

Optimization of the Benešov – Strančice railway section

The construction “Optimization of the track Benešov u Prahy – Strančice“ is one of a set of construction works on modernizing the transit railway corridor IV, which includes the track section from the state border with Federal Republic of Germany via Praha, Tábor to České Budějovice and on to the border with Austria.

Purpose of the construction is to put the railway track and the related buildings and equipment into technical state which corresponds to European parameters and standards. These parameters result from international agreements AGC and AGTC which the Czech Republic signed up to.

From the point of the international passenger and freight transport the track section Praha – Tábor – České Budějovice represents an important link with Austria and other states of South Europe. In domestic long-distance transport the track ensures connection of important population centers of the regions of Central and South Bohemia. In passenger traffic the track plays a significant role in connecting the capital city of Praha.

According to the order conditions, the railway track is proposed for optimization with the emphasis on the point of travel smoothness for rail vehicles with tilting superstructure.

According to Act no. 244/1992 of the Code, documentation was elaborated on assessment of the impact of the construction on the environment for the section of the railway corridor IV from Benešov u Prahy (including) – Praha Hostivař (excluding), whose part is also the construction “Optimizing of the track Benešov u Prahy – Strančice“. On the basis of this documentation an opinion in favor of the construction work was issued by the Ministry of Environment act.no.: NM700/3348/6100/OPVŽP/02 e.o., according to §11 of the Act of Czech National Council no.244/1992 of the Code.

ZONING APPROVAL:

The construction site occurs in the territory of Central Bohemia region. It applies to cadastral districts of Benešov, Žiňany, Mrač, Čerčany, Čtyřkoly, Senohraby, Pětihosty, Mirošovice, Božkov, Mnichovice u Říčan, Všetary u Říčan, Strančice, and at branch lines the districts of Myslíč, Struhařov u Benešova, Roubíčková Lhota, Jemniště, Postupice, Poříčí n. S., Bukovany, Pecerady, Týnec n.S., Lštění, Přestavlky, Vranov u Čerčan, Hvězdonice.

As a part of the documentation elaboration for zoning approval the construction work was divided into two parts. Zoning approval for construction „ČD DDC, Optimizing of the track Benešov u Prahy - Strančice“ – part I, section Benešov u Prahy - Čerčany was issued by Building Authority in Benešov on 27.5.2004 under the act.no.: 3411/2/2004/P, zoning approval for construction Optimizing of the track Benešov u Prahy - Strančice“ – part II, section Čerčany – Strančice, was issued by Building Authority in Mnichovice on 3.9.2004 under the act.no.148/04.

BUILDING PERMIT:

The next phase is a building permit, which is issued based on the approved design documentation; this documentation was elaborated in 09/2005. It clearly details the technical solution as well as meeting the requirements on the environment protection (monitoring, protective measures, etc.). The building permit was issued by Railway Authority on 7.8.2006.

SCOPE AND SUBJECT OF THE CONSTRUCTION:

A track optimizing is a set of measures which allow for reaching the track load class D4 UIC with the speed up to 120 km/h, introducing transport capacity for loading gauge UIC GC and modifications for the use of the maximum track speed, including enabling the operation of trains with tilting superstructures. In other words, the construction includes activities ranging from lesser-scope reconstructions to reconstruction of the whole objects, or possibly construction of completely new objects and technological equipment. The aim of the prepared construction is to improve the railway track parameters, to modernize the building and technological parts and to increase the speed and reliability of railway transport.

The construction "Optimizing the track Benešov u Prahy - Strančice" solves modifications to the existing railway track. For this reason it is located mainly on the railway property of Správa železniční dopravní cesty (Railway Transport Route Administration), s.o. and České dráhy (Czech Railways) a.s.. The construction beginning is at km 133.270 before the railway station Benešov u Prahy, direction from České Budějovice, the construction end is at km 157.220 (new stationing) before the railway station Strančice.

Construction concept:

Existing state:

The existing railway track is double-line along the whole section. It has been electrified since 1968 with direct current traction 3 kV. At present the track is operated at speeds 80 - 90 km/h with local limitations at 50 km/h at Praha station track neck of the railway station Benešov u Prahy, and at 50 km/h in the railway station of Čerčany.

Proposed state:

The optimizing relates to all professions linked to the railway track. In relation to the complex of activities connected with the reconstruction of the track itself the parameters of other facilities will improve with which railway transport customers come into contact. The scope, contents and technical solution of the construction draws on the previous state of the documentation on which the zoning approval was issued.

The key part of the construction contents lies in the reconstruction of the railway track superstructure, substructure, made-up structures, platforms, traction lines, communication and interlocking equipment and power current along the whole length of the railway track inter-station sections. Important parts of the construction are structures eliminating the impact of noise from the railway track operation on the neighboring environment.

Construction capacity data

Capacity data	Project 2005
<u>Track velocity</u> for classical trains for trains with tilting cases	75 to 100 kmh ⁻¹ 95 to 125 kmh ⁻¹
<u>Rail establishment</u> UIC 60 new attached without bearing plates. S 49 used with fixed attachment	46 921 m 5 965 m
<u>Rail switch establishment</u> UIC 60 new on concrete sleepers S 49 new (used with priority)	30 pcs 26 pcs

Capacity data	Project 2005
<u>Modification of level crossings</u> Reconstruction / removing	3 / 0 pcs
<u>Railway track substructure improvement</u> - total	53 km
<u>Island platform at a station</u> new reconstructed	1 x 220 m 1 x 286 m 1 x 300 m 1 x 200 m 1 x 320 m
<u>Outside platform at station</u> reconstructed	1 x 200 m 1 x 50 m 1 x 200 m
<u>Outside platform at train stop</u> reconstructed	10 x 200 m
<u>Railway bridges, passes and subways</u> railway bridges pedestrian bridges signal booms signal footbridges passes retaining walls supporting walls road-bridge	46 pcs 1 pc 1 pc 2 pcs 41 pcs 12 pcs 4 pcs 1 pc
<u>Anti-noise measures</u> Noise barriers	17,842 m
<u>Station interlocking equipment</u> Electronic interlocking frames	3
<u>Track interlocking equipment</u> Electronic automatic block Automatic clearing block mechanism	along the whole construction length 3 + 1 track sections
<u>Crossing interlocking equipment</u> modification	8 (branch tracks) 2 (main track)
<u>TV construction</u> whole length of double track	60.7 km
<u>Labor force savings</u>	64 persons

Capacity data	Project 2005
<u>Construction scope</u> New stationing Section length	133.234 637 – 157.220 23.950 km
<u>Power current technology</u> Reconstruction of traction transformer station and substation	1 object

Description of the area of interest

The area of interest lies in the bio-region of Posázaví.

POSITION

This bio-region lies in the southeast of Central Bohemia, it reaches to the eastern part of geomorphologic complex of Benešovská pahorkatina (hilly land) and to the northern promontories of the complexes of Vlašimská pahorkatina and Křemešnická vrchovina.

The bio-region is formed by upland on granite and gneiss along the incised valley of the Sázava River and its tributary streams. It is characterized with its poorer mesophile biota formed by acidophilic oak woods and secondarily also by flowering beech woods and oak-hornbeam woods. In the system by Zlatník it belongs to 4th beech vegetation level, in Sázava valley 3rd oak-beech vegetation level. Botanically most significant are tiny serpentine isles with the appearance of a number of species of exclave character. Atypical parts are transient areas towards the surrounding bika beech woods.

Today there are places with preserved fragments of oak-hornbeam woods and sporadically also larger beech complexes, but the cultivated pine and spruce woods prevail, and for dominating part there is arable land.

ROCKS AND RELIEF

Western part of the bio-region is geologically quite varied. For the main part there is Central Bohemian plutone represented by acidic granites and slightly more basic granodiorites to quartz diorites (tonalites), smaller areas in the center of the territory are formed by basic gabrodiorites. These rocks weather in a sand way.

The bio-region has a character of monotonous hilly land; it fluently joins the bio-region of Slapy. The valley of the Sázava is at places recognized for the valley phenomenon, by Kralovice there is slightly developed serpentine phenomenon. Peak phenomenon is indicated at Velký Blaník. Not very distinctive rock formations are bound mainly to the slopes of incised valleys.

The relief has a character of articulate hilly land with altitude range of 75 – 150 m. In this hilly land, however, there are deeply incised valleys of the Sázava River and its tributary streams. Here the relief is more articulate; it has a character of flat upland with altitude range 150 – 200 m, at places up to 240 m. The bio-region typical altitude is 320 – 540 m.

CLIMATE

The whole area, namely its northern part, is relatively warm due to the vicinity of Polabí and also humid due to the influence of position of the windward slope of Vysočina (Highland). Precipitation amount is significantly higher than around Praha and in the bio-region of Slapy. Typically, the temperatures drop from northwest to southeast and precipitation levels slightly

rise in the same direction. The warmest part of the bio-region is the valley of the Sázava River (Prosečnice 8 °C) and the northern edge of the bio-region of Český Brod. According to Quitt, these areas belong to the warmest mildly warm area MT 11. Nevertheless, the bio-region is dominated by mildly warm area MT 10. Higher situated places belong to areas MT 9 and MT 7. Climate is locally influenced in the valley of the Sázava River.

SOILS

A characteristic quality of an overwhelming majority of soil substrates from the area is a lack of CaCO₃. In the northwestern part and in wider surroundings of the Sázava River valley there is predominance of more or less saturated typical cambial-soil. In the Sázava River valley there is a varied range of rankers at minor areas.

BIOTA

The bio-region lies in mesophyte in phytogeographic district 41, Střední Povltaví, in phytogeographic sub-district 64b, the plateau of Jevany and in southern part of phytogeographic sub-district 64c, Černý Kostelec perm.

Vegetation stages (Skalický): supracoline (to submontaneous).

Potentially there are mainly acidophilic oak woods (*Genisto germanicae-Quercion*), with firs represented in the bio-region eastern part. On perm in the eastern part and on the southern edge oriented towards the Sázava River valley there are oak-hornbeam groves (*Melampyro nemorosi-Carpinetum*).

Natural alternative vegetation of damp meadows is formed by vegetation of *Calthion* genus. Flora is quite varied, with certain bault elements, as an exception there are also exclave elements. Prevailing are Central European elements, some of them have sub-Atlantic tones.

The whole area of interest belongs to the basin of the Sázava River. Recipient - Vltava at km 78.514. The total area of the Sázava River basin is 3 431.74km².

The designed construction crosses the following streams: Baba, Benešovský potok, Medunský and Čerčanský potok, the Sázava, Zaječický potok and Kunický potok.

The area of interest of the construction passes flood territory of the Sázava River and Benešovský potok.

From the hydro geological point, the area of interest is classified as a part of region no.632, Crystallinics in the basin of the Central Vltava. In the area there is water bearing of porous and fracture type. From the point of underground water protection this construction does not come into contact with any water source and it does not cross any protective area of a water source used for public supply of drinking water.

Natura 2000 is a system of locations protecting the most endangered species of plants, animals and natural habitats (for example, marshlands, rocky steppes or mountain spruce forests, etc.) in territory of the EU.

The most important EU legal regulations in the area of environment protection are the following:

- Directive of the Council 79/409/EHS from 2 April 1979, on protection of wild birds (abbr., directive on birds).
- Directive of the Council 92/43/EHS from 21 May 1992, on protection of natural habitats, wild animals and wild-growing plants (abbr. Regulation on habitats).

By 22 December 2004 the government of the Czech Republic set a list of locations significant in the European context, government directive no.132.

The area of interest contains a location proposed as a part of NATURA 2000:

Sázava – Týnec

Location code:	CZ0213068
Location name:	Sázava - Týnec
Bio-geographical territory:	continental
Location area:	398.04 ha
Proposed concept of especially protected area:	PP

Species:

(Rhodeus sericeus)

(Unio crassus)

Impact on the environment

IMPACT ON THE ENVIRONMENT DURING CONSTRUCTION

Impact on population

In the construction phase, negative impact on the population can potentially occur mainly in the form of increased emission and noise load.

Impact on the air

Point sources, areal sources

During the construction there will probably be higher concentrations of pollutants in the air from point, line as well as areal sources.

The technology of recycling center can be regarded as the main point and areal source of pollution. There are solid emissions of natural, chemically not modified materials of comparatively large dimensions. Dispersion into more distant surroundings is not expected.

The recycling base is designed at places which have already been affected by human activity. The recycling base also meets the condition of an easy transport access.

A model emission study has been elaborated in order to assess the emission load from the recycling base operation. From the above mentioned model calculations it can be derived that the movement of trucks will not bring a significant increase of noise load.

Other major sources of pollution are construction and manipulation areas.

Line sources

A prevalent majority of construction material and waste (90%) will be transported on rail. A lesser part of material and waste (from the manipulation and recycling areas) will be transported on trucks.

A model air study has been elaborated in order to assess the emission load. Based on the result analysis it can be expected that emission load on population will not be significantly increased during the construction phase.

In order to reduce emissions and dust production it is necessary to respect the following measures:

- During construction phase the transport of construction materials will be preferred on rail.
- Dust formation will be minimized by trapping dust at the place of its origin (should the technical and organizational conditions allow for it), secondary dust formation will be

reduced by regular sufficient sprinkling or misting the construction site and the roads used for construction work.

Noise exposure

The main source of noise in the construction phase will be the operation of recycling lines and the transport of material and waste on roads.

In order to reduce noise level while carrying out noise producing work in the vicinity of a protected residential area we recommend at the mentioned locations the following measures:

- All noisy construction work will be carried out only at day, from ca 8 to 16 o'clock, other suitable work can be carried out in the period from 7 to 19 o'clock).
- Possible requirements on night work must be consulted in advance with hygienic authorities, which set forth further conditions.
- To choose machines with guaranteed lower noise level
- To enclose stationary construction machines (noise sources) with a mobile noise-reducing wall with absorbing effect (*reduction by ca 4 - 8 dB(A)*).
- To combine work with high noise level with work of low noise level (reduction of equival. value)
- To place machines as far from residential areas as possible
- To shorten operation of strong noise sources in one day, to divide noisy work into more days with shorter time periods (reduction of equival. value).
- To organize building site traffic outside residential areas where possible.
- To inform the affected inhabitants on planned activities in order to allow them to organize the corresponding day regime.
- To install mobile anti-noise walls during work in municipalities where possible

If the terms of the proposed measures are met, the noise level of some machines (mainly stationary – circular saw, compressor) can be reduced as far as by 12 - 20 dB (A). Nevertheless, these values can not be uniquely guaranteed, since they depend on many other factors. With mobile machines the reduction of their noise level by technical means is very difficult (for example, trucks, excavators, cranes, etc.) Noise reduction here can be achieved only by organizational means.

Vibrations

In order to assess the existing level of vibrations a vibration measurement has been made. The scope of this measurement was set based on a consultation at Regional Hygienic Station of Central Bohemia region. All the measured vibration levels meet the permitted limits, therefore no anti-vibration measures are proposed.

Impacts on water

In the section of the railway corridor subject to evaluation, no significant changes in routing have been realized. From the point of view of seriousness of impacts on the respected area's drainage character, this is considered to be of a zero impact, and from the point of view of their importance, it is expected to have an insignificant impact.

The project as such respects the existing permanent as well as intermittent watercourses and their crossing is realized by means of bridges and culverts. With respect to the aforementioned

realization, it is not possible to expect record-relevant changes in the flow rate of the respective watercourses.

The project realization does not interfere with any water body either.

The most serious risk concerning the quality of underground water is represented by possible spillage or leakage of oil-based substances (oil, petrol, hydraulic oils, etc.) used in operation of the construction machinery.

Similar leakage can be found in most cases due to working indiscipline or insufficient training of employees.

In general, it is necessary to be very careful while handling dangerous substances along the whole railway section as sporadic sources of underground water (e.g. private wells) may exist there in various locations.

With increased care, it is necessary to carry out construction work in sections where the water sources protection zones concerning underground water are located in the immediate neighbourhood of the railway line.

Among recommendations in the submitted documentation, the following conditions are therefore expressed:

- in areas important from the point of view of water management – the water protection zones, no handling with or storage of oil-based substances shall be allowed, no machinery shall be allowed to be repaired (construction machinery or vehicles) and no parking of the aforementioned shall be allowed in such areas as well,
- for the purpose of parking and repairs of such machinery, a construction yard located outside the areas important from the point of view of water management – the water protection zones shall be established within the framework of the respective construction work,
- all machinery, which is supposed to be present in areas important from the point of view of water management – the water protection zones and in the facilities of the construction sites within the immediate neighbourhood of the respective watercourses, shall be in perfect operating condition; it will be necessary to check it, in particular, as far as possible spillage of oil-based substances is concerned – such a check shall be performed on a regular basis, always prior to the commencement of work in such areas,
- in the course of a short-term shutdown of the machinery in areas important from the point of view of water management – the water protection zones these shall be equipped with underlying leak-proof oil pans for interception of products subject to accidental leak,
- vehicles incoming to areas important from the point of view of water management – the water protection zones shall be equipped with necessary quantity of fuels only,
- in case of leakage of oil-based or other harmful substances, the contaminated soil shall be removed immediately and transported outside the respective area important from the point of view of water management – the water protection zone and deposited in location designed for such purposes,
- for the period of the construction work within the area important from the point of view of water management – the water protection zones, a specialist supervision concerning safety measures performed by employees of the respective water-supply organizations shall be provided.

Impact on soil

Appropriation of non-railway-owned areas, which is realized in some places, is of small extent and concerns a limited tract of land along the base of the rail. In most cases, such land is not used for agricultural production.

If such appropriation of areas belonging to the agricultural land resources – the respective top-soil and under-top-spoil layers shall be removed from the appropriated areas and subsequently utilized for reclamation of the temporarily appropriated constructional areas as well as the areas intended for handling activities.

The problem of soil contamination concerns in particular the process of optimization of the railway line while using necessary construction machinery (leakage of substances from the construction machinery or in the course of storage of fuels and process liquids) and loading of and disposal of unutilized construction materials processing as well as disposal of wastes resulting from the construction process.

Impacts on flora and fauna

From botanical point of view, no serious conflict is imminent in the course of the corridor construction. The determined sites of specially protected botanical species can be found outside the railway lay-out, however, in its immediate neighbourhood. No species included in the Red List of Flora of the Czech Republic are endangered within the respective areas. This concerns accidental occurrence in most cases.

The zoological research proved occurrence of specially protected animal species in some sites belonging to the respective area. However, such sites will be affected by the construction work within minimal extent. Along the whole section of the respective area, no site with occurrence of specially protected animal species was proved to be existing, which may disappear due to the construction while remedial measures may not be possible and the population of such species would be destroyed.

Within the whole respective area, no site was found where any significant conflict of interests with the state-organized protection of the environment could be expected.

Another one, no less serious problem, is the creation of a barrier in the landscape, which although lacking impenetrability of road systems of the express-road type in motor transport, creates, in particular while having a form of high railway embankments or deep cuts, a precondition for frequent collisions with migrating animals. With respect to the fact that this is not the case of new construction, no additional impact on creation of barriers in the landscape is expected.

Impacts on NATURA 2000 Site

The construction interferes with this EU-important site in the place of the existing bridge across the Sázava River. In the bridge, the existing load-bearing structure is to be replaced and the lower part of the construction is to be injected. The project documentation of the construction includes an expert opinion pursuant to section 45i of Act No. 114/1992 Coll. as amended with respect to the aforementioned site.

As it implies from the expert opinion, the decisive aspect for the existence of populations of the bitterling¹ and the riffleshell² is the preservation of the existing hydrological conditions, in particular, the quality of water in the river.

With respect to the extent of the catchment area and the size of the site, the author of the expert opinion evaluates the impact of the project as insignificant. In the expert opinion, the following measures aiming at minimization of impacts on the Natura 2000 site are proposed.

¹ *Rhodeus amarus* (transl. note)

² *Unio crassus* (transl. note)

- In case of necessary interference with the riverbed in the course of realization of the railway bridge across the Sázava River repair, it will be necessary to carry out exploration of the riverbed focused on the occurrence of an exact quantity of the riffleshell. Upon finding any individuals of aforementioned species during the exploration or in the course of the construction, their transfer to another place in the river performed by a qualified person will be necessary. During operation of the machinery in the riverbed in the course of the reconstruction of the bridge, it will be necessary to inspect for possible leakage of oil-based substances. After completion of the reconstruction of the bridge, the riverbed shall be restored.
- During realization of the reconstruction of the bridge across the Sázava River, no, even temporary barriers, preventing migration of animals shall be created.
- As far as the rainwater sewers in Čerčany and Benešov railway stations in the project documentation are concerned, it will be necessary to solve the possibility of the sewer closure as prevention measure in case of accidental leak. It is necessary to adhere to the proposed measures concerning the protection of water purity in areas of the construction site.

The above-mentioned measures are incorporated in the project documentation of the individual building sites.

Impacts on anthropogenic systems, their components and functions

Impacts on architectonic and archaeological monuments and other artefacts are not expected. If any unexpected discovery of objects valuable from cultural point of view, details of structures or archaeological findings are made, the procedure prescribed in the relevant legislation shall apply.

Impacts on cultural values of immaterial character are not expected.

Damage to and loss of objects of geological and palaeontological interest are not expected.

Wastes

The quantity of potential wastes is recorded in total for the overall construction site in terms of the individual operating and building sites, and a method of their utilization or removal has been designed. Variants of utilization and removal of wastes are designed on the basis of recommendations provided by the relevant bodies of the state administration – Municipal Office of Benešov. Recycling of building wastes is recommended to maximum possible extent.

IMPACTS ON THE ENVIRONMENT FOR THE PERIOD OF OPERATION

Impacts on population

For the optimized railway line, a detailed Acoustic Study has been elaborated pursuant to Act No. 148/2006 to regulate public health. Based on the study of noise levels, anti-noise barriers have been designed. The efficiency of the anti-noise protective measures shall be proven by check measurements performed after the construction has been realized.

For the purpose of elimination of undesirable effects of noise, anti-noise barriers have been designed in several locations. In total, 17,842 meters of anti-noise barriers have been designed.

Designed anti-noise barriers

Site	Stationing	Length (m)	Height (m)	Side
Benešov	135,100-136,600	1500	3	on the right
	135,150-136,750	1600	2.5	on the left
Mrač	141,200-141,500	300	3	on the right
	141,250-141,500	250	2.5	on the left
Podmračí	141,650-142,150	500	2	on the right
Podmračí - chaty	142,4000-142,650	250	2	on the left
	142,330-142,600	270	2	on the right
Čerčany	143,300-143,680	380	2.5	on the right
	144,000-145,620	1620	2.5	on the right
	144,150-144,650	500	2.5	on the left
Čtyřkoly	144,950-145,620	670	2.5	on the left
	145,800-146,060	960	2	on the right
	146,150-146,850			
	146,150-146,800	650	3	on the left
	147,100-147,700	600	2	on the right
	147,050-147,220	170	2	on the left
Senohraby	148,100-148,550	450	2	on the right
	149,850-150,060	210	3	on the left
Mirošovice	149,850-150,080	230	3	on the right
	151,570-152,200	630	3	on the left
	151,708-152,450	742	2	on the right
	152,750-153,010	260	2	on the right
	153,150-153,450	300	2	on the right
Mnichovice	154,150-154,650	500	3	on the left
	154,800-155,060	260	3	on the left
	155,250-155,650	400	3	on the left
	153,800-156,050	2250	2.5	on the right
Jedlovec	156,050-156,800	750	3	on the left
Stránčice	156,500-157,140	640	3	on the right

The operation of the optimized railway line as such does not cause any atmospheric pollution, as the corridor is fully electrified.

Impacts on water

No risk factors arise from the operation of the optimized railway line as such that may have a direct impact on the quality of underground water. Pollution of underground water may appear only in case of accident of a train set, in particular, if wagons containing hazardous substances would be involved.

Under operation, the possibility of impact on hydro-geological situation is minimal. The only theoretically possible impact is the one resulting from vibrations and affecting the structure of rocks in the reservoir. Such an impact is of very low importance and it is further lowered by the construction of the railway line and by the layer of quaternary and relatively porous sediments.

Impact on soil

Under operation, there is a risk of train accident or of transported shipments resulting in possible leakage of process liquids or load to the neighbourhood of the corridor body. Such a risk may be lower than nowadays – by optimization of this section as well as by the use of new train sets the safety and smoothness of the operation should increase.

Upon adherence to all the proposed measures, the risk of negative impact of the construction and of the corridor operation on soil contamination is minimal.

The total permanent appropriation of the agricultural land resources due to the construction amounts to 0.7049 ha and the construction does not require any temporary long-term appropriation.

Impacts on NATURA 2000 sites

For the period of operation, the designed construction is expected to have no impact on the EU-important site.

Impacts on flora and fauna

Under operation, no significant biological impacts are expected.

Description of measures proposed for the purpose of prevention, elimination, minimization and compensation of impacts on the environment:

THE CONSTRUCTION STAGE

- within the framework of finishing work, the unused areas and slopes of the roadbed shall be covered with humus soil and grassed over
- during construction, the operation of heavy machinery in the neighbourhood of the residential development shall be minimized, the noise-producing stationary equipment shall be surrounded by mobile anti-noise barriers
- the contractor of the structure shall provide for adherence to limits concerning noise levels for the period of the construction pursuant to Decree No. 148/2006 Coll.
- for the reason of reduction of dust nuisance, it is necessary to carry out spraying while performing demolition work and work involving creation of dust
- the roads used shall be cleaned on a regular basis
- vehicles shall be cleaned on a regular basis prior to their access to the roads
- powdery and dusty materials shall be loaded and secured on vehicles so that no contamination of the respective roads was possible
- under inactive building machinery, intercepting vessels shall be installed (metallic with inserts of suitable sorbent) securing against possible leakage of oil-based substances
- refilling of fuels within areas of the construction site shall not be allowed
- within areas of the construction site, a mobile oil emergency set with capacity of minimum 90 litres containing absorbing mats, cloth, pillows, emergency sealing substances, warning tape and protective gloves shall be at the disposal
- all maintenance and possible repairs shall be conducted outside areas of the construction site
- within areas of the construction site, no fuels shall be stored
- drainage of waste water shall be realized by means of an interception sump and pumped out
- within areas of the construction sites in the neighbourhood of watercourses, no powdery and floating materials shall be stored
- within areas of the construction site, chemical toilets for relevant number of employees shall be installed
- cut-out woody plants shall be chipped
- the owner of the structure under construction shall provide for rescue archaeological research in case of need pursuant to section 22 of Act No. 20/1987 while performing earth-moving and excavation work. Pursuant to section 22 of Act No. 20/187, such an archaeological research shall be paid by the investor and it is necessary to enter into the relevant contract prior to its commencement
- the existing woody plants shall be protected pursuant to the standard of ČSN DIN 18 920 Landscape gardening and architecture – Protection of trees, seedling crops and areas intended for greenery in the course of building activities
- after completion of the construction, the respective terrain shall be treated to create grassy areas pursuant to the standard of ČSN DIN 18 917 Landscape gardening and architecture – Establishment of grassy areas
- during reconstruction of the bridge across the Sázava River, no, even temporary, barriers preventing migration of animals shall be created
- level of dust shall be minimized by means of absorbing dust in the place of its origin (if possible, under the respective technical and organizational conditions), secondary dust

nuisance shall be reduced by means of regular and sufficient wetting or spraying the surface of the construction site as well as the roads used for the purpose of the construction

- all noisy construction work shall be performed in daytime only, from approximately 8 AM to 16 PM; additional suitable work may be carried out from 7 AM to 19 PM as well
- possible requests for night work shall be consulted with the Hygiene Office in advance, which shall provide for additional conditions
- select machinery producing guaranteed lower levels of noise
- surround the respective stationary building machinery (sources of noise) with a mobile anti-noise barrier with noise-absorbing surface (*dampening capacity approximately 4 - 8 dB/A*).
- combine work producing low level of noise with work producing high level of noise (reduction of the equivalent noise level)
- if possible, place the machinery as far away as possible from areas of residential development
- limit the operation of sources of high noise levels in a single day, divide the respective work into more days with shorter periods (reduction of the equivalent noise level)
- organize the construction site-related transport outside the inhabited areas always with respect to the specific possibilities
- inform the respective inhabitants of the scheduled activities in time providing them with possibility to reorganize their daily routines
- during work within municipality limits, place mobile anti-noise barriers along the construction site whenever it is possible
- in case of necessity to interfere with the riverbed in the course of reconstruction of the railway bridge across the Sázava River, it is necessary to carry out exploration of the riverbed with respect to possible occurrence of the riffleshell. Upon discovery of any individual of the above-mentioned species during the exploration or the construction work, provide for their transfer to other places in the river by a qualified person. During operation of the machinery in the riverbed, check for possible leakage of oil-based substances. After completion of the reconstruction, restore the riverbed
- during reconstruction of the bridge across the Sázava River, do not create even temporary barriers preventing animals from migration
- the respective anti-noise barriers shall be covered with greenery in the form of creeping plants

THE OPERATION STAGE

- after completion of realization, it shall be necessary to perform a check measurement of noise levels and effectiveness of the designed anti-noise measures

List of forecasting methods:

- Dispersion study on emission from stationary sources was elaborated pursuant to the methodology of the SYMOS'97 – System of stationary sources simulation, version 99, ČHMÚ³ Prague, 1998. Software – calculation model pursuant to the methodology of the SYMOS'97 – System of stationary sources simulation, version 99, ČHMÚ Prague, 1998
- For the purpose of elaboration of the study on noise levels, the calculation software of

³ Czech Hydro-meteorological Institute (transl. note)

SoundPlan HighPerf 6.3/2005 designed by the Braunstein+Berndt GmbH was used. Its use for acoustics-related calculations was verified by the National reference laboratory for noise in the communal environment at the OHS⁴ in Ústí nad Orlicí in July 1997. For the purpose of calculation of noise levels due to railway transport, the Schall 030 standard was used.

- Calculation of waster water contamination
- Evaluation of literary resources, studies and regulations concerning the location subject to evaluation
- Evaluation of the field investigation of contamination of the railway superstructure and the bed of ballast

List of arrears concerning knowledge and uncertainties

- The forecasting methods used in the field of emissions, immissions and noise are not and cannot be absolutely precise forecast – they are based on the current state of the art
- In addition, the respective access and temporary roads, areas for handling and construction sites shall be specified as well

⁴ District Hygiene Station (transl. note)

OUTLINE OF THE PROGRAMME TO MONITOR AND CONTROL THE POST-PROJECT ANALYSIS PLANS

- In the course of the construction, the quality of the bed of ballast and of the respective part of the railway substructure, subject to handling in the course of the construction, shall be checked on a continuous basis. Analyses of samples of the bed of ballast shall be carried out and the method of treatment of this material shall be specified with respect to certificates granted by an accredited laboratory.
- In the course of the operation and after completion of the construction, monitoring of the quality of underground as well as surface waters and of soil in the surroundings of the recycling bases shall be preformed.
- For the period of construction work in areas important from the point of view of water management – the water protection zones, a specialist supervision concerning adherence to relevant safety measures shall be provided by employees of the respective water-supply organizations.
- Within the framework of the application for approval of the construction work, specification of types and quantities of waste resulting from the construction process shall be provided for as well as documentation concerning the method of their disposal.
- Upon commencement of the operation of the optimized railway line, a check measurement of noise levels, in particular, in places where the anti-noise barriers have been built, shall be performed.