1. **Basic information**
   1.1 **Desire Number:** PL01.06.01.01
   1.2 **Title:** Southern Bypass of Torun
   1.3 **Sector:**
   1.4 **Location:** Poland, Kujawsko-Pomorskie Voivodship, City of Torun

2. **Objectives**
   2.1 **Wider objectives**
   The wider objective of the project is to strengthen the economic and social cohesion of Kujawsko-Pomorskie Voivodship by provision of transport infrastructure.
   2.2 **Immediate objectives**
   Increased number of SME’s; Creation of new jobs; Improvement of transport system; Connection with the motorway network, and as a result with the TEN network; Improvement of transport accesses for Torun and the region; Safety improvements for travellers and inhabitants; Cultural heritage protection and improvement of tourist attractiveness; Minimizing ecological dangers.
   2.3 **Accession Partnership and NPAA priority**
   The project responds to the medium term priority identified in the AP: developing national policy for economic and social cohesion and preparing for the implementation of regional development programmes as well as Community Initiatives. It corresponds also with the NPAA priority "Regional and cohesion policy".
   2.4 **Contribution to the Preliminary National Development Plan**
   Transport infrastructure plays a key role in efforts to reduce regional disparities in economic performance. Therefore one of the priorities for the country’s cohesion policy identified in the PNDP is “Integration of the Polish economy through modernisation and enlargement of transport networks”. Since the activities under the priority are concentrated on transport infrastructure located in the TENs, they shall be complemented by the actions carried out in the regions, contributing to the achievement of economic and social cohesion of the country. They have been described under the priority “Strengthening development potential of regions and counteracting marginalisation of certain areas”. One of the proposed measures under this priority is “Development and modernisation of infrastructure serving to strengthen competitiveness of the regions”. It identifies co-financing of regional transport infrastructure as a principal element of building endogenous potential for economic development and regional competitiveness. The project is therefore in line with both the PNDP and the operational programme for the Kujawsko-Pomorskie Voivodship. It will be implemented under the OP priority “Development of the road infrastructure of supra-local significance” and will aim at upgrading the access to areas and locations in the region, enabling the creation of value added within the regional and local economy.
   2.5 **Cross border impact:** not applicable

3. **Description**
   3.1 **Background and justification**
   Transit traffic in the region of Torun in the direction East-West goes alongside road No 15 running through the center, South and North of the Vistula river and road No 10 running South of the Vistula river. Traffic from both roads merges on the only existing road bridge in the city, additionally very congested by very heavy city traffic and by transit traffic in the direction North-South. Journeys through the city center are extremely difficult for drivers and create danger for inhabitants and for ancient buildings. According to the national transport policy, the Southern Bypass of Torun will be part of the future expressway S-10 Szczecin-Bydgoszcz-Torun-Plonsk (Warszawa) (acc. Regulation by the Council of Ministers of 28 September 1993-Journal of Laws. No 92), which crosses the planned Motorway A-1, collecting traffic on the direction North-South, but located outside TEN corridors. As a result a complex interchange will be created, joining national roads N°10 and N°15 from Warszawa, Poznan, Szczecin, and Olsztyn. New built bypass will eliminate hazards from heavy traffic that impacts on ancient borough of Torun. It will introduce for sure better tourist perspectives of old town, and consequently better economic situation of the city because of tourist product development. Furthermore the planned bypass allows opening the region on European transport system, and additionally it will improve investment and tourist attractiveness of the whole region. Conditions for
industrial area development will be also created in Torun and its neighborhood due to improved access to investment areas. In long term perspective it will have direct impact on socioeconomic activity and reduction of unemployment. The effects of the project shall be enhanced by the realisation of two other projects to be carried out in the vicinity: construction of a Technology Transfer Centre (Phare 2001) and upgrading and development of the water and sewage management in Torun (ISPA). Based on the studies carried out, the proposed location of the southern ring road is the best possibility. The Torun city is at its southern and western part surrounded by lands which in the past performed the functions of military firing ground. Now these lands are successively handed over by army to the civilian authorities in order to use them economically. It refers, first of all, to the planned ring.

3.2 **Linked activities**
Implementing construction of the Naklo and Stargard Szczecinski Bypass within the road N°10; planned implementing (Phare 2000) 2 sections of the road N°10 in the Warminsko-Mazurskie voivodship; construction of a Technology Transfer Centre (Phare2001); creation of an industrial park by preparing investment areas in Solec Kujawski (Phare 2001); upgrading and development of the water and sewage management in Torun (ISPA).

3.3 **Results**
Reduction of journey time (by 15min. on the route Bydgoszcz-Wloclawek and by 20min. on the route Inowroclaw-Olsztyn); access to 150ha of investment areas; improvement of the national and international traffic, especially in the direction East-West (Russia-Germany); adjusting the road to EC standards (115kN/axle).

3.4 **Outputs**
Construction of the road section 12.5km long as expressway designed for loads 115 kN/axle; Construction of 9 engineering structures (overpasses); Construction of 2 road interchanges.

3.5 **Inputs**
Phare budget 7.6M€; State Treasury 17.4M€; high quality equipment; qualified engineering-technical staff.

4. **Institutional framework**
The Beneficiary of the project: General Directorate of Public Roads, Northern Department, Office in Bydgoszcz. The Employer: General Directorate of Public Roads, Northern Department, Office in Bydgoszcz. Supervising engineer will be appointed within the tender procedure. Investment owner after project realisation: public property administrated by General Directorate of Public Roads, Northern Department, Office in Bydgoszcz. The investment will be conducted in compliance with the DIS regulations. The project implementation will not result in any changes in the institutional framework described above.

5. **Detailed budget (M€)**

<table>
<thead>
<tr>
<th></th>
<th>Investment</th>
<th>IB</th>
<th>Total Phare</th>
<th>National Co-financing</th>
<th>IFIs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>7.6</td>
<td>0</td>
<td>7.6</td>
<td>17.4</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7.6</strong></td>
<td><strong>0</strong></td>
<td><strong>7.6</strong></td>
<td><strong>17.4</strong></td>
<td><strong>0</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

Polish co-financing will be available.

6. **Implementation arrangements**

6.1 **Implementation agency:**
PAO: Vice - Minister in the Ministry of Regional Development and Construction, Wspolna 4 St., 00-926 Warsaw, phone: + 48 22 661 91 19, fax: + 48 22 661 91 45.
Implementing Agency: Polish Agency for Regional Development, Zurawia 4a St., 00-503 Warsaw, Phone:+48 22 629 28 88, Fax: + 48 22 627 22 46

6.2 **Twinning:** not applicable

6.3 **Non-standard aspects:** Not applicable. DIS regulations will be followed.

6.4 **Contracts:**
Contract 1 (works): 23.25M€
Contract 2 (engineer): 1.75M€

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7. Implementation Schedule
7.1 Start of tendering: III/2001
7.2 Start of project activity: I/2002
7.3 Project completion: IV/2004

8. Equal Opportunity
The procedures followed in the project of implementation will be based on the Polish legal system which ensures equal opportunities for all the interested entities as well as natural persons, regardless of their gender, race or nationality. The involvement of men and women in the employment will be based on the EU standards concerning EOE (Equal Opportunity Employment). Special provisions will be included which will guarantee equal access to activities, employment and other profits arising from the implementation of the project.

9. Environment
The EIA was prepared in line with EU directive 85/337 as amended by 97/11 and is available at the beneficiary’s office. One should take under consideration change of acoustic climate parameters in the field. Because the route will run mostly in military area, where no housing is situated, it will not cause environmental nuisance. There are no environmental elements that should be protected by a conservator. In order to soften investment impact on the environment, the following is planned: pre-cleaning of surface water running off carriageway through ditches and sewers into existing water-courses, and regeneration of forest clearings by new planting.

10. Rates of return
Net Present Value : NPV – 111 461 000 zl. Internal Rate of Return : IRR – 26%. The feasability study is available at the beneficiary’s office.

11. Investment criteria
11.1 Catalytic effect
Phare support will be conductive to achieving economic and social cohesion goals in the Kujawsko-Pomorskie Voivodship, which otherwise could be attained only after a much more extended period of time and on a more modest and less efficient scale.

11.2 Co-financing
The project is co-financed by the Polish partners.

11.3 Additionality
The Phare project is not displacing other financing sources, especially from the private sector and IFI system, it is co-financing identified priorities and not taking the place of national resources.

11.4 Project readiness and Size
The project is ready for contracting and disbursement, as all activities will meet all conditions for cofinancing by the start of project implementation.

11.5 Sustainability
The project will contribute to the long term sustainable development of the region, as described in the Kujawsko-Pomorskie Voivodship OP. The investment is sustainable and does not demand further expenditure, apart from the ongoing technical maintenance.

11.6 Compliance with state aids provisions
All aspects of the project will be developed with respect to the state aids provisions of the Europe Agreement

11.7 Contribution to the Preliminary National Development Plan
The project is in line with the PNDP and as such will contribute to increase of economic and social cohesion of the country and region.

12. Conditionality and sequencing
Co-funding of specific activities will be conditional on:
• preparation of regulation concerning selecting and implementing of sub-projects;
• selecting appropriate sub-projects for implementation;
• co-financing of project by the beneficiaries;
• maintaining timetable set in the programme
• obtaining building permission before the start of tendering
• all tendering, contracting, reporting and monitoring conditions met;
• selecting contractors suitable for proper realisation of works.

**Benchmarks:**
• Financing memorandum signed
• Construction designs prepared
• Preparation of tender documentation
• Resources earmarked for Phare co-financing of programme reach National Fund
• Beneficiary contracts project activities
### Wider Objective
- **Indicators of Achievement**: Increase of GDP per capita; decrease of unemployment rate
- **Sources of Information**: Main Statistical Office
- **Assumptions and Risks**: Constant growth of Polish economy; implementation of active forms of combating unemployment

### Immediate Objectives
- **Indicators of Achievement**: 40 new firms near the bypass after 2 years; 250 new net jobs near the bypass after 2 years; Decrease in accidents number by 33 after 1 year; Increase by 1260 vehicles per day after 1 year (from 7890 to 9150); Decreasing amount of CO₂ by 5% and noise by 8% after 1 year.
- **Sources of Information**: Statistics from beneficiary, Statistics from gmina, Voivodship Statistical Office, Consultants reports, Evaluators reports, Police data
- **Assumptions and Risks**: Good functioning of the companies and their continued development; Changes in the policy of the state and the region; Decrease of loans interest rates; Access to all reports, monitoring and contracts, Increased number of tourists, National strategy of transport realised

### Results/Outputs
- **Indicators of Achievement**: 12.5 km of new built/ modernized national road: 9 overpasses and 2 interchanges; reduction of journey time by 15 minutes on the route Bydgoszcz-Włocławek by 15 min. and Inowrocław-Olsztyn by 20 min.; increase in vehicle axle load from 100 kN per axle to 115 kN per axle; 150 ha of investment areas accessed
- **Sources of Information**: Consultants reports, data from beneficiary
- **Assumptions and Risks**: Change in the policy concerning the sector of small and middle-size enterprises; Change in the transport policy of the country, Appearance of new investment grounds

### Activities/Inputs
Implementation of construction works (12.5 km of national road); Phare resources – 7.6M€; National resources – 17.4 MEUR

### Annex 1: Logframe matrix for the project

<table>
<thead>
<tr>
<th>Date of drafting:</th>
<th>December 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Number:</td>
<td></td>
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<tr>
<td>Project title:</td>
<td>Southern bypass of Torun</td>
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</table>

<table>
<thead>
<tr>
<th>Phare:</th>
<th>25M€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phare:</td>
<td>7.6M€</td>
</tr>
</tbody>
</table>

### Planning period:
- **II 2001 ÷ IV 2004**

### Total Budget: 25M€

### Project Number: 01.06.01.01

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| Annex 2-4: Cumulative implementation, contracting and disbursement schedule |
|-----------------------------|-----------------------------|-----------------------------|
| Date of drafting:           | August 2000                 |
| Planning period:            | II 2001 ÷ IV 2004           |

<table>
<thead>
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<td>D</td>
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<tr>
<td>Implementation schedule</td>
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<td>Disbursement schedule</td>
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</tr>
</tbody>
</table>

Legend: D - design of sub-project / C - tendering and contracting / I - contract implementation and payment

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Annex no 5. Summary of Environmental Impact Assessment

The subject of analysed investment is construction of designed Torun town South By-pass within express road No. S-10 Szczecin – Bydgoszcz – Torun – Warszawa.

Torun by-pass was designed as one-roadway with two lanes road of express road parameters of length c.a. 13.1 km.

Environmental Impact Assessment was worked out in February 1998 and it was annex to the application of decision on building and site development conditions.

Present assessment which is unfold of Environmental Impact Assessment prepared in February 1998 allows to introduce short summary concerning impacts of the project on the environment and to consider environmental issues at the later stages in project planning and design:

Designed Torun town South By-pass is likely to have significant effect on the environment,

The route runs across areas of low development without any conflicts with natural environment, and influence on human health and welfare,

No tree specimens to be qualified among monuments of nature and subject to preservation were found present. Detailed study with a specification of trees and shrubbery assigned to be felled, cut away or transplanted will be introduced at the later stages in project planning and design and coordinated with the competent authority - Department of Environmental Protection town of Torun,

Water from the by-pass project site will be discharged by culverts into existing and designed roadside ditches. Contaminated waters from cross-roads and junctions pretreated in oily water separators and discharged by culverts into roadside ditches should satisfy the requirements set out in the Order by the Polish Minister of Environmental Protection, Natural Resources and Forestry, of November 5, 1991 on water classification and conditions to be met by sewage and waste water discharges into water and soil regime (Dz.U. 1991, No. 116, item 503). Total emission of four basic pollutants i.e.: carbon monoxide, nitrogen dioxide, and lead on the projected vehicle load on the project route is insignificant. The most significant factor is emission of nitrogen dioxide and carbon monoxide.

On the basis of computer simulation allow to assume that emission of nitrogen dioxide determining the range of road noxiousness is included in the area of 30 – 130 m on the both sides from the road axis, outside the belt emission will be well within the allowable limits for the site. In the area of possible designed housing development emission can be reduced by planting isolating greens, of low and high growth.

Realization of analysed by-pass is likely to change the acoustic climate within the sites adjacent to the analysed road. Considering road routing outside of intensely developed urban sites (mostly across military range and terrain without dense building development of housing estates) potencial level of noise impact of the project will be low.

Minimal distance of possible designed housing development should be located no less then 50 - 75 m from the road belt edge; observation of admissible noise levels won't be exceded in existing building development by night in 200 m distance,

Detailed simulation to investigate the possible impact of noise at the protected areas - housing development should be carried out at the later stages in project planning and design. At these stages should be proposed measures to reduce traffic noise at the protected areas.

To sum up the environmental hazards that can be expected due to the Torun town by-pass operating are:

- increased noise levels near to the road site, without exceeding admissible noise levels on the border of existing building development sites,
- air-sanitary condition deteriorated in next proximity to the road,
- higher pollution of surface waters due to precipitation and melt water drawdown; the amount of pollutants will be reduced by water pretreatment in sand traps and oily water separators,
- risk of environmental pollution owing to vehicle casualties when dangerous goods i. e. hazardous waste are carried. Positive aspects for the environment and living conditions of the local population are:
- improvement of acoustic and air annoyance town of Torun,
- traffic conditions better than in the existing layout (better noise-absorbing road surface, unobstructed vehicle flow and stoppages eliminated) will reduce environmental hazards right at their source,
- protection of historic and cultural resources town of Torun and increasing its tourist activity,
- part of the local and international transit traffic to be taken up by the by-pass especially in the course of Russian Federation - Germany,
- road routing outside of intensely developed urban sites,
- enhanced safety of road traffic.

In addition, construction of Torun town South By-pass has been classified according to Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain
public and private projects on the environment to projects likely to have significant effects on the environment listed in Annex II p. 10 e of the Directive.

**Annex no. 6 Feasibility study - summary**

The project comprises of construction of southern bypass of Torun along expressway S10, 12,5 km long. The bypass will take the traffic from the existing roads 10 and 15. The project is in accordance with an investment strategy of Kujawsko-Pomorskie Voivodship (region) and with local land use plan.

All national roads meet in the center of Torun and they cause grate disturbance for road users and for citizens of the town. Situation has been significantly improved after construction of the section of A1 motorway with bridge over Vistula river creating eastern bypass of Torun. However on the east – west direction situation is still very difficult. Planning activities indicated that the best solution will be to direct future expressway S10 to A1 motorway and further through southern part of the town. Road 15 would goes in the same way. As a result, A1 motorway would take the traffic from road 1, 10 and 15 but southern express bypass from road 10 and 15. The bypass will bring the benefits to citizens, road users and environment, and in particular it will:

- eliminate the „bottleneck” on the pass of national road through the centre of Torun,
- eliminate at grade crossings with streets and side railway line,
- increase comfort of driving and road safety as well as it will decrease of travel time in national road,
- relieve the town centre of throughout traffic,
- decrease of road impact on environment,
- facilitate to better land use in the area,
- attract domestic and foreign investors,
- facilitate the tourist and recreation movement in the region and in Torun,
- better use of A1 motorway section with bridge over Vistula river.

Technical regulations for roads are included in the ordinance of Minister of Transport and Maritime Economy of 2 March 1999 regarding technical and construction regulations for roads and their location. The following technical assumptions for designing of Torun bypass are adopted from the above regulations:

- technical class - S (expressway),
- minimum width of right of way - 40 meters,
- design speed - 100 km per hour,
- pavement width - 7.5 meters, in later stage 2 x 7.5 m,
- hard shoulder width - 2 x 2.0 meters,
- minimum radius of horizontal curve - 300 meters,
- maximum longitudinal grade - 6%,
- minimum radius of vertical convex curve - 4500 meters,
- minimum radius of vertical concave curve - 2000 meters,
- horizontal clearance - 4.7 meters,
- permissible axle load - 115 kN.

In the Feasibility Study the following topics and analysis associated with the project are presented:

the state of the art of the existing road including general data, pavement condition, accidents and environmental aspects

project characteristics including objectives, technical description, timetable, and costs and sources of financing

methodology of economic analysis

traffic forecast and capacity analysis

traffic user analysis including vehicle operating costs, time savings, accident reduction and fume emission

results of economic justification

results of financial justification.

The cost benefit analysis considers:

vehicle operating costs
costs of time losses
accident costs
costs emission of toxic fume components.

In the result the analysis provide net benefits (discounted to the first year of the analysis period) such as: benefit/cost ratio (B/C), net present value (NPV) and internal rate of return (IRR).
Economic and Financial Analysis
Methodology
The purpose of economic justification is to analyze and compare the consequences of the investments presented bellow with so-called do-nothing situation. Methodology of economic analysis is adopted from „Provisional instruction of economic evaluation of road and bridge investments” elaborated by Road and Bridge Research Institute (IBDM) for General Directorate of Public Roads (GDDP) and up-dated in 1999. The analysis comprises of the following two alternatives: 1) do-nothing alternative and 2) investment alternative.
„Do nothing” Alternative
The do-nothing alternative presents situation where it is possible to maintain the current capacity of the road without introduction of investments, which would improve the road to a higher level then ordinary maintenance can assure. In this alternative the road and engineering structures will be subjected to regular routine maintenance. Apart from routine maintenance the wide scale rehabilitation in the next 3 years and twice in following 16 year period is predicted.
Investment Alternative
Construction of bypass will decrease of maintenance costs and it brings benefits to traffic users and environment. The bypass will attract through out traffic from the town centre, facilitate smoothness of the traffic flow and improve road safety. New pavement and bridges will assure driving of heaviest permissible vehicles without restrictions.

Maintenance scenarios and costs
The main roads in Poland are subject to serious deformation caused by heavy traffic load and pavement material of low stability used in the past. The policy of these road maintenance assumed more frequent but less expensive treatment. According to this policy the maintenance process comprises of the following works:
• routine maintenance – ordinary works made during the whole year including, marking, crack sealing, patching, de-icing, local milling, cleaning etc,
• periodic maintenance – the works done in few year intervals (usually 5 years) removing deformations with cheapest possible way, for example, thin milling, remixing of narrow strips, remixing at intersections,
• rehabilitation – usually replacing of one or two pavement layers after 10-15 years.

Economic Values and Indicators
The main result of the economic analysis is present value (NPV) of costs and benefits associated with the investment. The value illustrates how the investments are profitable for society. The benefits included in the calculations of the NPV are the reduced traffic user savings. The costs, however, are cost of investment decreased by the reduced maintenance costs.

The internal rate of return (IRR) is the rate of interest that discounts the cash flow to a net present value of zero. The project would be accepted if it returns an IRR greater than the discount rate.

The economic analysis for Torun bypass was made in Transprojekt Gdanski in August 2000. In the present study the results of the analysis has been adopted with the following changes:
• the currency euro instead of zlotys has been introduced in the rate 1EUR=4PLN,
• maintenance scenarios described in 9.1 have been introduced,,
• structure of benefits has been calculated,
• the test of sensitivity for increase of construction costs has been presented.

The economic analysis for this project is made for 20 year period and discount rates of 8%, 10% and 12%. The results are presented in the table.

NPV and IRR values

<table>
<thead>
<tr>
<th>Discount rate</th>
<th>8%</th>
<th>10%</th>
<th>12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV [MEUR]</td>
<td>62.0</td>
<td>45.2</td>
<td>23.8</td>
</tr>
<tr>
<td>IRR</td>
<td>26.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The net present values are highly positive for any accepted discount rates, internal rate of return is significantly greater than the discount rates, thus investment is economically justified.

Sensitivity of economic indicators on changes of construction costs are presented in the table.

### Changes of NPV and IRR

<table>
<thead>
<tr>
<th>Description</th>
<th>NPV [MEUR]</th>
<th>IRR [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease of investment costs by 20%</td>
<td>49.1</td>
<td>30.0</td>
</tr>
<tr>
<td>Increase of investment costs by 20%</td>
<td>41.4</td>
<td>23.1</td>
</tr>
</tbody>
</table>

### Net Benefits

The net benefits from the investment through the period are shown in the table.

Net benefits of investment, PV

<table>
<thead>
<tr>
<th>Benefits</th>
<th>MEUR</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings in vehicle operating costs</td>
<td>1.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Savings of time</td>
<td>39.8</td>
<td>61.3</td>
</tr>
<tr>
<td>Savings due to lower accident frequency</td>
<td>23.2</td>
<td>35.7</td>
</tr>
<tr>
<td>Savings due to lower vehicle emissions</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Total savings = total benefits</td>
<td>65.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The data in the table indicate that largest benefits to road users (61%) come from savings of travel time what is typical for express bypass construction in the case that road passing through town is overcrowded. Smaller but significant benefits (36%) come from lower accident frequency. This is the result of taking part of traffic by safer bypass and decrease of traffic congestion in the town. This is caused by better pavement condition on bypass and less fuel consumption while driving through town. Much more smaller benefits (3%) come from vehicle operating costs. However, the benefits are small because they are reduced by relatively high vehicle speed on the bypass, in particular in the first period of its operation. In the first four years of the bypass operation the benefits are negative (see appendix 1, table B, column 2). The benefits from vehicle emissions are not significant (0.4%).

### Benefit Cost Ratio

The benefit cost ratio (B/C) is calculated as the ratio of the present value of total benefits and present value of total costs. The project would be accepted if B/C ratio is greater than one. The results are given in the table.

<table>
<thead>
<tr>
<th>Value at discount rate of 10%</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PV of total benefits</td>
<td>74.3 MEUR</td>
</tr>
<tr>
<td>PV of total costs</td>
<td>16.8 MEUR</td>
</tr>
<tr>
<td>Benefit/Cost ratio</td>
<td>4.62</td>
</tr>
</tbody>
</table>

### Financial Analysis

The financial analysis has been made for two options: with ISPA funds and without ISPA but with equivalent loan component. Since the expressway is not toll road only revenue for road administration is lower maintenance expenditure due to expressway construction. The following assumptions to the financial analysis has been adopted:

- total costs of investment with PHARE and budget components,
- maintenance costs of the sections of roads 1 and 15 in the “do nothing” alternative,
- maintenance costs of the bypass and the sections of roads 1 and 15 in the investment alternative.

Calculation of the financial analysis has been made and presented in the table. The results of financial analysis at 10% discount rate

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Value [thousand EUR]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintenance costs in the “do-nothing” alternative</td>
<td>4961</td>
</tr>
<tr>
<td>2</td>
<td>Maintenance costs in the investment alternative</td>
<td>5529</td>
</tr>
<tr>
<td>3</td>
<td>Savings in maintenance costs</td>
<td>-568</td>
</tr>
<tr>
<td>4</td>
<td>Total costs of investment</td>
<td>42798</td>
</tr>
<tr>
<td>5</td>
<td>Total PHARE input</td>
<td>5835</td>
</tr>
<tr>
<td>6</td>
<td>Total governmental input</td>
<td>-18968</td>
</tr>
<tr>
<td>7</td>
<td>Financial net present value (FNPV)</td>
<td>-13697</td>
</tr>
</tbody>
</table>

* 1 EUR = 4 PLN
Unfortunately, the results of the analysis cannot be positive since saving in maintenance costs are negative. The reason for the negative savings is the necessity of maintenance in investment alternative the two roads, old and new, both significantly loaded by the traffic. The financial situation improved by PHARE input could not change financial net present value which is still highly negative. The benefits from the investment go in total to society and nothing to road administration.

**Results and conclusions**

The economic analysis demonstrates that the bypass construction project has clear positive internal rate of return compared with situation without investment. The main reason are proposed in the project radical improvement of traffic condition. The level of IRR in economic analysis of 26.0% almost three times exceeding discount rate (10%), very high positive NPV almost twice higher than initial construction costs, and B/C ratio equal to 2.6 can be considered as acceptable for road construction project.

The financial analysis indicates that bypass construction will increase maintenance costs of road scheme. It will not bring savings in maintenance costs but, in the contrary, losses. Therefore, all benefits from investment go to society.

The environmental impact assessment shows that bypass construction will caused the decrease of harmful influence of the road and the road traffic for environment. Some impact factors such as changes on earth surface or changes of nature and landscape are not significant. Other factors such as air pollution have not high influence. The significant impact comes from the noise which can be substantially reduced by noise barriers and from water pollution in indirect zone of water intake crossed by road. Surface run-off from the road will be treated or discharged off the zone.

**SCHEME OF ECONOMIC ANALYSIS**

<table>
<thead>
<tr>
<th>Investment and maintenance costs</th>
<th>Costs and benefits of traffic users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do-nothing alternative</td>
<td>Investment alternative</td>
</tr>
<tr>
<td>Maintenance costs</td>
<td>Traffic: 1) Volumes, speeds</td>
</tr>
<tr>
<td></td>
<td>Costs: vehicle operating time, accidents, fume emission</td>
</tr>
<tr>
<td></td>
<td>Benefits: 1) vehicle operating 2) trip time 3) accidents</td>
</tr>
<tr>
<td>Total costs</td>
<td>Net benefits</td>
</tr>
<tr>
<td><strong>Discount rate</strong></td>
<td><strong>Economic values and indicators:</strong></td>
</tr>
<tr>
<td></td>
<td>1) present value of benefits NPVB</td>
</tr>
<tr>
<td></td>
<td>2) net present value NPV</td>
</tr>
<tr>
<td></td>
<td>3) internal rate of return IRR</td>
</tr>
<tr>
<td></td>
<td>4) benefit cost ratio B/C</td>
</tr>
</tbody>
</table>