INTER-AMERICAN DEVELOPMENT BANK

Brazil

ECOVIAS DOS IMIGRANTES TOLL ROAD PROJECT

BR-0312

ENVIRONMENTAL AND SOCIAL IMPACT REPORT

October 1999

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LIST OF DOCUMENTS RECEIVED FROM ECOVIAS

ACRONYMS AND INITIALS

CETESB	Technology and Environmental Sanitation Company *(Companhia de Tecnologia e Saneamento Ambiental)*
CONDEPHAAT	Council for the Defense of the Historical, Archeological, Artistic and Tourism Heritage for the State of São Paulo *(Conselho de Defensa do Patrimônio Histórico, Arqueológico, Artístico e Turístico do Estado de São Paulo)*
CONSEMA	State Environmental Council (*Conselho Estadual de Meio Ambiente*)
CPRN	Natural Resources Protection Office *(Coordenadoria de Proteção aos Recursos Naturais)*
DAIA	Environmental Impact Analysis Department (*Departamento de Avaliação de Impactos Ambientais)*
DEPRN	Natural Resources Protection Department *(Departamento de Proteção aos Recursos Naturais*)
DER	Highway Department *(Departamento de Estradas de Rodagem)*
DERSA	Highway Development, Inc. *(Desenvolvimento Rodoviário S/A)*
DNER	National Highway Department (*Departamento Nacional de Estradas de Rodagem)*
DUSM	Metropolitan Land Use Department *(Departamento de Uso do Solo Metropolitano)*
ECOVIAS	ECOVIAS dos Imigrantes Concessionaire *(Concessionária ECOVIAS dos Imigrantes)*
EIA	Environmental Impact Assessment *(Estudo de Impacto Ambiental)*
EMP	Environmental Management Plan *(Plano de Gerenciamento Ambiental)*
GTR	Technical Highway Group *(Grupo Técnico de Rodovias)*
IBGE	Brazilian Institute of Geography and Statistics *(Instituto Brasileiro de Geografia e Estatística)*
IDB	Inter-American Development Bank *(Banco Interamericano de Desenvolvimento)*
IF	Forestry Institute *(Instituto Florestal)*
IPT	Technological Research Institute for the State of São Paulo *(Instituto de Pesquisas Tecnológicas do Estado de São Paulo)*
PGF	General Supervision Facility (*Posto Geral de Fiscalização*)
RAP	Preliminary Environmental Report *(Relatório Ambiental Preliminar)*
SAI	Anchieta-Imigrantes System *(Sistema Anchieta–Imigrantes)*
SAU	Users Support Service (*Serviço de Atendimento ao Usuário*)
SMA	State Environmental Secretariat *(Secretaria de Estado do Meio Ambiente)*
RMSP	São Paulo Metropolitan Region *(Região Metropolitana de São Paulo)*

I. INTRODUCTION

1.1. The São Paulo State highway system is extremely important to the Brazilian economy, since it constitutes the largest network linking economically related regions such as the São Paulo Metropolitan Region (RMSP) and the states of Rio de Janeiro, Minas Gerais, and Paraná. Most of the highways in the State of São Paulo were built in the 1960s and 1970s, but due to a lack of resources, these highways have been inadequately maintained and not properly enlarged to handle the growing traffic demand.

1.2. Faced with this situation, in 1996 the State of São Paulo launched a Highway Concession Program aimed at privatizing the operation and improvement of state's main highway systems. The main goals of the Concessions Program were: (i) to reduce transportation costs; (ii) to improve highway safety; (iii) to rationalize the use of the highway infrastructure; (iv) to improve efficiencies in transportation sector; and (v) to increase highway capacity to meet economic demands.

1.3. As part of this program, the concession of the Anchieta – Imigrantes Highway System (SAI), known as Lot 22, went into an International Bidding process DER Edict number 15/CIC/97. On May 27, 1998 the Concession Contract was awarded to Concessionaire ECOVIAS DOS IMIGRANTES, a company created with the sole purpose of operating the SAI, for a period of 20 years. ECOVIAS took over the SAI on May 29, 1998. ECOVIAS is composed of the following stockholders: Primav Construções e Comércio Ltda. and Impregilo S.p.A.

1.4. The SAI is one of the nation's most important highways systems, connecting the RMSP (plateau region), and other industrialized regions of Brazil, with the Port of Santos (coastal region), one of the largest Brazilian corridors of exportation and importation. SAI also connects the RMSP and the state inland with one of the most important tourism regions located along the coast, the Baixada Santista Metropolitan Region[1].

1.5. Due to its intensive traffic, the SAI has shown over the past few years a saturation level which requires special traffic operations in the Serra do Mar area, such as lane inversions, notably during holiday periods and weekends. Usually, the 4X3 plan is used (Anchieta Highway 4 lanes carrying traffic toward the Baixada Santista (downside the Serra do Mar), while Imigrantes Highway 3 lanes serve the opposite flow). In more intense traffic conditions, a 5X2 plan is adopted, with five lanes descending and two ascending.

II. PROJECT DESCRIPTON

A. Characteristics of the Existing System

2.1. The Anchieta – Imigrantes System comprises a group of state highways with a total of 176 Km in length and 7 (seven) toll plazas, all in operation before the concession. The current System comprehends 4 (four) main highways, and 2 (two) connecting highways, as per the following table. The map of the SAI is presented in Annex 1.

MAIN CHARACTERISTICS OF THE EXISTING SYSTEM

Highways	Code	Stretch	Length	Characteristics

[1] Municipalities: Santos, São Vicente, Praia Grande, Bertioga, Guarujá, Mongaguá, Itanhaém and Peruibe

Anchieta (55,9 Km)	SP-150	Plateau	31,3 Km	• Divided highway with 2 lanes each • Shoulder 3.0 m • Marginal lanes in the São Paulo vicinity • Right of way 100 m • 1 toll plaza
		Serra do Mar	14 Km	• Divided highway with 2 lanes each • Shoulder 3.0 m • Right of way 100 m
		B. Santista (coastal plain)	10,6 KM	• Divided highway with 2 lanes each • Shoulder 3.0 m • Right of way 100 m
Imigrantes (58,54 Km)	SP-160	Plateau	29,54 Km	• Divided highway with 4 lanes each • Shoulder 3.3 m • 4 toll plazas • Right of way 120 m • Completed 2.2 Km of duplication project • In construction 1.2 Km of duplication
		Serra do Mar	18 Km	• 1 3-lane highway ascending • Shoulder 3.3 m • No right of way • Inside Serra do Mar Park • 11.1 Km to be built (duplication project)
		B. Santista	11 Km	• 1 highway with 4 lanes • Shoulder 3.4 m • 15 meters of *non-aedificandi* • 3.6 Km of the duplication project in construction
Padre Manoel da Nóbrega (22 Km)	SP – 170/55	B. Santista	22 Km	• 2-lane divided highway • 1 toll plaza • Right of way 50 m
Cônego Domênico Rangoni (23 Km)	SP - 240/55	B. Santista	23 Km	• 2-lane divided highway • 1 toll plaza • Right of way 50 m
Connecting and Access Roads				
Guarujá Access	SP – 248/55	B. Santista	8 Km	• 2-lane divided highway
Anchieta – Imigrantes	SP-041	Plateau	8 Km	• 2 and 3-lane divided highway • No right of way • Inside Serra do Mar Park
Anchieta – Imigrantes	SP-059	B. Santista	1,5 Km	• 2-lane divided highway • Right of way 100 m

2.2. The volume of traffic on the highways which comprise the ECOVIAS concession is presented in the following table:

TRAFFIC VOLUME (vehicles/year)

MAIN HIGHWAYS	1987		1997	
	VEHICLES		VEHICLES	
	Passenger	Com-mercial	Passenger	Com-mercial
ANCHIETA	2,601,837	853,040	5,179,589	1,243,274
IMIGRANTES	4,812,524	975,052	7,021,716	1,049,818
SUBTOTAL	7,414,361	1,828,092	12,201,305	2,293,092
TOTAL	9,242,453		14,494,397	

Source: DERSA – Statistical Bulletin (1998)

B. Integrating Services of the Concession Contract

2.3. The concession contract for the Anchieta – Imigrantes System sets forth operational and implementation activities divided into three basic groups, namely: services/activities delegated, not delegated and complementary. Delegated services are divided in three categories: (i) operational functions; (ii) maintenance functions; and (iii) system expansion functions.

2.4. Services related to operational functions include: (i) toll plazas operation; (ii) vehicle weight stations operation; (iii) supporting traffic control activities; (iv) complying with recommendations for safety auditing; (v) providing support to users, including, among others, first aid and medical service to traffic accident victims; (vi) inspection of lanes and rights of way; (vii) development and implementation of special operating plans, including traffic detours to permit highway repairs; (viii) development and implementation of special operating plans to respond to emergency situations; (ix) support of and delivery of public services on the highways and rights of way; (x) monitoring traffic conditions on the highways; and, (xi) operational coordination of events and activities involving other agencies such as civil and military police, fire fighters and environmental organizations.

2.5. Services related to maintenance functions are: (i) regular maintenance of the basic elements of the system, including pavement, drainage systems, bridges, overpasses, signs and signals and other elements of the rights of way; (ii) special maintenance of all elements composing the system in order to preserve the original undertaking, including repaving the highway, recovery of special structures; and (iii) emergency conservation, including replacement, reconstruction or restoration to normal condition, stretches of the highway which have been obstructed, as well as facilities and equipment and other elements of the highway damaged in various ways.

2.6. Expansion functions include basically: (i) completion of the duplication of the Imigrantes Highway in the Serra do Mar stretch between kilometers 41 and 59; (ii) completion of the Anchieta Highway North Marginal lanes between kilometers 18 and 29; (iii) completion of the 3rd lane of the Plateau Interconnecting Highway between Anchieta–Imigrantes; (iv) improvement and modernization of toll plazas; (v) expansion and completion of special structures; (vi) completion of additional lanes on access roads; (vii) installation of safety and protection devices; (viii) installation and adjustment of pedestrian walkways; (ix) installation of an operational control system; (x) installation of Service Assistance Systems for Users and Traffic Inspection; and (xi) other improvements such as installation of ventilation systems in tunnels and projects for hillside containment.

MAIN INTERVENTIONS IN THE ANCHIETA – IMIGRANTES SYSTEM

HIGHWAY	WORKS	CHARACTERISTICS
Imigrantes	Duplication of the highway between Km 41 and 59	• Total length of 18 Km; • 3 stretches in the project: (i) Plateau – 3.4 Km, (ii) Serra do Mar – 11.1 Km, and (iii) Baixada Santista – 3.6 Km; • 1 roadway with 3 lanes • Shoulder 3.0 m • 4 tunnels (7.4 Km) • 8 overpasses (3.6 Km) • 4 years for the construction
Anchieta	Construction of North Marginal lanes between Km 18 and 29	• Total length of 9 Km • Project in its planning phase • 1 2-lane roadway • Shoulder

2.7. The following expansion services for the System will be performed under the responsibility of the Conceding Authority: (i) construction of 2 overpasses over railroad branch lines on Imigrantes Highway; (ii) construction of 2 Interconnections on Imigrantes; (iii) duplication of the Imigrantes highway, in the Baixada Santista stretch between kilometers 59 and 65.6; and (iv) construction of the right and left access roads (length 5 Km) for the Cônego Eugênio Rangoni Highway (SP 240/55). ECOVIAS will assume operation and maintenance of these projects after execution.

C. Project Schedule

2.8. The length of the concession is 20 years. System expansions must be completed within a maximum term of 8 years, with an expected concentration of investment in the first 5 years.

GENERAL SCHEDULE FOR THE CONCESSION

Years / Interventions	1998	1999	2000	2001	2002	2003	2004	2005	2006-2017
Imigrantes Highway									
Duplication	■	■	■	■	■	■			
Marginal / Additional lanes					■	■	■	■	■
Anchieta Highway									
North Marginal / additional				■	■	■	■	■	
Plateau Interconnection									
Marginal / Additional lanes	■	■		■	■				
Cônego Domênico Highway									
Intersection BR-101							■	■	
Manoel Nobrega Highway									
Intersection / marginal			■	■					

D. Total Investment Cost

2.9. ECOVIAS total investment cost is estimated at R$876 million (approximately US$461 million). The main intervention (Duplication of Imigrantes Highway) is estimated at R$555 million. Completion of the Anchieta Highway North Marginal is estimated at R$30.5 million.

E. Project Alternative Analysis

2.10. For the construction of the primary intervention, the Duplication of Imigrantes Highway (Km41 to 59), an Environmental Impact Study (EIA) and respective Environmental Impact Report (RIMA) (see Section III.C for details) were completed in 1989. The EIA presents technical considerations on the study of alternatives for linking the Metropolitan Region and the Baixada Santista and South Coast performed by DERSA.

2.11. DERSA study compared the following alternatives: (i) duplication of the Imigrantes Highway; (ii) new road connecting Plateau Region with Mongaguá city; (ii) new road connecting Plateau Region with Itanhaém city; and (iii) new road connecting São Paulo to Peruíbe city passing by Parelheiros. As a conclusion, it was recommended that priority should be given to completion of the Imigrantes Highway, with the duplication of its section mostly in Serra do Mar region, to be build parallel to the ascending road, taking advantage of the existing service roads and other installations used for the construction.

2.12. Subsequently in 1998, ECOVIAS performed a new technical study detailing the engineering project for the duplication of the Imigrantes Highway in the Serra do Mar stretch and assessing potential alternative designs and modifications. The study adopted the following objectives: (i) to follow the basic technical approach of the route performed in 1989; (ii) to incorporate the technical know-how and evolution in construction techniques; (iii) to minimize environmental impacts associated with construction of the project; and (iv) to avoid its passage through geologically unstable areas with talus formations and coluvionais soils. In order to receive the necessary Installation Licenses to begin construction, this study was presented and approved by CONSEMA and additional public consultation was undertaken. For additional information regarding the approval and disclosure process, please refer to Section 3.C (paragraph 3.41).

2.13. The study considered six design alternatives for the duplication in the Serra do Mar stretch. The study of alternative routes was submitted for approval to the Environmental Impact Analysis Department (DAIA) of SMA. The DAIA elaborated its Technical Appraisal No. 162/99 approving the change in route, considering "that there will be an environmental gain in the adoption of the proposed adjustments." This alteration in the route of the duplication project has also been approved by CONSEMA. The final alternative selected resulted in the following, which resulted in a reduction of environmental impacts: reduction of total number of tunnels from 5 to 4 and the increase in the total length of tunnels; reduction in the number of work camps/facilities from 16 to 2; reduction in number of pilars required from 63 to 23; and reduction in viaduct height and lengths. The main technical characteristics of the selected alternative for crossing the Serra do Mar are presented in the following table, compared with the 1989 project and the current Imigrantes ascending lanes.

STRETCH SERRA DO MAR TUNNELS AND OVERPASSES

ITEMS	Basic EIA Project approved in 1989		Current Project approved by CONSEMA		Existing ascending roadway	
	Length (m)	%	Length (m)	%	Length (m)	%
Tunnels	5,570	53	7,455	67	3,925	33
Overpasses	4,920	47	3,653	33	7,990	67
Total Length	10,490	100	11,109	100	11,915	100

III. LEGAL AND INSTITUTIONAL FRAMEWORK

A. Institutional

1. Highway Concessions System

3.1 The entities directly related to the concession to ECOVIAS are the Commission for Monitoring of Concession and Permissions for Public Services under the Transportation Secretary (Concessions Commission) and the Department of Highways of the State of São Paulo (DER-SP).

3.2 The Concessions Commission, created by State Decree No. 43.011/98, has as its objectives: (i) to monitor highway concession contracts; (ii) to prepare regulations and procedures for control and supervision of the concessions; and (iii) to develop studies to create a regulatory and oversight agency for concessions. This is a temporary Commission to be maintained until the regulatory and oversight agency for concessions is operational. Once created, this agency will act in the name of the granting authority (DER), with all the powers to manage, and oversee the concession.

3.3 The Commission responsibilities are: (i) to constitute technical groups to monitor the contracts; (ii) to establish parameters for monitoring; (iii) to establish performance indicators and monitor their evolution; (iv) to monitor service levels; (v) to systemize basic information; (vi) to inspect irregularities; (vii) to evaluate the economic situation of concession holders; (viii) to develop an inventory of civil projects, equipment and installations; (ix) to monitor the transfer of the State facilities.

3.4 A Monitoring and Supervision Commission (CAF) is created for each highway concession. Each CAF develops an evaluation regarding the adjustment of the quality standard for services delivered by the concession holder in relation to the conditions established in the concession contract. The service evaluation considers the following aspects: continuity, regularity, safety, efficiency and courtesy. Each CAF is composed of representatives of: users, state assembly, and granting authority.

3.5 DER, jointly with DERSA, was responsible for construction, operation and maintenance of the entire highway network in the State of São Paulo. In the state's highway concessions program, DER is the granting authority, establishing criteria for the auctions.

2. Environment

3.6 The National Environmental Policy created a National Environmental System (SISNAMA), involving of federal, state and local agencies. SISNAMA is responsible for the protection and improvement of environmental quality, while it falls to the states and cities to legislate on the environment under their responsibility.

3.7 The establishment of regulations, criteria and parameters relative to the control and maintenance of environmental quality is responsibility, at the federal level, of the National Environmental Council (CONAMA), the consultative and deliberative arm of SISNAMA.

3.8 The National Institute for the Environment and Renewable Natural Resources (IBAMA) is the executor of environmental policy in the federal sphere, with responsibility to, among other things, authorize all interventions in permanent preservation areas. In January 1999, IBAMA delegated to the Forestry Institute power to approve projects in permanent preservation areas relative to recuperation of the existing service road and duplication the Imigrantes Highway.

3.9 The State of São Paulo Secretary for the Environment (SMA) is the agency responsible for the application of state environmental policy, assuring compliance through application of means of protection and control. Legal means include, among others, licensing potentially polluting activities which therefore require preparation of environmental impact studies

(Preliminary Environmental Report or RAP, in accordance with Resolution SMA No. 42/94, or Environmental Impact Study or EIA).

3.10 The Environmental Impact Analysis Department (DAIA), part of SMA, is responsible for technical analysis of the RAPs and EIAs, which it sends on with its Technical Appraisal to CONSEMA for final approval. DAIA is also responsible for analyze other complementary environmental studies relative to Installation and Operation Licenses.

3.11 The State Environmental Council (CONSEMA) is responsible for establishing environmental policy, norms and procedures, which regulate the instruments of environmental protection and control within the State of São Paulo. CONSEMA has 38 members, 50% of whom are representatives of governmental agencies, and the rest non-governmental organizations, including nine members from environmentalists groups. CONSEMA is responsible for the analysis of the Technical Appraisal from DAIA and for the final approval of EIAs, with the power to incorporate complementary recommendations or requirements into the licensing phases of a project. CONSEMA is also responsible for organizing public hearings relative to EIAs in the licensing process.

3.12 Given the importance and complexity of the duplication project of the Imigrantes Highway, a special task force was created (Resolution SMA No. 79/98), coordinated by the superintendent of the Forestry Institute, to facilitate the environmental licensing process of the works. The Technical Highway Group (GTR) is subordinate to the Coordinator for Protection of Natural Resources (CPRN) to which DAIA is also subordinate. Created by SMA Resolution No. 5/99, GTR coordinates the installation and operation licensing processes related to highways under concession and is primarily responsible for issuing Installation Licenses for the main highway projects. In the duplication of Imigrantes Highway, GTR worked in coordination with the Forestry Institute.

3.13 The State Department for Protection of Natural Resources (DEPRN), also part of SMA, is responsible for authorizing any suppression of vegetation and other interventions in permanent preservation areas. It also authorizes the use of selected areas for installation of infrastructure for support of projects.

3.14 The Metropolitan Land Use Department (DUSM), also a part of SMA, is responsible for the application of norms and procedures related to the use of metropolitan land, involving specific legislation on industrial installation and on protection of river basins considered as water supply sources for the RMSP. It must be consulted on any interventions in the Plateau region which are situated in the area of protected springs of RMSP.

3.15 The Technology and Environmental Sanitation Company (CETESB), an agency subordinate to SMA, is responsible for authorization of all industrial installations for support of highway construction projects, including concrete plants and crushing units.

3.16 The Forestry Institute (IF) is the agency subordinate to SMA responsible for maintenance and operation of state parks and other conservation areas. All interventions within the Serra do Mar State Park and near its frontiers, when pertinent, must be approved by IF.

3.17 The Council for Protection of the Historical, Archeological, Artistic and Tourism Heritage (CONDEPHAAT) is responsible for the protection of the Area of Preservation of the Natural Heritage created by Resolution SC No. 40/85, relative to Serra do Mar, allowing it to approve all interventions within its limits.

B. Legal

1. Highway Concessions System

3.18 The Federal Constitution establishes that it remains with the Public Authority, directly or through concession or permission, to deliver public services. Laws No. 8.987/95 and 9.074/95 regulate the process of concession for public services.

3.19 The process of concession for public services in the State of São Paulo is regulated by Laws No. 6.544/89 and 7.835/92. Decree No. 40.000/95 instituted the State Program for Private Initiative Participation in Public Services and Infrastructure Projects, and Law No. 9.361/96 instituted the State Privatization Program.

3.20 State Decree-Law No. 13.626/43 defines parameters and specifications for state highways. This legislation defines the width of the right of way for state highways as, at least, 50m, and 80m when near urban areas. For highways more recently built in the state, specific laws or decrees define the width of the right of way. Federal Law No. 6.766/79 defines as a *non-aedificandi* area a 15m-width strip along both sides of the right of way for highways.

3.21 In addition to these legal documents relative to the concession of the highway system, norms and regulations defined by DER for expansion and maintenance of state highways must also be observed.

3.22 Each toll road concession holder must develop an Annual Report of Environmental Performance (RADA) to be sent to the Concessions Commission on the anniversary date of the concession. The Concessions Commission works in conjunction with the concession holders in the sense that they establish environmental criteria and parameters to be evaluated in this report. After the establishment of these criteria, the first RADA's from the concession holders will be prepared for the 1998/99 period.

2. Environment

3.23 The National Environmental Policy is ruled by Federal Law No. 6.938/81 (altered by Laws No. 7.804/89 and 8.028/90) and by the Federal Constitution of 1988. Based on this policy, CONAMA Resolutions No. 001/86 and 237/97 define that those projects or activities with potential to cause significant environmental degradation must present an Environmental Impact Study.

3.24 Federal Law No. 7.347/85 (altered by Laws No. 7.804/89 e 8.028/90) defines civil public action for responsibility for damages caused to the environment, to the consumer and for artistic, esthetic, historical, tourist or landscape heritage. Law No. 9.605/98 sets forth penal and administrative sanctions derived from conduct injurious to the environment.

3.25 The Federal Law No. 4.771/65, altered by Law No. 7.803/89, speaks to protection and preservation of significant vegetative cover, permitting suppression of vegetation of permanent preservation areas when necessary for performance of projects of public utility or social interest. This same code defines as permanent preservation areas along watercourses and on the sides of hills with a pitch greater than 45º and on the peaks of mountains.

3.26 Law No. 6.938/81 (altered by Law No. 7.804/89) transformed the permanent preservation areas into ecological reserves under the responsibility of IBAMA. Federal Decree No. 3.438/41 (altered by CONAMA Resolution No. 04/85) declared the mangrove and *restinga* areas as ecological reserves with restrictions equivalent to areas of permanent preservation. Presidential decree No. 1.736/98 establishes that all interventions in permanent preservation areas require previous approval by the federal environmental agency - IBAMA.

3.27 CONAMA Resolution No. 002/96 sets forth the allocation of resources of, at least, 0.5% of the project cost to repair the environmental damages caused by destruction of forests and other ecosystems.

3.28 Federal Decree No. 96/88 approves the Regulation of Highway Transportation of Hazardous Products, complemented by Ministerial Resolution No. 291/88. Law No. 7.802/89 and the Decree No. 98.816/90 discipline the transport of agro-toxins and hazardous products; and CONAMA Resolution No. 1-A/86 obliges those who transport hazardous products to communicate their transport to state environmental agencies at least

72 hours prior to the act. SMA Resolution No. 81/98 speaks to the response to emergencies resulting from transporting hazardous products.

3.29 Federal Law No. 7.661/88 requires that all states with shorelines to establish procedures for coastal management and environmental zoning along their respective shoreline bands. State Law No. 10.019/98 establishes the system of coastal management for São Paulo.

3.30 The Serra do Mar State Park was created after construction of the ascending roadway of the Imigrantes Highway, by State Decree No. 10.251/77, defining the most important conservation unit in the State of São Paulo, protecting the fragile barrier of shoreline mountains and the most important remainders of Mata Atlântica rainforest in the country, defined as having great scientific and cultural importance due to the occurrence of rare and valuable species.

3.31 The State Parks are regulated by State Decree No. 25.341/86 (altered by Decree No. 29.762/87), with the general objective of making compatible natural preservation with environmental education, leisure and research. SMA Resolution No. 28/98 defines the Environmental Management Plan for the Serra do Mar State Park.

3.32 The Spring Protection Legislation – created by State Laws No. 898/75, 1172/76 and Decree No. 9714/77, and altered by Law No. 9.866/97 – defines the use and occupation of the land in the Billings basin and other springs from RMSP. State Decree No. 10.755/77 classifies all the state's rivers, among them, the Billings Reservoir and the capture basins for the Cubatão and Pilões rivers included in Class 1, whose waters are destined exclusively for public supply, prohibiting discharges of effluents of any type.

3.33 Resolution No. 40/85 from the Secretary of Culture establishes that the Serra do Mar State Park is a preservation area of the natural heritage. In the same year, CONDEPHAAT declared as a state protected heritage the Serra do Mar area, including the State Park, with the objective of articulating and consolidating the various actions of public entities in defense of this area.

3.34 State Law No. 3.735/83 regulates the planting of fruit trees along the highways; and State Law No. 5.255/86, regulates the conditions for removal of vegetation in areas contiguous to state highways.

3.35 DEPRN Resolution No. 17/98 defines the technical documentation to be presented to instruct those who are requesting authorization, and DEPRN Resolution No. 44/95 defines the specific procedures for authorization to cut isolated native trees.

3.36 SMA Resolution No. 81/98 speaks to environmental licensing in cases of interventions designed for maintenance and improvements of highways and to response to emergencies resulting from transportation of hazardous cargoes. It establishes that authorization and/or environmental licensing will be required for highway improvements within the right of way only when: (i) they exceed the limits of the strip; (ii) require relocation of population; (iii) require cutting of native vegetation in medium or advanced stage of regeneration (in or out of permanent preservation areas); and (iv) require cutting of native vegetation in the initial stage of regeneration (only when within permanent preservation areas).

3.37 State Law No. 444/96 authorized the construction of the Imigrantes Duplication within the borders of the State Park. This law was necessary as the São Paulo State Constitution requires specific legislative approval for this type of intervention.

C. Project Compliance

3.38 Brazilian legislation requires the following steps for the licensing process: (i) Preliminary License (LP), to be obtained in the planning phase; (ii) Installation License (LI), to be obtained in order to start the construction or project implementation; and (iii) Operation License (LO), to be obtained at the conclusion of the project in order to start operations.

3.39 CONAMA Resolution No. 237/97, gives the appropriate state agency the right to set the term of each environmental license, specifying it in the respective documents, taking into consideration the following aspects: (i) the period of validity of the LP not over 5 years; (ii) the period of validity of the LI not over 6 years; (iii) the period of validity of the LO will be, not less than 4 years and not more than 10 years. The LP and LI may have their periods of validity extended as long as they do not exceed the limits of the maximum terms mentioned above.

3.40 In the State of São Paulo, environmental licensing, besides the federal legislation already mentioned, follows the rule established by SMA Resolution No. 42/94, by CONSEMA Deliberation No. 06/95, which requires presentation of the Preliminary Environmental Report (RAP) and the Work Plan prior to development of the EIA/RIMA. The licensing process for projects relative to the Anchieta-Imigrantes Highway System, in the case of Imigrantes duplication, began before this regulation (in 1986), therefore following federal legislation.

1. Duplication of the Imigrantes

3.41 The Environmental Impact Study of the Duplication of the Imigrantes Highway was originally approved by CONSEMA in 1989 (Deliberation No. 38/98). The EIA was made available to the public and public meetings/hearings were held. In August 1998, ECOVIAS asked SMA for an Installation License for the duplication of Imigrantes (stretches in Plateau and Baixada Santista) and all the infrastructure to support the project, in addition to the repair of the existing service road to be performed at the same time.

3.42 In February 1999, ECOVIAS requested from SMA reconsideration of CONSEMA Deliberation No. 38/98 aiming at the redefinition of the route originally approved within the Serra do Mar State Park. That request was approved in August 1999, by means of CONSEMA Deliberation No. 28/99. The mitigating measures proposed in the EIA/RIMA, and the requirements and recommendations resulting from the licensing are summarized in Annex 2.

3.43 The following table synthesizes the current licensing situation for the duplication of the Imigrantes.

CURRENT LICENSING SITUATION FOR THE DUPLICATION OF THE IMIGRANTES HIGHWAY

Stretches	Environmental Licenses	Current Situation
Repair to the Service Road	Authorization conceded by IF (January/98) and by CONDEPHAAT and DEPRN (November/98)	Project completed
Imigrantes Plateau A	Installation License No. 083/98 (September/98) IF authorization for clearing of vegetation published CONDEPHAAT authorization published	Construction completed Operating License applied for
Imigrantes Plateau B Additional portion	Installation License No. 104/99 (June/99) IF authorization for clearing of vegetation published CONDEPHAAT authorization published	Construction in process
Imigrantes Serra do Mar*	Installation License No. 111/99 (August/99) IF authorization for clearing of vegetation published CONDEPHAAT authorization published	Construction to begin

Imigrantes Baixada A VD-08 and complementary overpasses	Installation License No. 94 /99 (February/99) IF authorization for clearing of vegetation published CONDEPHAAT authorization published DEPRN authorization for put-aside published	Construction in process
Imigrantes Baixada B VD-07 beginning of TD-04	Installation Licenses No. 101/99 (April/99) IF authorization for clearing of vegetation published CONDEPHAAT authorization published	Construction in process
Concrete Plant	License requested; awaiting approval	
Crushed Facility	License requested; awaiting approval	
Main Work Camp	License requested; awaiting approval	

* License published after approval of alterations in the route of the initial project

2. Other Interventions

3.44 All the interventions within the Serra do Mar State Park require specific approval from the Forestry Institute, from the CONDEPHAAT and from the DEPRN when vegetation is affected. Secondary improvements and interventions of minor impact, outside the limits of the Serra do Mar State Park (PGFs, SAUs, mobile scales, bus stops, pedestrian crosswalks, additional lanes and other similar interventions) will not depend on licensing as set forth in SMA Resolution No. 81/98.

3.45 Licensing of the North Marginal Lanes to be constructed in the right of way of the Anchieta Highway, between Km 18 and 29, given that it is situated in an area of protection of springs by RMSP, will likely depend on the presentation of a Preliminary Environmental Report (RAP). Based on the example of all similar projects in the state, the RAP could be considered sufficient for receipt of the Preliminary License .

IV. ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1. The highways of the Anchieta-Imigrantes System (SAI) pass through three distinct environmental areas, which are: (i) the Plateau (Planalto Paulistano), where Brazil's largest urban concentration, the São Paulo Metropolitan Region (RMSP), is located; (ii) the Serra do Mar, with the presence of protected natural areas; and (iii) the Baixada Santista, on the coastal region, where there are cities important to the national economy, such as Cubatão, with its significant industrial park and Santos, with one of the main Brazilian seaports.

4.2. The most significant intervention to be undertaken in the SAI is the duplication of the Imigrantes Highway, as described in Section II. This project of 18 km in length will take place largely (11 Km) in the Serra do Mar sub-region, with the addition of work in 2 (two) stretches of roadway in the sub-regions of Plateau (3.4 Km) and Baixada Santista (3.6 Km). The environmental and socioeconomic characteristics of the sub-regions crossed by the existing system and those where the main intervention will be performed are similar. For this reason an overall environmental and social characterization is presented, pointing out the aspects most directly associated to construction of the Imigrantes Highway duplication, notably in the Serra do Mar stretch.

A. Environment

Climate

4.3. In accordance with the Köppen classification system, the regional climate is of the type Af, characterized as tropical humid, without the presence of dry seasons. The region's average temperature is 23ºC with relative humidity which can reach 87% during the rainy months.

The region average rainfall is variable, ranging from 1,500 mm/year, in the Plateau sub-region, to 4,000 mm/year in certain areas of the Serra do Mar. This sub-region even has periods of fog due to the humidity in the masses of air coming from the sea.

Geology

4.4. The Plateau (Planalto Paulistano), where the Anchieta (SP-150), Imigrantes (SP-160) and Interconnection Anchieta-Imigrantes (SP-150) highways are built, consists of foundation rocks of shale, migmatites of several structures, granitoids and sediments of the São Paulo basin (argilites, sandstone, siltstones and conglomerations). In this area there are also quaternary alluvial sediments, deposited in fluvial plains. The relief in the area of the project features small downs with local crests, long and parallel hillocks, small hills with limited ridges and alluvial plains. This relief presents low grade erosion, mainly surface runoff and limited creeping.

4.5. The Anchieta highway, the service road and the duplication area within the Serra do Mar State Park, form part of the Coastal ridge Zone of the coastal Province. This zone refers to the transition between the Coastal Plain (Baixada Santista) and the plateau area (Planalto Paulistano), of the Atlantic Plateau Province. The relief is supported by rocky crystalline foundation, made up of stromatitic and oftalmitic migmatites of dominant neosome, stromatitic migmatites of dominant shaly paleosome, calcium-silicatic rocks, cataclastic rocks, shales of various compositions, quartzites and marbles. The Coastal ridge on the area has its peaks leveled at 750-770 m, and its boundaries with the Plateau are marked by a strong break in positive slope, followed by steep slopes, with gradients higher than 30% going on to the Coastal Plain.

4.6. An important geological characteristic of the Serra do Mar sub-region is the presence of *talus* geological formations and of *coluvionais* soils, notably near the existing lanes of the Imigrantes Highway (ascending road) at the level of the ascending viaduct - VA19. These geological formations are considered unstable. In the revision of the duplication project, an effort was made to avoid running the new descending roadway near these formations.

4.7. In the Coastal Plain, Anchieta, Imigrantes, Padre Manoel da Nobrega, Cônego Domenico Rangoni and Baixada Interconnection highways run, mostly, on mixed sediment, marine and continental quaternary, associated with tidal, marine and fluvial plains, although some small segments are built on crystalline foundation rocks formed by migmatites and granites and on continental sediments, in the form of *talus* and alluvial fans. The relief in the area interfered by the project is marked by tidal plains, marine plains, fluvial plains, marine terraces, alluvial fans and *talus* bodies, isolated hills and finger-like Crests of the Serra do Mar slopes.

Water Resources

4.8. The principal watercourses in the area of the project are the Cubatão River and the Billings Reservoir. The Cubatão River has flows fluctuating between 2-18 m^3/sec. Both of these watercourses are used to supply water to the Baixada Santista. Groundwater in the region is plentiful, replenished by the high levels of rainfall. Given that the areas where the water table is recharged are mostly free of human occupation, the quality of the groundwater is high. In addition to these water resources there are a large number streams that originate in this area.

4.9. Most of the Atlantic watershed is within the Cubatão river catching basin, which is a major water supply source for the coastal region below. In fact, there are two water treatment plants in vulnerable condition downstream from the Imigrantes Duplication Project: the Cubatão river plant and the Pilões river plant. The latter is only about 900 m downstream of the proposed expansion.

Ecosystems

4.10. The SAI highways cross various ecosystems, including: the Plateau region, the coastal mountain range, the coastal plains, and the estuary region where Porto de Santos is located. The whole region is considered to be within the Mata Atlântica rainforest domain. The following vegetation can be found in the area:

(i) Dense Atlantic rainforests, which protect most of the coastal mountain range and expand over much of the Plateau region over areas still distant from encroaching urbanization;

(ii) Riparian forests which are still reasonably preserved along secondary river valleys in the Plateau region;

(iii) Altitude camps, which prevail at the boundary between the Plateau and the coastal mountain range;

(iv) Mangroves which originally extended over all of the Port of Santos estuary and the coastal region surrounding it, and which are under severe environmental stress due to industrial pollution and invasions by illegal settlements;

(v) Coastal floodplain vegetation, known as *restinga*, which is also under severe stress due to urbanization; and

(vi) Several transitional vegetation occur at varying altitudes, particularly at the transition between *restinga* and Atlantic forest. Also, reforestation with Eucalyptus is significantly present in the Cubatão river valley.

4.11. The Serra do Mar is an extremely fragile and unstable region. Nearly vertical slopes over 100 m high are not uncommon in a mountain range that forms a very narrow transitional strip between the Plateau region (at 800 m above sea level) and the coastal plain. Landslides frequently occur as a natural phenomenon independent of any human induced factors. The Atlantic mountain range sector, along which the Imigrantes Duplication shall descend, is predominantly protected by dense forest cover.

B. Socioeconomic

4.12. The Plateau region is intersected by the Anchieta and Imigrantes highways which begin in the south of São Paulo Metropolitan Region, in a heavily industrialized sector. This sector still concentrates the most important vehicle assembly and car parts industrial center in the country.

4.13. Anchieta alignment in the Serra do Mar facilitates access to adjacent park areas, and gradually a group of irregular settlements known as *Bairros-Cota* has been established along its margins. These settlements began during the original road construction phase (1957) and were further facilitated at a later date by lack of adequate access restriction along the Imigrantes Highway service road. In total, in 1991 about 9,465 persons were living in the *Bairros-Cota* (IBGE Census), some of whom arrived before the State Park was created in 1977.

4.14. In November 28, 1994, the larger of those settlements, known as *Bairros-Cota* 100/95 and 200, were excluded from the Serra do Mar State Park through State Law No. 8,976. This exclusion constituted a recognition of a likely irreversible situation, in that these people could not likely be required to be relocated out of the park.

4.15. *Bairros-Cota* 400 and 500 as well as *Bairro Água Fria* on the Cubatão river valley are still within park boundaries and environmental authorities would like to remove and resettle these people outside of the park. Current estimates put the population of those three settlements at about 1,200 families. However, the political and economical reality of actually implementing this relocation is not clear.

4.16. Also invading park areas are several small groups of roadside vendors concentrated along pull-off areas which exist in the Serra do Mar stretch of the Anchieta highway.

4.17. The area licensed by the project for disposal of excess soil in located in the coastal plain will be subsequently urbanized to receive necessary housing, as established in CONSEMA Deliberation No. 38/89 and agreed to by the City of Cubatão which owns the site.

4.18. The Padre Manoel da Nóbrega and Cônego Doménico Rangoni highways intersect Anchieta and Imigrantes highways at the border between the Serra do Mar and the coastal plain. At that point, they also form the boundary of the Baixada Santista Metropolitan Region, which includes nine municipalities clustered around the city and Port of Santos.

4.19. Cubatão, upstream of the estuary, hosts one of the most important heavy industry complexes in the country, including a major refinery, a petrochemical complex, a major steel mill and cement factories. Twenty years ago Cubatão had one of the worst air quality problems in the world. Acid rain and other effects of pollution on forest cover began to induce slope instability on the Serra do Mar and some major landslides occurred. This triggered major action by the state and pollution control legislation was severely enforced and several hundred million dollars worth of pollution control equipment was acquired by local industries.

4.20. With a population exceeding one million, and with infrastructure problems and housing shortages resulting partially from the lack of adequate land for urban expansion (most unutilized land is either mangrove or *restinga* under rigid environmental protection), the region poses some environmental management problems. The infrastructure problems are made more severe by seasonal tourism which is concentrated along the ocean front and which may result in more than doubling of the population during holidays and long weekends.

4.21. The Port of Santos is the main port in the country and currently handles approximately 40,000 tons per year. All traffic generated by that flow utilizes the Anchieta – Imigrantes System (approximately 90 percent) and/or the railway lines that link it to the Plateau region.

4.22. Expanding population and the absence of environmentally sound areas for urban growth have resulted in a pattern of urbanization through irregular settlements which generally invade mangrove preservation areas or other such improper sites. In some cases these invasions are adjacent to the highway system under ECOVIAS' responsibility. The segment of the Imigrantes Highway to be duplicated is almost entirely within Serra do Mar State Park boundaries, with the only exception being the final section of overpass VD-08 which reaches the coastal plain. There is one irregular settlement located at that point.

V. SOCIAL AND ENVIRONMENTAL IMPACTS

5.1. An analysis of the social and environmental impacts reveals that they are mainly related to the construction of the new lanes on the Imigrantes Highway and are limited to the area of intervention. The benefits, on the other hand, extend throughout the entire user population of residents in the area affected, as well as toward the regional development and vitalization of the economy currently limited by conditions of accessibility. A summary of these impacts, according to the improvements and investments anticipated, is presented below as follows: (i) impacts related to the duplication of the Imigrantes Highway; and (ii) impacts related to improvements in the existing system, emphasizing the construction of the North Marginal Lanes of the Anchieta Highway; and

A. Duplication of the Imigrantes Highway

1. Construction

5.2. The main impacts with regard to the construction of the new Imigrantes lanes are related to the fragility of the Serra do Mar ecosystem and the water basin of the Cubatão river which is the principal source of water supply for the Baixada Santista.

5.3. Inducement of erosion and destabilization of hillsides. The Serra stretch, where highly fragile lands predominate and where the suppression of the vegetation cover on very steep hillsides can result in significant risks, represents a major concern of the construction phase with regard to the inducement of erosive processes and destabilization of hillsides. The critical areas coincide with the overpasses throughout the Serra stretch, especially in cases where the overpass foundations are not easily accessible to the existing service road, requiring the construction of new access roads. The riverheads also represent critical points. The vulnerability of the water treatment stations downstream will be more critical in the case of the Pilões station, situated barely 900 m downstream from the work. The Pilhões station, along with the Cubatão water treatment facility are principal water treatment facilities for the municipalities of Cubatão as well as portions of São Vicente and Santos.

5.4. Silting up of watercourses and valleys. All the watercourses that will be intersected by the work can be considered critical, with emphasis on those situated in the containment basin for the water treatment stations.

5.5. Risk of contamination of springs. During paving and other activities involving the intensive use of concrete, runoffs can occur resulting in the alteration of the acidity levels (pH) of the watercourses. Other cases of contamination can occur in the event of accidental spilling of gasoline, lubricants or similar products.

5.6. Lowering of the water table at specific points. A reduction could occur in the water tables as a function of the construction of tunnels in the Serra stretch. Other impacts on groundwater are unlikely. Infiltration of effluents through septic tanks can occur on a smaller scale in the industrial installations and in the secondary work camps.

5.7. Dust and noise. The traffic associated with the construction could be intense on the service road and on the route down to the main send-off area, involving an increase in the atmospheric emissions, mostly during the peak periods. This impact will be more significant along the unpaved streets, especially where the adjacent land use includes irregular settlings. Explosives will be used not only in tunnel excavation but also in the cut stretch next to the intersection with the Padre Manoel da Nóbrega Highway. The noise caused by the explosives will be intense but should occur only two or three times a day at the majority of the excavation frontages. In the cement plants and crushing units the use of dust controlling devices will be necessary, and both units, especially the main crushing unit, will be noise sources.

5.8. Loss and degradation of vegetation. Cutting down of vegetation will be less than 100,000 m^2. The majority of cuts will reach vegetation of secondary growth in an average or advanced state of regeneration. Indirect impacts on the natural forests could result from mud slides induced and other processes of hillside destabilization, aside from the marginal effects on the boundaries of the deforestation area. Aquatic vegetation and border plants downstream from the water courses subjected to silting could be affected.

5.9. Displacement of fauna. In the interior of the Park, the fauna is quite diverse and its displacement from the area of the most intense construction can be significant. It should be observed, however, that most of the work will occur in areas already affected by the noise from the existing highway and/or local traffic along the service road.

5.10. Interference with local traffic and increase in the risk of accidents. Traffic associated with the construction will utilize stretches of the existing system in a rather limited way. Some

stretches of the service road currently used by the local population living in the irregular settlements existing in the Park area will be affected by the construction traffic, implying an increase in accident risk.

5.11. Risk of Operational Interruption of the Water Treatment Stations. In the case of the water treatment station in the Pilões River (the one closest to the work), the major turbidity and/or silting up stemming from the construction could cause, eventually, interruptions in the operation.

5.12. Risks of invasion of the PESM area. The implementation of new circulation routes, whether permanent or service routes, can accelerate the inducement of settlement inside the Park. Some new stretches of access roads will result from the construction process, part of which should be removed after conclusion of the work, and others should remain for maintenance purposes.

5.13. Alteration of the natural landscape of the Serra do Mar. Alterations of a temporary nature will occur in the landscape as a result of the suppression of vegetation, and of a permanent nature as a result of the introduction of the overpass. In view of the fact that the overpasses stretches of the new lanes are adjacent to those found on the existing highway and substantially shorter, that impact does not represent any major problem.

5.14. Removal and resettlement. The construction of the VD-08 overpass will require removal and resettlement of 12 families and one small commercial establishment in Vila Esperança. The criterion for defining which houses should be removed was established by the engineering design due to safety conditions, consisting of a strip 10 m wide from the edge of the VD-08 plus an additional 5m strip to provide for circulation and access to the remaining dwellings. The duplication of the Imigrantes Highway does not imply removal of the families living in the *Bairros-Cota* (95/100, 200, 400 e 500), nor does the operation of the Anchieta-Imigrantes System, unless critical safety situations are identified along the Anchieta Highway.

5.15. Expropriation. Most of the work will occur in the interior of the Park boundaries and the stretches outside the park were expropriated when the existing highway was constructed. The partial expropriation of only one piece of land was identified.

5.16. Creation of jobs. More than 4,000 workers will be employed during the peak of work. Indirect employment will have a diffuse geographic impact. It is hoped that a good part of this will occur in the region of the Baixada Santista, the urbanized regions of which are the closest to the main work sites.

5.17. Increased demand for health services. Basic and diagnostic services will be offered in the main work camp. It will be necessary to establish special agreements with regional hospitals in order to guarantee the support necessary for handling emergencies.

5.18. Risks related to the health and security of the workers. This is an important matter, not only stemming from the risks inherent to specific construction procedures (use of explosives, services on steep hillsides, etc.), but also stemming from the natural environment and the consequent necessity to monitor the incidence of tropical diseases among the work force.

2. Operation

5.19. Alteration of Atmospheric Emissions. The new route will permit an increase in traffic and therefore may result in greater amounts of atmospheric emissions. The spatial distribution of those emissions will be equally altered mainly because the cargoes traffic that currently uses the Anchieta Highway will be attracted to the more modern design of the lanes coming down from the Imigrantes Highway.

5.20. Noise Pollution. Operation of the new highway will result in higher noise levels. The impact will occur mainly in the overpass stretches.

5.21. Risk of Spring Contamination. Most of the risks of water contamination are connected to accidental spills, especially those involving toxic cargoes.

5.22. Fauna displacement. The areas directly affected are already subjected to the noise coming from the existing highway and from other forms of human intervention. It is expected that the areas subject to impacts will not represent critical habitats in view of the above characteristics.

5.23. Reduction in the frequency of special traffic operations. With the increase in the system capacity, many special operational traffic arrangements will become unnecessary, reducing upheavals to the user population. However, special operations dealing with the inversion in the direction of traffic will still be necessary during prolonged weekends and on principal holidays.

5.24. Reduction in travel time and in transportation costs. The reduction in travel time will represent a great benefit for all system users. The costs of regional transportation, especially for cargo transport, will also be reduced, as a function of the reduction of travel time and of a better and safer design. At present, commercial vehicles coming down from the mountain range use the Anchieta Highway, which is always congested.

5.25. Intensification of Regional Tourist Flows. Regional tourist flow may be increased, inducing the development of tourism and real estate on the shore. Due to the increase of tourist flows, indirect impacts on urban development and land use in the cities by the shoreline could also occur. These impacts will be more significant in the less structured municipalities, such as São Vicente, Praia Grande, Bertioga, Itanhaém, Mongaguá, and Peruíbe.

5.26. Real estate. Real estate values will represent a diffuse geographic impact, affecting the major part of the coastal region. The current real estate market, substantially tied to the tourist and leisure industry, is currently repressed by the access restrictions during the weekends and resulting travel times.

B. Existing System

5.27. Construction of the North Marginal Lanes of the Anchieta Highway, which will not occur for the next couple of years, has not yet been the subject of an environmental assessment. However, the environmental impacts anticipated are based on similar situations, in areas of consolidated urbanization.

5.28. The other interventions anticipated in the Expansion and Improvements Program under the responsibility of ECOVIAS are of a localized nature. The environmental impacts most commonly identified for those interventions are similar in general to those anticipated for construction of the North Marginal Lanes of the Anchieta Highway. However, some type of interventions will result in specific impacts, such as the recovery of bridges, due to the direct interference with water courses.

5.29. There maybe the need for the removal of vendors currently within the limits of the Park and in areas adjacent to the Anchieta Highway.

5.30. Among the special conservation jobs, the periodic resurfacing of the highways should be emphasized. The most relevant environmental aspects of those interventions has to do with the disposal of the pavement milling material in send-off areas and/or provisional stocking, and the questions of interference with traffic, signals and highway safety.

5.31. The Anchieta Highway improvements and operation will require the relocation of approximately some roadside vendors concentrated at km 42 of Anchieta Highway in a rest area where a escape ramp is being built and in a small road pull-off located in an area adjacent to the junction of the Anchieta Highway with the Plateau Interconnection Highway.

1. Construction

5.32. The principal environmental impacts related to the implementation of the North Marginal Lanes of the Anchieta Highway are: (i) interference with water courses and drainage structures; (ii) erosion and siltation (iii) increase in the turbidity of the water courses during construction; (iv) impacts stemming from the removal of interferences both above and below ground; (v) impacts in the utilization of borrow pits and send-off areas; (vi) noise and dust generation; (vii) loss of vegetation on the right of way; and (viii) alteration of the landscape. The principal social impacts caused by the construction include: (i) interference with local traffic; (ii) removal and resettlement of low-income populations living along the right of way or immediately contiguous with it; (iii) expropriations; (iv) increased risk of accidents; and (v) creation of jobs.

5.33. Special attention should be given to the crossing of the Grande river at the Billings Reservoir, the upstream compartment of which is used for the public supply for the entire ABCD region. In this stretch, widening of the currently existing dam is being foreseen in order to make room for the new lanes, which might compromise the water quality for purposes of water supply

5.34. Preliminary studies reveal that the relocation of an aqueduct will form one of the main impacts of the job, with the risk of interrupting essential public services. The expected design also accompanies the right of way for an oil pipeline, requiring additional services for containment of cut slopes and landfills in order to provide stability and preservation of the right of way containing them.

5.35. The geometric preparation of the existing junctions and the construction of new overpasses will require the execution of temporary projects in order to detour local traffic. It is possible that some expropriations may be necessary for those intersections, as well as at other isolated points, to be identified as a function of the engineering project.

5.36. The construction of the North Marginal Lanes of the Anchieta Highway, on the Plateau, could end up requiring removal and resettlement of families living in irregular settlements. Verification of this impact, however, can only be made based on the development of the engineering design, when any potential interference can be defined.

2. Operation

5.37. The potential impacts of the operation are generally positive, especially with regard to the improvement in circulation and security conditions, with the elimination of bottleneck points and amplification of circulation conditions, principally in the urban stretches of the highways. Also to be expected is an appreciation of real estate values in the area affected by the highway, mainly in the region directly affected by the improvements.

5.38. The potential negative impacts are related to the atmospheric and noise emissions, with the stretches within the Park area being especially sensitive. However, to the extent that the improvements should reduce the bottleneck points, with the resulting increase in average speed, a reduction can be expected in the atmospheric and sound emissions.

C. Positive Impacts and Other Benefits

5.39. The benefits of the project will be of national importance. The infrastructure that today links the RMSP to the port of Santos has shown itself to be totally insufficient, and the productivity of the port is growing rapidly after privatization.

5.40. The extension of the duplication of the Imigrantes Highway will provide a significant improvement in the circulation and traffic conditions between the uplands and the lowlands, meeting a sizable repressed demand. As a result, a significant reduction in travel times, costs of transport and risk of accidents can be expected. Also, it makes the conditions for regional development and vitalization of the economy possible.

5.41. With regard to the North Marginal Lanes of the Anchieta Highway, the main benefits expected are the increase in routing capacity with the incorporation of new lanes in already saturated stretches, together with the consequent reduction in travel time and costs. The main justification is the need to segregate the inter-regional flows from the intra-urban flows. The shared use of the same lanes for trips with different profiles generates serious problems of security and leads to the multiplication of irregular accesses without the necessary acceleration and deceleration lanes.

5.42. With regard to the special conservation works (erosion recovery, stabilization of slopes, de-silting of drains, among others) they present a significant positive environmental impact.

VI. ENVIRONMENTAL AND SOCIAL MITIGATION AND MONITORING MEASURES

6.1. As requested by the environmental agencies of the State of São Paulo and the IDB, ECOVIAS elaborated in May 1999 an Environmental Management Plan for the Anchieta - Imigrantes System (EMP), consisting of various environmental Programs. The main goals of the EMP are: (i) coordinate the environmental actions to be implemented by ECOVIAS during the entire period of the concession; (ii) consolidate the requirements and recommendations of environmental agencies and financing agents; and (iii) create instruments to control and supervise environmental actions of ECOVIAS. A summary of the EMP programs is presented below.

A. Mitigation and Monitoring Measures

Program 1 – Environmental Licensing

6.2. The goals of the Environmental Licensing Program are: (i) to establish an environmental management planning procedure for the implementation of expansions and improvements; (ii) to ensure that environmental licensing and/or authorization procedures are initiated enough in advance, in order that the pre-established deadlines to initiate the performance of services and works requiring authorization be met; and (iii) whenever possible, to streamline procedures by means of grouping different interventions in single processes in terms of proximity and/or initiation date.

6.3. This Licensing Program comprises the following activities: (i) the identification of areas affected by specific environmental protection legislation; (ii) the constant follow up of modifications in regulations applicable to environmental licensing: (iii) the identification of specific procedures and rules governing environmental licensing; (iv) the follow up of the current demands and licenses; and (v) the procedures for public disclosure.

Program 2 – System's Environmental Performance Control and Monitoring

6.4. The goal of the System's Environmental Performance Control and Monitoring Program is the ongoing enhancement of the system from the environmental perspective, and it includes a set of three sub-programs which are to be developed on a permanent basis for the duration of the concession, namely: (i) Environmental Performance Evaluation; (ii) Recovery of Environmental Liabilities; and (iii) Management of Irregular Occupation of the Right of Way.

Environmental Performance Evaluation Sub-program

6.5. As established in the concession contract, a yearly environmental evaluation must be undertaken in order to check the environmental performance of the system, both from the operational standpoint as well as the work implementation is concerned. This sub-program's goal is to set a self-evaluation routine aimed at the promotion of the gradual improvement of the environmental indicators in the Anchieta-Imigrantes System. ECOVIAS plans to hire such yearly evaluations from specialized companies.

6.6. ECOVIAS, in conjunction with the Concession Commission and the other concessionaires, is defining the indicators that must be analyzed in the Yearly Environmental Performance Reports (RADA). Some indicators which must be adopted are: (i) forestation cover rates in permanent preservation areas along the rights of way; (ii) rates related to statistics of response to accidents involving toxic loads; (iii) rates related to intensity/frequency of environmental liabilities; and (iv) performance rates of hired contractors for the implementation of works, which are to be established based on the results of the environmental monitoring.

Management of Irregular Occupation of the Right of Way Sub-program

6.7. This sub-program's goal is to manage the irregular occupation situation all along the Anchieta-Imigrantes System (both commercial and low income residential), all of them previous to the concession contract date. According to the sub-program, there will not be relocation of urban areas in the right of way, since they do not have direct impact in the scheduled interventions as set in the concession contract. All planned relocations are mitigated in Program 7 (described below).

6.8. As to urban invasions, the forecast corrective measures are: (i) units subject to risk shall be singled out for relocation in the same settlement; (ii) fencing of the right of way as pertinent and/or possible; (iii) collection of trash and establishment of disposal areas; (iv) enhancement of the protection system at critical invasion points, below pavement level; and (v) interaction with the community for environmental education through communication activities.

6.9. The main corrective action related to the vendors is the relocation of the ones subject to risk of accident, taking into account acquired rights, but also improving the operational and safety conditions of the highway. The sub-program identifies possible locations for the relocation of vendors: (i) user aid systems, (ii) check points, and (iii) rest areas to be implemented.

6.10. The following control and verification actions will also be adopted: (i) disclosure of policy regarding new settlements in the stretch, keeping the number of residences and vendors at the current level; and (ii) permanent checking of the invasion locations with immediate removal of any new household or vendor stand.

Recovery of Environmental Liabilities Sub-program

6.11. This sub-program's goals are: (i) recovery and/or stabilization of all SAI environmental liabilities; and (ii) monitoring of environmental impact in neighboring areas, aiming at the identification of situations which may provoke risks or compromise areas in the right of way. The sub-program defines environmental liability as "all cases of alterations of natural environmental conditions of the region, resulting from the implementation of the current highway system and other existing infrastructure works and/or from actions initiated by third parties not directly connected to the implementation of this infrastructure."

6.12. ECOVIAS has prepared a SAI Inventory of Environmental Liabilities, based on the DNER Highway Conservation Manual. The inventory also establishes *structural* and *non-structural* procedures for the recovery and management of the identified liabilities. The table below summarizes the main identified environmental liabilities and the proposed corrective actions/measures.

TYPE OF LIABILITY	MEASURES	
	Structural	Non-structural
Stability of slopes	Implementation of drainage systems Rehabilitation of cuts Implementation of containment structures	Re-vegetation Maintenance/rehabilitation of existing drainage systems
Siltation/erosion control	Construction of structures such as abutment walls	Implementation of plant cover
Waste disposal		Identification of type of waste Restoration of soil organic horizon Implementation of plant cover
Landscaping alteration		Environment rehabilitation projects (landscaping)
Illegal invasions on right of way (vendors and low income population)		Management defined in Irregular Occupation Sub-program

6.13. The sub-program establishes a recovery schedule for those liabilities with the following general deadlines: (i) 1 year – service road for Imigrantes Highway; (ii) 2 years – other liabilities for the service road; (iii) 4 years - erosion, siltation and/or drainage resizing, if posing a risk situation; and (iv) 6 years – other liabilities which do not pose a risk situation.

Program 3 – Environmental Control of Implementation Activities

6.14. This program's goal is to ensure that all works under the responsibility of ECOVIAS will be undertaken strictly in compliance with SMA requirements and according to current best environmental practices. The following technical documentation is part of the Program:

- Instruction for Environmental Control of Construction Works, divided into four specific instructions:
  - (i) Instruction for Environmental Control of Construction Works - Works
  - (ii) Instruction for Environmental Control of Construction Services – Work Sites, Industrial Facilities and Complementary Support Areas
  - (iii) Instruction for the Control of Possible Occupation Induction Effects in the Neighborhood of the Support Areas Proposed in the Interior of the State Park of Serra do Mar (PESM)
  - (iv) Instruction for Environmental Control of Topography and Geotechnical Services in the PESM
- Work Safety and Occupational Health Sub-program
- Environmental Orientation and Training for Work Foremen

6.15. All these documents have been grouped in a *Technical Manual for Environmental Control and Monitoring*. This Manual was approved by SMA departments (DAIA, IF, CETESB) in

the Imigrantes duplication licensing process. ECOVIAS established with the construction company (São Simão), as part of the construction contract, a specific article covering the fulfillment of the technical provisions as set forth in the Manual, and an Environmental Agreement was executed by the contractor and their sub-contractors.

Instructions for Environmental Control of the Construction Works

6.16. The following table presents the organization of the Work Technical Instruction with the corresponding subject matters.

MAIN ASPECTS OF THE TECHNICAL ISSUES OF THE WORKS

Sections	Sub-item	Control Measures
Environmental controls for the work implementation	Permanent Operational Control	- Noise Control - Emission Control of Atmospheric Pollutants - Works Signaling - Health and Safety - Boundaries and Access Control of Restricted Areas - Erosion and Siltation Control - Control of Vegetation Removal
	Special Executive Procedures	- Control with instruments at siltation locations - Protection of areas neighboring detonation locations in critical points - Traffic Interference Planning - Population Relocation Planning and Coordination - Trash Utilization Planning and Control
Environmental Licensing Restrictions (Imigrantes)	Control requirement list of SMA departments	- For each requirement, a control measure is identified.
Procedures for the deactivation of the works	Technical and operational procedures	- Highlights: re-vegetation and stabilization of embankments
Responsibilities	Construction Contractor	- Fulfillment of the measures established in the Manual
	ECOVIAS	- Environmental Monitoring
	Internal Auditing	- Works Manager and ECOVIAS environmental team
Communications	Between the parts	- Instates Inspection Reports
	Special	- Emergency situations - controlled communications
	Others	- Public Relations Office - Community relations

Environmental Control Instructions for the Construction Services - Work Sites, Industrial Installations and Complementary Support Areas

6.17. This technical instruction's goal is to establish environmental guidelines that must be adhered to by the construction contractors for the implementation, operation and eventual

deactivation of the work sites and other support facilities[2]. This instruction affects both the duplication works of the Imigrantes Highway, whose work site will be located inside the Serra do Mar State Park (PESM), as well as the other enlargement works in the Anchieta - Imigrantes System, to be undertaken by ECOVIAS during the duration of the concession.

6.18. The main construction environmental guidelines are: (i) implementation of the superficial drainage system, with devices for the containment and guidance of rain waters; (ii) implementation of boundary dam to contain leakage around fuel tanks; (iii) implementation of leakage containment drains and running traps for the separation of water and oil; (iii) disposal of household effluents according to CETESB guidelines; (iv) effluent chemical tank which must be periodically collected by specialized company, to be used in the PESM area; (v) forecast leisure areas and equipment (4 m^2/housed employee); and (vi) cleaning and sealing systems for conveyor belts.

6.19. The main operational environmental guidelines are: (i) sanitary control; (ii) periodic cleaning of the draining systems and decantation tanks; (iii) hiring of specialized company for the collection and final disposal of solid waste; (iv) permanent maintenance of all control systems; (v) fulfillment of regulations covered by Rules for Transport of Hazardous Products of the Ministry of Transport; (vi) control and monitoring of noise levels, including delimitation of areas where individual protection equipment must be utilized; (vii) previous implementation of compensatory re-vegetation according to proposals or requirements of the licensing phase; (viii) environmental education of workers as to the utilization of provisional facilities inside the Park, including information regarding restriction of use for the neighboring woods areas, hunting restrictions, fire prevention measures, waste, etc.; and (ix) fencing and access restrictions at necessary locations to avoid access to the woods.

6.20. The main deactivation/recovery guidelines are: (i) general recovery of the provisional site, removal of flooring, concrete areas, waste in general, leveling and superficial drainage[3]; (ii) final general cleaning of all components of the permanent superficial drainage system, including the removal of the site's interim drainage components; (iii) removal of the Effluent Treatment Station facilities; (iv) recover of the organic level of the ground and re-vegetation of all dirt areas; (v) complete implementation of the compensatory planting requested during the licensing phase; and (vi) inspection of the machine and equipment washing areas, as well as those dedicated to stockpiling and handling of fuels, oils and greases, in order to verify possible soil contamination problems.

Instruction for Occupation Control of the Surroundings of the Proposed Support Areas inside the Serra do Mar State Park (PESM)

6.21. This instruction introduces the prevention procedures to be adopted by the contractor(s) with the aim of avoiding the presence of people in the PESM. The document is divided in the following items: (i) Prevention Measures, dealing with planning the support areas; operation control; deactivation procedures and human resource selection and hiring policy; and (ii) Corrective Actions, dealing with the application of disciplinary measures and possible removal from the facilities.

Instruction for Environmental Control of Topography and Geotechnical Services inside PESM

6.22. Specific technical instructions are presented in relation to the work of the topography and geology teams, with the aim of restricting and controlling deforestation inside the PESM. The main measures deal with: (i) guidance for tree cutting (cut height, direction of fall, etc.); (ii) transport, stockpiling and use of wood; (iii) use of vegetation; (iv) sprout cutting; and (v) trails and clearings. These instructions were adapted from the deforestation control measures adopted during the implementation of the works.

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[2] Comprises, among others, the following areas: (I) fuel stockpiling; (ii) explosive stockpiling; (iii) interim industrial facilities (concrete mills and stone crushing units, including mobile units); and (iv) stockpiling of building materials or equipment.

[3] After conclusion of the works, in the PESM area, only those facilities requested by IF shall be maintained

Work Safety and Occupational Health Sub-program

6.23. This sub-program aims at the establishment of levels of safety for the workers and other people present at the site, eliminating or reducing the risk for accidents, ensuring the fulfillment of all applicable legal regulations and other rules, taking into account the environmental characteristics of the areas to be dealt with. It is a specific sub-program that will affect construction works under the responsibility of ECOVIAS, namely in the implementation of the duplication of the Imigrantes Highway.

6.24. The sub-program involves the following main aspects: (i) General Guidelines, dealing with the definition of procedures for the training of workers, safety auditing and documentation procedures; (ii) Specific Guidelines, dealing with Work Medicine instructions, control and monitoring of contagious diseases, sanitation and work hygiene, safety procedures, individual and collective protection equipment, work signaling and worker's quality of life.

Training and Environmental Orientation for the Work Foremen

6.25. This sub-program's goal is the training of workers, in the following areas: (i) executive procedures of the works; (ii) correction actions in case of unforeseen impacts; (iii) emergency actions in case of accident; (iv) work safety procedures and occupational health; (v) operation rules for work sites, industrial facilities and equipment; and (vi) other relevant aspects. With the implementation of this sub-program it will be rendered possible to enable groups of workers (workmen, foremen, engineers, etc.) to actively participate in the environmental control of the works, while they will also be aware of their responsibilities, tasks and possible penalties.

6.26. The sub-program is presented in the following way: (i) Training Group Definition, including managers and foremen, topography and support teams, machine and leveling equipment operators, explosive material handlers, workmen in general; (ii) Training Methodology, dealing with training material definition according to the groups to be trained and the training objectives; (iii) Training Contents, dealing with work safety rules, occupational health, delimitation of permanent preservation areas and heavily vegetated areas, hunting control, erosion control procedures, transport procedures; (iv) Schedule associated with the development of the works and with the hiring of workmen; and (v) Definition of Responsibilities, establishing the implementation of actions to be undertaken by the contractor (São Simão) through its Environment Management Unit, with ECOVIAS in charge of coordination and supervision of the sub-program.

Program 4 – Monitoring and Environmental Documentation of Implementation Activities

6.27. This program's goal is to ensure the correct monitoring of all works under the responsibility of ECOVIAS and the fulfillment of the requirements issued by the environment agencies. The following technical documents, grouped in the *Technical Manual for the Environment Control and Monitoring*, are part of the program:

Monitoring and Environmental Documentation of the Works Sub-program

6.28. This sub-program's goals are: (i) to ensure the correct implementation of the works according to the specifications contained in the several instructions of the Environmental Control Program; (ii) to produce documented proof of the strict fulfillment of all measures and guidelines specified during the steps taken in the Environmental Licensing.

6.29. The sub-program is structured as follows: (i) Instrumentation of the Monitoring Services, through the definition of the monitoring technical team; (ii) General Monitoring Instructions, which establish the previous identification of environmental impact and/or risks to be monitored; (iii) Monitoring Procedure, which establishes a routine of inspections in locations deemed critical and also the procedures for the verification of fulfillment of mitigating measures as defined in the EIA and in the requirements of the SMA; (iv) Environmental Registration System, made up of a set of monitoring documents, among which the following are the most important: mapping and general inventory of

control locations, list of monitoring situation, photographic record of the situation in the control locations, preventive action, corrective action and non-conformity, inspection reports, and non-conformity notification; (v) Monitoring and Management Activities (see next paragraph); and (vi) Service Conclusion, showing the Monitoring Final Report stating the fulfillment of the relevant technical measures.

6.30. The main environmental monitoring activities include: (i) Noise: periodic monitoring of noise levels and activation of control actions, in response to the demands of CONAMA Resolutions No. 01/90 and 08/92; (ii) Particle Material: verification of the correct control of suspension dust during excavation activities, leveling, material stockpiling; (iii) Waste: control and monitoring of waste exploration/utilization activities; (iv) Re-vegetation: verification of work schedules in order to minimize the timeframe between the end of the leveling activities and the beginning of re-vegetation; (v) Erosion: monitoring and control of erosion, to be intensified in the beginning of every rainy season; (vi) Water courses: monitoring and permanent protection of water course banks; (vii) Deforestation: monitoring of deforestation activities, including local technical orientation; (viii) Water and Fauna Quality: monitoring defined in specific sub-programs presented below; and (ix) Others: including monitoring of service roads, safety procedures and work hygiene, disposal of solid waste, basic sanitation among other aspects.

Water Quality Monitoring Sub-program

6.31. This sub-program will be implemented according to what is set in CONSEMA Deliberation No. 38/89. The main goal is the adoption of a set of actions aiming at controlling the environmental impact on waterways in the areas to be affected by the works in Imigrantes. The sub-program highlights the interference the works will have on drainage of the Cubatão and Pilões rivers, where the public Water Capture and Treatment Stations are located.

6.32. The sub-program is structured as follows: (i) Monitoring Coverage, which defines 4 priority locations upstream from the supply systems; (ii) Siltation Monitoring, to be undertaken nearby the water intake areas, by means of "scale stakes”; (iii) Turbidity Monitoring, done more frequently during more active periods of work and after intense rain; (iv) pH monitoring, during periods of concrete deployment; (v) Documentation of Previous Conditions, conditions previous to the works, recording environmental conditions at that time using a Hydrographic Characterization Sheet; (vii) Inspection Reports and Photographic Documentation, to be periodically prepared by the monitoring team; (viii) Reports, which will be part of the Environmental Record System; and (ix) Responsibilities, ECOVIAS, through its monitoring team, shall be in charge of this sub-program.

Fauna Monitoring Sub-program

6.33. This sub-program comprises a series of actions, regarding: (i) preliminary fauna survey, before the work activities are initiated in the intervention area and its immediate neighborhood; (ii) weekly inspections to verify the presence of the identified species; (iii) preliminary evaluation of the work effects upon the fauna withdrawal; and (iv) possible adoption of management actions.

Monitoring of Operations in the Vicinity of the Gas Pipeline Sub-program

6.34. This sub-program is to be implemented only in the Baixada Stretch of the Imigrantes work, due to the presence of the Petrobras Merluza gas pipeline. Two stretches of the work are situated near the gas pipeline. It will not be necessary to relocate the gas line. The defined actions are related to the strict fulfillment of the Work Environmental Control Instructions of the Construction Services and Safety Regulations, since explosive materials shall be utilized.

Program 5 – Environmental Control and Monitoring of Operation Activities

6.35. The Directory of Operations will be responsible for the implementation of this Program. The environmental control/monitoring of operation activities to be undertaken permanently in relation to the operating stretches in the SAI shall include: (i) monitoring of waterways (siltation, turbidity and contamination control); (ii) permanent erosion control; (iii) permanent control of hillside stability; (iv) fire control and operation of the emergency procedures; (v) periodic monitoring of air quality; (vi) periodic monitoring of noise levels and recommendation, whenever adequate, of landscaping in order to reduce noise levels in critical stretches; (vii) support for the local municipal administrations in the inspection of activities alongside the highway; (viii) permanent control of cleanliness and maintenance of superficial drainage structures; and (ix) monitoring of the re-vegetation processes in the right of way.

6.36. This environmental program is structured in the following sub-programs: (i) Management of the Risks of Hazardous Products Transportation; and (ii) Emergency Actions regarding Accidents with Hazardous Cargoes. Both sub-programs are described in Section VI.c.

Program 6 – Disclosure and Interaction with the Community

6.37. This program's goals are to disclose information, clarify and advise the population bordering on or using the system, regarding the effects that will result from the project with sufficient forewarning. The proposed channels of communication are: (i) activities disclosing the project and the interferences to be generated, directed to the affected population; (ii) a consulting process where the population can request specific information.

6.38. ECOVIAS will count on an ombudsman who will act jointly with environmental management unit. This program should last throughout the entire period of the project under the responsibility of ECOVIAS, with its greatest emphasis during construction of the North Marginal Lanes for the Anchieta Highway and the duplication of the Imigrantes Highway.

Program 7 – Relocation

6.39. The Relocation Program establishes basic directives to be followed in case of need for removal and resettlement of population and complies with the IDB resettlement policy. The program is directed toward the following irregular settlements along the right of way: (i) population of Vila Esperança, affected by the duplication of the Imigrantes Highway; (ii) vendors on the Anchieta Highway; and (iii) vendors near the intersection of the Anchieta Highway with the Plateau Interconnection Highway. If there is a verified need to remove families along the Marginal Lanes at Anchieta Highway, on the Plateau, a resettlement plan will be developed based on the directives set forth in this program

6.40. ECOVIAS understands that in the case of irregular settlements in the right of way, so long as they do not interfere directly with the programmed activities set forth in the concession contract, resettlement will not be necessary, and they will be limited to eliminating situations of risk or mitigating environmental problems (Program 1). Should any resettlement become necessary in these cases, the directives established in this program must be followed.

6.41. Removal of the population of Vila Esperança. ECOVIAS developed a Preliminary Resettlement Plan for resettlement of the 12 families and one commercial establishment, based on the directives established in the relocation program. The Plan proposes the resettlement of the 12 families in apartments of an equivalent standard to that being adopted by housing and resettlement programs in the City of Cubatão. The new resettlement area belongs to the City of Cubatão comprising the development of 2 apartment buildings with 20 units each. ECOVIAS will construct a building for the families to be removed related to this project, leaving to the City of Cubatão the construction of the other. A cooperative agreement has been negotiated between ECOVIAS

and the City of Cubatão, in which ECOVIAS takes responsibility for fixing up the existing public school in the area and maintaining it for a period of 3 years.

6.42. The Preliminary Resettlement Plan was presented to the affected families in August 1999, clarifying the need for resettlement, the initial proposal and the need for temporary resettlement on the part of the families. During the meeting, ECOVIAS placed at the disposition of the families vehicles for visiting the buildings rented for temporary resettlement. This plan received full acceptance from all of the affected families.

6.43. Of the total number of families, 7 were removed in the beginning of September 1999 to allow the beginning of the construction works. These were transferred to residences rented by ECOVIAS, situated in the Vila Natal neighborhood, on the outskirts of Vila Esperança. They are regularly established living quarters of dimensions equivalent to the original residences of the removed families but in better condition. The move of the families was aided by ECOVIAS, which furnished the transportation and assisted in placing the children in their new schools. One week after the move, a visit was made to verify the degree of adaptation of the families resettled. The families were informed that the period in which they would stay in the temporary resettlement housing would be no more than 12 months, since a period of 8 months is estimated before their final move to new buildings.

6.44. The estimated cost for resettlement of the affected population from Vila Esperança is US$ 7,500 per family[4], and US$ 1,200, the financial compensation agreement for the small commercial establishment to be removed.

6.45. The evaluation of the environmental liability of the Anchieta-Imigrantes System identified approximately 28 points of invasion by low income population into the right of way of the System highways prior to the concession to ECOVIAS. No evaluation/characterization of the number of families was performed or of the socioeconomic profile of this population. There is no forecast of resettlement of this population on the part of ECOVIAS.

6.46. The implementation of the North Marginal Lanes in the Anchieta Highway could require removal of irregularly settled low-income population, however their identification can only be verified with the development of the engineering design. Should there be an identified need for removal, a plan of resettlement, consistent with the policies of IDB, will have to be presented.

6.47. Removal of vendors. At the intersection of the Anchieta Highway with the Plateau Interconnection Highway, there are approximately 10 vendors which must be moved. The proposed plan is to construct an adequate area for them within the adjoining highway interchange. The details of the relocation and/or indemnification alternatives nor the date for their execution have yet been defined.

6.48. There are three small groupings of small vendor stalls on the Anchieta Highway in the Serra do Mar park area which sell drinks and food. The removal of the existing vendors was requested by the PESM administration, since it constitutes an invasion within park limits. Their removal is also necessary for safety reasons. Ecovias will be proposing to SMA a major truck parking area at the intersection of the Anchieta Highway with highway SP-041 in the Planalto (Km 40). A cluster of commercial stalls will be proposed at this point and existing vendors on the Anchieta Highway will be given the right of refusal. Those who accept will be assisted in moving. Since truckers will most likely no longer stop at the existing stalls once the parking area is implemented, it is expected that most vendors will prefer to move. Those who choose not to move will be assisted in removing and storing their stalls as well as with liquidation of their stocks for sale. Timing of the proposal to be made to the vendors is dependent on the construction schedule for the new parking area. The cost of removal of the existing structures on the Anchieta Highway is estimated at US$4,500 apiece. This cost includes the support to the affected business

[4] Not including the cost of land

owners in the taking down of these points of sale and transportation to another site for them as well as the possible liquidation of their stocks for sale.

Program 8 – Environmental Compensation

6.49. This program seeks to comply with the recommendations of CONSEMA Deliberation No. 38/89, which became a requirement as a result of CONSEMA Deliberation No. 28/99 which resulted from the prior licensing of the construction of the descending lanes of the Imigrantes Highway. The requirement consists of pass-through, in the form of an legal agreement (covenant) with SMA 4% of the project total cost as a note of financial compensation for use of the area of the Serra do Mar State Park and for any damages that may eventually be caused to the environmental heritage of the State. The resources obtained through the agreement are to be applied to institutional enhancement of PESM (administration, control and development of the Park and research activities) and the possible resettlement of irregular settlements in critical areas situated in the Serra do Mar State Park, along the Anchieta Highway *(Bairros-Cota)* and along the Cubatão river *(Água Fria)*, inside the PESM. In both cases, ECOVIAS is not responsible for the implementation of these actions but only for the pass-through of the resources to SMA.

6.50. The measures proposed for the institutional enhancement of PESM include: (i) control program which consists of planning and implementation of actions related to control, protection, including signage, fire control and registration of irregular settlements; (ii) program of public visitation and environmental education, including planning and infra-structure; (iii) program of environmental entitlement; and (iv) program supporting research related to the monitoring of the project and recovery work for degraded areas.

6.51. The measures proposed by the IF related to the irregular settlements: (i) development and implementation of an emergency management plan aimed at immediate freeze on the areas already occupied and prohibition on new occupation; (ii) demarcation and placement of fences in the disaffected areas (*Bairros-Cota* 100/95 e 200); (iii) performance of the registering of human occupation; (iv) stabilization of the infrastructure and preparation of a Plan for Organization of the Land Use in the *Bairros-Cota* 100/95 e 200; (v) resettlement of part of the irregular human occupancy; (vi) development of an Environmental Education Program for the population remaining in the Park; (vii) implementation of a system of signals and signage; (viii) monitoring of the physical and biological elements; (ix) recovery of degraded areas after completion of the resettlement. The resettlement of families who live in *Bairros-Cota* (400 e 500) and *Água Fria* is the responsibility of SMA, by a future agreement with the Housing Secretary of the City of Cubatão. It must be stated, however, that while SMA/IF desire to remove these families, the political and economic feasibility of this is extremely uncertain. A census dated in 1997 indicates that at least 1,200 families were living within the limits of the State Park in situations of risk and/or irregular conditions, with many of these families having lived there prior to the creation of the state park and the construction of Anchieta Highway. The removal and later resettlement of all the families who live within the limits of the State Park will not be possible, even considering the total allocation of 4% of the project cost to be passed through to SMA by ECOVIAS. Considering a unit cost per family of US$ 15,000, total resettlement would present a cost estimated at US$ 22.5 million. The 4% of the total project cost is estimated at R$ 27 million (or around US$ 14.4 million).

B. Cost, Schedule and Responsibilities

6.52. The following table presents a summary of costs involved in the implementation of environmental programs of the EMP. Annex 4 shows the detailed costs and schedule of the EMP.

COST OF ENVIRONMENTAL PROGRAMS OF THE EMP

Programs	Duration	Cost (R$)
1. Environmental Licensing	20 years	1,296,800
2. System's Environmental Performance Control and Monitoring	20 years	600,000
3. Environmental Control of the Implementation Activities *	5 years	---
4. Monitoring and Documentation of the Implementation Activities *	5 years	---
5. Control and Monitoring of the Operation Activities	20 years	16,565,423
6. Disclosure and Community Interaction **	20 years	---
7. Relocation	4 years	525,129
8. Environmental Compensation ***	5 years	24,023,491
Total Cost	-------	43,010,843

* costs included in contractor's costs
** ECOVIAS operation cost
*** 4% environmental compensation

C. Contingency and Safety Plan

Road Safety and Operation Performance Audit Sub-program

6.53. This sub-program aims at: (i) enhancing the safety standards on the highways for which ECOVIAS has the concession; and (ii) establishing a system of procedures to detect the critical points in the system from an operational and road safety standpoint, where safety and/or prevention structures shall be established. Special attention shall be granted to the following situations: (i) slow traffic locations; (ii) busy pedestrian crossing locations, which need pedestrian overpasses; and (iii) stretches which present critical noise levels.

Emergency Action and Accident Sub-program

6.54. Two Preliminary Plans have been prepared by ECOVIAS regarding this sub-program, which are: Management of the Risks of Hazardous Products Transportation; and (ii) Emergency Actions regarding Accidents with Hazardous Cargoes. Both plans were submitted to CETESB, which issued a Technical Appraisal requesting complementation. ECOVIAS is in the process of fulfilling the requirements presented by CETESB.

6.55. The Preliminary Plan for Risk Management which was prepared aims at: (i) avoiding accidents involving transportation of hazardous products in the Anchieta – Imigrantes System; (ii) identifying the various risk situations which contribute to a road accident; (iii) establishing control mechanisms, rules and standards to influence those factors; and (iv) acting in a preventive manner, by acting *vis-à-vis* each and every factor which contribute to a road accident.

6.56. The Preliminary Emergency Plan to Respond to Accidents with Hazardous Products defines the rules and technical and administrative procedures which are to be quickly launched in the event of emergency situations which involve hazardous products, aimed at minimizing impact to the population and to the environment. The Plan presents the procedures currently in use in the Anchieta - Imigrantes System, as well as the proposed modifications aiming at the improvement of the procedure until the duplication of the Imigrantes Highway in the Serra do Mar is opened to traffic.

D. Environmental Management System

6.57. ECOVIAS established an environmental management structure, involving the creation of an Environmental Management Unit, under the Engineering Directory, which is responsible for the coordination of all necessary activities in order to enhance the environmental management of the Anchieta - Imigrantes System. Distribution of environmental management activities in the framework of ECOVIAS' organizational structure is presented in the following table.

ECOVIAS ENVIRONMENTAL MANAGEMENT STRUCTURE

Areas	Tasks
Environmental Management Unit	General Coordination / Environmental Management Environmental Audit of Engineering Projects Environmental Licensing Implementation Control and Monitoring Disclosure / Interaction with the community
Directory of Operations	Operation Control and Monitoring
Ombudsman	Handling of conflicts with the community

E. Supervision and Control of the Implementation of Mitigation and Monitoring Measures

6.58. Mitigation and monitoring actions of the environmental impacts established in the Environmental Management Plan must be controlled by the following entities: (i) ECOVIAS, through its Environmental Management Unit; (ii) Concession Commission, through the implementation of RADA, as put forth in section 3; and (iii) SMA, through its technical departments.

6.59. The construction work of the duplication of the Imigrantes Highway, due to the environmental characteristics of the area (Mata Atlântica rainforest, PESM, fragile geological conditions, etc.) must be subject to more intense inspection by SMA. SMA is hiring the IPT – Technical Research Institute of the State of São Paulo to support the inspection of the work in the Serra do Mar stretch. The following table presents the public entities that are supposed to be part of the work supervision of the Imigrantes duplication project and each one's corresponding areas.

MAIN AGENCIES OF ENVIRONMENTAL SUPERVISION

Entities	Area to Cover
Highway Technical Group	- Fulfillment of requirements established in the Installation Licenses and EIA measures
Forestry Institute	- Actions inside the PESM (fauna and flora) - Assignation of 02 employees (funds by ECOVIAS)
DEPRN - Natural Resources Protection Department	- Fulfillment of measures related to vegetation
Forestry Police	- Obedience to deforestation authorizations
CETESB	- Pollution control in the work site, concrete mills, equipment, etc.
	- Aspects related to the work implementation, namely: (i) local geological conditions; and (ii)

IPT	geotechnical issues

VII. PUBLIC CONSULTATION

A. Existing System

7.1. ECOVIAS plans, according to the Environmental Program 6 — Disclosure and Community Interaction, to make available information from the Environmental Management Plan. This activity should involve the cities located in the area of influence of the highways, public authorities, non-governmental agencies, etc. A Summary of the EMP will be released within this Program, involving all the municipalities and other regional entities.

7.2. The most significant intervention to be performed in SAI existing system will be the implementation of the North Marginal Lanes of the Anchieta Highway, in the city of São Bernardo do Campo, partially in a protected area for the regional water supply. This project will probably undergo SMA environmental licensing procedures including submittal of a Preliminary Environmental Study (RAP), and will thus need to comply with extensive public disclosure requirements as required by SMA Resolution No. 42/94 and CONSEMA Deliberation N0. 6/95.

B. Duplication of the Imigrantes Highway

7.3. The duplication of the Imigrantes Highway passed through a process of environmental licensing in 1989 through presentation of an Environmental Impact Study and respective Environmental Impact Report, as set forth in section III. As part of this process, the following activities related to the disclosure of information were performed: (i) public hearing in the city of Cubatão; (ii) announcements in newspapers with broad circulation about the existence of the EIA/RIMA; and (iii) availability of the RIMA to the public, as set forth in Brazilian environmental legislation.

7.4. The process of evaluation and subsequent approval of the EIA/RIMA for the Imigrantes duplication project was amply discussed and involved the active participation of environmentalists entities, notable those linked with CONSEMA.

7.5. After the 10 years since SMA/CONSEMA approved the project, the following activities related to project disclosure of information took place: (i) disclosure to the media about the project's execution; (ii) CONSEMA approval (with the participation of non-governmental organizations) of the environmental study of changes in the Serra do Mar stretch; (iii) events for project disclosure (workshops and meetings with key entities); and (iv) publication of announcements in large-circulation newspapers regarding the request for Installation Licenses for the project, as set forth in the Brazilian legislation.

VIII. RECOMMENDATIONS

8.1. The Bank will require as part of the Loan Agreement that the Company and all portions of the Project shall, at all times during the life of the Loan Agreement shall comply with each of the following:

1. All applicable environmental, health and safety Brazilian regulatory requirements.
2. All requirements associated with any environmental, health and safety related permits, authorizations, or licenses that apply to the Project or the Company.

3. All environmental, health and safety requirements of the concession contract and any subsequent modifications.

4. All aspects and components of project environmental, health and safety document, including without limitation the Environmental Management Plan, the Health and Safety Plan, and the Emergency Plan.

5. Consult with IDB before approving or implementing any and all substantive changes to the Project or its timetable, particularly those changes which could have environmental or social effects.

6. Send written notice within thirty days of (i) any and all noncompliance with any environmental requirement of the loan agreement (ii) any significant environmental or social accident, impact, event or environmental claim, and (iii) actions taken and preventative measures implemented for the future regarding any such breach, accident, impact or event.

7. Ensure that all companies contracted for construction or operation activities comply with all environmental requirements.

8. Implement routine activities to make project-related environmental and social information available to the local public and to maintain a system of consultation with the public.

9. Implement an environmental, health and safety management system that is consistent with ISO 14001.

10. Do not implement any activities which will directly or indirectly result in the resettlement of individuals or business until the Borrower has submitted to the IDB, and the IDB has approved, a specific plan (procedures) to deal with this situation which fully complies with the Bank's policy on involuntary resettlement.

11. Prior to implementation of the construction on the North Marginal Lanes of Anchieta Highway submit, subject to IDB approval, the RAP (Preliminary Environmental Report) or similar study defining the proposed project impacts and associated mitigation and monitoring programs and that adequate information disclosure and public consultation has been performed.

8.2 Prior to the date of Financial Closure, the Company must fulfill the following conditions:

1. Submit, subject to IDB approval, the final Environmental Management Plan, including cost estimates, time schedule and designated responsibilities for each individual component. The finalized plan must include the following enhancements: (i) finalized program for the resettlement of the 12 affected families including schedule; (ii) plans for mitigating the impacted roadside vendors; (iii) specific technical measures to ensure technical, social and safety protection associated with each irregular settlement along the road system; (iv) specific definition of operational air quality monitoring and noise monitoring programs; (v) finalized mitigation and control measures for construction camps/facilities including worker code of conduct; (vi) finalized corrective action plan to deal with all identified environmental liabilities, including designation and acceptance of responsibilities for each action; and (vii) definition of a new program related to potential indirect impacts resulting from the duplication of the Imigrantes Highway.

2. A copy of the Installation Licenses (LI) for the Imigrantes Duplication Construction Facilities/Camp at Planalto and Baixada.

8.3 Prior to the date of First Disbursement, the Company must fulfill the following conditions:

1. Submit, subject to IDB approval, the revised versions of the Risk Plan and the Emergency Response Plan (i.e., for Management of the Risks of Hazardous Products Transportation

and Emergency Actions regarding Accidents with Hazardous Cargoes), including cost estimates, time schedule and designated responsibilities for each individual component.

2. Present the finalized Health and Safety Plan for the construction phase.

3. Submit a written report on the status of implementation of all applicable environmental, health and safety requirements of the loan agreement.

4. Submit evidence, in content acceptable to the Bank, that the construction of the building for the families to be resettled is being implemented according to the defined schedule.

8.4 Prior to each disbursement, the Company must fulfill the following conditions:

1. Certification of compliance with all environmental requirements in the loan agreement.

2. Description of any non-compliance with any environmental requirement and action plan to correct non-compliance.

3. Description of any additional or new environmental or social liabilities, including without limitation environmental claims, or material complaints, or unforeseen environmental, health or safety impacts or risks.

8.5 The Company shall as a specific requirement for Project Technical Completion:

1. Submit to IDB, in form and substance satisfactory to IDB, a final Construction Phase Environmental and Social Report, which shall include: (i) Company's certification that the construction of the Project complied with all environmental requirements; (ii) information concerning any and all substantial deviations from the original construction plans and specifications set forth in the construction contracts, and a description of resulting adjustments made to the environmental and social mitigation measures or monitoring programs; (iii) information concerning any and all environmental or social liabilities, complaints, demands, or environmental claims; and (iv) copies of any and all important environmental or social documents or reports executed in order to satisfy environmental legal requirements.

2. Submit to IDB, in form and substance satisfactory to IDB, a finalized Environmental and Social Management Plan for the operational phase of the Project.

3. Submit to IDB, in form and substance satisfactory to IDB, the Health and Safety Plan for the operational phase of the Project.

8.6 During the life of the Loan Agreement, the Company must prepare and submit an Environmental and Social Compliance Report, in form and content acceptable to IDB. During Project construction (i.e., until Project Technical Completion), the Company must prepare a quarterly report and the report must be received by the Bank in the subsequent month. After construction, the report must be prepared annually and must be submitted within 60 days after the close of the Calendar Year. The report must include, at a minimum, the following:

1. Company's certification of compliance with all environmental requirements of the loan agreement;

2. Information concerning any and all non-compliance with any environmental requirement, including a brief description and justification and corrective measures taken;

3. Description of any and all relevant environmental or social circumstances or problems, and actions taken and measures implemented in order to prevent the repetition of the same;

4. Description of any and all environmental or social risks or liabilities, either existing or foreseen;

5. Description of any and all environmental, social, or health and safety complaints, demands, inquiries, third party communications, or environmental claims concerning the Project or the Company;

6. Description of the status and results of all environmental and social programs and summary of the previous time-period results/data from the environmental and social monitoring programs; and

7. Copies of any and all important environmental or social documents or reports executed in order to satisfy Environmental Laws.

8.7 The Bank will monitor the environmental, social, and health and safety aspects of the project via internal Bank supervision actions (e.g., site visits, review of documentation, etc.) and will contract an external independent environmental consultant to perform more detailed supervision/monitoring actions during project construction and initial operation to assess compliance with all applicable environmental and social requirements in the Loan Agreement. In addition, the Bank will have the right, as part of the Loan Agreement, to contract for the performance of an independent environmental, health, and safety audit, if needed.

8.8 In terms of the potential use of the funds contributed by ECOVIAS to SMA (i.e., 4% of the project total cost as a note of financial compensation for use of the area of the Serra do Mar State Park), and even though ECOVIAS is not responsible and has no control on the use of these funds, the Bank proposes the perform the following: (i) the Bank will discuss with the applicable Brazilian governmental authorities their plans for the use of these funds (ii) the Bank will discuss with the applicable Brazilian governmental authorities their plans for managing the irregular settlements within and adjoining to the Serra do Mar State Park with the intent of promoting a reasonable decision making process; and (iii) the Bank will monitor the ongoing activities related to these issues.