THE RIJEKA GATEWAY PROJECT
ENVIRONMENTAL ASSESSMENT REPORT
FINAL REPORT

Consultant:
URBING
enterprise for environmental protection and physical planning
Zagreb, Maksimirka 81
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Contract No.: 233/02 - URBING i
003/2002-LUR

Database: U7/LD/vrata rijeke/engl_final report_doc

# Conclusion

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GOALS AND TASKS

Environmental Assessment Report (the Report) has been performed in order to implement the Rijeka Gateway Project, and its contents have been defined by the Terms of Reference (TOR) set by Rijeka Port Authorities in co-ordination with the World Bank (WB).

The objective of this Report was to present potential environmental impacts, as well as guidelines and impact mitigation measures, along with the environmental monitoring program of the Project implementation consequences. Impacts, protection and mitigation measures, and monitoring activities for individual Project components have been dealt with in physical planning documents, environmental protection documents, as well as in design and other documentation produced in line with Croatian standards and regulations. Another objective was to check and verify conformity of the mentioned documentation with the World Bank Environmental Policy Guidelines.

The TOR has defined the Project components: the port, the bridge and the roads. These Project components are developments expecting construction, reconstruction or modernization in the near future, along with the WB support in their realization.

Majority of these components refers to the system of inland and maritime traffic (transportation), defined in physical planning documentation as Rijeka traffic node. The Report involves only those segments whose realization is expected in the near future. Therefore, the Report does not cover the state road D-403, completion of the second carriageway of the west bypass road of Rijeka, which are essential for the entire functioning of the Rijeka traffic node. The Port component does not cover the whole area of the Rijeka Port, but only Zagreb and Beč (Vienna) pier/quay, and the removal (demolition) of the section of existing warehouses. With regard to the road component of the Project, it covers only reconstruction of already built highway Zagreb-Macelj, i.e., its section Zaprešić-Jankomir. Construction of the second carriageway of the same section and construction of the currently un-built section from Krapina (V.Vas) to Slovenian border, are not included in the Project.

Along with the general task of reviewing the documentation prepared so far and its conformity check-up and verification towards WB guidelines, there were also additional tasks:
- For the port component:
  (a) to conduct additional investigation referring to (i) analysis of the warehoused materials, and (ii) analysis of soil in the surrounding of warehouses planned for demolition (within the port area covered by the Report),
  (b) and to express a professional opinion with regard to suitability using demolition material of structures and excavation material for raising the ground at the seabed.
- For the road component: to verify that its route has not been altered compared to the one in the Environmental Impact Study (EIS), that no new settlements have been established at the road route, and to specify activities performed.
- For the bridge component: to check environmental impacts of the planned bridge reconstruction.
- To submit the list of documentation prepared so far, as well as procedures applied so far, and to indicate activities still needed to be performed.

PROCEDURES APPLIED IN THE PROCESS OF DEFINING SPATIAL INTERVENTIONS

All components of this Project (the construction of the communication roads, as well as modernization of the Port of Rijeka as the main Croatian port and its further spreading on western part of Port) are planned in relevant physical planning documentation: Strategy and Physical Planning Program of Croatia, and Physical Plans of relevant Counties (County of Primorje-Gorski kotar, County of Zagreb and County of Krapina-Zagorje).

The Project components: port – Zagreb Pier, roads – State roads D-8 (D.Orehovica-Sv. Kuzam/Vitoševski-Križišće section) and D-404 (Draga-Brajdic connection road), and Zagreb-Macelj highway are spatial interventions that have undergone all legally prescribed procedures for determination and approval of locations.
Based on characteristics of spatial interventions, a location permit is needed for all Project components except for the Krk Bridge and Zagreb – Macelj highway, its section Zaprešić-Jankomir, due to the fact that the bridge and this section of the highway are already in use.

Due to significance and potential environmental impacts of the Zagreb Pier and state roads D-8 and D-404 construction, an environmental impact assessment (EIA) procedure had to be performed prior to issuing the location permit. The EIAs were performed by means of various documents elaborated (whose titles and contents are in line with laws and regulations in force in the time of their elaboration). Based on the EIAs, along with mitigation measures required to prevent negative environmental impacts and environmental monitoring programs, the competent state administration bodies accepted the developments (spatial interventions) in question and issued the relevant location permits.

Based on characteristics of spatial interventions, a building permit is needed for all Project components except for the Krk Bridge and Zagreb – Macelj highway, section Zaprešić-Jankomir, due to the fact that the bridge and this highway section are only to be maintained/reconstructed.

When locations for the Project components were being determined, the participation of the public was ensured through the procedures of public insight and public debate. The latter must be carried out for an environmental impact assessment, which is carried out in line with the Law on Environmental Protection (and the Regulation on Environmental Impact Assessment) and within the procedure for the adoption of physical plans in line with the Law on Physical Planning.

Procedures applied and documents elaborated for particular Project components correspond to the WB Operational Policy. Only minor sections of environmental protection documents, i.e., those referring to capacity building and education, as well as Implementation Plan with detailed assessment of environmental costs, do not fully correspond to the contents of Environmental Management Plans (EMPs). In line with the latest relevant legislation, environmental protection documents include global environmental assessment, and institutional framework.

In line with requirements given in the TOR a public hearing and round-table discussion was organized and the Environmental Impact Assessment Report covering whole project – was presented. Representatives of state, county and city administration, professional and municipal services, NGOs, journalists and other groups of general public were invited, either directly or by announcements in media.

The round-table took place on Jan 15, 2003 organized by the Rijeka Port Authority. About forty invited participants and a large number of media people attended the round-table, but none of invited NGOs.

Written materials, the Report and all other report supporting documents were at disposal for comments in the premises of the Rijeka Port Authority for additional seven days after the round-table.

Remarks, comments and suggestions to the Draft Report are appropriately included in the Final Report.

INITIAL DATA

Initial data on the state of environment which are presented in the Report are for the most part described in Environmental Impact Studies (EIS) and other documentation, but for a certain part they were also collected during terrain reconnaissance and through additional investigations required in the TOR. It is assessed that data described in EISs and other documentation were sufficient for decision making on the siting issues of particular Project components and also on their environmental impact assessment.

Analysis of additional investigation results has shown that most of the excavation material for construction of new objects/structures may be re-used without negative environmental impacts, while a part thereof must be removed from the location/area in question and disposed of (managed) in a way defined by regulations. Demolition material of the hazardous waste storage, objects/facilities for maintenance, garage and transformer substation, including also outdoor handling areas of the courtyard, may not be used for raising the ground level at the seabed. Similarly, the upper layer of all handling and traffic surfaces (asphalt, concrete), due to its saturation with mineral oils, is not suitable for deposition to the seabed will be managed
in line with regulations.

Part of the side walls, as well as the roofing cover, made of asbestos-cement (AC) boards must be disposed of (to the landfill – controlled waste disposal) following the procedures in line with regulations.

ENVIRONMENTAL IMPACT (ASSESSMENT OF THE INTERVENTION ACCEPTABILITY)

Documents related to environmental protection indicate potentially environmental impacts of the Project components, but at the same time they point out larger positive impacts with regard to improvement of the state of environment in the closer and wider area of influence. This particularly refers to the roads component.

Based on the analyses made, documents elaborated and results of additional investigations obtained, it may be concluded that the realization of all the Project components is ENVIRONMENTALLY ACCEPTABLE, provided all stipulated measures for reduction (mitigation) of negative environmental impacts are taken.

ENVIRONMENTAL PROTECTION MEASURES AND ENVIRONMENTAL MONITORING PROGRAM

Environmental impact mitigation measures and environmental monitoring program (through which implementation and efficiency of the prescribed measures are controlled) - as given in documents reviewed, along with additional measures as presented in this Report, are sufficient to make construction of planned spatial interventions without causing unacceptable environmental impacts.

INSTITUTIONAL FRAMEWORK

Organization structure of state and local administration in the Republic of Croatia guarantee implementation of the prescribed environmental protection measures, as well as the control of their efficiency through environmental monitoring program. Implementation is supervised institutionally, through the Ministry of Environmental Protection and Physical Planning (MEPPP), and their sub-units in counties.

Investor’s obligation is to finance both, the implementation of the prescribed measures, and environmental monitoring program. In the Republic of Croatia there exist organizations entitled and authorized by MEPPP to perform environmental monitoring activities.

TO SUCCESSFULLY COMPLETE THE PROJECT THE FOLLOWING ACTIVITIES SHOULD BE CONTINUED:

1. Port Component
   Zagreb pier:
   - Main and Implementation Designs for Zagreb pier

2. Issue of the permits (applications made and the issue under progress):
   State road D-8, section Orehekova-Sv. Kuzam
   - Building permit for whole route

3. Permits issue:
   Zagreb pier:
   - A building permit for all D 404 sections
   State road D-8, section Sv. Kuzam – Križišče
   - A building permit
   State road D-404
   - A building permit
STARTING POINTS
The starting point for physical planning in the Republic of Croatia is the State Physical Planning Strategy which involves space and all environmental elements, as well as the state policy on the protection of the environment. The State's long-term development strategy, which should form the basis for the Physical Planning Strategies, does not exist, but instead the development strategies for particular sectors have been taken into consideration. The Physical Planning Strategy gives space to economic development, from this level to the potential level of development of the most advanced countries, which required long-term consideration of the potentials of space and environmental protection and envisioning of the time stages for rational construction with the purpose of reaching priority and final goals. The implementation of the Strategy refers primarily to the reconciliation of the interests of space users with their active participation, so that individual decisions cannot be made without giving some thought to the influence of individual interventions into space as a whole and the environment of the State and its parts. The strategy is not a firm physical plan, but is aimed at setting basic guidelines, on the basis of which the Government and competent bodies make final decisions. It, as well as environmental protection, includes all the elements of integration with the structure of space and the protection of the European and world environment. Owing to the status of a permanent member of the Council of Europe and an associate member of the European Union and having joined EU-PHARE and kindred programs, the Republic of Croatia will, in addition to the reciprocal commitments taken on with that integration, be able to fulfil the integrating function that has a considerable impact on the physical planning policy.

A complete and planned coverage of complex economic and infrastructure systems focuses on corridors and functional systems that include all segments of state and interstate infrastructure, accompanying economic functions (terminals, free zones) as well as the contact with populated areas and other areas under the immediate influence of routes and transport. Corridors provide the basis for integral and combined traffic and include roads, rail, maritime and river traffic - commercial ports.

a) Trans-European traffic corridors:
- W – E corridor (West Europe – East) and as part of the link Central Europe – Mediterranean
- N – S corridor (Central Europe – Mediterranean) link with the direction W – E, and further connections with Central Europe and the South Adriatic

b) Traffic corridors of state and interstate level with the function of interconnecting large centers and parts of Croatia, which supplement (or constitute a part of) European networks:
- Podravina corridor
- Adriatic (coastal and inland)
- link between North and South Croatia across the territory of the Federation of Bosnia and Herzegovina.

c) Complex traffic, economic and infrastructure systems with the functional elements of corridors:
- intersection system of European and state communications, terminals and economic zones of Zagreb County.
- Kvarner Bay system: Rijeka port system,
- Croatian Danube region (Hrvatsko Podunavlje) system: Vukovar port system, the Danube-Sava canal - the port of Vukovar is the priority, in addition to establishing road and rail connections for combined traffic towards seaports,
- Ploče and Split port complexes (communications with the Federation of Bosnia and Herzegovina)

Integral traffic and energy system planning is established in its key elements at state level as an integral network. This applies particularly to the process of bringing the ports of the Croatian Adriatic to their optimum through traffic support, as well as to the criteria for providing location for energy systems in terms of safety of supply, use of resources and balanced strain on the environment. The planning of these systems
is based on economic evaluation and the programs with an environmental and ecological component which must ensure adequacy of locations and effects on space and the environment. These elements are to be adopted by the physical plans of the counties and defined as a planning obligation in projects and sub-projects.

It has been established by the Physical Planning Program of Croatia that traffic and infrastructure are of particular importance for future development. By the goals of physical planning, economic and developmental framework is determined by the aspiration of the State to improve living quality and balance the development of all parts of the State, to improve the efficiency of the economy adjusted to market conditions and join European development systems and global exchange. One of them is to develop infrastructure systems in the whole territory of the State in keeping with developmental needs and European standards and thus establish safe and high-quality traffic communications among all regions within the State and communication with Europe, as well as direct environmental and developmental priorities primarily towards improving efficiency within the already developed and used environment, and establishing conditions for new programs with the purpose of initiating economic activities and improving the quality of life in all, especially depopulated, areas. The priorities particularly apply to:

- reconstruction of war-torn areas through complex reconstruction and establishing of the conditions for the return of the population and resumption of all the functions of a settlement in order to satisfy current needs and enable further development under new conditions,
- establishing the conditions for instigating and the improvement of economy as well as strengthening traffic functions aimed at stopping negative processes in the depopulated areas, especially borderland and islands,
- use of available and insufficiently effective potentials, especially in the locations and facilities that may have early, high-quality and multipurpose effects (ports, existing working zones, central populated areas, tourist complexes, etc.),
- eliminating the defects (technological, security) of present infrastructure systems and their full integration into the system of the State, as well as the realization of systems and segments which are necessary in order to become part of the international exchange of goods and better connections among particular parts of the State.

When choosing the priority development programs, the multipurpose of effects and purposeful use of space in terms of achieving developmental aims and fulfilling the conditions for its original purpose such as providing infrastructure, environmental protection measures and recovery of the areas burdened and endangered by development must be taken into consideration.

LEGAL FRAMEWORK

Every intervention in space is carried out in accordance with physical planning documents. The components analysed for the Rijeka Gateway Project are located in the Port of Rijeka area, in the broader area of Rijeka, and in other areas of Croatia:

- Port component:  - Zagreb pier,
  - Beč (Vienna) pier, and
  - warehouses scheduled for demolishing in the Port of Rijeka area

- Road component:  - State road D-8, Orehrivica – Knižišče section,
  - State road D-404 and
  - Zagreb – Macelj highway, Jankomir – Zaprešić section

- Bridge component:  - Krčki bridge

The system of physical planning in Croatia is regulated by the Law on Physical Planning as a principal law. This law imposes the obligation to prepare physical plans of various levels and scope. Physical plans on higher level determine strategy and concept of development, while physical plans on lower level determine further conditions for physical planning. The standard method of making and elaborating physical plans (physical planning documents) is determined by the Law on Physical Planning and the Rule Book on the contents, criteria for map projections, required spatial indicators and the standards of physical planning studies.
The **Strategy** determines long-term goals of physical development and planning in accordance with overall economic, social and cultural development, and includes the basis for the coordination and direction of physical development, the physical organization of the State, priority development activities as well as the planning systems with common physical and developmental characteristics that will be the subject matter of physical plans or other physical planning documents.

The **Physical Planning Program of Croatia** provides the measures and activities for the implementation of the strategy. It includes, in addition to more specific goals of physical development, the criteria and guidelines for the design of physical and other entities, as well as a proposal of priorities for achieving the goals of physical planning, and, on the basis of natural, economic, social and cultural starting positions, determines the basis for the organization, protection, use and purpose of space, environmental protection and development, the system of central populated areas and the system of the state development infrastructure.

The physical planning strategy and program of the Republic of Croatia, the documents that set the basic guidelines of long-term physical development, determine the systematization of physical units, systems and entities as a permanent physical basis for planning, observation and implementation of measures.

The **county physical plan**, by recognizing the natural, cultural, historical and landscape values, elaborates the principles of physical planning and determines the goals of physical development, as well as the organization, protection, use and purpose of space. The physical plan includes the county’s physical and economic structure, the system of central populated areas of regional importance, the system of developmental regional infrastructure, bases for physical planning and protection, measures and guidelines for economic development, preservation and advancement of natural, cultural and historical and landscape values, measures for the advancement and protection of environment as well as other elements important for the county. The physical plan is issued by the county, i.e. city assembly, after obtaining consent from the Ministry of Environmental Protection and Physical Planning on its compliance with the state Strategy and Program of physical planning and provisions of this Law.

Picture 1. Illustration of physical planning system

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<td>PHYSICAL PLAN OF AREAS WITH SPECIAL CHARACTERISTICS – NATIONAL PARK, NATURE PARK</td>
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<td>COUNTY PHYSICAL PLAN</td>
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<td>TOWN AND DISTRICT – APPROVED BY TOWN / MUNICIPAL COUNCIL</td>
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<tr>
<td>URBAN / DISTRICT PHYSICAL PLAN</td>
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<tr>
<td>MASTER PHYSICAL PLAN</td>
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<tr>
<td>URBAN DEVELOPMENT PLAN</td>
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<td>DETAILED PHYSICAL PLAN</td>
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The physical plan of the areas with special characteristics determines, with regard to common natural, cultural and other characteristics, the basic physical organization, the measures of use, design and protection of that area with the activities which are a priority, measures for environmental improvement and protection, and, when necessary, determines the obligation of drawing up detailed physical plans for smaller units within the physical plan. A physical plan is obligatory for national parks and natural parks, as well as for the areas which are found obligatory by the State Physical Planning Program or the county physical plan.

The district or city physical plan determines the conditions for physical planning of district or city areas, determines purposeful use, purpose, shaping, reconstruction and recovery of building land and other areas, environmental protection and protection of cultural heritage and particularly valuable parts of nature in the district, i.e. city. The physical plan provides a basis for physical development, goals of physical planning, purpose of the space, standards, guidelines and terms of use, protection and design of the space, as well as other elements important for the district, i.e. city area. The district or city physical plan is issued by the district, i.e. city assembly, upon obtaining consent from the county institute on its compliance with the county physical plan.

The master physical plan determines the basic physical organization, protection of natural, cultural and historical values, use and purpose of areas with a proposal for planning priorities. A detailed physical plan determines the detailed purpose of areas, the regimes of physical planning, methods of providing communal, traffic and telecommunications infrastructure, conditions for the construction of buildings and undertaking of other spatial activities, as well as other elements important for the areas covered by the physical plan.

The participation of the public in the process of physical planning is ensured by the legal obligation whereby during the adoption process all the documents of physical planning must be put up for public debate on the physical planning proposal, which includes the participation of the government administration bodies, local self-government and government units, legal persons with public authority and citizens.

CONFORMITY OF THE PROJECT WITH PHYSICAL PLANNING DOCUMENTS

The Physical Planning Program is a key document all the physical planning documents at the lower level shall comply with. The Physical Planning Program, determines the development program for the road network which encompasses the aspects of the integral traffic system and all the components of activity. Among other things, the program envisages:

- the construction of Highways and fast roads on the major state traffic routes, with preliminary plans for the construction of alternative modern road communications in other traffic corridors,
- retention of the domination of road traffic in the territory of Croatia due to spatial diversity of the network and most adequate approach to users,
- intensification of investments in the maintenance of road infrastructure in order to ensure the full standard of usefulness as well as gradual improvement of critical sections and structures, primarily on the state road network, access roads and by-passes to larger cities,
- employment of stricter environmental protection criteria than in Europe in order to retain the advantages of the preserved condition of our environment.

The priorities by the year 2005 are as follows:

- improvement of the present network, especially on critical sections (introducing the third lane, improvement of the technical and technological features of the roadway structure, etc.), reconstruction and reorganization of traffic according to the present classification of a communication as a transitional period until the planned Highways and fast roads are opened to traffic, and use of present corridors in the process.
- construction of by-pass roads in all larger populated areas on the state roads and establishing connections among communicational isolated parts of the State,
- Other measures and activities include the works by which the by-pass roads in larger populated areas will be completed.
Functional systems and big economic zones, for which complex research must be done and a coherent urban development concept defined, are represented by the Port of Rijeka. It covers Rijeka, the Bay of Bakar, Bršica and Sušak and is a part of the network of Croatian ports with a high international significance.

The next in the hierarchy of physical plans derived from the Physical Planning Program are county physical plans that must be in conformity with the Physical Planning Program.

The prominent position in the Physical Plan of Primorsko-goranska County is occupied by traffic. A number of major European and state directions are the backbone for establishing a system of road communications in this county at international and national level. All these directions intersect in the Rijeka traffic junction and define it longitudinally (direction) from the border with Slovenia (Rupa, Pasjak) across Matulj, Orehovica, the Kržišće junction towards Senj and Gospić, as well as transversally from the Orehovica junction to the Oštrovića junction. The Port of Rijeka which is the main Croatian port has great significance here, and its primary function is the integration of European and state overland and maritime traffic routes and infrastructure (roads, railways, ports).

In addition to main traffic directions, the main linking roads to the port area and the city of Rijeka are of considerable significance. These are primarily:
- Western linking road from the Škurinje junction to the western industrial zone and the Rijeka city basin west,
- East linking road from the Draga junction to the basin Sušak / Brajdica and the city center and the ferry port,
- linking road for the Bakar basin and the industrial zone from the junction Sveti Kuzam / Bakar towards Bakar and Čavli.

The construction that is the completion of the integral traffic junction of Rijeka from Matulji to Kržišće, with all pertaining junction and connection roads to the Port of Rijeka basin, traffic zones and terminals vital for the State have been given the absolute priority.

Under the Physical Plan the Port of Rijeka would be a seaport for public traffic of particular international economic importance. The Physical Plan provides for the strengthening of the role of the Port of Rijeka through the modernization of infrastructure and further development in the western part of the city of Rijeka in the areas now occupied by INA refinery “Mlaka”, “Torpedo” and other users that have been granted adequate replacement areas in the Kukuljanovo industrial zone, i.e in the areas of Urinje and Kostrena.

The Physical plan of Zagrebačka county highlights the advantages of the county area which consist of its convenient geostrategic and communications position and the vicinity of the city of Zagreb proper, the capital that is significant not only in national, but also in European terms. The city of Zagreb is at the heart of the county, it is the most important traffic hub centre in the entire country, radiating the main traffic routes into all other parts of the Republic of Croatia. Through the area encompassed by the county of Zagreb stretches a part of the Highway from Zagreb to Krapina, which is at the same time a part of the panEuropean road corridor Zagreb – Macelj – Republic of Slovenia. The section of this Highway on the territory of the county is its route from Zaprešić to Jankomir, which was constructed as a three-lane two-way road. It is necessary to finish the construction of these Highways, and the section of the already existing three-lane two-way road Jankomir-Zaprešić should be completed into a regular Highway adding the Jakovlje road hub as well.

Prostornim planom Krapinsko-zagorske županije planirana je izgradnja do sada neizgrađene dionice autoceste Zagreb – Macelj, dionica Velika Vas – državna granica.
PRECONDITIONS FOR CONSTRUCTION

Every intervention in space is carried out in accordance with physical planning documents, special regulations and the planning permission. The Location permit is an administrative decision, and is issued on the basis of the physical planning documents and special acts and regulations based on those legislation. The Ministry of Environmental Protection and Physical Planning issues a LOCATION PERMIT for the structures of special national interest and for interventions in space which cover the areas of two or more counties. The structures of special national interest are determined by the Government of the Republic of Croatia.

The LOCATION PERMIT also includes the excerpts from physical planning documents on the basis of which is issued. The LOCATION PERMIT is valid for two years from the date of its coming into effect, provided that an application for the building permit is filed during that period, or the construction works that under the law do not require a building permit are initiated. The LOCATION PERMIT, i.e. exceptionally, an excerpt from the Plan, is a prerequisite for a building permit.

Some interventions into space require an assessment of the impact on the environment based on special legislation – By-Law on Environmental Impact Assessment, which determines the interventions that require an assessment of the impact on the environment (the list of interventions is an integral part of the Role Book is), or based on the obligation assumed by physical plans. The obligation of drawing up an environmental impact assessment for an intervention in space is fulfilled through the making of a technical basis for the assessment of the impact on the environment – Environmental Impact Study.

The environmental impact assessment is a procedure of evaluating the adequacy of the intended intervention with regard to the environment, and the determination of necessary environmental protection measures, i.e. before issuing a LOCATION PERMIT or other approval for an intervention that does not require a LOCATION PERMIT.

The assessment of the environment impact of an intervention is performed by the commission for the assessment of the adequacy of an intervention, and the participation of the public is ensured by making the study available to the public. The committee decides whether to propose an approval or to refuse the approval for the intended intervention. In the event that the environmental impact assessment is required, the LOCATION PERMIT is issued only after the Environmental Impact Study for the intended intervention has been approved.

The Project components: Port – Zagreb Pier, roads – State roads D-8 (D. Oreholica-Vitošev-Križišće section), D-404, Zagreb-Macelj highway are spatial interventions that have undergone all legally prescribed procedures for the determination of locations.

Due to their significant and possible impact, before of location permit issuing, procedure for impact assessment is required. The environmental impact assessment has been conducted through development of different documents (names and content of the documents in conformity with the laws and by-laws applicable at the moment of
The government authorities have given their approval for the projects in the area on the basis of the environmental impact assessment provided that the measures needed to prevent the negative environmental impact are identified and a program for monitoring the environment condition is made. The following location permits have been issued for that purpose.

The building permit is a document (administrative decision) on the basis of which the construction of a structure can be initiated. It establishes that the master plan, i.e. basic design drawn up in conformity with regulations and requirements a structure in a certain location has to meet, and that all the construction prerequisites are met. The building permit issuance is regulated by the Construction Law.

The building permit is issued for the construction of the whole structure. Exceptionally, at the investor’s request, the building permit can be issued for the parts of a structure, but before filing an application for the building permit the investor is obliged to obtain a pro-forma permit for the whole structure. The pro-forma permit, at the investor’s request, determines the parts of the structure for which the building permits are to be issued. Based on the pro-forma permit, preliminary works can begin, but not the works on the structure.

All the mentioned planned operations are of the national importance. That means that the Ministry of the Environment and Physical Planning is in charge of issuing building and LOCATION PERMITS. Likewise, all these operations, according to their significance, require a study on their effects on the environment before the issuing of the site and building permit.

Up to now, these documents, necessary for obtaining the location and building permit, were made:

1. The Port Component
   Zagreb pier:
   - Study of the effects on the environment (as its aimed content) Reconstruction of the Zagreb pier within the Port of Rijeka
     Client: The management of the Port of Rijeka, Rijeka, Riva 1
     Contractor: Rijekaprojekt – niskogradnja, Rijeka, Moše Albaharija 10a
     Date: March 2002.
   - Decision on the environmental consequences of the planned operation of reconstruction of the Zagreb pier within the Port of Rijeka:
     Class: UP/I-351-02/01-06/0073
     Number: 531-05/2-VM-02-7
     Date: 31. 05. 2002.
2. The Road Component

- The study of the effects on the environment, Adriatic coast Highway Rijeka – Split –
  Dubrovnik
  Section: D. Orehovica – Vitošev – Križišće with junction road Križišće – the bridge and the land-
  Krk (present day indication D 102)
  Client: RSIZ za ceste SRH, Zagreb Vončinina 3
  Contractor: Rijekaprojekt, Rijeka, Moše Albaharija 10a
  Date: September 1986.
  - A Conclusion of adopting the final EIS for the Project of Jadranška highway, section Orehovica
    - Vitošev – Križišće with a connection to the Mainland – Krk bridge:
      Class: 002-05-89-02/18(S)
      Number: 2170-02-01-89-001
      Date: April 1989.
  - Engineering, geological and hydrogeological works, an underlying document for the main design
    for the Project of execution of the works aimed at protection of drinking water source zones for
    the state road D-404, from Draga junction to E1 point

State road D-404 (GMC 105)
- Study of the effects on the environment for the urban regional highway GMC – 105 (present day
  indication D 404)
  Study of the effects on the environment
  Client: The city of Rijeka
  Contractor: Ekoplan, doo, Kostrena, Glavani 24 &
  Rijekaprojekt – niskogradnja (civil engineering), Rijeka, Moše Albaharija 10a
  Date: April 1996.
- Detail design for work implementation, protection of the sanitary zones of the springs of
  drinkable water for state road D-404, form juncion Draga to point E1.
  Client: Hrvatske ceste, Zagreb Vončinina 3
  Contractor: Rijekaprojekt – niskogradnja, Rijeka, Moše Albaharija 10a
  Date: October 2000.
- The application of the Act on the environment protection, the initial project for the protection of
  the sanitary zones of the springs of drinkable water
  Client: Hrvatske ceste, Zagreb Vončinina 3
  Contractor: Rijekaprojekt - niskogradnja, Rijeka, Moše Albaharija 10a
  Date: July 2002.

3. Bridge Component – Krk Bridge
- A Report, investigation and evaluation of the condition of the material of reinforced concrete
  structure of Sv. Marko – Krk bridge (larger arch of Krčki bridge)
  Volume 1: Struts
  Volume 2: Props and columns
Client: Hrvatske autoceste, Zagreb Vončinina 2
Contractor: Institute of Civil Engineering of Croatia, Zagreb, Rakušina 1
Date: 15. 02. 2002.

- A Project of renewal and protection of the reinforced concrete structure of Sv. Marko – Krk bridge (smaller arch of Krčki most)
  Volume 3: A technological solution for renewal and protection of columns S20 and S27.
  Client: Hrvatske autoceste, Zagreb Vončinina 2
  Contractor: Institute of Civil Engineering of Croatia, Zagreb, Rakušina 1
  Date: 10. 09. 2002.

- A Project of renewal and protection of reinforced concrete structure of Sv. Marko Krk bridge (smaller arch of Krčki bridge)
  Volume 4: A technologic solution for renewal and protection of the arch, carriageway, and buttresses.
  Client: Hrvatske autoceste, Zagreb Vončinina 2
  Contractor: Institute of Civil Engineering of Croatia, Zagreb, Rakušina 1
  Date: 5. 12. 2001.

- A Project of renewal and protection of reinforced concrete structure of Sv. Marko – Krk bridge (smaller arch of Krčki bridge)
  Volume 5: Complement to the Project design, volumes 1 to 4
  Client: Hrvatske autoceste, Zagreb Vončinina 2
  Contractor: Institute of Civil Engineering of Croatia, Zagreb, Rakušina 1
  Date: 11. 03. 2002.

- Main Design, A Project of renewal and protection of columns S20 to S27.
  Volume 1: Structural and dynamic analysis of the Sv. Marko – Krk bridge (small arch of Krčki bridge)
  Client: Hrvatske autoceste, Zagreb Vončinina 2
  Contractor: Civil Engineering Institute of Croatia, Zagreb, Rakčušina 1
  Date: 09. 2001.

- Detail design, detail design for repair of 12 bearing points.
  Volume 1: Structural and dynamic analysis of Sv. Marko – Krk bridge (small arch of Krčki bridge)
  Client: Hrvatske autoceste, Zagreb Vončinina 2
  Contractor: Civil Engineering Institute of Croatia, Zagreb, Rakušina 1

OBTAINED PERMISSIONS:
A. LOCATION PERMITS

1. The Port Component
   Zagreb pier:
   - LOCATION PERMIT for the reconstruction of the Zagreb pier in the Port of Rijeka
     Class: UP/I-350-05/02-01/0089
     Number: 531-08/2-02-8
     Date: August 14, 2002.

   Beč (Vienna) pier:
   - An Opinion of Ministry of Environmental Protection and Physical Planning that the location permit for Viena pier is not needed
     Class: UP/I-350-05/01-01/0160
     Ur. Number: 531-08-01-2 GR
     Date: November 2002.

2. The Road Component
   State road D-8, Section: D. Orehovica - Sv. Kuzam
   - Location permit:
     Class: UP/I-350-05/00-01/0026,
     Number: 531-08/2-00-6/KM,
     Date: July 2000.

   State road D-8, Section: Sv. Kuzam (Vitoševo) – Kržišće
   - Location permit;
B. BUILDING PERMITS

2. The Road Component

State road D-8, Section: Sv. Kuzam (Vitošević) – Križišće
- Pro-forma building permit

State road D 404 (GMC 105):
- Pro-forma building permit
  Class: UP/I-361-03/96-01/52, Number: 531-03/1-01-97-4, Date: 29. siječnja 1997. god.
- Change of Pro-forma building permit
  Class: UP/I-361-03/02-01/361, Number: 531-09/1-1-02-7, Date: 25. 10. 2002.

Highway Zagreb – Macelj:
- Pro-forma building permit for whole route, location and building permits for already constructed sections of the highway.

THE FOLLOWING PERMITS ARE CURRENTLY IN THE PROCEDURE OF BEING ISSUED (their issuing has been requested):

State road D-8 Dionica D. Orehošća – Sv. Kuzam:
- Building permit for whole route

THE FOLLOWING PERMITS NEED TO BE OBTAINED:

State road D-8, section Sv. Kuzam -Križišće
- Building permit

State road D-404
- Building permit according to changed Pro-forma building permit

Zagreb pier
- Building permit

PROCEDURES CARRIED OUT WITHIN THE PROCEDURE FOR THE DEFINITION OF SPATIAL INTERVENTIONS

As already mentioned, for each spatial intervention a location or a construction permit, respectively, is necessary. The Project components considered are spatial interventions which have undergone all legally prescribed procedures for the definition of locations.

Some of these components have already undergone the procedure for the issue of a construction permit, while for some the procedure is underway. In this context it is worth mentioning that a part of the procedure was finished several years ago under the laws and regulations which are not in force any more. This primarily refers to the elaboration and acceptance of environmental performance studies for the State road D 8 and the State road D 404. The procedure for the Zagreb Pier has been completed recently.
When the environmental performance study was being elaborated for the State road D 8 and the State road D 404, it was not compulsory to grant the public an insight into such studies. This may give an impression that the public was not able to take part in deciding whether to accept the mentioned spatial interventions. However, these were not the only procedures carried out for the definition of locations for these interventions. The Physical Plan of the Primorsko-goranska County in the 1:100,000 scale and the Physical Plan of the Rijeka Municipality (Official Gazette No. 8/86) in the 1:25,000 scale were developed and adopted. Both plans defined in terms of concept and physical plan of the traffic infrastructure as a part of the national infrastructure system, in which the Rijeka-Split highway (D-8) and GMC - 105 (D-404) road made a unity of the Croatian traffic system.

The modernisation and transformation of the Port of Rijeka in the Rijeka basin, which also includes Zagreb pier, has been foreseen by the Physical Plan of Primorsko-goranska County. The Environmental Impact Assessment (EIA) has been carried out by an Environmental Impact Study (EIS) that has been adopted, a location permit has been obtained and now the development of the Main Designs and the procedure of building permit issuance follow.

The Zagreb – Macelj highway has been constructed in the full cross-section from Zaprešić to Velika Ves. Its section Jankomir – Zaprešić is partially built (half cross-section), while the section Velika Vas – Macelj is yet to be constructed. All the built section conform to the provisions of Physical Plans of Counties (Zagrebacka County and Krapinsko-zagorska County) and are fully licensed (location and building permits). The component of this Project is only the already built carriageway lane of the Zaprešić - Jankomir road section. Since this is only the carriageway reconstruction within the existing road clearances, the location permit and building permit are not requested.

In accordance with the Law on Physical Planning, in the procedure for the adoption of these plans the participation of the public was ensured through public insight and public debate procedures, compulsory for each physical plan. During the public insight procedure, every citizen has the right to make a remark on any segment of the plan. The author of the plan must answer all remarks in writing – whether the remark is accepted or not, and if not, why. The answer must be sent to the author of the remark before the plan is adopted. Within the plan adoption procedure, the county assembly or the municipality council, respectively, decides whether to accept the remarks or not.

Within the adoption (and public insight) procedure for the physical plan of the Primorsko-goranska County, which was adopted the last (Official Gazette of the Primorsko-goranska County, No. 14/2000 – July), Zagrebačka and Zagorsko-krapinska County, have been defined in terms of concept and physical plan and accepted the routes of state roads D-8 and D-404, and highway Zagreb-Macelj. During a 30-day public display that was organised for all the plans the proposed road routes could be discussed and the comments could be made thereto.

The Public Display of the Physical Plan of Primorsko-goranska County was organised in the local government units (municipalities and towns) from November 11, 1998 to January 31, 1999. The beginning of the public debate was published in Novi list, Jutarnji list and La Voce del Popolo. All neighbouring counties and municipalities and towns have been submitted a proposal for the Physical Plan of Primorsko-goranska County, Volume 2 along with the instructions and clarifications. In addition, a room has been arranged and decorated in the premises of the County Institute for Development, Physical Planning and Environmental Protection where the public was able to review the Volumes 1 and 2 and talk with any team member or associate. A notice of the beginning of the public debate was submitted to all public institutions (30 institutions and companies), state offices, administrative bodies in the County and the members of the County Assembly. At the end of the public display from January 18 to January 27, 1999 a public exposition was organised. A notice of the public exposition was published in Novi list. The public expositions were performed in the following order: Delnice, Krk, Rijeka, Cres, Lošinj, Crikvenica, Rab, and Opatija. A Task Group and occasional participation of some associates performed the public expositions. A number of exhibitions have also been organised to have the best possible presentation of the subject. A central exhibition was set up in Rijeka (WTC) from January 24, 1998 to December 4, 1998. Smaller exhibitions were organised in the following centres: Delnice, Mali Lošinj, Krk, Rab, and Cres. Along with the exhibitions, thematic discussions about the Plan and in connection therewith were organised. The discussions covered the following topics: A Method of Plan Development, Protection of Natural Legacy and
The Environment of Primorsko-goranska County, and A Concept of Traffic Development in Primorsko-goranska County. In order to get a wider circle of population familiar with the issue and to clarify the importance and the role of the Plan, many presentations were organised in co-operation with the media. The following media performances have been organised: articles in Novi list, radio discussions about the topic (Radio Rijeka), discussions on television (RiTV) and other activities (lectures, discussion with the societies/organisations, discussions at various gatherings, etc.)

It can be seen from the Public Debate Report, which is an integral part of the procedure for the Plan adoption, that there were no remarks to the road routes being the components of this Project and located in the Primorsko-goranska County region.

Since the section of Zagreb - Macelj highway (Zaprešić – Jankomir), which is a component of this Project, has been already constructed and in use for a number of years, we shall review the planned construction of the roads D-8 and D-404.

Lately the public has been expressing its dissatisfaction with the location selected for the D8 and D404 roads. The need for the construction of the D 8 road and the D 404 road has been proven several times on various decision-making levels. It is a fact that these are the roads of national significance and this has been confirmed each time. The fact is also that the construction of the D 8 road began more than ten years ago and that environmental protection solutions were applied in the construction which have proven to be efficient by the use of the road. To date there has been no environmental incident on the constructed and used part of the D-8 road.

It is much more dangerous to push this road to the plateaus above Rijeka, because the situation is getting more tense in terms of environmental protection. The hinterland of Rijeka is an area from which water is strained into the underground, springing on the coast directly on the sea. The passage of the road through the hinterland of Rijeka is much more dangerous for the reason of pollution. Contaminated waters would have to be passed through separators into the ground. It would be impossible to conduct them to the sea due to distance.

The same environmental situation is actually found on the entire section of the road's passage through Rijeka. The situation in the Valley of Draga (D 404) is not an exception. To be true, the existing road through Draga should actually be closed for traffic because it is extremely dangerous and unsafe in every sense due to the risk of pollution.

It needs mentioning that the Rijeka by-pass road (D-8) is not only important for transit but also for local city and inter-city traffic, and that in terms of the average daily traffic per annum local traffic is currently more dense.

We consider that the construction of this by-pass road will have effects which are the opposite of those cited in remarks: the standard of traffic services in the eastern part of the town will be significantly improved by increased traffic safety and reduced environmental effects, especially in the following aspects:
- Traffic on the existing Draga road will be reduced drastically.
- Residential areas of the eastern part of the town, Gornja Vežica and Podvežica with Plumbum, will be relieved of a traffic burden.
- The existing Adriatic road from Martinšćica to Bakar will also be relieved of a part of traffic burden to the benefit of local inhabitants.
- The existing communication from Orešovica over Vežica Plumbum to Bakar, ca. 14,0 km long, will be reduced to 6,0 km when the road through Draga is constructed. This will not only yield savings on fuel and time of travel but will also increase safety on the existing road by reduced transit traffic through residential areas and areas with schools and other city institutions in the eastern part of Rijeka and Kostrena.

It is a fact that these planned roads run through an environmentally sensitive area particularly from the ground water viewpoint. This was the reason for designing the road according to special conditions defined by the authorities, utilities, and the Ministries and currently maximum available and applicable measures for environmental protection.
INTERNATIONAL TREATIES RATIFIED OR SIGNED BY THE REPUBLIC OF CROATIA

ATMOSPHERE

- CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION
  GENEVA, 1979
  Official Gazette SFRJ - International treaties 11/86
  Official Gazette - International treaties 12/93

- PROTOCOL TO THE 1979 CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION ON
  LONG TERM FINANCING OF THE COOPERATIVE PROGRAMME FOR MONITORING AND EVALUATION
  OF THE LONG-RANGE TRANSMISSION OF AIR POLLUTANTS IN EUROPE (EMEP)
  GENEVA, 1984
  Official Gazette SFRJ - International treaties 2/87
  Official Gazette - International treaties 12/93

- PROTOCOL TO THE 1979 CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION ON
  FURTHER REDUCTION OF SULFUR EMISSIONS
  OSLO, 1994
  Official Gazette - International treaties 16/1998

- UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE
  RIO DE JANEIRO, 1992,
  Low on ratification UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE
  Official Gazette - International treaties 2/96

- VIENNA CONVENTION FOR THE PROTECTION OF THE OZONE LAYER
  BEČ, 1985
  Official Gazette SFRJ - International treaties 1/90,
  Official Gazette - International treaties 12/93

- MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER
  MONTREAL, 1987
  Official Gazette SFRJ - International treaties 16/90

- AMENDMENT TO THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER
  LONDON, 1990
  Low on ratification AMENDMENT TO THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE
  OZONE LAYER
  Official Gazette - International treaties 11/93

- AMENDMENT TO THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER
  COPENHAGEN, 1992
  Low on ratification AMENDMENT TO THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE
  OZONE LAYER
  Official Gazette - International treaties 1/8/96

- in preparation for ratification:
  PROTOCOL TO THE 1979 CONVENTION ON LONG RANGE TRANSBOUNDARY AIR POLLUTION
  CONCERNING THE CONTROL OF EMISSIONS OF VOLATILE ORGANIC COMPOUNDS OR THEIR
  TRANSBOUNDARY FLUXES
  GENEVA, 1991

  PROTOCOL TO THE 1979 CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION
  CONCERNING THE CONTROL OF EMISSIONS OF NITROGEN OXIDES OR THEIR TRANSBOUNDARY
  FLUXES
  SOFIA, 1988

  PROTOCOL TO THE 1979 CONVENTION ON LONG RANGE TRANSBOUNDARY AIR POLLUTION ON
  HEAVY METALS
  AARHUS, 1998

  PROTOCOL TO THE 1979 CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION ON
  PERSISTENT ORGANIC POLLUTANTS
  AARHUS, 1998

  THE KYOTO PROTOCOL TO THE FRAMEWORK CONVENTION ON CLIMATE CHANGE
  KYOTO, 1997
NATURE / BIOLOGICAL DIVERSITY:

- CONVENTION ON BIOLOGICAL DIVERSITY
  RIO DE JANEIRO, 1992
  Low on ratification of CONVENTION ON BIOLOGICAL DIVERSITY
  Official Gazette SFRJ -International treaties 1/6/96

- CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE ESPECIALLY AS WATERFOWL HABITAT
  RAMSAR, 1971
  Official Gazette SFRJ -International treaties 9/77
  Official Gazette - International treaties 12/93

- CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE
  PARIS, 1972
  Official Gazette SFRJ - International treaties 56/74
  Official Gazette - International treaties 12/93

- in preparation for ratification:
  - CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA
    WASHINGTON, 1973
  - CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (CMS)
    BONN, 1979
  - CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE AND NATURAL HABITATS
    BERN, 1979
  - AGREEMENT ON THE CONSERVATION OF CETACEANS OF THE BLACK SEA, MEDITERRANEAN SEA AND CONTIGOUS ATLANTIC AREA
    MONACO, 1996

WASTE / HAZARDOUS WASTE:

- BASEL CONVENTION ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTES AND THEIR DISPOSAL
  BASEL, 1989
  Low on ratification of CONVENTION ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTES AND THEIR DISPOSAL,
  Official Gazette - International treaties 3/94

SEA:

- CONVENTION FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION
  BARCELONA, 1976
  Official Gazette SFRJ -International treaties 12/77
  Official Gazette - International treaties 12/93, 16/98

- PROTOCOL FOR THE PREVENTION OF POLLUTION OF THE MEDITERRANEAN SEA BY DUMPING FROM SHIPS AND AIRCRAFT
  BARCELONA, 1976
  Official Gazette SFRJ -International treaties 12/77
  Official Gazette - International treaties 12/93

- PROTOCOL CONCERNING COOPERATION IN COMBATING POLLUTION OF THE MEDITERRANEAN SEA BY OIL AND OTHER HARMFUL SUBSTANCES IN CASES OF EMERGENCY
  BARCELONA, 1976
  Official Gazette SFRJ -International treaties 12/77
  Official Gazette - International treaties 12/93

- PROTOCOL FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION FROM LAND-BASED SOURCES
  ATHENS, 1980
  Official Gazette SFRJ -International treaties 1/90
  Official Gazette -International treaties 12/93
• PROTOCOL CONCERNING MEDITERRANEAN SPECIALLY PROTECTED AREAS
  GENEVA, 1982
  Official Gazette SFRJ - International treaties 9/85
  Official Gazette - International treaties 12/93
• CONVENTION ON THE PREVENTION OF MARINE POLLUTION BY DUMPING OF WASTE AND OTHER
  MATER
  LONDON, 1972
  Official Gazette SFRJ - International treaties 13/77
  Official Gazette - International treaties 3/95
• CROATIAN-ITALIAN-SLOVENIAN AGREEMENT ON CO-OPERATION IN THE PROTECTION
  OF ADRIATIC SEA WATER AND COASTAL AREAS FROM POLLUTION
  1974
  Regulation on ratification CROATIAN-ITALIAN-SLOVENIAN AGREEMENT ON CO-
  OPERATION IN THE PROTECTION OF ADRIATIC SEA WATER AND COASTAL AREAS
  FROM POLLUTION
  Official Gazette - International treaties 2/77
- in preparation for ratification:
• PROTOCOL FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST
  POLLUTION RESULTING FROM EXPLORATION AND EXPLOITATION OF THE
  CONTINENTAL SHELF AND THE SEA-BED AND ITS SUB-SOIL
  MADRID, 1994

WATER:
• CONVENTION ON COOPERATION FOR THE PROTECTION AND SUSTAINABLE USE OF
  THE DANUBE RIVER
  SOFIA, 1994
• Low on ratification of CONVENTION ON COOPERATION FOR THE PROTECTION AND
  SUSTAINABLE USE OF THE DANUBE RIVER
  Official Gazette - International treaties 2/96

SOIL:
- in preparation for ratification:
• CONVENTION ON COMBATING DESERTIFICATION PARTICULARLY IN AFRICA
  PARIS, 1994

INTERVENTION PLANS IN ENVIRONMENT PROTECTION:
- in preparation for ratification:
• CONVENTION ON TRANSBOUNDARY EFFECTS OF INDUSTRIAL ACCIDENTS
  HELSINKI, 1992

ENVIRONMENT PROTECTION ASSESSMENT:
• CONVENTION ON ENVIRONMENTAL IMPACT ASSESSMENT IN A TRANSBOUNDARY
  CONTEXT
  ESPOO, 1991
  Low on ratification of CONVENTION ON ENVIRONMENTAL IMPACT ASSESSMENT IN A
  TRANSBOUNDARY CONTEXT
  Official Gazette - International treaties 1/6/96

PUBLIC PARTICIPATION AND ACCESS TO INFORMATION:
- in preparation for ratification:
• CONVENTION ON ACCESS TO INFORMATION, PUBLIC PARTICIPATION IN DECISION-
  MAKING AND ACCESS TO JUSTICE IN ENVIRONMENTAL MATTERS
  AARHUS, 1998

MARPOL Convention
relating thereto (MARPOL 73/78) Annex III (Prevention of Pollution by Harmful Substances Carried by Sea in

UBRING

15
Packaged Form) to delete tainting as a criterion for marine pollutants from the Guidelines for the identification of harmful substances in packaged form.

Tainting refers to the ability of a product to be taken up by an organism and thereby affect the taste or smell of seafood making it unpalatable. A substance is defined as tainting when it has been found to taint seafood.

The amendments were approved at the last MEPC session in June-July 1999.

The amendments will mean that products identified as being marine pollutants solely on the basis of their tainting properties will no longer be classified as marine pollutants.

Annex III of MARPOL applies to all ships carrying harmful substances in packaged form, or in freight containers, portable tanks or road and rail tank wagons. The regulations require the issuing of detailed standards on packaging, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications, for preventing or minimizing pollution by harmful substances.

"Harmful substances" covered by Annex III are those substances which are identified as marine pollutants in the IMO International Maritime Dangerous Goods Code (IMDG Code).

OPRC Convention
The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), which was adopted in November 1990, is designed to help Governments combat major oil pollution incidents. The Convention became international law in May 1995.

The Convention is designed to facilitate international co-operation and mutual assistance in preparing for and responding to a major oil pollution incident and to encourage States to develop and maintain an adequate capability to deal with oil pollution emergencies.

In 2000, IMO adopted the Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances, 2000 (HNS Protocol) which follows the principles of the OPRC Convention for hazardous and noxious substances other than oil.

Like the OPRC Convention, Parties to the HNS Protocol will be required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries. Ships will be required to carry a shipboard pollution emergency plan to deal specifically with incidents involving HNS.

INSTITUTIONAL FRAMEWORK
The organisational structure of the state and local governments in the Republic of Croatia guarantees the implementation of certain environmental protection measures and the control of their efficiency by monitoring. The implementation is controlled institutionally through the Ministry of Environmental Protection and Physical Planning and through the organisational units in the Counties.

The Investor is responsible for financing, implementation of the measures prescribed and monitoring the environment condition. The monitoring of the environment condition in the Republic of Croatia is performed by the organisations authorised by the Ministry of Environmental Protection and Physical Planning.

The implementation of bilateral agreements ratified in the field of environmental protection that are within the scope of the Ministry of Environmental protection and Physical Planning is at the state level inspected by the environmental inspector.

In the Republic of Croatia the protection of sea against pollution is organised through the development and implementation of the following plans:
- A State Plan for Protection of Waters, a County Plan for Protection of Waters and
- A Contingency Plan for Accidental Sea Pollution in the Republic of Croatia, a Contingency Plan for Accidental Sea Pollution in Counties that stipulate the responsibilities of the subjects in the area.

The State Plan for Protection of Waters and the County Plan for Protection of Waters have been developed with an aim of systematic, continuous and optimum water protection from pollution. It contains
the basic guidelines, tasks, activities, and the measures for protection of waters. The Plans are based on the Law of Waters (OFFICIAL GAZETTE 107/95) and their implementation is inspected by a Water Inspector (at the State level at the State Directorate for Waters and at the County level at the State Administration Office of Primorsko-goranska County, Economy Department). The inspector prescribes the procedures if the Plans are not abided by.

A By-law of limit values of indicators for harmful and other substances in sewage water (OFFICIAL GAZETTE 40/99 and 6/01) stipulates the limit values of the indicators and allowed concentration of harmful and other substances in industrial wastewater and for the waters discharged into the natural recipient after the treatment.

A By-law of Water Categorisation (OFFICIAL GAZETTE 77/98) defines the type of waters that satisfy the water quality conditions in terms of their general environmental function and the conditions for special use of water referring to the surface waters, ground waters and the seawater in terms of protection against pollution from mainland and islands.

The environmental protection inspector and the inspector are responsible for checking the implementation of the Contingency Plan for Accidental Sea Pollution, which stipulates the measures for mitigation of damage to the environment in the event of accidental larger-scope pollution, the entities responsible for implementation of the measures and their authorisation, and the manner for the measure implementation.

The environmental protection inspector, which is an employee of the Ministry of Environmental Protection and Physical Planning inspects the implementation of the Law of Environmental Protection, the Law of Waste, the Law of Air Protection and the regulations passed on the basis thereof. All environmental protection measures and the environment monitoring program (compulsory monitoring), the solutions of the Ministry of Environmental Protection and Physical Planning identified during the environmental impact assessment, location and building permits in terms of the environmental protection are subject to inspection. The investor that provides the funds is responsible for implementation of the protection measures and the monitoring. The environmental inspector at the County level operates through the organisational units of the Inspection Office of the Ministry of Environmental Protection and Physical Planning. The Organisational Unit of Rijeka is authorised for Primorsko-goranska County.

On the basis of the Maritime Code (OFFICIAL GAZETTE 17/94), the Inspection Office at the Ministry of Maritime Affairs, Transport and Communication supervises the safety of sea navigation, construction works executed on the maritime property, protection of the sea and the navigational safety. This means that it is also authorised for supervision of the implementation of the Contingency Plan in the case of accidental sea pollution.

The implementation of the Noise Law (OFFICIAL GAZETTE 17/90) stipulating the maximum allowed noise levels and other regulations passed on the basis thereof is controlled by the Sanitary Inspector at the state level and at the county level.

**ADMINISTRATIVE FRAMEWORK**

The Port of Rijeka is managed by the Rijeka Port Authority, which was established by the Croatian Government by its Decision on the establishment of the Rijeka Port Authority (Official Gazette of the Republic of Croatia, No. 42/96).

The component referring to roads comprises State roads (D-8 and D-404) and highways (Zagreb-Macelj highway, Jankomir-Zaprešić section), State roads are operated and maintained by Hrvatske ceste, Vončinina 3, and highways and the Krk Bridge by Hrvatske autoceste, Vončinina 2.

Territorial and administrative constitution of Republic of Croatia are:
- 21 counties – state administration and local government
- around 500 Towns and Municipalities (communities) – local government.
The components considered are located in the area of 2 counties:

- Primorsko-goranska County:
  County center: Rijeka
  (the Port of Rijeka, Krk bridge and communications – D-8 -eastern Rijeka by-pass road, section Oreholica – Križišće, D-404 - linking road Draga – Brajdica (from the container terminal to the eastern Rijeka by-pass),
- Zagreb County:
  County center: Zagreb
  (Zagreb – Macelj Highway, section Jankomir – Zaprešić).
(c) Project description

Four components have been considered as parts of the Project (port, communications, terminal and bridge) on which certain interventions will be made in order to ensure higher efficiency of the Port of Rijeka. Part of the work refers to restructuring (terminal), part refers to recovery works / maintenance (bridge), part to the reconstruction (Vienna pier) and part to more significant interventions into space:

- **Port of Rijeka:**
  - western terminal (includes the reconstruction of berths, demolition, reconstruction and construction of new warehouse facilities and reconstruction of operational road and rail areas)
- **Communications:**
  - eastern Rijeka by-pass roads, section Orehevice – Križišće, linking roads Draga – Brajdica (from the container terminal to the eastern Rijeka by-pass)
  - construction of the part of the Highway Zagreb – Varaždin, section Jankomir – Zaprešić

1. The Port Component

The planned intervention refers to the reconstruction and extension of a part of the cargo port in the Rijeka port area, which is an integral part of the Port of Rijeka. According to its purpose, the Port of Rijeka is open to mass transit, while according to its size and importance, it is a port of special (international) economic interest to the Republic of Croatia.

The city center cannot satisfy the needs of all present and future users, a rational attitude towards precious city space has become a fundamental factor which puts limits on the plans to define the purpose of the space in order to serve the needs of the city, port and other important users. Therefore, one of the goals of the city center’s future physical development through modern evaluation of existing work zones in the port and industrial activity is to examine the possibility of optimum physical and functional development of port activities in the west port area. This would be accomplished by moving the container and “ro-ro” terminal from the Delta area, the port of Bradoš and Brajdica to the western port area in order to gradually leave the Sušak port area to the city, through realization and relocation stages. In order to achieve that goal it is necessary to expand and modernise the mainland part of the port in the west part of the port basin. Because of the spatial restrictions (a railway with a cargo terminal and a shunting yard in the west, a large industrial zone in the port hinterland with INA Oil Refinery (Milka) occupying its largest area, and some INA’s smaller industrial zone west of the pier) and based on the current physical and time possibilities, the “conquering” of the sea surface is one of the possibilities for expansion of the port cargo terminal in the west basin of Rijeka.

The present traffic situation in the Rijeka west port area is far from satisfactory. The roads are very bad with very bad technical elements, small, almost disastrous capacity, while the location is very unsuitable, as well as its connection with public city and intercity roads. The new traffic plan for the Rijeka port area would establish quality communication with corresponding city roads, as well as a direct link (D-403) with the state road network through the Skurinje junction on the Rijeka by-pass road. The reconstruction of the Zagreb pier will fulfill the basic functions of the port:

- Mooring
- Trans-shipping goods from the ships to indoor and outdoor warehouses and to means of transport: ship – rail – trucks
- Outdoor warehouses
  - for general cargo
  - for container and “ro-ro” terminal
- Indoor warehouses for the storage and protection of cargo, treatment of goods, packing, etc.
- Ensuring the basic functions of work and safety at work
- Direct road connection to the state road network
The Project, that is the construction of a new Zagreb pier, with expansion of the cargo port includes actually a reconstruction of the existing Zagreb pier and a part of the cargo port located in the west part of Rijeka port basin.

Spatial development conception in long term function of Rijeka basin, planed that Rijeka traffic direction will be based on the next technology entities:

Rijeka-Sušak port area:
- Brajdica container terminal in its final size
- Sjeverna Brajdica (Northern Brajdica) as a distribution center represents a transitional part between the port and the city
- Passenger port and nautical center in the Baroš port with accompanying facilities on Delta
- terminal for general cargoes in the Rijeka port area
- grain terminal (silo)
- Zagreb Pier as a multi-purpose terminal and timber terminal

Bakar port area:
- bulk cargo terminal Podbok; as a multi-purpose terminal for bulk cargoes (iron ore, coal, phosphates, ...)
- "Goranin" area as a reloading point of the Škriljevo Free Zone

Raša port area:
- cattle terminal Bršica
- roll on-roll off terminal Bršica

Omišalj port area:
- tanker port

To conclude, the spatial concept of the development of the Rijeka port area envisages a concentration of general cargoes, timber and grain in the western part of the port, a gradual conversion of the old port of Sušak and Delta into passenger, tourist and promotional marine facilities, a concentration of bulk cargoes in the Bakar port area and the affirmation of the Raša port area as port facilities appropriate for accommodation outside densely populated areas.

1.1. Zagreb pier
Realisation of the west terminal is related to areas which are today occupied by the Port of Rijeka (Zagreb pier) and the refineries «Mlaka» and «Torpedo» owned by the company INA and various other holders. They are supposed to move to adequate replacement areas in the industrial zone of Kukuljanovo, or in the area of Urinje and Kostrena. The removal of the bulk of these facilities is planned by the year 2010, which met an approval of the President of the Croatian government. On the basis of these plans of development, the Port of Rijeka placed an order for the elaboration of the project documentation necessary for the construction of Zagreb pier, better known under the name of «West terminal». Fundamental characteristics of this terminal are as follows:

- Construction of the new operational wharf in its overall length of 1200 metres;
- This wharf should be a continuation of the former pier «Ivo Lola Ribar» or «Bratislava pier»,
- In the initial phase, the construction of pier in length of some 600 metres is planned, and in the second phase the remaining 800 metres, with the possibility of extending it for additional 200 metres in length.
- The average depth of sea along the coast should be around 30 metres, which enables it to anchor all the ships that are sailing and that will sail around the world, because there is no port in the world that has deeper sea along its coast,
- By the boundary of the naval goods some 829 100 m² of area is reserved along this terminal, which almost equals the area in the city of Rijeka that is at disposal of the Port nowadays,
- This terminal is reserved for the container traffic, and for the traffic of the general cargo, especially the cargo consisting of heavy and voluminous freight (staples, stone blocks, ship and other tin-plates, industrial equipment and plants, etc.)
- For its construction they are planning to use the same technology used in the construction of container's terminal in the port of Trieste, which is more familiar under the name of «Molo settimo». Basically, this technology consists of concrete columns constructed on a firm foundation where a flag-stone is erected as an area scheduled for the port. This technology makes possible the construction of the entire terminal
within five years, and its full burdening immediately after each of its phases is being finished, because it doesn't require time for the adjustment of the operational areas.

The reconstruction of the Zagreb pier is closely connected with the overall technological, physical and traffic restructuring of the Port of Rijeka which creates the conditions for moving a number of port activities from the immediate city center and providing space for new, commercial facilities in the very city center.

The present Zagreb pier, which now consists of a developed part of the coast, an undeveloped part of the coast, undeveloped and manipulative space, as well as the area with warehouses, occupies the area of 52,000 m².

The new, developed Zagreb pier will occupy the onshore area of 282,000 m² in total (28.2 ha) and 164,000 m² (16.4 ha) in the maritime zone, i.e. 446,000 m² (44.6 ha) in total. The capacity of the pier for general cargo will be 2,000,000 t/year, the capacity of the container terminal will be 1,000,000 t/year and the estimated workforce is 350. The capacity of the pier and the workforce (the data analysed in a number of studies) may vary depending on the process of the port's restructuring and the dynamics of introducing modern technologies.

According to its purpose, the Zagreb pier is categorized as a port area intended for transport and storage of goods. In keeping with its purpose, in the onshore part of the pier the existing areas and structures will be repaired and new ones will be built and developed. New areas will be built in the part of the port's maritime zone, as well as a new pier with platforms for ships to land at.

An open area for trans-shipping, loading and unloading of general cargo and containers from ships to the operational storage area and vice versa, transport and storage of goods, as well as loading and unloading of cargo between: ship-freight car and vice versa, ship - truck and vice versa, freight car - truck and vice versa, and warehouse - freight car - truck will be organized in the areas intended for transport and storage of goods. New structures for storage of goods will be constructed and the existing warehouses will be repaired. Part of the space will be allocated to the temporary construction site (during the reconstruction of the pier), and another part will be used for auxiliary facilities and traffic and public infrastructure facilities.

The areas with outdoor warehouses, indoor warehouses, facilities for the control of entries and exits, utility facilities, etc. will be used by the investor - user to serve its primary purpose as indicated below. The onshore part of the pier will be developed as a functional system in accordance with technological requirements.

In direct link with this terminal is the program called «West exit» from the city of Rijeka, which encompasses the construction of the tunnel under the settlement of Murvice and the junction of the Port with the Škurinje hub - state road D-403 (this road is not component of Project).

1.2. Beč (Vienna) pier
The reconstruction that is the renewal refers to the existing areas without their reassignment. After many years of operation at Beč (Vienna) pier, some parts of the embankment have subsided which resulted in deformation of the handling area, precipitation water sewers, crane trolley path, track, and the water network. The length of the embankment is 246,5 metres, and its medium width 11,25 metres.

After a number of years of usage, there was a sagging of dam at certain parts of embankment at Vienna pier, which caused deformations in the commercially exploited area, canalisation of precipitation waters, paths of cranes, tracks and water supply network.

After wide excavations up to the depths of + 1,80 metres above the sea level, a basic trough will be made, represented by the dam made out of stone, flattened and jammed together, 20 centimetres thick. Over such a channel an 18 centimetres thick supportive layer of mechanically jammed grained material is put. Over this supportive layer a sheet of 22 cm thick micro reinforced concrete is added.

Reconstruction of the tracks will be carried out together with the tracks at Orlando pier. Because of the heavy traffic, the foundation of the tracks will be a 25 cm thick sheet of reinforced concrete which is going to be constructed on a flattened and compressed trough of crumbling stone.
A new path is being constructed serving the cranes, in the length of the already existing one, as a continuous traverse of reinforced concrete.

Reconstruction of the embankment wall consists of adding the moor rings, repairing of the damaged stone surfaces, constructing of portholes for the infrastructure (energy cables, water supply hook-.

2. The Road Component

2.1. D8 State road, Orehovica – Križišće Road Section

The State road D-8 is a part of the road routes, which is of wider European importance and therefore included in the European Network of Roads. They are:


The existing route of the Adriatic Tourist Road through Rijeka in the road categorisation planned is substituted with a highway whose route bypasses the City following its longitudinal form of Križišće – Orehovica – Matulji. On the Orehovica – Matulji – Rupa highway there are junctions planned for integration of City road network of which the following ones are relevant for this Report:

- "Škurinje" Junction to connect the City centre and the Port to the by-pass road. Indirectly, s few City suburbs are connected to the same junction as well.
- "Draga" Junction by which Sušak and Kostrena are connected to the junction through the "Eastern Exit" (tunnel connection of Brajdica – Plumbum and a new Plumbum – Draga road).
- "Vitoševo" Junction to which the Port industrial area and the new industrial zone of Kukuljanovo – Cernik are connected. The villages of Krasica, Praputnjak, Škrževje, and Kukuljanovo are connected to the eastern junction.
- "Križišće" Junction will separate the Rijeka-Split highway and the state road connecting the island of Krk across the bridge (Krčki Most), which will be the shortest car ferry connection to the islands of Cres, Lošinj, Rab, and Pag.

Road section Orehovica – "Sv.Kuzam" (Vitoševo) from the "Orehovica" junction via "Draga" junction to the "Vitoševo" junction, in total length of 5.6 km, and including "Sv.Kuzam" junction 6.35 km, collects the traffic from Zagreb, Jušići and "Sv.Kuzam" (Vitoševo) directions.

From the "D.Orehovica" junction in direction Vitoševo, the Highway route is laid on the south slope of Draga Valley, and mainly in cuttings. Due to geologic properties of soil at the side of cutting, the road is characterized with almost continual retaining walls. At position km 2+0 there is the "Draga" junction that distributes the road traffic of the east part of the City.

From the "Draga" junction towards "Sv.Kuzam" (Vitoševo) the Highway route passes through the "Draga" tunnel within the 3rd km. Further on, the route is laid at the south slope of the valley having the same soil (rock) properties and consequently the same technical concept as the road section between "Orehovica" and "Draga" junctions. The village "Sv.Kuzam" (Vitoševo) is passed by through the tunnel (length L = 270 m); immediately after the tunnel follows the "Sv.Kuzam" (Vitoševo) junction. This junction serves as connection to the industrial zones and Adriatic tourist road located above the town of Bakar.

The road section "Sv, Kuzam"(Vitoševo) – Križišće is laid on the very slopes of the Bakar Bay. It is laid as close as it can be to the facilities and structures/objects of the railway marshalling yard (R.K) Rijeka, in order to minimize the number of ruined slopes and to preserve the picturesque sloppy landscape of well-known "Bakar gromače/terraces" as much as possible. The Highway has been elaborated in the length of about 9.00 km. At that length it involves 3 tunnels in total length of some 1400 m and 8 viaducts in total length of about 2200 m; that means about 40 percent of this Highway section length is to be built in the form of structures/objects.

The road route from Orehovica to Križišće passes through the Draga Valley till Vitoševo, then through the Sv.Kuzam tunnel it rises to higher elevations above the Bakar Bay, crosses the Krasica Plateau beneath the villages of Meja and Praputnjak, and finally ends downward to Križišće. At the head of Bakarac Cove through Križišće the route passes the tunnel which leads it to the south slope of the Vinodol Valley. With regard to
existing and planned settlements, the Highway route is laid sufficiently off, so that the impacts of the road / traffic on the residents in the surrounding area will be minimal. In order to maintain normal functions of the settlements, grade-separated road, pedestrian and railway crossings have been planned.

The criterion applied for the pedestrian crossings is that the opposite side of the Highway can be easily reached in 5 to 10 minutes, i.e., the distance between adjacent pedestrian crossings is 400 to 600 m at the subsection of the Highway where accessibility is required from both sides of the Highway. Road crossings criterion is maintained at 1000-1500 m distance between crossings, and existing roads shall be mandatory left in operation. Grade-separated crossing solution is applied also for railway crossings in two levels. There are no newly built housing settlements on the planned route of D-8 road.

2.2. State road D 404 (GMC-105), Draga – Brajdica Connection Road

The State road D 404 (GMC-105) is planned to pass the area of the Rijeka City and the area of Sušak respectively (SE part of the Rijeka City). The route D 404 (GMC-105) runs from the Mrtvi kanal bridge that crosses Delta, then a new bridge on the Rječina River across Brajdica (north of the railway station and parallel to the railway). Almost the entire length of the road route in the area of Pećine and Donja Vežica is laid in the tunnel. Two tunnels are planned: Pećine tunnel (1300 m long) and Bobova tunnel (200 m long). When it leaves the tunnel the route runs through an undeveloped area below the settlements in Vežica that is on the southwest slope above the Martinšćica Cove (parallel to the Draški Potok (stream) to the Draga area where it connects to the Draga Junction on the future Adriatic Highway. There are no newly built housing settlements on the planned route of D-8 road.

D 404 is the state road which present the consistent solution of one of the transversal – longitudinal lines that are derived from the global/general traffic system of the City of Rijeka. It is the road starting at the Rijeka Theater, passes above Container Terminal Brajdica, then through the Pećine tunnel under the Gornja Vežica city district, and connects to the Highway system at the “Draga” junction. Its main traffic function is to collect the road traffic from industrial zone and Rijeka Port that flows through the urban center and to direct it towards the Draga junction, and to Kostrena and east coastal areas respectively. Considered at the higher traffic level, this road connects Sušak and Kostrena. At present, traffic flows through Franjo Rački Street with high up-hills and sharp bends and curves, passing through the very center of the city, threatening urban traffic, causing traffic congestion and environmental pollution.

D 404 is the road to remove all these problems. By leading the road through the Pećine tunnel, the area of Sušak becomes free of transit traffic. The function of D 404 (GMC-105) road is two-fold; first – it is a high quality solution of transversal line to connect coastal belt of the City with the City bypass road, and second – it is a very good solution of the primary coastal traffic corridor that, starting from the Rijeka Theater, heads to the west through Ivan Zajc Street and Riva Street. Therefore its realization is justifiable.

2.3. Zagreb – Macelj Highway, section Jankomir – Zaprešić

The reconstruction is planned for the left (est) road track of the Zaprešić – Jankomir Highway, the already constructed left road track of the Highway Zaprešić - Jankomir, which was opened to traffic as a half Highway. The reconstruction covers the renewal works and replacement of the asphalt layer on the road lane, shoulder, and precipitation water discharge. Along the left lane the junctions of Zaprešić and Jankomir have been built as well as the sections of the highway after those Junctions. They were completed and opened for traffic as a complete highway. By construction of the right lane of the Zaprešić-Jankomir lane the entire line of the state road D1 Karlovac – Zagreb – Jankomir – Zaprešić – Zabok – Krapina will be connected to the road network and on to the future highway to Macelj to the border with Slovenia.

The whole section of the Highway is in a dam 2 - 13 m high. The existing roads are crossed over by flyovers (overpasses), and the river Sava by a bridge. These objects are symmetrical with the objects constructed on the existing left road track.

3. The Bridge Component

The Krk bridge is a bridge with the largest concrete arch of this type in the world. It consists of two arches and connects the mainland and the Island of Krk over the small island of Sv. Marko. Maintenance operations on the bridge are currently underway. Maintenance is divided into regular and extraordinary. Regular maintenance is done by their service and covers the road surface, traffic signs, bumpers, guard nets, railings.
etc. Extraordinary maintenance is done by third parties and implies works other than regular. The reinforced-concrete skeleton construction of the bridge Sv. Marko-Krk (the small arch of the Krk bridge) – its struts – are currently being repaired. The works are performed by Vijadukt from Zagreb under the project of the Civil Engineering Institute Zagreb.

Struts are relieved of load by a support scaffold and the support assembly is replaced. By a high-pressure pump under the pressure of ca. 2,000 bar, "unsound" concrete is removed by means of water, any oxidized reinforcements are replaced and a new thickened protective layer of concrete is applied by dry jet procedure, or a new thickened protective layer of concrete reinforced by steel fibers, respectively. In the end, concrete is protected from new chloride penetration by polymeric coatings on the parts with jet mortar, and with silanes or silicones on the parts with concrete repair. Since this is a very complex operation and there are no major experiences with the repair of such constructions worldwide, certain deviations from the project are being made in terms of quantities of removed "unsound" parts of the bridge and the applied repair technology. The project solution of repair and protection of the struts of arched construction of the Sv. Marko-Krk bridge was performed on the struts S28 to S31 on the inundation on the Island of Krk under the pressure of need without ensuring the possibility to relieve the struts from load and to repair support assemblies at the same time. Therefore, this solution does not improve the static and dynamic stability of the struts, it even weakens it to some extent. For this reason, an improved solution in terms of durability, static and dynamics has been designed for the continuation of repair and protection works on the remaining struts (S20 to S27). This improved solution is performed on the struts S21 to S26 with their relief of load for the simultaneous reconstruction of support assemblies as well, and on the highest struts S20 and S27 (in arch heels) without a relief of load. On the latter, the pavement structure is dilated, the supports of the main abutments are executed as half-joints and are not damaged, and will therefore not be reconstructed. The new, improved solution for the repair and protection of the struts S21 to S26 of a significantly reduced cross-section can be summarized as follows:
- struts are completely relieved of load by a new support scaffold,
- repair and protection of strut ribs of the cross-section thickness 30 cm (like on all other struts) according to the former project solution (by removing 2-3 cm protective coating of concrete with above-critical chloride concentration and executing a new protective layer of concrete, 2 cm thicker, by dry jet procedure),
- repair and protection of strut booms (dimension of cross-section only 130x20 and 100x20) by removing 2-3 cm of protective coating of concrete with above-critical chloride concentration and classic execution (in transportable shuttering) of a new protective layer of concrete, 5 cm thicker, MB 75 trademark, reinforced with steel fibers,
- reconstruction of support assemblies according to a special project solution (given in Book 2),
- protection of concrete from new chloride penetration by polymeric coatings on the parts with jet mortar, and with silanes or silicones on the parts with concrete repair.

The new high-strength micro-reinforced protective layer of concrete of strut booms will have physical and mechanical characteristics similar to the present characteristics of basic concrete and will, together with it, participate in taking over and transferring the total load of the pavement structure. Given its high quality (and strength and impermeability) and a significant thickening, the durability of reinforcement protection can be reliably estimated at about 75 years. Additional steel fibers replace the classic divisional reinforcement and strengthen to some extent these elements of struts, which is also contributed to by the addition of silicate dust that significantly homogenizes and increases the strength of the connection between the new and the old concrete.

High struts S20 and S27 in arch heels represent a specific problem because in their bases (up to about 15 m height) they have an above-critical chloride concentration also in the zone of the main reinforcement (up to 4-5 m depth) and because presently there is no practical possibility to relieve them of load when repair and protection works are carried out, and since the support assemblies in them will not be reconstructed, they do not have to be relieved of load. For them, on the lower ca. 15 m height (in the zone of deeper chloride penetration and maximum strains), a concrete strengthening by high-strength impermeable concrete (MB 75) has been designed, while the other parts are repaired and protected along the entire height according to the earlier solution for the repair of struts S28 to S31 (on the inundation on the Island of Krk). On the lower part of the S20 strut, 4,5 cm of the surface layer of concrete is removed (the main reinforcement is partly uncovered) and on the lower part of the S27 strut 4 cm, and these layers are thickened by 5 cm. On the upper parts of both struts, 3 cm of the surface layer of concrete is removed and it is thickened by 2 cm.
Technological project solutions for the three remaining construction assemblies (arch, pavement structure and buttresses) are similar to those for the struts. On the biggest part (except for the heel and the parts of the arch up to 15 m above sea level), they are applied only partially, on the spots of visibly corroded reinforcement, although the world's state of the art avoids such solutions today. It is believed that they speed up the corrosion of reinforcement around the spots repaired in this way. However, repair and protection are envisaged only on the spots with visible defects in execution, where the protective layer of concrete is only several millimeters thick. This is a provisional solution that will slow down corrosion on critical spots. Since this open reinforcement is not coated with epoxy protection and the repaired and adjoining surfaces are impregnated with penetrating inhibitors and silanes or silicones, it is not expected that the corrosion of adjoining reinforcement will be significantly accelerated. We believe that, pending a possible implementation of complete reconstruction and protection of the protective layer concrete, these parts will be able to endure several more years needed for the repair and protection of all critical parts on both the small and the big arch and for the completion of research on the possibility of a durable protection of these parts only by a cheaper silane impregnation or polymeric coating with minimum roughening and reprofiling of the surface layer of concrete, or by a more durable and efficient cathodic protection, which is underway.

The following is envisaged:

- on the outer surfaces of arch heels and arches up to the height of 15 m above the sea level, 2-3 cm of protective layer concrete with an above-critical chloride quantity will be removed, the protective layer will be reprofiled and thickened by 2-3 cm by a high-quality jet mortar, and all this will be durably protected by electro plastic chloride-impermeable polymeric coating;
- only surfaces with visibly corroded reinforcements on the remaining part of the structure will be provisionally repaired and protected in a similar way: the protective layer concrete will be thickened by jet mortar by 1-2 cm and impregnated on the surface by penetrating inhibitors and silanes or silicones (not coated with polymeric protection); the lower reinforcement of joints with more than 10% of cross-section surface destroyed by corrosion will be replaced by sound reinforcement,
- front walls ('masks') of buttresses and the buttresses themselves will not be protected for the time being, because no reinforcement corrosion is visible on them yet; the state of reinforcement is checked (every two years).

Later (in 3 or 5 years; in the meantime we do not expect any significant deterioration of the state of concrete and reinforcement of these parts), when the efficiency is confirmed of the polymeric coating on the struts and the silane impregnation, which will be checked when repair and protection works on the critical parts of the big and the small arch (struts, arch heels, bracings and stays) are completed, the method of durable repair and protection will be defined for these parts, too.

In this context, the possibility of applying more recent methods of cathodic protection should be checked as well (with nets or layers with surface conductivity); these methods are increasingly recommended and used in developed countries. Only they totally block the corrosion process already begun, without damaging the concrete of the construction element. In order to check this, one should first test electric connection of the overlapping reinforcement in the joints of certain pre-fabricated arch panels, as a pre-requisite of a possible efficient application of cathodic protection; if it proves to be satisfactory, a trial surface should be executed, on which both the efficiency and the price of execution would be checked. Before, in spite of certain recommendations, we avoided it for the very reason of its price. However, the price of the technology we use now has probably exceeded the possible highest price of cathodic protection. We believe that cathodic protection will prove to be indispensable on the stays of the big arch (after the research, which is underway, has been completed).

The coastal belt stretching over the territory of the Rijeka port area to the "Torpedo" factory is occupied by the port with its homogeneously and extensively used port activities. For the purpose of these activities, in front of the city there is a permanent traffic corridor of road, railway and port internal and interregional traffic. The interference of truck traffic in the city traffic has many negative effects in terms of environmental impacts - traffic safety, environmental pollution and occupation of a part of the capacity of roads. In the present organization of traffic, trucks leaving the port facilities and heading for the areas outside the city are driving through a series of transversal city streets. Truck traffic greatly disturbs the increased needs of city traffic, pedestrian traffic, passenger car traffic or public city transport. This situation on the roads leading to or from the port causes the greatest pollution in every sense.
Basic initial data have been partly elaborated in EIA studies and other documentation, partly collected during site reconnaissance, and partly obtained through additional investigations and research as required in the TOR. These data make the relevant basis for decision making with regard to siting (selection of locations) of individual components, and with regard to environmental impacts of the Project.

1. The Port Component
The starting data for the environmental impact assessment for the port component were obtained from the Environmental Impact Study for the Zagreb pier. They were partly collected by visiting the sites and interviewing current and former employees in the Port of Rijeka, and partly by additional investigations asked for by the Terms of Reference. The Environmental Impact Study has been made almost entirely in accordance with the World Bank Operational Policy. Namely, the Study contains all the elements of the environmental assessment report except for the part referring to the Environment Management Plan. The Study stipulates the mitigation measures and the monitoring but it does not discuss the capacity building and training, and the implementation plan and cost estimates. Therefore, the environment management plan for the Project components has been made as an annex to this Report that is based on the Environmental Impact Study and the data presented subsequently.

1.1 Zagreb pier
Within present limits, the cargo port with the Zagreb pier is part of the western cargo port in the Zagreb port area. It is located in the working zone in the western part of the Rijeka midcity and is used for harbour and transport activities. The quay occupies a part of the coast of 500 m in length, and the port’s manipulative space onshore occupies the 100 – 150 m wide coastal belt. The total area of this part of the cargo port is about 5 ha.

The planned intervention refers to the extension of manipulative space in the cargo port and construction of a new Zagreb pier. Manipulative space will be extended to the west, to the maritime zone in which a kerosene port has been built, i.e. INA’s industrial port, and to the part of the maritime zone to the south, 150 m in length. The Zagreb pier will thus get a 1,200-meter-long coast and much larger manipulative port space, 28 ha in area in total.

The cargo port is located between the railway freight terminal to the north and the INA industrial plant to the west. According to the proposal for the physical concept of the city, the Rijeka railway freight terminal should remain in the Mlaka location, because the railway freight terminal is thus optimally integrated into the tissue of the Rijeka port area. To the north of the railway freight terminal and parallel to it runs the industrial street stretching from Zvonimirova street to the factory Torpedo. The cargo port is located in the working zone and in an environment of transport (railway) and mainly industrial facilities (INA oil refinery).

1.2. Beč (Vienna)pier
The planned reconstruction of Beč (Vienna) pier includes the works that do not change the current assignment of the pier. On the contrary, the pier will maintain its current work assignment. The repair of the traffic area, precipitation water sewer, crane trolley path, track, and water network will be carried out on the existing locations and routes.

PRESENT ECOLOGICAL STRAIN ON THE ENVIRONMENT

AIR
The main sources of air pollution in this part of the city of Rijeka are power and industrial processes, INA, Lubricants Rijeka, grain elevator and phosphate terminal in the Port of Rijeka, traffic, i.e. road vehicles on the main city artery – Krešimirova, i.e. Zvonimirova street.

INA – oil refinery in Mlaka
The main sources of air pollution in the refinery are production plants and processing and power furnaces.
Port of Rijeka – Rijeka port area
There are no major stationary sources of air pollution in the Rijeka port area. There are a few smaller boiler-
rooms intended for heating of business premises where gas or special light liquid fuel is used, and the
quantity of pollutants emitted into the air is negligible. However, during loading, i.e. unloading of cargo at
the Budapest pier (cereals and oil crops), i.e. the Bratislava pier (salt, artificial fertilizers, soda) huge
amounts of particles are emitted into the air. Loading activities near grain elevators (storage capacity of
56,000 T) and the terminal for artificial fertilizers (storage capacity of 15,000 T) are carried out with
outdated loading equipment, in which process, due to inadequate technical solutions, dust is emitted into
the air uncontrollably. Since the equipment for loading of cargo falls under diffuse sources of pollution, i.e.
there is no outlet where the values of air pollution could be measured and controlled, but the whole loading
machine is an open source of pollution, there are no exact readings of the emission of particles for the
Rijeka port area. Air quality measurements during loading of loose and powdery cargo in the Port of Rijeka
showed very high count of particles in the air in the surrounding residential and business parts of the city,
which exceeded the air pollution level defined by law. It follows from what is said above that the
improvement of the grain elevator as well as modernization of loading machines in the grain elevator area
and phosphate terminal area are absolutely necessary.

TRAFFIC
Road vehicles have the major impact on overall air pollution in densely populated urban areas due to their
large number, adverse engine conditions and rather poor air circulation. The data on average daily traffic per
year (PGDP), portion of passenger and freight vehicles, length of particular road sections and equivalent
factors of sulfur-dioxide and nitrogen-oxide emissions for a particular category of vehicles have been
analysed. Based on the comparison of the readings taken during 1998 and 1999 with recommended and
limit air quality values (OFFICIAL GAZETTE 101/96) and under the Article 21 of the Law on Air Quality
Protection (OFFICIAL GAZETTE 101/96), the Rijeka city area, which is located in the area surrounding the
site planned for the works – construction of a new Zagreb pier in the Port of Rijeka, it can be concluded that
the air around the site falls into category II, i.e. it is mildly polluted.

The coastal belt by the sea, stretching across the territory of the Rijeka port area to the factory Torpedo, is
occupied by the port with its homogenous and extensive harbour activities. In order for these activities to
function, there is a permanent traffic corridor involving road and rail traffic and the port’s internal and
transregional traffic. The interference of freight traffic in city traffic (passenger vehicles) is essentially
negative in terms of its impact on the environment, either in terms of road safety, environmental pollution or
occupying part of the road’s capacity. Under present conditions, trucks follow the route from the port
facilities towards the city exit through a number of transversal city streets. The increased needs of city traffic
(pedestrians, passenger vehicles, public transport) are in collision with freight traffic in many respects. It is
precisely this situation on the roads leading to the port or from the port that contribute to the pollution more
than anything else and in every respect.

According to the current situation and the existing traffic organisation the truck traffic from the port facilities
towards the places outside the city area runs through a number of city crossing streets. The increased needs
of the city traffic, pedestrian traffic, personal car and public transport traffic are very much conflicting with
the truck traffic. This very situation on the roads running to/from the port is the cause for the largest
pollution in every way.

By this work, the reconstruction of the Zagreb pier, which implies the modernization of loading technology
and internal traffic, freight traffic will be rerouted to the direct connection with the main state road network
at the Škurinje junction on the Rijeka by-pass road through which working zones in the city suburbs are
connected. In this way city streets will be relieved of heavy freight traffic, both of internal and long-distance
traffic. This will also reduce the adverse effects of the port on the environment of the site.

SEA
The bay of Rijeka is a sheltered bay of 450 km² in area and average depth of 60 m. It is an area with the
striking collision between urban, industrial and tourist activities and recreation grounds. The north-east side
of the bay is an endangered zone with the highest concentration of the pollutants of industrial and urban
origin. In addition to urban liquid waste, the greatest industrial polluters of the bay are the oil refineries in
Mlaka and Urinje, shipbuilding industry, petrochemical industry and the potentially dangerous oil terminal in
the bay of Omišalj. The bay of Rijeka is an area with intensive sea traffic and adequate harbour activities.
Through direct release of liquid waste and intake of fresh water, 6,200 t of organic substances (BOD₅), 3,260 t of total nitrogen and 230 t of phosphorus is released into the bay of Rijeka every year. About 82% of the total bay of Rijeka intake occurs on the north-east side of the bay. By the release of the Rijeka sewage system alone, which is located in the Delta area, 1750 t BOD₅, 340 t of total nitrogen and 43 t of total phosphorus is released into this part of the sea every year.

Due to the large oil plant and incidental pollution caused by sea traffic and harbour activities, oil and its derivates (hydrocarbons) are probably the prevalent polluters of this area. The measurements of the concentration of hydrocarbons in the sediments of Rijeka bay show that the concentration of hydrocarbons in the sediments of the areas near the sources of pollution, i.e. the coastal area to the north, is much higher than in other parts of the bay.

There has not been any testing of sea quality in the area planned for the reconstruction of the Zagreb pier, except for the exploration of the life on the sea bottom. As that part belongs to the port maritime zone and is under the immediate influence of the oil refinery in Mlaka, and having taken into consideration the results of the tests carried out in the greater area, i.e. in the bay of Rijeka - in the locations whose purpose is similar to the purpose of the area to be developed - it could be expected that this area is rather degraded. The clearness of the sea is reduced in this area, and the sea surface, especially on the western side of the planned works, is permanently covered by a film of oil. In the planned work area, the greatest sources of sea pollution are the oil refinery in Mlaka and harbour activities.

Oil refinery in Mlaka — production of lubricants and bitumen — with the port for trans-shipment of oil and petroleum products

The sources of pollution are liquid waste and the outflow of hydrocarbons into the sea from the polluted underground in the refinery area. The quantity of industrial liquid waste is 400 – 500 m³/day. Industrial liquid waste from the refinery is purified in two purification plants. Liquid waste is released into the sea by a drainpipe on the coast. The concentration of total hydrocarbon on the way out of the plant vary to a greater extent, from 2 to 150 mg/l. However, it is interesting to note the total annual intake of hydrocarbon from these sources of pollution. In the year 1996, 107 t of hydrocarbons were released into the sea with liquid waste from the refinery, in 1998 122 t were released and in the year 1999 67.8 t of hydrocarbons were released into the sea.

The leakage of hydrocarbons from the underground is a great problem. The landfill under the refinery is saturated with hydrocarbons, which is a result of the work of the refinery over many years (leaking tanks for raw material and products in the first place) and the destruction the refinery suffered during the Second World War. More intensive leaking occurs at low tide, and is intensified after heavy rain.

Western part of the Port of Rijeka — Rijeka port area

In the Rijeka port area the basic harbour activities take place: mooring, trans-shipment of goods from the ships to indoor and outdoor warehouses and trans-shipment to the means of transport ship-rail-trucks. The transfer of general and bulk cargo is performed in this port area. Marine pollution in ports is for the most part a result of the pollution of the sea from ships and handling of cargo at its loading, unloading, trans-shipping and storage. The pollution occurring as a result of unanticipated events — accidental pollution, is the greatest problem, although pollution can occur in normal conditions. In normal working conditions the pollution level depends on the way of handling and storage, the physical features of working space and storm sewage system in this area. Port equipment and its maintenance also pose a threat to marine pollution due to dirtying the working areas with oil and due to liquid waste and the waste generated in the garage and equipment maintenance shop.

The northern coast of the bay of Rijeka in which Rijeka and the Port of Rijeka are situated, stands out for its oceanographic and bio-production characteristics from the rest of the bay. Most of fresh waters flow into the bay in the coastal part of Rijeka, including most of urban sewage and liquid waste from industrial polluters. Owing to the large population and problems with sewage outlets into the sea, the sanitary quality of sea water in the Rijeka city area is poor (3rd category). Therefore, the present strain on the sea within the Rijeka port area is caused by the overall pollution situation on the northern side of the bay of Rijeka and direct pollution in the very port.
NOISE
The city center zone includes industrial areas, business premises and strictly residential areas. The above mentioned areas, different in terms of contents, have a conflict of interests with regard to permitted noise levels. The residential-business zone of the city which is within the potential influence of noise from the Port of Rijeka, as well as other sensitive zones, is dominantly burdened by noise from the city streets and the noise generated by the rail traffic from the railway junction.

WASTE
According to their origin and characteristics, waste substances occurring in the port can vary considerably, but, generally, they can be classified into two categories: dangerous waste and other waste substances. Dangerous waste may occur as a result of accidents caused by handling dangerous substances. Dangerous waste also includes sludge from oil separators (e.g. storm sewage separators). Other waste that will be produced in the Zagreb pier area is the waste generated by cleaning the operational coastal zone (wood pieces, plastic bags, rags, cardboard...), waste generated by the maintenance process of internal sewage system (solid waste occurring on the drain cover), waste from ships and waste produced by dock workers, which is similar to domestic waste.

SOCIOCOLICAL ASPECTS
No special sociological research has been conducted for this study, instead the results of an extensive sociological-demographic study have been used, which was undertaken in 1996 for the new master urban development plan of the city of Rijeka.

1.3 ADDITIONAL INVESTIGATIONS (AREA IN WHICH REMOVAL OF BUILDINGS IS PLANNED)
For realization of the Zagreb berth/pier (as section of the Rijeka Port) it is planned to remove (demolish) majority of existing objects and facilities in order to get the free area for construction of new ones. Similar process has been planned also for other sections of the Port. Although these other Port sections are not within the scope of this Project, the investigation has been conducted to define the state of the environment, in particular the soil composition analysis at the locations of objects planned for demolishing. The goal was to determine the suitability of demolition material to be re-used for filling purposes, i.e., for raising the ground level by shooting the material at the seabed which will be taken for construction of Zagreb pier shore.

Construction material originating from demolition of buildings and structures consists of two types of material: sidewalls material and roofing, top-cover material. One part of sidewalls of buildings are walls made of concrete, concrete blocks or bricks with mortar. This is an inert material with no environmental impact. The other part of sidewalls, as well as the part of top covers of newly built warehouses, is performed as covering on the supporting steel structure/construction. The covering, as well as the roofing cover, are partly tin plates, and partly asbestos-cement (AC) boards. In both cases, the supporting structure and the coverings have to be disposed of in line with regulations. Steel structure and tin plates have to be recycled (as secondary raw materials) and AC demolition waste has to be disposed of at the landfill (controlled waste disposal) in line with licensing procedure.

In order to avoid consequences caused in the environment by individual actions, especially in coastal areas, the principle of viable growth is the basic measure taken into consideration in the making of this study.

Analysis of the freight unloaded in the Port of Rijeka in past ten years has been performed, too. The analysis included: the kind of cargo, the way it was stored, transported, as well as all the other manipulations with it, and the analysis of the potentional dangers on the environment.

In addition to that, some data was collected, concerning the analysis of the sea quality in the coastal regions, and liquid waste that is released into the sea in the coastal region, as well as of the quality of air at various posts in the vicinity of the Port of Rijeka. The analis was carried out by the Institute for the Protection of Public Health in Primorsko-Goranska county.

The company «Luka Rijeka» informed us that in the expired period they were storing the following cargos:

- In the warehouses erected with a number of floors - 17, 18, 19, 20, 21 and 22 various types of cargos were stored, transported either by sea or by land. According to the data collected, all cargo transported...
in this area has some sort of packaging and as a rule the bulk cargo was not handled. There are no exact data on the cargo and the warehouses, which cargo in which warehouse, so a general data on the kinds of cargo were collected:

- Cargo in bags: coffee, sugar, flour, pea, cacao, fertilizer, pepper, rice, peanuts.
- Cargo in bales/packages: cotton, wool, jute, fibre, tobacco, paper, leather, India-rubber, cellulose, seaweed, medical herbs.
- Cargo in cases/chest boxes: parts of engines, various equipment, motorcycles, bicycles, parts of tractors, glass wool, ceramic works.
- Ware in pieces: tractor tyres, automobile tyres, coarse leather sprinkled with salt, pieces of furniture.
- Cargo in cardboards: dried fruits, vegetables, tea, inner tubes, electric bulbs, edible (cooking) oil, canned food.
- Cargo in casks/barrels: edible oil, edible fat, motor oils.
- Cargo in pallets: paper, flour, tin-plates.

- Warehouses of a hangar type: 26, 27, 29, 30, 34: Here they used to store cargo in bales, barrels, bags, cases, rolls (of paper), packages of wood, a in the last few years strewn salt for the roads.

- Warehouse 24 is a specified repository for the storage of dangerous materials. Because of the lack of so-called dangerous cargos, that warehouse is nowadays used for the storage of various other cargos such as wood in packages and tin-plates. During the previous years various dangerous cargos were stored there, such as: dye-stuff and lacquer, diluant, nitro-gas, bromine, soda, bitumen (inflammable), ammonium-nitrate, gas under pressure, all in the appropriate containers. Therefore, it is obvious that the storage was mainly in the adequate containers, and that the cargo in pieces was on the pallets, and that all the cargos except those in the warehouse 24 represent negligible danger for the environment.

The manipulation was on the relation: freight car - warehouse, truck - warehouse, truck - terminal, warehouse - ship, terminal - ship.

In order to get the complete information, the measurements conducted in the warehouses that are about to be crushed down and planned for the reclaiming of the sea and surrounded open area, are organised by the Institute for Medical Research and the Medicine of Work in Zagreb and the company INA - Zagreb.

The following analysis was provided: pH, Cd (Cadmium), Pb (Lead), Co (Cobalt), Ni (Nickel), Cr (Chrome), Cu (Copper), polycyclical carbohydrates and mineral oils.

After the results of all the analysis in process are collected, as well as of the analysis of the previously conducted tests, an assessment of the potential dangers on the environment will be made and compared to the Regulation on the dangerous materials in sea waters of class two, because, according to the State plan, the sea in Rijeka port is classified as the sea water of class two.

Samples was taken from surfaces and from depth of 50 cm on the 16 locations from area in which removal of buildings is planned and new objects are planned (outside and inside area in objects) After the results of all the analysis in process are collected, as well as of the analysis of the previously conducted tests, an assessment of the potential dangers on the environment will be made and compared to the Regulation on the dangerous materials in sea waters of class two, because, according to the State plan, the sea in Rijeka port is classified as the sea water of class two.

16 samples was taken from Praško i Zagreb piers near by warehouses 16, 18, 19, 20, 21, 22, 26, 27 i 34, 4 was taken around warehouse 24 (hazardous waste), 3 samples from Mechanization part, one sample from warehouse 26 (presently used for vechicles) and one near by trafo.

Analysis results, made by Institute for medical research and work medicine from Zagreb, have shown that a part of materials obtained by soil excavation shows that concentration of metals are on highest acceptable limit for agricultural soil according to Law on Agricultural Land and Rule Book for Agricultural Land Protection (this is used because of lack of other regulations) or little above highest allowed limit (Ni, Pb). Concentrations for mineral oils are above higheste limits.
The investigation results show that the land in the Port of Rijeka is relatively polluted with heavy metals if the values are compared with the allowed values for arable land (OFFICIAL GAZETTE 34/91). There are no regulations for other kind of land. It should be underlined that in this case it is not a question of arable land so the comparison is questioned. These results show the current situation that is the ,,zero" situation before the works planned in that area. The experience and standards of the European Union dealing with this issue are used for individual specific cases.

Mass concentration of metals

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<th>Samples locations</th>
<th>Cd</th>
<th>Cu</th>
<th>Co</th>
<th>Cr</th>
<th>Ni</th>
<th>Pb</th>
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*The analysis of polycyclic aromatic hydrocarbons (PAH) was conducted on the samples 1, 4, 8 and 15 at the places where their presence was expected. The PAH analysis however could not be conducted because of much organic pollution in the sample extracts. The results of organic pollution concentration that could be obtained by further sample analysis by gas mass spectroscopy (GMS) are useful to make a decision on the method of disposing the materials generated by demolition of the buildings at the sampling location 1, 4, 8 and 15.

PROBLEMS OF PRESERVING THE CULTURAL LEGACY IN THE AREA OF THE PORT OF RIJJEKA

By the Act of the Ministry of Culture, Department for the preservation of cultural legacy, its conservatory section in Rijeka, it was stated that the port warehouse XIV (17), Visinov pier, in Rijeka, was erected on the land-registry parcel number 3354 k.o. Stari grad (1245, number of the land-registry entry. 5031, k.o. Rijeka) and the warehouse XIV (17), erected on a land-registry parcel number 3354 k.o. Stari grad (1245, number of land-registry entry. 5031, k.o. Rijeka), has the potentials of the cultural asset, according to the article 7. of the Law on protection and maintenance of cultural assets. These cultural assets within their physical boundaries will be included into the Registry of cultural assets of the Republic of Croatia on its List of protected cultural assets.

For a cultural asset a following set of measures of protection is stated:
- Protectional and various other interventions on a cultural asset from the paragraph 1. and under the physical boundaries from the paragraph 2. can be conducted only upon a previous approval of the authorities in charge
- The owner (holder) of the cultural asset is obliged to take measures of protection stated by the authority in charge, and these refer to the up keeping of the given cultural asset,
- Cultural asset or its parts can be a subject of buying and selling only on conditions provided by the Law on protection and maintenance of cultural assets.
In the port, at Visinov pier, there is a warehouse number XIV (17), which was erected according to a project of a Hungarian engineer Ferenz Pfaff, the chief engineer of the Hungarian State Railway, originating from the year 1906. The warehouse was erected in 1909, in reinforced concrete, which was the first time it was used in Rijeka, in the form of rectangle, with the total ground-plan area of 50 x 100 m. Because of its dimensions, it was a monumental structure for the pier area. Throughout the ground floor and three storeys there are wide, partially closed openings, alternatively representing doors and windows. The walls of the building are highly elaborated, but the horizontal parts are more emphasized on the longer facades of the structure because of the constructions of balconies that stretch along all three floors. On this building of utmost functionality and simplicity, its historicism is visible in the form of the final bead-moulding and the roof balustrade. The warehouse is along its longitudinal central axis divided by two portal openings in the form of architrave ment for railway freight cars. They are mutually separated by a row of massive columns made in reinforced concrete. The pioneer of modernist and rationalistic architecture in Rijeka area, the warehouse XIV possesses the historical, architectural and formal value and is in all its aspect a cultural wealth of industrial architecture.

The port warehouse number XIII (12), located near the coast at Budapest pier, just near the grain elevator, is another cultural pearl of industrial architecture. The project outline of the warehouse number XIII was ordered at Hungarian architect Lajos Burgstaller by the Royal Maritime Office in 1893/1894. Its rectangle ground-plan, with the area of 28 x 70,80 m. consists of two units with distinctly different purposes, the warehouse itself and the eastern, more representative part divided into offices. Both have cellars, ground floor and three additional floors. The inner peripheral walls were made out of brick, which is visible at the facade as well, and the interior construction has a skeleton of three rows of columns, of cast iron and with rounded longitudinal sections, and of central row of bricklayed pylons. The roof is constructed of the iron cross-bars that lie directly on the peripheral walls. In the original physical disposition the partition-walls formed a number of smaller storage places, each having its own communication between the floors. Over the ground floor, along the height of all three floors, stretches a longitudinal prop wall, which served as a fire-prevention. Characteristic are the elements stretching along the longer sides of the warehouse: swing-gateways plastered with stone carrying the cast-iron columns with a console porch. Along the entire southern facade of both warehouses there were balconies in the first and second floor. All the openings are partially closed and elaborated in brick, originally in the alternations of doors and windows, except in the third floor. In the area of the central axis, these openings are separated by frames while the walls of the offices are divided by pillars in three separate units. All the elements of vertical and horizontal division are made in plaster. Exceptional is the complex bead-moulding of the roof above the part of the building containing offices, as well as its upper wall and pyramidal endings.

The royal marine governor had the complex of port warehouses XIX-XXII (18-21) that are located in two rows at Prague pier in Rijeka built in the period from 1909 to 1913 according to the design of Istvan Bacsak, Venceslav Celligoa, Janositz Josef and Egan Lajos, Wehler and Rolberitz. The warehouses identified as XIX and XX are located in the same building line alongside the coast whereas the warehouses identified as XXI and XXII are separated from the previously mentioned by a road with a railway flyover and located more north as a monolithic corp. Since 1914 they have been connected according to the design of Dr. Enyedi Bela. Reinforced concrete bridges connect the opposite warehouses. All four buildings have the plan of 20 x 120 m except for the warehouse XIX whose plan is 20 x 60 m. They do not have the cellar area and are built from reinforced concrete, they have longitudinal rooms divided by two rows of columns and a transversal firewall. The openings extend in a row at the ground floor and four floors with the balconies placed diagonally. Of architectural interest because of their size are the bay windows and gable-designed facade and two representative units of the facade ending with a gable made from mortar with decorative elements and yellowish bricks. At the ground floor there are two exceptional wide arc openings in terms of aesthetics and communication. As regards the styles, it is a mixture of the Secession and Historicism and the complex itself is exceptionally functional, preserved, monumental, historically worth and it offers a rare view of «Metropolis».

These warehouses have been protected by a decision of preventive protection of cultural assets made by a body with the Ministry of Culture, a Directorate for protection of cultural legacy, A Department for National Trust in Rijeka. The Port of Rijeka Management and the Port of Rijeka Company lodged a complaint to that decision and the Ministry of Culture partially agreed with the complaint referring to the complex of port warehouses XIX-XXII on the basis of the following explanation: «The modern technology and the operation of the Port set out in the Project for its renewal and development, has foreseen the removal of the entire
warehouse complex which has been mostly conditions by the port’s impossibility to expand the port and port facilities toward the west, the area occupied by INA Oil Refinery plants.

An estimate of the quantity of the material available for filling up the sea obtained from demolition of the buildings in the port area and the excavations for the new buildings.

**Estimate of available quantity the material obtained from their demolition and the quantity of earth excavated for construction of the new buildings**

The warehouses planned for demolition are the warehouses 34, 26, 24, 22, 21, 20, 19, 18, 16 and 13 and the buildings for maintenance and storing the warehouse machinery within and outside the Zagreb pier. Below table shows an estimate of the material obtained from their demolition and the quantity of earth excavated for construction of the new buildings. This is just a rough estimate because the designs of the buildings have not been made yet.

<table>
<thead>
<tr>
<th>Building</th>
<th>AREA (m²)</th>
<th>HEIGH (Floors)</th>
<th>QUANTITY (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>warehouse 4</td>
<td>1,260,0</td>
<td>P+4</td>
<td>480,0</td>
</tr>
<tr>
<td>warehouse 27</td>
<td>3,750,0</td>
<td>P</td>
<td>620,0</td>
</tr>
<tr>
<td>warehouse 26</td>
<td>9,750,0</td>
<td>P</td>
<td>1,150,0</td>
</tr>
<tr>
<td>warehouse 24</td>
<td>1,300,0</td>
<td>P</td>
<td>270,0</td>
</tr>
<tr>
<td>warehouse 20, 21 i 22</td>
<td>6,300,0</td>
<td>P</td>
<td>50,400,0</td>
</tr>
<tr>
<td>warehouse 19</td>
<td>2,150,0</td>
<td>P+4</td>
<td>2,200,0</td>
</tr>
<tr>
<td>warehouse 18 i 16</td>
<td>3,560,0</td>
<td>P+4</td>
<td>3,150,0</td>
</tr>
<tr>
<td>warehouse 13</td>
<td>1,620,0</td>
<td>P</td>
<td>1,200,0</td>
</tr>
<tr>
<td>maintenance</td>
<td>2,250,0</td>
<td>P+1</td>
<td>640,0</td>
</tr>
<tr>
<td>equipment, other</td>
<td>3,200,0</td>
<td>P+1</td>
<td>1,150,0</td>
</tr>
<tr>
<td>ground excavation for the foundations</td>
<td>35,140,0*</td>
<td>1,0 m</td>
<td>57,710</td>
</tr>
</tbody>
</table>

An estimate of total available quantity of the material for filling up 118,970,0

**2. Road Component**

The starting data for the environmental impact assessment of the road component are taken from the Environmental Impact Study for D-8 road and D-404 road, and the documentation made on the basis of the requests that resulted from those studies. The Environmental Impact Study for D-8 road include an environmental impact assessment and the mitigation measures for environmental impact but it does not stipulates the monitoring of the environment condition. The EIS for the state road D-404 includes the EIA, the mitigation measures of environmental impact and stipulates the environment condition monitoring. The studies do not address the capacity building and training, the implementation plan and the cost estimates. An Environment Management Plan has been developed as an annex to this Report. It refers to the Project components based on the Environmental Impact Studies and additional documents made for this component, which reviews all the missing requirements and data.

**2.1. Sate road D-8, section Orehovica – Sv. Kuzam (Vitošev) – Križišće**

Orehovica – Sv. Kuzam (Vitošev) Sub-section (Rijeka by-pass road) is situated in the Rječina – Draga – Vinodol valley, which is a region of bound small-clastic rocks and flysch tectonic deformations. The slopes are of such geological, morphological and hydrogeological characteristics that the instabilities are possible and frequent phenomena. The soil overlying flysch is not stabilised. Devastation of the plant cover, land clearing and other operations have caused strong washouts, and on some places even water-worn ravines and landslides. This is the zone II of the sanitary protection of drinking water sources.

The vegetation in this region is scanty. Degraded forest communities of the oriental hornbeam are more present along the southern slopes of the Draga valley to Vitošev (northern slopes of Kostrenski Brijeg (Solinscopal)), whereas the agricultural land (Inke) prevails on the stretch from Orehovica to the railway embankment. However, the slopes of Kačjak, where the larger route of the highway will pass, are covered

* area under building to be demolished and average excavation of 1,5 m depth for placement of new buildings was taken for calculation
with degraded forest communities of the oriental hornbeam. The regional junction of Orehovica is situated on a rather good agricultural land. On the northern side of the junction there are rock quarries, which have been permanently devaluing a sensitive natural landscape that could be rehabilitated by backfilling with useless excavation material generated during the construction of the Orehovica – Sv. Kuzam section.

Subsection from Orehovica to the west border of Dragac settlement is otherwise an un-built area, with exception of numerous smaller business, predominantly provisional and cheap, sometimes even ugly, objects (most frequently small wooden sheds, tool sheds and similar) related to farming activities.

The other part of the Highway route, to the east from the railway line, also passes through an un-built area. The only obstacle to reach the "Sv. Kuzam" ("Vitoševo") junction is the south part of Vitoševo (Sv.Kuzam) settlement and railway line Škriljevo – Bakar. To overcome this problem, the Highway is planned in the tunnel, in length of about 150 m. This section of the Highway, at its whole length, passes along the slopes with 20-30% inclination, sometimes 50% and even more. The orientation of slopes is to the north, except at the subsection from Orehovica to the railway line where it is to the east-northeast.

Southwest border of Dragac village (Pod Ohrusvom) with residential housing estate (detached, family houses) happened to be very close to the Highway route. In the area south of Orlič, where the Dragac valley meets the Martinšćica valley, it is planned to build a Highway junction to realize connection with Sušak (and east half of the Rijeka City center) and Kostrena.

Subsection “Sv. Kuzam” (Vitoševo) – Križišće passes through very harsh and unfavorable land with inclination of about 50 – 60 % all the way up to the Crni Vrh hill (south of Praputnjak village). That is the area of north slopes of the Bakar Bay, having predominantly southwest, and partly also south orientation. The slopes are made of rocks (vezanih sitnoklastičnih stijena), exposed to the bora wind gusts, with scarce vegetation – mainly underbrush and other forms of degraded forest communities of white hornbeam, sporadically with rugged, bare rocky soil. The area forms an open, free natural landscape of Bakar slopes, specially exposed to the views from the sea and from the existing Adriatic tourist road. Part of these slopes, the one with abandoned vineyards of Bakar, is protected as “the human work monument”.

The Highway route within this subsection is laid, almost to the very peak (or inclination change point) of the slopes, close to the Krasica and Praputnjak polje ("polje" - the karstic phenomenon, plateau with some arable land). In the Physical Plan of the Rijeka Municipality, this plateau/polje is planned for railway marshalling yard, so that the Highway route could not have been laid in the plateau/polje itself, but at the slopes. Therefore, the route encompasses two tunnels: the first - in the area of Rebar-Kras (length about 900 m) and the second - close to the Crni Vrh (in length of about 200 m). This subsection of the Highway is located in the 2nd level sanitary protection zone of drinking water springs. Another interesting characteristic of the route is its first 500 m long section, from the “Sv.Kuzam” (Vitoševo) junction to the east, which passes along (i.e., within) the HV transmission lines corridor.

From the Crni Vrh location the Highway route is heading towards the planned "Hreljin" junction along somewhat milder slopes of the Bakar Bay. Further towards the southeast to Križišće the route is laid on very hard and sloppy terrain, sporadically with inclination of even over 80%. Above Turinovo, in very mild S-curve, the Highway route crosses to the west slopes (close to Bareticevo village), heading to the junction (near Križišće) with the future main road for the island of Krk. The area through which this Highway subsection passes is very similar, in terms of morphology, geology, pedology and vegetation, to the previous one; in addition, this subsection influence area encompasses some past and potentially new plots of arable land – between the Highway route and parts of the Meja – Gaj and Hreljin settlements, and near Bareticevo village, as well as near Križišće and towards Turinovo village. This Highway subsection is mainly located in the 3rd level sanitary protection zone of drinking water springs.

Based on hazardous meteorological phenomena registered so far, the Highway route concerned is characterized by:

- North winds, which can reach the intensity level of hurricanes (wind speed up to 200 km/h).
  These winds have been registered in the area east of the Rječina canyon. Winds of such speed are rather frequent – they occur every 2 to 3 years. Therefore, windshield structures should be constructed along the complete bypass road where the road is built in embankment or in viaduct.
- Icy rain, that has been registered too, and always followed by north winds. Security precautionary measures (such as temporary closure of road for traffic) should be taken on time; or good maintenance practice for carriageways.
- Fog, that occurs very rarely.

The current noise level at the locations nearby the residential zones of Draga, Vežica, Vitoševo, and Hreljin is already at the levels that exceed the values allowed at peak load hours. The noise level during an average traffic load on the road from Orehovica to Sv. Ana and the road Vežica - Draga - Vitoševo slightly exceeds the allowed daily levels of 55 dB (A).

The catchment area through which the M-2 road (State road D8) passes is an inflow area for drinking water sources so the outflow mentioned affects substantially in many cases the water receiving bodies that are connected for the road construction. The section from Orehovica Junction to Vitoševo Junction is situated in a catchment area of the Martinšćica water sources that is the water supply facilities of the Rijeka region. The section of Vitoševo Junction – Meja Junction is situated in a catchment area of the water sources in the Bakar Bay, a series of the water supply facilities on which waters the water supply system relies on. The section of Meja Junction – Križišće Junction, the connection to Kraljevica and the bridge from the mainland to the island of Krk are situated outside the catchment areas vital for the drinking water sources but in the inflow area of the coastal sea.

2.2. State road D 404

Traffic forecasts of design basis parameters for technical elements of the road and determination of its environmental impacts have been made under assumption that the construction will start in 1996 and end in 1998. The forecast is based on the Traffic Study of Rijeka, Opatija and Crikvenica (ZUIR, 1984) and the Study of the 3rd Traffic Corridor in the Town Center (IGH, 1994). Traffic forecasts refer to the period of 20 years, assuming that the complete road section D 404 (GMC-105) – from the Theatre to the Orehovica junction and connection road to Kostrena, as well as the whole Highway up to Križišće, will be finished within that period. The traffic intensity to be present in the tunnel will significantly depend on the phasing-in of individual new sections of the road, in particular the one from the Theatre to the "Pećine" tunnel. For the central section B-F of the road, the traffic forecasts have been made for the case when all the construction phases, including also high-speed bypass road through Draga, will have been completed. Traffic load will amount to 9,700 PAJ/day per direction, a maximum hourly load JVS will be 1050-1510 PAJ/day per direction for the "Vulkan" tunnel section or 1290, and 1330 PAM/h respectively, for the "Pećine" tunnel section. (PCU - Passenger Car Unit)

Construction of the state road D 404 (GMS-105) presents the long-term resolution of the traffic problems of Sušak. Besides the shortest high quality link between city district Vežica (21,000 inh.) and city center, as well as connection of the WTCR to high-speed urban and inter-regional roads, it will also bring manifold benefits to the existing and newly planned city zones:
- removal of the city transit traffic from the city streets and roads
- removal of the heavy duty vehicles (trucks) traffic from the city streets and roads by rerouting it to D 404 (GMC-105) road
- reduction of negative environmental impacts of the traffic: noise emission, air pollution, landscape deterioration
- increase of traffic safety
- improvement in the urban traffic (pedestrians and buses) through traffic load/volume reduction in the city
- shortening the travel time and increasing the economic efficiency of the overall traffic system

In order to maintain the high level of traffic safety, design documentation of the road should include up-to-date devices for traffic control, monitoring and management/regulation, as well as the fire protection system.

Of the whole Rijeka Port system there are two port sections (basins) directly related to the D 404 (GMC-105) main road construction, namely Rijeka-Grad (City) section and Sušak-Brajdica section. The whole Rijeka urban traffic system is strongly dependent on the Rijeka road traffic node which links the City with the neighboring towns – from Matulji - west of the City, to Križišće - east. West section of the Rijeka road traffic node is built as part of the Adriatic tourist road and connected to Opatija, Trieste and Ljubljana road directions. On contrary, east section of the bypass road has not been built, so that transit traffic towards
Orehovica, Bakar and Knžišće penetrates the City and uses City road network. Therefore is the construction of the east section of the Rijeka road traffic node the priority – it is the essential condition for development of the Rijeka City itself and its Port. East connection road Brajdice-Draga, as well as the west one, has its both - urban and port traffic function; so they are both evidently justifiable.

Economic justification of the road construction (results of the questionnaire survey)

In order to test the justifiability of the D 404 (GMC-105) main road construction, a short questionnaire survey was conducted and relevant information from main business entities were collected. The sample included only selected business entities (companies) which considerable portion of their freight transportation needs and activity meet/perform by using trucks. The planned main road was assessed to be of higher importance for these companies in their future transportation routing. The companies surveyed were divided into two groups: those located in the City, and those located in industrial zones at the City outskirts (out of the City).

The companies surveyed have 8,866 employees, of which 6,780 in in-the-City companies and 2,086 in out-of-the-City group. 92% of all employees of in-the-City companies (i.e., 6,273), live permanently in the City; so they area directed to using urban road network. Only 7% (507), having residence outside the City, commute. Within the group of out-of-City companies 77% of employees live in the City, so they are directed to using the future GMC-105 main road; 23% work and live outside the City. Since 88% of surveyed companies’ employees use urban road network while traveling to or from the work, their opinion about the urban traffic is assessed to be very competent. Based on their opinion (100%), it is considered that the new GMC-105 road will significantly improve the road traffic within the City, mainly due to partial relocation of freight transport from the most important, traffic-loaded and congested City roads.

High percentage (95%) of people surveyed think the construction/operation of D 404 (GMC-05) main road will significantly increase the content of citizens with regard to traveling from their place of residence to the City in meeting their commuting or other daily needs. Somewhat lower percentage (80%) share the opinion that the traffic improvement reached through D 404 (GMC-105) will increase the environmental quality of life in the City, since air pollution and other forms of City pollution from the road traffic will be reduced. An additional argument of an indirect type, important for business entities and people – some 1,609 employees, having residence in the City, that daily commute to/from Kukuljanovo industrial zone, are to use GMC-105; construction of this road is thereby, directly and indirectly, reconfirmed as justifiable.

The survey also showed that business entities/activities located in the City routed the portion of their freight/goods transport towards the west entry/exit, and 29% towards the east one (GMC-105). Companies located in out-of-City industrial zones route some 70% of their freight to D 404 (GMC-105) road. By extension of the Kukuljanovo Industrial Zone the role of D 404 (GMC-105) road will become even more important – it is namely the most favorable connection of this industrial zone with Port of Rijeka sections (basins) located in the City. Although the sample size of this survey is relatively small and inadequate for tackling total traffic frequency issues, this survey points out and draws attention to justifiability of D 404 (GMC-105) main road – being the natural route/direction of freight transport for the companies located within the City and also for those out of the City.

The former companies, which are facing the freight/goods transportation and distribution problems much more frequently, put emphasis today on expected increase in turnover and volume of services, as well as in the profit due to the future D 404 (GMC-105) road contribution. On contrary, the latter consider this road important, but do not expect its significant impact on their business results in terms of increasing turnover and volume of services, or profit growth.

Larger number of surveyed companies expects from D 404 (GMC-105) road to play its role in increasing freight transport volume in both directions – to and out of the City; the lesser number of companies is indifferent with this regard. In addition, three is also general conviction (90%) that D 404 (GMC-105) road will contribute to the increased passenger traffic within the City, and to the commuter traffic as well. However, the question of D 404 (GMC-105) road influence on opening new jobs was answered positively by thin majority (55%) of companies; the rest did not expect any major effect.

Rijeka companies surveyed are located either at the beginning, or at the end of D 404 (GMC-105) road. It is, however, important to mention an additional function of D 404 (GMC-105) road, namely the one it has for
the World Trade Center Rijeka (WTC). The WTC building is located nearly in the middle section of this road, at Pecine. The WTC is one of initiators of this road construction because it would mean direct connection of WTC to both, the Highway and the City center. The WTC Rijeka, such as all other WTCs in the world, is an elite type of organization with rather broad scope of requirements in terms of transport infrastructure and location of the center. GMC-105 road offers with this regard extraordinary transportation services and underground parking facilities, which are extremely important for the area in question. The WTC Rijeka, considering its primary trading function, will need quick and high-quality contacts with Rijeka companies and agencies in both directions. Therefore, road traffic flow capacity and parking facilities have a decisive role for the WTC Rijeka location at Pecine.

Indirect impacts/effects of D 404 (GMC-105) road construction
Besides direct effects D 404 (GMC-105) road will have on the Rijeka economy, the survey identified certain indirect effects in the form of small qualitative improvements, to-be-called "the citizens' content". For this type of changes the survey did not approach ordinary citizens in the street, but business people who feel the problem of urban traffic and transportation from the point of view of both, the business people and the citizens. The area of citizens' content, with reference to the traffic and D 404 (GMC-105) road, includes:

- improvement of the general traffic situation/condition in the city, that is with regard to the place of residence/living, and to traveling through the city as well,
- improvement in the general city cleanliness level – improvement of the air quality

Another important environmental feature of this road is that its route is laid through I.b and II. level sanitary protection zone of Martinsčica drinking water springs.

Protection of cultural legacy on the road routes
An art-conservation document containing the measures for protection of cultural assets has been developed for the Sv. Kuzam junction since the works on the new east connection of Bakar with Sv. Kuzam is under way as the first phase of the works resumed on the system of Rijeka by-pass road east of Oreovica. An art-conservation document has not been made for any other area except during the analysis of the entire traffic system with a shunting yard at Krasica – Praputnjak plane. In these areas an ethnographic zone of Praputnjak and Bakar partition walls in terrace vineyards as a "human work monument" have been recorded. This ethnographic cultural asset should be again subject to microtopographic evaluation and supported by a conservation document during the road route stake out. It should be underlined that with a diligent work of the enthusiasts the planting of wine grapes near Crni Vrh again started and it is appreciated.

It should also be emphasised that after the stake out the route should be visited from the aspect of possible archaeological cultural assets because the entire cultural landscape from the system of buildings starting with Sv. Križ to the mouth of Vinodol is very dense.

2.3. Zagreb-Macelj Highway, Jankomir-Zaprešić section
The highway section Zaprešić-Jankomir is an integral part of the road communication Šentilj-Maribor-Zagreb-Split, or, widely speaking, a part of the continuation of the Pyhrn highway on the territory of the Republic of Croatia. This road communication is categorized as the European communication E-59, while under the Croatian categorization it is classified under State roads numbered with 1. On the section between Zaprešić and Jankomir the left (eastern) carriageway of the future highway has been built. It has been used since 1980 as a three-lane two-way road. The highway sections from Jankomir to Ivanja Reka (Zagreb by-pass road) and from Zaprešić to Zabok, as well as the Jankomir and Zaprešić Junctions, have been built in the full highway profile.

From the beginning of the Zaprešić section, the highway passes through an area with economic/production/business purposes on the western side and through the area of extremely valuable arable land on the eastern side. It then passes through a wooded special-purpose area, vacant lots of buildable land, an area of sport and recreational purpose (water sports center) and an area of waters and water good (a lake resulting from gravel excavation on the western side and the Sava River on the eastern side of the highway). From the sixth kilometer to the end of the section, the highway passes through the area of extremely valuable arable land and the zone of sport and recreation purpose. Between the Bestovje overpass and the planned two-level crossroad, the highway passes through an inhabited area.
The highway does not pass through protected parts of nature nor through a cultural good area. The closest protected area is the special ornithological reserve Zaprešić-Sava and Strmec-Sava (the shortest distance from the highway is about 320 m).

From the recorded parts of the nature for which protection is proposed under the Law on the Protection of Nature, the highway passes through the area of protected landscape: the valley of the Črnec brook and the landscape along the Lužnica brook (Zaprešić). For them the following conditions of development and use have been defined: "protect natural values from any form of devastation which would change their quality; prevent changes in water regime, in regulations and in other water interventions". The protected area of the Medvednica Park of Nature is about 350 m away from the highway.

For the area of the exceptionally valuable natural landscape of the Krapina river valley (Zaprešić, Bistra), the following has been established: "The valley of the Krapina river has lost its natural features and essential landscape values needed to place it under a special protection regime. Meanders of the Krapina river have been lost by its regulations, and its valley to the east borders on the Zagorje Main Road, while the western border is a railroad. The mentioned artificial elements require the preservation of the valley on the basis of measures under the physical plan."

The highway does not pass through a cultural good area.

The major part of the section does not pass through a water-bearing area. Along the said section at the overpass, the Sava river belongs to the watercourse category II/III.

The area at the beginning of the section at Zaprešić - to the railroad - and beside the Sava river - from the turn at the highway overpass to the west - is designated as a land regulated by hydraulic land reclamation. The same area is defined as flood area.

Defined as redevelopment areas have been the areas threatened by noise, stretching through the entire area of the said highway section, to the border of the Zagreb County at the seventh kilometer of the section.

The major part of the highway section is situated in a seismically and tectonically active area (7,5-8,0). The highway passes through the area of waters and water good (the Sava river and excavation of gravel). The main collector passes along the highway, and the pumping station for the drainage of waste waters is situated near the Bestovje overpass (the area of the Zagreb County). The main water supply piping passes along the major part of the highway section.

3. Bridge component

The bridge is located in the zone of strong bora and thus in the so-called "spray zone". As a result of the wind, waves are created and bora sprays the bridge with seawater drops under the pressure. Concrete is saturated with chlorides which reach the reinforcement and cause chloride corrosion. In the underwater part of the bridge, beside the effect of chlorides, the Rocellaria Dubia shell has also been defined as "dangerous". It drills habitats of up to 13 mm diameter in concrete, i.e. only in grains of carbonate aggregate way. After the shell was discovered, an epoxy underwater protection of concrete has been applied. It survived and has prevented further settlement of the shell. For the time being, it does not threaten stability, safety or durability of the underwater part of the bridge, also due to the fact that the pressure resistance of concrete, e.g. of stays, is about 70% higher than the initial one (at the age of 28 days).

In other words, the bridge is exposed to extreme conditions, especially its smaller arch (Sv. Marko-Krk) due to its micro location or due to a greater length exposed to wind and the resulting higher waves from which the wind lifts "sea dust". At the big arch (mainland-Sv. Marko), testing has revealed that damage is even smaller than anticipated. The test report was made by the Croatian Civil Engineering Institute from Zagreb. The most threatened parts of the bridge are stays, bracings and struts. The repair of arches, pavement structure and buttresses is planned as well.
(c) Environmental impacts

The Republic of Croatia is a signatory country of all the UN conventions and protocols regarding the environment protection. From this fact, as well as from its strategic commitment for the entry into the European Union, which insists on the implementation of the strictest criteria on the environment protection, results the adjustment of the domestic legislature to the requirements of the viable growth.

In the Republic of Croatia the environment is regulated by the legal acts which completely encompass the protection of the environment, its rational economy, restoration of its previous conditions and planning of all the actions and procedures in relation to environment, the goal of which is the balance of the natural and artificially made elements in their mutual correlation.

The legal system of the Republic of Croatia contains a number of specific acts and laws which are governing the measures of the environment protection, which all indicates the unison of the existing legislature in its wish to encompass the entire area of the state's environment protection.

Legal acts which basically deal with the regulations of the environment protection are included into the so-called general ecological legal acts. They are regulating the framework of legality and practical implementation in the area of environment protection, the status and functions of the central state institutions and agencies, as well as local authorities in charge of environment protection, special instruments in the programme, the assessment of the influence on the environment, and the accessibility of information about the environment protection.

A number of fundamental laws and legal acts about environment protection was enacted, such as the Law on the protection of nature, the Law on the protection of environment, the Law on waste, the Law on communal economy, the Law on waters, the Law on the protection of the air etc. Together with afore mentioned laws which regulate certain aspects of economical and social life, other regulations, equally important, were enacted, concerning the measures of protection of certain areas of environment; Maritime law, Law on agricultural land, Law on forests, Law on fishing, Law on concessions etc.

The environment protection is additionally regulated by numerous lower regulations such as. the Statute on the estimate of the influence on the environment, the Regulation on the standards of quality of the sea at beaches, the Regulation on the classification of waters, State plan for the protection of waters, the Regulation on the borderline values of indicators of perilos matters in liquid waste, the Regulation on medical quality of drinkable water, the Plan of interventions in the environment protection, the Regulation on types of waste, the Regulation on the registry of emissions into the environment, the Statute on recommended and borderline values of the quality of air, the Regulation on the borderline quantities in the air originating from emissions of contaminating particles from stationary sources, the Statute on protection of agricultural lands from the contamination with poisonous particles, as well as many others which are not directly linked to the subject of this study.

In order to avoid consequences caused in the environment by individual actions, especially in coastal areas, the principle of viable growth is the basic measure taken into consideration in the making of this study.

1. The Port Component

1.1. Zagreb pier

Environmental Impact Study made for Zagreb Pier shows that construction of Zagreb pier will not cause additional pollution of the sea, increasing of traffic, or negative effects on visual appearance but that increasing of noise level is possible.

The Study also shows that indirect positive effects on the economic activities are possible by construction of Zagreb pier including the improvement of the seawater quality (reduction in negative effects of the existing polluters outside Zagreb pier), improvement in traffic functioning in the city and with this also the total living conditions in residential areas in the contact area, and the increase in visual values of the area.
AIR POLLUTION
In the Zagreb pier the reloading of general, classic and integrated freight will take place. The reloading of this sort of freight does not additionally pollute the air, as for example, during the reloading of loose and bulk freight. The possible sources of air pollution are:
- ships on mooring
- heavy road vehicles (trucks).

When a ship is on mooring, the main ship motors mostly don't work. Only the secondary motors work, so that the quantities of polluting substances which are being emitted from the chimney are negligible.

Trucks, vehicles which are in function of freight reloading in the area of the pier, depending on the type of fuel, age and motor maintenance, can be a source of additional air pollution. Nevertheless, due to the distance, the inhabited settlements, is negligible.

NOISE
The influence of noise on the environment during the use of the OPERATION includes:
- the influence of ship systems noise during the manoeuvres of entering and leaving, and mooring
- the influence of port reloading systems
- the influence of the noise coming from road and railroad traffic.

The predicted levels of incoming noise in any of the set control measure. If the measures show that despite the inclusion of technical elements for noise protection, the noise level exceeds the limits et by law, a subsequent isolation of any sources defined as such, by technical measures provided by the profession.

SEA
The existing burdening within the sea basin of Rijeka is conditioned by the pollution of the north shore of the Gulf of Rijeka and direct pollution in the port itself. The numerous population and industry of the Rijeka basin produce waste waters which, in a more or less altered form, are drained in the shallow shore sea of Rijeka, including the port basin of Rijeka. A reduced transparency, eutrophisation (well-nourishment) and summer sea blossoming, the presence of substances from industrial plution, including oil, are a proof of a considerable burdening of the port aquatorium. In the area of the city of Rijeka due to a large number of population and the unsettled sewage outlets in the sea, the sanitary quality of sea water is low. By The Physical Plan of The Primorsko-Goranska County (Official Gazette 14/2000.), the sea on the territory of the Port of Rijeka is classified as second quality. The sea on location is polluted today by:
- hydrocarbons from the Mlaka refinery
- municipal waste waters drained in the aquatorium of the port.

The construction of the Zagreb pier will not cause additional pollution in relation to the present situation, but calls for sanitation and reducing the sea pollution coming for present sources of pollution.

FUNCTIONING OF THE CITY'S TRAFFIC SYSTEM
The truck road traffic in the Zagreb pier and out of the Zagreb pier as well as from the old part of the Rijeka basin would go through the new tunnel connection from the Junction "Škurinje" on the Rijeka roundabout until the Industrijska street, with a direct entrance/exit in the port and industrial zone west of the city.

By a new technological organization also the internal transport in the old part of the Rijeka basin is reduced, as well as in the new reconstructed Zagreb pier.

By a new traffic organization, improvements are expected in the functioning of the traffic system. This is concluded on the basis of the assumption that the same quantity of freight will be manipulated and transported in a more rational manner, which is the main aim of reconstruction.

No operations are planned on the existing railroad facilities. No special influences are expected on location from the railroad because it involves manipulation of an already existing quantity of freight.

EXISTING AND PLANNED ECONOMIC ACTIVITIES
The Zagreb pier would be constructed by a minor part on the narrow shore space on land, and mostly on the aquatorium in front of. A larger portion of surface (of land and sea) functions as a freight port today
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ENVIRONMENTAL IMPACTS

(the existing Zagreb pier) and forms a functional whole with it, whereas a smaller portion of land surface is in function of the oil industry (INA). It is planned to build the pier on part of the aquatorium in front of the industrial zone, on the present location of a smaller port basin the so called Petroleum harbour which is a part of the Rijeka port, but is used for the mooring of tankers which transport oil and oil products, and is, therefore, in function of INA oilrefinery. The pier is located, or more precisely “wedged” between the railroad freight terminal on the north and the industrial facility of INA oil refinery (Mlaka) on the west.

The proposal of the spatial scheme of the city envisages that the Rijeka railroad freight terminal would remain on the location Mlaka because this is the territory where it is optimally integrated in the port structure of the Rijeka basin – west, whereas all the physical plans envisage the dislocation of INA oil refinery Rijeka (Mlaka) from this location, and the enlargement of port facilities to this location. The existing railroad terminal and the new road will enable a quick and undisturbed transport of freight cargo in both phases of the construction of the Zagreb pier. Simultaneously, the function of other, mostly economic activities in the area of this port-transport and industrial zone will not be disturbed since all the other economic activities are in terms of organisation and traffic connected to the Industrijska street.

THE DENSITY OF CONSTRUCTIONS

For the kind of port reloading operations which will take place on the reconstructed Zagreb pier, open areas without buildings are primarily needed. The applied technology on the terminals for general freight and container terminal, envisages warehouses in the background, on the location where they are partly situated at the present. It is planned that some of the warehouses will have to be demolished and new ones built, but on the same location so that basically the disposition of constructions will remain the same. By the reconstruction of the Zagreb pier the density of constructions will not alter essentially.

THE VISUAL APPEARANCE OF THE CITY

All the changes which will take place because of the construction of a new Zagreb pier will be visible only from the sea or the city tracts which are located on elevations (the Trsat castle). In the view from the sea, the city of Rijeka has the appearance of seaport and industrial town because this part of the shore area belongs to the port basin Rijeka – west, more precisely to the port-transport and industrial operative area of Rijeka. This area extends from the center of town itself i.e. from the passenger port to Kantrida in the length of 5 – 6 km. In the view from the sea, port, industrial and transport facilities (piers, warehouses, numerous reservoirs of INA oil refinery Rijeka- Mlaka and other industrial facilities and buildings, shunting railway station, shipyard) can be seen in the foreground. Behind that the urban structure of lower-sized buildings partly “drowned” in urban greenery can be seen in the distance, and only in the background do that on the slopes over the “nether” part of the city high-rise buildings stand out.

The construction of the new Zagreb pier with the extension of the manipulative area of the port for general freights, will basically improve the existing, from the aesthetical point of view, rather unsightly and gloomy picture of the west part of the west part of the Port of Rijeka. Stricter laws and conditions will bring order into the use of manipulative and open storage areas. By the construction and setting of new port facilities, improvement of the existing dilapidated warehouses and by building of substitute buildings instead of dilapidated buildings, and especially by a careful arrangement of the surrounding area, the new pier with its manipulative area will reflect the appearance of an ordered and modernly equipped port. By means of a careful reconstruction and new building, with an emphasis on the choice of colours, the visual appearance of this part of the port and the city of Rijeka as well, will be notably improved.

As regards the historical port warehouses it should be stressed that they represent, particularly viewing from the sea and from the Rijeka by-pass road, monumental buildings of the city centre that have been defining the picture of the port city for the whole century. We cannot but say that the loss if they are demolished would be enormous.

Through further elaboration and development of the documentation, the possibility of the port modernisation in phases should be considered and because of the location in the city very centre (its west border if the centre is the area from Piramida to Mlaka) the terms of restricted and sustainable development should be apostrophised. Zagreb pier alongside the new connection road to the by-pass road, and the extension of the breakwater could be the first good phase during which the move out of the more west accommodated space users could be defined (They have already been defined by the Schedule to 2010 -
INA, Torpedo). With due respect of the wording in Rijeka GUP (General Urban Planning) that tries to value the cultural legacy of the industrial facilities and perhaps a vision that the city is developed towards the west (because there are not conditions for that in the east), also the city centre will follow that direction (because such conditions do not exist in the east as well). In this respect possible preservation of the port warehouses should be considered. They cover an area of altogether 100,000 m² that is suitable for reassignment to urban purposes from office buildings to garages, apartments and high school/university buildings.

1.2. Removal/demolition of buildings

Environmental impacts of buildings and structures removal/demolition refer only to the impact on the sea in case the demolition material is reused as construction material. Since for the filling purposes, i.e., for raising of ground level by shooting material at the seabed, it is planned to use only inert material, the only impact of this activity would be the change of the coastline shape. Other types of demolition material that might have some seawater quality impact are not planned for this purpose; this material will be managed in line with Croatian regulations.

SOIL, CONSTRUCTION MATERIAL FROM DEMOLISHED BUILDINGS AND STRUCTURES,

Analysis results have shown that a part of materials obtained by soil excavation for the construction of new buildings can be used without negative effects on the environment, and a part must be removed from the observed area and disposed in the legally prescribed way (Law on Environmental Protection, Law on Waters, Maritime Code, Law on Agricultural Land, Ordinance on the Classification of Waters, Water Protection National Plan, Regulation on limiting values of dangerous and other substances in waste waters, Plan of interventions in case of a sudden pollution of waters in the Republic of Croatia and Ordinance on Treatment Conditions for Hazardous Waste).

Construction material originating from demolition of buildings and structures consists of two types of material: sidewalls material, and roofing top-cover material. One part of sidewalls of buildings are walls made of concrete, concrete blocks or bricks with mortar. This is an inert material with no environmental impact. The other part of sidewalls, as well as the part of top covers of newly built warehouses, is built as covering on the supporting steel structure/construction. The covering, as well as the roofing cover, are partly tin plates, and partly asbestos-cement (AC) boards. In both cases, the supporting structure and the coverings have to be disposed of in line with regulations. Steel structure and tin plates have to be recycled (as secondary raw materials) and AC demolition waste has to be disposed of at the landfill (controlled waste disposal) in line with licensing procedure.

Aside from analysis results, due to cargoes stored in Warehouse 24 (hazardous waste) and maintenance facilities, garage and transformer station, together with the outside handling areas of the court, material obtained by their demolition cannot be used for the leveling of the sea. Likewise, the upper layer of all handling and traffic areas (asphalt and concrete) is not appropriate for leveling due to their saturation with mineral oils and must be disposed in the prescribed way.

By-Law on the Waste Types (Off.Gaz. 27/96) contains the Waste Catalogue with the list of business activities and processes generating various types of waste. The catalogue number 10-13-02 denotes the waste generated in the asbestos-cement production, the waste which is not classified as hazardous waste. However, prior to final disposal of that waste, it needs to undergo the waste treatment process. Croatian regulations have clearly defined the process and type of waste treatment, as well as the type and location of its final disposal after the treatment. Without undergoing the process of reducing impacts of harmful substances contained in this type of waste, it is not allowed to be disposed of at the sanitary waste disposal site. This means that asbestos containing (waste) material is not suitable for filling activities at the seabed near the shoreline.

From the chemical point of view the commercial asbestos belongs to the group of laminated silicates. Silicates of laminated structure are the laminations consisting of one or two silicate layers combined with a layer of hydroxyl groups firmly bonded (glued) to silicate leafs by means of Mg or Al atoms.

Comparing the permitted concentrations for particular substances from the Regulation on limiting values of dangerous and other substances in waste waters and having in mind that the sea at the Port of Rijeka is classified under II. category under the National water protection plan, the other material can be used for
filling up; regardless of the concentrations of particular parameters the current state of sea quality in the local waters of the Port of Rijeka will not deteriorate. This is particularly due to the fact that during the filling-up procedure, coast is formed by concrete, which is an inert material, and the material is located between concrete and the sea. It is recommended monitoring during reconstruction and after finishing all building work according to EIA for Zagreb pier.

The material for filling up the sea could be the material obtained from demolition of the buildings and excavation of land in which no higher content of heavy metals is identified, that does not contain mineral oil and the material that has not been grouped as harmful waste. If such quality material is used neither the seawater quality in the port nor the water column 80 km away from the port would be affected.

2. The Road Component

2.1. State road D-8, section Orehovica – Sv. Kuzam (Vitošev) – Krizišće

The construction of the state road D-8 is a very complex project in terms of space and engineering and it has an impact on the space organisation, vegetation, flora and fauna, and the noise level increase. The Study implies a possibility the negative impact on the drinking water sources. On the other hand, it estimates undoubtedly positive impacts on the traffic system by diverting the traffic from the urban area of Rijeka City (and thus the mitigation of air pollution and noise level).

VEGETATION, FLORA AND FAUNA

The construction of the road will effect to vegetation, flora and fauna. Direct consequences of the road construction will be unavoidable intrusion in the top-soil cover by mechanical force (construction machinery or explosive), the force that will considerably affect macro- and micro region of soil and vegetation, with further consequences in terms of fauna deterioration. Along the road route itself, and also in the broader surrounding belt, auxiliary facilities (buildings, structures such as viaducts, bridges, tunnels, galleries, cuttings, fillings, depots and the like). These objects along the route will certainly open the “fresh wounds” in the existing landscape – rugged rocks with vegetation and urban construction.

Since the newly designed road route is longitudinally surrounded by rugged rocky terrain, sporadically even completely bare, or covered by a thin top-soil layer of earth, overgrown by arid vegetation elements/sorts, and including also underbrush or brushwood, the economic loss of forest constituents will be felt much less in this type of terrain than in larger forest areas.

High quality game, specially the big game, already pressed aside, will hardly survive and increase their number along the impact zones of the new road. Only the small-feathered fauna, of interest for hunting activities, can be expected to survive and remain in the area, unless human intervention is taken.

AIR

Rijeka bypass road is laid at the terrain that overtops the City of Rijeka, so that increased natural air circulation at these higher-elevation areas will significantly contribute to the reduction of local air pollution by road traffic. As very high traffic loads of individual road sections are forecasted, it is very important that (a) the route of the bypass road and its corridors is as much open as possible to predominant wind directions in the area (from east and north-east quadrant), and (b) disposition of adjacent buildings does not reduce the natural ventilation of roads.

NOISE

The City of Rijeka configuration is from the acoustic point of view rather unfavorable. Industrial zone (shipyards, factories, the port, and the railway), main roads and the airplane corridor are concentrated in the coastal belt, behind which gradually rises the land part, containing the core of residential and business city areas. Residential areas should be protected from the road traffic noise by various methods and protection measures). Since the Highway route is laid mainly in the free, un-built terrain, traffic noise will possibly influence residential areas of any the following settlements: Draga, Vrh, Gornja Vežica and Hreljin. These influenced zones approach the Highway route so densely that noise levels and impact of the Highway traffic will exceed not only the existing noise levels, but also the noise limit values.
It is important to mention that with the construction of this road the traffic will be diverted from the city settlements and the very centre of Rijeka, which will result in decrease of nowadays too high noise in this area in addition to other benefits.

WATERS
The route of D8 state road is laid within the borders of water protection areas/zones of drinking water springs/sources. Therefore the hazard of pollution by waste substances entering the subsurface transported by run-off rainwater is very evident, especially in the karstic area. Road construction causes increased surface run-off. By opening of cuttings in the terrain, the groundwater flow is drained, and soil humidity in the wider belt area decreased. Ditches do not reduce the groundwater level, but frequently alter or modify the run-off flow pattern of surface waters. Thereby the possibility for their sinking into subterranean passages is reduced.

Construction of tunnels makes hydrographic changes in the drainage basin possible, particularly in the karstic area. By cutting groundwater flows, and by changing the structure of cavities in the karst, impacts on groundwater drainage patterns become possible. As the consequence, surface watercourses can also be changed – due to relocation of the surface water rise from the spring. In case groundwater flows that can be brought to capture are detected in the course of tunnel construction, they will be used for water supply of the area concerned. Bridges and viaducts have no significant impact on surface- or groundwater flows.

Catchment area (drainage basin) trespassed by state road D-8 is the supply area for the drinking water springs, so that the aforementioned draining often influences water recipients interconnected for the road construction.

Section: Junction Orehovica - Junction Vitošev is located in the catchment area of water wells in Martinšćica, the water supply facilities of the Rijeka region.

Section: Junction Vitošev - Junction Meja is located in the catchment area of the water sources in Bakarski bay downstream of the water supply facilities, kaptaže Perilo, Dobra, Dobrica, and the water sources Podblok, Črno, Žminjca and other on which water the water supply system relies on.

Section: Junction Meja - Junction Križišće, connection with Kraljevica and Bridge Land - Krk
This section is located outside of the catchment areas that have significant sources of drinking-water, but is in the precipitation area of the sea-shore in Bay of Bakar (out according to the Regulation of the categorization and classifications sea was sorted in II category because of the prevention of contamination of sea-shore with oil, petroleum products and other dangerous and noxious substances).

The quantities of water that in such a way reaches natural recipients from the roads is not only a basis for sizing the drain systems but is a prerequisite for possible assessment of its operation on them. We are not only interested in the quantity of inflow into the public watercourses but also its operation of the outflow of the entire natural ground to prevent the overload of the natural recipients with the water inflow from the roads. Recipients for waste water from road are different for different sections:

- Orehovica - Sv.Kuzam (Vitošev) is connected to a drain sewer along the stream Javor and after than discharged into the recipient, the coastal sea in Martinšćica.
- Sv.Kuzam Junction (Vitošev) is connected to already built open canal Industrial Zone – Bakar.
- Meja Junction - The precipitation waters from this area are connected to the precipitation sewer systems of Krasica and Pruputanja-Hreljin area.
- Viaduct at 13 km to the Križišće junction - The precipitation waters from this area is discharged into the ground by the absorbing wells but in direction of the valley towards Bakarac.

ORGANISATION AND INTENDED USE OF THE AREA, VISUAL VALUES OF THE AREA
The Highway route - section Orehovica -Sv.Kuzam - passes through the area of City of Rijeka, although through its peripheral sections, such as the valley and slopes of Kačjak and slopes of the Draga Valley. The Orehovica junction is mainly located on the arable land; moreover it is so close to the Orehovica village that protection corridors of sufficient width cannot be realized. These corridors (min 50 m measured from the central line/axis of the nearside lane of the Highway) could still be realized, unless local connection roads to the junction are constructed. These, namely, significantly reduce and threaten the protection corridors.
In order to avoid disturbance of local residents and negative impacts on their quality of life due to road traffic, it should be cared for that new residential buildings are not located and built immediately adjacent to the road. Besides air pollution by exhaust gases, noise and vibrations cause additional negative impacts on the residents near roads. Therefore, this unfavorable impact of road traffic on human health should be mitigated by horticultural protection zones/barriers along the road.

At the east side of the railway embankment the sport and recreation center is planned in the valley; further to the east there are already sections of the settlements Drage, Pod Ohrusvom and other. At this point a couple of houses happened to be very close to the Highway route; the corridor is here locally narrowed to only 25 m from the Highway axis (but only in the length of 40 m).

From “Draga” junction to Sv. Kuzam (Vitošev) the Highway route passes through a free un-built area and sufficiently distant from the nearest sections of Draga settlement, some 100 to 150 m from the Highway axis, so that no special protection measures are needed. However, the Highway will be largely visible from the settlement. Considering the sensitivity of this natural landscape (“greened” and steep slopes, possible close and easy access), a good horticultural arrangement of the north slopes and safety corridor of the Highway will be required.

The whole Highway section Sv. Kuzam (Vitošev) – Križišče passes through an area of free nature and sufficiently far from every settlement, so that no impact (of neither noise nor exhaust gases) can be felt in these settlements (the closest being Hreljin at some 150 m from the Highway axis).

The “Križišče” junction, located at the slopes between Baretičevo village (part of autonomous currently village-type settlement Križišče, and planned as mixed-type settlement) and existing road Kraljevica – Križišče, is located also quite close to the existing settlement. Since the distance from the Highway axis to the closest houses is still at least 75 m, and the Highway level elevation with reference to that of the closest houses is favorable (the road should be at least 10 to 15 m lower), no special protection measures shall be required even in this case.

The road route partly runs through the area (a part between Orehovica junction and Sv. Kuzam Junction), which is categorised as a protected landscape according to the Physical Plan of Primorsko-goranska County. According to the Law of Nature Protection (OFFICIAL GAZETTE 30/94 and 78/94) “the protected landscape is a natural or cultivated area of higher aesthetic or cultural and historical value, or a landscape characteristic for an area. The activities that impair the characteristics of an area which were the reason for proclaiming it a protected area are not allowed”. The protection does not exclude the construction. The proclaiming procedure has not been implemented yet.

Positive effects of the road construction are:
- The road has been designed for high traffic standard with technical elements of a highway.
- Relieving the city road network from trucks; is considered the largest improvement in the traffic situation.
- The transit will be routed to the by-pass road thus avoiding the city settlements and the city centre and complex many conflicts with complex traffic situations in the city.
- City areas will be directly connected to the by-pass road by a junction.
- Shorter connections to the port basin of Rijeka through Škurinje junction, Sušak basin through Draga junction and Bakarski basin through Vitošev junction.
- Interconnection of the city parts (1/3 of the total foreseen traffic is of local character).

The use of natural conditions (succession of valley and mountains alongside the road route for development of the connections to the existing and planned city roads), which are the most economic ones on the route foreseen. The most important connections are realised in the Škurinjska valley for connecting the city and the port from the west side and in the Draška valley for the shortest connection of Sušak and Kostrena to the highway.

2.2. State road D-404
The possible consequence of the state road D-404 construction could be higher noise level and pollution of water in Martinšćica water source, the impact on flora and fauna and the landscape, and minor impact on organisation and assignment of the area. On the other hand, the road construction will have direct positive
effects on the Rijeka city economy, improvement of traffic in its broader region in terms of road location and rerouting of traffic.

WATER
There might be a negative impact on the environment considering water quality, since this state road passes through I. b and II. zone in Martinšćica where drinking water is protected. It also passes outside the protection zones in the costal region. Sensitivity of the area, complexity of implementing the security measures, especially during construction, as well as the importance of the Martinšćica spring in Rijeka water supply system, requires some extra project work in order to reduce bad influences road construction might have on underground-waters (the survey about construction organization).

A special problem in terms of environmental protection is posed by the part of the D 404 State road route from the Bobova tunnel to the E1 point – it passes through a sanitary protection zone. Given the configuration of the land it passes through, the hydrogeological situation and the position of the D 404 road route and its junctions, it is clear that this is an extremely sensitive and complicated intervention in terms of environmental protection, i.e. the protection of the drinking water spring in the Martinšćica pumping site. The protection of the spring is clearly conditioned by water management conditions and the conditions set by the “K.D. Vodovod i kanalizacija, PRV Vodovod” from Rijeka (public water company).

In the periods of stronger or long-lasting precipitation, it can be expected that during rough construction works the spring will become partially turbid. For this reason works are planned with the reduced front (execution in short sections, 10-15 m). It is clear that such a method of work reduces the possibility of incidents to a minimum, but at the same time requires increased funds for the execution.

Since the width of the construction site in its widest part is ca. 25 m measured with slopes and the length ca. 150 m with the finish grade situated on the levels from 55,00 to 77,00 meters, such a "band" excavated in relation to the entire slope will not cause a threat to the spring.

INTENDED USES AND ORGANIZATION OF SPACE
Construction of D 404 (GMC-105) will acquire preconditions for the better organization of space in Sušak area, since this part of town would be unburdened from the significant part of traffic, especially lorries. Better and faster connections between Kostrena, Sušak and the town centre would also be achieved.

Construction of D 404 (GMC-105) would not cause significant changes in the intended land use, neither on the wider township, nor in the route corridor, since larger part of the route (on Brajdica) is laid down in the corridor railway, and the other part is mostly in the tunnel. The other part passes outside the town centre, through the area which is undeveloped, but is intended for recreation (for walkers and hikers) and which is also the water protection area of the Martinšćica spring. The interesting system of underpinned pedestrian pathways that take shape of large serpentine and whose building has been initiated by the town even before the World War II is on slopes of Sv. Kriz. The slopes of Sv. Kriz and the valley of Draško's stream and Solin are a recreational area. Construction of the road would cut the main pedestrian pathway, which starts from the large curve in the Zdravka Kučića street across southern slopes of Sv. Kriz and then goes across the Draški stream by a stone bridge, than to the other side of defile towards the trim track on Solin. Pathway has been marked by hikers, which use it a lot.

POPULATION AND SETTLEMENTS
Negative impacts (noise, air pollution and destruction of town ambiance) from D 404 might be expected on the smaller area of the settlements Pećine and Donja and Gomja Vežica, since in the populated area the road is placed in the tunnel. Positive impacts for Sušak inhabitants (as well as Rijeka inhabitants) which are expected from D 404 are considerably larger, because all freight and especially transit traffic from Sušak area and some parts of Rijeka will be directed to the fast state road. It would also have a positive ecological impact.

There are some objects that ought to be demolished on the open part of the road, especially on the A-B section (Brajdice area). Most of them are warehouses intended for dockside transhipment and a small part of them are residential objects inside the Sušak railway station. The object of greater significance is the
station building that was built in the nineteen thirties. It serves as a residence and a workshop for Croatian Railways. Croatian Railways have already given its consent for its demolition or changing its purpose.

The study confirmed that the road in question is economically and functionally justified investment and by its building all the Sušak settlements would be unburdened from transit traffic, especially freight one. Ecological state in this part of town would be improved.

AIR
On the basis of the analyses (mathematical model of dispersion) it was found that the recommended limit values of (SO2, NOx, NMVOC, Pb and particulates) would not be exceeded at maximum emission from the road. The wind rose in this area is very favourable. The study found that the concentration of polluted air (CO, Nox, smoke) on outlet of ventilation would be considerably below permitted limitations and would not change air quality for the worse. The air quality in the tunnel shall be achieved in accordance with the PIARC 1991. regulations.

NOISE
Going beyond permitted noise limitations shall definitely happen on some sections of the road. However, a few critical road sections have been identified where the recommended noise level could be exceeded:
- at Brajdici from the point 0+791.0 to 1+126.0 (housing buildings),
- at the section before entering the Pečine tunnel, from the point 1+200.00 to 3+150.0 (housing and office building)
- in the tunnel
- at the section from the point 2+921.0 (Bobova tunnel exit) to 1+126.6 (housing settlement of Bobova),
- at entrance and descending ramps towards the port of Brajdica.

VISUAL INFLUENCES
Harmful and unfavourable influence of the road on landscapes and slopes above the cove Martinšćica is in constructing this significant construction in underdeveloped land, and especially the construction of cutting, barrier and dam. In urban town area, especially in the area of Delta, Brajdica and Pečine the visual influence of the road is relevant. This is related to the new bridge across Rječine (inviting tenders for the architectonic solution would be appropriate), viaduct on Brajdica and tunnel portal in Pečine. For protection from noise acoustic walls ought to be made according to the special project so they could be well incorporated into this sensitive town area.

NATURAL AMBIANCE AND BIOCENOSYS
It has been ascertained that no flora and fauna typical for Rijeka region will be devastated by the road construction because only some species of local importance live on the road route. Influences on environment, especially on animals and the natural ambiance are:
- in the tunnel exit on Brothers Pavlinić settlements up to the place where the road cuts the Brothers Pavlinić stari is the small oak forest;
- near the Zdravko Kučića street is fertile ground;
- passage of the road through the belt are planted forests of the alepski pine.

A part of the road route (from Orehočica junction to the point E1) runs through the area that has been proposed for the protected landscape categorisation by the Physical Plan of Primorsko-goranska County. Pursuant to the Law of Nature Protection (OFFICIAL GAZETTE 30/94 and 78/94) “the protected landscape is a natural or cultivated area of higher aesthetic or cultural and historical value, or a landscape characteristic for an area. The activities that impair the characteristics of an area which were the reason for proclaiming it a protected area are not allowed”. The proclaiming procedure has not been implemented yet.

ENGINEERING AND GEOTECHNICAL CHARACTERISTICS
In the case of shallow foundations for the bridge across Riječina river or a viaduct, local land subsiding is possible. There is also a danger of hazardous seismic effects caused by blasting and possible land break off during excavation. This particularly refers to the locations where in the excavation zone the impact of the existing building foundations is expected.
Possible local break off of land that could occur during the land cutting shall be prevented by adequate technical measures during the construction works.

Harmful impacts of earthquakes to the existing building shall be eliminated by incorporating the investigation parameters obtained within the seismology study into the stability analyses.

With construction of D-404 road some positive effects are expected that will be a long-term solution for the traffic situation in Sušak. In addition to a good solution for the shortest connection between Vežica housing settlement (21,000 inhabitants) and the city centre, and the connection of WTC to high-speed urban and inter-regional roads, the existing and planned city zones will be getting manifold benefits such as:

- The streets will be relieved of the transit traffic burden.
- The streets will be relieved of heavy truck traffic, which is rerouted to D-404 road.
- Negative impact of the traffic is reduced: noise, air pollution, landscape impair.
- Higher safety of the participants in traffic.
- Improvement of the city traffic efficiency (pedestrian and buses) because the streets are relieved of heavy traffic.
- Shorter travelling and higher economic efficiency of the entire traffic system.

2.3. Zagreb – Macelj Highway

Because of the scope of the works scheduled, not additional environmental impact is expected. The environmental impact of the second road lane construction on this route has been addressed in the Environmental Impact Study for construction of the second road lane but this is not a component in this Project.

3. The Bridge Component

Reconstruction of the bridge started three years ago and so far only piers of small ports are being restored. By pillars which are on arc ends "cleaning of " a concrete with a high-pressure pump has no influence on ship traffic below the bridge, which anyway unwinds between marks which are drawn on the arc of the bridge.

The Port authority, branch office Rijeka, had been notified of the works in the arc centre and so far hasn't had remarks about it. There is also a small boat of «Croatian highways» below the bridge, which warns about the work going on above the waterway.

The material that should be eliminated from the bridge does not put in danger boats passage. No work shall be performed during summer when there is an intensified maritime traffic below the bridge. During reconstruction of Krk's bridge the work did neither influence the sea traffic below the bridge nor the work of oil pipeline that passes through the arc of the bridge. There are plans for arc reconstruction in the near future. It is still unclear which method will be applied. The new method of cathode protection is possible. There is a pipeline inside the arc bridge. Its function shall not be endangered during reconstruction, because it will be performed externally.
(e) Environmental Protection Measures and Monitoring Program (Environmental management plan - EMP)

This Report provides a systematic review of the documents analyzed (EIS, location permits - special conditions for environmental protection, documents which are requested by EIA) which deal with environmental protection measures and environmental monitoring program – responding to relevant items of Environmental Management Plans (EMP), i.e., item a. Environmental protection/mitigation measures, and item b. Environmental monitoring. Other required sections of the EMP have not been elaborated in the aforementioned documents.

Environmental impact mitigation measures prescribed in the documents reviewed and environmental monitoring program (to check implementation and efficiency of the prescribed measures) as well, along with additional measures presented in this Report, are all together sufficient to ensure that construction of the planned developments (spatial interventions) has no unacceptable environmental impact. Prescribed environmental measures and monitoring elements for particular Project components are presented further on.

ENVIRONMENTAL MANAGEMENT PLANS (EMPs)
In conformity with the World Bank’s operational policy (Op. 4.01, Annex C) the Environmental Management Plan consists of the following required sections:
   a. Mitigation
      - identifies and resumes all harmful effects,
      - describes technically every mitigation measure,
      - assesses any potential impact and provides a reference to all other mitigation plans
   b. Monitoring
   c. Capacity development and training
   d. An operational plan and cost estimates
   e. EMP inclusion in the Project

This report provides a systematic review of the documents analysed (EIS, Location permits - special conditions for environmental protection) for the Project components in conformity with the following EMP parts:

   a. Mitigation (environmental protection measures)
      - identifies and resumes all harmful effects
      - describes technically every mitigation measure
      - assesses any potential impact and provides a reference to all other mitigation plans
   b. Monitoring (of the environment condition)

Other required parts of the EMP have not been addressed in the documents analysed.

1. The Port Component
1.1 Zagreb Pier
Environmental protection measures given/stipulated in the Zagreb Pier EIS and presented further, covered all environmental media and aspects where impacts can be expected, so that no additional measures should be required. Some measures and actions listed below includes also measures which are not addressing environmental impacts related to the project. Demands related to sea protection from pollution, sewage system for oiled waters and sludge disposal cannot be bound exclusively to the (re)construction of the Zagreb pier. Rijeka port authority have to give an initiative to start the activities (designing) aimed at solving these problems.
a) ENVIRONMENTAL PROTECTION MEASURES

The influences can be reduced to acceptable level, if the following environmental protection measures are conducted in the process of drawing up plans, building, and utilization:

DURING- DESIGNING MEASURES

Before the issuing of the pro-forma construction permit or the final construction permit it is necessary:

- Set in the Gulf of Kvarner, in front of the port of Rijeka a permanent buoy equipped with measuring instruments for the survey of the wind-wave climate;
- Simultaneously, a "Measuring programme" study must be conducted on the basis of which these measurements will be carried out according to the time and place of the measuring;
- Check the functioning of the reconstructed Zagreb pier due to its exposure to the open sea on a physical model, in order to define the parameters of the influence of the waves on the shore of the pier as well as on the existing aquatorium of the Port of Rijeka, all on the basis of the measuring of the wind-wave climate;
- Conduct the final maritime study for the reconstructed Zagreb pier;
- Frame a preliminary design of the linking road D-403 and set in motion the process of obtaining the Location permit. This as well as the beginning of the construction, must be arranged with Hrvatske ceste.

In the preliminary and architectural designs, the following environmental protection measures must be taken:

SEA

- the appropriate temporary location for the storage of waste, which must be removed from the harbour.
- transformator cells with dry cooling in the electric fittings projects.
- the divisible sewage system for sanitary-faecal waste waters, waste rain-water from the traffic and operative areas of the harbour and the “clean” rain-roof water.
- the drainage of sanitary-faecal waste waters so that they are conveyed into the public sewage system of the city of Rijeka.
- In a project, envisage the passive sea pollution protection due to the underground leaking of hydrocarbon in the area of the oil refinery Mlaka. By a planned intervention, the existing petroleum harbour of the INA oil refinery will be filled up, and the existing break-water will be pulled down in order to enable the building of a new coastal construction. In the new filled up part a construction must be designed and built for the prevention of the leaking of underground hydrocarbon into the sea.
- Setting in motion of a procedure of intensified maintenance and enlargement of the system for the implementation of measures in order to decrease the damages in the environment caused by sudden sea pollution. This demand cannot be bound exclusively to the reconstruction of the Zagreb pier. Nevertheless, the planned intervention, as a very important intervention for the future development of the Rijeka harbour, must give a stimulus to the further development of the system of sea pollution prevention in the Gulf of Rijeka. The port authority as one of the state-operated institutions has an obligation to implement the government policy on environment protection. In terms of this, it is bound to start on the level of designing the solving of these problems and afterwards ask for the participation of the users in the investment.
- In the designing phase it is necessary to envisage the enlargement of the sewage system for oiled waters of ships in the INA-oil refinery in Bakar, especially the system for waste water percolation (the effect of water percolation is not satisfactory)
- Prepare the project and other documentation for the readjustment of the furnace for the burning of mud, built as part of the system of waste water processing in INA-oil refinery in Urinj. This furnace, which is out of use today, could be used for the burning of mud from the machines for the processing of oiled waste waters and other dangerous waste which originates in the area of the Gulf of Rijeka.

NOISE

- Carry out architectural noise protection measures during the designing by deploying the buildings so that they with their dimensions represent a conveniently located barrier to the spreading of the noise coming from the most powerful sources (here: noise produced by road and railway transport).
• Adapt the technology design to the machines and appliances for which the bidder and supplier can prove that produce the lowest level of noise;

VISUAL APPEARANCE
• Give special consideration to the aesthetic appearance of the port, especially to the view from the sea on the urban structure of the city in the background, with a special emphasis on the physical structure of the freight port in the configuration sense and the choice of colours and hues for all the elements of the port (the shore and the manipulation area, all the buildings and all the works for freight manipulation), where grey and similar colours and hues must be excluded.
• Devise a "Landscape arrangement project".
• Apply and implement throughout all the phases of the projects, the regulations of the Republic of Croatia as well as execute the decrees of international regulations and conventions relating air pollution, sea pollution, waste manipulation, the influence of noise and traffic safety on sea and land and impact on cultural heritage.

It is a further obligation of the port authority to attend to the problem of construction, maintenance and use of the reconstructed Zagreb pier as well as the specialised port terminals, thus managing the environment. In order to provide a successful management, a few steps must be made already in the designing phase. This project is a constituent part of the pro-forma construction permit, through which the following will be devised:
• An "Environment Management Policy" study wherein the following must be included: confirmation of the readiness for the improvement of the port terminal performances in relation to the environment, regulate the mode of the founding of a team whose task will be to control the project and prescribe the mode and obligation on the basis of the existing state of the environment as well as management and application of the adequate protection measures.
• Devise a "State of the Environment Survey" study which acts as the initial picture of the existing distinctive features of the Zagreb pier and the basis for the devising of an adequate basis for the development of an appropriate environment management programme.
• Devise a "Environment Management Programme" study as a complete management plan, used to coordinate the objectives and purposes of the Zagreb pier functioning with the adequate demands and necessities of environmental protection.
• Consider the possibility of conducting a study on "The Use of Industrial Building Heritage" as the basis for possible spatial insertion and different staged and gradual development and possible integration of valuable cultural resources.

DURING- CONSTRUCTION MEASURES
It is an obligation of the contractor to devise a plan of arrangement and organisation of the construction site with a transparent and easily understandable cost estimate and specification for the implementation of environment protection measures based on set criteria which will have to be met during the construction, everything based on regulations, conventions and other decrees:
• The study has to pass the verification of the Government commission for the evaluation of this project.
• The study has to obtain the approval of the city of Rijeka.
• The study has to obtain the approval Ministry of culture.

NOISE
• Obtain the opinion and approval of the competent inspection department responsible for the works which due to the nature of their technological procedure and process must be performed uninterruptedly day and night (and on holidays).
• Limit the time of the execution of works every day, mostly in the period from 6 to 23 o'clock.
• In the construction phase, the contractor must meet the general measures of protection of the location from the spreading of noise from the construction site (restriction of the emission of noise allowed for the contractor’s equipment)
- It is an obligation of the contractor to devise a plan of arrangement and organisation of the construction site with a transparent and easily understandable cost estimate and specifications for the implementation of environment protection measures on the basis of set criteria which will have to be met during the construction, everything based on regulations, conventions and other decrees.
- Supervise the course of construction works, not only technical supervision, but occasional or permanent supervision of inspection departments during the measuring of noise level by competent companies.
- Condition the co-operation with transport companies, which will perform the transport during arrival and departure, by the inclusion of state-of-the-art means of transport (road and railway).

WASTE
- Waste packing materials must be gathered separately and specially marked (Law on waste, Official Gazette 34/95)
- Municipal and other similar waste must be collected in specifically intended containers and disposed regularly.

DURING-USE MEASURES
It is an obligation of the user of the shores and terminals to devise a technological plan of the arrangement and organisation of the shore surface sand shores with transparent and easily understandable specifications for the implementation of environment protection measures based on set criteria which will have to be met during the use, everything based on regulations, conventions and other decrees:

NOISE
- The implementation of architectonic protection measures against noise by technological arrangement of freight (containers) and reloading equipment so that they with their dimensions represent an adequately located barrier to the spreading of noise from the most powerful sources (here: noise produced by road and railway transport).
- Adapt the technology design to the machines and appliances for which the bidder and supplier can prove that produce the lowest level of noise;
- Condition the co-operation with transport companies, which will perform the transport during arrival and departure, by the inclusion of state-of-the-art means of transport (road and railway).
- All machines and other equipment, which is being used in the technology of the development of the process, must be functional.

WASTE
- All dangerous waste originated in the area of the port must be gathered separately and separate storage which fulfills the prescribed technical-technological standards.
- Waste packing materials must be gathered separately and specially marked.
- Municipal and other similar waste must be collected in specifically intended containers and disposed regularly.

POTENTIAL ECOLOGIC DISASTERS
- During the use of the presumed intervention, with the exception of the above mentioned elements of potential environmental burdening, it is possible that ecologic disasters could appear only in case of natural disasters such as earthquakes and large fires.
- The possibility of earthquake is shown by the seismic characteristics of the area. In case of fire, the disaster can be localised by fire-protection measures and activities and it would thus present a danger for the immediate surroundings (the urban area) for a short time.

TRAFFIC
- All vehicles which enter into or leave the area of the reconstructed Zagreb pier must be equipped in compliance with the valid laws (Regulation on technical inspection of motor vehicles, Off. Gazette No. 9/93, 69/96, 2/01 and 149/02, defining max. allowed concentration of air pollutants emission in exhaust gases of motor vehicles)
- All the ships which put in in the Rijeka port at the Zagreb pier must respect the valid legal regulations.
It is the obligation of the port authority to attend to the problem of construction, maintenance and use of the reconstructed Zagreb pier, as well as the specialised terminals, thus managing the environment according to the programme. For the achieved results in the implementation of the Programme, a permit will have to be sought from the competent and supervising institutions.

**b) MONITORING**

The proposed monitoring program for the environment condition fully covers all the environment elements that could be affected by the construction and it does not require any modifications in that part. During the licence issue procedure it shall be necessary to identify the locations for the checkpoints and measuring frequency in co-operation with the authorities with the environmental protection offices at Primorsko-goranska County (e.g. it is enough to measure the noise level once in each season). Because of the planned reconstruction of the Zagreb pier in part of the Rijeka port basin, the contractor obliges himself to supervise and examine on an organised basis during the use of the operation:

- By measuring the air quality, along with the measurement of a series of law-regulated parameters
- By supervising the state of noise through the constant measurement of its intensity on control points
- By supervising the state of sea and sediments through measurements on control points
- By supervising the quality of waste waters on the separators
- Supervision of the state of solid waste through the keeping of an obligatory record
- Supervision of the state of means of transport on land by means of obligatory semi-annual reports
- Keeping records of incidents in sea transport, compiling of an annual report
- Measuring the state of the wind-wave climate, compiling of an annual report

The necessity of the introduction of a system of supervision and measurement during the use of the operation and before the construction is being considered in detail because of:

- the previously ascertained state of the quality of the environment in a wider area affected by the activities in the port of Rijeka and the activities of other economic agents in the industrial zone
- the existing bad state of the environment: II. category of air, III. category of sea and excessive burdening by noise which state is taken as initial and referential.
- potential further burdening of the environment through the functioning of the pier
- development of a relationship of co-operation with the public in the exchange of good and updated information on the state of the environment
- a recommended equalizing the status with the standards of other competitive ports in the northern Adriatic.

A confirmation will have to be sought by the competent and supervising institutions for the achieved results each year. The confirmation or certificate (Environmental Statement) for the achieved improvements in the influence on the environment in all parts and functions of the Zagreb pier, relates especially to:

- Nature conservation
- Water resource management
- Waste management
- Energy efficiency and purchasing policies
- Education and the working environment
- Communications and public awareness.

The environmental monitoring program proposed here entirely involves all the environment constituents (media) for which environmental impacts have been defined, needing thus no changes in that part. In the licensing procedure of issuing building permit the measuring point locations and measurement frequency should be defined, and that in co-operation with competent offices of Primorsko-goranska county administration in charge for environmental issues. For example, noise level measurements would suffice if performed only once in every season of the year instead of proposed continuous measurements.
1.2. Removal/demolition of objects/structures

The material analysed and found to contain the heavy metal concentrations higher than allowed for agricultural land, as well as the presence of mineral oils, cannot be used for filling up the sea, but it shall be transported to a special disposal sites. The design documentation for obtaining the building permit shall define the quantities and the method of disposing the material produced by demolition of the buildings and excavation of land for the new buildings that is found inappropriate for filling up the sea.

By-Law on the Conditions for Waste Handling (Off.Gazette No. 123/97) defines the categorisation of landfills and defines parameters and various substance concentrations in waste. Additional analysis of the solid matter and physical-chemical parameters in the leachate (eluate), polycyclic aromatic hydrocarbons (PAH) and organic pollution concentration (GMS), should be carried out in order to decide the category of landfill (I or II) at which the mentioned waste material shall be disposed of.

2. The Road Component

Environmental protection measures defined in the Environmental Impact Study (EIS) for D-8 state road refer to protection of drinking water springs/sources, noise protection, and protection of natural, rural and urban values of the area concerned. Since the EIS did not define environmentaly impact mitigation measures concerning cultural heritage objects, these measures are proposed in this Report.

2.1. The state road D-8, section Orehovica - St Kuzam (Vitoševko) - Križišće

a) ENVIRONMENT PROTECTION MEASURES

Environmental protection measures defined in the Study are in conformity with the Decision on establishing and maintaining sanitary protection zones and on protection measures of drinking water spring areas of zone I and II. By implementation of stipulated protection measures environmental impacts are reduced to an acceptable level.

WATER

The state road D-8 goes through the area that is enclosed and processed in the Decision about establishing and maintenance of sanitary protection areas and security measures of drinking-water sources in I and II sanitary protection areas (drinking-water sources, strict regime areas). It does bring benefits and welfare but represents a risk for the region, especially for underground-waters because vehicles constantly release lubricants and fuel and occasionally by traffic accidents greater contamination may take place. Protection of drainage basin areas, as well as drinking water source areas, is ensured by construction of a waterproof stormwater drain system along the whole route of the road and according to condition of sanitary zones protection:

The first area zone (area of strict regime) of sanitary protection has to be arranged in the following way:
- sanitary effluents must be taken away from the area under protection by the impermeable drainage,
- precipitation from hinterland of the zone must be transferred outside the zone with exceptionally impermeable trough through the zone
- if precipitation cannot be driven outside the direct penetrating zone because of the natural conditions, it has to be taken to the abysses. Before that it has to be cleansed to the regulated degree.

The second zone area (the strict limitations area includes direct hinterland of drinking-water source) of the sanitary see protection has to be arranged in the following way:
- all free surfaces must be arranged as a green belt,
- all the precipitation from the road and such surfaces with impermeable grounds, as well as sanitary-used effluents, must be driven away by impermeable drainage out of these protected areas,
- roads with bigger traffic frequency must have lateral fenders, so they prevent vehicles from going off the traffic surfaces. They must also have objects and separators for acceptance of fuel and other harmful liquids,
- transport of poisonous and noxious substances (poisons, oils and similar) on existing roads must be performed with speed limitations. Therefore, adequate traffic signs should be set up,
- in this zone road construction is permitted with special security measures of underground-waters.

Protection of water supply areas and water sources shall be achieved in the first place by designing suitable objects and performing the work according to the decision above.

A special attention should be drawn to works in the I zone when it comes to drainage of PRECIPITATION. It is necessary to prevent the penetration of precipitation into the ground and its flowing away on the ground surface. Building little channel (runnel) alongside the road would prevent precipitation from flowing away. Precipitation will be collected by closed waterproof canals and than transported to cleansing appliances. Relevant precipitation within 20 minutes has intensity of $= 160 \text{ l/sek/ha}$, and for oil separator dimensioning relevant intensity is $25 \text{ l/sek/ha}$. Oil storage space is $15 \text{ m}^3$.

The type of appliance with built in rain spillover applies when drainage from larger surfaces or larger quantity of precipitation is concerned. Appliance must be permanently under control, and the buoyant superficial layer should be withdrawn. Occasionally, at least once a year, it is necessary to eliminate the sand and the mud from the bottom and the appliance with clean water. The covered type of appliance that in winter months does not freeze is recommended. Schedule for cleansing appliance is defined according to longitudinal profile of the road, on the lowest parts.

During construction of the road and its objects, a special attention should be drawn to the zone I and II, especially:
- workhouses for machines and vehicles, stations for fuel, warehouses with dangerous substances should not be placed there,
- surfaces around and inside workshops, warehouses with construction material and offices must be made impermeable,
- impermeable surfaces must have waterproof drainage which will drive away precipitation outside the I and II zones,
- sanitary effluents can be dropped into hygienic waterproof buffers, which need to be under permanent control and emptied on a regular bases,
- mining of the field has to be preformed in such way that would not cause disorders in underground-waters streams,
- diving of dug up material down the slope of the hill is not permitted. The whole dug out material must be taken away in dams or dumps,
- inclinations of cutting or choose according to natural angels of fiction for certain category of grounds, in order to reduce energy effects on minimum.

Section: Junction Orehrivica - Junction Vitoševio is in the precipitation area of well in Martinščica, water supply objects of Rijeka area. Water from road surfaces will after cleansing with separator follow the draining main sewer beside Javor stream to the vent in recipient-sea-shore. Previously, partial regulatory works on Draški and Brniški stream should be performed.

Section: Junction Vitoševio - Junction Meja is in the precipitation area of source in the Bay of Bakar. There are many objects for water supply and transportation by canals Perilo, Dobra, Dobrica, as well as the source Podblok, Črno, Žminjca and others that are needed for the water supply system. Waters from the road surfaces will, after cleansing, be followed in an open, already built canal of Bakar Industrial area. It would happen along with previous controls in Krasica and Praputnjak - Hreljin for whose systems an Preliminary study of town Rijeka drainage (the GUP area) has been made. Separating the I from the II protection zone in the area near the road will cause separation of "Strict regime" areas, i.e. areas of water supply objects with sanitary protection (I) from the area of "Strict limitation" (II). As it is well known (Decision, article 8), object constructions, except for the pump site and water supply tank, are not permitted in the first zone area. Roads and surrounding objects along with other appropriate measures in accordance with the Articles
12 and 13 of the Decision (the impermeable drainage, fenders, objects for acceptance and separation of harmful liquids, speed limitation etc.) shall be arranged in the second zone area.

Section: Junction Meja - Junction Križišće, connection with Kraljevica and Bridge Land - Krk
This section is outside the precipitation areas that have significant sources of drinking-water, we must take into consideration the sea-shore in Bay of Bakar was sorted out according to the Regulation of the categorization and classifications in II category because of the prevention of contamination of sea-shore with oil, petroleum products and other dangerous and noxious substances. Therefore it is necessary the precipitation water to be disposed into the field by a drainage system by water-well. The most important thing when we speak of exploitation of objects is keeping them in the valid condition. The built object must also satisfy the prescribed measures.

NOISE
Necessary things for making a documentation of noise protection of Rijeka roundabout are:

a) to determine levels of noise that are expected according to planned vehicles frequency in different periods, for all crossroads near settlements whose distance from residential objects is less than 300 m.
b) to record the existing residential objects in zones and make the evaluation of the noise from the prognosis
c) to design a protection from noise for all the existing objects where noise from the roundabout is above allowed limitations
d) to determine the most convenient kinds of soundproof screens and built them wherever needed.

It is also necessary to employ a specialized organization to perform all the work connected with protection from noise. That organization has to guarantee that the level of noise in populated areas will be reduced on permitted levels. These measures are the part of special conditions and the Conditions of space development.

For the houses near the Highway route on section Orehoivica – Sv. Kuzam (Vitoševco) at the point where the corridor is narrowed down to only 25 from the Highway axis (but only in 40 m length) is necessary to apply the noise protection by a special screen.

NATURAL, RURAL AND URBAN VALUES
Section Orehoivica – Sv. Kuzam (Vitoševco)
The objects in the Junction Orehoivica, or in its protected area, the least in a 30 metre belt from the axis of the closest roadway, the extension of the Highway, should be removed. That location should be used for horticultural purposes. The old public building of local community "Orehoivica" is inside this belt, but it has to be protected because of its values. It would also have to be protected from the noise and gases from the Highway by a special screen.

There are two pathways for coming down the valley that have to be kept. That would be achieved by enabling their cross below or above the Highway. From east side of the railway dam in the valley a recreation center have been planned and further east are settlements- Draga Pod Ohrusvom and some others. Several houses are near the Highway route. There is a point where the corridor is narrowed down to only 25 from the Highway axis (but only in 40 m length). On these sections it is necessary to protect the area with evergreen trees and bushes in order to reduce the disturbances from the Highway and to hide the Highway dums.

Except for the necessary dodging the part of the existing road for Draga - below the Highway and near the railway durn - the wide pedestrian pathway has to be constructed (connecting of the Gornje Vežice and planned recreation center). The Highway route from the Junction Dragc to Sv. Kuzma (Vitoševa) passes through a free area and on a large distance from the closest part of Draga settlement (100 to 150 metre from the Highway axis), so no precautions are necessary. However, the Highway will be well seen from the settlement, and a good horticultural treatment of north edges and Highway corridor would be needed (this is a very sensitive landscape with many slopes and green surfaces).
Section Sv. Kuzam (Vitošev) - Križišće

At the very beginning of this section all the elements of Bakar Kalvarija should be preserved. In this section the Highway passes through natural environment and sufficiently far from the settlements (the closest one is Hreljin, about 150 metre from the Highway axis) so they cannot be affected by noise or exhaust gases. The field in this section is very rough, steep and visually displayed from everywhere, specially from the sea. A special care has to be taken of aesthetics. Terraces and dry stone walls of former Bakar vineyards should in no case be damaged and filling in slopes should not happen during excavation and construction of the road. Junction "Križišće", which is located on slopes between Baretić village (the part of independent settlement Križišće) and the existing road of Kraljevica - Križišče, is near the existing settlement. However, there is at least 75 meter from the Highway axis to the closest houses and the altitude situation is favourable because gradients of Highway should be at least 10-15 metres shorter from the closest houses. So special security measures would not be needed here.

All measures taken for preservation and improvement of disrupted state of natural landscape are measures connected with environment protection program. They relate to construction, technical and bio-technical works as well as cultivation in forest with some horticultural work.

There will be wide excavations, cuttings of various inclines in different soils, expansions (by plateaus) for necessary services and other constructions, tunnels, galleries, viaducts, bridges, subway crossings etc. Therefore, it would be necessary to improve the aesthetics with the responsible and professional approach.

Measures that have to be taken for arranging the green vegetation last longer, they are more sensitive, depend on superior solutions in order to approach the autochthonous (original) vegetation. This is of great importance for this section, since larger part of the route passes through intensive karst, with a very devastated vegetation and no cultivation value. The new appearance after the road was built would be very difficult to integrate into the authentical landscape. This especially relates to the road section above Bakar terrace, which stayed in the heritage as a value and under protection. Therefore, if they would be damaged during recovery work, a special attention would be necessary for their recover.

In order to achieve better road integration into natural ambiance and to carry out security measures that are caused by mechanical caving in during construction, successfully, special attention should be payed to the recovery work of the greenery. The basic is to preserve the aucthonous plants. Everything that is damaged or presents the danger that is potentially or constantly the focus of pathogenic appearance should be removed.

Old and broken trees and vegetation should be removed, as well as stumps and similar. After work is completed it is necessary to register the types of vegetation, level of degradation and cultivation measures that are needed. The evaluation is necessary at first, and right after that the vegetation has to be chosen. It would determine and define the object in space.

CULTURAL HERITAGE
During designing, construction and use:
The protection measures include permanent archeological and conservation supervision during performance of works on the entire road section. In case archeological finds are encountered, the possibilities and methods of their protection and conservation will be analyzed, including:
• conservation by backfilling the archeological find,
• relocating of the find,
• relocating parts of the find and conservation of the remaining archeological site by backfilling,
• in case the archeological finds are of extraordinary value, the road route relocation may be requested,
• ethnographic and cultural assets, registered ethnographic zone of Praputnjak and Bakar stonewall partitions of terraced vineyards as a monument of human labor, ask for new microtopographic valorization from the conservation aspects during the road route staking out. Enthusiasm and diligence of local individuals have resulted in re-evaluation of the grapevine growing in the vicinity of Cni Vrh.
b) MONITORING

Environmental Conditions Tracking Program has not been regulated neither by the Environment Impact Study, nor by a preliminary building permit. Because of sensitivity of the area it is necessary to regulate the measures for environmental conditions in the process of issuing building permit for:

- water: check the condition of the waste water treatment plant (WWTP), test the water quality leaving the WWTP before being discharged into recipient, four times per year in relevant hydrological conditions (period of first rainfalls, particularly after the dry season).
- air: continuous emission measurement of $\text{SO}_2$, black smoke, $\text{NO}_2$ and suspended matter ($\text{Pb}$),
- biomonitoring (before and after the road was in function):
  - Best results in biomonitoring of air quality can be expected by monitoring the state of epiphyt lichen.
  - According to Pearson, simple biologic test is recommended (Alebić-Juretić and Ark-Cock, 1989) for measuring of the lichen cellular membrane which are damaged.
  - Lead concentration test in biologic objects (lichen, moss or spicules wrinkle) on the specific distance from the road is recommended,
  - It is necessary to monitor the tree drying on wider area around road route, in order to determine possible harmful impacts that road have on forest vegetation.
  - It is necessary to examine and monitor changes of plants and animals after the new road was in function, with special accent on rare, endangered and protected species.
- noise: measurement of noise level once in every season of the year, and that at the outskirts of residential areas of settlements located adjacent to the road

3.2. State road D 404

a) ENVIRONMENTAL PROTECTION MEASURES

Environmental protection measures defined in the EIS for D-404 state road refer to protection of drinking water springs/sources, air quality preservation, protection from wind strokes, noise protection, and protection of landscape, as well as natural, rural and urban values of the area concerned. Since the EIS did not define environmental impact mitigation measures concerning cultural heritage objects, these measures are proposed in this Report.

WATER

Basic protection measures for the whole route of state road demands:
- methodologically correct hydrological calculation based on the analysis of the existing digitalized data from ombrografic station in Rijeka, and ITP curves applied in a same way as for Rijeka roundabout and Highway Rijeka-Zagreb;
- cleansing of effluents before getting to receivers (Rječina, Mrtvi kanal and the sea);
- construction sites organization and executing the work according to the specially detailed design;
- permanent and quality surveillance over work execution
- road maintenance and maintenance of its objects in water protection areas (primarily for securing the flow and functionality of road sewage system).

As the route the road passes through the second and the first B zone of sanitary protected drinking water sources in Martinšćica and also outside the protected areas in the coastal part of town, different security measures for each section are required:
1. Section A-B, outside the protected areas with drinking water sources
   - precipitation effluents should be collected with waterproof drainage, cleansed and dropped into receivers (Mrtvi kanal and Rječina);
2. Section B-C-D-E, partly in other protected areas with drinking water sources.
- to develop waterproof drainage which will accept precipitation effluents, percolating waters in the tunnel and on route sections in cuttings and barriers, waters from tunnel washing and fire-prevention waters, as well as all liquids (incident). Cleansed water should be dropped into the recipient (sea);
- to insure that the surface and slope of dam are waterproof;

3. Section E to the Junction of Draga including connection to the Zdravko Kučić Street
This is the most sensitive part of the route because of the risk for contamination of drinking water source in Martinščica (first B area of protection) is high.
- cross section of the road on this part of the route should be designed so that effluents and dangerous liquids which can spilled on the road stay on it, are being collected and taken away by waterproof drainage to appliances for cleansing and dropped into the sea;
- construction of waterproof drainage canals on lower side of the road would insure the drainage of all surface waters from slope’s upper parts and establish the artificial barrier towards the source;
- it is proposed within construction of the road to reconstruct the drainage Gornje Vežice which gravitates towards the road which has been planned and which is the main pollution source of the well in Martinščica;
- to secure impermeability of surface, sides of cuttings and dam;
- to collect the external waters from the slope and secure water acceptance from construction site plateau. It considers construction of drainage objects. All objects should be designed in a way that they can later accept drainage from the constructed road, if possible;
- to prevent any temporary, especially permanent deposition of excavated material;
- organization of construction site and work execution, according to the detailed design, is from exceptional importance for this section.

A special problem is construction of streetward Dr. Zdravko Kučić Street connection, because of sensitivities of influential area on the source Martinščica, i.e. because of the size of building work and morphological conditions of the ground. It is proposed to consider the other possibility for positioning of this connection on the area less sensitive.

It is also proposed to consider and elaborate different way of road execution in the route section, which passes through the first B area of protection for source Martinščica. For example, road execution as viaduct, that requires less earthworks and there would be less risk for the Martinščica source during constructions.

Suggestions for further work

From the water protection point of view, the main problem considering construction and usages of D 404 (GMC-105) is possible negative influences on the Martinščica source and protection measures for this source. Specific quality of karst and exceptional sensitivity of its underground, complexity and importance of possible negative impacts on the water regime and quality of underground-waters due to the road D 404 constructions, requires additional investigative work and making certain documentation for the Final survey.

Therefore it is proposed:

a) to draft a detailed hydrological, hydrogeological and geotechnical report.
   It is necessary to define the area microseismology where the route of the state road passes. It is necessary to develop the technology of rock mining considering the excavation of tunnel in the urban area, also considering that route passes through source Martinščica hinterland.

b) to make a survey about organization of facility building.

Meanwhile, a conceptual design has been developed for application of the environmental protection solutions and for protection of sanitary zone of drinking water sources. It identifies the manner and organisation and operation of the water sources protection during the construction. The basic condition is that during the road construction all precipitation water is drained from the route to Brajdica. A special organisation and order of the works execution can achieve this. In parallel with the tunnel excavation and construction of the buildings the precipitation sewer shall be built as well.
Due to the specific nature of the works carried out in the vicinity of Martinšćica water production well the design documents stipulate that utmost attention should be paid at excavation works. The water production well consists of eight water wells that provide water to the water supply system of Rijeka (300 to 500 l/s). It is obvious from this data how important that water production well is. Because of that, all the excavations performed there must be carried out without blasting that means the machines only can do the excavations. The entire route base is water permeable carbonate rocks full of cracks because of tectonic movements and karstic which is a mitigating circumstance for the excavation works. The excavated material should be immediately transported from the i b water protection zone to prevent wash out and sweeping the material away to the water well.

The design documentation developed provides the application of the most stringent conditions during the construction and the most stringent security measures for preventing incidental pollution. The protection measures and special construction condition, maintenance and use of the road provided under this design documentation will reduce adverse impacts of pollution to an acceptable risk level. The measures set out and proposed in this design documentation for the execution of the works in the zone I b of water protection provide the solutions that will eliminate incidental situation that might happen there. To achieve that, continuous monitoring during all the stages of the construction works is necessary.

Because of the specific nature of the project, a permanent presence of hydrogeological supervision and the representatives of K.D. Vodovod i kanalizacija (Water and Sewerage company) Water Supply Unit is obligatory in order to monitor the execution of the works and protection of the existing water source.

To maintain a high level of traffic safety the road design should foresee sophisticated systems for control and supervision of traffic as well as a fire fighting system.

**AIR**

For the drainage of polluted air from the tunnel of "Pećine" ventilation system with the one vent for polluted air in the center of tunnel of "Pećine" is recommended. Ventilation whole has a vent with four canals in one pipe, in order to ensure adequate speed of smoke gases and diffusion of gases on heights above 130 meters. Ventilation whole should be at least 25 meters high. Vent location is at Pećine, southern from the railway station.

**WIND**

In order to ease the impact of lateral wind on the vehicle and to protect participants in traffic, especially on valley bridges, it is necessary to find the solution that would reduce negative influences on the smallest possible level. Windshield protection is recommended.

In order to reduce the number of traffic-jams caused by extreme weather conditions in winter times on the route in the cove Martinšćica, it would be necessary to strengthen winter maintenance for this section of the route.

**NOISE**

Solution to environmental noise pollution problem that would appear alongside the new road D 404 (GMC-105) route, could be to:

- use the appropriate material
  - quality asphalt mixtures,
  - absorbing materials on tunnel segments
- acoustic walls
  These walls (barriers) are the most frequent and simplest way of protection today, on places where decrease of noise from car traffic is demanded according to the law.
- construct the artificial cutting or completely closed sections

Achievable decrease of noise on the most endangered object is around 12 dB. Defining the optimal solution must be the subject of the state road design.
LANDSCAPE, NATURAL AMBIANCE
It is necessary to restore, shape, horticulturally arrange and afforest with autochthonous plants all of the route parts on which cutting, barriers and dams, as well as the building work for construction of miscellanies buildings on the route (valley bridges, portals of tunnel) to reduce harmful and unfavourable influences on the landscape. Horticultural arranges are necessary on the part of the road below the street of F. Belulović, where connection streetward F. Belulovića is envisaged.

In order to fit into the urban town tissue, especially in the area of Delta, Brajdica and Pečine, it is necessary to shape some road elements carefully. This especially relates to the new bridge across Rječina (inviting tenders would be appropriate), viaduct on Brajdica and tunnel portal Pečine.

Special attention should be paid to the formation of structures which should be built to reduce harmful influence that road has on the environment. These are protection barriers from the excessive noise and strong wind, as well as the ventilation culvert of polluted air from the tunnel "Pečine "(heights 25-35 metre and widths 5 metre).

For noise protection it would be necessary to make a special project for acoustic wall in the area of Brajdica, so that the road fit better in planned town contents.

Suggestions for route improvement works
Construction of road on the valley bridge is recommended on the whole section on the slope above the cove Martinščica. This would avoid devastation of ground in the longitude of 1 km, and also significantly reduced negative influence that road has on natural ambiance.

It is necessary to reexamine the possibility of lifting the route gradient on the crossing E, in order to reduce the height of cutting near the joining road towards Gornja Vežica.

Due to significant works, especially cutting (up to 15 metres height and 200 metres length) on the road towards Gornja Vežica-Sušak, which explicitly devastates the natural landscape on slopes above the Martinščica cove, it is desirable to reexamine the possibility of building a gallery, tunnels or the retaining wall on cutting places.

It is inevitable that construction of the route harm the living animals, domiciles, biocenosys and natural ambiance. Constructions should be done very carefully to preserve the existing biocenosys - primarily forest vegetation in kerbside and protection zone.

INTENDED USE AND SPACE ORGANIZATION
After D 404 (GMC-105) construction in the area of Delta and Brajdica, the existing contents of warehouse and traffic objects will gradually convert into planned town contents, according to the Decision about Physical plan of town Rijeka and Implementation plan of Rijeka center.

Until then, it is necessary to secure functioning of the existing contents and their intended uses. For that purpose vehicular and pedestrian accesses have been envisaged in the preliminary solution of D 404 (GMC-105). It is necessary to preserve the existing pedestrian communication (this should be achieved by the construction of road on viaduct) or predict new ones.

b) MONITORING
AIR (harmful substances)
There is a need for continuous measurements of polluting substances in three locations:
- Inside the tunnel of Pećine for contaminants NO₂, CO and NMVOC. It would indirectly insure tracking emission of polluting substances on ventilation shaft.
- On the existing location of Vežice, which has been in function until 1990, measurements should be renewed. Therefore, in this location program of continuous measurement for contaminants SO₂, black
smoke, NO₂ and sediment substances (Pb) will be executed, so the years-long continuity and possibility of data comparison before and after the construction GMC105 will be insured.

- In the area near the west portal of tunnel of "Pećine" there were no measurements of air quality so far. Therefore, one place for such measurements is recommended and it is placed near school, 50 meters north from the portal. A 24-hour measureings of NO₂ values and sediment substances (Pb) should be required in the beginning. Automatic measurements would be appropriate later, as well as measurements of other contaminants.

BIOMONITORING
Best results in biomonitoring of air quality can be expected by monitoring the state of epiphyt lichen. For these purposes some permanent stations need to be established. The stations would monitor changes in epiphyt's structure and numerosity of various kinds of lichen on the oak crust near the route D 404 (GMC-105).

- According to Pearson, simple biologic test is recommended (Alebić-Juretić and Ark-Cock, 1989) for measuring of the lichen cellular membrane which are damaged. That is a good indicator of air pollution. The test needs to be carried out before and after the road was in function.

- lead concentration test in biologic objects (lichen, moss or spicules wrinkle) on the specific distance from the road is recommended, before and after the road was in function, by an authorized institution.

- It is necessary to monitor the tree drying on wider area around road route, in order to determine possible harmful impacts that road have on forest vegetation.

- It is necessary to examine and monitor changes of plants and animals after the new road was in function, with special accent on rare, endangered and protected species.

NOISE
It is necessary to choose points carefully and organize a constant noise monitoring as well as define three permanent stations for measurements near the road, on the positions that Survey describes as critical.

It is our position that there is no need for continuous noise measurement proposed in EIS; instead we find sufficient to measure noise level only once in every season of the year, and that at the outskirts of residential areas of settlements located adjacent to the road.

WATER
Although EIS did not stipulate, but it should be in the process of issuing building permit, to check the condition of the waste water treatment plant (WWTP), test the water quality leaving the WWTP before being discharged into recipient, four times per year in relevant hydrological conditions (period of first rainfalls, particularly after the dry season).
Documentation:

- Physical Planning Program of Republic of Croatia, (Official Gazette 50/99)
- Physical Plan of Zagrebačka County, Zagreb 2002.
- The study of the effects on the people's environment, Adriatic coast Highway Rijeka – Split – Dubrovnik
  Section: D. Orehojica – Vitošev – Križišće with junction road Križišće – the bridge and the land-Krk (present day indication D 102)
  A Conclusion of adopting the final EIS for the Project of Jadranska highway, section Orehojica – Vitošev – Križišće with a connection to the Mainland – Krk bridge
- Engineering, geological and hydrogeological works, an underlying document for the main design for the Project of execution of the works aimed at protection of drinking water source zones for the state road D-404, from Draga junction to E1 point
- Study of the effects on the environment for the urban regional highway GMC – 105 (present day indication D 404)
- The application of the Act on the environment protection, the initial project for the protection of the sanitary zones of the springs of drinkable water
- A Report, investigation and evaluation of the condition of the material of reinforced concrete structure of Sv. Marko – Krk bridge (larger arch of Krčki bridge)
  Volume 1: Struts
  Volume 2: Props and columns
- A Project of renewal and protection of the reinforced concrete structure of Sv. Marko – Krk bridge (smaller arch of Krčki most)
  Volume 3: A technological solution for renewal and protection of columns S20 and S27.
- A Project of renewal and protection of reinforced concrete structure of Sv. Marko Krk bridge (smaller arch of Krčki bridge)
  Volume 4: A technological solution for renewal and protection of the arch, carriageway, and buttresses.
- A Project of renewal and protection of reinforced concrete structure of Sv. Marko – Krk bridge (smaller arch of Krčki bridge.
  Volume 5: Complement to the Project design, volumes 1 to 4
- Main Design, A Project of renewal and protection of columns S20 to S27.
  Volume 1: Structural and dynamic analysis of the Sv. Marko – Krk bridge (small arch of Krčki bridge)
- Detail design, detail design for repair of 12 bearing points.
  Volume 1: Structural and dynamic analysis of Sv. Marko – Krk bridge (smaller arch of Krčki bridge)
- LOCATION PERMIT for the reconstruction of the Zagreb pier in the Port of Rijeka
- An Opinion of Ministry of Environmental Protection and Physical Planning that the location permit for Viena pier is not needed
- Zagreb pier Location permit, July 2000.
- State road D 404 (GMC 105) Location permit, December 1995.
- An opinion of the Ministry of Environmental Protection and Physical Planning about confirmation of Location permit from 1995. for D-404, 2002. god.
- Preliminary design for Beč pier reconstruction, Rijeka 2001.
- Location permit state road D 404, 1995. g
Foosnotes

2 Physical Planning Program of Croatia, (Official Gazette 50/99)
3 List of regulations on physical planning:
   1. Low on Physical Planning (Official Gazette 36/94, 68/98 i 61/00)
   2. By-law on public hearing in adoption procedure of Physical Planning Documents (Official Gazette 104/98)
   3. Pravilnik o sadržaju, mjerilima kartografskih prikaza, obveznim prostornim pokazateljima i standardu elaborata prostornih planova (Official Gazette 106/98)
   4. Role book of list of intervention with no request for Location permit (Official Gazette 98/99)
   5. Order of buildings of importance of epublic of roatia (Official Gazette 6/00)
   6. Role book of spatial standards, urban and technical conditions for prevention architectonic-urban barriers (Official Gazette 47/82)
   7. Role book of protection measures for natural and war disarstes (Official Gazette 29/83, 36/85 i 42/86)
5 An application for the LOCATION PERMIT is filed by the investor. The LOCATION PERMIT is issued by the county branch office, i.e. the municipal office of the City of Zagreb, which has the authority over physical planning activities on whose territory interventions into space are planning, unless the Law on Physical Planning or special legislation stipulate otherwise. The Ministry of Environmental protection and Physical Planning issues LOCATION PERMITs for the structures of national interest.

The Ministry of Environmental Protection and Physical Planning issues LOCATION PERMITs for the interventions that cover the territories of two or more counties.

The following documents must be enclosed with an application for the LOCATION PERMIT:

- registered land certificate
- description and preliminary design of the intended intervention into space.

In case of a structure for which a building permit is not required, the following documents must be enclosed with an application:

- preliminary design in terms of special legislation,
- proof of structure ownership rights or a contract, i.e. the document of the competent authority on the basis of which the applicant was granted the right to make an intervention into space.

The Location permit includes the excerpts from physical planning documents on the basis of which it is issued. Depending on the type of intervention in space, the LOCATION PERMIT determines:

- shape and size of the building plot, i.e. the volume of the intervention into space,
- purpose of the structure,
- size and area of the structure,
- position of two or more structures on the building lot, i.e. within the intervention in space,
- shape of the structure,
- development of the building lot,
- method and conditions for connecting the building lot to the public traffic area and municipal infrastructure,
- method of preventing the adverse effects on the environment and
- other elements which are important for the intervention in space, in compliance with special regulations.

6 List of regulations on environmental protection:

General

Law on Environmental Protection, 82/94, 128/99
National Environmental Strategy,46/02
National Environmental Action Plan (NEAP)
By-Law on Environmental Impact Assessment, Official Gazette no. 59/00
By-Law on Quality Standards for Liquid Oil Fuels, 8/97
Contingency Plan for Accidental Marine Pollution in the Republic of Croatia
Environmental Protection Emergency Plan 82/99, 86/99, 7/97
By-Law on Conditions for Issuing Permits for Performing Professional Environmental Activities, 33/96
By-Law on Beach Water Quality Standards
By-Law on Environmental Information System 74/99, 79/99
Rule Book on Environmental Emission Inventory 36/96
Rule Book on Awards and Prizes for Environmental Achievements 1/99
Rule Book on Environmental Inspectors Official Identity Card 79/95
Rule Book on Environmental Label 64/96
Instructions on the Form, the Tenor and the Manner of Keeping Records of Inspections Performed by Environmental Inspectors 79/95

**Air**
Law on Air Quality Protection 48/95
By-Law on Recommended and Limit Air Quality Values 101/96, 2/97, 140/97
By-Law on Limit Values of Pollutant Emissions from Stationary Sources into the Air 7/99, 20/99
By-Law on Substances Depleting the Ozone Layer

**Waste**
Law on Waste 34/95
By-Law on Requirements for Handling Hazardous Waste 32/98
Rule Book on Container Waste Management 53/96
Rule Book on Waste Management Requirements 123/97
Rule Book on Waste Types 27/96
List of Professional Institutions with Authority of Publishing Reports on Testing Physical and Chemical Properties of Waste 51/96, 93/96

**Nature**
Law on Nature Protection 30/94, 72/94

**Content of Environmental Impact Study:**
A. Describe of Location and intervention
B. Evaluation of acceptability of Intervention
C. Environmental protection measures and plan of measures implementation
D. Conclusion of EIS (Condensed)
E. EIS Summary for public presentation
F. Data sources

The following documents must be enclosed with an application for a building permit:
- proof of been granted the right to build on a real estate,
- four copies of the master plan with a certificate proving that the master plan, i.e. preliminary design has been drawn up in compliance with special conditions, i.e. provisions of a special legislation and other regulations in cases when this is explicitly prescribed by a special legislation, except when it comes to the procedure for issuing a building permit determined by the government administrative body competent for physical plaOfficial Gazetteing activities, pursuant to the physical plaOfficial Gazetteing document, the adequacy of the master plan, i.e. preliminary design is determined by the authority competent to issue a building permit. In that case the certificate prescribed by special conditions is not required.
- written report on the master plan control,
- certificate of validity and signature of the parties.

**Procedure for building permit issuing**
The building permit determines that the master plan, i.e. preliminary design has been drawn up in compliance with prescribed and determined conditions a structure in a location has to meet and that the conditions of the Construction Law have been fulfilled. The master plan is an enclosure to and integral part of the building permit, which must be indicated in the project and verified by the signature of an officer and the seal of the authority that has issued the permit. The Ministry of Environmental Protection and Physical PlaOfficial Gazetteing issues building permits within 60 days from the receipt date of a complete application.
The Ministry of Environmental Protection and Physical Planning issues building permits for the following structures: traffic structures, power plants, water structures, industrial structures, structures for handling waste and special-purpose structures. An application for the building permit is filed by the investor.

8 Construction Law (Official Gazette /Official Gazette/ no. 52/99, 75/9 and 117/01)

9 The construction of right (west) roadtrack of the Zaprešić – Jankomir section of the highway Zagreb – Jankomir, is not a component of this Project. Environmental Impact Study was made for this construction
Client: Hrvatske autoceste, Zagreb Vončinina 2
Contractor: Oikon, doo, Zagreb, Vlade Prekrata 20
Date: October 2002.
THE RIJEKA GATEWAY PROJECT
ENVIRONMENTAL ASSESSMENT REPORT
FINAL REPORT
ANEX: ENVIRONMENTAL MANAGEMENT PLAN

Consultant:
URBING
enterprise for environmental protection and physical planning
Zagreb, Maksimirka 81

THE RIJEKA GATEWAY PROJECT
ENVIRONMENTAL ASSESSMENT REPORT
FINAL REPORT
ANEX: ENVIRONMENTAL MANAGEMENT PLAN

A. MITIGATION PLAN
B. MONITORING PLAN
C. INSTITUTIONAL STRENGTHENING
D. SCHEDULE
E. INSTITUTIONAL ARRANGEMENTS
D. RECORD FROM THE ROUND TABLE ON PRESENTATION
   OF REPORT ON ENVIRONMENTAL CONDITION

1. The Port Component
   1.1. Zagreb pier
2. The Road Component
   2.1. State road D-8
   2.2. State road D-404

Consultant:
URBING, enterprise for environmental protection and physical planning
Zagreb, Maksimirska 81

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Coordinator:
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Expert group:
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Ljiljana Doležal, BSArch
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Živana Lambaša Belak, MA BSChe
Tomislav Doležal, BSE
Hrvoje Giaconi, BSArch

Contract No.: 233/02 - URBING i
003/2002-LUR
Database: U7/LD/vrata rijeke/EMP_040203_engl.doc

A. MITIGATION PLAN

1. The Port Component,
1.1. Zagreb pier

<table>
<thead>
<tr>
<th>Phase</th>
<th>Issue</th>
<th>Mitigating Measure</th>
<th>Cost (Euro)</th>
<th>Institutional Responsibility</th>
<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>Wind-wave Climate</td>
<td>to reduce influence of waves, physical model for defining the influence of the waves, Maritime study</td>
<td>300.000</td>
<td>RPA, Head of Project Team</td>
<td>Qualified Institution</td>
</tr>
<tr>
<td>Construction</td>
<td>Sea</td>
<td>divisible sewage system, separators for cleansing of precipitation waters, execution of works mostly in period from 6-23 o'clock, gather separately and specially mark all waste packing materials, collect and dispose regularly municipal and other similar waste, remove and dispose contaminated soil in the prescribed way, analysis of excavated soil and material generated from demolition, prior to final disposal of asbestos-cement (AC) provide waste treatment process, steel structure and tin plates have to be recycled (as secondary raw materials)</td>
<td>630.000</td>
<td>Head of Execution Team, Head of Execution Team, Head of Execution Team, Qualified organisations</td>
<td>Sanitary Inspector, Sanitary Inspector, Environmental Inspector</td>
</tr>
<tr>
<td></td>
<td>Noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Demolition of Buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Sea</td>
<td>control condition of separators for cleansing of precipitation waters, measurement of waste waters sampling on the exit of separators, gather and store all dangerous waste, gather separately and specially mark all waste packing materials, collect in specifically intended containers and dispose regularly municipal and other similar waste, use low noise technology, use low noise transport vehicles</td>
<td></td>
<td>RPA, Infrastructure and Environmental Division, Qualified organisations</td>
<td>Environmental Inspector</td>
</tr>
<tr>
<td></td>
<td>Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MEPPP - Ministry of Environmental Protection and Physical Planning
RPA - Rijeka Port Authority
B. MONITORING PLAN

1. The Port Component

1.1. Zagreb pier

<table>
<thead>
<tr>
<th>Phase</th>
<th>What parameter is to be monitored?</th>
<th>Where</th>
<th>How is the parameter to be monitored?</th>
<th>When is the parameter to be monitored/ frequency of measurement or continuous?</th>
<th>Why is the parameter to be monitored (optional)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>wind-wave climate</td>
<td>permanent buoy in Gulf of Kvarner</td>
<td>Measuring of wind-wave climate</td>
<td>continuous</td>
<td>to define influence of the waves on the shore of the pier and on existing aquatorium of the Port of Rijeka</td>
</tr>
<tr>
<td>Construction</td>
<td>Noise</td>
<td>on control points at border of residential areas</td>
<td>Measuring of noise level</td>
<td>During noise equipment operation</td>
<td>Population protection, Legal requirements</td>
</tr>
<tr>
<td></td>
<td>polycylic carbohydrates, physical and chemical values</td>
<td>soil samples from demolition of buildings</td>
<td>Measuring of a series of law-regulated parameters</td>
<td>one-time</td>
<td>to decide how and where this materials can be disposed</td>
</tr>
<tr>
<td>Operate</td>
<td>Air quality</td>
<td>on control points</td>
<td>measurement of a series of law-regulated parameters</td>
<td>continuous</td>
<td>Population protection, Legal requirements</td>
</tr>
<tr>
<td></td>
<td>Noise</td>
<td>on control points at border of residential areas</td>
<td>measurement of noise intensity on control points through measurements of a series of law-regulated parameters</td>
<td>quarterly for 24 hour once a month quarterly</td>
<td>Population protection, Legal requirements, Sea protection, Sea and ground water protection</td>
</tr>
<tr>
<td></td>
<td>Sea and sediments</td>
<td>on control points</td>
<td>waste waters sampling on the separators</td>
<td>daily, annual report once a year</td>
<td>Legal requirements</td>
</tr>
<tr>
<td></td>
<td>Water Quality</td>
<td>port area</td>
<td>port area</td>
<td>daily, annual report</td>
<td>Legal requirements</td>
</tr>
<tr>
<td></td>
<td>Waste</td>
<td>port area</td>
<td>port area</td>
<td>legal record condition of vehicles incidents in sea transport</td>
<td>Legal requirements</td>
</tr>
<tr>
<td></td>
<td>vehicles</td>
<td>port area</td>
<td>port area</td>
<td>daily, annual report</td>
<td>Legal requirements, Authorized Person</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install</td>
<td>Operate</td>
</tr>
<tr>
<td>Baseline</td>
<td>35,000</td>
</tr>
<tr>
<td>Construction</td>
<td>1,800</td>
</tr>
<tr>
<td>Operate</td>
<td>8,400</td>
</tr>
</tbody>
</table>

MEPPP - Ministry of Environmental Protection and Physical Planning
RPA - Rijeka Port Authority
C. INSTITUTIONAL STRENGTHENING

1. Equipment Purchases - After adoption of Final design

2. Training

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PRACTICAL ACTIVITIES RELATED TO ENVIRONMENT IMPACT MITIGATION, MONITORING*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF TRAINING</td>
<td>4 trainees – 2 persons</td>
</tr>
<tr>
<td>DURATION</td>
<td>2 weeks</td>
</tr>
<tr>
<td>START DATE/END DATE</td>
<td>Last semester, 2003 and first semester, 2004</td>
</tr>
<tr>
<td>VENUE OF TRAINING</td>
<td>Abroad</td>
</tr>
<tr>
<td>INSTITUTE OR ORGANIZATION TO PROVIDE TRAINING</td>
<td>A partner company, similar to PRA</td>
</tr>
<tr>
<td>COST</td>
<td>10.000 Euro</td>
</tr>
</tbody>
</table>

* It is necessary to establish a special division at PRA, responsible for environmental issues, specially for implementation and control of implementation of mitigation measures and monitoring during construction and operate phase, and after that, for drawing environmental reports and transmission to responsible institutions.

3. Consultant Services – not necessary
4. Special Studies – not necessary

D. SCHEDULE

<table>
<thead>
<tr>
<th>MITIGATION ACTIVITIES</th>
<th>Starting date</th>
<th>Ending date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct</td>
<td>01. 06. 2004.</td>
<td>31. 12. 2007. thencefort</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MONITORING ACTIVITIES</th>
<th>Starting date</th>
<th>Ending date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct</td>
<td>01. 06. 2004.</td>
<td>31. 12. 2007. thencefort</td>
</tr>
</tbody>
</table>
## E. INSTITUTIONAL ARRANGEMENTS

<table>
<thead>
<tr>
<th>Responsibilities for mitigation and monitoring</th>
<th>Environmental information flow (reporting—from who and to who and how often)</th>
<th>Decision making chain of command for environmental management (to take action, to authorize expenditures, to shut down, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
</tr>
<tr>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
<td>Head of the Rijeka Port Authority to County Environmental Department, to Ministry for Environmental Protection and Physical Planning (MEPPP), Environmental Protection Division</td>
<td>RPA - Head of Project Team, Authorized Person Environmental Inspector - County Environmental Department (MEPPP) Sanitary Inspector, State Directorate for Water Management</td>
</tr>
<tr>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
<td>Data collection and analysis</td>
<td>Head of the Rijeka Port Authority and Authorized Person Environmental Inspector - County Environmental Department (MEPPP)</td>
</tr>
<tr>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
<td>Monitoring Reports to County Environmental Department – quarterly</td>
<td>RPA - Authorized Person (in future RPA environmental protection division) Ministry for Environmental Protection and Physical Planning Local government City of Rijeka</td>
</tr>
<tr>
<td><strong>RIJEKA PORT AUTHORITY (RPA)</strong></td>
<td>Coordination of execution of “Environment Management Policy” study, “State of the Environment Survey”, “Environment Management Programme”</td>
<td>Operational Plan for an emergency cases Head of the Rijeka Port Authority Environmental Inspector - County Environmental Department (MEPPP)</td>
</tr>
</tbody>
</table>
## A. MITIGATION PLAN

### 2. The Road Component

#### 2.1. State Road D-8

<table>
<thead>
<tr>
<th>Phase</th>
<th>Issue</th>
<th>Mitigating Measure</th>
<th>Cost (Euro) Install</th>
<th>Cost (Euro) Operate</th>
<th>Institutional Responsibility</th>
<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Construction</td>
<td>• Groundwater, Water sources</td>
<td>200.000</td>
<td></td>
<td>Head of Execution Team</td>
<td>Water Resource Management Inspector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• impermeable surfaces and waterproof drainage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• special mining of the field (not to cause disorders in underground-waters streams)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• whole dug out material must be taken away</td>
<td>350.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• separators for cleansing a water from road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• workhouses for machines and vehicles, stations for fuel, warehouses with dangerous substances should not be placed inside sanitary zones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• special screens, acoustic walls</td>
<td>82.000</td>
<td></td>
<td>Croatian Roads Head of Execution Team</td>
<td>Constructor Inspector</td>
</tr>
<tr>
<td></td>
<td>Noise</td>
<td>• horticultural treatment of exposed sections of the road</td>
<td>100.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• recovering of any damage to Bakar terrace (value under protection)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• keep all communications for pedestrian and vehicles (cross below or above the Highway)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permanent archeological and art-conservation servillance on whole road route</td>
<td>6,700</td>
<td></td>
<td>Ministry of Culture Constructor Inspector</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultural Heritage</td>
<td>• road and road objects maintenance</td>
<td></td>
<td>4,500</td>
<td>Croatian Roads</td>
<td>Water Resource Management Inspector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• control of condition of separators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• measurement of waste waters sampling on the separators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• measurement of noise intensity on control points</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• control of condition of equipment for traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• managing, surveillance and control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MEPPP** - Ministry of Environmental Protection and Physical Planning

**Note:** The table above outlines the mitigation measures and costs for the State Road D-8, categorized by phase and issue. Each measure includes specific actions taken to mitigate environmental and socio-economic impacts, along with the associated costs and institutional responsibilities. The comments column (e.g. secondary impacts) highlights additional considerations or measures not captured in the main table.
B. MONITORING PLAN

2. The Road Component
2.1. State Road D-8

<table>
<thead>
<tr>
<th>Phase</th>
<th>What parameter is to be monitored?</th>
<th>Where is the parameter to be monitored?</th>
<th>How is the parameter to be monitored?</th>
<th>When is the parameter to be monitored-frequency of measurement or continuous?</th>
<th>Why is the parameter to be monitored (optional)?</th>
<th>Install</th>
<th>Operate</th>
<th>Install</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate</td>
<td>* Air quality</td>
<td>• control points</td>
<td>• SO₂, black smoke, NO₂, sediment (Pb)</td>
<td>continuous measurement</td>
<td>Population protection</td>
<td>8.400</td>
<td></td>
<td>Croatian Roads</td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>* Water Quality</td>
<td>• on the exit of the separators</td>
<td>• measurement of a series of law-regulated parameters</td>
<td>quarterly in relevant hydrological conditions (period of first rain, especially after dry period) before and after the road was in function</td>
<td>Sea and Groundwater protection</td>
<td>2.600</td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>* Biomonitoring (state of epiphyt lichen)</td>
<td>• some permanent stations need to be established near the route</td>
<td>• measuring of cellular membrane</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td>6.000</td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>• on the specific distance from the road</td>
<td></td>
<td>• lead concentration</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td></td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>• on wider area around road route</td>
<td></td>
<td>• tree drying</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td></td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>• three control points at border of residential areas</td>
<td></td>
<td>• changes of plants and animals</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td></td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>• Equipment</td>
<td>• drainage and separators</td>
<td>• measurement of noise intensity on control points</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td></td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td>• whole route, especially knots, viaducts</td>
<td></td>
<td>• condition of drainage and separators</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td></td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• condition of equipment for traffic managing, surveillance and control</td>
<td>Population protection</td>
<td>Legal requirements</td>
<td></td>
<td></td>
<td></td>
<td>tests at qualified organizations</td>
</tr>
</tbody>
</table>
C. INSTITUTIONAL STRENGTHENING

1. Equipment Purchases – After adoption of Final design.
2. Training/Study Tours – not necessary
3. Consultant Services – not necessary
4. Special Studies - not necessary

D. SCHEDULE

<table>
<thead>
<tr>
<th>MITIGATION ACTIVITIES</th>
<th>Starting date</th>
<th>Ending date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct</td>
<td>30.05.2003</td>
<td>31.12.2005</td>
</tr>
<tr>
<td>Operate</td>
<td>31.12.2005</td>
<td>thenceforth</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MONITORING ACTIVITIES</th>
<th>Starting date</th>
<th>Ending date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct</td>
<td>30.05.2003</td>
<td>31.12.2005</td>
</tr>
<tr>
<td>Operate</td>
<td>31.12.2005</td>
<td>thenceforth</td>
</tr>
</tbody>
</table>

E. INSTITUTIONAL ARRANGEMENTS

<table>
<thead>
<tr>
<th>Responsibilities for mitigation and monitoring</th>
<th>Environmental information flow (reporting—from who and to who and how often)</th>
<th>Decision making chain of command for environmental management (to take action, to authorize expenditures, to shut down, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRVATSKE CESTE (Croatian Roads)</td>
<td>Head of the HRVATSKE CESTE to County Environmental Department, to Ministry for Environmental Protection and Physical Planning (MEPPP), Environmental Protection Division</td>
<td>Monitoring the implementation of Environmental Management Plan, HRVATSKE CESTE - Head of Project Team, Authorized Person, Environmental Inspector - County Environmental Department (MEPPP), Sanitary Inspector - State Directorate for Water Management, County Department</td>
</tr>
<tr>
<td></td>
<td>Data collection and analysis, Head of HRVATSKE CESTE and HRVATSKE CESTE, Environmental Division</td>
<td>Environmental Inspector - County Environmental Department (MEPPP)</td>
</tr>
<tr>
<td></td>
<td>Monitoring Reports to County Environmental Department – quarterly, HRVATSKE CESTE - environmental protection division</td>
<td>HRVATSKE CESTE CESTE</td>
</tr>
<tr>
<td></td>
<td>Operational Plan for an emergency cases - yearly, Head of the HRVATSKE CESTE</td>
<td>Environmental Inspector - County Environmental Department (MEPPP)</td>
</tr>
</tbody>
</table>
## A. MITIGATION PLAN

### 2. The Road Component

#### 2.2. State road D-404

<table>
<thead>
<tr>
<th>Phase</th>
<th>Issue</th>
<th>Mitigating Measure</th>
<th>Cost (Euro)</th>
<th>Institutional Responsibility</th>
<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>• Groundwater, Drinking water sources, Sea</td>
<td>• detailed hydrological, hydrogeological and geotechnical report</td>
<td>* 40.000</td>
<td>RPA, Head of Project Team</td>
<td>Qualified Institution</td>
</tr>
<tr>
<td>Construction</td>
<td>• Groundwater, Drinking water sources</td>
<td>• organization of construction site and work execution, according to the detailed design</td>
<td>150.000</td>
<td>Head of execution team</td>
<td>MEPPP, Constructor Inspector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• prevent deposition of excavated material</td>
<td>350.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• excavations in Ib zone without explosives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• permanent hydrogeological surveillance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• impermeable surfaces and waterproof drainage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• separators for cleansing a water from road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ventilation system (vent for tunnel Pedine at least 25 meters high)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wind</td>
<td>Windshield protection is recommended</td>
<td>50.000</td>
<td>Qualified organisations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Noise</td>
<td>use of the appropriate materials for road surface</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• acoustic walls</td>
<td>40.000</td>
<td>Qualified organisations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Landscape, Natural Ambiance</td>
<td>• restore, shape, horticulturally arrange and afforest all of the route parts on which cutting, barriers and dams are placed.</td>
<td>100.000</td>
<td>Head of Execution Team</td>
<td>MEPPP, Constructor Inspector</td>
</tr>
<tr>
<td></td>
<td>• Intended Use and Space Organization</td>
<td>• preserve the existing pedestrian and vehicular communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>• Groundwater, Drinking water sources</td>
<td>• cleansing of effluents before getting to receivers</td>
<td></td>
<td>Croatian Roads</td>
<td>Water Resource Management Inspector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• road maintenance and maintenance of its objects in water protection areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• maintenance of equipment for traffic managing, surveillance and control and fire protection system</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MEPPP - Ministry of Environmental Protection and Physical Planning
* already finished
## B. MONITORING PLAN

### 2. The Road Component

#### 2.2. State road D-404

<table>
<thead>
<tr>
<th>Phase</th>
<th>What parameter is to be monitored?</th>
<th>Where is the parameter to be monitored?</th>
<th>How is the parameter to be monitored?</th>
<th>When is the parameter to be monitored?</th>
<th>Why is the parameter to be monitored (optional)?</th>
<th>Cost</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>• Air quality</td>
<td>• Existing location Vežica</td>
<td>• SO₂, black smoke, NO₂, sediment (Pb)</td>
<td>for a year</td>
<td>Population protection</td>
<td>Install</td>
<td>Operate</td>
</tr>
<tr>
<td>Operate</td>
<td>• Air quality</td>
<td>• Inside the tunnel of Pećine</td>
<td>• NO₂, CO and NMVOC</td>
<td>continuous measurement</td>
<td>Population protection</td>
<td>Install</td>
<td>Operate</td>
</tr>
<tr>
<td></td>
<td>• Air quality</td>
<td>• Existing location Vežica</td>
<td>• SO₂, black smoke, NO₂, sediment (Pb)</td>
<td>24-hour measuring in the beginning, later automatic measurements before and after the road was in function</td>
<td>Legal requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Air quality</td>
<td>• west portal of tunnel Pećina, near school</td>
<td>• NO₂, sediment substances (Pb)</td>
<td>continuous measurement</td>
<td>Population protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Biomonitring</td>
<td>• some permanent stations need to be established near the route</td>
<td>• measuring of cellular membrane</td>
<td>quarterly</td>
<td>Population protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(state of epiphyt lichen)</td>
<td>• on the specific distance from the road</td>
<td>• lead concentration</td>
<td>quarterly</td>
<td>Population protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• on wider area around road route</td>
<td>• tree drying</td>
<td>quarterly</td>
<td>Population protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Noise</td>
<td>• three control points at border of residential areas</td>
<td>• changes of plants and animals measurement of noise intensity on control points</td>
<td>quarterly in relevant hydrological conditions (period of first rain, especially after dry period) quarterly</td>
<td>Legal requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Water Quality</td>
<td>• water samples on the exit of the separators</td>
<td>• measurement of a series of law-regulated parameters</td>
<td>quarterly</td>
<td>Population protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Road Equipment</td>
<td>• drainage and separators</td>
<td>condition of drainage and separators</td>
<td>quarterly</td>
<td>Legal requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• whole route</td>
<td>condition of equipment for traffic managing</td>
<td>quarterly</td>
<td>Legal requirements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Baseline**
  - Air quality
  - Existing location Vežica
  - SO₂, black smoke, NO₂, sediment (Pb)
  - For a year
  - Population protection
  - Responsible organization: a qualified organization
- **Operate**
  - Air quality
  - Inside the tunnel of Pećine
  - Existing location Vežica
  - NO₂, CO and NMVOC
  - SO₂, black smoke, NO₂, sediment (Pb)
  - Continuous measurement
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: 24-hour measurements in the beginning, later automatic measurements before and after the road was in function
- **Biomonitring (state of epiphyt lichen)**
  - Some permanent stations need to be established near the route
  - Measuring of cellular membrane
  - Lead concentration
  - Tree drying
  - Changes of plants and animals
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: quarterly in relevant hydrological conditions (period of first rain, especially after dry period) quarterly
- **Noise**
  - Three control points at the border of residential areas
  - Measurement of noise intensity on control points
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: quarterly in relevant hydrological conditions (period of first rain, especially after dry period) quarterly
- **Water Quality**
  - Drainage and separators
  - Condition of drainage and separators
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: quarterly in relevant hydrological conditions (period of first rain, especially after dry period) quarterly
- **Road Equipment**
  - Whole route
  - Condition of equipment for traffic managing
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: quarterly in relevant hydrological conditions (period of first rain, especially after dry period) quarterly

- **Baseline**
  - Air quality
  - Existing location Vežica
  - SO₂, black smoke, NO₂, sediment (Pb)
  - For a year
  - Population protection
  - Responsible organization: a qualified organization
- **Operate**
  - Air quality
  - Inside the tunnel of Pećine
  - Existing location Vežica
  - NO₂, CO and NMVOC
  - SO₂, black smoke, NO₂, sediment (Pb)
  - Continuous measurement
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: 24-hour measurements in the beginning, later automatic measurements before and after the road was in function
- **Biomonitring (state of epiphyt lichen)**
  - Some permanent stations need to be established near the route
  - Measuring of cellular membrane
  - Lead concentration
  - Tree drying
  - Changes of plants and animals
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  - Whole route
  - Condition of equipment for traffic managing
  - Population protection
  - Responsible organization: Croatian Roads
  - Additional notes: quarterly in relevant hydrological conditions (period of first rain, especially after dry period) quarterly
C. INSTITUTIONAL STRENGTHENING

1. Equipment Purchases - after adoption of Final design.
2. Training/Study Tours – not necessary
3. Consultant Services - not necessary
4. Special Studies - not necessary

C. SCHEDULE

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<tr>
<th>MITIGATION ACTIVITIES</th>
<th>Starting date</th>
<th>Ending date</th>
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<td>Construct</td>
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<td>31. 12. 2005</td>
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E. INSTITUTIONAL ARRANGEMENTS

<table>
<thead>
<tr>
<th>Responsibilities for mitigation and monitoring</th>
<th>Environmental information flow (reporting—from who and to who and how often)</th>
<th>Decision making chain of command for environmental management (to take action, to authorize expenditures, to shut down, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRVATSKE CESTE (Croatian Roads)</td>
<td>Head of the HRVATSKE CESTE to County Environmental Department, to Ministry for Environmental Protection and Physical Planning (MEPPP), Environmental Protection Division</td>
<td>Monitoring the implementation of Environmental Management Plan</td>
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<td>Monitoring Reports to County Environmental Department – quarterly</td>
<td>HRVATSKE CESTE - Head of Project Team, Authorized Person</td>
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<td>Data collection and analysis</td>
<td>Environmental Inspector - County Environmental Department (MEPPP)</td>
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<td>Sanitary Inspector - State Directorate for Water Management, County Department</td>
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<td>Head of HRVATSKE CESTE and HRVATSKE CESTE, Environmental Division</td>
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<td>Environmental Inspector - County Environmental Department (MEPPP)</td>
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<td>HRVATSKE CESTE - environmental protection division)</td>
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<td></td>
<td></td>
<td>Operational Plan for an emergency cases - yearly</td>
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<td>Environmental Inspector - County Environmental Department (MEPPP)</td>
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</table>
In the premises of the Port of Rijeka Authority, on January 15th 2003 with beginning at 11,00 a.m., was held a presentation of Report on environmental condition, presented by the consultant firm “URBING d. o.o.” from Zagreb, according to project task elaborated by the World bank.

After the introducing greetings of the Port of Rijeka Authority’s executive director Mr. Bojan Hlača and Mrs Nina Perko, representative of the Ministry of maritime affairs, transport and communications, it was started with presentation of the Report.

The Elaborate under the title “Rijeka Gateway Project”-Report on environmental condition, was presented from the side of the project coordinator Mrs. Ljiljana Doležal from the firm “Urbing d. o.o.”.

In the introductory part was presented the project task as well the sources and approach to elaboration of the project. In the main part of report were presented the three components concerning the report, and modalities of bringing into line with legal and administrative frames needed for their realisation, with special emphasis on environmental protection for every part of the project. Regarding the environmental influence, there were proposed a measured needed during the projecting and construction, as well the measures during use of single parts within the project and a programme for monitoring of the environmental conditions. For single parts of the project were proposed the measures foreseen for environmental protection, with special review for air, noise, waters, sea, wind, traffic, visual values of the area, landscape, soil, vegetation, flora and fauna, as well the measures for protection of cultural heritage.

After the held presentation started the discussion and working part of the round table, where all present had opportunity to give their statements and opinions.

The first speaker was the county prefect of County Primorsko – Goranska, Mr. Zlatko Komadina, who pointed out that the County gives fully support to the realisation of the project, and welcomes the serious approach to the environmental protection, with observation that the Port of Rijeka Authority, as a state institution, should be a leader in respecting of the measures, laws and regulations in relation with the environmental protection.

Mr. Milorad Milošević, the deputy mayor of city administration for development, urban planning, ecology and land management, gave welcome in the name of his department and commended the approach for organisation of professional and public discussions for such important projects and works planned in the area, namely more carefully understanding of influences on environment, regarding the planned works. Furthermore, he pointed out that to the segment of environmental protection should be given the additional attention, and suggested the implementation of the elaborated Report on environmental condition into existing plans documentation for issuing of the new zoning plan and general plan of zoning. The Port of Rijeka Authority Executive director agreed with the proposition, and concluded that welcomes the initiative that a copy of final report should be delivered to the City of Rijeka, so that it could be used and inserted into elaboration of the new zoning plan of the city.

Mr. Josip Stanković from the Chamber of Commerce, pointed out that it should be necessary to introduce a very rigorous measures for improvement of the sea quality within the port area, and the necessity for Rijeka to arrange better it’s economical situation regarding the transport infrastructure from the centre of the city to the exit towards Zagreb and Split. He also expressed his satisfaction in regard to the team work on this project, which should be completed on pleasure of citizens and businessmen.

Mr. Mladen Crnjar, the executive director of the County administration, pointed out that it should be necessary to elaborate the strategic studies at niveau of the County and of the City, regarding the elaboration of different types of the projects which are in procedure within the area of the county. Giving his support to the efforts of the
Port of Rijeka Authority in realisation of the project, he suggested to consider in whole the reciprocally influences of different projects within this area, taking into consideration that this part of territory explicitly determined itself for development of the traffic, industry and tourism.

Mr. Ivan Dadić, Institute of Transport and communications, welcomes the quality approach to the zoning development within the County Primorsko – Goranska, and pointed out delaying in realisation of the Croatian transport system, alongwith the necessity for more quality and faster approach to the realisation of the project regarding the traffic solution for Rijeka and it's surroundings.

Mr. Denis Vukorepa, president of the "Luka Rijeka d.d." board, emphasized the needs for construction of the modern port capacities on the western part of the port which were foreseen in the project, and pointed out their necessity, so that the Port of Rijeka could on equal basis be represented on maritime markets and as such to be competitive within the area of the North – Adriatic ports.

Mrs. Nada Plesnik, the person responsible for the environmental protection, from ("Jadranski naftovod") "Adriatic oil pipeline", was interested in modality of management regarding the ballast waters within the area of the Rijeka port, as well into fact if as a part of the project has been elaborated a state of the sea conditions in connection with the autochtonic organisms, zoo - planktones, fito - planktones, namely the biology of the sea, and related representatives of the sea organisms within the area of the port.

Answering on the question, Mrs. Doležal pointed out that the Report was purposely elaborated according to the project of the World Bank, in connection with the reconstruction and construction at the Zagreb pier, and that the question of the ballast waters was not the subject of elaboration within the study mentioned hereto. The examination of the sea community conditions within the port could be executed in the following period, as a part of elaboration of some other project.

The Port of Rijeka Authority Executive director, Mr. Bojan Hlaca, pointed out his dissatisfaction because of nonappearance of eco – societies from this territory, to whom were send the invitations participation at the presentation of Report on environmental conditions, mentioning that the copies of Report will be on disposal within the premises of the Port of Rijeka Authority, and that in term of seven days could be given observations or suggestions in connection with the presentation of the environmental conditions and realisation of the Project.

After the afore cited, there was no interest in further discussion, therefore it was concluded at 12:50 p.m.

The list of present persons, representatives of different subjects interested in, and included into named project, has been attached to this record.

Prepared by: Rajko Jurman, Port of Rijeka Authority

NOTE: Written materials, the EA Report and all other report supporting documents were at disposal for the public in the premises of the Rijeka Port Authority for additional seven days after the round-table.
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<th>Name</th>
<th>Position</th>
<th>Organization</th>
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<td>1</td>
<td>Kovač Stanko</td>
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<td>AUTOCESTE Croatian Highways</td>
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<td>2</td>
<td>Halldin Anders</td>
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<td>BANKA World Bank</td>
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<td>3</td>
<td>Skendrović Vladimir</td>
<td>Director</td>
<td>BANJA Croatian Road Administration</td>
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<td>Bizjak Vladimir</td>
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<td>CESTE Civil Engineering Institute of Croatia</td>
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<td>Božković Dražen</td>
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<td>INSTITUT Institute of Transportation and Communications</td>
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<td>6</td>
<td>Dadić Ivan</td>
<td>Head of department</td>
<td>KAPETANJAI Lučka Kapetanjija Rijeka Board of Port of Rijeka Authority</td>
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<td>Žiganto Igor</td>
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<td>Stanovski Josip</td>
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OKRUGLI STOL O STANJU OKOLIŠA U OKVRU PROJEKTA "RIJEKA GATEWAY PROJECT"

Napomena: Molimo pisati štampanim slovima 15.01.2003.

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