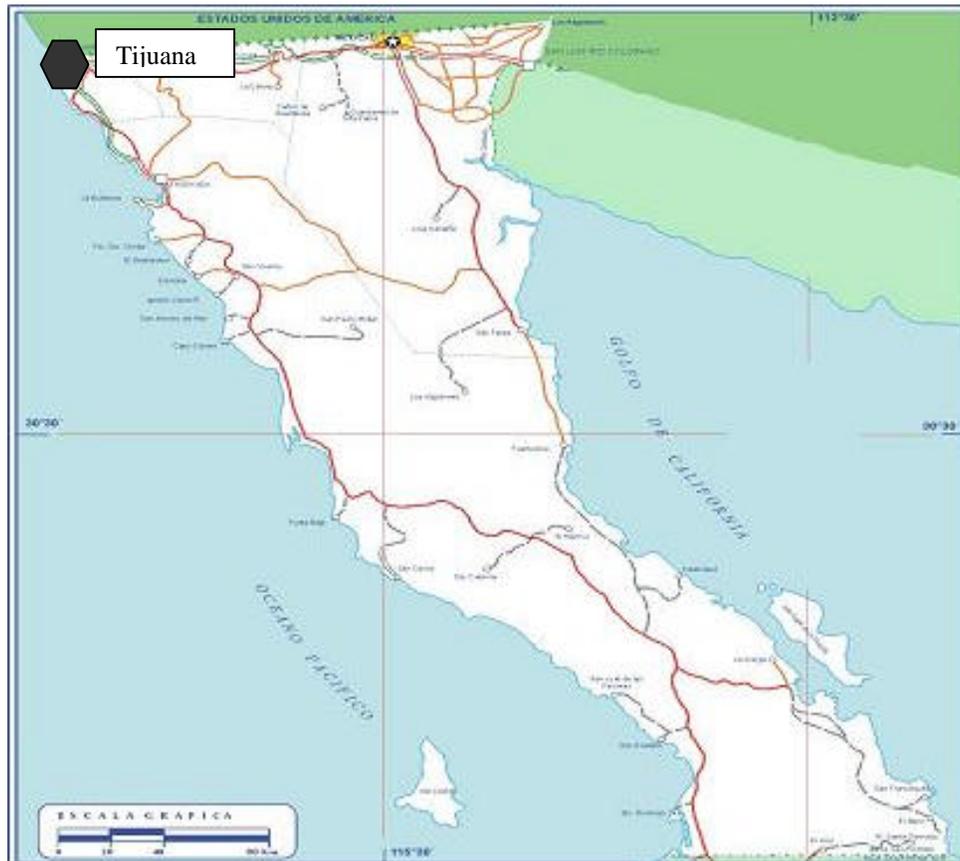


Figure 1 Tijuana, Baja California

1.3 Project Description and Work Tasks

Project Description

The project consists of purchasing new equipment for domestic solid waste collection and transfer to the existing solid waste landfill. The project proposes to purchase an estimated thirty-six (36) solid waste rear-end loading collection vehicles, seven (7) front-end loading collection vehicles, and sixteen (16) flatbed dump trucks. However, the final quantity may vary according to market conditions, prices and other variables.

The new vehicles will replace decommissioned collection trucks, which will allow for a better collection of municipal solid waste.

Program of Project Work Tasks

The acquisition of the vehicles will be completed in a two (2) year period (2005/2006); the Municipality has initiated the bidding process for the purchase of the equipment.

Description of the Community

The population of Tijuana is estimated to reach 1.5 million residents in the year 2006, and projections indicate that this figure will increase to approximately 1,653,777 by 2010 according to the *Consejo Nacional de Población* (CONAPO). Population growth is estimated at 4.9% annually. According to data provided by the *Comisión Estatal de Servicios Públicos de Tijuana* (CESPT), the city has 98% potable water coverage and 95% coverage for sewer. The solid waste coverage is 95%. The Municipality out sources its solid waste collection service to a private company, which assumes an additional 4% coverage.

Seven of the solid waste collection vehicles proposed for purchase will be used to provide service to neighborhoods that currently do not have solid waste collection. The following table presents relevant population data of Tijuana, Baja California.

Population	2000 ¹	2002 ²	2004 ²	2006 ²
	(Inh.)	(Inh.)	(Inh.)	(Inh.)
Total	1,238,057	1,323,685	1,407,528	1,490,128

(1) Source – INEGI, XII General Population and Housing Census 2000.

(2) Source – CONAPO Population Projections of Mexico 1996-2050 México 1998.

Project Alternatives

The Municipal Public Works Department performed an analysis to determine which type of solid waste collection vehicles were most appropriate for the city of Tijuana, known for its difficult and rugged topography.

The Municipality considered several combinations of brand name trucks with a variety of compactors, among them were International, Freightliner and Kenworth Kenner. Brand names for compactors with varying loads included PICAPSA, CEMSA, and Magaña McNeilus.

The technical chapter of this document details the possible specifications required by the Municipality for the purchase of the collection vehicles.

Project Justification

Population growth in the last decade in the city of Tijuana has created an excessive production of waste and an extraordinary demand for public services, in particular the collection, transfer and disposal of municipal solid waste. The deficit in collection service caused by a lack of infrastructure causes the uncontrolled disposal of significant amounts of solid waste in illegal landfills, empty lots, and creek beds. As a result, this creates

unhealthy and high risk conditions for the environment and the public. Currently, approximately 730,000 tons of solid waste is collected annually in the city of Tijuana, representing about 60,800 tons per month. The Municipal Public Works Department through the Solid Waste Division provides collection services to 294,365 households distributed in 730 neighborhoods, and about 1,237 tons are collected daily. The remaining collection service, including commercial solid waste, is provided by a private company.

The collection and disposal problem can be seen in the amount of trash that accumulates in households, the unlimited number of existing illegal landfills, and the saturation of the transfer stations. The Municipality has 165 vehicles for domestic solid waste collection, of which 136 are in good condition and 29 are out of service. Also, consideration has been made to increase the collection coverage using trash containers for high concentration public areas, such as multi-housing units, schools, public parks, athletic parks, community centers, and public buildings. The operation of these disposal areas requires the purchase of collection vehicles for solid waste management.

Replacing the units that the Municipality intends to decommission will allow for a more efficient collection service since these units were out of service for extended periods of time due to mechanical failure. This will allow for the extension of collection services to the neighborhoods of Fraccionamiento Valle (Delegación La Mesa); Casas Geo Las Fuentes, El Dorado, El Lago (Delegación La Presa); Infonavit Lomas del Porvenir (Delegación Playas de Tijuana); and Pórticos de San Antonio, Villas de Santa Fe sections 1^a, 2^a, 3^a, and 4^a (Delegación San Antonio de los Buenos.)

1.4 Conformance with International Treaties and Agreements

The project is in compliance with all international agreements between Mexico and the United States, in particular the Border 2012 Program. An objective of this Program is to reduce pollution caused by solid waste in the border.

2. Human Health and Environment

2.1 Human Health and Environmental Need

The objective of the project is to improve public health and environmental conditions through the improvement of the municipal solid waste management and disposal system. The project will substantially improve the solid waste collection service in the nine districts that make up the city of Tijuana. It is important to recognize that these districts represent areas of the city that show a deficit in the collection of the solid waste, posing a threat for infectious conditions due to the excessive buildup of domestic waste in the streets. Also, these results in the disposal of waste in inappropriate areas, such as creeks, open areas and empty lots.

The Public Health Services Institute of Baja California provided the following statistics related to diseases caused by the inadequate management and disposal of municipal solid wastes.

Diseases	Year				
	2000	2001	2002	2003	2004
Intestinal Infections	50,557	55,873	52,699	36,130	22,110
Helminthiasis	6,507	5,815	4,215	3,845	2,500
Intestinal Amaebiasis	5,161	4,474	3,729	2,205	1,485

Source: Baja California Public Health Institute.

2.2 Environmental Assessment

According to the Environmental Department of the State of Baja California, and in compliance with Article 45 of the Environmental Protection Law of the State of Baja California, projects or undertakings which do not have significant negative environmental impacts are excluded from preparing an environmental assessment. Since the purpose of the project is to purchase collection vehicles, it is not required to obtain an environmental clearance from the state or municipality.

It is important to note that while the project does not require an environmental assessment, not implementing the project would have adverse impacts to the environment. These impacts would be direct and indirect. A direct impact is the possible pollution of surface water and aquifers and the development of habitat and increase of harmful species caused by the disposal of solid wastes in inappropriate areas. Indirect effects are air pollution caused by the illegal burning of waste or by accidental fires, exposure to toxic substances, flooding caused by the blockage of canals or drainage pipes, and an increase in diseases caused by the inadequate management of solid wastes. Other effects, even though they are not linked to the natural environment, have an impact in the urban environment and must be considered as additional costs, such as the rehabilitation of illegal landfills, the loss of property values, and the general deterioration of the urban landscape and scenery due to the a lack of collection services in the affected areas. A major issue is the increase in human illnesses caused by the deficient collection of solid wastes and the possibility of this causing major pandemic in the community.

2.3 Compliance with Applicable Environmental and Cultural Resource Laws and Regulations

Environmental Laws and Regulations

The project must comply with the regulations established by SEDESOL's Municipal Solid Waste Collection and the Route Design Manual. During the implementation of the project, municipal acquisition regulations a well as urban development and traffic recommendations of the State of Baja California will be followed.

3. Technical Feasibility

3.1 Appropriate Technology

Project Specifications

The City council has proposed the following engineering specifications with the purpose of obtaining the most suitable equipment for the service area. These specifications will vary according to the specific conditions of the market and/or prices. The specifications proposed for the chassis are the following:

- Diesel Engine with specifications for protection against high temperatures, low oil pressure, and accelerator pedal deactivation of the collection equipment once it is started up, to include a main fuel filter and delayed combustion release.
- Automatic transmission must be in compliance with "Norm TE 295" for synthetic oils.
- Front axle - 12,000 pound capacity, automatic brake adjuster and power steering.
- Single rear axle specifications – 23,000 pound capacity, automatic brake adjuster, 23,000 pound capacity mechanical suspension.
- Sixteen layer radial tires, wheel size 11R225, steel frame rims with heat treatment, under cabin aluminum fuel tank or similar with a 200 to 250 liter capacity and sound alarm when the reverse gear is engaged.
- Color white passenger cabin with bench sitting for three persons; black chassis with automatic air drying system.
- Hour meter and malfunction electronic detector dashboard.
- Single piece metal bumpers.
- Folding mirrors.

The following issues will be considered for chassis purchase:

- The vehicles will have to guarantee a minimum performance of 80% efficiency for a GWL (gross weight load) of 35,000 pounds and a slope of 29% with a maximum cruise speed of 90 km per hour (performance certification letter must be enclosed).
- Frame length will be according to the selected compaction equipment selected (at seller's expense)
- The truck shall be transferred to the compaction equipment supplier (best bid) site to be fitted with the equipment and subsequently delivered to Tijuana.
- Written warranty to secure a spare parts inventory within the city of Tijuana at an accredited auto parts dealership for a minimum period of ten years.
- Written warranty for maintenance availability within the city of Tijuana.
- Written warranty for a period of two years to cover truck and engine failure due to manufacturer's error.
- Written warranty for a period of two years to cover transmission failure due to manufacturer's errors.
- Performance certification letter must be enclosed and shall guarantee that the transmission will have the adequate cooling system adapted for continuous stops in sloping terrain and under heavy duty.
- On site training of drivers and city maintenance personnel, including the required manuals at no extra cost.
- Must include a written schedule of truck delivery for the container setup to the body shop manager.

- Written warranty for a period of two years to cover compaction equipment failure due to manufacturer's error.

The following are the proposed specifications for the compacting containers:

- Rear load trash collection container with compacting capability for 20 cubic yards with a minimum compacting power of 20 tons.
- Minimum hopper capacity of 2.5 to 3.0 cubic yards.
- Heavy duty steel construction with a minimum of 90,000 psi tensile strength and 50,000 yield strength.
- High abrasion resistance steel with a minimum Brinell hardness of 140, a minimum of 10 gauge for all frame members and chassis supports.
- Floor and ceiling of bodywork should be a minimum of 10 gauge, hopper caliber walls shall be 10 gauge minimum also.
- Ejecting plate – 10 gauge minimum.
- Must have side door access to the ejecting piston, to allow access for maintenance.
- Compactor shall have a minimum hydraulic strength of 1800 psi, the minimum diameter for the compacting hydraulic cylinders shall be 4", and all hydraulic hoses shall have a safety factor of 4:1.
- Allison automatic transmission with Chelsea type inlet and electro hydraulic drive, in accordance with the manufacturer's recommendations for the application requested, with a 30 gpm minimum hydraulic pump and hydraulic oil tank with 10 micron diameter suction filter return and level gauge.
- Acrylic based enamel paint with anticorrosive base.
- A minimum of 15 lights adequate for night-time work as per the specifications of the Dept of Transportation; must include exterior automotive type electrical outlets.
- The control panel for back up equipment should not block crew seat space.
- Stauff type hydraulic system fasteners, compaction equipment shall meet the manufacturer's recommended engine rpm while in operation, deactivating foot accelerator when equipment is operating.
- A certificate should be submitted guaranteeing the quality of the steel used for the manufactured components.

Furthermore, the following shall be taken in consideration for the compaction containers:

- Installation of the container in the selected chassis shall be included.
- Warranty policy for the compaction containers and written warranty for the spare parts supplies and local repair service.
- Delivery schedule
- Application of the Public Works and Municipal Services logo, as provided by the agency, to the compaction containers.
- Include warranty policy and equipment maintenance agreement proposal for a two year period.
- Written warranty from the contractor securing the training for the unit operators and technicians, including maintenance mechanics, on the operation of the equipment, the training should be for a minimum of 40 hours.

The justification to replace the units was based on the sanitation department logs where the condition of each of the units is documented. The log includes photos, model and make of units and an assessment of each one of the unit components

3.2 Operating and Maintenance Plan

The Department of Municipal Services and Public Works, through the sanitation division, offers an operations manual for the appropriate management of municipal solid waste. The truck suppliers will provide an owner's manual of operation and maintenance and training. Also, the trucks will have a minimum warranty period of 2 years on any mechanical failure.

3.3 Compliance with Applicable Design Regulations and Standards

The project includes the acquisition of collection trucks for solid waste. There are no other norms or regulations, other than the internal procedures, established that regulate the acquisition procedures. The acquisition will comply with the established specifications described in Section 3.1 of this document.

4. Financial Feasibility and Project Management

4.1 Financial Feasibility

The North American Development Bank (NADB) reviewed the financial information presented by the Municipality of Tijuana and determined that the ability and financial structure proposed for the Project are adequate. The information presented and the financial analysis include among others:

- Historical financial statements and pro forma.
- Financial structure of the project.
- Investment Budget.
- Historic operations and maintenance budget and pro forma.
- Economic and demographic information pertinent to the project's area.

The detailed analysis of the financial information for the Project is included in the loan proposal that will be presented for NADB's Board approval. A summary of the financial analysis is presented in the following table.

The total cost of the Project is estimated at MX\$50.00 million, including the closing costs, sales tax and contingencies.

Concept	Amount (Million Pesos)
Collection equipment and transportation	50.00
TOTAL	50.00

The Municipality and NADB agreed on a financial structure for the project implementation, as reflected in the following table:

Source of Financing	Amount (Million Pesos)	%
Municipality	25.0	50
NADB Loan	25.0	50
TOTAL	50.0	100

The Municipality of Tijuana has a stable financial position reflected by the level of revenues and control of expenditures. The Municipality will budget a part of its revenues for the payment to meet the debt obligations.

Tijuana has an efficient management of its finances. The effective use of its resources and financial discipline has created an operating surplus. The NADB's loan will not affect the financial rating of the Municipality; it will continue to be able to meet future infrastructure needs.

4.2 Fee/Rate Model

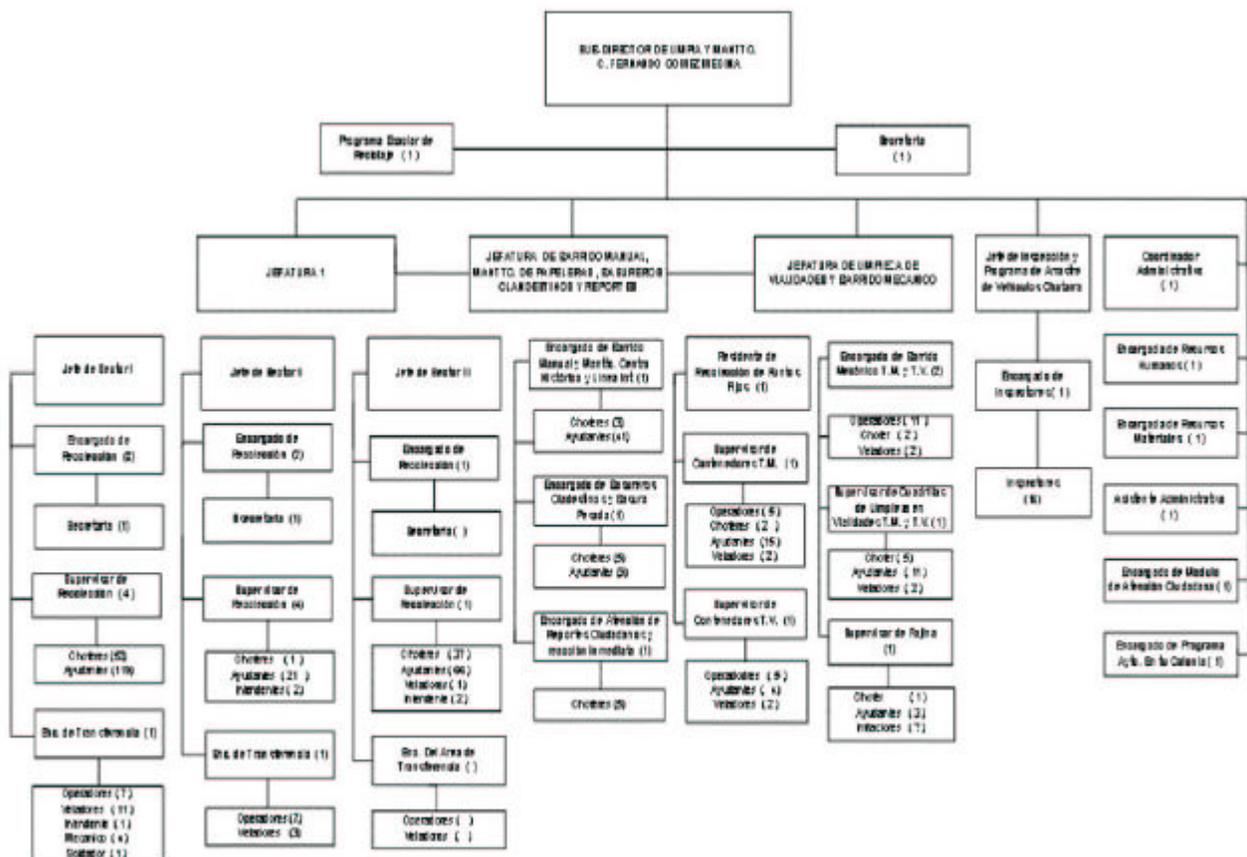
Due to the characteristics of the project the Municipality of Tijuana will not require implementation of a rate model for the project.

The Municipality of Tijuana has sufficient revenues to cover payment of the debt service with NADB. In addition, the Municipality, will budget for required resources to complete the Project.

4.3 Project Management

The Project will be administered by the Municipality of Tijuana which has suitable personnel to manage the acquisition of the equipment proposed and the ability to solve any potential emergency related to the operation and maintenance of the selected equipment.

The project will be administered by the Sanitation Division. As reflected in following organizational chart, the Division has suitable personnel to achieve the responsibilities related to the adequate management of municipal solid waste



5. Public Participation

5.1 Comprehensive Community Participation Plan

The Citizen's Committee provided BECC the Public Participation Plan on November 22nd, 2005. The objective of the Plan is to assist the Committee in its outreach efforts and to specify the dissemination of the project information

Local Steering Committee

The Municipal Administration of H. XVIII City Council of Tijuana, BC, is developing 2 projects to be certified by BECC (projects "495 Solid Waste" and "494 Air Quality and Street Paving"). Therefore, the municipality took advantage of the expertise from BECC and its certification process and decided to establish a single Citizen's Committee for both projects. This will avoid duplication efforts and provide savings in financial and human resources.

Thus on the 27th of October, 2005 at the offices of CANACO in Tijuana, BC, a meeting took place to install the Citizen's Committee for both Tijuana, BC projects.

With an attendance of approximately 25 people, representing social and business groups, professionals, civil associations and academic institutions from the community, etc., a board was elected for this committee, members are as follows:

Committee President: Diego Martinez Martinez. IBEROAMERICANA University President - Tijuana Campus.

Committee Vice-President: Arq. Rigoberto Diaz, President of the School of Architecture in Tijuana, BC.

Committee Spokesperson: Carolina Aubanel, Information Coordinator of the City council

Committee Secretary: Yolanda Enríquez

During the installation of the Citizen's Committee, information about the 2 projects and the plans of the municipality of Tijuana to meet BECC's certification was presented. A series of questions and comments were generated that clarified concerns and generated enthusiasm for participation by the attendees.

Meetings with Local Organizations

Press conferences are on going with diverse professional organizations, neighborhood associations and NGO's of recognized stature in the community.

Public Access to Project Information

The Citizen's Committee with the support from COPLADEM of Tijuana, headed by Yolanda Enríquez, prepared written information about the projects, with the purpose of broad disseminating during the various meetings. Additionally, complete project information and documentation is available in the offices of COPLADEM, in the event a person or institution wishes to access it. The sponsor is using all means possible to distribute the project information, including to the Citizen's Committee for distribution during meetings with local organizations and covering costs incurred in the delivery of these documents.

Public Meetings

As part of BECC’s eligibility criteria, at least two public meetings must take place, with an open invitation for the participation of the general public in these forums. Presentations describing the project will be held, clarifying any concerns about the project’s development. Furthermore, feedback will be obtained from the participants with respect to the projects under consideration. During these open forums, the presentations will explain in detail the purpose, required actions, and benefits obtain as a result of the project’s implementation.

First Public Meeting: The first public meeting took place on December 13, 2005 with over 370 attendees. The meeting took place at the Mayor’s office and it started at 11:00 AM. The purpose of the meeting was to present the project components and respond to questions by the interested parties and gauge public support for the project. At the end of the meeting, 227 people responded to a survey where 98 percent expressed their support for the project.

Second Public Meeting: The exact meeting date is yet to be determined, with the understanding that it should take place during the third week of January 2006.

5.2 Report Documenting Public Support

Once public consultations are completed, a “Comprehensive Public Participation Report” will be drafted; all comments and conclusions will be included to validate the overall commitment of the Tijuana, B.C. community for the project.

<p><u>Scheduling Pending Issues</u> Second Public Meeting is pending Final Public Participation Report is pending</p>

6. Sustainable Development

The project was developed within a framework of sustainable development. Sustainable development incorporates environmental, social, and economic needs through the protection of natural resources.

6.1 Definition and Principles

According to the definition of sustainable development, the Tijuana solid waste project must comply with the concept of economic and social development based on the conservation and protection of the environment and the rational use of natural resources, always considering the needs of the present without compromising the capability of future generations to meet their own needs.

The first principle of the sustainable development criteria indicates that the project must produce a benefit for human health based on the right to a healthy and productive life in harmony with nature. In this regard, the project will comply by improving solid waste collection, which will prevent disposal of solid waste in unregulated sites.

The second principle establishes the right to develop, as long as there is compliance with the development and environmental needs of present and future generations. The project complies with this principle by allowing an adequate solid waste management, by replacing obsolete collection trucks and expanding solid waste collection in areas that lack service.

The third principle states that in order to achieve sustainable development, environmental protection must be an integral component of the project. In this regard, the main objective of an adequate solid waste management is to prevent disposal in unregulated areas and avoid vectors of disease.

The fourth principle states that those groups affected directly by the implementation of the project of environmental infrastructure must have the opportunity to make decisions about the protection and management of environmental resources, jointly with involved groups and institutions to improve social, economic, and environmental conditions with the purpose of achieving a balanced planning. The fulfillment of this principle is met by means of forming the Steering Committee, through meetings with interested organizations, the outreach on the project using mass communications media and through public meetings and surveys conducted throughout the process of public participation.

6.2 Institutional and Human Capacity Building

The acquisition of solid waste collection equipment will allow the City of Tijuana to increase its capacity to provide adequate solid waste management. The loan application to the NADB is within the credit parameters that allow the City of Tijuana to have debt capacity for future projects. The City's bond rating will not be impacted and the City will be able to continue implementation of other infrastructure projects. The project will be administered by the Public Works and Services Department, which has an adequate staff, and an operation and maintenance program for an adequate solid waste management. In addition, the solid waste trucks vendors will provide with an operation and maintenance manual, operator training and equipment guarantees.

6.3 Conformance with Applicable Local and Regional Conservation and Development Plans

The project meets the Municipal Plan for Development 2005-2007 by aligning itself with the goals established with regard to strengthening the urban infrastructure by allowing the City to have an adequate solid waste collection.

The 2001-2006 National Program on Natural Resources and the Environment establishes that due to its demographic and economic dynamics as well as its environmental characteristics, Mexico's northern border is singled out as a priority region for the design and application of environmental policies and programs.

6.4 Natural Resource Conservation

The purpose of the project is to improve the City's solid waste management and provide an important health benefit to its residents, without impairing the environment.

6.5 Community Development

The project will foster community development by reducing the incidence of diseases related to inadequate solid waste management. Within this environment a direct benefit to the community is forecasted by improving the quality of life of the residents by avoiding disposal of solid waste in unregulated areas.

List of available documents:

- State of Baja California Environmental Law
- Solid waste collection trucks specifications
- Comparative analysis of units to be purchased
- Solid waste collection routes map
- Organizational chart for the Solid Waste Department
- Basic data from the City
- Health statistics from the State of Baja California Public Health Services Institute (1999 through 2004.)