POLAND

ROADS II PROJECT

EXECUTIVE SUMMARY

Gdańsk - 1997 year
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EXECUTIVE SUMMARY

1. Introduction and Scope:

The improvement of roads and highways is an important component of the overall investment plan of Poland. The proposed project is considered to be very important for the economic development. It will involve in improving and rehabilitating of roads and highways due to heavy traffic activities. This project consists of several subprojects on selected sections of the roads. The subprojects consist of rehabilitation of roads, bridges for river crossings, construction of bypasses around towns etc. The proposed subprojects have been selected on those sections that would improve traffic flow and minimize “bottlenecks” of these roads.

Poland lies in temperate climatic zone. An important feature of the climate of Poland is in transitional character between the maritime and continental climates. As a result there are significant variances in seasonal temperatures during the summer and winter. The rainfall varies from 450 to 600 mm through out the country. The scope of the projects is provided below.

1. Overall length of the road sections related to the projects - 60Km
2. River Crossings - 3
3. Improvements of major intersections - 2
4. Percentage of two lane roads in the project - 20
5. Percentage of routes passing the forest /total length of roads - 15

All roads will be designed to accommodate maximum allowable speed under worst load conditions.

2. Policy and Legal Issues

The Polish Government wishes to proceed with its proposed road project which will require a full environmental assessment. In Poland, EA procedures are enforced by Law and the Government requires that the EA must be approved at the State level. The requirement to carry out EA for roads is based upon the 1995 decree by the Minister of Environment Protection, and Nature Resources and Forestry Regional Planning Act of 1994. The EA must be conducted after finalizing the routes for each road and bridges, which requires formal administrative decision to accept the land use and road construction. The Administrative Decisions are issued by the Local (gmina)Authorities after consultation with all major entities including regional authorities. The scope of EA governed by the decree in 1995 stipulates that it meets the requirements set forth by the European Union Regulations and their codes of practice. Additionally, it is
recommended that the EA for roads should follow comprehensive guidelines that was published recently by the Agency for Construction and Operation of Motorways.

According to the Bank’s environmental screening criteria on transportation projects, especially those involving land clearing and leveling, new land development, bridges and bypasses are considered to be environmental category “A”. Therefore, a full environmental assessment is required. This level of screening is in consistent with the requirements of the Polish Government. The objective of both the polish government and the Bank EA guidelines is to ensure that projects undergo comprehensive examination in which environmental and socioeconomic issues are identified early in the project cycle, so that the project can then be designed to optimize environmental and social benefits and minimizing negative impacts by mitigating and compensating for adverse impacts.

There are many polish laws, regulations, decrees and guidelines that govern environmental requirements and interagency responsibilities and coordination. A list is provided below.

2. Regional planning Act of 1994
3. Ministry of Environmental Protection (decree of the Minister of Environmental Protection issued in 1995.)
7. Act on Protection of Agriculture and Forest area of 1995
9. 1980 Decree Issued by the Council of Ministers on Environmental Protection Against Noise and Vibrations
10. Decree of 1990 Issued by the Minister of Environment and Natural Resources and Forestry on Air Protection against Pollution
11. Decree issued in 1991 by the Minister of Environment and Natural Resources and Forestry on the water quality and wastewater discharges
14. Decree Issued by the Minister of Environment and Nature Resources and Forestry on the impact of motorways on environment, arable land, forest and cultural heritage

The prime focus of the requirements of regional administration is to make sure that the planned roads are in conformity with the local land use management plan. A through review was conducted before granting the construction permits. The detailed design must be approved by the relevant Regional Authorities. Regional Environment Inspectorate provides the general environmental supervision to make sure that all relevant environmental regulations have been followed in accordance with regulatory requirements.
3. Collection of Baseline Data

The baseline data was collected by using a combination of existing available published information and documentation, interviews with key individuals, and reconnaissance level site visits to obtain environmental baseline data on each road segments and bridges. Collected information including feed back from public meetings, which were organized for citizens by Mayors of towns or head of communes. Data collection was focused on obtaining sufficient information to postulate the nature of impacts that can accrue from a given road segment or bridges identified in this project and recommend possible mitigation strategies. In most cases, the study areas are limited to the immediate road alignment. However, in other cases where mobile resources like river water, fauna and wildlife, it was extended for some distant away from the right of way. The baseline environmental data includes climatic conditions, surface geology, water resources (surface water, acquit biota, groundwater); terrestrial biota (terrestrial flora, fauna, wildlife etc.). Socioeconomic data includes commercial activities in the area, demographics, recreational areas, heritage, cultural and archeological resources and existing infrastructure. Based on the data collected, a list of negative environmental impacts have been considered in the environmental assessment.

4. Environmental Impacts and Mitigation Measures:

The environment cannot be comprehended by merely juxtaposing separate assessment for each environmental components. Environment is made up of natural ecosystems, human development activities and environmental factors that often affect one another profoundly. During the environmental assessment of roads and bridges, many negative environmental impacts have been evaluated. These environmental impacts cover: 1. physical and natural environment that includes soil and erosion, water, air quality and natural environment (flora and fauna). 2. Human and social environment cover community life and economic activities, Land acquisition and resettlement, indigenous and traditional people; cultural heritage, aesthetic and landscapes, noise, and road safety. 3. Management of road works and traffic operations include construction and roadside activities, rehabilitation and maintenance practices and risks associated with roads works and traffic operations. Negative environmental impacts, mitigation measures and actions are presented in Table 1, 2, 3. The costs for mitigating the negative environmental impacts are estimated to be in the range of 3 to 5% of the total costs of the project. Environmental considerations used in the conventional design practices such as road safety, storm drainage etc. are not included in the costs of mitigation measures.

5. Reduction of Noise

Noise mainly affects urban areas and villages near roads with heavy traffic. It is one of the most obvious impacts of daily road use. However, noise may also have added impact during the construction. The use of standardized methods for assessing noise levels is
helpful. It should be noted that measurement methods very considerably in each country. Cost of measures for protecting the environment from noise may vary but they may be combined with landscape measures to minimize costs. The discomfort caused by noise is difficult to assess; it includes auditory fatigue and temporary lessening of hearing ability. Traffic flow, speed, acceleration and braking patterns, and vehicular composition play an important role in developing the intensity of noise. Noise barriers such as wall, trees, bushes and other protection have been commonly used in the urban areas where the distance of buffer zone is small. Poland road authorities are aware of noise protection measures and will consider on a case by case basis.

6. Impacts on Flora and fauna:

In addition to the road itself, borrow sites and material stockpiling areas near quarries can disturb the natural environment. In this project, fifteen percent of the road (about 9 Km) will be passing through the forest areas and it will consume about 60 hectors of forests. It will have a minor impact on the forest. Indirect effects of the roads can be minimized by enforcing the laws which provide penalty for forest destruction, poaching, and minimize impacts on the environment. Precautions will be also be taken to minimize the damage to wild and marine life.

7. Cultural Heritage:

Road construction and associated works such as quarrying and backfilling are not close to any cultural and archaeological sites except of Wolin bypass project #15.. Therefore, the question of aesthetic impacts of road construction for that bypass is being reviewed thoroughly by the Government.

8. Indigenous or Traditional People

Indigenous or traditional people require special attention in road projects because they possess a unique cultural heritage and have limited ability to defend their interests and rights in land and other productive resources. In this project, there are no indigenous living in the vicinity of road construction or nearby towns and villages. Therefore, this issue has not been raised in this project.

9. Land Acquisition and Resettlement

Road projects sometimes requires additional land, which must be acquired by the government from current users. While it is sometimes possible to negotiate the price for a voluntary sale of the property, governments often have to use their rights of acquisition of properties for public projects. In Poland, the laws are reasonable and a fair compensation is being provided to the people whose land or property being affected. There are less than twenty people who will be relocated. The government has provided a reasonable compensation package so that it will not create hardship for them during
relocation. Legal compensation procedures have been used for the property owners who are being affected by the construction of road bypasses.

10. **Positive Environmental Impacts:**

It is recognized that the road projects will have some significant positive impacts on environment particularly it improves the amenity of local and regional communities in comparison with overall impact of the road improvement and development. For example it improves local accessibility, parklands, shopping areas, commercial and industrial development and other facilities which will help in improving education and quality of life for the people. The road project also contributes to better traffic flow, reduction of noise, and improvement in traffic safety. Positive environmental impacts are stated in Table 4.

11. **Environmental Impacts During The Construction:**

The regional and local environmental considerations were studied in the light of demography, dynamism of landscape formation, biotic (soil, fauna and flora), human response to environment and heritage. There are 15 subprojects as a part of this project. Environmental impacts on these segments are studied for the following three stages of road construction:

(a) Construction of Camp sites  
(b) During Construction  
(c) After construction and during operation

Likely negative environmental impacts and mitigation measures are summarized in Tables 1, 2, 3

(a) **Construction of Camp Sites**

In every case of road and bridges construction, the least negative impact sites have been selected along with measures to maximize the positive environmental impacts and its enhancements. Potentially significant environmental impacts are:

(1) air pollution from asphalt plant  
(2) dust and noise pollution from crusher  
(3) sanitation and waste disposal.

Mitigation measures have been recommended and are expected to be monitored during construction.

(b) **During Construction**

During the construction of the roads, the potential significant impacts are provided below:
(1) collection and disposal of construction materials;
(2) collection and of oil and other spills
(3) Ground water pollution

c) After Construction and During Operation:

Potential significant environmental impacts are as follows:

(1) induced and uncontrolled development of commercial, residential, and industrial units;
(2) unplanned land clearing and alienation;
(3) air and noise pollution from increased vehicular traffic.
(4) Ground water and surface water pollution

12. Alternatives of Alignment

The Road agency has conducted a study on several alternate routes for selection of bypasses and bridges with respect to their cost effectiveness along with minimum environmental damage. Several alternatives were considered for alignment and bypasses. In case of bypasses, the alternative proposals include considerations of different routes requiring varying travel distances. However, most optimal routes have been selected from the environmental and human health point of view.

13. Environmental Management and Monitoring Plan

The identified mitigating measures required to deal with the negative impacts directly arising out of road construction activities and they would be carried out through comprehensive design reviews based on considerations for environmental mitigation measures. These mitigation measures could be implemented during road construction and monitored by the Regional Environmental Administration and the State Directorate of Public Roads (SDPR) by adhering to the standard design, specifications and construction methods. However, involvement of an EA specialist would be an advantage, particularly from the point of view of dealing with modifications and mitigation measures. It is recommended that the mitigation measures should be monitored and guided through the development of a Mitigation Management Plan (MMP) by using experts from key agencies. A flow diagram for the Environmental Management and Monitoring plan with respect to mitigation measures arising out of construction is provided in Figure 5. With respect to other measures, it is suggested that ACOM and REA should form a committee to serve as a forum for broad-based flow of information and decision making and to provide a basis for identification and prioritization of handling the environmental problems and development of mitigation measures.

14. Risks Assessment:
Road accidents result in deaths, injuries, and damage to the property. They are major public health problems and can add to a significant cost to the economy. Although in Poland road accidents are slowly increasing because of poor road conditions, lack of bypasses through major towns, high travel speeds and lack of modernization of the roads. Pedestrians and nonmotorized road users are especially vulnerable and accidents are generally higher where these road users mix with motorized traffic, unless special measures are adopted. In Poland, there is a national traffic accident reporting system for more in-depth understanding of where accidents occur and what are the main contributing factors. In this project, site-specific measures are proposed. These road measures include improve in pavement and shoulder conditions, signs, markings, intersection layout and control, roadside access, parking, bus stop arrangements, provisions for pedestrians, cyclists and nonmotorized road users, road design standards, traffic management plans, design audits, speed limiting measures, improvement of visibility by providing lighting, improvement of crossings and so on. By developing proper mitigation measures, risk of accidents can be minimized. A special attention should be given to the risk analysis and assessment associated with transport of hazardous substances. Besides this, additional measures will be required to protect ground and surface waters from contamination of toxic substances resulting from the accidents. Therefore, there would be a need to consider restrictions on speed limits and other measures on transport of hazardous substances.

15. **Institutional Development and Training Programs**

Road management and construction involved various agencies and the private sector. Environmental specialists within the road agency are required to undertake studies, develop mitigation plans and coordinate environmental activities with other government agencies, institutions, and the private sector. Training in environmental skills is required both for environmental specialists working on studies, mitigation plans, and supervision of project implementation, and also for the road staff or road agencies, contractors, and consultants responsible for planning, designing, constructing and managing roads. Ultimately, success of sound implementation depends on the awareness of environmental factors at all levels and stages of the project cycle, and on the motivation to deal with problems whenever they arise. The training will be used to create or reinforce environmental diagnosis, planning and management capabilities of the road agency and its environment team. Training should require a through understanding of environmental regulations, laws, decrees and guidelines issued by each local, regional and federal agencies and ministries. There would also be a need to provide training to the Ministry of Environment and other regulatory agencies, who are responsible for issuing permits and providing enforcement.

16. **Improvement in Community Life and Economic Activities:**

Roads are provided to bring benefits to community life and economic activities through improved access, lower transport costs and better markets for local products and services. Road improvement will have a wider effects on community life and business,
considerably beyond the direct impacts of road construction. The road improvement will have significant benefits to the surrounding community through better access to markets, jobs, goods, and services. In general, road construction and rehabilitation are expected to lead to modifications in the community and social environment around the road, influencing various aspects of life styles, travel patterns, and social and economic activities.

17. Public Participation:

In each road segment and bridges, public meetings were conducted to gather opinion regarding rehabilitation and improvements of the roads. To get the feedback from the local people, public meetings were organized for citizens input by the mayors of towns and head of communes. In each subproject, at least one public meeting was held. There were twenty two public meetings in which at least 350 people participated. Large majority of public is entirely in favor of these projects because it will not only improve the economic and social development of the people but it could also minimize accidents by providing bypasses across three major towns and villages.

18. Conclusions and Recommendations

There are many environmental concerns associated with fifteen subprojects. Several negative environmental impacts associated with road project have been identified and a number of them could be mitigated without much difficulty. A mitigation plan has been developed and actions have been recommended to address these concerns. The project should set aside about 3 to 5% of the fund for environmental mitigation program considered for the roads.

A number of direct and indirect environmental impacts of the proposed road construction are considered during the design and can be monitored during the road construction. These mitigation measures should be monitored by the State and Regional Environment Protection Inspectorate. Regional Inspectorate are expected to provide general environmental supervision and adherence to general environmental regulations of all activities including the road construction.

Mitigating measures like combating desertification, control of induced development, preventing contamination of ground water, development of storm water drainage program should also be monitored during the construction phase. Minimization of noise in populated areas are being considered by planting trees and bushes or constructing the walls in the buffer zone.
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Impacts</th>
<th>Order of Impacts Upon Road Segments (*)</th>
<th>Mitigating Measures</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>DIRECT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Resettlement/land acquisition</td>
<td>0 0 0 0</td>
<td>There may be some resettlement issueto individual bypasses for about 20 people</td>
<td>adequate compensation will be provided in accordance with polish Law and other requirements</td>
</tr>
<tr>
<td>2.</td>
<td>Destruction of vegetation</td>
<td>0 1 1 1</td>
<td>Establish camps away from vegetated areas. Where unavoidable plant trees in replacement of those cut</td>
<td>Include Special Condition in Tender Document. Monitoring during construction by Regional Environmental Administration (REA) &amp; Sanitary Administration (SA)</td>
</tr>
<tr>
<td>3.</td>
<td>Oil-grease spillage</td>
<td>1 1 1 1</td>
<td>Adopt good practice to avoid spillage and pursue collection and recycling</td>
<td>- do -</td>
</tr>
<tr>
<td>4.</td>
<td>Air pollution from asphalt plant</td>
<td>2 2 2 2</td>
<td>Select and maintain plant to satisfy pollution criteria and locate plant at leeward edge of camp. This will be a local phenomenon confined to a few locations</td>
<td>- do -</td>
</tr>
<tr>
<td>5.</td>
<td>Dust and sound pollution from crusher</td>
<td>2 2 2 2</td>
<td>Locate plant at leeward edge of camp. No habitation other than the construction camp is likely to be affected</td>
<td>- do -</td>
</tr>
<tr>
<td>6.</td>
<td>Poor sanitation and waste disposal</td>
<td>2 2 2 2</td>
<td>Install lavatory; source separation of garbage; use of organic materials as compost; storage of non-bio-degradable materials</td>
<td>- do -</td>
</tr>
<tr>
<td>7.</td>
<td>Waste water</td>
<td>1 1 1 1</td>
<td>Irrigate camp site plantation</td>
<td>- do -</td>
</tr>
<tr>
<td>8.</td>
<td>Transmission of communicable disease</td>
<td>1 1 1 1</td>
<td>Periodic health check and medication</td>
<td>- do -</td>
</tr>
<tr>
<td>9.</td>
<td>Poaching</td>
<td>1 1 1 1</td>
<td>Control through terms of employment</td>
<td>- do -</td>
</tr>
<tr>
<td>10.</td>
<td>Obstruction to local communication</td>
<td>0 0 0 0</td>
<td>None</td>
<td>No action</td>
</tr>
<tr>
<td>11.</td>
<td>Archaeological and prehistory sites</td>
<td>0 0 0 0</td>
<td>Avoid significant sites as identified</td>
<td>Include special condition in Tender Document. Monitoring during construction by REA &amp; SA</td>
</tr>
<tr>
<td>12.</td>
<td>Social and cultural disruption</td>
<td>0 0 0 0</td>
<td>None</td>
<td>No action</td>
</tr>
<tr>
<td></td>
<td><strong>INDIRECT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Illegal timber cutting</td>
<td>0 1 1 1</td>
<td>Use liquid petroleum gas as fuel in kitchen</td>
<td>Include special condition in Tender Document. Monitoring during construction by REA &amp; SA</td>
</tr>
</tbody>
</table>

**NOTE:** * Order of impact implies: 0 = No Impact; 1 = Mild Impact; 2 = Moderate Impact; 3 = High Impact; 4 = Severe Impa
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dislocation and compulsory resettlement of people living on the right of way</td>
<td>0</td>
<td>According to available information about 20 people will be resettled</td>
<td>Adequate compensation will be provided</td>
</tr>
<tr>
<td>2</td>
<td>Poaching by construction workers</td>
<td>1</td>
<td>Prohibit poaching under terms of employment</td>
<td>Include Special Condition in Tenor Documents. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>3</td>
<td>Landscape disfiguration by high embankments and deep cuts</td>
<td>1</td>
<td>Road side plantation of trees and gentle slope at cut and fill sections</td>
<td>None for embankment but for cut section trees and shrubs plantation. Programming and implementation. Monitoring by SA &amp; REA</td>
</tr>
<tr>
<td>4</td>
<td>Borrow areas and quarry sites</td>
<td>1</td>
<td>Systematic and controlled excavation/quarrying of borrow/quarry areas preferably on windward side and backfilling by waste material from cut section. Avoid significant heritage sites.</td>
<td>Include special Condition in Tender Documents. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>5</td>
<td>Landslides, slumps and slips in road cuts</td>
<td>1</td>
<td>Provide drainage works and stabilize with retaining structures like concrete/masonry wall, gabions, grouted rip rap etc. where risk exists.</td>
<td>Necessary measures to be taken in design. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>6</td>
<td>Air, dust, fume, smoke and noise pollution to inhabited areas from construction equipment, crusher, blasting at quarries</td>
<td>1</td>
<td>Use pollution control for construction equipment, control blasting at quarries with precautionary measure at quarries during blasting. Avoid installations near inhabited areas.</td>
<td>Include Special Condition in Tender Documents. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>7</td>
<td>Interference with surface drainage</td>
<td>2</td>
<td>Provide ditches and cross drainage structures</td>
<td>Necessary measures taken in design. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>8</td>
<td>Erosion of or along road embankment by flowing water</td>
<td>2</td>
<td>Channelise water flow through drains. Provide drain lining and other erosion protection measures at vulnerable locations</td>
<td>Necessary measures to be taken in design. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>9</td>
<td>Alteration of sub-soil water table due to water abstraction</td>
<td>1</td>
<td>Controlled withdrawal of water from deep aquifer</td>
<td>Include special condition in Tender Documents. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>10</td>
<td>Alteration of hydrological regimes of wet lands</td>
<td>0</td>
<td>Hydrological engineering activities are carried out</td>
<td>EA should be carried out in environmentally sensitive areas on specific segments of the road</td>
</tr>
<tr>
<td>11</td>
<td>Destruction of vegetation and wildlife on the right of way</td>
<td>0</td>
<td>Regenerate vegetation in the neighborhood plus roadside plantation. Do not disturb vegetation outside the area occupied by the road embankment or cut</td>
<td>Include special condition in Tender Documents. Monitoring during construction by SA &amp; REA</td>
</tr>
<tr>
<td>12</td>
<td>Destruction of biological resources or eco systems</td>
<td>0</td>
<td>None</td>
<td>No action</td>
</tr>
<tr>
<td>13</td>
<td>Interruption of migratory routes for wild</td>
<td>0</td>
<td>None</td>
<td>No action</td>
</tr>
<tr>
<td>Sl. No.</td>
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<td>Order of Impacts (*)</td>
<td>Mitigating Measures</td>
<td>Actions</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14.</td>
<td>Creation of breeding habitats for mosquito by stagnant pools of water</td>
<td>0</td>
<td>Provide drainage or reuse water for vegetation. Facilitate quick fill up by sand by aeolian movement of the empty borrow pits</td>
<td>Include Special Condition in Tender Documents. Monitoring during construction</td>
</tr>
<tr>
<td>15.</td>
<td>Creation of a transmission corridor for diseases, pests, weeds and other undesirable organisms</td>
<td>0</td>
<td>None</td>
<td>No action</td>
</tr>
<tr>
<td>16.</td>
<td>Construction interference to existing traffic</td>
<td>1</td>
<td>Provide markers, lights with warning signs for traffic diversion</td>
<td>Include Special Condition in Tender Documents for lights and warning signs. Monitoring during construction by REA &amp; SA</td>
</tr>
<tr>
<td>17.</td>
<td>Destruction of utility lines</td>
<td>0</td>
<td>Take precautionary measures and avoid moving construction equipment over or near the utility lines</td>
<td>Monitoring during construction by REA &amp; SA</td>
</tr>
<tr>
<td>18.</td>
<td>Obstruction of routes from houses to farms</td>
<td>1</td>
<td>Provide suitable crossings</td>
<td>Special Tender provision for construction of diversion road and monitoring during construction by REA &amp; SA</td>
</tr>
<tr>
<td>19.</td>
<td>Archaeological and prehistory sites</td>
<td>2</td>
<td>Avoid significant sites as identified. Significant sites to be protected by fencing. If necessary select alternative alignment</td>
<td>Measures taken in Alignment design and monitoring during construction by REA &amp; SA</td>
</tr>
<tr>
<td>INDIRECT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Accident risks associated with vehicular traffic</td>
<td>2</td>
<td>Design curves (horizontal and vertical) for high speed traffic; introduce emergency plan to contain damages from accidental spills.</td>
<td>Already measures taken in Geometric Design of road. Monitoring during construction by REA &amp; SA</td>
</tr>
<tr>
<td>21.</td>
<td>Impairment of non-motorised transportation in the highway corridor</td>
<td>1</td>
<td>Include safe crossings and diversions where required</td>
<td>Special Tender provision for construction of diversion road. Monitoring during construction by REA &amp; SA</td>
</tr>
</tbody>
</table>

**NOTE:** Order of Impact Implies: 0 = No impact; 1 = Mild; 2 = Moderate; 3 = High; 4 = Severe
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<tr>
<td>1.</td>
<td>Air and noise pollution from increased vehicular traffic</td>
<td>1</td>
<td>The expected traffic level being moderate and the traversed area being less populated, no actual inconvenience is envisaged</td>
<td>No action is planned</td>
</tr>
<tr>
<td>2.</td>
<td>Roadside litter</td>
<td>1</td>
<td>Provide roadside disposal facilities. Campaign for CLEAN road strengthen local governments for proper conservancy service in towns and villages</td>
<td>Monitoring by local government</td>
</tr>
<tr>
<td>3.</td>
<td>Water Pollution</td>
<td>1</td>
<td>Provide surface water run-off drainage and ensure adequate treatment by using evaporation tanks, ponds, separators etc.</td>
<td>Include special provision for necessary measures to be considered in the design. Monitoring by REA and Local Authorities</td>
</tr>
<tr>
<td>4.</td>
<td>Groundwater Pollution</td>
<td>2</td>
<td>Provide drainage collection and treatment facilities. Protect ground water from pollution</td>
<td>Protection of soil against infiltration and develop adequate system. Monitoring by SA &amp; REA</td>
</tr>
<tr>
<td>3.</td>
<td>Induced development of commercial, residential and industrial development</td>
<td>3</td>
<td>Plan for controlled development</td>
<td>Planning and monitoring by concerned ministries</td>
</tr>
</tbody>
</table>

**INDIRECT**

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<tr>
<td>4.</td>
<td>Impairment of non-motorised transportation economy due to increased availability of motorised alternatives</td>
<td>0</td>
<td>None</td>
<td>No action</td>
</tr>
<tr>
<td>5.</td>
<td>Unplanned timber cutting</td>
<td>1</td>
<td>Introduce fuel-yielding trees as a part of program to arrest desertification. Enforce forest conservation laws.</td>
<td>Monitoring by SA &amp; REA</td>
</tr>
<tr>
<td>6.</td>
<td>Unplanned land clearing and occupation</td>
<td>2</td>
<td>Plan for controlled development</td>
<td>Planning and monitoring by concerned ministries</td>
</tr>
</tbody>
</table>

**NOTE:** * Order of Impact Implies: 0 = No impact; 1 = Mild; 2 = Moderate; 3 = High; 4 = Severe
<table>
<thead>
<tr>
<th>Stage</th>
<th>Sl. No.</th>
<th>Positive Impact</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIRECT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction of camp sites</td>
<td>1.</td>
<td>Local employment generation</td>
<td>Monitoring by local authorities</td>
</tr>
<tr>
<td>During construction</td>
<td>2.</td>
<td>Additional consumption of local produce</td>
<td>- ditto -</td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>Local employment generation</td>
<td>Collecting employment statistics by SA &amp;REA</td>
</tr>
<tr>
<td></td>
<td>4.</td>
<td>Enhancement of local skills (technology transfer)</td>
<td>- ditto -</td>
</tr>
<tr>
<td>After construction</td>
<td>5.</td>
<td>Elimination of multiple tracks on desert floor</td>
<td>Post-construction surveys by concerned Agencies</td>
</tr>
<tr>
<td></td>
<td>6.</td>
<td>Local employment generation in road maintenance and transportation sectors</td>
<td>Keeping statistics by concerned Agencies</td>
</tr>
<tr>
<td></td>
<td>7.</td>
<td>Improve the access of people to social services like education, health, trade, livelihood and increase in social interaction between communities</td>
<td>Monitoring by local government / concerned ministries together with regional development</td>
</tr>
<tr>
<td>Construction of camp sector</td>
<td>8.</td>
<td>Taking over camp buildings and associated facilities as maintenance depots, community centers or growth nucleus</td>
<td>inserting special condition in contract regarding taking over camps</td>
</tr>
<tr>
<td></td>
<td>9.</td>
<td>Utilization of deep borewells for enhancing local water supply</td>
<td>- ditto -</td>
</tr>
<tr>
<td>All stages</td>
<td>10.</td>
<td>Improvement of security environment</td>
<td>Keeping chronological record of security related incidents by concerned government department</td>
</tr>
<tr>
<td></td>
<td>11.</td>
<td>Activation of local economy due to improved access and security</td>
<td>Planning and monitoring by the concerned govt. departments</td>
</tr>
</tbody>
</table>
FIG. 5 FLOW DIAGRAM - ENVIRONMENTAL MANAGEMENT AND MONITORING
APPENDIX:

Information on the investment environmental impacts.

Projects summaries sheets.
Appendix:
„Information on investment environmental impact.
Projects summaries sheets.”

THE CONTENT

PROJECT NO. 1
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the Nakło bypass one carriageway in the route of national road No.10 Szczecin -
Bydgoszcz, from km 208+848 to km 213+185
(Contract No.53)

PROJECT NO. 2
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of viaduct and bridge in Bogaczewo in the route of national road No.7 Gdańsk-
Warszawa, section from km 71+140 to km 72+840
(Contract No.55)

PROJECT NO. 3
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of Białobrzegi bypass one carriageway in the route of national road No.7 Warszawa-
Kraków from km 409+615 to km 417+154
(Contract No.62)

PROJECT NO. 4
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the Jędrzejów bypass one carriageway in the route of national road No.7 Warszawa -
Kraków from km 554+941 to km 560+736
(Contract No.63)

PROJECT NO. 5
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the Karlino bypass one carriageway in the route of national road No.6 Szczecin-
Gdańsk from km 116+500 to km 121+862
(Contract No.64)

PROJECT NO. 6
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the bridge over the Raba river in Chełm locality in the route of national road No.4 Kraków - Rzeszów from km 453+952 to km 454+797
(Contract No.65)

PROJECT NO. 7
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of Brzesko bypass one carriageway (follow-up) in the route of national road No.4 Kraków - Rzeszów from km 475+541 to km 475+810 and from km 476+500 to km 478+000
(Contract No.66)

PROJECT NO. 8
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the Piaski bypass one carriageway in the route of national road No.17 Lublin -
Zamość, task I from km 167+320 to km 171+090, task II from km 171+090 to km 173+620
(Contracts No.69.1 and 69.2)

PROJECT NO. 9
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of Okopy bypass in the route of national road No.82 from km 66+088 to km 68+530
(Contract No.70.2)
PROJECT NO. 10
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of Radymno bypass in the route of national road No.4 Kraków-Przemyśl from km 646+938 to km 651+704
(Contract No.80)

PROJECT NO. 11
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of Śmigiel bypass in the route of national road No.5 Poznań-Wrocław from km 233+165 to km 238+500
(Contract No.79)

PROJECT NO. 12
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the Syców bypass one carriageway in the route of national road No.8 Warszawa-Wrocław from km 265+300 to km 272+350
(Contract No.78)

PROJECT NO. 13
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the Ostrów Mazowiecka bypass one carriageway in the route of national road No.18 Warszawa-Białystok, section from km 92+500 to km 97+170 (junction Łomża) and relocation of road No.628 in the area of Brok junction, 1.3 km long and section from 97+170 (Łomża junction) to km 99+250
(Contracts No.86.1 and 86.2)

PROJECT NO. 14
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of the bridge over Zalew Zegrzynski in Zegrze in the route of national road No.61 Warszawa-Ostrołęka from km 26+900 to km 30+150, construction of the bridge, construction of the access roads and rehabilitation of the existing bridge, including modernisation of access roads.
(Contracts No. 87.1, 87.2 and 87.3)

PROJECT NO. 15
INFORMATION ON THE INVESTMENT ENVIRONMENTAL IMPACTS
Construction of bypass road for town of Wolin in the system of national road No.3