Phare

ESTONIAN RAILWAYS

Tapa Railway Yard
Reconstruction

PHARE Framework
Contract - Transport FC 351

ENVIRONMENTAL IMPACT ASSESSMENT

July 2000

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EXECUTIVE SUMMARY

The present Environmental Impact Assessment (E.I.A.) is intended to the evaluation of the potential impacts of the reconstruction of the Marshalling Yard in Tapa and of the associated mitigation measures.

The purpose of the study is, above all, to delimit all the environmental issues raised by the proposed reconstruction yard in Tapa, and to provide a global estimate of the financial cost that would be involved by the mitigation of such impacts.

The project includes the reconstruction of the present marshalling yard (23 tracks) and the construction of a new road viaduct.

The **environmental situation** in the project area can be summarised as follows:

The 40 hectares of the marshalling yard project is situated in the territories of Tapa municipality and partly in the Saksi municipality (for the western part), outside of the city of Tapa, with traffic of 60 freight trains a day.

The area has about 12,000 inhabitants (7500 for the city of Tapa).

There are no really special protected species nor is there a special landscaped protected zone in the area or the surround of the project.

The railway marshalling yard runs through a limestone area and is partly in a peaty zone (in the western part).

The marshalling yard is located on one major groundwater table.
This groundwater table has direct connection with the surface (due to the nature of the geology).
This table is already highly polluted and is not used for the drinking water supply of the town of Tapa.

The Marshalling yard project doesn't need additional land annexation. The construction of the viaduct needs requires minor private land annexation (involving one garage and one outhouse).

The study area is not really faced with acute air pollution or noise issues.
The existing marshalling yard already generates various impacts related to the physical presence of the infrastructure or its operation.

There is visual impact of the marshalling yard but it is not really significant and is not very acute.
The visual impact of the viaduct exists but can be mitigated with appropriates measures.

In the review of the **environmental impacts of the project,** distinction is made between two types of impacts:
i) Impacts related to the project (impacts related to the rail traffic caused by the project).
ii) Impacts related to the works period.

The impacts related to the future infrastructure are related to:
- annexation of garage and outhouse for the construction of the viaduct,
- small visual impacts related to the creation of the viaduct.

The risks of accidental water or soil pollution will decrease due the improvement of the drainage,

the improvement of the waterproof of an existing technical underpass in the marshalling yard and the construction of a cleaning up water device.
The risks of accident or collision at the junction between the road and the marshalling yard will decrease due to the construction of the new viaduct.
The noise pollution will decrease due to the improvement of the communication devices.

As to the impacts related to the works period, they can be differentiated according to the works phase:
- site installations (base camps): noise, disturbance to traffic, sewage, soil and water pollution, social issues;
- preparatory works and earthworks: impacts related to borrow and stockpile sites and during haulage of materials, excessive land-takes, damages caused to service networks;
- civil engineering structures, small visual impact;
- removal and replacement of the track: waste (ballast, rails, sleepers), noise.

It must be pointed out that the impacts related to the works period will be limited to the construction period and can be reduced by the taking of simple precautions which should be laid down in the specifications for the bidding contractors.

Transport of dangerous goods, although not directly linked with the project impacts, is also dealt with in the present study.
The Tapa Marshalling yard is one of the most important locations for the freight railways in Estonia.
A lot of the freight train transport dangerous goods. There are about 60 trains a day, with sometimes 40 wagons of dangerous goods on average.
The main transported goods are ammoniac, sulphuric acid, chlorine and fuel oil.

Up to the present time no major incident has occurred on this yard, but there is a lot of fuel oil leakage.

The reconstruction of the yard will achieve improvements in safety conditions through several measures: replacement of the old tracks and ballast, improvements of signalling and telecommunication equipment, improvements of the drainage and installation of cleaning up water device and water monitoring.

Mitigation measures are proposed for the good integration of the project in the surrounding environment. With respect to the project execution, recommendations are given for:
- the reduction of the project visual impacts for the marshalling yard, with cleaning up of the dumping area, and for the viaduct with anti-noise measures and special greening.

For the project operation, it is proposed:
- to reduce the risks of contamination of watercourses and aquifers, especially by improvement of the drainage.

The top-soils will be temporarily stored and re-used for the greening operation of this project.

A **Monitoring plan** aiming at refining the environmental impact assessment and correcting the mitigation measures is also proposed. This monitoring plan focuses mainly on water and soil issues and on the impacts related to the works period (with soil monitoring).

A first evaluation of the cost of the mitigation measures amounts to 960,000 Euro (4% of the total cost of the project).

EXECUTIVE SUMMARY (Estonian translation)

Käesolev keskkonnaekspertiisi akt käsitleb Tapa raudteesõlme rekonstrueerimisega kaasnevaid potentsiaalseid keskkonnamõjusid ja nende leevendusabinõusid.

Töö eesmärgiks on eelkõige raudteesõlme rekonstrueerimisega kaasnevate keskkonnaprobleemide määratlemine ja nendega kaasnevate keskkonnamõjude leevendusabinõude maksumuse esialgse hinnangu andmine.

Projekt haarab praeguse raudteesõlme territooriumi (23 rööbasteed) ja uue viadukti rajamise üle rööbasteede.

Projektiga haaratud ala keskkonnaseisund on järgmine:

Raudteesõlme territoorium (40 ha) paikneb Tapa linnas ja lääneosas Saksi vallas. Tapa raudteesõlme läbib 60 kaubarongi päevas.

Piirkonnas elab 12000 elanikku, neist Tapa linnas 7500.

Käsitletaval alal ja selle lähiümbruses ei ole kaitstavaid loodus- ja muinsuskaitse- ega arhitektuuriobjekte.

Tapa raudteesõlm ja projektiga haaratav ala paikneb lubjakivi platool. Ala lääneosas on tegemist turbasooga.

Tapa raudteesõlm paikneb põhjavee avamusalal ja seetõttu on otsene ühendus pinnavee ning põhjavee vahel. Põhjavee ülemine horisont on reostunud ja seepärast ei kasutata seda Tapa linna veevarustuses.

Tapa jaama rekonstrueerimise projekt ei vaja täiendavat maaeraldust. Viadukti rajamine mõjutab eramaaomanikke vähesel määral, mis väljendub mõne garaaži ja kuuri lammutamises.

Kavandatava tegevuse puhul on väheolulised õhu reostamise ja müra probleemid, sest eksisteeriv jaam koos oma infrastruktuuri ja tööoperatsioonidega juba mõjutab keskkonda erineval moel (ka müra).

Olulist mõju ei evi raudteesõlme rekonstrueerimine visuaalsest aspektist. Kavandatava viadukti visuaalset mõju saab vastavate abinõudega leevendada.

Kavandatava tegevusega kaasnevad **keskkonnamõjud** saab jagada kaheks:
- projekti teostamisega kaasnevad keskkonnamõjud (raudtee liiklus);
- tööde teostamisega kaasnevad keskkonnamõjud.

Tulevase infrastruktuuriga seotud mõjud on järgmised:
- viadukti rajamisega kaasnevad garaaži ja kuuride lammutamine;
- suhteliselt vähene visuaalne mõju seoses kavandatava viaduktiga.

Põhjavee ja pinnase reostamise riski avariiliste situatsioonide korral drenaaži parandamine, samuti olemasoleva tehnilise tunneli veekindlaks tegemine ja õlipüüniste rajamine.

Õnnetuste riski vähendab praeguse ühetasandlise raudteeülesõidu sulgemine autotranspordile ja

viadukti rajamine.

Müra tase väheneb kommunikatsioonide (raudtee, autotransport) parandamisabinõudega.

Projekti teostamise käigus tekkivad keskkonnamõjud saab jagada vastavalt tööde etappidele järgmiselt:

- koha ettevalmistus ehitustööde tegemiseks: müra; häiringud liikluses, reovee kanaliseerimine, pinnase ja vee reostamine, sotsiaalsed aspektid;
- ettevalmistavad tööd ja mullatööd: täiendavad alad, materjalide ladustamine;
- ehitustööd: vähesed visuaalsed häiringud;
- rööbasteede eemaldamine ja asendamine: jäätmed (mulle, rööpad, liiprid), müra.

Mõjud, mis ilmnevad tööde teostamise käigus piirduvad vaid ehituse perioodiga ja neid saab vähendada lihtsate võtete ja nõuetega, mis fikseeritaks töövõtjale pakkumisdokumentatsioonis.

Ohtlike veoste transport. Nimetatud aspekt ei haaku kavandatava tegevusega, kuid leiab antud töös käsitlemist.

Tapa jaam on Eesti üks tähtsaim raudteetarnspordi kaubavoogude sõlmpunkt. Suhteliselt suure osa kaubavoost moodustavad ohtlikud veosed - keskmiselt on igas 60-st Tapa jaama läbivas kaubarongis 40 vagunit seotud ohtliku veosega.

Põhilised ohtlikud kaubad on ammoniaak, väävelhape, kloor ja kütus.

Kuni tänase päevani ei ole Tapal juhtunud suuri õnnetusi, samas on seal esinenud arvukalt väiksemaid õlilekkeid.

Tapa jaama rekonstrueerimisega saavutatakse ohutuse suurenemine järgmiste abinõude rakendamisel: rööbasteede ja ballasti uuendamine, signalisatsiooni ja telekommunikatsioonivahendite parandamine, drenaaži uuendamine, õlipüüniste paigaldamine ja veekeskkonna seire.

Leevendusabinõude rakendamise eesmärgiks on kogu kavandatava tegevuse integreerimine ümbritseva keskkonnaga. Kavandatava tegevuse elluviimisel on soovitused järgmised:

- jaama ja rööbasteed visuaalse häiringu vähendamine - seal olevate jäätmete äravedu, maa-ala puhastamine, viadukti puhul müravastaste abinõude rakendamine, maa-ala haljastamine.

Projekti käikuandmisel on ette nähtud:

- vähendada pinna ja põhjavee reostamise riski, eriti drenaaži rajamise abil

Viljakas mullakiht kooritakse, ladustatakse eraldi ja hiljem kasutatakse seda haljastamisel.

Seirekava eesmärgiks on keskkonnaseisundi kontroll ja leevendusabinõude korrigeerimine. Seirekava on suunatud eelkõige vee ja pinnase seisundi jälgimisele ning mõjudele, mis on võimalikud tööde käigus (koos pinnase seirega).

Leevendusabinõude maksumus on esialgse hinnangu järgi 960,,000 Euro (4 % projekti kogumaksumusest).

1 Introduction

The location for the reconstruction of the marshalling yard in Tapa was chosen by the Estonian Railway and is located on the western part of Tapa Town (cf. location map in the Appendix I, II and III).

The project is situated on a 40 ha surface area.

The present Environmental Impact Assessment (E.I.A) is intended to cover the evaluation of the potential impacts of the building of the reconstruction of the Marshalling yard in Tapa and of the associated mitigation measures. The present EIA is focussed more precisely on the reconstruction of the Marshalling Yard, because an EIA for the viaduct has already been done. (cf. summary in Appendix V).

With that aim, this report presents the following sections:

- Policy, legal and administrative framework.
- Project description.
- Environmental situation in the project's area.
- Issues arising from the discussions with interested parties.
- Environmental impacts of the project.
- A specific issue: the transport of dangerous goods and maintenance of rolling stock.
- Mitigation measures.
- Environmental Monitoring
- Mitigation plan and cost estimates.
- Conclusions and Recommendations

This study was conducted in compliance with the EU and Estonian legislation.

The methodological approach is based on field visits, interviews and "scoping" meetings with all the bodies involved. The scoping process made it possible to take into consideration the possible issues and concerns raised by the various groups.

The EIA addresses the impacts related to the railway marshalling yard and viaduct crossing tracks nearby Tapa Station building (cf.Appendix II and IV).

In fact, the main function of the present study is above all to delimit all the environmental issues raised by the project, and to provide a global estimate of the financial cost that would be involved by the mitigation of such impacts, assuming that this cost is likely to play a significant role regarding the project.

2 Policy, Legal and Administrative Framework

In that section, we consider first the environmental procedures currently in force at the EU and then the legal requirements imposed by the Estonian law.

2.1 The EU Environmental Procedures

It is not our purpose to present here the details of European Union's environmental procedures, but more to give a global overview of them, pointing out the specificities of the European's approach.

The two main guidelines and regulations for the Environmental Impact Assessment in European Union are the following:

- Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment' was adopted by the European Community on 27 June 1985. It came into effect in July 1988.
- An amending Directive (97/11/EC) has been negotiated and this is due to come into effect on 14 March 1999.

The changes to the Directive are intended to clarify ambiguities in the existing Directive and extend the scope of the projects that are subject to Environmental Assessment.
They concern especially the Construction of railways and intermodal transhipment facilities (see 85/337/EEC and 97/11/EC annex II).
The EIA has to concern both the environmental impact during construction/execution and the impact during operation.

2.2 Estonian Legal and Administrative Framework

The procedure for conducting ElA in Estonia is established with Governmental Regulation No 314 of November 13, 1992. This Regulation stipulated that national concepts, programmes and development plans of areas related to nature management as well as land use plannings are object of environmental assessment.

Order of the Estonian Minister of Environment No 8 of March 14, 1994 on the Methodological Guidelines for Implementing Environmental Impact Assessment in Estonia elaborates further on the procedures of EIA. This Order gives a developer practical approach, what data is needed to be submitted to competent authority, and also provides experts with practical assignments that should be undertaken while compiling an environmental impact assessment report.

In the year 1995 the Estonian Ministry of Environment started drafting of new act on EIA. The new draft was meant to achieve two main goals - to put the highest legislative basis for EIA in Estonia, and updating also in the context of harmonization with EU legislation (Directive 85/337/EEC). Changes were made into the draft legislation when new amendment of this directive (97/11/EC) was adopted. This act was adopted by Parliament on July 14, 2000 and will be enforced on January 1, 2001.

Other relevant legislation acts to the EIA of project *Tapa Railway Yard Reconstruction* are following:

- Act on Planning and Building, approved on July 14, 1995.
- Act on Sustainable Development, approved in 1995, amended on July 5, 1997.

- Waste Act, approved on June 10, 1998;
- Railway Act, approved on February 23, 1999;
- Act on Protection Ambient Air, approved on April 27, 1998;
- Water Act, approved on May 5, 1994, amended several times;
- Order of the Estonian Minister of Environment No 58 of June 16, 1999 on Limit Values of Hazardous Substances in Surface and Ground Water.

2.2.1 The administrative procedure

According to the Regulation of the Estonian Government No 314 of November 13, 1992 on the Environmental Impact Assessment, the project *Tapa Railway Yard Reconstruction* is the responsibility of the Ministry of Environment (competent authority) to carry out EIA (List of Projects of state importance, Appendix 2 of above mentioned regulation).

The rights of competent authorities are:
- to intermit, limit or stop any activity having or likely to have adverse impact on the environment, as well as unreasonable use of natural resources;
- to control the execution of mitigation measures by the developer;
- to receive free and unrestricted information from the developer about the utilisation of natural resources, monitoring systems, waste management etc. and explanations from authorities concerned by the project.

Competent authorities and experts are obliged to follow the norms and limits set by legal documents and keep state, industrial, commercial and private secrecy on matters which they have become aware of during EIA process.

Legal or physical bodies concerned by the project having information relevant to the EIA of the project are obliged to submit the information free to the competent authority when requested.

2.2.2 The Environment Impact Assessment Preparation Procedures

As the project *Tapa Railway Yard Reconstruction* is the subject of state importance the EIA is mandatory.

The expert group provides following information for EIA report:
- Description of the development, the local environment and environmental baseline conditions
  - Site description
  - Description of the affected environment
  - Baseline conditions
  - Identification and evaluation of impacts
  - Prediction of impact magnitude
  - Assessment of impact significance
  - Scope and effectiveness of mitigation measures
  - Communication of results
  - Public responses

3 Project Description

3.1 Present Background

Tapa marshalling yard is a key facility for freight transport on Estonian Railways.
It lies at the junction of the main east-west rail line from Tallinn to Narva (and Russia) and the important line running south to Tartu, which in turn branches into a line to the south (to Latvia) and a line to the east (crossing the Russian border at Petseri). (cf. Appendix I).
The north-south line from Tapa to Latvia forms the TEN Rail Corridor 1.
The line Tapa-Tartu-Petseri is the second international rail line for the country and is carrying an increasing level of transit traffic.

The strategy of the Estonian Railways is to concentrate train formation for international freight traffic at Tapa marshalling yard.
The marshalling area is located in a flat zone, near to the Tapa Town centre.

3.2 New project of marshalling yard - Reconstruction of the railway yard

Planned activity.

In addition to rehabilitation of existing tracks, renewal of the signalling and lighting, installation of switch heaters, the project also includes building of a road viaduct over the railway.

Main activity on behalf of the railway is this project of Tapa Railway Yard reconstruction and development.

Main activity on behalf of the Tapa Town government is the establishment of new viaduct between the northern and southern part of the town.
Major impact within and immediately adjacent to the railway territory is the construction of viaduct itself and access roads, leading to the viaduct.

3.3 Viaduct project

Northern and southern part of Tapa Town are connected via one railway crossing, which is at same level with the railway (cf. Appendix IV). Therefore the crossing is often closed due to scheduled trains and shunting of vehicles. Tapa Town Government initiated the detail planning of the viaduct in October 1997, detail planning was elaborated by Estonian designing company EA Reng Ltd.

Detail planning preconditions were the finding of new connection with as little demolition work, and relocation of communications as possible, redirection of transit traffic from the centre of the town. Different options were considered during the selection of the location.

Maves Ltd made the environmental impact assessment of proposed viaduct in 1998. (cf. summary of the viaduct EIA in Appendix V)

Then in 1999 K-Most Ltd elaborated the technical design project of viaduct. Total length of the designed viaduct is 430 m, width 15,4 m and height between the lower constructions of the viaduct and the rails at the main tracks at least 7,6 m.

4 Environmental situation in the project area

4.1 General

Tapa Town is located at the western part of Lääne-Viru County, at the contact region of Lääne-Viru, Järva and Harju Counties.

Total population of Tapa Town and it's hinterland is ca 12,000.
At the present time the town population is 7,500.

Approximately 1/3 of the population of Tapa Town is living on the northern side of the railway and 2/3 on the southern side of the railway.

Division of the places of work between northern and southern part of the town is almost equal. At the southern side of the town are located four schools, town government, trading enterprises and military district.

Important objects for the town and the hinterland are located at the northern side: hospital and emergency medical aid, police, kindergarten and several industrial enterprises – Tapa railway carriage depot, AS Trimmal Tapa plant and Tapa bakery.

4.1.1 Boundaries of railway territory.

The boundary of railway and municipal territory border is not finally delineated at the present time.

There are still matters of discussion in the areas of conflicting interests – access roads from Ambla Road to the designed viaduct between southern and northern parts of Tapa Town, and road configuration at the immediate proximity of the railway, foreseen in the general planning of Tapa Town.

The current status of boundary configuration between railway and municipal territories is presented in Appendix III.

4.1.2 Land property

There is no private land ownership located in the bordering area of the territory of marshalling yard and eastern part of Tapa's station.

For the viaduct construction, one garage and one outhouse are affected by the project area.

4.2 Climatic conditions

The climate of the region is of maritime character, due to the influence of intensive cyclone activities of Northern Atlantic: therefore the weather here is changing and humid during the seasons and entire year.

Average air temperature of the year is 4,2°C(see data in Appendix VI).

The coldest month of the year is February is with average air temperature of the month –7°C.
Long-term minimum average air temperature of the month is –10°C, maximum average air temperature is +21,6°C in July.
Daily average air temperature exceeds zero degree in the beginning of April. Absolute maximum and minimum air temperatures, measured at Tapa are correspondingly +33°C (in July) and –38°C (in January).

Total amount of precipitation of the year is 710 mm (see data in Appendix VI), 65 – 70% of the total precipitation of the year falls during the warm period of the year (smallest precipitation in February-March, biggest in August).
Snow falls in November, permanent snow cover forms in second decade of December.
South-western, southern and western winds with average speed 4,0 – 4,5m/s are governing in the region, (see data in Appendix VI).
Wind velocity exceeds 15 m/s averaging in 13 days per year (max 1 day in July and max 5 days in March).

The number of humid days (humidity exceeding 80%) per year is 145 – 150, being highest in December, spring is dry at the region.

Average evaporation from the ground is 460mm per year, highest in summer, 14% of total amount evaporates from September until February. Thus the region has favourable groundwater recharge, since precipitation exceeds the evaporation (however, groundwater recharging is rather small during summer).

4.3 Geological structure and hydrogeologic and soil conditions

4.3.1 Topography

Tapa Town is located on the north-western slope of Pandivere Upland. Absolute elevation of the ground at the region is 85 – 111 m, mostly 95 – 97 m. Relief is relatively flat here, with small hills and lower areas between those.

Central part of Tapa Town (surrounding of the railway station) until the forking of Narva and Pihkva railway tracks is relatively higher and more even area, absolute elevation of the ground is 96 – 97 m here.

From the forking of the railways ground declines into east and north-east Towards Valgejõgi River, where ground absolute elevation in the river valley is ca 85 m (see in Appendix II).

The surrounding of Männikumäe hill is with more jointed relief.
On the background of ground with slight westwards slope rises Männikumäe with highest point absolute elevation 111 m, whereas at the foot of the hill, by railway absolute elevation is 93 m.
General slope of the ground is from the central part of the marshalling yard (from Männikumäe hill) into north and west.
The ground declines from here towards Rauakõrve Brook and large expanses of Tapa and Põriku swamps down to absolute elevation 90 – 91 m.

The embankment of studied railway section is almost at the same level with the ground between the railway carriage depot and railway crossing at Ülesõidu St., where the ground is flat.
Eastwards from the railway crossing the relative elevation of Tallinn-Narva railway track embankment increases and reaches 1,5 – 2,0 m at the locomotive depot, depending of the relief.

Relative elevation of the railway embankment from the surrounding ground reaches 4 m at some places westwards from the railway carriage depot, where the relief is more varied.

At the dispatcher services building the relative elevation of marshalling track is ca 4,5 m above the surrounding ground.
Embankments of southern railway tracks westwards from the dispatcher services building are ca 1 – 1,5 m higher than embankments of northern railway tracks, passing through Tapa.

4.3.2 Surface water

Studied railway section is located within the boundaries of Valgejõgi River basin.

There is no network of drainage ditches eastwards from the railway station, where the topsoil is relatively thin.

Some drainage ditches are established to discharge temporary flood water, caused by precipitation and snow melting, westwards from the dispatcher services building, where the ground declines towards Tapa swamp and Rauakõrve Brook.
Condition of the ditches is poor, ditches are partly filled with all kinds of rubbish, old sleepers, partly amortised and need cleaning.

Connections beneath single railway tracks are by pipe collectors, which are clogged at some places and not working.
Drainage ditches assemble into Rauakõrve Brook, flowing northwards and thereafter falling into Valgejõgi River. But in reality the connection of Rauakõrve Brook beneath the railway embankment has collapsed and blocks the water flowing. Rauakõrve Brook is shallow and clogged northwards from the railway and water is filtrating directly into ground due to the absence of proper discharge.

Consequently: Rauakõrve Brook must be dredged northwards from the railway and drainage ditches between railway tracks need cleaning.

4.3.3 Local geology and hydrogeology

According to general geological data, Tapa Town and studied railway section are located on the outcrop area of upper Ordovician vormsi (O_3vr) and nabala (O_3nb) layer limestone bedrock.

Total thickness of limestone complex is 125 – 135 m.

Absolute elevation of limestone surface is between 87 m (at Valgejõgi River) and 98 m (at the surrounding of railway station). Topsoil, covering the limestone is relatively thin, mostly 1 – 2 m, but locally it may be less than 0,5 m and up to 4 m.

Permanent soil water aquifer is not forming in the topsoil sediments due to the small thickness, and therefore it is of no importance from the water supply aspect.
Further, the soil water is contaminated at several areas (contaminated soil territories of railway carriage depot and locomotive depot).

Groundwater of different limestone aquifers used to be the main water source for private houses and central water supply of Tapa Town until the beginning of 60s.

At the present time the groundwater of upper limestone layer down to 20 m thickness is contaminated with oil products for almost the entire territory of Tapa Town and thus is not potable as drinking water.

According to the results of earlier geological investigations of the studied railway section (SAGP, 1997 and AS E-KONSULT, 1997) the thickness of topsoil is 0,8 – 4,1 m, mostly backfill. Natural soil under the railway embankment consists of sandy loam- and clay loam moraine, sandy loam and clay loam (total thickness 0 – 2,0 m).
In the western part of station area the organic sediments (peat) have been removed and backfilled with mineral ground.

Different sand from gravelly to fine sand (locally clayey), sandy loam and clay loam have been used as backfill for the construction of railway tracks embankments of the marshalling yard.
Backfill thickness is 0,2 – 1,0 m, at the surrounding of the locomotive depot up to 4,1 m (bedding immediately on the top of limestone).
The gangue of oil shale mines has been used for the construction of marshalling track according to the results of interviews. Limestone and granite splinters have been used as the surface layer (ballast) with 0,2 – 0,6 m thickness.

Groundwater table is at the western part of the studied railway section (in the surrounding of Rauakõrve Brook) at 0 – 0,5 m depth from the ground (10.04.2000) due to high water stand at the adjacent Tapa swamp, during low precipitation period it may drop to 1,0 m depth from the ground.

The relatively high water stand in the spring would drop faster, if Rauakõrve Brook were to be dredged northwards from the railway.
At the eastern part of studied railway section, at the locomotive depot the groundwater table is at 2 – 3,5 m depth from the ground according to the results of earlier investigations (10.09.1997) and may rise ca 1 m after snow melting in the spring.

4.4 Natural Environment and Landscapes

Natural flat relief is not changed here, except the railway embankments, elevated from the ground at the lower areas. Gravel and sand, used for the road construction, is partly excavated from the sediments of the esker at the western border of Tapa Town.

The railway is surrounded in the neighbourhood of the marshalling yard by unused grasslands, which at the surrounding of Rauakõrve Brook alternate with locally flooded, low and stunted birch brushwood. The rest of the railway is surrounded by the town and industrial landscape.

4.5 Description of Fauna and Flora

Natural fauna and flora have been totally changed in the area of railway yard and immediate surroundings. There are no rare species of fauna and flora.

4.6 Air quality

There are no electricity production facilities within the scope area of Tapa Railway Yard EIA.

Main sources of air pollution are both car and railway traffic. Due to the one level rail crossing the

car traffic is not smooth between the northern and southern parts of Tapa Town. Therefore the air pollution is an important environmental issue.
Beside the boiler houses of the railway there is one automatic boiler house, fuelled with heating oil, located in the vicinity of the railway territory. The boiler house belongs to Tapa consumers co-operative.

4.7 Actually Pollution of Groundwater and Water Supply

Soil and groundwater contamination. Waste. The soil is more or less contaminated with oil products along the entire railway (SAGP, 1997 and AS E-KONSULT, 1997). Limit value of the industrial zone for the content of oil products (5000 mg/kg) is exceeded at the eastern part of the marshalling yard (eastwards from Männikumäe hill), at the railway carriages depot and at several locations of the locomotive depot territory (Estonian railways. Tapa Station. Rehabilitation and renewal project. Factual report on ground investigations, 1997. GIB Ltd).(cf. Appendix VII and VIII).

Besides the oil products the content of phenols also locally exceeds the limit value at the locomotive depot territory. Soil with the contamination, exceeding the limit values of industrial zone, may not be dumped at Tapa landfill and must be treated at designated location in environmentally sound manner.

Penetration of oil products from the ground through the soil into the groundwater is relatively easy, since the topsoil thickness is small and topsoil mainly consists of backfill and coarse rubble moraine with good filtration properties.
Contaminated groundwater from the locomotive depot territory also discharges into Valgejõgi River.

Groundwater of limestone aquifers is contaminated with oil products at most of the railway surrounding The extent of contaminated groundwater area at the locomotive depot region is ca 30 ha, at the railway carriages depot region at least 30 ha, this also includes the marshalling yard of railway carriages.
Corresponding investigations have not been carried out at the last territory and therefore the assessment of contamination extent is approximate.
Contaminated groundwater areas may be bigger, since the phenols are mobile and highly soluble in water.

Since the upper limestone aquifer is contaminated with oil products, the danger persists that contamination penetrates into deeper aquifers, exploited by the drill wells of Tapa central water supply (*Investigation of Tapa Town groundwater resources, AS Maves, 1997*).

Besides the soil and groundwater contamination the area along the railway is littered with numerous piles of wooden sleepers and different other waste such as scrap metal (wrecks of railway carriages), reinforced concrete items.

According to approximate assessment the total volume of wooden sleepers along the railway side is ca 3000 m^3.
Large amount of wooden sleepers will obviously be replaced during the reconstruction of railway tracks.

Scrap metal amount is 150 tonnes according to the preliminary assessment. Part of the scrap metal and reinforced concrete items at the territory between marshalling yard and custom storage are

dumped here by other owners. Total amount of reinforced concrete items is about 50 tonnes.

4.8 Acoustic Climate

The noise is the significant item at Tapa Town and most important issue in the vicinity of the railway yard. Railway noise depends primarily on the speed of the trains, but main noise sources are the engine and the wheel-rail contact. Additional sources of noise are shunting operations in marshalling yard and squeal of wheels on tight curves. During last years the use of laudspeakers announcements decreased.

Depending of several above mentioned components and seasonal aspects the maximum noise level range from 65-85 dBA.

4.9 Traffic and socio-economic features

4.9.1 Cars Traffic

Short term traffic intensity measurements have been carried out in 1999 at the existing railway crossing. During the working days was counted up to 1000 vehicles per day and on Saturday up to 1200 vehicles per day (data from Mr. Jaan Viktor, Tapa Town Government). Calculated CO emission load from the road traffic is 0,26 – 0,57 g/km per vehicle. Prognosis of future traffic load increase after the establishment of the viaduct is 2000 vehicles per day, but the emissions will not increase pro rata, since the traffic will be smoother without stopping at the railway crossing, as it is today.

4.9.2 Trains Traffic

Data about traffic capacity of Tallinn-Narva railway line is presented in the following Table.

Year	Railway line	Freight trains	International passenger trains	Local diesel passenger trains	Local electric passenger trains
1996	Tallinn-Tapa	11	5	10	7
	Tapa-Kohtla	10	2	3	0
	Kohtla-Narva	14	2	8	0
1997	Tallinn-Tapa	14	4	9	7
	Tapa-Kohtla	12	2	3	0
	Kohtla-Narva	15	2	8	0
1998	Tallinn-Tapa	18	3	8	7
	Tapa-Kohtla	12	2	3	0
	Kohtla-Narva	14	2	8	0

4.10 Human living and Anthropic environment

Most of the human living areas, dwelling houses and enterprises are located in the eastern part of Tapa Town. Surroundings of marshalling yard are mostly without any houses, except the operational units of Tapa station.

Dwelling houses bordering with the railway territory. Dwelling houses with the territories bordering with the railway territory are about 40, most of them are private houses. The total number of inhabitants in these hoses is 400.
Enterprises bordering with the railway territory. Most of them works in connection with the railway activities. Total number of employees is about 400.

Other objects bordering with the railway territory. There are two major municipal buildings, bordering with the railway or located in the immediate neighbourhood of the railway territory: Männikumäe Sports Centre and Tapa Gymnasium (cf. Appendix III).

Männikumäe Sports Centre is designed to host the skiers during the winter period; runners and cyclists during spring, summer and autumn.
This is a public access area, where the number of sporting and otherwise relaxing people is highly dependent of the time of the day and period of the year and thus quite impossible to predict.

The number of pupils, attending the lessons at Tapa Gymnasium is 650 at the present time.
The territory of Tapa Gymnasium is not bordering with the railway, but is still located within the impact area of railway disturbances.

In the area project there are no known or supposed archaeological sites.
But, the Tapa's station building is an building with special interest.

4.11 Environmental situation of the location of viaduct

Designed viaduct crossing the tracks nearby of Tapa Station building (cf.Appendix IV).
Detail geological and geotechnical investigation was carried out by Estonian company GIB Ltd in 1997. The Ordovician limestone lies in the location of proposed viaduct at a depth of 1,3 to 2,0 m below the ground surface. The upper part of limestone is weathered.

Limestone is covered by silty gravel, backfill (silty sand) and ballast. Depending of the location main tracks or side-tracks the ballast contains limestone and crystallic rocks.

Land ownership. Most of viaduct area owned by state. During the first half of the year 2000 the borders between railway and Tapa municipality should be established and fixed.

Fauna and flora. There are no rare species on the proposed viaduct area. As a whole during the construction of viaduct and traffic junction southward of the tracks about 50-55 trees (poplars and maples) should be cut off. Most of these trees are situated southward part of the viaduct.

Dwelling houses bordering. On the immediate nearby of the viaduct there are living about 50 inhabitants, and one garage and one outhouse should be demolished.

Tapa Gymnasium is situated quite close to the southern part of viaduct and traffic junction.

5 Issues Arising from the Discussions with Interested Parties

For the viaduct project, several public hearings have been held by the Tapa's government in 1999.
For the marshalling yard project, a first public hearing have been held in May 18, 2000.
The purpose of this meeting was to introduce proposed activities and the scope of EIA.

The draft of EIA was presented in second public hearing on July 20, 2000.

The main issues arising from theses meeting are following:
- feasibility and funding of the project;
- possibilities of decreasing the noise level;
- accidental contamination and monitoring of groundwater.

Procedures concerning the consultations of the public were applied as in publications, access to the technical files, but it would seem that in spite of administration offered several occasions to the citizens to express itself, the public opinion of zones concerned by the project little felt concerned by the project of the marshalling yard.

6 Environmental Impacts of the project

6.1 Impacts related to the Future Infrastructure

6.1.1 Land Consumption

The Tapa's Marshalling Yard project doesn't involve new land consumption.

The viaduct project concerns municipality property and few private properties and poses the problem of expropriation according to this project.

6.1.2 Impacts on the Physical Environment

The project will not damage the drainage pattern of surface water and groundwater, it should even improve it.

6.1.3 Impacts on the Natural Environment

The marshalling yard area will not cross any protected natural area, as it is already in the present situation. The severance effect of the project on animal populations will not increase. The impact will not be sensitive.

The construction of new culverts and the cleaning of dumping area should be a positive point on looking at the fauna environment.

The vegetation adjacent to the present platform will not suffer more from the induced pollution.

6.1.4 Impacts on Land Use

On agriculture and forestry which are the main economical activities concerning the land consumption, the project will not impose any reduction.

6.1.5 Impacts on Landscape

The project will not create significant impacts on the present landscape, owing to the absence of main changes of the Marshalling yard area. So the impact will not be sensitive.

6.2 Pollution Generated by the reconstruction of the railways yard

6.2.1 Traffic Forecasts on the railway marshalling yard

According the investigations, the present freight traffic in Tapa should have an annual 25% increase. As to the passenger traffic, it is assumed that it won't be changed.

6.2.2 Air Pollution

In despite of the freight traffic increase, we should estimate in the future the air pollution should decrease : the putting into service of new locomotives more efficient should reduce air pollution in the Tapa area.

6.2.3 Noise and Vibrations

The noise and vibration level will decrease according to the reconstruction (replacement) of ballast and basement of the main and aside tracks. It will decrease with the replacement of the tracks with long welded rails and replacement of the old turnouts with new ones too.

The noise level will decrease with the improvement of the communication device too.
As a whole the noise level will be decreased about 10-20% compare with present situation.

In the viaduct area, noise level will increase due to the moving of the traffic in the area, Estimated noise level on the viaduct (2000 vehicles per day) is 67 dBA

6.2.4 Water and Soil Pollution

Regarding water pollution, the project will have positive effects and will decrease the risks of accidental pollution and chronic pollution.

The probability for accidents –despite a foreseeable growth in transport of hydrocarbons – will be reduced, because the several measures included in the reconstruction project:
- suppression of the level-crossing in Tapa,
- improvements of signalling and telecommunication equipment,
- replacement of the old tracks and ballast.

These reconstruction works will decrease the risks of pollution in link with the accidental derailments too.

Chronic water pollution and soil pollution will be diminished by the progressive change of the electric transformers by new ones devoid of PCB.

6.2.5 Waste and Litter

Usual waste and litter produced by the marshalling railway activities are tightly linked with the traffic. But an improvement in the material management should reduce strongly the volume and the nature of the produced waste.

6.2.6 Light Pollution

The global enlightened area in the Marshalling yard will not increase,
The improvement of the floodlighting material will permit a new rational use of the lighting in the area.

6.3 Impacts during the Works Period

6.3.1 Nature and sequence of the Works

The different stages of reconstruction must first be identified and described in order to cover the potential impacts during the works phase.

The works schedule will be as follows in the present case:
- Establishment of base camps
- Preparatory works
- Earthworks
- Civil engineering structures (new crossing viaduct)
- Removal of the existing tracks and replacement by a new track (ballast, rails, sleepers)
- Installation of signalling.

One part of the work will be located in the Tapa station and the other part in the Tapa marshalling yard area.

The works have to be scheduled in order to keep the traffic free in the Tapa Marshalling Yard and in the Tapa Station.

Most of works are performed by specific machines moving on the track itself. But during the implementation of the marshalling yard works, the corresponding over-pass and adjoining road works will be carried out.
The works duration will not exceed 18 months for the Marshalling Yard and 10 months for the Viaduct construction during 2 years

6.3.2 Foreseeable Impacts

6.3.2.1 Site Installation (Base Camp)

On the Tapa Marshalling Yard two site installations should be required one for the viaduct works and the second one for the tracks works.

In usual in a site installation one can find an office, mechanical workshops, petrol store, a depot for plant and materials, a canteen, sanitary facilities, ...
The impacts related to the site installations consist mainly of the physical area of the installation, which can cause the disappearance of several hectares of use land if it is not managed carefully.

There is then the assortment of nuisances and pollution caused by the functioning of the camp:
- local nuisances (noise, disturbance to traffic) for the possible neighbouring population,
- sanitary problems related to the treatment and disposal of sewage,
- pollution of soil and surface water by lubricants and hydrocarbons, during maintenance of works plant and utility engines. The mechanical workshops, maintenance pits, fuel installations and chemical depot are often severely polluted,
- social problem involved in the temporary installation. This effect is not really detrimental as it is likely that some works will create temporary employment for local people.

6.3.2.2 Preparatory Works

Cleaning dumping areas, tree and bush felling, clearing and soil stripping are part of the preparatory works.
The preparatory works sometimes should cause serious damage.
If the initial topographical benchmarks works is not leaded carefully, the impact of the project could easily extend beyond the area initially planned.

Preparatory works can thus involve unjustified tree filling or excessive use of agricultural land. Instead of being recovered and stockpiled for re-use, topsoil is sometimes dumped with excess spoil. During the works, the topsoil has to be carefully stockpiled in separate area for facilitating the re-using.

During the works, if no precautions are taken, a number of underground pipes risk breakage (networks such as potable water supply system), causing accidental flow and supply being cut off certain houses.

The preparatory works of viaduct construction consist the following items:
- Removal and protection of trees and bushes
- Demolition and removal of buildings
- Removal and protection of communications - air and underground cables, sewage, water supply pipes etc
- Temporary car traffic junction.

6.3.2.3 Earthworks

In the framework of the reconstruction of the Marshalling yard, a sub layer is planned.
Selected sub-layer and fill materials will have to be supplied from borrow pits.

Various disturbances such as land take erosion, change in flow conditions, pollution and nuisances (noise, dust and vibration) and changes in the landscape can be forecast for borrow and stockpile sites and during haulage of materials.

The most serious of these nuisances should be water pollution caused by the works. The initial topsoil stripping phase, haulage and dumping is the occasion for maximum movement of fine particles by rain, wind and movement of works plant.

To the problem of suspended matter should be added the risk of pollution (oils and fuel) by works plant.

6.3.2.4 Civil engineering structures (new crossing viaduct)

Most impacts concerning construction of the new viaduct are:
Nuisances in freight and passenger train traffic (during the works period)
Nuisances in car traffic.

6.3.2.5 Removal and Building of the tracks

This part is the most important part of the works in volume and it generates a considerable quantity of waste: ballast, rails, timber and concrete sleepers.

Gravel from gravel ballast and excavation earth from earth base of ballast, excavated materials along the railway line comprises most volume of material. This material should be examined and distributed on the basis of performed analyse depending on the contamination rate:
1) Contaminated gravel ballast (places under the point operating apparatus, railway siding areas etc.)
2) Low contaminated gravel ballast (main through line sections besides of places in front of station building)
According to these categories the manner of treatment and subsequent disposal will be defined.

Analysis of gravel ballast samples will be performed as to hydrocarbon content and heavy metal content. This analysis will be a basis for specification of deposit manner. Sampling must be carried out on the specific railway line places. (cf. Appendix IX the location of the presumed high contaminated level areas).

The material shouldn't be nowadays suitable for the main railway line from the point of view of loading capacity as well as content of pollutants. It should be therefore recycled and used against in the superstructure after the new fraction replenishment.

The gravel ballast, which can not be used in superstructure, should be re-used as the secondary building material e.g. by road compaction, into the sub-base layers, etc.

Unprocessed excavated earth under the gravel ballast can be used as the secondary base material for different purposes, e.g. it can be used as the secondary building material.

The ballast not reused during the works will be stockpiled on the railway side or given to the municipality for various works (road construction...).

The pollution level of the ballast may be high enough to deserve specific attention to the future disposal site.

Rails are made with very hard steel and can be reused or utilised as scrap-iron.

The old timber sleepers are usually sold as firewood. They are likely to be polluted by heavy metals and hydrocarbons. In addition, the products used for the sleeper preservation can generate toxic fumes when burnt. So, the use as firewood could be harmful.

Old wooden sleepers with appropriate quality can be used again on the Estonian Railways side lines, which are less heavily used. The sleepers, which are no more suitable as to their quality and cannot be used for fastening of rails, must be deposited on the dumping site, appropriate for this waste category. They could be burnt in special power-plant too.

Concrete sleepers can be used directly as secondary building material or as concrete crush after crashing.

The track components that will be disposed off will be replaced by new materials to be procured. This procurement is in itself a source of environmental impacts resulting from the manufacture, the production and transport of these materials. The effects are those associated with any industrial operation including gaseous emissions, noise, consumption of energy and natural resources, production of solid and aqueous wastes (sometimes hazardous).

The procurement of new track components will involve the following impacts:

- New ballast: development of new quarries, with associated disruption of land use, visual intrusion,
- rails and sleepers processing: extraction of raw materials and associated impacts, noise, energy use, air pollution,
- transport and storage: noise, dust, vehicle traffic.

The material should be transported by rail which is a more environmentally friendly transport than the road.

The removal and replacement of the track materials bring also a trail of impacts among them noise produced by the machines replacing the ballast, which is particularly high.
Vibrations levels and dust generated by this activity have strong potential effects

6.3.2.6 Installation of Signalling/Telecommunication Equipment

These works phase should not generate significant disturbances.

Hence, it should reduce the impact of the equipment on the environment with the substitution of the old material with new one in accordance with the new legislation (new electric transformers devoid of PCB).

6.4 Impacts related to the viaduct

Relevant environmental impacts, associated with the establishment of the viaduct are following:

- viaduct embankment with 5 m height is located at 5-7 m distance from the three dwelling houses; access is complicated; market value of the houses at the immediate vicinity of the viaduct most probably decreases;
- increasing of noise and air pollution at Valgejõe Boulevard,
- traffic safety is not secured at the exit road from the viaduct at the real estate unit at Valgejõe Blvd. 2;
- railway traffic is disturbed during the construction works of the viaduct.
- removal of 55 trees from the location of viaduct area.
- demolition of some outhouses and garage
- demolition of unused small boiler house with fuel tanks.

Probably, some amount of contaminated soil should be excavated and disposed in the environmentally sound manner.

Establishment of the new connection possibly increases the transit traffic via Tapa Town, i.e. between Central Estonia, Loksa harbour and Võsu recreation district.

As a whole the air pollution will be decreased in the central part of Tapa Town. Local traffic will be moved from nowadays on level crossing with railway to the viaduct. The traffic will be smoother and emission by car unit will be decreased.

The construction of the viaduct will decrease the risk of traffic accident. The improvement of the level crossing will decrease the risks of accident for pedestrians too.

7 Specific issue : Transport of Dangerous Goods and rolling stock maintenance

Transport of dangerous goods is a special problem linked with safety as well as the environment.
Accidents involving dangerous or polluting goods are rare but can cause major environmental damages if these goods are discharged into the environment.
The damage will depend upon the nature, characteristics and volumes of the substances released. (generally the transported dangerous goods are hydrocarbons).

A majority of the accidents involving transport of dangerous goods occur during loading and unloading operations. Accidents occur in transit, maintenance or storage installations.
Transport of dangerous goods is a complex problem which involves many services and concerns numerous people.

In Tapa, most of the dangerous goods are hydrocarbons and chemicals. They are transported in tank wagons. The old rolling stocks begin to be substituted with new wagons, so the quality of the storage is improving and the risk of accidental leakage will be reduced.

The reconstruction of the Tapa marshalling yard will induce improvements in safety conditions with:
the replacement of the old tracks and ballast, the improvements of signalling and telecommunications equipment, and the suppression of the level crossing in the Tapa's station.

Tapa is the principal maintenance shops for locomotives and wagons on the Estonian Railway network..

The following sources of oil and grease pollution were observed: locomotives do not recycle lubricating oil. It is collected in a pan under the engine and should be dumped in a collection pan in the depots. Crews are dumping this oil, particularly when approaching their home terminal or while standing in stations or in yards at the end of the leads, diesel hydraulic multi-unit passenger sets leak oil and transmission grease, heavy oil spilt during the loading drips from the sides tank wagons along the right of way.

Curtailing pollution:
The environmental issue is the prevention of this oil and grease pollution. For the locomotives and multiple unit passenger equipment the lasting solution is replacement with non polluting design. The recommendation on improving the locomotive fleet will gradually reduce the rate of pollution. Another immediate action would be to enforce the operating rules and ensure that engine dump the accumulated oil in the collecting pans.
Reduction of the oil dripping from the outsides of tank wagons requires co-operation with the customers and the loading points. Either improved loading equipment methods or steam cleaning prior to dispatch could reduce the amount of pollution.

The elimination of the pollution and action to deal with the spills areas should be the following:
To eliminate or reduce pollution from rolling stock and excessive consumption of lubricating oil requires replacing the equipment with proper designs. Meanwhile controlling engine drivers ensure that they dump waste oil in collecting pans to eliminate much of this pollution. Work with customers to clean exterior of oil wagons prior to dispatch.
A program is required to clean the ballast and to dispose of the oily residue from this operation. This action should be included in the track rehabilitation project.

The Estonian Railway track structure is being polluted by oil and grease from wasted lubrication from the diesel locomotives, grease and lubricants from the multiple unit passenger sets and oil

dripping from tank wagons being transported along the tracks.

Track maintenance:
Control and discipline engine-men (locomotive drivers) and have them dump oil in proper receptacles, not on track side. Oil contamination of ballast is a major problem. It should be stopped before any money is invested in new or cleaned ballast.
Before any track renewals are undertaken, bring embankments up to standard and provide good drainage for mainline and yard tracks.
Until the locomotives oil spill problem is resolved, the use of imported ballast should be minimized

8 Mitigation Measures

This part describes successively the measures to be taken for the following aspects:
- project operation,
- the works period.

The measures to be taken are the responsibility of the contracting authority who undertakes to perform them.

8.1 Measures related to the project operation

8.1.1 Landscaping

One main point will be the cleaning of the dumping zone in the project area.
Clearing out of the unused sleepers, old concrete ready made unit, dump wagons and other wastes. Possibility of utilising of the sleepers by incineration is available in special units, since there is no information about the substances used for the impregnation of sleepers, released during the incineration and causing air pollution.

On the project area, landscape integration will be mainly obtained by using strands of vegetation. The planted trees and shrubs must correspond to the local plant communities, avoiding monocultural planting. Around the viaduct area, it is planned a special greening program too.

8.1.2 Urban planning

In substitution of the present level crossing near Tapa Station, it planned to build a two carriage way viaduct to ensure the motor traffic through the two part of the city.

The old level crossing will be improved for an exclusive pedestrian use (with secure effective measures).

8.1.3 Reduction of Noise and Vibrations

The acoustic conditions levels acceptable from the viewpoint of health state are the following (limit values of the equivalent levels for night time).
LAEQ = 50 dB – allowable noise level, in the environment,
Laeq = 60 dB – allowable external noise level, at which one may ensure the noise level inside dwelling house admissible when using a standard, modern window woodwork.

It is proposed to apply for a few areas near the viaduct anti-noise screens (100 m length) (cf. Appendix IV).

8.1.4 Reduction of Water and Soil Pollution

8.1.4.1 General measures

The risk of contamination of aquifers may be mitigated by:
- Improvements to maintenance and design of rolling stock (trough reducing incidental spillage of oils, introduction of carriages with sealed sanitary systems).
- Improvements to track maintenance (trough selection of lubricants and de-icers, use of non persistent herbicides in vegetation management)
- Improvements to liquid waste management and facilities at workshops.

8.1.4.2 Specific measures for the Protection of Aquifers

Accidental pollution, especially those involving transport of dangerous goods, are major threats regarding the protection of aquifers.

Considering that the underground water pollution is sometimes everlasting, and that the self-cleaning processes occur very slowly, preventive means should be undertook which would reduce the contamination migration to aquiferous layers.

These preventive means could be general drainage protection works incorporated in the design of the marshalling platform:
- waterproof ditches (cf. Appendix XII) and interceptor drains,
- improvement of the waterproof for an existing technical underpass in the marshalling yard,
- groundwater protection using geotextile and sand layer,
- oil-cleaning up water device.

8.1.4.3 Reduction of Soil Pollution

The reduction of soil pollution is linked with the improvement of the rolling–stock (decrease of the risk of leakage). The general level of the soil pollution will decrease too with the cleaning up of some high polluting soil area during the works.

8.1.4.4 Reduction of waste and Litter issues

The options for improvement waste and litter management are:
- adoption of waste minimisation procedures in purchasing and facilities management (use of recycled and durable products, improved handling of materials),
- introduction of recycling procedures and targets for materials giving rise to major waste streams (metals, ballast, timber, plastics).
- Adoption of specific measures for the handling and disposal of potentially hazardous or environmentally damaging wastes (oils, battery acids, contaminated spoil, solvents).
- Cleaning up of non authorised dumping area on the Marshalling Yard (cf. Appendix XI)

8.2 Mitigation measures of the viaduct

The basis of the environmental impacts mitigation measures is the relocation of the access road from Valgejõe Blvd. to the viaduct 25 – 30 m westwards.. As a result of this:
- the shadowing impact of the viaduct will considerably decrease, major part of the orchard at Väike-Põllu St. 2 will be preserved and normal access to the house and the land will be secured;
- visibility the exit road from the viaduct at the beginning of Valgejõe Blvd. will improve and the extent of the disturbances of the inhabitants at Valgejõe Blvd. 2 and Valgejõe Blvd. 4 will decrease;

non-exploited boiler house and potential contamination at the beginning of Valgejõe Blvd. will be liquidated.

Regardless of the proposal to relocate the access road from Valgejõe Blvd. to the viaduct the following measures must be implemented:

- restoring of the high burnishing, using pre-grown trees with baled roots;
- thorn hedge must be established to separate Ambla Road and Tapa Gymnasium to decrease the disturbances, dust, noise and pollution. Transparent screen must be established to protect the household at Amble Road 2; wooden or concrete barrier screen must be established to protect the household at Valgejõe Blvd. 2.

- Further using of the old railway crossing by the pedestrians and securing of traffic safety will be improved for an exclusive pedestrian use (with specific measures as lights signals and lifting gates).

8.3 Measures related to the Works Period

Presented hereafter are some environmental specifications to be included in the overall Technical Specifications for the Contractor in order to improve the environmental protection during the execution phase.

The engineer responsible for supervision of the works will ensure that all the mitigatory and compensatory measures planned in the project are performed.

He will also handle the relations between the different categories of users and residents in the project implementation area to take into account their problems during the works.

All the measures described in this part will form part of the Technical Specifications for the Contractor. In particular, the Contractor will justify his working methods for reducing the nuisance of the works for the environment.

8.3.1 Measures related to the works installations

The works installations must be equipped with the following facilities to reduce pollution:

- a septic tank for the sanitary installations,

- surface coating to render impermeable the truck and site plant parking areas, the hydrocarbon and bitumen storage areas and the filling station. Runoff water from these areas will run into impervious ditches and discharge into a storm water tank with an oil separator before discharge into the natural environment,

- installation of grease interceptors in the inspection pits and mechanical workshops.

The greases and hydrocarbons collected in the storm water tanks/oil separators must be incinerated under environmentally satisfactory conditions.

If possible, the works installations should not be sited nearer than 500 m to a built-up area in order to limit nuisances in the nearby area. Hiring of local workers should nevertheless be preferred to workers from outside the region.

Attention must also be paid to rehabilitation of the site at the end of the works. The surface coating must be removed, stripped topsoil (stockpiled outside the site area) must be recovered and spread over the works installations area. No stockpile of materials, remains of vehicles or buildings should remain on the site. Everything must be removed for use at other sites or taken to a tip. The site will be redeveloped as farmland or woodland according to the initial land use.

8.3.2 Measures concerning the preparatory works

All accesses required by the works will be entered in an overall plan showing the precise area of provisional rights-of-way, the amount of the indemnity for temporary use of the land and the obligation to restore the latter (generally for renewed use as farmland).

Tree felling plans will be drawn to prevent abuse in scrub clearing and felling operations with penalties laid down for the unplanned felling. All useable timber shall be retained for firewood or construction purposes. The other vegetation will be burnt only under careful control in order not to damage the forest edge.

During the soil stripping phase, topsoil must be kept for future re-use for erosion control and landscaping purposes. Topsoil must not be stockpiled to a depth of more than 2 metres or it will lose its biological qualities. It must under no circumstances be mixed with spoil. Its soil value should be maintained by sowing with legumes to enrich its nitrogen content and protect the stockpiles from erosion.

The overall plans mentioned above will show the precise routing of underground pipes and will thus limit damage caused during the movement of service networks.

8.3.3 Measures related to the earthwork phase

Soil analyses must be done during the railway reconstruction works, if the soil must be removed, in order to decide, either the soil requires special treatment or it may be dumped at the municipal landfill.

If borrow materials requirements are small, they can be met from existing borrow pits to avoid the multiplication of nuisances.

In addition, the opening of new extraction sites would involve more clearance and hence erosion not only in the borrow areas themselves but also as a result of the creation of new access roads.

After completion of borrow operations, it will be necessary to regrade the pit area by remodelling steep slopes.

Spoil materials could be used for this operation. These materials will be suitably compacted in order to prevent soil loss by erosion.

The next steps would be to respread the topsoil stored for this purpose, scarify it and revegetate the working area. It is reminded that natural revegetation on bare ground is very slow. Satisfactory completion of replanting will have to be carefully monitored.

Moreover, all working areas on bare ground will generally induce increased runoff.

The site surface must be carefully drained to reduce this impact. Strict attention to peripheral drainage at all working areas will help to alleviate this problem.

Settlement traps must be installed as necessary to concentrate runoff and keep dispersal of sediments in watercourses to a minimum.

Special attention must therefore be paid to all activities related to the construction of cross drainage structures. Sediment traps are one of the main design features to prevent sedimentation from occurring downstream of culverts during earth works.

Where flows are expected to be small, this can be in the form of a shallow sediment trap to slow down the flow of water and allow the finer materials to settle out. The device could be completed by the plantation of thick grass mat barriers at the outlet of the sediment trap. But the main preventive measure for fighting erosion, runoff and sedimentation at these points is to schedule construction activities during the dry season.

Spoil materials not reused in embankment will serve in priority for borrow pit rehabilitation.

The filling of borrow pits will serve both landscaping and safety purposes. Leaving deep pits with vertical walls in which people might fall will be avoided.

All spoil materials which cannot be reused for reconstruction purpose will be dumped in waste pits. Waste pits are usually sited along the road in low points not developed for agriculture.

The impacts associated of these sites are the same as those of borrow pits (erosion, runoff, sedimentation, landscape damage, etc.). The same rehabilitation principles should therefore be applied: slopes $\leq$ 1/2, suitably compacted, respreading of top soil ($\cong$ 15 cm) and revegetation.

There do not appear to be any local regulations concerning site plant (mixing plant) noise levels. The degree of noise nuisance depends to a considerable extent on the condition of the plant and the quality of maintenance.

The first measure to be applied is the careful soundproofing of motors. As an example, the sound emission measured 7 m from site plant should not exceed 80 dB(A) to 90 dB(A), depending on motor power. No night work will be allowed, in order to protect local populations.

An impact which lasts for a few months cannot be considered as a substantial nuisance in terms of site or landscape. For this reason, few measures are really necessary during the works phase.

However, the overall image of the site could be improved by avoiding leaving unused or not yet used equipment on the site itself or along the edge of the right-of-way.

8.3.4 Measures related to the platform works and tracks replacement

In order to reduce the impacts to neighbouring dwelling houses, the following measures below should be adopted :

As regards to noise issues, prior to commencement of the work, the contractor will be required to submit the following:

- a method statement describing the type of plant to be used and the noise control methods

proposed,
- a work programme indicating the sound power level and location for each activity.

Hours or working will be subject to the relevant authorities agreement.
This should normally exclude night-time working in sensitive locations (e.g. close to housing or schools or hospitals).

There do not appear to be any local regulations concerning work plant noise levels. The degree of noise nuisance depends to a considerable extent on the condition of the plant and the quality of maintenance. The first measure to be applied is the careful soundproofing of motors.

The contractor will take all reasonable measures to avoid creating a dust nuisance and to prevent emissions of smoke of fumes from plant or stored materials (e.g. fuel oils).
Note that special precautions will be required if potentially contaminated materials are encountered (e.g. demolition old building).

The contractor will take all reasonable measures to control vibration so as to comply with any regulatory requirements, to protect receptors from nuisance or discomfort and to protect buildings from damage.

With respect to the waste generated by this work phase (ballast, rails, sleepers,...), specific measures will be implemented for their disposal or reuse :
- Prior site investigations will be carried out on any areas which are known or likely to contain contaminated materials. The excavation, handling and disposal of those materials will have to be carried out in compliance with the best practices, regulatory controls and agreements with relevant authorities.
- All waste will have to be handled and transported in a safe and environmentally responsible manner. Waste contractors and hauliers will be licensed or will otherwise be able to demonstrate an adequate degree of competence in complying with this requirement.
- A consignment note system or equivalent shall be adopted, enabling waste to be tracked to its final destination.

- All reasonable opportunities will be sought for the recycling of waste arising from the project.

The contractor will have to submit a Recycling Plan which shall specify the types and quantities of waste to be recycled, the proposed method of recycling and the end-use to which the recycled product will be put.

Sites or facilities used for the disposal of waste from the project:
- will be licensed or otherwise approved for that purpose (especially for contaminated material),
- will have an acceptable record of health, safety and environmental performance,
- will have been designed specifically for their intended waste disposal purpose,
- will incorporate appropriate environmental mitigation (e.g. leachage control and methane recovery on landfills; cleaning and venting of combustion emissions on incinerators), and
- will be managed in an environmentally responsible manner, including documentation of activities and emergency response procedures.

9 Environmental Monitoring

The environmental monitoring is an essential component of the management for Tapa marshalling Yard and Station. The objectives of a monitoring programme are:

- to detect adverse environmental impacts from the marshalling yard
- to demonstrate that the environmental control measures are operating as designed.

Environmental monitoring should cover all important issues during the working period of reconstruction of marshalling yard and construction of viaduct, and during everyday operation of marshalling yard afterwards.

9.1 General Provisions

Environmental monitoring divided three parts:
visual monitoring (supervision) of earth works and in-situ treatment of contaminated soil
sampling of probably contaminated soil (ballast and Backfill) during working period
creation of groundwater monitoring network, as a whole 8 points (wells) (cf. Appendix X)

The aim of groundwater monitoring network is to assess impacts from marshalling yard to groundwater. If some accident or oil spill happened in marshalling yard then monitoring wells used as points of pumping out contaminated ground water.

In order to facilitate this monitoring, the project engineer in charge of works supervision will give adequate notice of the way mitigatory measures are to be implemented so that the required compliance monitoring can be carried out. In addition, it would be useful to use the services of an independent environmental consultant who would visit the site regularly to supervise and oversee the monitoring procedures.

9.2 Monitoring during the Construction Phase

The major impacts of the construction phase are related to accidents and unforeseen events. A monitoring programme will have no relevance in such cases. However, a contingency plan dedicated to the construction managers and workers is recommendable in order to reduce the risk of severe environmental impacts from accidents, spillage and other unforeseen events during the construction phase. The contingency plan should, in particular, address the following possible problems :

- spillage of oil and chemicals, and
- earthworks at contaminated sites.

10 Mitigation Plan and Cost Estimates

The cost of the mitigation measures for the Tapa Marshalling Yard could be considered as follows :

According to the preliminary results of the project EIA, the cost of the mitigation measures for the Tapa Marshalling Yard could be considered as follows :

Nature of the Measure	Type	Cost (rough estimation)
Measures related to the work period	mitigation measure	no additional cost (included within the Technical Specifications)
Landscaping	mitigation measure	70,000 Euro
Improvement of waterproof for the Old Technical Underpass	mitigation measure	50,000 Euro
Improvement of crossing level for an exclusive pedestrian use near the station	mitigation measure	50,000 Euro
Contaminated soil monitoring (previously to the works period)	mitigation measure	2,000 Euro
Cleaning up of non authorised dumping area on the Marshalling Yard	mitigation measure	44,000 Euro
High Contaminated soil area	mitigation measure	360,000 Euro
Oil depolluting and cleaning water device	mitigation measure	60,000 Euro
Rivers and ground-water protection (construction of new ditches)	mitigation measure	132,000 Euro
Environmental monitoring and maintenance of environmental devices	Accompanying measure	to be included in the operating costs (minimum annual provision of 20,000 Euro)

SUB - TOTAL COST for mitigation measures for the Marshalling Yard	**768,000 Euro**

Mitigation cost of viaduct - planting of trees and bushes, restoration of buildings, noise screen	mitigation measure	192,000 Euro

SUB- TOTAL COST for the Viaduct	**192,000 Euro**

TOTAL COST for mitigation measures for TAPA project	**960,000 Euro** (monitoring not included)

This total cost relates to investment costs of the project.
Regarding the maintenance costs we can consider provisions for maintenance of environmental devices (water protection devices) and environmental monitoring
(total = approx. **20,000 Euro per year**).

11 Conclusions and Recommendations

The reconstruction of the reception yard project in Tapa should have only few global impacts on the local environment. The appropriate mitigation measures (greening, drainage, water treatment facility, water monitoring and anti-noise screens) could reduce the impacts of the project on the environment.

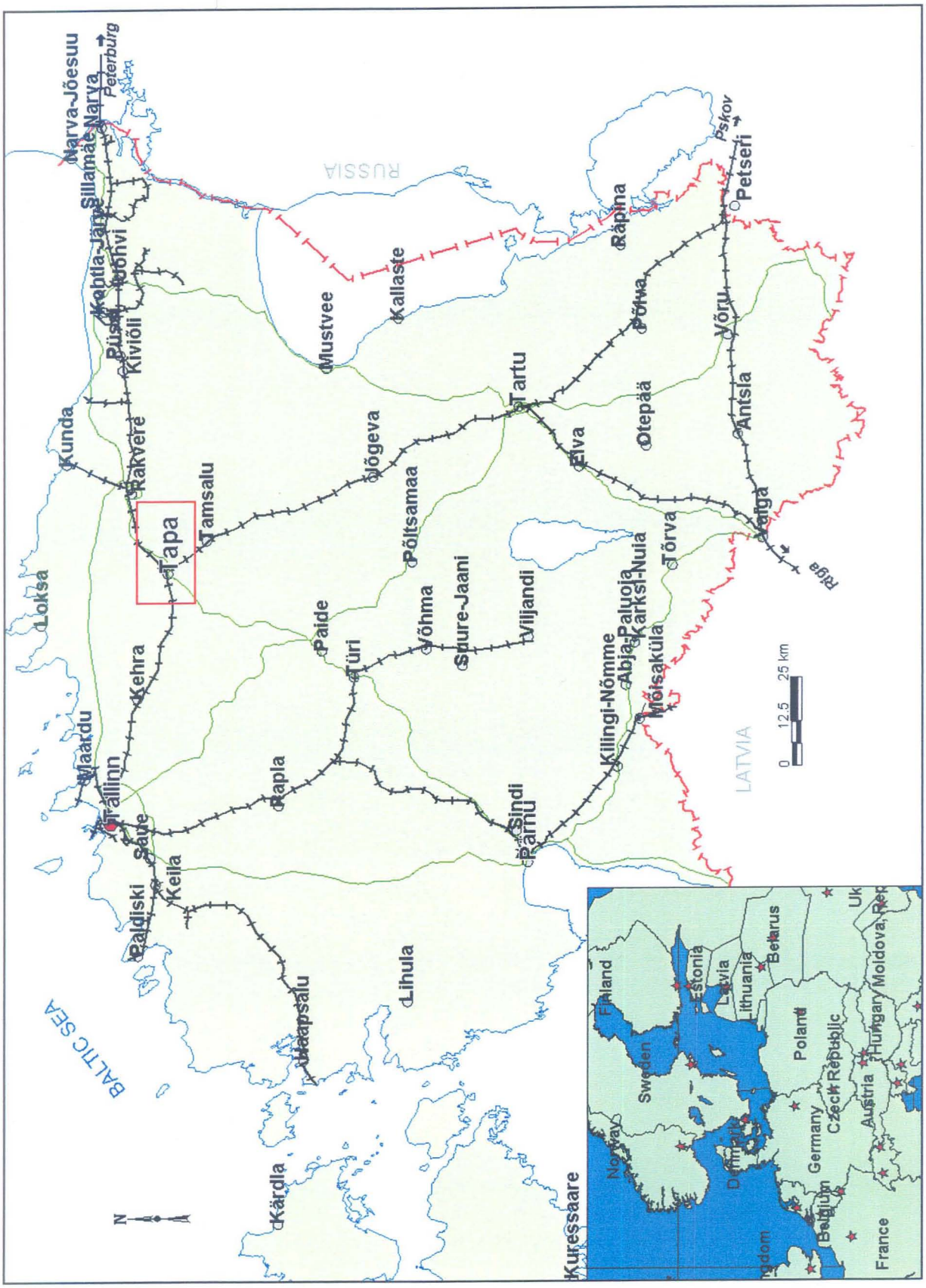
Recommendations:

Before initiating construction works an analysis of soils quality should be carried out to determine background concentrations of different chemical parameters. The results will specify the conditions for the reuse of soil.

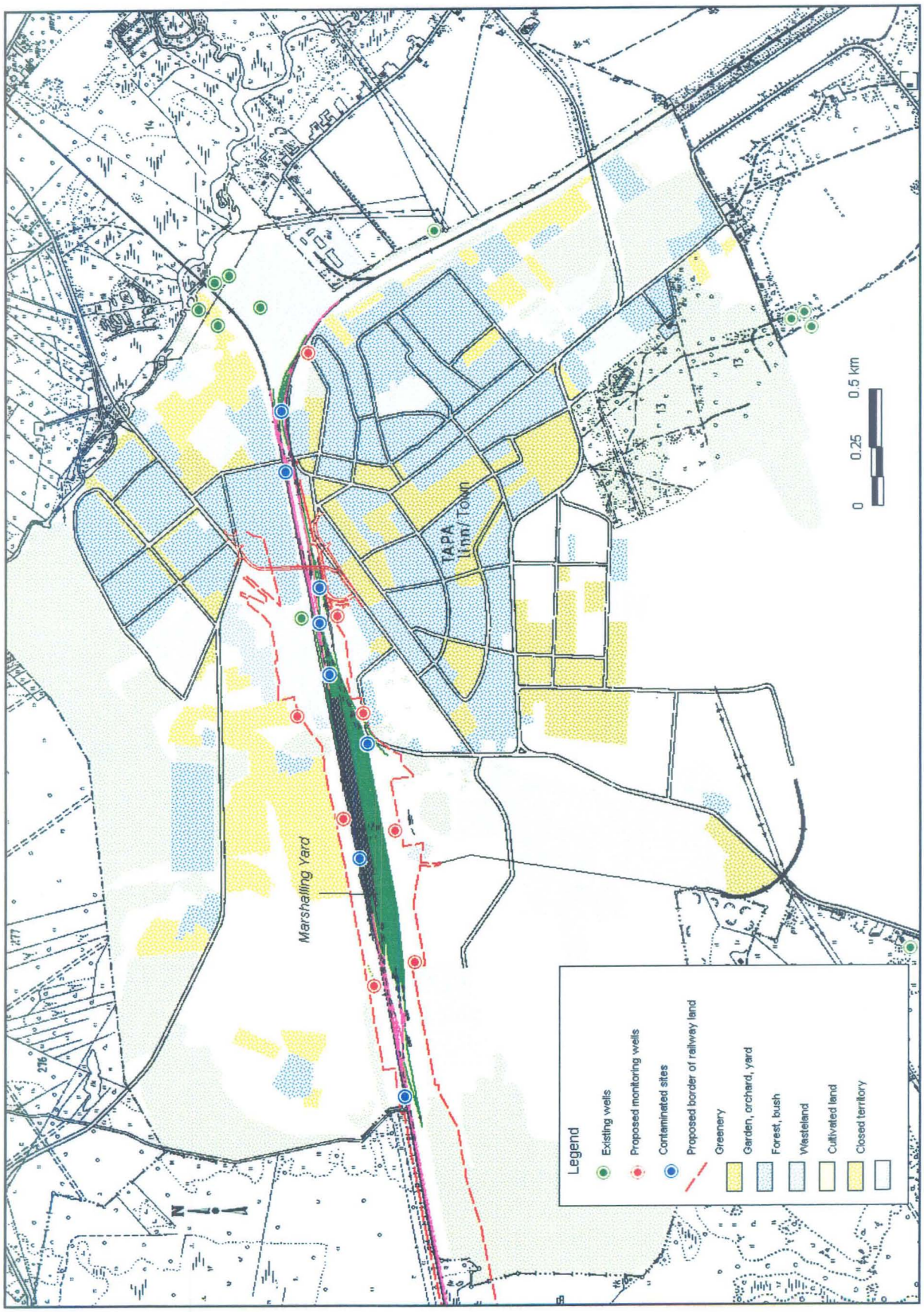
Appendix Table:

Appendix I	Estonian Railways Network
Appendix II	Project area
Appendix III	Connection of the project with the municipality area
Appendix IV	The Marshalling yard and the viaduct area
Appendix V	Summary of the EIA for the viaduct
Appendix VI	Climatic data
Appendix VII	Geological sections
Appendix VIII	Location of soil investigations (through existing wells)
Appendix IX	Location of high polluted area
Appendix X	Location of the wells for water monitoring
Appendix XI	Location of dumping areas
Appendix XII	Location of planned ditches
Photograph Appendix	

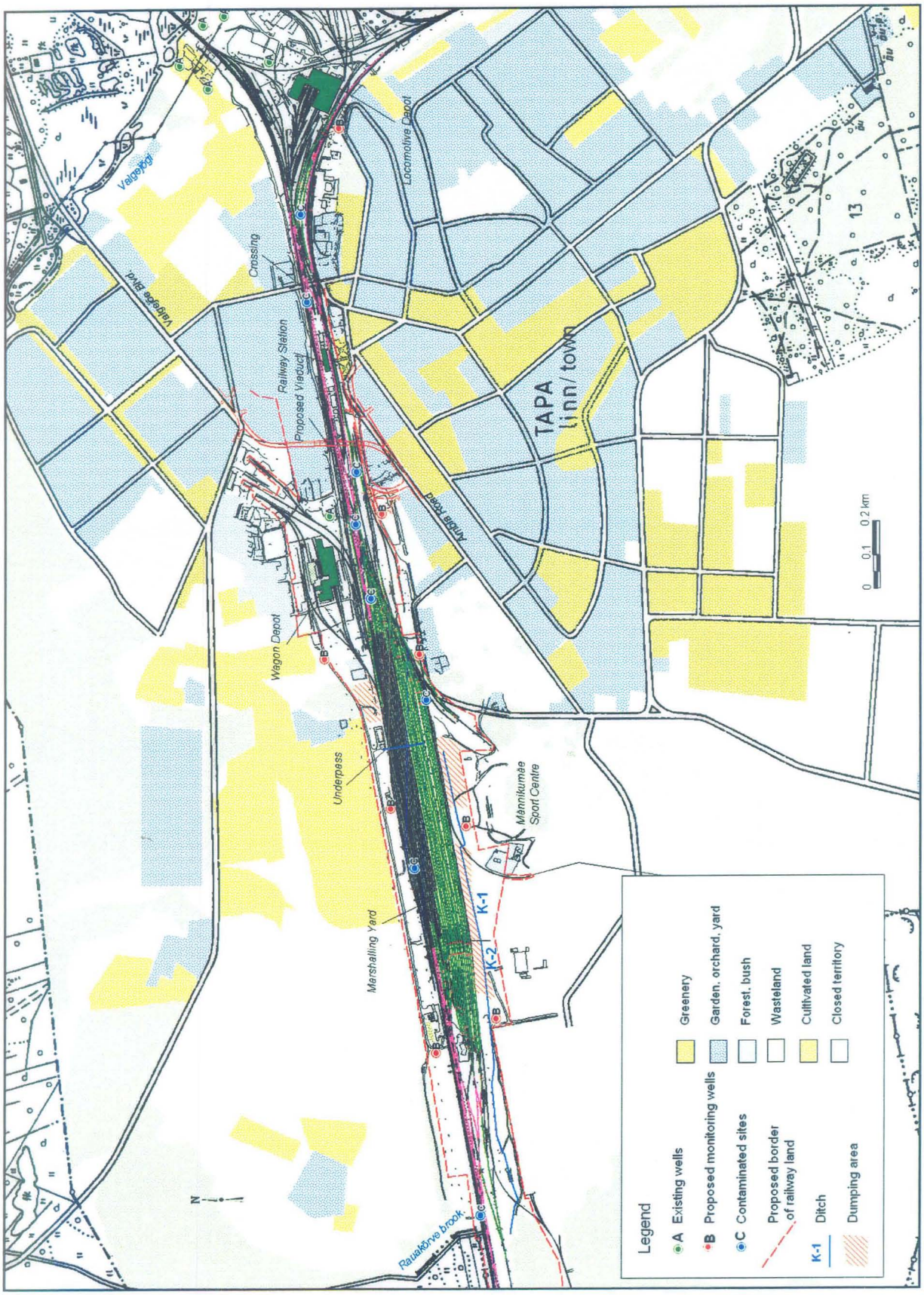
Appendix I : Estonian Railways Network



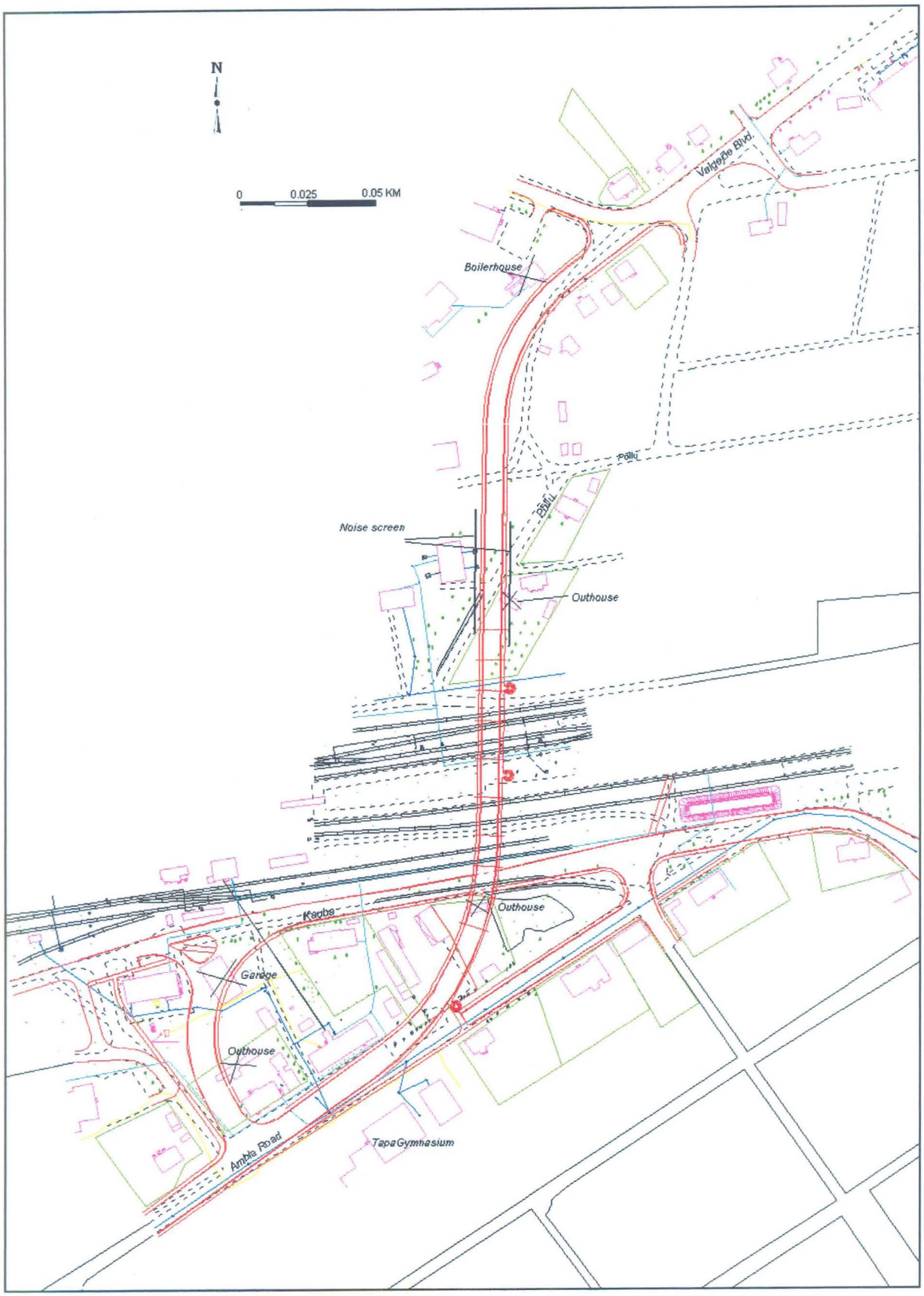
Appendix II : Project area



Appendix III : Connection of the project with the municipality area



Appendix IV : The Marshalling yard and the viaduct area



Appendix V : summary of the Environmental Impact Assessment for the viaduct.

DETAIL PLANNING OF TERRITORY BY VIADUCT BETWEEN AMBLA ROAD AND VALGEJÕE BOULEVARD AT TAPA TOWN

ENVIRONMENTAL IMPACT ASSESSMENT REPORT Tallinn, 1999

Client: Tapa Town Government
Contractor: Maves Ltd

1. Proposed Activity

Northern and southern part of Tapa Town are connected via one railway crossing, which is at the same level with railway and therefore often closed due to the scheduled trains and manoeuvring of carriages. Tapa Town Government initiated the detail planning of the viaduct in October 1997, detail planning was elaborated by AS EA Reng.

Detail planning elaboration preconditions were the finding of new connection with as little demolition works and relocation of communications as possible, redirection of transit traffic from the centre of the town. Different options were considered during the selection of the location.

Proposed project associated with the construction of a viaduct in the centre of Tapa Town (7500 inhabitants) to improve everyday and hinterland traffic connection between northern and southern part of Tapa Town.

Total length of the designed viaduct is ca 430 m, width 14 m and height between the lower constructions of the viaduct and the rails at the main railways at least 7,3 m.

2. Object and Scope of the EIA

The object of the environmental impact assessment was the *Detail Planning of Territory by Viaduct Between Ambla Road and Valgejõe Boulevard at Tapa Town.* The goal of the expertise was the assessment of environmental impacts, associated with the location and construction of the viaduct.

2.1 Scope

Detail planning comprises the territory of 6 hectares, covering the designed viaduct, access roads and the area of the viaduct and Ambla Road crossing. The negative impacts and ways of their mitigation will be considered.

The EIA covered the planned activities in a broader sense, since the new connection affects the traffic arrangement and environmental condition of entire Tapa Town (7 500 inhabitants) and it's hinterland.

2.2 Stakeholders

The interested parties are inhabitants of Tapa Town, Tapa Municipality, Estonian Railway, and people living near by proposed viaduct,

2.3 Public hearing

According the *Act of Planning and Construction* and *Regulation for conducting EIA in Estonia* there were two public hearings on January 18, 1999 and February 10, 1999 at Tapa. The relevant information was distributed by local newspaper.

2.4 Legal Framework

The legal basis for EIA was the relevant Estonian regulatory acts.

3. Description of Physical and Social Features

3.1 Geology and Hydrogeology

Tapa Town and proposed viaduct are located on the flat area in northern part of Estonia. Absolute elevation is 93 m on the area of proposed viaduct. Tapa Town and viaduct section are located on the outcrop of limestone. Topsoil, covering the limestone is relatively thin - 1–2 m - backfill, sandy loam- and clay loam moraine. Groundwater table is at 3-9 m depth from the ground, but sometimes at 0,5 m depth from ground.

3.2 Climatic conditions

Average air temperature in February is - 7°C. Southern winds are govering in the region.

3.3 Burnishing

As a whole on the area of the proposed viaduct and traffic junction are about 55 bigger trees. There are no protected areas or rare species on the viaduct area.

3.4 Social environment

On the immediate nearby on the proposed viaduct are living about 50 inhabitants. Tapa Gymnasium (650 pupils) is situated close to the southern part of viaduct and traffic junction. There is also the departments and communication centre of Estonian Railway.

4. Alternatives of Proposed Activity and Environmental Impacts

The following alternative locations of new connection were studied:

Alternative 1. Viaduct location, as foreseen in the detail planning
Alternative 2. Viaduct location eastwards from the existing railway crossing
Alternative 3. Tunnel instead of viaduct at the location, foreseen in the detail planning
Alternative 4. 0-alternative, designed activities are impossible to execute.

The following aspects are considered during the analyse of alternatives:

- ownership of the land
- noise and air pollution
- feasibility and cost of the construction
- traffic safety

- demolition of buildings
- burnishing
- social aspects

Analyse of the above mentioned alternatives proved, that the best solution is the establishment of viaduct at the territory, comprised by the detail planning. There is no reason to use 0-alternative. The advantages of the alternative 1 are following:

- fulfilling the conditions of Tapa Town general planning and the connection can be used in everyday traffic by both cars and pedestrians, and transit traffic
- investments and running costs are less compare with other alternatives
- less extensive negative environmental and social impacts and mitigation possibilities of those

4.1 Environmental impacts

Environmental impacts associated with the establishment of the viaduct at the territory, comprised by the detail planning, are following:

- significant environmental impact on the inhabitants of three dwelling houses viaduct embankment with 5 m height is located at 5 – 7 m distance from the houses;
  - increasing of noise level;
  - visual impact;
  - access is complicated;
  - market value of the houses at the immediate vicinity of the viaduct most probably decreases;
- increasing of noise and air pollution at Valgejõe Boulevard,
- decreasing of high burnishing importance at the detail planning territory;
- need for contaminated soil processing increases the cost of construction works;
- demolition of some outhouses and garage
- demolition of unused small boiler house with fuel tanks
- impacts during preparatory and earth works of the viaduct
- railway and car traffic are disturbed during the construction works of the viaduct

5. Mitigation Measures

The mitigation measures are following:

- relocation of the access road from Valgejõe Blvd. (northern part) to the viaduct little bit westwards; to mitigate disturbances and the shadowing impact of the viaduct immediate vicinity of viaduct embankment
- to construct transparent noise screens on the northern part of viaduct
- environmentally sound demolition of old boiler house and treatment of contaminated soil and fuel tanks
- restoring of the high burnishing, using pre-grown trees with baled roots
- to compensate or construct new outhouses and garage

The amount and specification of preparatory works, earth works and construction of viaduct will be defined during the viaduct construction design, but overall recommendations are following:

- creation the environmentally sound plan of supervision for every phase of project execution
- visual inspection and analyses of soil contamination during earth works

Further using of the old railway crossing by the pedestrians and securing of traffic safety there must be studied separately.

6. Conclusions

The establishment of the viaduct at the location, foreseen in the detail planning improves the environmental condition of Tapa Town as a whole. Location of the viaduct, connecting Ambla Road and Valgejõe Boulevard, is practically the only option.

Traffic load at the centre of Tapa Town, railway and bus station decreases and normal connection of everyday traffic between northern and southern parts of the town will be secured.

Most of environmental impacts are connected with execution of proposed activity.

Appendix VI : Climatic Data

Air temperature

Monthly and annual averages

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
-6,5	-6,9	-3,9	2,8	9,2	13,8	16,6	14,8	10,2	4,7	-0,2	-4,1	4,2

Absolute minimum temperatures

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
-38	-39	-30	-22	-6	-3	1	0	6	-4	-15	-23	-38

Absolute maximum temperatures

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
7	8	15	25	30	32	33	32	27	21	12	9	33

Precipitation

Monthly and annual averages

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XI-III	IV-X	Year
45	36	33	36	55	65	83	96	72	68	64	59	237	475	712

Winds

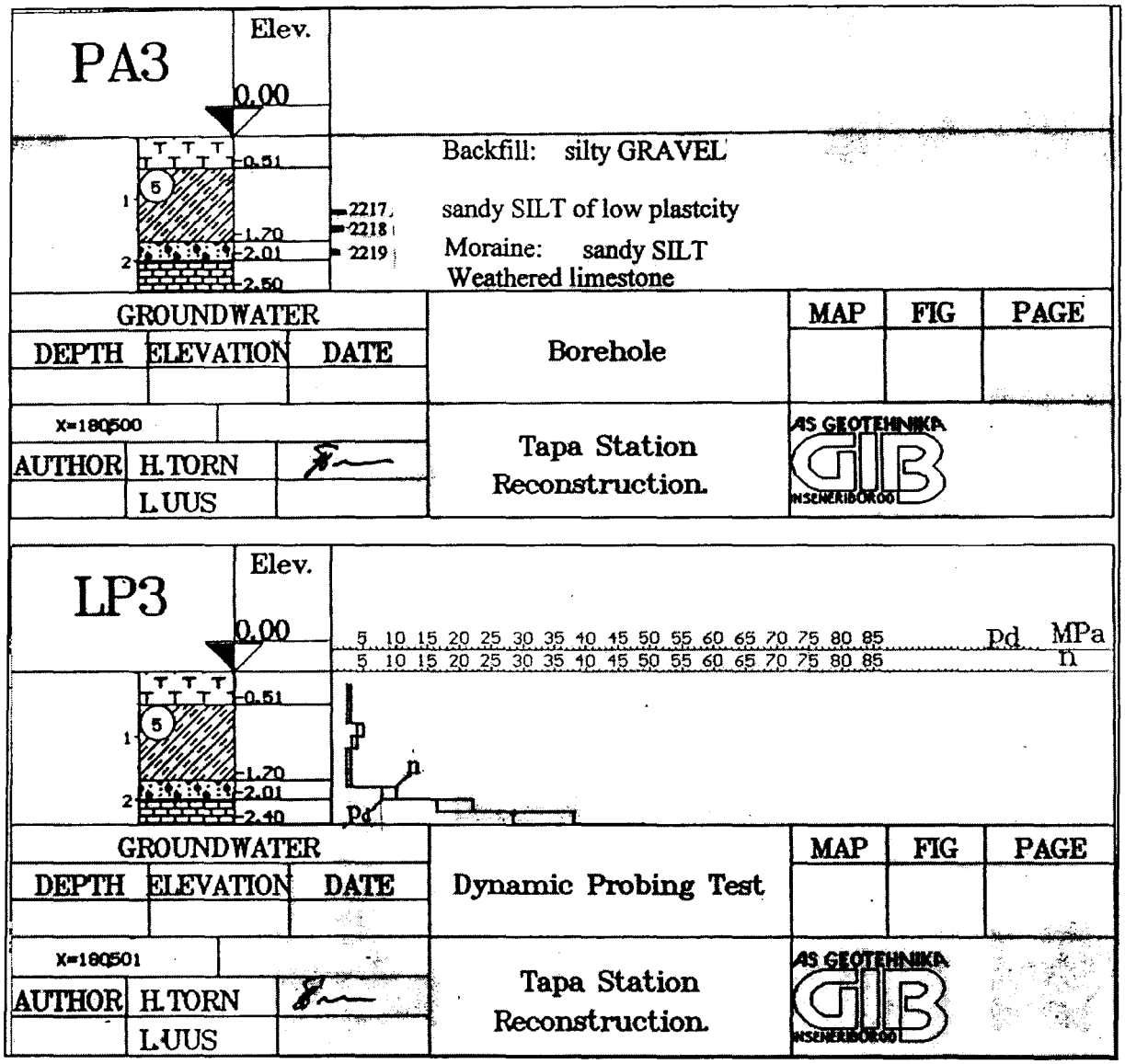
Occurrence frequency (%)

Month	N	NE	E	SE	S	SW	W	NW	Calm
I	6	7	6	12	21	27	12	9	4
II	7	9	6	17	19	23	11	8	6
III	6	11	8	12	17	23	15	8	6
IV	5	13	10	12	20	20	12	8	6
V	7	17	12	10	12	20	12	10	5
VI	7	10	6	9	15	24	18	11	4
VII	5	12	9	10	14	23	17	10	6
VIII	4	8	7	11	20	27	14	9	6
IX	6	6	6	10	22	27	15	8	6
X	4	4	7	10	23	31	13	8	5
XI	6	4	10	15	24	24	10	7	4
XII	4	5	5	14	27	28	11	6	4
Year	6	9	8	12	19	25	13	8	5

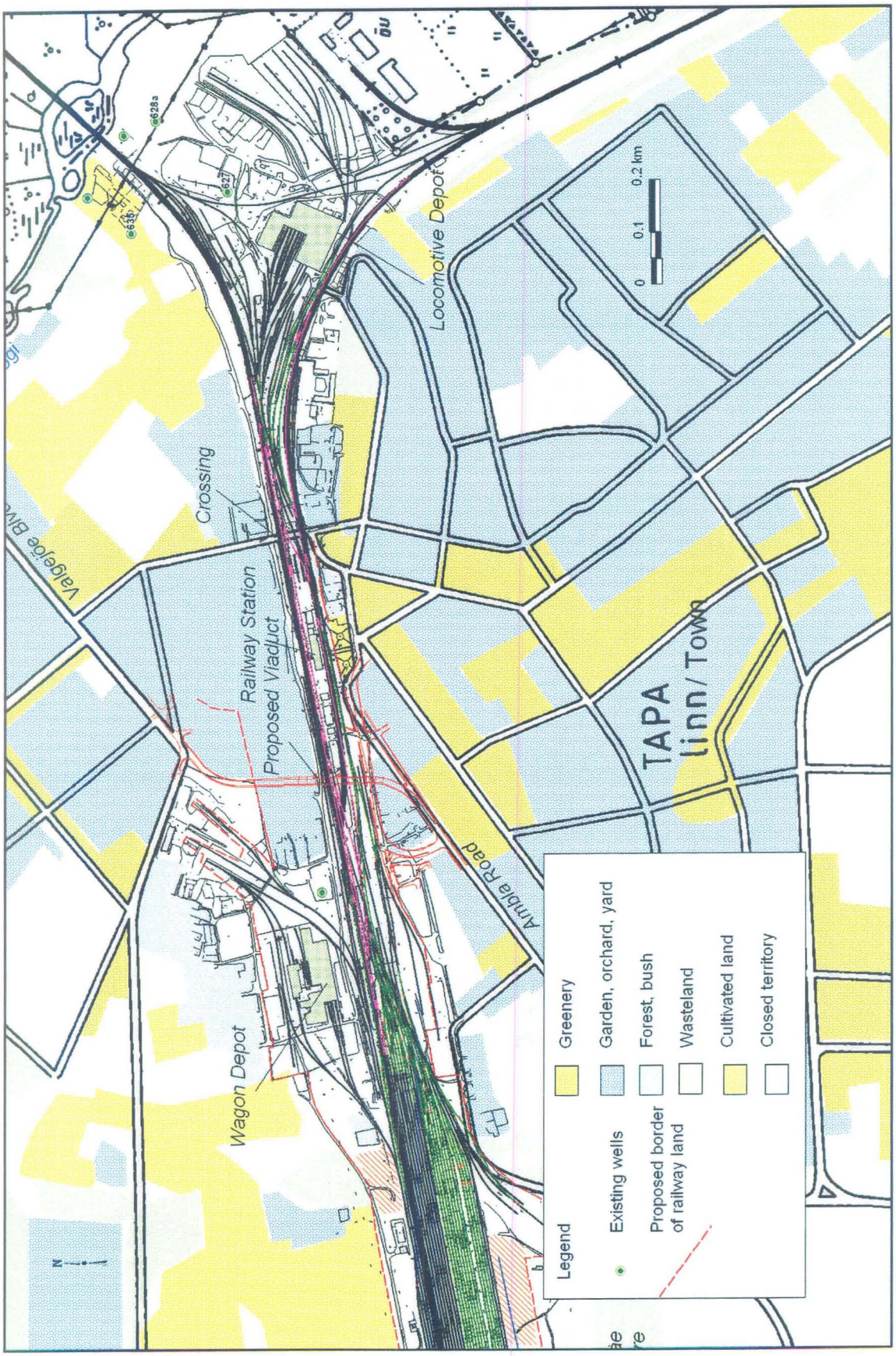
Average wind velocity

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
3,8	3,4	3,2	3,3	3,3	3,3	2,8	2,6	2,8	3,5	3,6	3,6	3,3

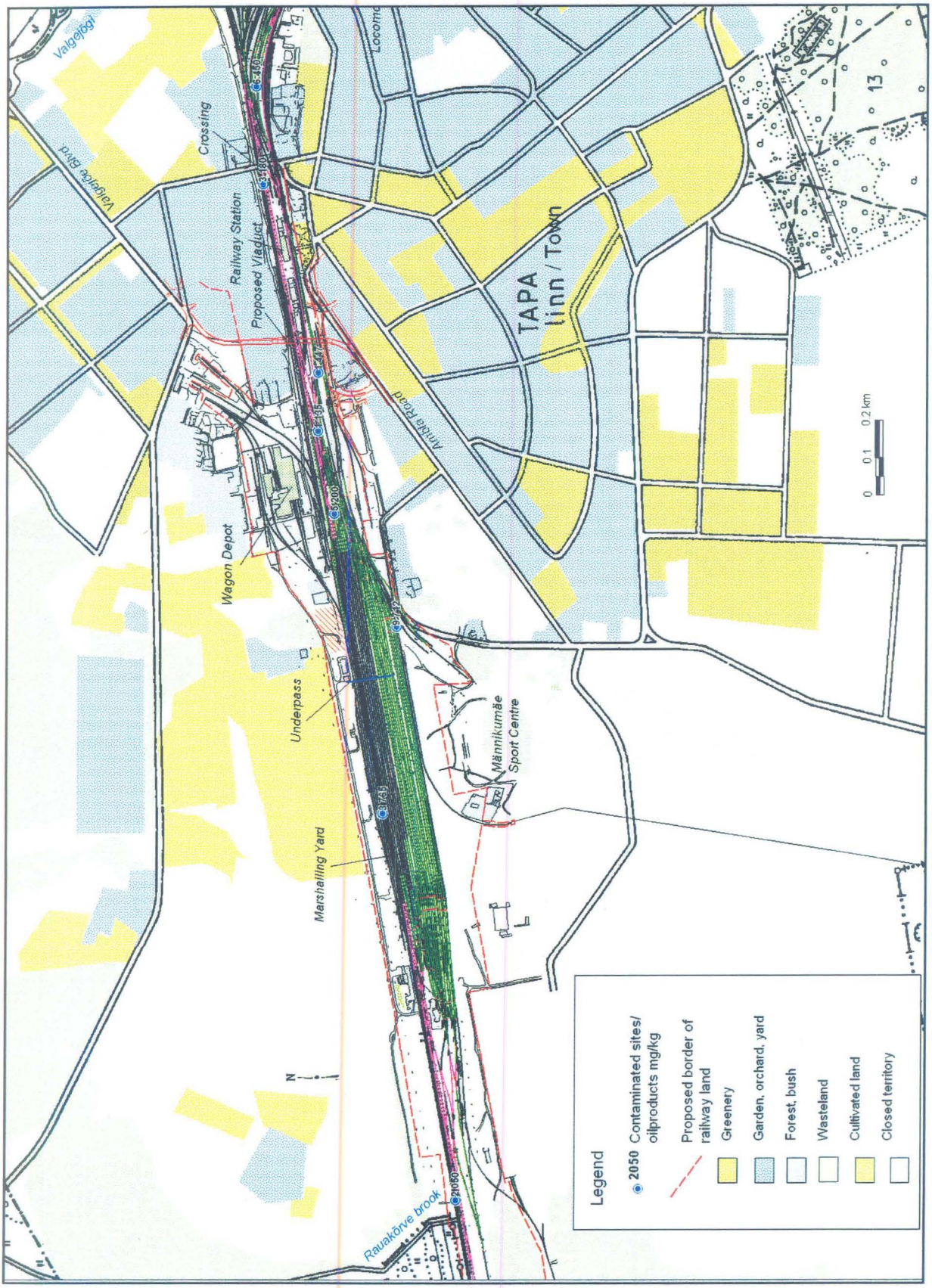
Appendix VII : Geological sections



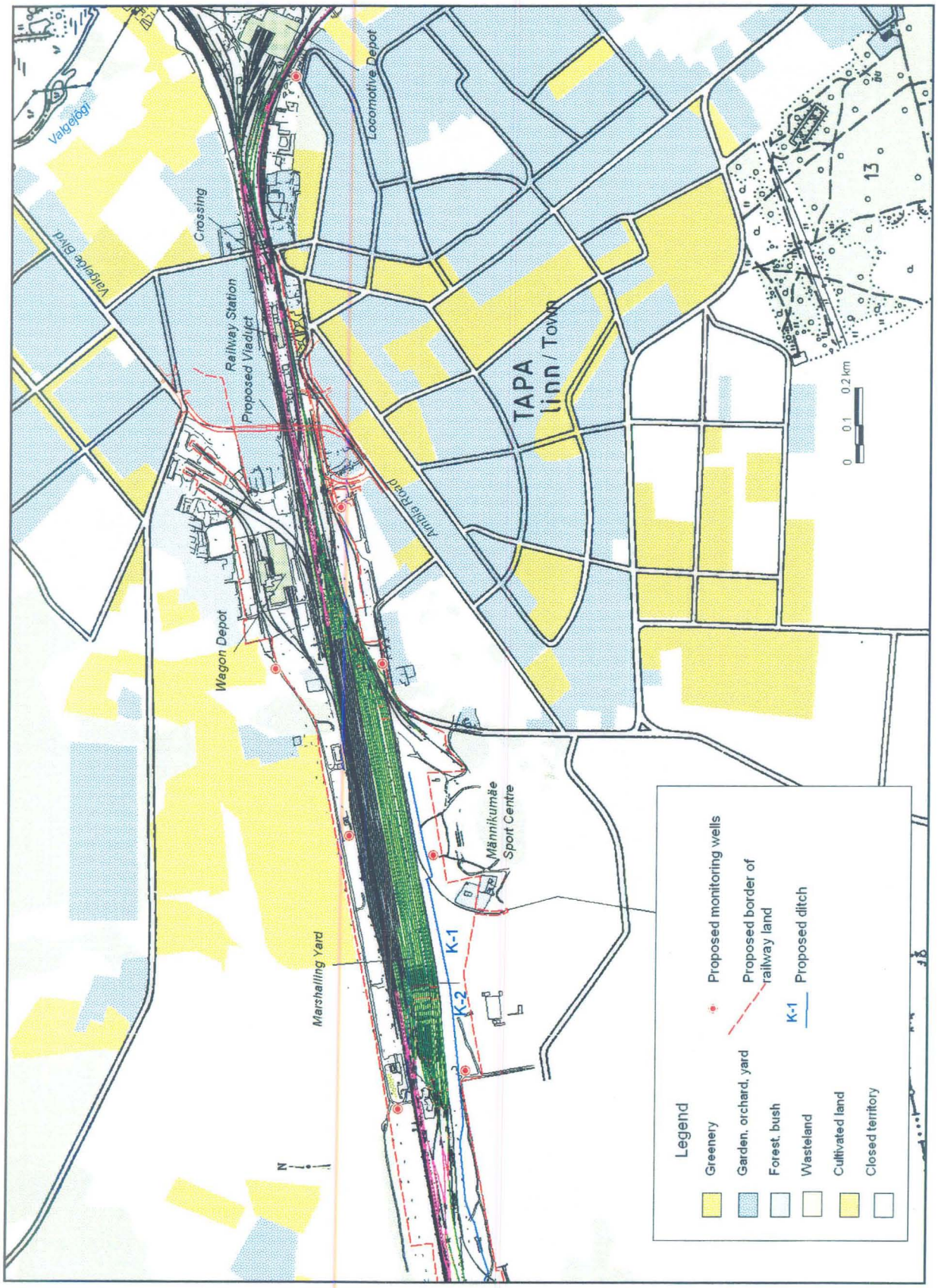
Appendix VIII : Location of soil investigations (through existing wells)



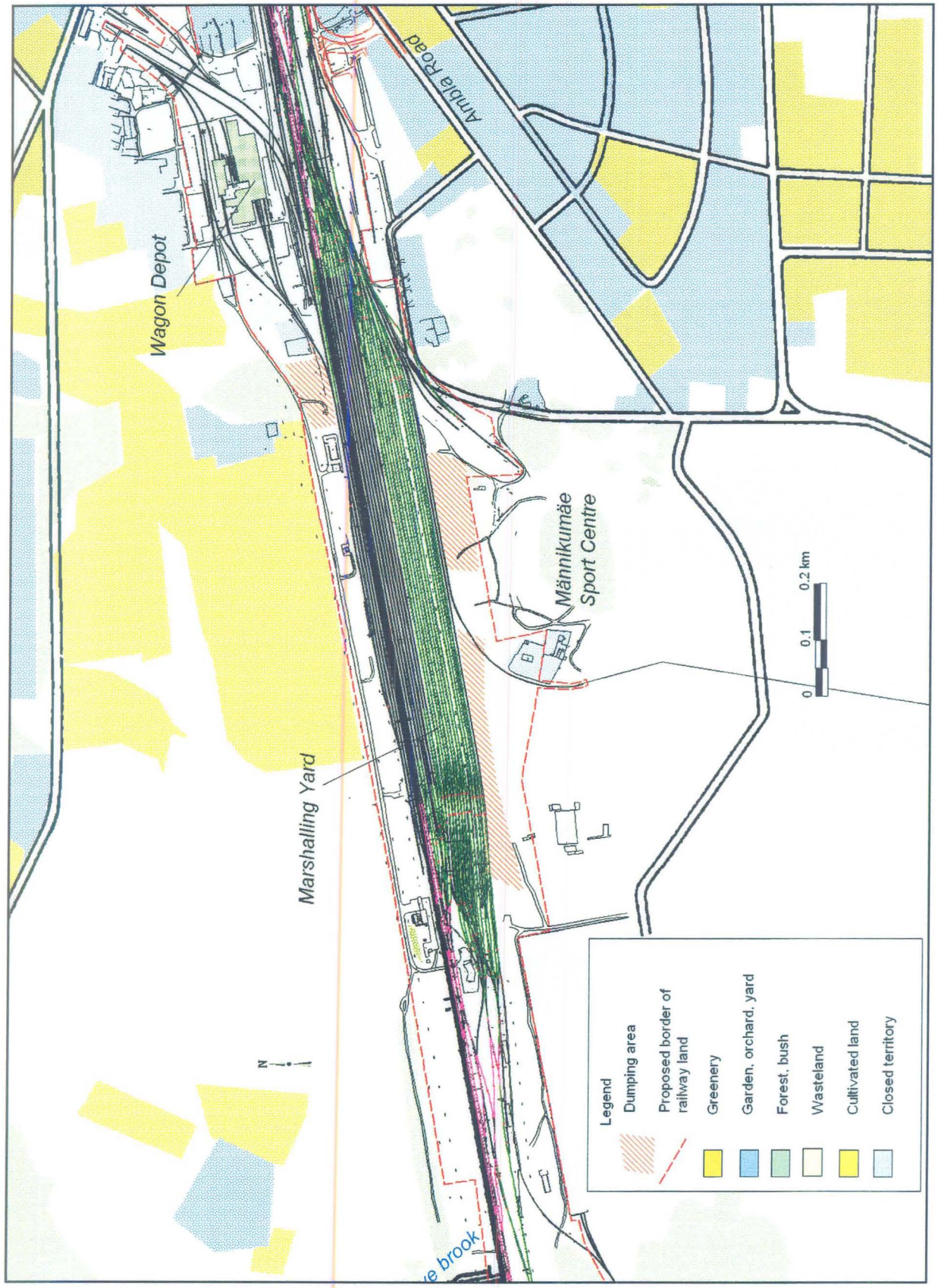
Appendix IX : Location of high polluted area



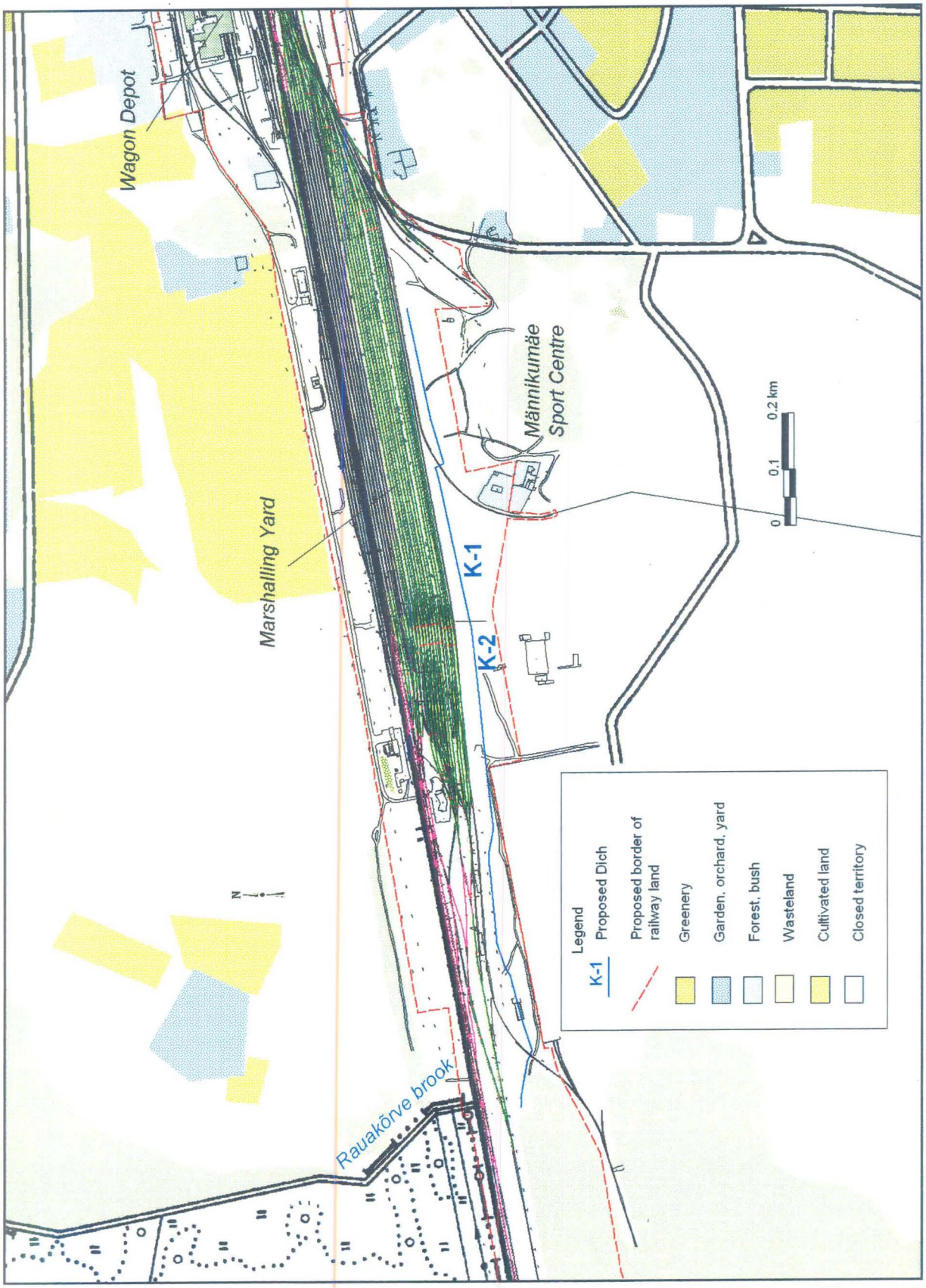
Appendix X : Location of the wells for water monitoring



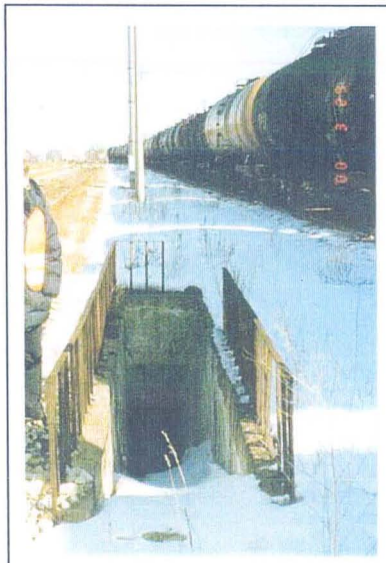
Appendix XI :Location of dumping areas



Appendix XII :Location of planned ditches



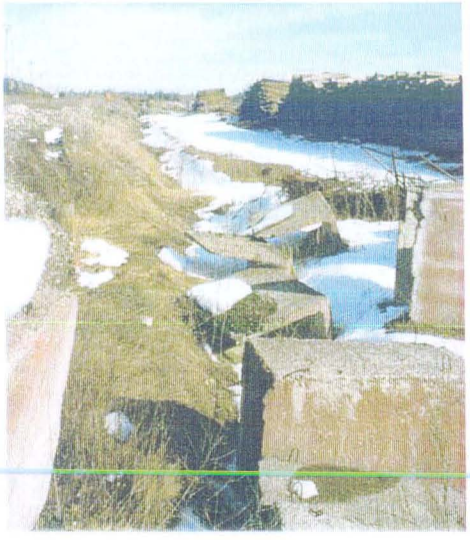
PK 180 south-eastern view



Entrance of the Technical Underpass crossing the marshalling yard

PK 179 -eastern view

PK 182 – tapa Station - eastern view



PK 180.5 – southern view _ dumping area

PK 180.5 – southern view _ dumping area

PK 180.5 –general view of the marshalling yard

PK 181– general view of the tracks

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Environmental Impact Assessment	Final report - version a
	July 2000