

1CE055P2 - SoNorA



O.4.6.3 – Feasibility study for the railway line Berlin - Prague

Work Package	WP 4 – Removing Obstacles to Infrastructure Realisation				
Action	4.6 – Preinvestment studies				
Author	PP10 – Usti Region				
Version	2	Date	07.06.2011	Status	Final

Title: O 4.6.3 – Feasibility study for the railway line Berlin - Prague

File name: SoNorA_4.6.3_ Feasibility study for the railway line Berlin - Prague

Document Approval Chronology

Document			Revision / Approval	
Version	Date	Version	Date	Version
1	22.03.2011	Draft	26.05.2011	WPL Approved LP revised
2	07.06.2011	Draft	28.06.2011	LP Approved

Subcontractor:	Research team:
<p>CityPlan Ltd. Jindrisska 17 110 00, Prague 1 Czech Republic</p>	<p>Ing. Jiri Landa Ing. Arnost Belohlavek Ing. Miroslava Brabcova Ing. Roman Turza Bc. Tomas Hartl</p>
	

Index

1	Executive summary.....	4
2	Introduction.....	5
2.1	Objective of the study	5
2.2	Importance for the SoNorA transport network	6
2.3	Methodological approach.....	7
2.4	Input data.....	8
3	Analysis of routing variants of the high-speed track across the Usti Region	9
3.1	Introduction.....	9
3.2	Variant led out of the City of Usti nad Labem.....	9
3.3	Variant involved in the Usti nad Labem - East station	10
3.4	Comparison of technical demandingness and efficiency of routing in terms of track speeds	11
3.5	Transparent comparison of both assessed variants	12
4	Evaluation of benefits for the Usti Region.....	14
4.1	Transport servicing of the City of Usti nad Labem	14
4.1.1	Variant I - routing of the high-speed track out of the City of Usti nad Labem	14
4.1.2	Variant II - routing of the high-speed rail track via Usti nad Labem - West station	15
4.2	Evaluation of expedience of variants in relation to environment	17
4.2.1	Impact on specially protected areas	18
4.2.2	Impact on Natura 2000 localities	18
4.2.3	Impact on the air quality	18
4.2.4	Impact of the noise and vibrations.....	18
4.2.5	Impact on geological conditions and mineral resources.....	19
4.2.6	Impact on water sources	20
4.2.7	Impact on agricultural land.....	20
4.2.8	Impact on population and agglomerations.....	20
4.2.9	Assessment of environmental impacts.....	20
5	Overall evaluation of benefits and expenses of realization of both variants for the City of Usti nad Labem and the Usti Region	24
6	Recommendations.....	25
	Recommendations for the Usti Region	25
7	Conclusion	26
8	Bibliography.....	27
	List of figures	28
	List of tables.....	28
	Annex 1	29

1 Executive summary

This case study, developed within the framework of the South – North Axis (SoNorA) project, compares 2 variants of potential routing of a high-speed railway line Berlin – Dresden – Prague via the Usti Region and evaluates potential impacts of both variants on the region. Due to the nature of the document (preinvestment case study) and the quite early stage of the project preparation this comparative analysis has not been conducted as a proper feasibility study and elaborates on available source materials dedicated to this issue.

Given the fact that one of the variants only passes through the Usti Region without stopping, while the other is to stop at the Usti nad Labem – north station, the most significant differences between them have been observed in expected benefits for the region in terms of improving accessibility and connections to the backbone railway network. The evaluation of technical and financial demandingness has been based on very limited input data but still gives, at least, a general picture of both variants' expensiveness due to their different alignments in the objective territory. Similarly, the detail of the evaluation of both variants' environmental impacts is affected by the schematization and commonness of the inputs and is not to substitute a proper EIA documentation.

Besides the comparative assessment of both high-speed railway variants in the region the study adverts to a problematic issue of harmonization and coordination of the trans-national infrastructural investments preparation with neighboring countries (Germany, in this case), while the project has not been given a clear priority and political support yet and has been dealing with several legislative and technical discrepancies. It is exactly these aspects that can be relevant subjects for an international dialogue within the SoNorA project, which can give incentives to speed up the process of finding an optimal solution for a coherent railway link between Berlin and Prague.

2 Introduction

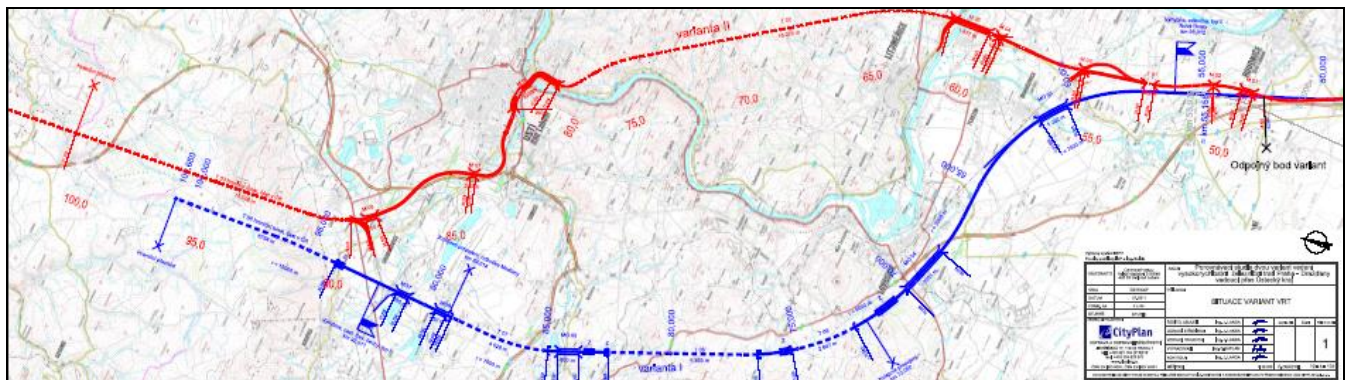
The comparative study of two variants of routing of the high-speed railway track from Prague to Dresden, leading through the Usti Region (hereinafter “the study”) was prepared as an individual case study of the South North Axis (SoNorA) project within the frame of the work package WP4 - Removing Obstacles to Infrastructure Realisation, action 4.6 - Preinvestment studies.

The subject is coherent to strategic objectives of the SoNorA project, which are (among others) focused on supporting new opportunities for regional development resulting from transport infrastructure improvement. It is focused on evaluation of potential benefits of the planned railway infrastructure for the Usti Region both in terms of improvement of the area accessibility and attractiveness increase of the railway North - South network in the Central Europe. Evaluation particularity of possible impacts of realization of proposed high-speed railway track variants within the area of the Usti Region corresponds to the level of particularity of existing data and preparatory phase of this project.

Findings and conclusions of the elaborated study should be instrumental to the Regional Authority of the Usti Region as a background data for subsequent steps of the project development. In particular, this should pave the way for a regular feasibility study of routing the high-speed railway track via the Usti Region and elaboration of the EIA documentation for planned variants.

2.1 Objective of the study

The study compares the variant of existing proposed routing of the high-speed railway track from Prague to Dresden (with a stop on the crossing with the track no. 130) with the variant of the route, which counts with a connection directly to Usti nad Labem to the Usti nad Labem - Centre station, approximately in a place of present Usti nad Labem - East railway station.



Basic assessed criteria:

- Quality of the connection of the Usti Region and the City of Usti nad Labem with neighbouring regions and remote destinations in Germany;
- Possibility of improvement of the transport connection of the Most-Chomutov agglomeration with neighbouring regions and remote destinations in Germany;
- Overall comparison of benefits and expenses of realizations of both variants for the City of Usti nad Labem and the Usti Region;
- Evaluation of convenience of both variants in relation to the environment.

2.2 Importance for the SoNorA transport network

In light of the importance of the objective infrastructure construction for the backbone transport network, which is defined by the SoNorA project, it is possible to state that the project is very beneficial and is situated on one of the most important railway axes in the Central Europe. In fact the relevance of this link in the TEN-T network (belonging to PP22) has been addressed in SoNorA output 3.3.3 – SoNorA TEN-T Recommendations. In particular, this case study is dealing with a cross border section. The typical issues related to cross border issues have been thoroughly discussed in the SoNorA project, in particular within output belonging to work package 4.

Other questions are its topicality, urgency of realization, priority in the frame of development of transport infrastructure of both concerned states (Czech Republic and Germany) and readiness, as well.

It is the project of the high-speed railway track, whose benefits should be expressed especially in the area of supply of alternative passenger transport on medium distances. Regarding the phase in which the development of high-speed railway tracks is, it is difficult to assess direct impacts and benefits of such realization (either in the variant led out of the City of Usti nad Labem or via the city). Nevertheless, it is possible to state that from the system point of view, this investment is highly needed. Resulting network effect of completed high-speed railway corridor in Berlin - Prague - Vienna direction is fundamental for strengthening the competitiveness of international railway passenger transport in the South – North connection thus this project has a clear relevance in the framework of the SoNorA project.

That is to say, that integrated track would offer fast and comfortable connection of three important Central European capitals with a high touristic potential.

Of course, at the level of the SoNorA project, the question of existence of the high-speed railway track as a whole is more important than its exact routing within the area of the Usti Region. However, it is evident that for the Usti Region as for a project partner, the question of possible regional impacts of two presently proposed variants is significant because each of these variants brings absolutely different consequences due to their characters.

2.3 Methodological approach

The evaluation methodology was chosen with respect to the extent of available backgrounds and the degree of completion of individual plans. In order to evaluate variants of the high-speed track routing across the area of the Usti Region, the compiler took advantage of methods used for evaluation of rail constructions on a regular basis, which differ in particular aspects from processes of road constructions evaluation. This is mainly the evaluation of parameters such as the lost elevation and other vertical alignments significantly relating with the overall energetic demandingness of the transport.

For the purposes of more consistent evaluation of both variants the compiler decided for engineering integration of backgrounds available for individual variants (see below) into a one general graphical form, which would allow assessment of e.g. impact on components of the environment, especially the passage through the regional protected landscape area (created schematic map enclosed to this comparative study). Detailed description of the methodological approach of environmental impact assessment is presented in the respective chapter.

From the methodological point of view it is possible to refer to certain insufficiencies influencing the quality of the final evaluation, which have their grounds not only in the early phase of the project documentation but also in the conceptual approach standardly used for an expert estimation of anticipated transport demand on a given transport service. In the frame of the road transport, this is possible with a help of functional traffic model that can properly simulate impacts of variant solutions both in present state and in perspective scenarios, too. The absence of possibility to assess existing transport linkages including their prognoses limits the identification of possible benefits and risks of the realization of the first or second solution.

2.4 Input data

The project partner, Usti Region, responsible for this study, does not own any input data. The compiler was given contact details for the owner or executor of the input data, respectively. On the basis of these connections, the compiler obtained following materials:

- Coordination study of the high-speed railway track 2003 – updated as of 31.7.2004 (IKP Consulting Engineers): Variant of the high-speed track leading out of the City of Usti nad Labem, which is supplemented by the route axis in 1:50.000 ratio scale, longitudinal profile and accompanying report describing general requirements on the high-speed railway track.
- Input data to the variant led out of the Usti nad Labem - West station (Ing. Jiri Klacik, authorized transport construction engineer): First incomplete input data were received by the compiler on 11.10.2010. These included only a delineation of the route and the longitudinal profile in DWG format.

3 Analysis of routing variants of the high-speed track across the Usti Region

3.1 Introduction

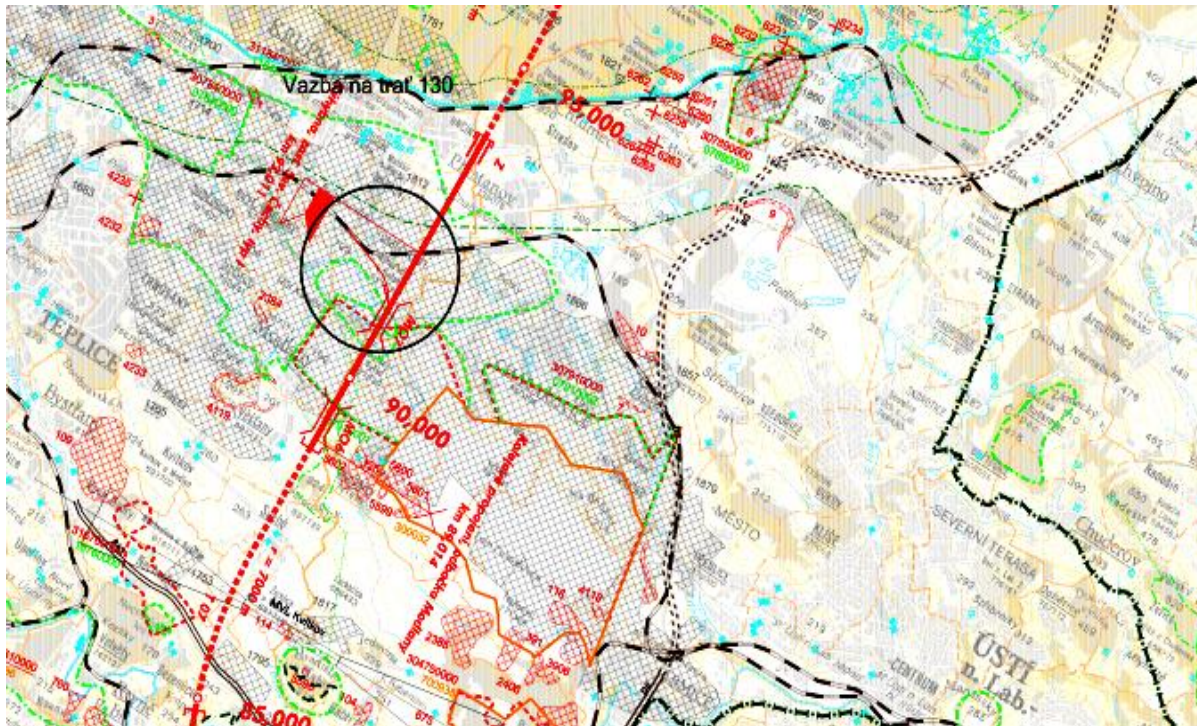
The background data of assessed variants is on the level of “exploratory study”. That is the reason why both assessed variants suffer from a lack of detailed bases. Projection scale 1:50.000 is not suitable for detailed assessments. In consequence of this, volumes of works are not illustrated and neither is the financial demandingness of assessed solutions.

The comparative study, according to its submission, assesses a part of the high-speed railway track, which is led through the Usti Region. It also assesses benefits for the transport servicing of the region and the City of Usti nad Labem. It does not take into account the route led within the Central Bohemia Region and the Capital City of Prague.

3.2 Variant led out of the City of Usti nad Labem

Following description of the route starts at the place of splitting assessed variants on the km 53.4 of the red variant. The route is led in wide curvature outside of the urban areas. It crosses the protected landscape area Ceske Stredohori and the national park Eastern Ore Mountains. The border tunnel starts near Prestanov. The only connection with nationwide railway (track no. 130) is supposed to be near Chabarovice. The connection is assumed to be only in Most - Prague direction. The high-speed railway track is designed for the speed of 300 km/h.

Figure 3.1 – Routing of high-speed railway track outside of Usti nad Labem



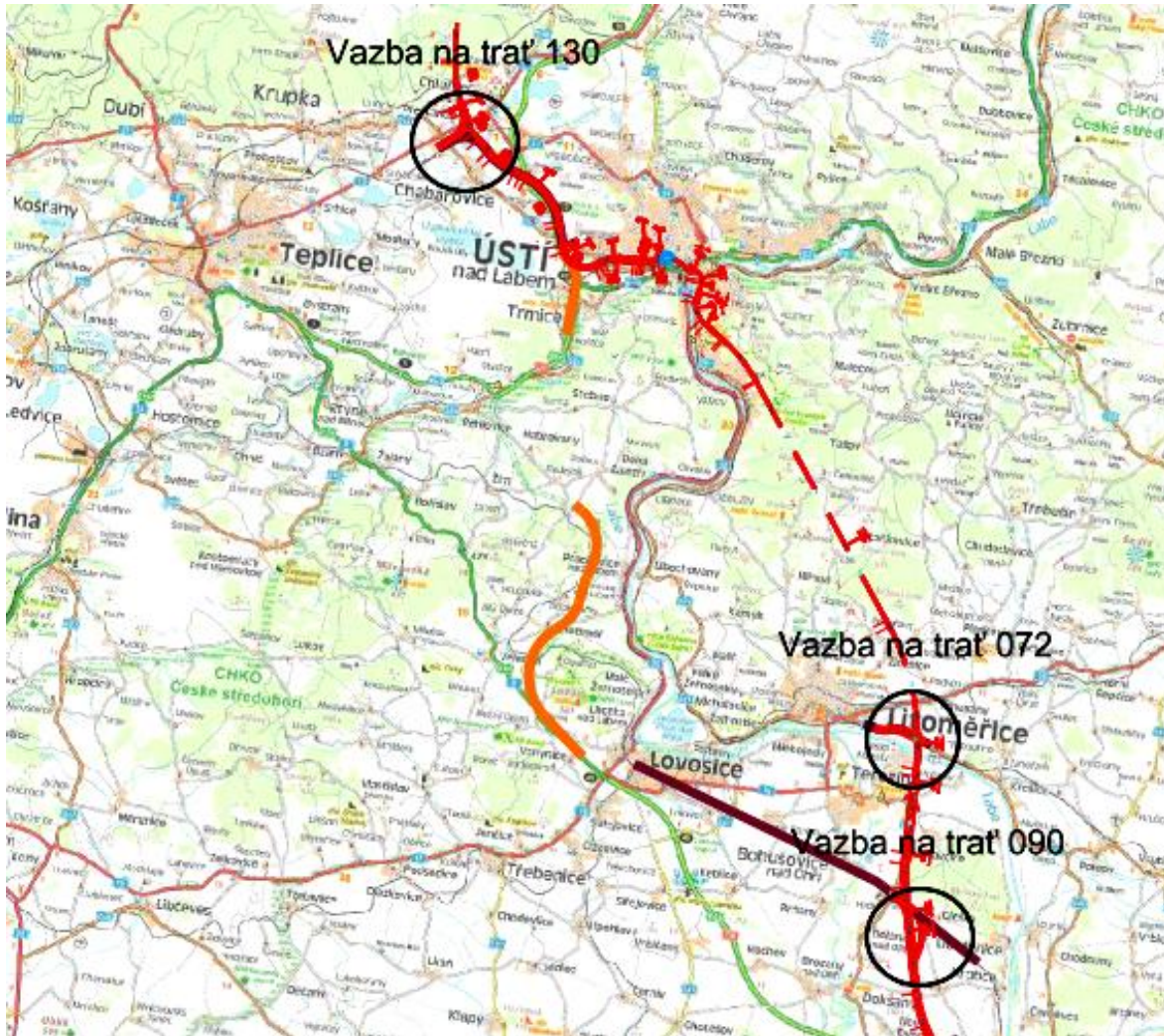
Source: IKP Consulting Engineers – Coordination study of high-speed railway track 2003 – updated 31.7.2004

3.3 Variant involved in the Usti nad Labem - East station

Initial point of the assessment is the same as in the case of the previous variant. Approximately on the 53.5 km the monitored variants draw apart. The assessed variant of the route turns straight to the North. It crosses the nationwide corridor route 090 with assumed connection to this track between Hrobce and Bohusovice nad Ohri. It leads over the River Elbe near Ceske Kopisty. Furthermore, it crosses the nationwide track 072 again with assumed connection to this track. Both connections from the nationwide tracks allow linkage only in direction to Usti nad Labem, not to Prague. Beyond this crossing the high-speed track is led via tunnel, which will end in Usti nad Labem on the right bank in the area of Litomericka and Zeleznicarska Street. It continues in a parallel way with the existing track over the new bridge over Elbe to Usti nad Labem - West station. Then it leads through the station on the South margin (along Bilina). Beyond Predlice it turns to right curve (continuously in a parallel with the track number 130) and continues in a parallel with the D8 motorway, which will be consequently crossed. Connection of the high-speed track on the track number 130 is planned near the crossing of III. class road to Chlumec and I. class road number 13. Connection from Dresden will be realised only in

direction to Most, not to Usti nad Labem. Near Stádov, the high-speed railway track will pass into the border tunnel.

Figure 3.2 – Routing of high-speed railway track via Usti nad Labem - West station



Source: IKP Consulting Engineers – Coordination study of high-speed railway track 2003 – updated 31.7.2004

3.4 Comparison of technical demandingness and efficiency of routing in terms of track speeds

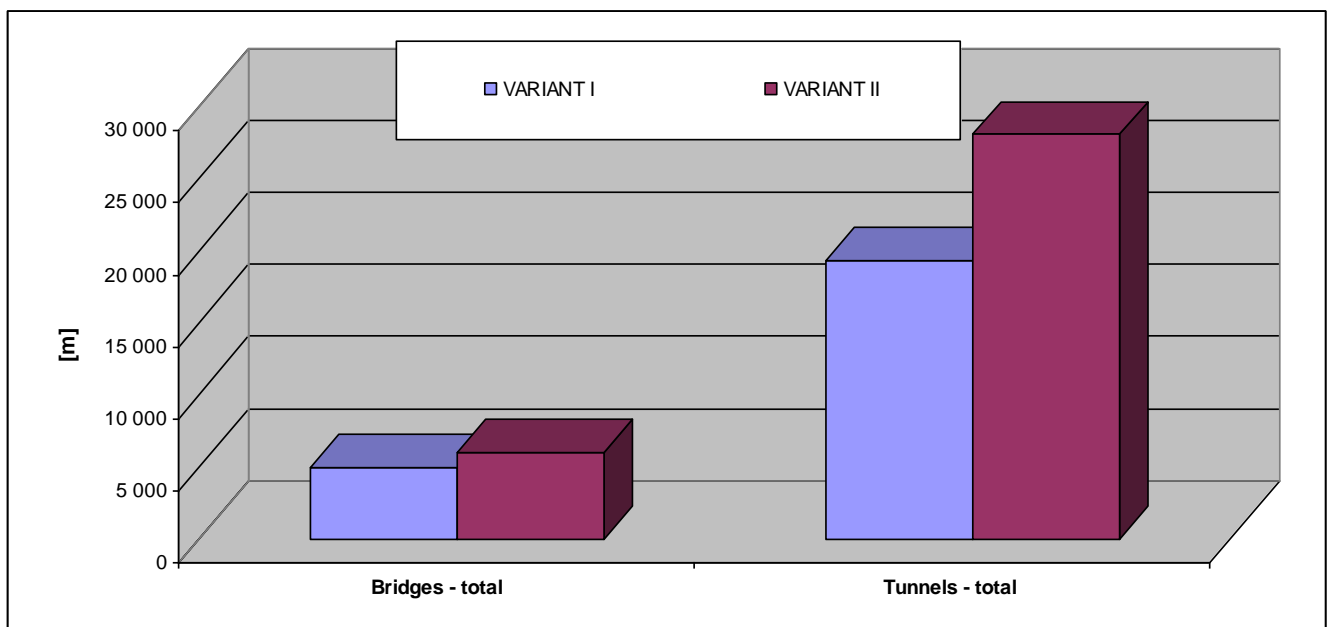
Technical demandingness of the route can be assessed from many points of view. These involves especially:

- Tunnel length - both length of individual excavations and the total length;
- Bridge length - both length of individual bridges and the total length of all bridges;

- Scope of ground works (excavations and mounds) - cannot be determined from available source data;
- Number of curves and minimal radii;
- Length of sections in uphill (downhill) grade, maximal uphill grade and lost elevation¹;
- Total comparable length of the route.

3.5 Transparent comparison of both assessed variants

Figure 3.3 – Graphical illustration of construction demandingness of both variants.



Source: CityPlan spol. s r.o.

It is possible to have different (or even contradictory) opinions on the routing. The table below represents a list of critical sections of proposed high-speed railway track.

¹ It is the elevation that the train must raise to climb a certain slope and that exceed the difference in altitude between the starting point and the destination

Table 3.1 – Evaluation of routing

	VARIANT I. (routing out of the City of Usti nad Labem)	VARIANT II. (routing via the station)
Lost Elevation	174,43 m	93,23 m
Critical uphill grade	17,6‰ , 17,5‰ - 11 453 m total	15,0‰ , 12,5‰ - 9 800 m total
Curve radii	9 000, 7 000 m	4 000, 690, 500, 305 m

Source: CityPlan spol. s r.o.

The table can be interpreted as follows:

- Variant I allows higher speed (300 km/h) in all length without any restrictions;
- Variant I is more energy demanding with regard to lost elevations and uphill grades;
- Speed of variant II is restricted in minimal length of 4 km (even to 60 km/h);
- Variant II is less energy demanding with regard to lower lost elevations and uphill grades.

If we consider the connection route up to Berlin then the speed reduction in Variant II is not detrimental. From the energetic point of view the Variant II is preferable. Even for operation of high-speed freight trains is the Variant II more favourable.

- **In terms of technical demandingness of the construction and economic costs the Variant I is preferable.**
- **In terms of routing convenience the Variant II is better.**

4 Evaluation of benefits for the Usti Region

4.1 Transport servicing of the City of Usti nad Labem

Transport servicing of the city can be considered as a system destined entirely for trips within the city or wider as a system destined for all trips of city's inhabitants (regional, domestic and international). It is obvious that the high-speed track cannot participate on transport servicing of the city. The same applies in case of regional transport servicing unless the high-speed railway track is accessible for passenger stopping trains.

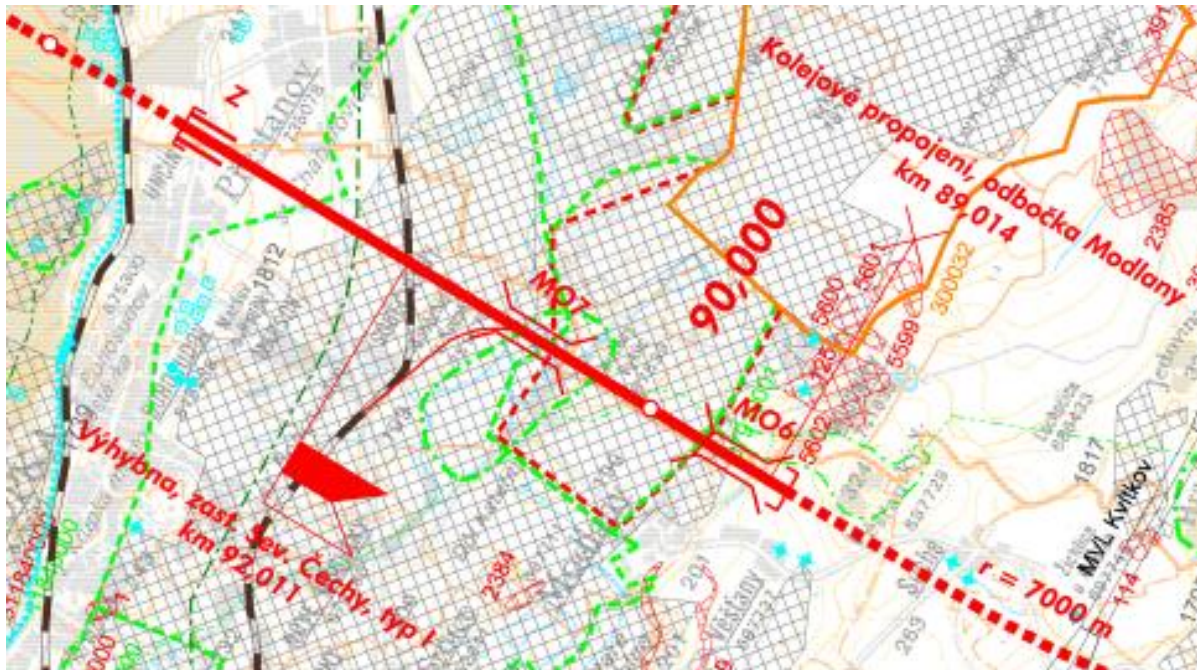
In case of long-distance transportation the situation is different. The City of Usti nad Labem does not have its own airport and even for the whole Usti Region there is no airport capable to ensure the operation of long-distance transportation. The high-speed railway track would eliminate this entire lack of the long-distance transportation and would ensure quick connection of the City of Usti nad Labem with Prague and Dresden.

Individual variants offer certain connections, which are conditional on not quite guaranteed assumptions. Some of them are conditioned on so far non-existing approval of German counterparty, others on buying vehicles from the part of Czech Railways. Conditional assumptions are listed with regard to individual directions assessed.

4.1.1 Variant I - routing of the high-speed track out of the City of Usti nad Labem

In case of routing the track out of the city, it is possible to calculate its benefit only with the connection to Prague and even with a transfer northwards from Usti nad Labem near Chabarovice (see route description). This means longer distance for a cost higher than by a regular express train and only in case the high-speed train would stop near Chabarovice. Therefore, it is possible to state that this variant does not bring anything for transport servicing of the City of Usti nad Labem and the Usti Region in direction to Prague.

Figure 4.4 – Connection of the track 130 on the high-speed railway track near Chabarovice



Source: IKP Consulting Engineers – Coordination study of high-speed railway track 2003 – updated 31.7.2004

4.1.2 Variant II - routing of the high-speed rail track via Usti nad Labem - West station

In case of variant of routing the track via the Usti nad Labem - West station, the situation is different:

- In every case there would be a high-speed connection to Prague;
- In every case there would be a high-speed connection to Dresden and further to Germany;
- In case of operation of regional trains on high-speed railway track the connection to Lovosice and Roudnice would improve;
- All trips to stations, in which high-speed trains would stop, would be preferable even if fares were higher.

This variant disposes of linkages of high-speed railway track with “normal” tracks and transfer linkages and three transfer points or the linkage to existing tracks, respectively. Linkages between the high-speed railway track and other tracks are demonstrated the best on following figures:

Figure 4.7 – Connection of track 072 on the high-speed railway track near Ceske Kopisty



Source: IKP Consulting Engineers – Coordination study of high-speed railway track 2003 – updated 31.7.2004

The route variant led via Usti nad Labem - West station will have significantly high possibilities of transfer linkages both on high-speed trains and on “regular” trains operated on high-speed railway track.

None of these variants brings significant improvement of transport servicing for the Most - Chomutov agglomeration.

4.2 Evaluation of expedience of variants in relation to environment

In terms of the environment, high-speed trains ensure favourable mobility. Since high-speed railway tracks are line constructions, which lead through large area, they significantly influence the environment. Construction of tracks can have an impact on specially protected landscape areas, Natura 2000 localities, geological and mineral resources, water sources, air quality and acoustic situation, land, population and agglomerations etc.

The high-speed railway track is considered as a construction, which compulsorily underlie to environmental impact assessment. The evaluation based on the section no. 244/1992 Coll. on assessment of environmental impacts according to annex 1, section 7 Infrastructure: “7.1.Construction of motorways, I. class roads, railways, airports and permanent racetracks for motor-powered vehicles with paved tracks and waterways including ports.”

Evaluation in the presented project assesses variants in relation to the environment only generally. For comparison of both variants, according to above mentioned Act, it is necessary to execute the EIA documentation, which will evaluate possible negative impacts of the high-speed railway track on the environment, or it will propose adequate measure of the realization to minimize inevitable negative impacts of the construction. The data contained in the project can be taken as a basis for the EIA documentation.

4.2.1 Impact on specially protected areas

According to The Act of Protection of Nature and Landscape no. 114/1992 Coll., specially protected areas are divided into six categories: large-area specially protected areas, national parks and protected landscape areas and small-area specially protected areas, national nature reserves, nature reserves, national nature sanctuaries, nature sanctuaries.

4.2.2 Impact on Natura 2000 localities

Natura 2000 localities are defined by legal enactment of the directive of the Council 2009/147/EC on the conservation of wild birds, (substitutes the directive of the Council 79/409/EEC) and the directive of the Council 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

Natura 2000 is a system of protected areas in EU, which strives to ensure a protection of animal species, plants and natural habitats, which seems to be the most valuable, most endangered and precious.

4.2.3 Impact on the air quality

Railway transport represents the most favourable transport mode with regard to air pollution. Local negative impacts on the air pollution from electric traction are almost at a zero level. Global negative impact is represented by production of traction energy.

During the construction of the high-speed railway track, air can be polluted by emissions and dust from point-, areal (construction and service areas or recycling platforms - if established) or line sources (freight transport of substances and waste from the construction site).

4.2.4 Impact of the noise and vibrations

Noise and vibrations are considered to be one of the most significant negative impacts of the railway transport on the environment.

Generally, based on the length of the noise duration it is possible to state that the noise from the railway transport, having a character of short impulses, is less harmful for organisms than for example noise from the road transport, which is monotonous.

However, the noise differs according to the speed of a train. That is the reason why the operation of high-speed trains embodies different noise spectrum and source of noise in comparison to regular trains. The sources of noise of high-speed trains are rolling noise, compressor noise and intake, ventilation of the braking system, aerodynamic noise, traction vibration noise and pantographs. At high speeds the noise ascends to higher tones and is perceived more sensitively. Therefore, it is necessary to take measures, which would minimize spreading of the noise.

Maximal noise limits are defined by the Government Regulation no. 88/2004 Coll., which amends the Government Regulation no. 502/2000 Coll. on the health protection against adverse effects of noise and vibrations.

The levels of vibrations are detected by measuring the current state of vibration in a range given by Regional Public Health Authority. If the levels of vibrations are higher than limits measures like anti-vibration mats are proposed.

4.2.5 Impact on geological conditions and mineral resources

Especially the construction of tunnels will have significant effect on geological environment. Variant I (routing of the high-speed track out of Usti nad Labem) involves a construction of tunnels of total length of 13.302 km (40 %) and Variant II (routing of the high-speed track via the Usti nad Labem - West station) involves a construction of tunnels of total length of 28.011 km (53 %).

Furthermore, it is possible to expect that excavation of cuts will have an impact on the geological environment.

Protection of mineral resources and its economic utilization in the Czech Republic is determined by the Act no. 44/1988 Coll. on protection and utilization of mineral resources (Mining Law), as subsequently amended.

Available maps point at possible collisions of the high-speed track (in case of both variants) and protected deposit areas, undermined areas and slide of other areas or routing of routes very close to these areas. The high-speed track route (Variant I) is, among others, led very closely to old mines.

4.2.6 Impact on water sources

Protection of surface and underground water is determined by the Act no. 254/2001 Coll. on water (Water Law) with effect from 1.1.2002.

The impact of the high-speed track on surface and underground water is assessed both during the operation of the track and during its realization.

4.2.7 Impact on agricultural land

Act no. 334/1992 Coll. on the protection of agricultural land resources defines rules how to protect production function of agricultural land. The aim of this Act is also to increase the responsibility of owners and users of land as a part of environment.

4.2.8 Impact on population and agglomerations

Generally, it can be stated that railways have a positive impact on servicing and development of the region. However, in case of the high-speed railway track it is not possible to consider support of regional development because these benefits are of supraregional and international importance.

For region and its inhabitants the high-speed railway track has rather negative impact - a source of noise and a barrier effect. The railway operation on the high-speed track proceeds at very high speeds, which is a source of strong aerodynamic noise. Routing of these tracks should be designed out of agglomerations and suitably placed in the scenery.

High-speed railway tracks led via tunnels do not have impacts on the comfort factor of inhabitants. In sections where the track runs above the ground, it is necessary to carry out an acoustic study and propose noise protection measures in order to protect inhabitants against the noise.

4.2.9 Assessment of environmental impacts

Comparison of both variants was performed generally, only. On the basis of received data it was not possible to execute a detailed analysis. Detailed study of impacts on the environment will be performed in the EIA documentation.

The table below shows basic information about both variants of the high-speed railway track routing.

Table 4.2 – Basic summary of information about the impact on the environment of both variants of routing of the high-speed railway track

VARIANT I - routing of the high-speed railway track out of the City of Usti nad Labem	VARIANT II - routing of the high-speed railway track via the Usti nad Labem - West station
IMPACT ON SPECIALLY PROTECTED AREAS	
<i>large-area specially protected areas</i>	
* collision with the Protected Landscape area Ceske Stredohori – routing via tunnel in 57 %	* collision with the Protected Landscape area Ceske Stredohori – routing via tunnel in 90 %
<i>small-area specially protected areas</i>	
* very close to Cerna louka (nature reserve)	* very close to Spicak near Krasny Les (nature reserve)
* very close to Rac (nature reserve)	* very close to Cerna louka (nature reserve)
* very close to Malhosticky Rybnik (nature reserve)	* very close to Slunecni stran (nature reserve)
	* very close to Babinske louky (nature reserve)
	* very close to Holy vrch u Hlinne (nature reserve)
IMPACT ON NATURA 2000 LOCALITIES	
<i>bird areas</i>	
* collision with bird area (3.15 km)	* collision with bird area (4.30 km)
<i>European important localities</i>	
* collision with 4 European important localities	* collision with one European important locality
(8.20 km)	(4.10 km)
IMPACT ON AIR QUALITY	
<i>during operation</i>	
both variants will not have negative impacts on the air quality	
<i>during construction</i>	
in case of both variants it is possible to observe air pollution from point-, areal or line sources	
IMPACT OF NOISE AND VIBRATIONS	
both variants will require a construction of technical appliances for the protection of population against excessive noise	
<i>during operation</i>	
*route on the ground, where an acoustic study is needed or noise protection measures (28.848 km = 60 %)	* route on the ground, where an acoustic study is needed or noise protection measures (24.354 km = 47 %)

during construction	
in case of both variants the noise is produced especially during construction works and while transporting materials	
IMPACT ON GEOLOGICAL CONDITIONS AND MINERAL RESOURCES	
while excavating the cuts it is possible to expect effects on geological environment in case of both variants	
in case of both variants the construction of tunnels will have a significant impact on the geological environment	
* construction of tunnels (13.302 km)	* construction of tunnels (28,011 km)
mineral resources	
* collision with areas of protected deposit areas	* collision with areas of protected deposit areas
* collision with area of undermined areas	* collision with areas of undermined areas
* collision with slides of other areas	* collision with slides of other areas
* very close to old mines	
IMPACTS ON WATER SOURCES	
during operation	
both variants will not have negative impacts on water sources (except of train crash)	
during construction	
in case of both variants a leakage of dangerous substances is possible while operating construction machinery	
IMPACT ON AGRICULTURAL LAND	
during operation	
both variants will not have negative impacts on agricultural land (except of train crash)	
during construction	
in case of both variants an appropriation of land will be needed	
IMPACT ON POPULATION AND AGGLOMERATIONS	
* out of the tunnels the route is led close to 13 agglomerations	* out of the tunnels the route is led close to 5 agglomerations
* the route is led via Sulejovice	* the route is led via the City of Usti nad Labem
	* the route is led via Travčice

Source: CityPlan spol. S r.o.

The above mentioned evaluation is considerably simplified because at this level of the project preparation of the Prague - Dresden high-speed railway track there was a total lack of data needed for a full-valued and detailed assessment of impacts on the environment of individual variants. In context of available information, both variants embody a number of negative impacts on different parts of the environment. Nevertheless, it is not exactly possible to determine which variant is ecologically friendlier. Such a verdict will be based on the final conclusions of the standard assessment of impacts on the environment - EIA, which will be performed in next phases of project preparation.

In case of the impact of the route on Natura 2000 localities and especially in case of a collision of the route with important European localities, the Variant II embodies better results. The routing of Variant II collides with only one important European locality in comparison with Variant I, which collides with total of four such localities.

In case of evaluation of demandingness of tunnels' constructions and related impact on the geological environments, it is necessary to point out that the Variant II includes a construction of tunnels in total length of 28.011 km. Variant I requires a construction of just 13.302 km. On the other hand, considering the negative impact of noise on the environment it is necessary to state that routing the track via tunnels dampens spreading of the noise. In sections out of tunnels it is necessary to perform an acoustic study and subsequent construction of noise barriers.

5 Overall evaluation of benefits and expenses of realization of both variants for the City of Usti nad Labem and the Usti Region

For an overall evaluation of aspects, which were compared in the frame of previous analysis, a simplified version of multicriterial analysis was used. This analysis is based on expert estimation of the compiler and results from facts, which were acquired from available background data and other publicly accessible sources. The comparison of individual parameters is introduced in following table and is based on a scale from -5 to +5 points.

In terms of technical demandingness and investment costs for construction of the track, the Variant I appears to win, especially thanks to generally lower number of kilometres of the track led via tunnels and on bridges, which are generally the most expensive and most complicated in terms of construction.

On the contrary, in terms of benefits for the transport servicing of the Usti Region and its linkage on backbone international railway routes, the Variant II has definitely better results because it leads through the City of Usti nad Labem and allows much higher number of transfer linkages.

At this stage of the project preparation, comparison of environmental impact assessments of both variants was very rough and so its conclusion does not explicitly incline to any of proposed variants. More accurate evaluation of impacts has to be a part of a standard assessment of EIA documentation.

Table 5.3 – Multicriterial evaluation

Evaluated Parameter	Variant I	Variant II
Technical demandingness and convenience of routing		
Construction technical demandingness	+1	-2
Investment cost	+1	-2
Convenience of routing	+1	0
Convenience for Usti Region		
Transport service to Prague	0	+3
Transport service to Germany	+1	+3
Transfer linkages to other tracks	+1	+5
Possibilities for Most-Chomutov agglomeration	0	0
High-speed connection within the region	0	0
Environmental impacts		
Impacts on protected areas	-2	-1
Impacts on Usti nad Labem inhabitants	0	-2
Overall evaluation	+3	+4

Source: CityPlan spol. s r.o.

6 Recommendations

In principle, there are two views on the high-speed railway track - one from the side of the state and one from the side of the Usti Region.

The state assesses the construction of high-speed railway tracks with regard to:

- Amount of investments;
- Assumed utilization;
- International agreements.

In a situation, when it is necessary to behave economically, the amount of investments is decisive and it postpones the construction of the high-speed railway track to the period of consolidated budgets. That means after 2015 or even later. Until then it will be possible to objectively elaborate the perspective of the future demand. The Variant I is evidently preferable for the state even in case of mixed operation.

The perspective of the Usti Region must be inevitably different from the state's one. Big investment in the region area would bring ecological and transport loads during construction. Furthermore, a part of region's inhabitants would be disturbed by the operation. Therefore, for the Usti Region it is logical to prefer such variant that would have the biggest benefit for the region's inhabitants. In light of needs of the Usti Region the Variant II is more advantageous.

Recommendations for the Usti Region

During discussions with the Ministry of Transport assume the position friendly with the construction of the high-speed railway track on the following conditions:

- The type of operation on the high-speed railway track will be specified including a guarantee of the ČD a.s. that in case of mixed operation will not use high-speed passenger trains.
- The designer will assess other routing via the city of Usti nad Labem. The presented solution with stopping of high-speed trains in the freight station (Usti nad Labem - West) is user unfriendly and in addition it would bring bigger loads on the public transport. At the same time another solution is offered - e.g. routing via the quarry and further via tunnel in direction between Chuderov and Žežice.

In every case, the Usti Region should invoke consultations with the designer and the investor (production committees) in case of elaboration of other project documentation.

7 Conclusion

The comparative study appears to be rather general since it is based on available background data, which only consider passability of the route through the terrain. Therefore, the evaluation misses not only the scope of ground works and at least rough cost estimation but also impacts on the architecture of the City of Usti nad Labem. Also impacts on the environment and health of inhabitants were discovered and evaluated directly by the compiler because assessed documentations include only the most radical collisions with the protected landscape area, not bringing any evaluation parameters for its comparison.

Based on the comparative study and multicriterial analysis, following conclusions have been reached:

Variant II = routing of the high-speed track via the Usti nad Labem - West station is preferable for the Usti Region and for the City of Usti nad Labem. However, for the future solution of this variant, it is necessary to solve the routing of the high-speed track with regard to urban impacts and noise restrains (especially in case freight trains are in operation on the high-speed track).

From the national perspective it is necessary to perceive the planned corridor as a whole and to assess its overall positive and negative impacts at the same time. In case of such radical infrastructure investments with an international importance, it is necessary to objectively evaluate benefits of the entire functional complex and not only its selected parts (in this case it means evaluation of the whole corridor of the high-speed track Berlin - Prague). Only such evaluation (whether it is socio-economic, technical or environmental) will correspondingly take into account network effects and functional linkages in the frame of constructed backbone network.

With respect to legislative, technical, timing and financial matters, exactly these cross-border infrastructure linkages and ensuring of their harmonization should become one of the main strategic objectives of the national policy and bilateral intergovernmental discussions about the process of the transport infrastructure construction. This study, elaborated in the frame of the SoNorA project thus brings one concrete infrastructure realization case, which deserves considerably more active cross-border dialog and clear political decisions. Thanks to its structure of outputs and consortium of partners, the SoNorA project allows wider international discussion on this topic and conclusions of its core outputs (in this case the output 4.6.5 - Preinvestment case studies lessons) should contain clear recommendations for further progress in the preparation of these important infrastructure investments of the international importance.

8 Bibliography

- [1] Decision No 1692/96/EC of the European Parliament and of the Council on Community guidelines for the development of the trans-European transport network and Decision No 884/2004/EC
- [2] Commission Decision of 23 May 2007 C(2007) 2158, establishing a draft of the multi-annual work programme for grants in the field of trans-European Transport network (TEN-T) for the period 2007-2013
- [3] Bases and resources for the policy of spatial development of the Czech Republic 2008, Ministry for regional development (2008)
- [4] Latest trends in the field of high-speed lines infrastructure, Lukas Tyfa (2008)
- [5] Commission Decision No 2002/732/EC of 30 May 2002 concerning the technical specification for interoperability relating to the infrastructure subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Council Directive 96/48/EC
- [6] Act no. 100/2001 Coll., on environmental impact assessment, as subsequently amended
- [7] Act no. 86/2002 Coll., on air protection, as amended
- [8] Government Regulation no. 597/2006 Coll., on monitoring and evaluating of air quality
- [9] Government Regulation no. 615/2006 Coll., on determination of emission limits and other conditions for operation other stationary source of air pollution
- [10] Act no. 254/2001 Coll., on waters and on amendment of certain acts, as amended
- [11] Government Regulation no. 61/2003 Coll., on indicators and values of admissible pollution of surface and waste water, essentials of permission to drain waste water to surface water and to canalization and on sensitive areas
- [12] Act of Czech National Council no. 114/1992 Coll., on nature and landscape protection, as subsequently amended
- [13] Act no. 460/2004 Coll., amending Act no. 114/1992 Coll., on nature and landscape protection
- [14] Act no. 218/2004 Coll., amending Act no. 114/1992 Coll., on nature and landscape protection
- [15] Notice of the Ministry of Environment of the Czech Republic no. 395/1992 Coll.
- [16] Act of Czech National Council no. 86/1992 Coll., on care and health of people, as subsequently amended
- [17] Act no. 258/2000 Coll., on protection of public health and on amends of other related acts

- [18] Government Regulation no. 148/2006 Coll., on health protection against adverse effects of noise and vibrations
- [19] Act no. 289/1995 Coll., on forests and on amends and completion of certain acts (Forest Law), as amended
- [20] Act no. 20/1987 Coll., on national monument preservation, as subsequently amended
- [21] <http://drusop.nature.cz>

List of figures

Figure 3.1	– Routing of high-speed railway track outside of Usti nad Labem	10
Figure 3.2	– Routing of high-speed railway track via Usti nad Labem - West station	11
Figure 3.3	– Graphical illustration of construction demandingness of both variants.....	12
Figure 4.4	– Connection of the track 130 on the high-speed railway track near Chabarovice	15
Figure 4.5	– Connection of track 130 on the high-speed railway track near Chabarovice	16
Figure 4.6	– Connection of track 072 on the high-speed railway track near Bohusovice nad Ohri...16	
Figure 4.7	– Connection of track 072 on the high-speed railway track near Ceske Kopisty	17

List of tables

Table 3.1	– Evaluation of routing	13
Table 4.2	– Basic summary of information about the impact on the environment of both variants of routing of the high-speed railway track	21
Table 5.3	– Multicriterial evaluation.....	24

