TRANS-EUROPEAN NETWORK LINK – THE VILNIUS CITY WESTERN BY-PASS. STAGE II

Regional and Urban Policy

July 2013

E-mail: regio-publication@ec.europa.eu
Internet: http://ec.europa.eu/regional_policy/index_en.cfm

Cataloguing data can be found at the end of this publication.
Luxembourg: Publications Office of the European Union, 2013
ISBN : 978-92-79-31068-3
doi: 10.2776/37145

Printed in Belgium
PRINTED ON ELEMENTAL CHLORINE-FREE BLEACHED PAPER (ECF)

Leigh Fisher
Management Consultants

QUICK APPRAISAL REPORT

TRANS-EUROPEAN NETWORK LINK – THE VILNIUS CITY WESTERN BY-PASS. STAGE II

CCI 2011LT161PR001

Prepared for

European Commission – Directorate General Regional Policy
Unit H4
B-1049 Brussels
BELGIUM

7th February 2013

LeighFisher Limited
Registered Office: 1180 Eskdale Road, Winnersh, Wokingham, RG41 5TU
Registered in England No: 2591354

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Project Appraisal Fundamentals

This Quick Appraisal (QA) is prepared in accordance with the *QA Check List* for major transport investments agreed with the EC – Directorate General Regional Policy Financial Greffe REGIO.

The objective of this QA is to support a constructive dialogue between the EU and the Applicants providing recommendations and suggestions, based on an in depth analysis of the application form and annexed documentation.

The structure of this report is in line with the sections and headings of the Quick Appraisal Check List and the Investment Application Form.

Along with the description of the findings of the analysis in each Chapter or Section of Chapter in relation to which: a) the quality of the information provided and available is not satisfactory, or b) the quality of the project is deemed to be improved, or c) the methodological and technical solutions adopted to undertake the CBA analysis, demand studies and project design are deemed as not adequate or reliable, the comments are highlighted in a recommendations and suggestions box.

In the concluding remarks Chapter we summarize the main findings of our appraisal commenting on the essential elements of the project, and suggesting any potential solution that can improve its quality according to the findings of the analysis as appropriate. This section highlights any important issue that should be considered before the Commission can approve the project.

1.1.1 Applicant and project managing authority

The Applicant is the Lithuanian Government – the Ministry of Finance of the Republic of Lithuania responsible for the Operational Programme for Economic Growth for 2007–2013, which is the Lithuanian Managing Authority for the National Cohesion Strategy 2007-2013 (European Regional Development Fund and Cohesion Fund).

The Beneficiary of the funds is the Vilnius City Municipal Government Administration which is responsible for developing this investment to be funded by the European Union.

1.1.2 Documentation available

The application dossier made available in electronic format through the CIRCABC Library of the European Commission includes the following documentation:

- Annex XXI;
- Natura 2000 declaration;
- Cost-Benefit Analysis;
- Non-technical summary of the EIA Declaration;
- Project Summary for the *Western by-pass* Stage II project;

The project dossier is overall complete and complies with the EC Regulations. The information provided is consistent with Art. 40 Reg. 1083/2006, Annex XXI and Commission Regulation 1828/2006.

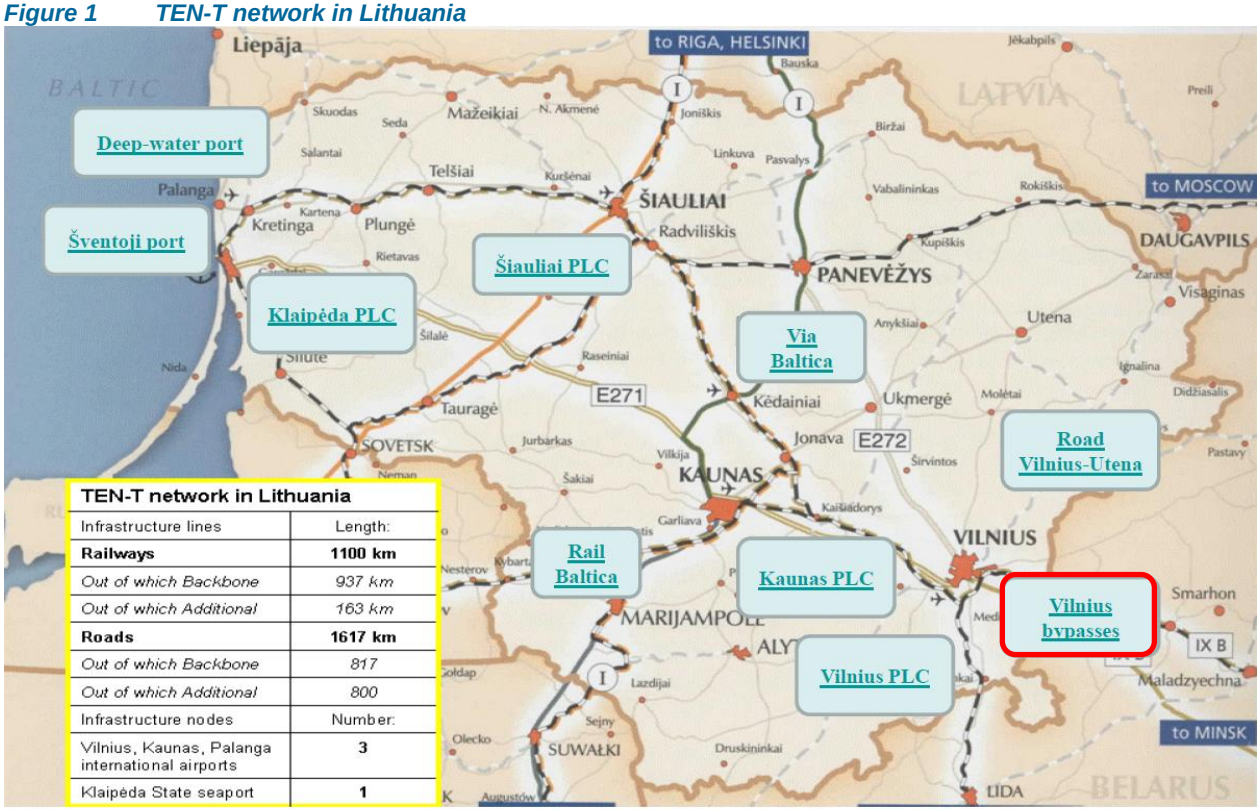
2 PROJECT STRATEGY AND OBJECTIVES

2.1 Project description and strategic objectives of the project

The *Western by-pass Stage II* project regards the new construction of an A1 category road of 2.84 km length, connecting the Northern part of the metropolitan area of Vilnius to the city centre and to the industrial Southern and Eastern part of the Lithuanian capital city. The project will improve road transport between the suburban area and the main city and also the accessibility to the International Airport situated in the South-Eastern part of the Vilnius district.

The major project contributes to the realization of the objectives of the *Operational Programme of the Economic Growth* – (approved by the European Commission - *Decision no. C(2007)3740 of 30 July 2007*, priority axis V – *Development of Trans-European Transport Network*, activity No. 4 *Transport congestions and accident rate decreasing*. The *Vilnius Western by-pass* will connect the international transport corridor IXB *Kiev-Minsk-Vilnius-Klaipėda* with the *Vilnius-Panevėžys* motorway and will become an integral part of the TEN-T corridor – North- South direction.

Figure 1 TEN-T network in Lithuania



TEN-T network in Lithuania	
Infrastructure lines	Length:
Railways	**1100 km**
Out of which Backbone	*937 km*
Out of which Additional	*163 km*
Roads	**1617 km**
Out of which Backbone	*817*
Out of which Additional	*800*
Infrastructure nodes	Number:
Vilnius, Kaunas, Palanga international airports	**3**
Klaipėda State seaport	**1**

Source: http://www.portofklaipeda.lt/uploads/banners/MoTC-G-Jakubauskas-Implementation%20of%20State-Transport-Policy.pdf

The implementation of the project will contribute to the following national and regional strategies and priorities as also identified in the application form:

At a national level:

- Lithuanian Strategy for the Use of EU Structural Assistance in 2007 – 2013 for the Implementation of Convergence Objective;
- The Master Plan of the Republic of Lithuania (2002) - foreseeing the construction of Vilnius Western and Southern by-passes;

- The Long-term (until 2025) Transport System Development Strategy of Lithuania (2005) - sets the target of developing a modern and sustainable multimodal transport system showing safety and service quality indicators in line with the European best practices. This document emphasises the lack of bypasses at major cities. One of the most important objectives of road transport infrastructure development is the modernization of E roads; E85, E272, E28 also including the construction of the Southern and *Western by-passes* in the Vilnius city area.

2.2 Project description

The investment subject of this appraisal regards one section (*Stage II*) of the whole *Western by-pass* project. Actually – as stated in the application form (§ B.5) – *the Vilnius City Western by-pass is one of the most expensive infrastructure in the road sector since the restoration of the independence. Based on preliminary prices the construction works of the whole by-pass would cost about 190 million Euro.*

By assessing the scale of the project and the financial resources of the Vilnius Municipality, it was decided to implement the investment in three stages (see Table 1 below and Figure 2 overleaf).

Table 1 Vilnius Western by-pass project description

Stage	Description	Status	Costs (M€)	Implementation Scheme
I	A three-level intersection at Oslo street and a road segment to *L.Asanavičiūtės* street.	Construction completed in December 2010	35.4	Public Fund and EU Contribution (2007-2013 Cohesion Fund)
II (2.84 km)	The section of the *Western by-pass* from *L.Asanavičiūtės* street to *Ozo* street.	Under construction (construction phase started in 2011)	51.3	Public Fund and EU Contribution (2007-2013 Cohesion Fund)
III (5.10 km)	The section of the *Western by-pass* from *Ozo* street to *Ukmergės* street.	Design stage (construction works start is expected not earlier than in 2013)	~100	Public Fund and EU Contribution (2014-2020 Cohesion Fund)

Source: Annex XXI

The *Western by-pass Stage I* construction works were carried out by *Kauno Tiltai* and *Panevėžio Keliai* companies. The *Lazdynai* bridge was reconstructed as part of the construction works for this first section. The bridge was widened from 6 up to 8 traffic lanes; also a two-level skyways and a tunnel viaduct were built, as well as new connecting roads, access ramps and utilities related works. *Stage II* works under appraisal are performed by *Kauno Tiltai* Company together with the construction companies *Alvora* and *Fegda*[1]. The main technical indicators of section two are as follows:

- A new 2.84 km long six-lanes road (three per direction), running parallel to *Laisves* Avenue, within the *Lazdynai* District;
- Two grade-separated intersections with *L. Asanavičiūtės* street and *Pilatėis* avenue with two 46.7 m. long viaducts;
- An additional 46,7 m. long viaduct along the main stretch of *Western by-pass* at the intersection with *D. Gerbutavičiaus* Street;
- A 48.4 m. long viaduct for pedestrians and cyclists will be built at *V. Maciulevičiaus* Street.

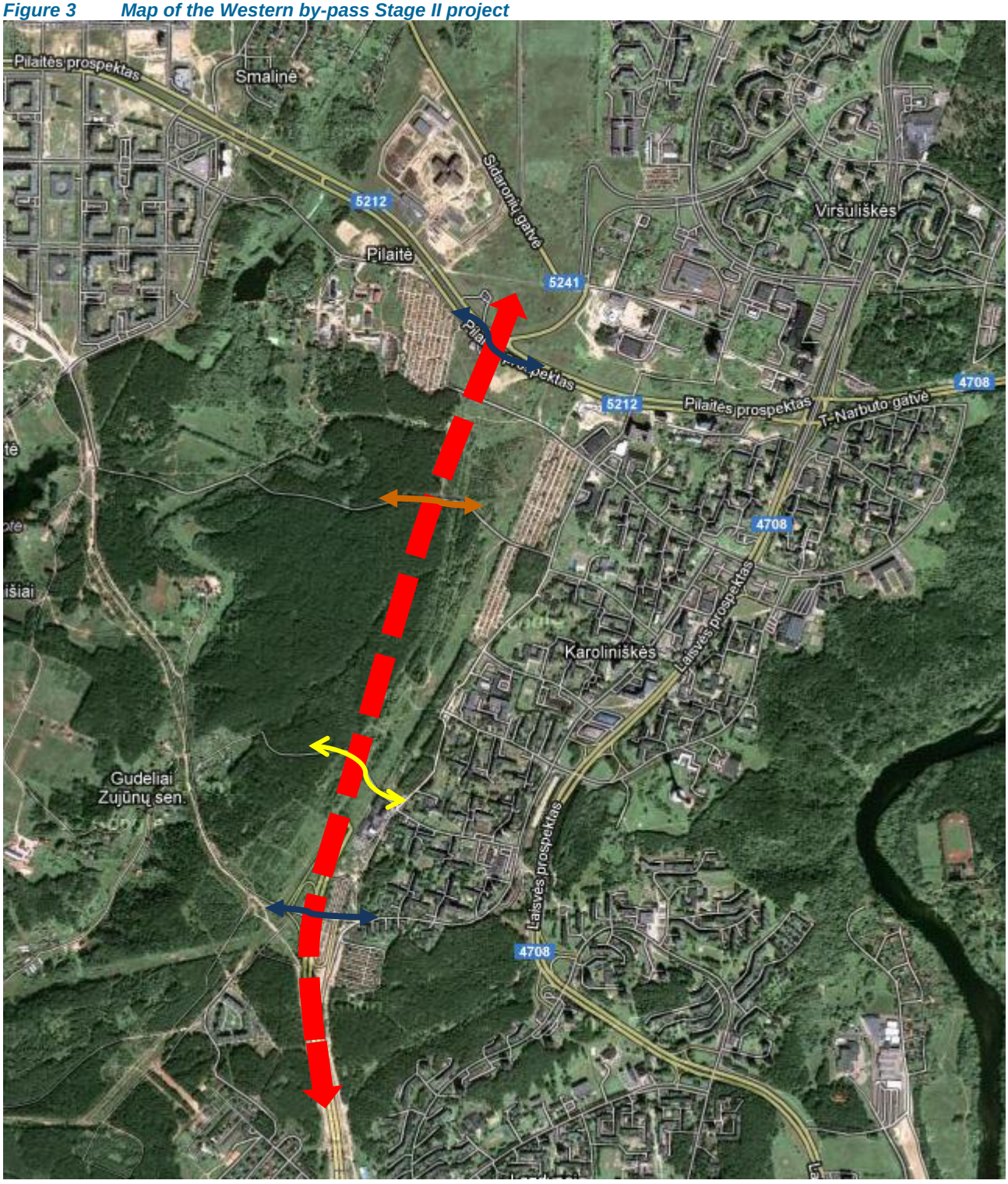
The implementation of the project is estimated reducing travel time on the main North-South TEN-T network, by introducing an additional alternative without stops and with a maximum speed limit of 80 km/h.

1 http://www.kaunotiltai.lt/media-center/2011/kauno-tiltai-and-partners-will-continue-the-construction-of-vilnius-western-bypass/

Figure 2 The three stages of the Western by-pass

Source: Annex XXI

Figure 3 Map of the Western by-pass Stage II project



Grade-separated Intersections and Viaducts

Viaduct

Pedestrian Viaduct

Western by-pass Stage II corridor

The table below summarizes the units of analysis adopted in the preparation of the application dossier; which are acceptable.

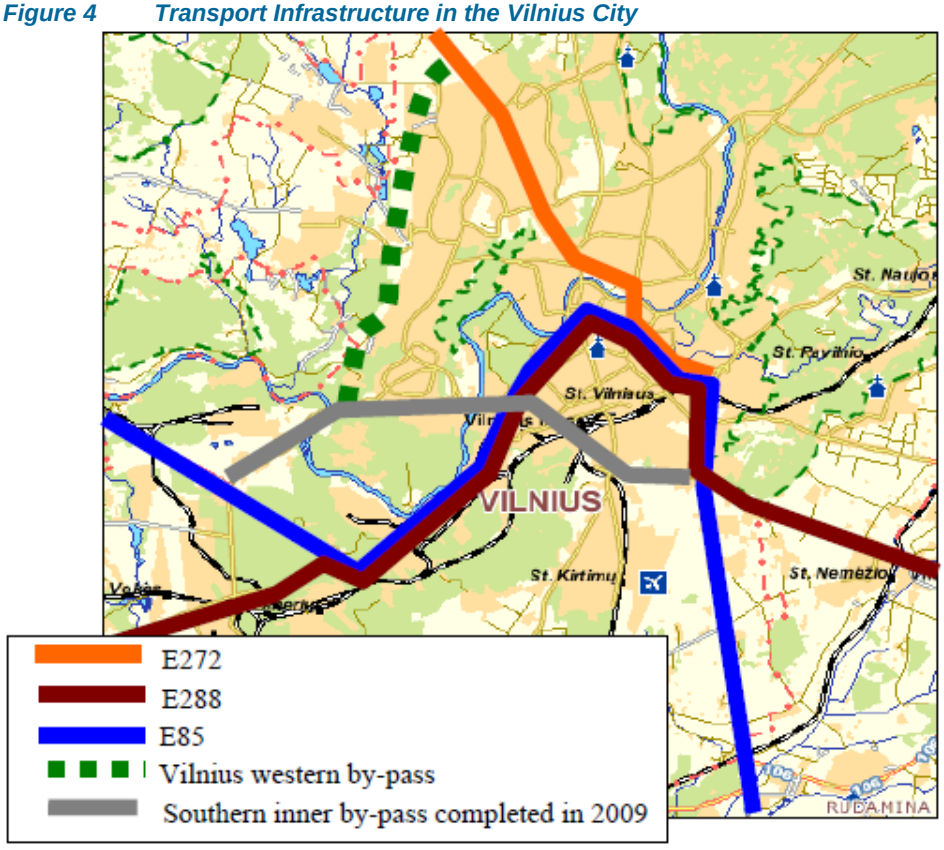
Table 2 Units of analysis

Engineering works including technologies	*Western by-pass Stage II*
Procurement and contracting	*Western by-pass Stage II:* • Contract for *Works* , Date July 04 2007, Reference N° 2007/S 126-154077 • Contract for *Technical Supervision,* Date February 16 2008, Reference N° 2008/S 33-045676
Development consent and environmental certifications	For EIA and Natura 2000 related procedures, the unit of analysis is the whole *Western by-pass* project.
Infrastructure management and operation	Whole *Western by-pass* managed and maintained by the Vilnius City Municipality.
Economic and financial analysis	*Western by-pass Stage II*

2.3 Functional objectives of the project

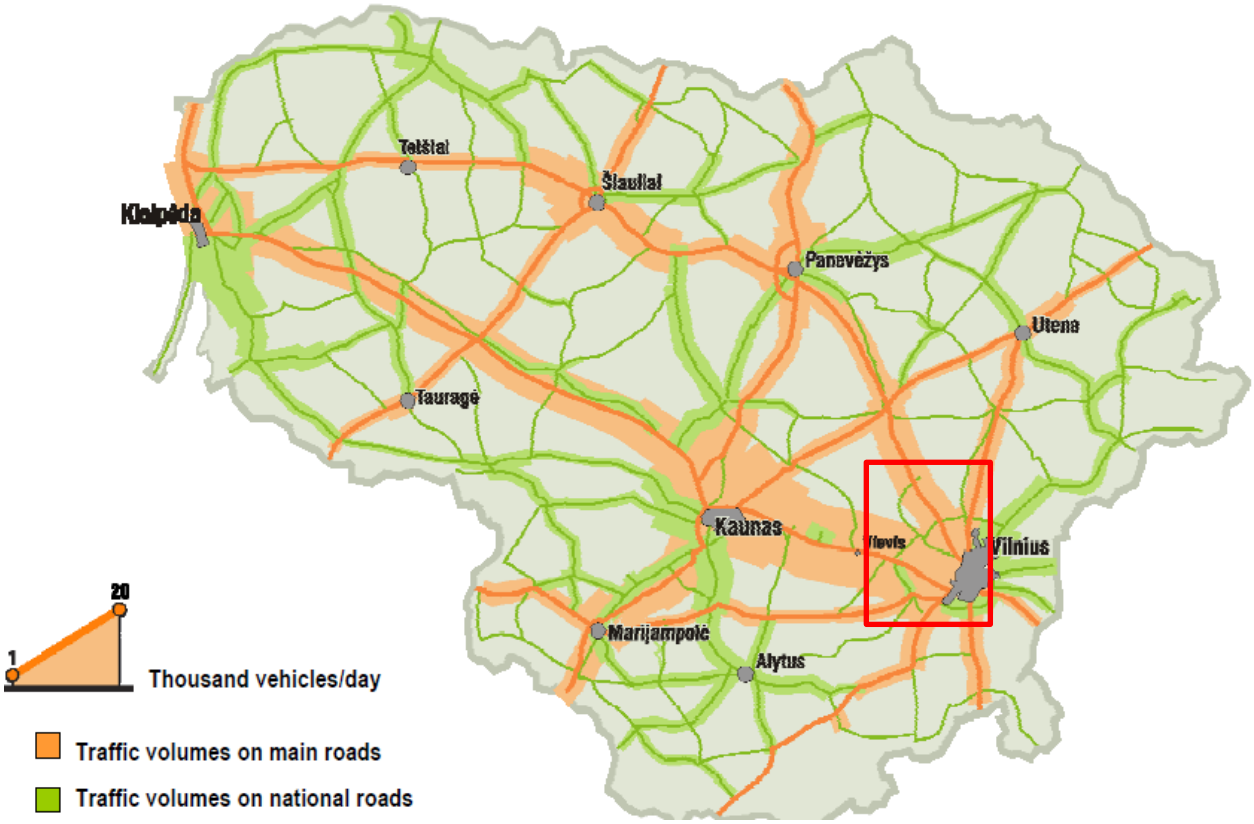
The *Western by-pass* project is considered strategic for the social and economic development of the northern area of *Vilnius*. According to the application form the A1 category road constructed under Stage II is expected to improve accessibility in the area, also supporting the development and activities at the industrial district located in the Southern and Eastern part of the Lithuanian Capital. In addition, users will access more quickly social services located in the city centre and at the International Airport. Figures 4 and 5 show how the transit and the incoming/outgoing traffic from the North is expected to cross the city centre network to reach the Southern and Eastern part of Vilnius – thus confirming the strategic importance of the *Western by-pass* project to release the city centre from traffic congestion.

Figure 4 Transport Infrastructure in the Vilnius City



Source: CBA report

Figure 5 Transport Volumes on main roads in Lithuania



Source: Integrated Territorial Plan in Lithuania, LRA, 2009

As already noticed in the previous paragraphs above, under the functional stand point, the *Western by-pass* will increase the capacity of the existing high-speed road network within the *Vilnius* metropolitan area inter-connecting to the following other major roads:

- The TEN-T roads E-272 and E-28;
- The Southern inner by pass (project completed in 2009 co-financed by Jaspers EIB funds);
- The East-West direction Trans-European transport corridor IXB (E-28 and E-85 roads).

The functional objectives of the project are reasonable overall; the road corridor will effectively contribute to an improvement of the existing road network and be beneficial for these territories.

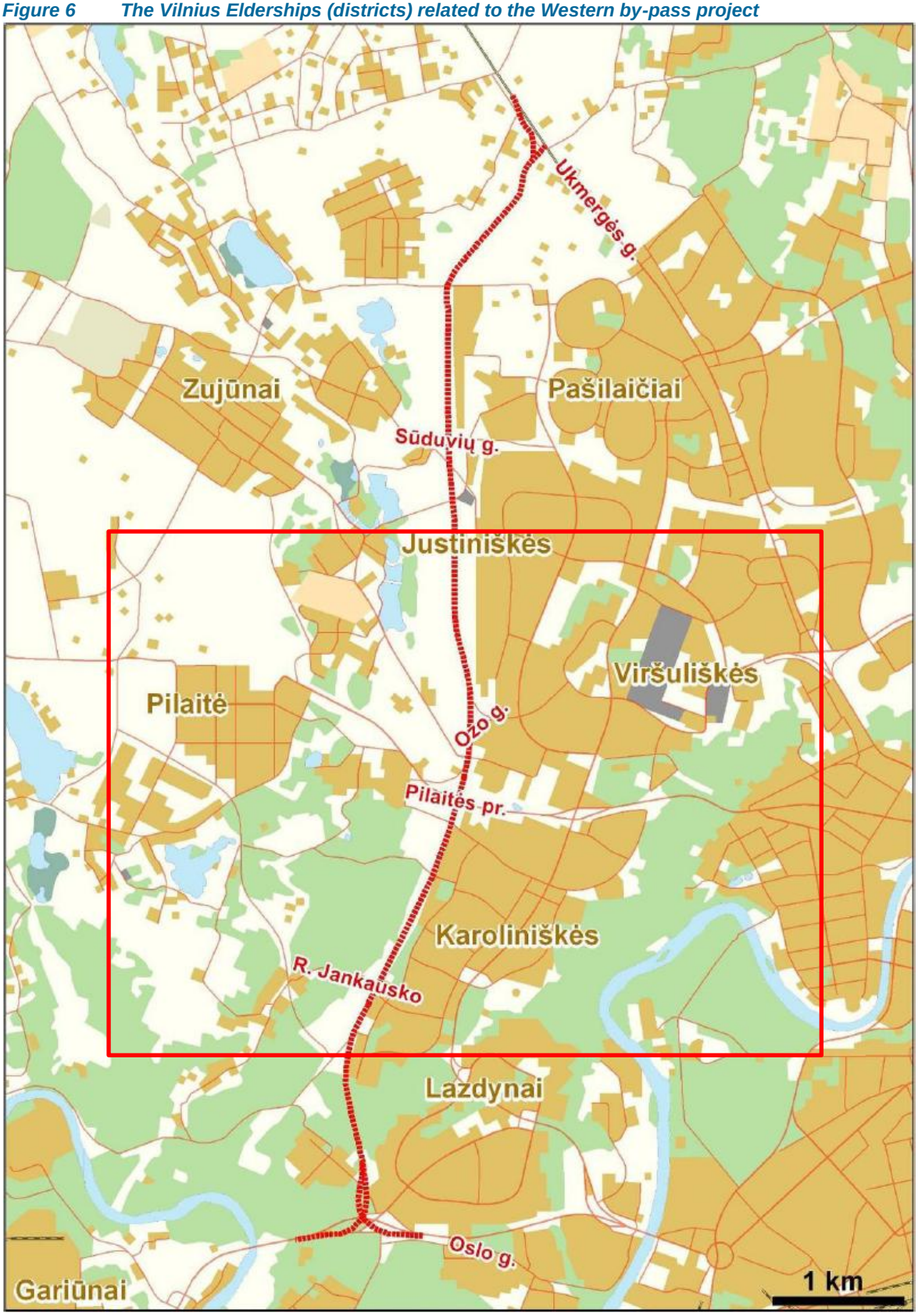
The population living in the neighbourhoods of the Vilnius Municipality directly benefiting from the project belongs to the Lithuanian *Eldership*s of Justiniškės (~31,000), Viršuliškės (16,250), Karoliniškės (31,175) and Pilaitė (~16,000) – See Figure 6 overleaf. In total, the entire population directly benefiting from the Stage II project is around 94,000 inhabitants which seems a reasonable value if considering the 2.84 km length of the A1 category road (see also Table 3 overleaf).

Nonetheless the population trend for the area suggest adopting more conservative assumptions for future traffic estimations than the ones effectively assumed in the application dossier – See also Figures 7 and 8 below. Accordingly to the application form (page 11), Vilnius city had 558 thousands inhabitants in 2009 and a population growth rate of 2% between 2003 and 2009. This information is not confirmed in other official study published by the Lithuanian Statistics Department (*Lietuvos Statistikos Departamentas*)[2]. Considering this 2011 up-to-date

2 http://www.stat.gov.lt

documentation, in 2009 the Vilnius population registered 535,631 inhabitants with a negative population growth rate of 3.3%.

Figure 6 The Vilnius Elderships (districts) related to the Western by-pass project



Source: CBA report

Table 3 Total area and Population in neighbourhoods of Vilnius Municipality

Seniūnijos *Neighborhoods (Administrative districts)*	Teritorija, km² *Total area, sq. km*	Gyventojų skaičius *Total population*	iš jų of which		Gyventojai amžiaus grupėmis *Population by age group*			Gyventojų skaičius 1 km² *Density, population per sq. km*
			vyrai *men*	moterys *women*	0-15	darbingo amžiaus *working-age*	pensinio amžiaus *age over working-*	
Antakalnio	77,2	39697	18382	21315	6608	24776	8311	514,2
Fabijoniškių	5,9	36644	16991	19653	7800	25640	3199	6210,8
Grigiškių	7,0	11617	5367	6250	2550	7385	1682	1659,6
Justiniškių	3,0	30958	14148	16810	5160	22156	3639	10319,3
Karoliniškių	3,7	31175	13711	17464	4763	18778	7632	8425,7
Lazdynų	9,9	32164	14499	17665	5452	18772	7938	3248,9
Naujamiesčio	4,9	27892	12521	15371	4435	17889	5565	5692,2
Naujininkų	37,6	33457	15263	18194	6710	21090	5653	889,8
Naujosios Vilnios	38,6	32775	15266	17509	6467	20302	6002	849,1
Panerių	84,8	8909	4326	4583	1879	5554	1476	105,1
Pašilaičių	7,9	25674	11799	13875	5333	18013	2326	3249,9
Pilaitės	13,9	15996	7447	8549	4261	10597	1136	1150,8
Rasų	16,3	13054	6240	6814	2498	8517	2037	800,9
Senamiesčio	4,4	21022	9534	11488	3878	13411	3731	4777,7
Šeškinės	4,6	36604	16659	19945	5961	25093	5541	7957,4
Šnipiškių	3,1	19321	8597	10724	3508	12303	3508	6232,6
Verkių	56,0	30856	14255	16601	6316	21065	3471	551,0
Vilkpėdės	10,8	24749	11047	13702	4773	15184	4792	2291,6
Viršuliškių	2,6	16250	7180	9070	2514	10474	3262	6250,0
Žirmūnų	5,7	47410	20632	26778	7646	26763	12996	8317,5
Žvėryno	2,6	12188	5254	6934	2032	7775	2379	4687,7
Nenurodyta	-	5492	3346	2146	569	4786	136	-
Iš viso	**400,5**	**553904**	**252464**	**301440**	**101113**	**356323**	**96412**	**1383,0**

Source: Census 2001, http://www.stat.gov.lt/vilniussampling/vsavsensk/surasymas%20seniunijomis.pdf

Figure 7 2001-2011 Population trend in the major cities

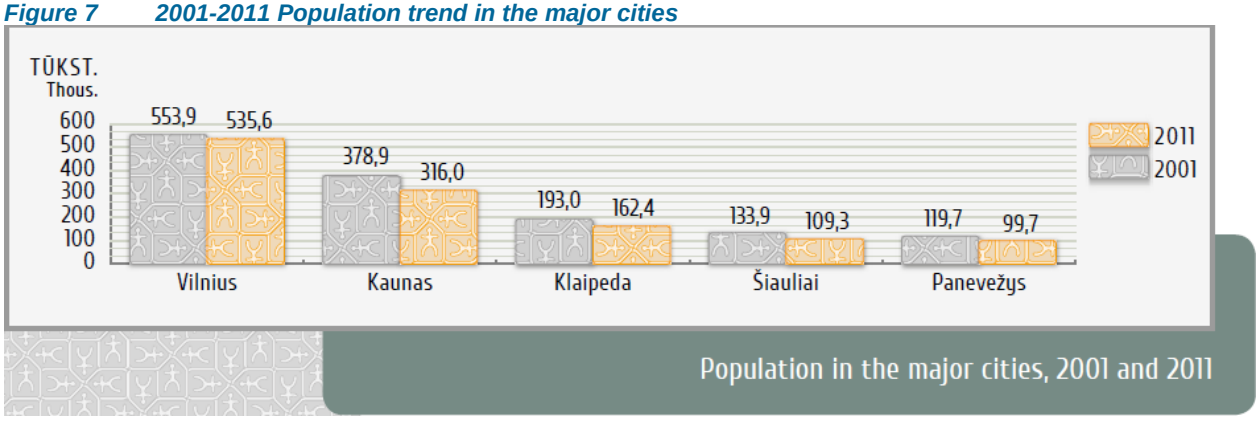
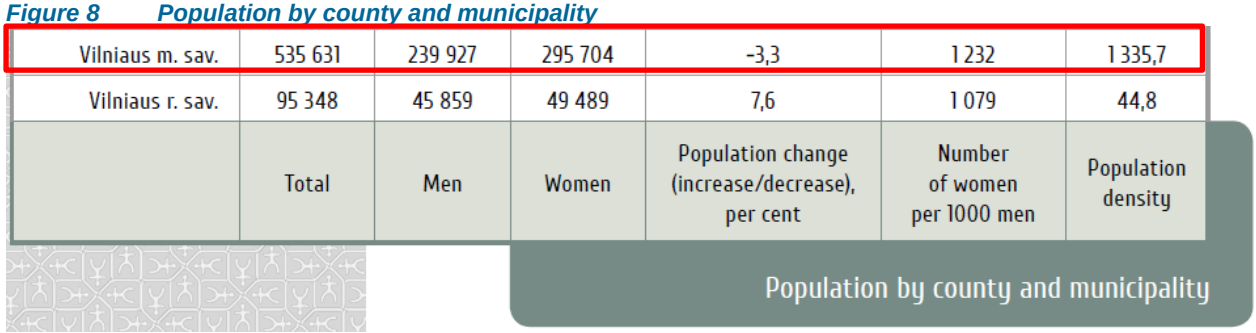


Figure 8 Population by county and municipality



Vilniaus m. sav.	535 631	239 927	295 704	-3,3	1 232	1 335,7
Vilniaus r. sav.	95 348	45 859	49 489	7,6	1 079	44,8
	Total	Men	Women	Population change (increase/decrease), per cent	Number of women per 1000 men	Population density

Population by county and municipality

Source: http://www.stat.gov.lt/uploads/Lietuvos_gyventojai_2011.pdf

The information included in the application is thus not updated and should be corrected in principle, particularly because of the correlation between demographic trends and traffic growth. As further commented at Section 3.3 and Section 4.2.2 below, although sensitivities to traffic demand seems confirming the project is still generating benefits for society, traffic demand forecasts seem however overestimated.

Concerning the road infrastructure indexes, it is worth considering how this is lower for the Vilnius County than the average for Lithuania (Table 4) – despite this county be more populated. This is however presumably to be associated to the low population density of this area (1359 inhab./km² while the average for Lithuania is 1864 inhab./km²).

Table 4 Technical indicators of streets in the largest Lithuanian cities in 2009

Indicators	*Vilnius*	*Kaunas*	*Klaipéda*	*Siauliai*	*Panévesys*
Population (thousands)	558.17	352.28	183.43	126.22	112.62
Population density (number/km^2)	1391.9	2243.8	1871.8	1558.2	2252.4
Length of streets (1000 inhabitants/km)	1.78	2.58	2.87	2.76	3.89
Density of streets (km/km^2)	2.47	5.79	5.38	4.3	8.76
Streets with improved paving (km)	762	586	309	182	307

Source:http://old.vilnius.lt/newvilniusweb/index.php/116/?itemID=90896

In any case, with the highest motorization indexes and existing low road infrastructure density, the existing traffic levels on the road network in the Western part of Vilnius support the case for this investment as it is confirmed in the Vilnius City Master Plan. The *Justiniškės*, *Viršuliškės*, *Karoliniškės* and *Pilaité* districts represent a high concentration of buildings in the territory (all residential areas) – See table 5 below.

Table 5 Concentration of buildings in the Western part of the Vilnius city

Indicators	*Karoliniškės*	*Viršuliškės*	*Justiniškės*	*Pilaité*
Population 2006 (thousands)	31.4	16.4	31.2	14.4
Concentration of buildings (ha)	172.7	80.93	137.47	58.36
Population Growth Rate 2001-2006	0.99%	0.90%	0.98%	-9.40%

Source: own based on http://old.vilnius.lt/newvilniusweb/index.php/116/?itemID=90896

2.4 Consistency with Other Union Policies

The sources for the financing of the *Western by-pass Stage II* are detailed at page 42 of the application form. The project is going to be financed by mean of public funds, including the EU Cohesion Fund. The co-financing rate adopted in the application form is 91.9%, consistently with the 2007-2013 Operational Programme of the Republic of Lithuania.

Also *Western by-pass Stage I* design studies and implementation works were co-financed during the programming period 2007-2013. In accordance with the application form (page 43), the Minister of Transport and Communications of the Republic of Lithuania, on amendment to the Order No. 3-262, approved the deadline for the submission of applications (1/30/2009) and on 5 February 2009 the evaluation of administrative compliance of the Application was completed. The final amount of Cohesion Fund grant was 25,477 M€. We suggest checking the scope and results of these studies and of previous applications with the ones included in the present application dossier, as appropriate.

The project has also received the JASPERS technical assistance contribution for the environmental compliance, feasibility study, and cost-benefit analysis, including the risk analysis. The JASPERS process and procedures related outcomes were not enclosed to the project dossier; we suggest cross-checking the results of our appraisal with any possible relevant JASPERS conclusion or recommendation.

The publicity measures, described at page 44 of the application form are in line with the requirements of the EU regulation. The cost for these measures is estimated to be equal to € 10,000, which is an acceptable value if compared to the total investment costs (51.3 M€ including VAT). This cost is also consistent with that presented in Table H.1 of the application form which results in a value of € 8,264 not including VAT (21%).

B.2. Recommendations and suggestions

The *Western by-pass* project is reasonably expected to be a beneficial one for the population living in the North-Western part of Vilnius and under the functional standpoint the road – adding an alternative to the existing infrastructure – will alleviate congestion on the North-South TEN-T corridor and other main urban road network. It will effectively reduce travel times and ensure safety. This last element will also be pursued through implementation of a speed enforcement device.

The information provided in the application dossier regarding the functional strategic merit of the project to improve traffic flow in the city and the socio-economic data (except the population trend) support overall the objectives of the project.

We suggest cross-checking the results of the applications for funding and preparatory works undertaken for this project and its *Stage I*, either supported by CF or JASPERS.

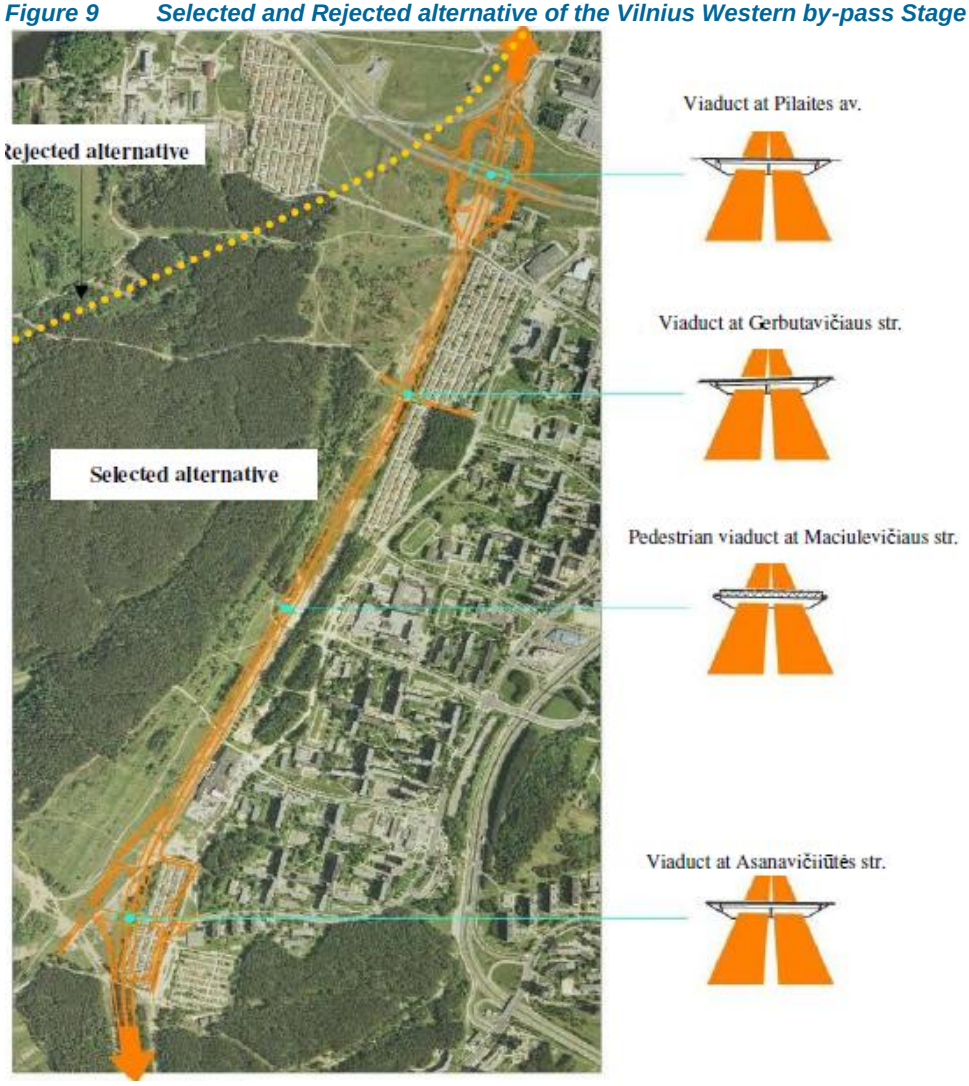
3 TECHNICAL FEASIBILITY, PROJECT COSTS AND DEMAND ANALYSIS

3.1 Technical Feasibility

3.1.1 Feasibility Study

The *Western by-pass* project was started to be planned 30 years ago. In the middle nineties, Vilnius City Municipality first analysed the alternative to reconstruct *Laisvės avenue* into a 6 traffic lanes and eliminate the existing traffic-light intersections by designing separated intersections. This project solution was less preferable than developing a *new link scenario*.

Figure 9 Selected and Rejected alternative of the Vilnius Western by-pass Stage II project



Source: Feasibility Study

As stated in the application form – page 17 – the alternative on the existing road was rejected because:

- *It would have been necessary to reconstruct the existing grade-separated intersections which are not adjusted to the increase of traffic lanes, and to construct new intersections which had not been planned during street design;*
- *The street carriageway and the engineering structures would come close to the buildings, negative impact noise and pollution on the local residents would increase;*

- *During reconstruction works of the street the traffic in the Western part of the Vilnius city would be practically paralyzed;*
- *The procedures of land acquisition for public needs will be more complicated and expensive compared to the building of Vilnius Western by-pass*.

After the decision of building a new link (1998), five different studies were pursued to find the best route option. The main *criteria* was the environmental impact (possible increase of noise and air pollution) as requested by the local residents. Two of these alternatives were not technically viable and therefore were rejected. The other three ones were analysed in their Environmental Impact Assessment (EIA):

- Crossing the *Gudeliai* settlement from the left side (option 2);
- Crossing the *Gudeliai* settlement from the left side including the construction of a tunnel with a different-length (150 m and 400 m), also with a modified grade-separated junction and reduced planned curves (option 3);
- Crossing the *Gudeliai* settlement from the right side: a new route from the western side of *Gudeliai* to the south of the existing corridor with a grade-separated junction in the south-western part of the planned territory. For this alternative more than 10 ha of forest should have been felt down, the route have got into the *Neris* River valley, having a complicated geomorphologic structure, causing a lot of ravines and washes; erosion of *Neris* River banks may also have happened due to construction (option 4).

This last fourth alternative was thus rejected for obvious impacts and risks (the *Neris* river is also classified as a Natura 2000 site). Option number 3 was finally chosen; worth adding that in order to reduce noise impact it was decided, by the public, to construct a tunnel at *Gudeliai* as part of the works realized under Stage I.

The analysis of the demand and traffic on the *Western by-pass Stage II* project is commented in Section 3.3 below.

3.1.2 Technical Concept

Under the operational/functional stand point a six lanes road section will of course improve accessibility in the area and reduce travel times on the North-South corridor of the Vilnius city. The *Western by-pass* is designed for fast travel without stops and its purpose is to distribute the traffic flows among the main neighbourhoods of the city and rural roads. The following are the main characteristics; maximum speed limit – 80 km/h; width of the carriageway – 22 m; and width of the right-of-way within the limits of red lines – 70 up to 100 metres. Pedestrian traffic will be prohibited; grade-separated junctions and pedestrian crossings are planned. Actually, to ensure traffic safety a pedestrian/bicycle track and passage road for light traffic in the continuation of *V. Maciulevičiaus* street is also planned. Based on the requirements of technical regulations of A1 category it is required to construct exit roads into the adjacent territory and entry roads from it, avoiding at-grade intersections.

The project is technically sound regarding the proposed solutions and construction techniques.

3.1.3 Environmental assessment

Environmental Impact Assessment. An Environmental Impact Assessment process has been undertaken and its related procedures completed for the whole *Western by-pass* project.

The Authorities consulted during preparation of EIA programme are:

- The Governor Administration of Vilnius County;
- City Development Department of the Vilnius City Municipality Administration;

- Fire Service of the Vilnius City of the Fire and Rescue Department under the Ministry of the interior;
- Vilnius Public Health Centre;
- Vilnius Territorial Unit of the Cultural Heritage Protection Department under the Ministry of Culture;
- Environmental Protection Department of Vilnius Region;
- The Ministry of the Environment;
- State Service for Protected Areas at Ministry of Environment.

The study was carried out by *UAB Infraplanas*. Although in the application form (§ F.3.1.2, page 36) it is presented the date of November 16,2009 for the development consent of the EIA, Appendix I(A) and I(D) states that the decision of the responsible institution and the date of decision-making was December 29, 2004 (official letter No. (1-15)-D8-10164). Given that the validity of the EIA related declarations in Lithuania is 5 years, we assume the certificates were re-produced in 2009, although we suggest confirming this interpretation.

The public was informed about the decision via internet on the following web site: *http://www.am.lt/TA/lrs_search.php3?RegKodas=&NuoMetai=1883&NuoMenuo=01&NuoDiena=01&IkiMetai=2020&IkiMenuo=12&IkiDiena=31&Organizacija=Aplinkos+ministerija&DokTipas=Informacija+d%C4%97l%20planuojamos%20%C5%ABkin%C4%97s%20veiklos&Statusas=&Kalba=&PavZodis=&TekstZodis=&SubmitButton=Ie%F0koti*

Also a non-technical summary of the EIA was correctly included in the documentation available – See Appendix I(B) of the application dossier.

The costs for the identified preventive and mitigation measures have been estimated to be equal to the 7.2% of the investment (totalling €3.7 M); which we consider reasonable. These costs are detailed as follows:

- Rainwater discharge (drainage works): €2.62 M;
- Pedestrian viaduct at V. *Maciulevičiaus* street: €0.62 M;
- Replanting with trees and bushes: €0.46 M.

These costs provided in the application form (page 39) are not consistent with the ones included in the Feasibility Study (page 19); the environmental protection measures in the latter total €3.35 M instead of €3.7 M. We assume the values in the application are the most updated ones, although this should be clarified and the application dossier made consistent.

Strategic Environmental Assessment. The application form states that the project is included in two plans subject to SEA Directive. The links to the *Long-Term Transport System Development Strategy of Lithuania* and to the *Vilnius Master Plan* are provided in the application form as appropriate:

- *http://www.transp.lt/en/activities/planning_documentation/long_term_strategy_until_2025_of_lithuanian_transport_system_development_/long_term_strategy_until_2025_of_lithuanian_transport_system_development*
- *http://www.am.lt/LSP/files/Aplinkapilnas.pdf*

As stated in the application form (page 38), after evaluation of comments and remarks the SEA was corrected and approved on February 14, 2007 by Decision No. 1-1519 of Vilnius City Municipality. The document is available for consultation in the Vilnius City Municipality Internet Website: *http://www.vilnius.lt/bplanas/download.php?file_id=98*

Natura 2000. *Appendix I(E)* to the application form contains the declaration from the institutional authority (Vilnius City Municipality Administration, Energy and Economy Department*)* for the whole *Western by-pass* project.

This certificate states that the project is unlikely to have impacts on any classified *Natura 2000* Area. Actually, the nearest Natura 2000 site is the *Neris* River and the shortest distance to this site is 300 metres; detailed design of the *Stage I* project ends at the upper terrace of the river.

As stated in the application dossier, in 2003 the EIA was under preparation and at that time Lithuania had no Natura 2000 network yet; therefore, *procedures related to the assessment of impact significance on Natura territories had started significantly later.*

However, the State Service for protected areas at the Ministry of the Environment signed the decision for which *the implementation of the planned economic activity cannot make a significant impact on the Natura 2000 site.*

B.3.1.3 Recommendations and suggestions

The application dossier includes some inconsistencies relating to the dates of the EIA certificates and the costs for the impact mitigation measures. These inconsistencies should be clarified or amended, as appropriate.

3.1.4 Project implementation scheme and time schedule

According to Table D.1 of the application form (page 21), the implementation status of the project is currently in progress. Table 6 below, shows the real and planned "start" and "completion" dates of the project phases:

Table 6 Project calendar

	Project Phase/Contract	Start	Completion
1	Feasibility Studies	01/05/2008	30/06/2010
2	Cost benefit analysis (including financial analysis)	01/05/2008	30/06/2010
3	Environmental Impact Assessment	01/06/2003	29/12/2004
4	Design Studies	01/03/2007	20/11/2008
5	Preparation of Tender documentation	15/05/2010	18/02/2011
6	Expected launch of tender procedure: ▪ *Works* ▪ *Technical supervision*	 04/03/2011 07/12/2011	 26/07/2011 25/04/2012
7	Land acquisition	-	-
8	Construction phase/ Contract	26/07/2011	25/10/2014
9	Operational phase	25/10/2014	-

Source: Annex XXI

Table 7 overleaf provides an overall overview of the construction works and technical supervision of the *Western by-pass Stage II* project. We do not see risks of timely completion for the investment, also taking into consideration the minimal 2.84 km length of the road and the respect of the construction timetable without delays in the completion of the *Western by-pass Stage I* project, which was already completed in December 2010.

As detailed in Section 4 of this study, the CBA does not follow the project calendar. In particular, regarding the construction phase the "start" date is 2009 instead of 2011, whilst the operational phase is expected to start in 2012 instead of 2014. As also stated in the Feasibility Study (page 20), the financial and economic calculations were actually made in 2010 assuming costs estimated in 2008. The financial and socio-economic analysis included in the CBA report should have made consistent with the new timetable presented in the application form.

Table 7 Project Summary Schedule

	2011					2012											2013											2014								
Month	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10
Activity																																							
Construction works																																							
Technical supervision	*	*	*	*	*	*	*	*	*																														

*Technical supervision is carried out bywag the contract for services is planned to sing 2012-04-25.

Source: Annex XXI

The project is not going to be implemented as a public private partnership. After its completion it is going to be operated and managed by the Vilnius City Municipality. Land acquisitions were not needed for Stage I and II of the *Western by-pass* because the land is owned by state.

3.2 Project costs

The application dossier – Table H.1 – states the costs for the *Western by-pass Stage II* project are € 51,325,904 (including VAT). This value is not consistent with that presented at Table E.2 of the application form (€ 54,508,643) and also with the construction costs included in the CBA report – See Section 4 below.

The overall investment costs (viaduct, tunnel, utilities, etc.) were presented in the Feasibility Study, consistently with the values included at Table H.1 of the application form. This division of costs between different categories is presented below (€2010 prices with VAT).

Table 8 Distribution of costs by eligibility

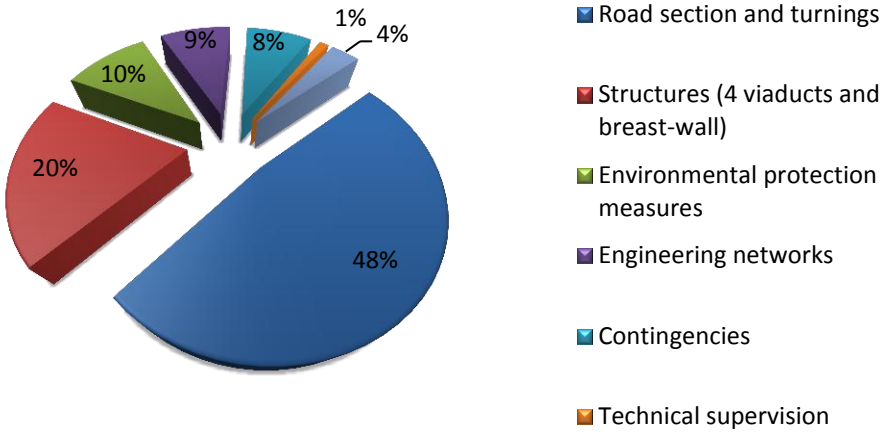
	Description	Costs	
		Value (Euro)	%
I. Eligible costs		**87%**	
1.	Construction of new road section and structures		
1.1	▪ Preparatory works	264,582	0.60%
1.2	▪ Road section and turnings	24,462,089	54.80%
2.	Structures		21.95%
	Viaduct of Asanavičiūtės str.	*3,901,930*	
	V. Maciulevičiaus str. Pedestrian viaduct	*559,785*	
	D. Gerbutavičiaus str. viaduct	*1,145,205*	
	Pilaitės av. viaduct	*4,201,599*	
3.	Planting	419,919	0.95%
4.	Rainwater discharge	2,377,686	5.30%
5.	Illumination	2,456,511	5.50%
6.	Breast-wall	315,507	0.70%
7.	Contingencies 10%	3,984,024	8.91%
8.	Technical supervision	577,068	1.29%
Total of eligible costs (including VAT)		***44,665,904***	***100.00%***
II. Non eligible costs		**13%**	
1.	Utilities (engineering networks; heat supply, electronic communication network, outdoor gas pipeline, domestic waste water collector)	4,595,406	69.00%
2.	Contingencies 10%	261,537	3.93%
3.	Project implementation supervision	118,782	1.78%
4.	Detailed design	1,649,223	24.76 %
5.	Detailed design expertise	5,068	0.08%
6.	Feasibility study and environmental impact	19,984	0.30%
7.	Publicity	10,000	0.15%
Total of non-eligible costs (including VAT)		***6,660,000***	***100.00%***
TOTAL OF ELIGIBLE AND NON-ELIGIBLE COSTS		**51,325,904**	

Source: own based on the Feasibility Study

The unit cost per km for the road section and turnings – €8.6 million – is closer to the higher – end value of the range for construction costs for this type of infrastructure in Europe (€11 million for motorways). Although the costs for the road sections and the turnings should have been provided in separate (as done for the other structures); we are of the opinion that high unit cost per km is due to the turnings and ramps infrastructure interconnecting the main road section with *L. Asanavičiūtės street* and *Pilatėis avenue*.

The costs relating to technical supervision are reasonable; the costs for planning (€ 1,481,866 not including VAT), as specified at Table H1 of the application form, correspond to the 3.5% of the project value, which is also acceptable.

Figure 10 Division for categories of Project costs



Source: own based on the Feasibility Study

B.3.2. Recommendations and suggestions

An additional clarification on the costs for the road sections and turnings should be requested, aimed at understanding their reliability. In the event the magnitude of the costs for the turnings and ramps would be less than 30%-40% of these costs, a value-engineering analysis should be requested and provided by the Applicant and Beneficiary aimed at confirming the cost-effectiveness of the propose project design (also in view of the consideration that the only criteria adopted for the selection of Option 3 (preferred layout) was mainly relating to environmental impact).

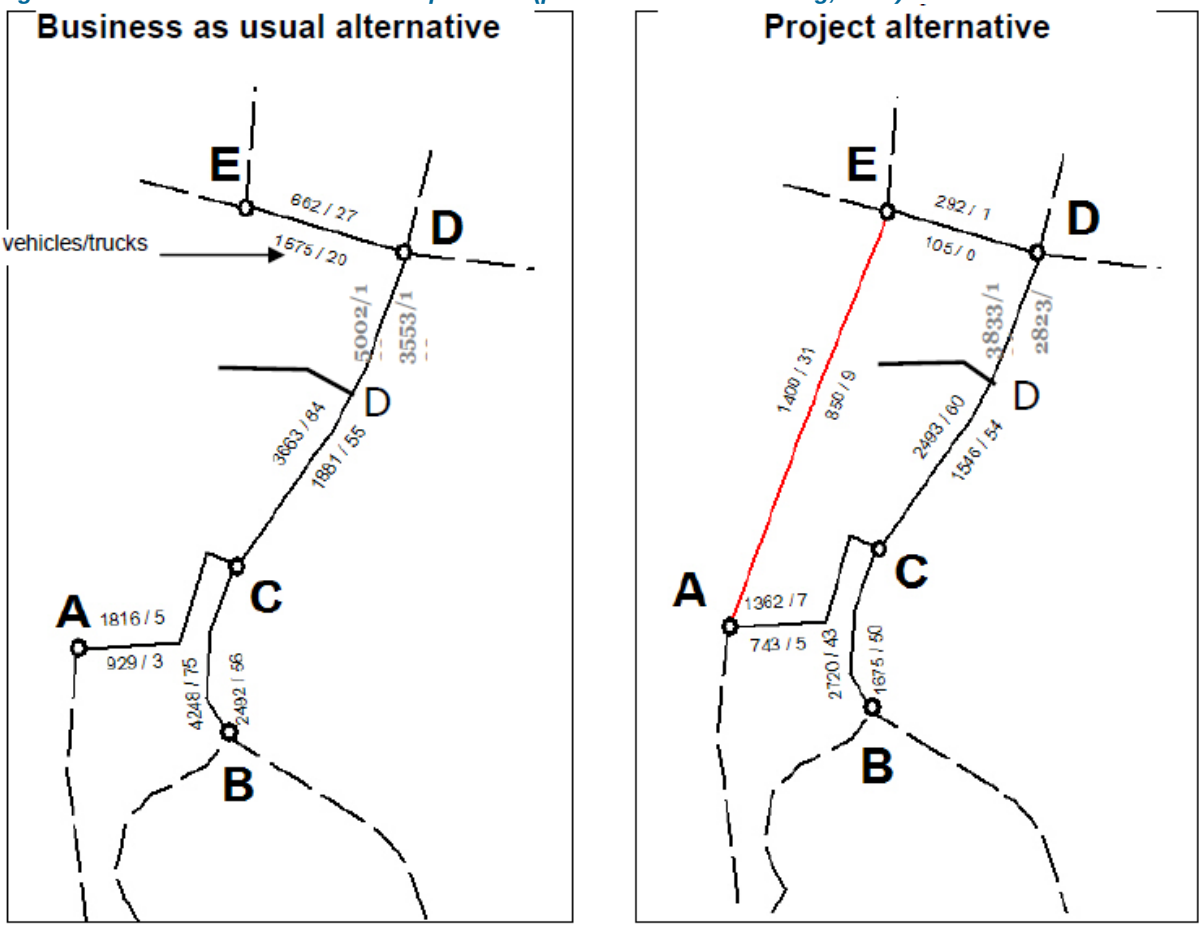
3.3 Demand analysis

The results of the demand analysis are presented under item C.1.1 of the application form.

More in detail, the study was carried out considering the traffic flows related to five roads directly connected with the by-pass project in the North-Western part of the Vilnius city (See Figure 11 below):

- *L. Asanavičiūtės* street – Section (A-C);
- *Laisvės* avenue (between *Architektu* street and *Sausio 13-ios* street) – Section (B-C);
- *Laisvės* avenue (between *Sausio 13-ios* street and *A.P. Kavoliuko* street) – Section (C-D_1);
- *Laisvės* avenue (between *A.P. Kavoliuko* street and *T. Narbuto* street) – Section (D_1-D);
- *T. Narbuto* street – Section (D-E).

Figure 11 Traffic forecast vehicles per hour (peak hour in the morning, 2015)



Source: Annex XXI

In accordance with the CBA, the traffic volume estimates for the base year (2012) for the business as usual scenario is 55,598 in average, for the five sections. This would increase up to 86,929 veh./day in 2032. The *AADT* value for the D_1-D section only is even equal to 93,213 vehicles per day in 2012 for the business as usual scenario.

Table 9 Results of traffic volume measurement, 2007

Road	Year	Location, km	AADT	of which trucks
E272	2002	8.05	20300	2000
	2007		32000	4050
E85	2002	10.01	7150	1000
	2007		10450	1150

Source: Feasibility Study

The information provided in the Feasibility Study – See Table 9 above – shows that the TEN-T network traffic flow (*AADT*) of the main high-speed corridor E-272 is only around 32,000 veh./day (2007). It is worth highlighting that the *traffic flows* values considered in the CBA for the socio-economic analysis (Annex A1, page 117) are considerably higher than the ones registered in the TEN-T corridor which should properly have the major vehicles demand of the North-Western part of the Vilnius city.

Table 10 AADT in the streets related to the Vilnius Western by-pass Stage I project, 2007

Location	Daily vehicle flow, thousand		
	Total of vehicles	Of them – buses, trolley-buses and large trucks	When recalculated to the reduced light vehicles*
Architektų str. in Lazdynai at the former „Papartis"	23.7	1.4	26.5
Asanavičiūtės str. at V. Druskio str.	12.7	0.4	13.6
Buivydiškių str. between Ozo str. and Laisvės av.	34.9	1.1	37.2
Erfurto str. between Oslo and Architektų str.	31.3	0.3	32.0
Geležinio vilko str. at Čiurlionio viaduct	83.1	4.0	91.1
Geležinio vilko str. on the bridge across Neris River	123.9	4.5	132.8
Justiniškių str. between Laisvės av. and Rygos str.	26.1	0.7	27.6
Justiniškių str. between Lūžių str. and Taikos str.	22.7	0.8	24.2
Laisvės av. on Lazdynų bridge	77.0	3.4	83.8
Laisvės av. between Oslo str. and Erfurto str.	34.8	2.3	39.5
Laisvės av. between Erfurto str. and Sausio 13 str.	56.0	3.1	62.2
Laisvės av. between Sausio 13 str. and L. Asanavičiūtės str.	49.1	3.1	55.3
Laisvės av. between L. Asanavičiūtės str. and T. Narbuto str.	68.6	3.4	75.5
Laisvės av. between T. Narbuto str. and Justiniškių str.	76.9	4.4	83.6
Laisvės av. between Justiniškių str. and Viršuliškių str.	45.5	2.6	50.6
Laisvės av. between Buivydiškių str. and Ukmergės str.	28.8	1.9	32.6
Narbuto str. between Geležinio vilko str. and Laisvės av.	45.6	1.4	48.3
Oslo str. before intersection with Erfurto str.	45.1	3.1	51.2
Oslo str. in Lazdynai at pedestrian viaduct	34.9	1.5	38.0
Ozo str. between Ukmergės str. and Buivydiškių str.	46.2	1.7	49.6
Pilaitės av. between Laisvės av. and Western by-pass	16.5	0.2	16.8
Rygos str. between Justiniškių str. and Laisvės av.	21.3	0.7	22.7
Ukmergės str. Žvėryne at Paribio str.	73.2	4.0	81.2

Source: Feasibility Study

Moreover, Table 10 (Feasibility Study, page 47) illustrates the daily vehicle flow in the streets related to the Vilnius *Western by-pass Stage II* project; the 2007 *AADT* for the above mentioned sections is highlighted in red. The average AADT for this year is around 46,000 vehicles, thus nearly 10,000 vehicles less than estimated.

The application dossier should actually include the real/observed traffic data on the corridor for the years 2011 (instead 2007) and the whole study should be updated to the year 2015 (new full first operating year), also considering any effect of the current economic crisis – See Table 11.

Table 11 Passengers' and freight traffic in Lithuania between 2002 and 2010

Traffic		2002	2007	2008	2009	2010	CAGR '02-'07	CAGR '02-'10	Var. % '07-'10
Passenger traffic	thousand mio pkm	*26.0*	39.1	38.0	36.1	29.9	8.5%	1.8%	-23.5%
Freight traffic	thousand mio tkm	10.71	20.28	20.42	17.76	19.40	13.6%	7.7%	-4.3%

Source: Eurostat 2012; Notes: the application dossier considers predominantly passenger traffic will use the infrastructure.

On the basis of these considerations we are of the opinion that the base year demand for the five sections is overestimated. The base year demand assumed for the project scenario – 15,000 at 2012 – should be therefore reassessed taking into consideration this, also clarifying on the adopted ramp up assumptions; expecting the traffic will increase from 15,000 to 30,000 in 3 years' time in this economic and demographic conjuncture seems also optimistic.

In what regards the traffic growth rates, the application dossier assumes traffic will grow by 6.6% per year in the period 2010-2015. The traffic will then grow by 1.5% in the following period. Whilst the growth in the short term may be over-estimated considering the trends after the crisis and the fact that the project will be predominantly used by passenger traffic (the most affected by the economic recession) the long term growth are acceptable.

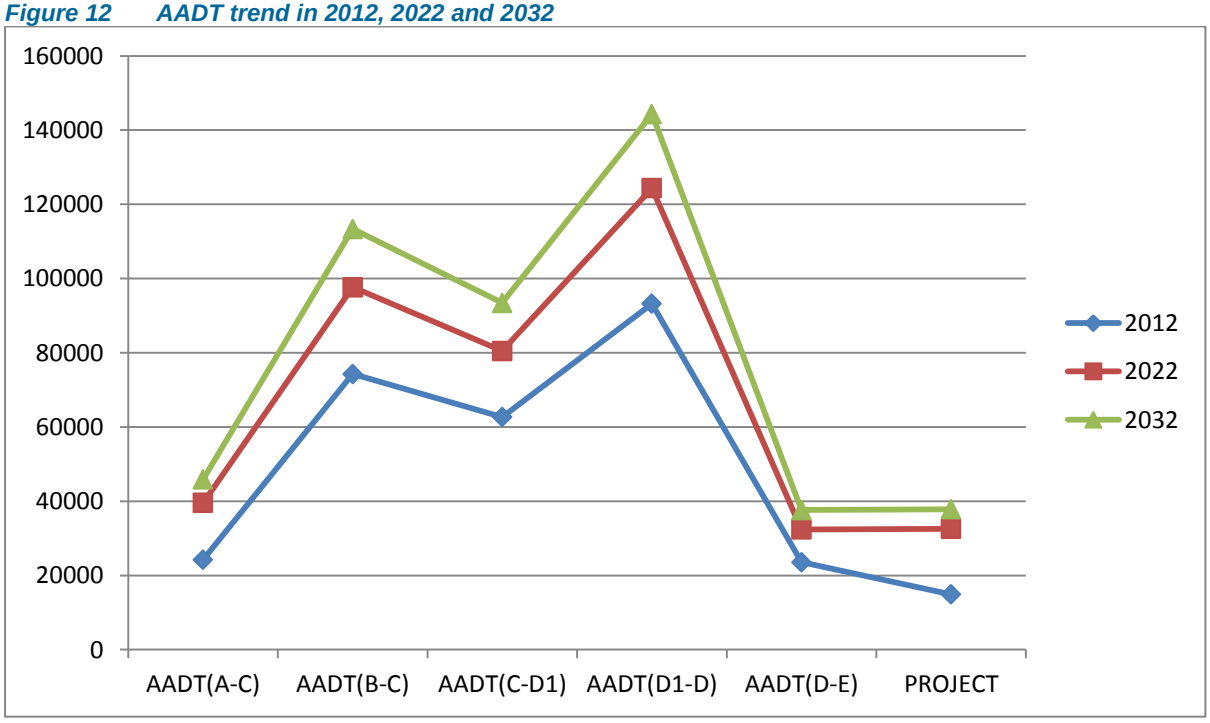
In addition to this the application shows inconsistencies regarding the assumed traffic growth rates; although stating a 6.6% traffic growth per year for the period 2012-2015, the CBA report shows a total of 25.37% for the same period [actually in line with the traffic volumes provided in the same document (page 117)].

Table 12 Compound Annual Growth Rate (CAGR)

Decade	CAGR Project	CAGR (A-C)	CAGR (B-C)	CAGR ($C-D_1$)	CAGR (D_1-D)	CAGR (D-E)
2012-2015	25.37%	13.71%	5.81%	5.00%	6.32%	7.40%
2015-2022	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
2012-2022	8.14%	5.02%	2.78%	2.54%	2.92%	3.23%
2022-2032	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%

As a result – See also Figure 12 – the combination of the assumptions leads to 50% or even higher traffic growths in certain sections, without an acceptable explanation for this.

Figure 12 AADT trend in 2012, 2022 and 2032



Source: own based on the Feasibility Study

Again, the assumptions used to develop the demand analysis should be revised and made consistent across the project dossier. Some bias in the description of the assumptions – leading to the possible over-estimation of the demand – should also be clarified/amended as appropriate; as already mentioned at Section 2.3 above, the application dossier states the North-Western part of the City rapidly develop in the past decade, the number of inhabitants in this area increased by 25%. However, based on publicly available sources[3], the population growth rates in the urban *elderships* (*Justiniškės*, *Viršuliškės*, *Karoliniškės* and *Pilaitė)*

[3] http://www.stat.gov.lt/vilniussampling/vsavsensk/surasymas%20seniunijomis.pdf and http://old.vilnius.lt/newvilniusweb/index.php/116/?itemID=90896

influenced by the project seem to be lower and equal to around 1% in the 2001-2006 years – See also Table 5, Section 2.3.

On the basis of this analysis and considering the relevance of the demand analysis to assess the reliability of the results of CBA and of the appropriateness of the proposed technical design we have tested a sensitivity reducing the demand by 70%. As described at Sections 4.2.2, the results of the economic analysis remain positive. Worth adding that by assuming this demand reduced scenario, the traffic levels which we can reasonably expect for the future would still require the adopted technical project layout solution.

B.3.3. Recommendations and suggestions

The description of the demand analysis is not satisfactory and the results provided look overall overestimated and not reliable at their comparison with real/observed traffic data, population and traffic growth rates. Despite this, a sensitivity test undertook as part of our analysis and reducing the demand by 70%, shows the results of the economic analysis are still positive, thus confirming the project adds value to society. The traffic levels which can be reasonably expected for the future within this reduced demand scenario would still require the adopted technical project layout solution.

4 COST BENEFIT ANALYSIS

As mentioned in the CBA report included in the project dossier, the CBA analysis has been developed according to the following guidelines:

- European Commission Directorate General Policy "*Guide to Cost Benefit Analysis of Investment Project*", July 2008;
- European Energy and Transport Trends to 2030, Update 2007; European Commission, Directorate-General for Energy and Transport;
- HEATCO Developing Harmonised European Approaches for Transport Costing and Project Assessment, 2006. Final Report. IER, Germany.

The overall quality of the documentation supporting the financial and socio-economic analysis is appropriate for the understanding of the methodology; albeit some of the inputs and assumptions adopted to develop the CBA are not provided nor explained.

Concerning the time plan assumptions, according to the application form (§ D.1) the project implementation will be completed by 2014 and the operational phase is expected to begin the same year, the full first operating year being 2015. However, the CBA financial and socio-economic analysis show a different project timetable with a 2009-2012 construction phase and a 2012-2033 operating phase. The CBA should have been updated in order to present a consistent updated application dossier.

Also, forecasts regarding the financial and economic analysis have been carried out over a period of 25 years (2009-2033), including the 4 years construction period, which is a relatively short period. Indeed, the time horizon is not in line with the recommendations the EC proposes in its 2008 CBA Guide, according to which for the majority of road infrastructure the time frame is 30 years including the construction phase.

Regarding the general approach to the study, the *do-nothing* scenario implies that the current situation is maintained over time without the *Western by-pass Stage II* project. The financial and socio-economic analysis are based on an incremental approach accordingly to the EU 2008 Guidelines.

4.1 Financial analysis

The accountancy unit is the *Vilnius Municipality*, which is the Beneficiary of the EU funds and the owner of the infrastructure. This approach is consistent with the recommendations of the *Guide to cost-benefit analysis of investments projects, European Commission Evaluation Unit, DG Regional Policy, 2008*.

The analysis considers 2009 as the base year of the project and the discount rate is 5.0%, which is acceptable.

The financial analysis is based on the following general assumptions:

- The time horizon for the analysis is 25 years including the 4 years construction period (2009-2033), which given the fact that the period also includes the construction years, could be more appropriately extended up to 30 years;
- The residual value seems correctly calculated and it is in line with the approved methodology by Vilnius municipality: *Rules for Calculating the Value of Roads of National Significance and its Change* (Order N° V-134 of 18 June 2007, issued by the Director General of the Lithuanian Road Administration).

Moreover, the following project cash flows have been considered in the financial analysis:

- Investments costs, as included in the application form;
- Cash out-flows: operating costs, including only ordinary and extraordinary maintenance, as there are no personnel, technology or admin costs related to tolling operations;
- Cash in-flows: no cash in-flows are included, as the road is not tolled.

The prices in the Financial Analysis do not include VAT in the calculation of the cash-flows. We are of the opinion that this assumption is not acceptable considering that VAT is not recoverable (****- *VAT non-reimbursable*) as it is described in the application form (§ H.1, page 41). The financial analysis should in principle be revised including VAT; albeit more appropriate this would in any case not change the negative result of the financial analysis nor the funding gap calculation, and more importantly the EU Contribution would remain the same.

4.1.1 Cash out-flows

Investment costs for the project are € 54.51 million (VAT not included whereas it should be), corresponding to a present value of € 48,173,956, according to Table E.1.2 of the application dossier but not consistently with Table H.1 in the same document. As mentioned before, the construction works are expected to start in 2009 and completed in 2012, which is not in line with the *status* of implementation of the project (see project calendar at page 21 of the application form). The construction phase/contract is now expected to be completed in the period 2011-2014; this should be reflected in the CBA, which should also be updated.

According to the *Notes* presented in the Feasibility Study (§ 1.7.3 project costs, pages 19 and 20), *the project costs differ from those used in cost-benefit analysis due to the reduction of market prices* and *delays in the implementation of the project.* The CBA should have been updated as the investment costs considered are not in line with those presented at Table H.1 of the application form. In line with what stated in the application form (page 6), the financial analysis should have been updated assuming € 51.3 (already including VAT) instead of € 54.5 million. In line with the above mentioned inconsistencies, these would however only impact on the CBA and not on the funding gap or EU Contribution calculations.

The ordinary and extraordinary maintenance costs are included in the cash out-flows. No details are provided concerning the split between work, labour, equipment and services or by technical activities. After completion of the project, ordinary and extraordinary maintenance in the project scenario is estimated to be € 8,874,550 with an annual average maintenance cost per km totalling 51,882 €/km, which seems reasonable taking into account the road length and similar road investment project.

The extraordinary maintenance costs are not clearly specified; we understand their occurrence is planned in three different years (2018, 2023, and 2031) and the total amount is likely to be around € 5 million, which seems acceptable also considering the road length.

The present value of the total operating costs is in our opinion not correctly calculated; it results slightly higher (€ 3.98 million) compared to our estimations (based on the same annual cash flows) of around € 3.68 million. This value should be then revised both in the CBA document and in the application form (§ E.1.2 page 24).

4.1.2 Cash in-flows

The project is not generating any annual revenue, given that the road is not tolled. The residual value has been correctly included in the analysis and it is equal to € 11,012,000 corresponding to 20% of the investment costs. We are of the opinion that this assumption is adequate, also given that a well-maintained road will still be functional at the end of the period.

4.1.3 Funding Gap and Financial Indicators

The project is not revenue generating, therefore the funding gap method is not applicable and correctly considered equal to 100% (§ E.1.2 of the application form).

By trying to replicate the calculation of the FNPV (financial net present value) – adopting the methodology suggested in the guidelines – we find this parameter is slightly lower if compared with our discounted calculation. The result included in the dossier is € -48,899,500 whilst our estimation gives a value of around € -49,157,064.

Moreover, by trying to replicate the same calculation methodology we found a negative FRR (financial rate of return) of 8.86% whilst the CBA presents a negative FRR of 8.96%. We suggest checking both the financial performance indicators also including VAT (non-reimbursable), notwithstanding a revision of those calculations does not change the funding gap rate or the EU Contribution.

4.1.4 Financial Sustainability

The financial sustainability presented in the CBA is not properly detailed; the total cash flows and cumulative cash flows were not calculated and the FRR(E) was not included, this hamper the full understanding of the methodology and hence the evaluation of the reliability of the results. By trying calculating this parameter, we find the FNPV(E) may equal to € -6,753,394 and the FRR(E) to 1.5% – thus suggesting a negative result of the financial sustainability. The calculation for these parameters should have actually been provided in the application dossier.

Besides, the project financial sustainability analysis (Table A.3.2 at page 121 of the CBA) was carried out including VAT and loan reimbursements and interests were correctly considered, also in line with the suggestions of the 2008 DG Regio Guidelines.

4.1.5 Public Contribution Viability

As described in the application form, the project is financed by mean of public funds, including the CF. The EU financial assistance is considered essential for the realization of the project.

Concerning the determination of the EU contribution (€41,047,966), Table H.1 seems correct – eligible costs include VAT since it is non-reimbursable – but total project costs are not consistent with those presented at Table E.1.2 of the application form and in the financial analysis included in the CBA. We understand Table H.1 is updated whilst Table E.1.2 and CBA must be revised.

Also Table H.2.1 of the application form is reliable and the co-financing rate adopted (91.9%) is consistent with the Decree of Minister of Transport and Communication in the Republic of Lithuania.

B.4.1. Recommendations and suggestions

The information included in the application dossier documentation is not consistent, which hampers the quality of the financial analysis and does not facilitate its assessment. In particular we understand that the application form is updated but not the CBA report. Despite this the results of the financial analysis are acceptable.

More in detail our analysis shows the following incongruences and inconsistencies which were to be corrected, although the way they are presented do not impact on the calculation of the Funding Gap (and therefore on the calculation of the EU co-financing rate):

- The prices in the Financial Analysis do not include VAT in the calculation of the cash-flows. We are of the opinion that this assumption is not acceptable considering that VAT is not recoverable as also stated in the application form (page 41);
- The application dossier is not consistent in what regards the investment costs presented at Table H.1; these should be the same ones presented at Table E.1.2 in the application form and in the CBA report;

- The application dossier is not consistent with respect to the project calendar included in the application form; the periods 2011-2014 and 2014-2035, respectively indicated in the application form as the construction and operating phases, do not correspond to the years assumed in the CBA report;
- The time horizon of 25 years (2009-2033), including the 4 years construction period, is not in line with the recommendations the EC proposes in its 2008 CBA Guide, according to which for the majority of road infrastructure the time frame is 30 years ;
- More information should have been provided regarding the operating costs including details on work, labour, equipment and services or by technical activities. Extraordinary maintenance costs should have been better specified.

4.2 Socio-economic analysis

The socio-economic analysis is based on the following main assumptions:

- The social discount rate is 5.5% which is acceptable according to the 2008 EU CBA Guidelines which suggest using this rate for the evaluation of projects in the Convergence Regions as it is the case for the *Republic of Lithuania;*
- In addition to the project costs from the financial analysis, the CBA also includes the users' benefits, whose values have been calculated based on the *EMME/2* software. A digital transport model of the Western part of the Vilnius City was also developed to take into consideration the planned urban development of the city;
- An incremental approach for the calculation of the benefits has been properly adopted. It was based on the comparison of two alternatives – the project and the business as usual (do-nothing) scenario;

The users' benefits considered are as follows:

1. Travel time savings;
2. Vehicle operating costs savings;
3. Reduction of accidents;
4. Reduction of externalities;

The value of travel time savings is by far the largest benefit supporting the case for this investment (65.9% of the total benefits). Then the vehicle operating costs savings correspond to the 32.1% of the total economic benefits; safety and reduction of externalities totalling only a percentage of 2%.

The overall quality of the information describing the methodology is satisfactory and adequate. In addition to the *Western by-pass Stage II* project benefits, also the road network directly related to the project was included in the socio-economic analysis. More in detail, five sections were considered for the calculation of the benefits:

- *L. Asanavičiūtės* street – Section A-C;
- *Laisvės* avenue (between *Architektu* street and *Sausio 13-ios* street) – Section B-C;
- *Laisvės* avenue (between *Sausio 13-ios* street and *A.P. Kavoliuko* street) – Section C-D_1;
- *Laisvės* avenue (between *A.P. Kavoliuko* street and *T. Narbuto* street) – Section D_1-D;
- *T. Narbuto* street – Section D-E.

4.2.1 Conversion of market to accounting prices

According to the 2008 EU CBA guidelines, socio economic prices of inputs and outputs to be considered for the CBA should be net of VAT and of other indirect taxes. Also, financial cash flows should be converted from market to accounting prices, in order to reflect the social opportunity cost of inputs and outputs.

The CBA and the application form do not mention nor contemplate any conversion factors. Considering the investment costs as stated in the CBA report, by replicating the calculation of the economic analysis, we found a conversion factor of 0.826 was probably applied to the construction works. This factor may be acceptable, although it is our estimation and the CBA report should have actually specified the methodology and assumptions adopted for the conversion of market to accounting prices of the costs.

4.2.2 User benefits and costs

Travel Time Savings

After the completion of the Vilnius *Western by-pass Stage II* the capacity of the street network will increase, and therefore the total number of vehicles will decrease, traffic conditions will improve, the average speed will increase and travel time costs will be reduced. The *travel time savings* benefit is estimated to be equal to € 623,189,000.

The Value of Time used to convert travel times to monetary values is based on prices suggested by HEATCO (*Developing Harmonised European Approaches for Transport Costing and Project Assessment*). In accordance with the *ME Vilniaus planas*' study, *business* value of time – representing the 25% of the whole travels – was estimated equal to 13.50 €/h. whilst the remaining 75% of *non-work* value of time was estimated equal to 5.2 €/h., thus resulting in a unique value of time of 7.28 €/h. in 2008 currency. In the application form (Table E.2.2 page 28) the value of time savings is 11.1 €/h. (year 2008) in average because it differs in the various segments of the Western road network of Vilnius city.

The adopted value of time is acceptable. If we consider the HEATCO Guidelines, as it is highlighted in Table 13 below, the Lithuanian value of time results in a lower value of 6.21 €/h. (25% business and 75% commute-short distance) in 2002 currency which correctly increase up to around 11 €/h. in 2008 year with the adjustment due to the CPI (Consumer Price Index) increase and the *pro-capita* GDP growth rate multiplied per 0.7, accordingly to HEATCO Guidelines.

Table 13 Values of Time in the HEATCO guidelines

€/h. (2002)	Commute-Short Distance	Business	25% Business – 75% Commute-Short Distance
Lithuania	4.43	11.58	6.21

Source: HEATCO

We have however some concerns on the relevant differences between the values of time in the six road sections (A-C, B-C, C-D1, D1-D, D-E and the *Western by-pass Stage II* project) considered in the CBA; which should have been better explained. In particular, the *T. Narbuto* street (section D-E) presents very high values of time in the project scenario (22.73 €/h. in 2008 up to 43.23 €/h. in 2033) which seem not acceptable and we therefore suggest revising this assumption. We observe that the lengths of the five segments of the study were not included in the CBA and in the application form, which should instead have been provided to properly verify and assess the reliability of the socio-economic analysis. Moreover, a unique Value of Time has been used, both for light and heavy vehicles. This should instead have been differentiated (although the application declares the traffic on the road is mainly composed by light vehicles).

By trying to replicate the results included in the CBA, we have considered an annualisation factor of 270 days a year and the HEATCO value of time of 6.21 €/h (2002 year). As a result of this test the overall magnitude of the benefits relating to *travel time savings* is in our opinion reliable.

Worth adding here that in order to take a position on the overall reliability of the estimation of the travel time savings we also tried to replicate all the calculations assuming a traffic demand reduced by 70%. We are indeed of the opinion that the demand is over-estimated (See Section 3.3 above) which makes the application not reliable. The result of the socio-economic analysis by simulating this conjoint sensitivity is still positive – thus confirming the social effectiveness of the project.

Vehicle Operating Cost Savings

The CBA analysis considered the relationship between Vehicle Operating Cost Savings and the pavement roughness. The latter is *a relative road quality index expressed in the number of unevenness in a unit of road length* – as stated at page 98 of the CBA dossier. This index was considered invariant for the whole project evaluation period.

Roughness values are acceptable based on other experiences of road street maintenance in Vilnius – €3 m/km, in the *Western by-pass Stage II* corridor – €2.8 m/km corresponding respectively to € 249 per 1000 vehicle km. and to € 247 per 1000 vehicle km.

We tried to replicate the calculation methodology based on the *AADT* provided and on the percentages of flow composition as it is illustrated on Table 14 below.

Table 14 Flow composition for Business as usual and Project alternative, in %

Street segment	Flow composition								Time value	
	Light vehicle	Light 2-axle truck	Mini bus	Bus	Trucks by axle number					
					2	3	4	5 and more	Lt	€
BUSINESS AS USUAL alternetive										
L. Asanavičiūtės str. A-C	82.4	6.3	8.0	2.9	0.3	0.0	0.0	0.1	41.6	12.0
Laisvės av. (between Architektų str. and Sausio 13-ios str.) B-C	80.5	6.2	7.8	2.9	1.6	0.3	0.2	0.5	41.6	12.0
Laisvės av. (between Sausio 13-ios str. and A. Kavoliuko str.) C-D_1	79.9	6.1	7.7	2.9	2.1	0.4	0.2	0.7	41.7	12.1
Laisvės av. (between A. Kavoliuko str. and T. Narbuto str.) D_1-D	79.6	6.1	7.7	2.9	2.3	0.4	0.2	0.7	41.7	12.1
T. Narbuto str. D-E	80.3	6.2	7.8	2.9	1.8	0.3	0.2	0.6	41.7	12.1
PROJECT alternative										
L. Asanavičiūtės str. A-C	81.3	6.2	7.9	3.8	0.5	0.1	0.1	0.2	44.0	12.7
Laisvės av. (between Architektų str. and Sausio 13-ios str.) B-C	79.0	6.1	7.6	4.4	1.8	0.3	0.2	0.6	45.8	13.3
Laisvės av. (between Sausio 13-ios str. and A. Kavoliuko str.) C-D_1	78.6	6.0	7.6	4.0	2.4	0.5	0.2	0.8	44.6	12.9
Laisvės av. (between A. Kavoliuko str. and T. Narbuto str.) D_1-D	78.5	6.0	7.6	3.7	2.6	0.5	0.3	0.8	43.9	12.7
T. Narbuto str. D-E	70.8	5.4	6.8	16.5	0.3	0.1	0.0	0.1	78.5	22.7
Western by-pass A-E	84.2	6.5	4.6	2.3	0.5	0.2	0.2	1.5	38.2	11.1

Source: CBA

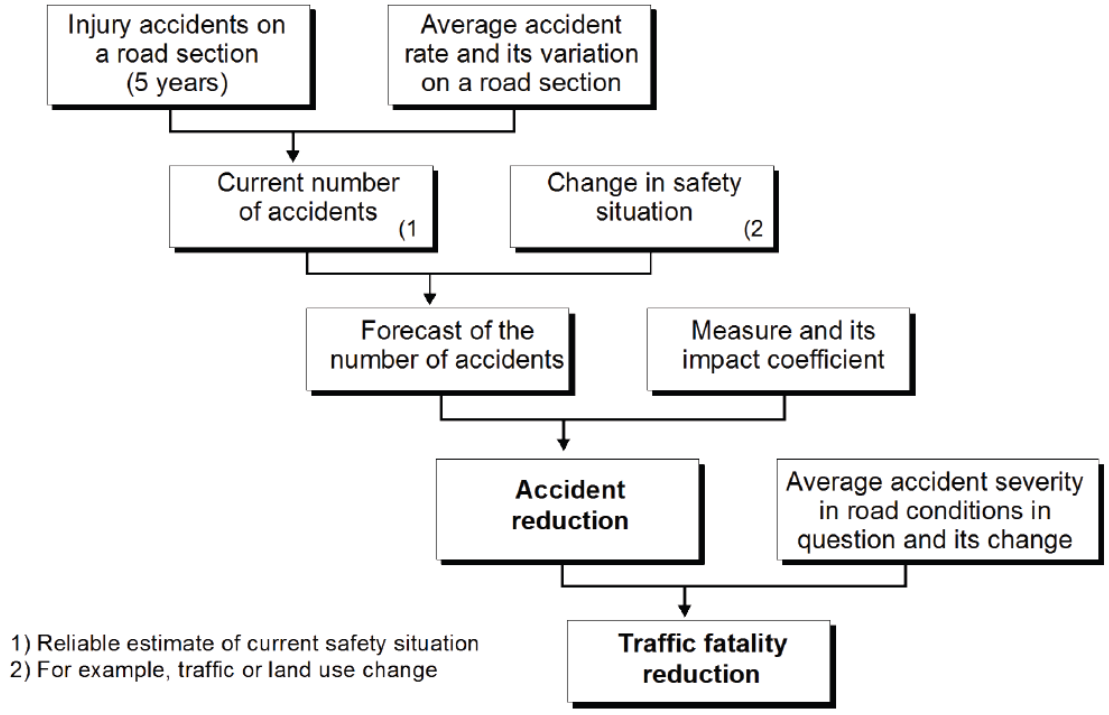
As a result, we found the same positive result of € 299,460,000, which seems acceptable.

Reduction of accidents

The reduction of accidents is estimated in economic cost and it represents only the 0.1 % of the total benefits, totalling a value of € 1,071,000 which seems reasonable. The calculation for fatal and injured people was carried out in accordance with the HEATCO Guidelines whilst the cost of damage-only accident according to the prices of Road Investment Manual. For the forecast of accident rate was used the Lithuanian version TARVAL of the Finnish model TARVA, developed by the Finnish National Road Administration. As stated at page 100 of the CBA, *based on this methodology the impact coefficient is calculated in a way that with the increase in the average traffic flow speed of 10 km/h, the accident risk increases by 9.8 %, with the decrease of speed the accident risk correspondingly decreases.* Finally, the calculation methodology of this benefit consists in the multiplication of the average losses for accident type (damage-only, injured and fatal) per total number of accidents; which is acceptable.

Figure 13 below illustrates the TARVA method:

Figure 13 TARVA method for road safety evaluation



Source: http://www.baltris.org/Newsletter/pdf.pdf

4.2.3 External benefits estimation

The external users' benefits include the reduction of environmental pollution (with vehicle-generated pollutants PM2.5, NO_x, SO_2, O_3), noise and greenhouse reduction (expressed CO_2 equivalent). The total effect of the project on the Western part of Vilnius city is positive. This is confirmed by a forecasted decrease of congestion and in the increase of the total speed of vehicle flows in the road network.

The evaluation of the environmental externalities amounts to € 10,772,000. The calculation methodology is clearly provided and the values included in Table A7 (page 137) seem reasonable. As it is described in the CBA, the air pollution cost for thousand tons of pollutants generated by vehicles are in line with the values suggested by HEATCO, with the 2003-2007 values determined considering the GDP growth and the 2008-2033 air pollution values taking into consideration the index of price increase.

4.2.4 Effects on employment and other non-monetized effects

The application form (table E.2.4) presents the estimation of the number of jobs created with this project. It is expected that the project will generate 423 jobs during the construction phase and only 2 jobs in the operation phase, and no quantification of indirect impact on employment is included in the application dossier. The economic benefits associated to the creation of employment were not considered in the CBA.

4.2.5 Economic performance indicators

The economic net present value (ENPV) presented in the application form § E.2.3 (page 43) shows a positive amount of € 346.7 million, thus suggesting that the project is producing high added value for the society. Moreover, by trying replicating the calculation of this value assuming the same economic inputs presented in the CBA, we find approximately the same result – thus confirming the reliability of the socio-economic analysis calculation.

The CBA dossier also includes the socio-economic analysis after implementing construction stages I and II of the project by increasing the investment costs and considering the same benefit assumptions. Since the result of the socio-economic analysis is still positive, we don't have any concern of this.

4.2.6 Risk assessment and sensitivity analysis

A sensitivity analysis is included in the application form, in line with the 2008 EU CBA guidelines. The sensitivity analysis allows the determination of the 'critical' variables or parameters of the socio-economic assessment. The critical variables are those variables or parameters for which a relative variation of 1% around the central estimate produce a corresponding variation of not less than 1% (one percentage point) in the ERR and not less than 5% in the ENPV.

In the case of the *Western by-pass Stage II* project, the sensitivity analysis covers two main variables such as the construction costs and the forecast of traffic volumes. The *pessimistic* assumption consist in increasing the construction costs to 9.8 times higher comparing to the base scenario and reducing the traffic volumes of 70%, whilst the *optimistic* hypothesis implicates a fluctuation for costs and benefits of 20%. The results show that the project is not sensitive to the realistic changes but the decrease of traffic by 1% has more than 1% effect to the decrease of ENPV and the switching values of the critical variables is the '*70% less traffic volume'* hypothesis comparing to the base scenario forecast.

Furthermore, the risk analysis was carried out because of the critical variable found in the sensitivity analysis and it was adopted the *Monte Carlo* methodology. As stated in the application form (§ E.3.3) – *probability distribution of ENPV shows that there is 6.5 % probability that ENPV will be higher than the forecasted one by the medium scenario and 93.5 % probability that it will be lower than the forecasted one (but there is no chance to get a negative value). By the most adverse scenario ENPV can drop to € 197 million. Most probable ENPV is € 312 million, i.e. approximately 1.11 times lower than the estimated one.*

We are of the opinion that the result of the risk analysis is reliable and with a low risk – thus confirming the social effectiveness of the project.

B.4.2. Recommendations and suggestions

The presentation of the assumptions behind the calculation of the economic benefit of the project is sufficient and appropriate to a full comprehension of the results. However, we consider these results are not reliable due to over-estimated demand assumptions. Despite this, by reducing the demand by 70% and adopting a more conservative value of time as suggested by HEATCO, we find the results of the analysis are still positive.

The following aspects should have also been considered, in order to improve the quality of the application:

- The application dossier is not consistent with respect to the project calendar included in the application form; the periods 2011-2014 and 2014-2035 respectively indicated in the application form as the construction and operating phases, do not correspond to the years assumed in the CBA report;
- Regarding the Travel Time Savings benefit, the value of time should have been differentiated both for lights and heavy vehicles; HEATCO values should be adopted or a clear explanation provided for the use of alternative values. To this respect we have also some concerns on the relevant differences between the values of time in the six road sections (A-C, B-C, C-D1, D1-D, D-E and the *Western by-pass Stage II* project) considered in the CBA, which should be explained;
- The lengths of the five segments should have been provided to properly verify and assess the reliability of the socio-economic analysis related calculations.

5 KEY FINDINGS AND CONCLUDING REMARKS

5.1 Key questions for project appraisal

(a) Is the application dossier complete?

The project dossier is complete and complies with the EC Regulations. The information provided is consistent with Art. 40 Reg. 1083/2006, Annex XXI and Commission Regulation 1828/2006.

(b) Does the project meet the expected strategic and functional objectives?

The *Western by-pass* project is reasonably expected to be a beneficial one for the population living in the North-Western part of Vilnius and under the functional standpoint the road – adding an alternative to the existing infrastructure – will alleviate congestion on the North-South TEN-T corridor and other main urban road network. It will effectively reduce travel times and ensure safety. This last element will also be pursued through implementation of a speed enforcement device. Most socio-economic data (except the population trend) support overall the objectives of the project. [See § 2.3 and recommendation and suggestions box B.2].

(c) Is the project consistent with the EU policies?

The project is consistent with EU policies and in particular with the Trans-European network development policies of the 2007-2013 *Operational Programme of the Economic Growth*.

We suggest cross-checking the results of the applications for funding and preparatory works undertaken for this project and its Stage I, either supported by CF or JASPERS [See § 2.4].

(d) Is the project technically sound?

The project is technically sound regarding the proposed solutions. It is also technically sound in what respect its functional characteristics either regarding the existing and future demand. We do not see major risks possibly affecting the timely completion of the project under appraisal [See § 3].

An Environmental Impact Assessment process has been undertaken and its related procedures completed for the whole *Western by-pass* project. The application dossier includes some inconsistencies relating to the dates of the EIA certificates and the costs for the impact mitigation measures. These inconsistencies should be clarified or amended, as appropriate [See § 3.1.3 and recommendation and suggestions box B.3.1.3].

(e) Are the project costs reasonable?

The unit cost per km for the road section and turnings – €8.6 million – is closer to the higher-end value of the range for construction costs for this type of infrastructure in Europe (€11 million for motorways). We are of the opinion that this high unit cost per km is due to the turnings and ramps infrastructure interconnecting the main road section with *L. Asanavičiūtės street* and *Pilatėis avenue*. However we suggest requesting a clarification on the road sections and turnings costs, to fully assess their reliability. In the event the magnitude of the costs for the turnings and ramps would be less than 30%-40% of these costs, a value-engineering analysis should be requested and provided by the Applicant and Beneficiary aimed at confirming the cost-effectiveness of the propose project design (also in view of the consideration that the only criteria adopted for the selection of Option 3 was mainly relating to environmental impact) [See § 3.1 and § 3.2 and recommendation and suggestions box B.3.2].

(f) Are the results of the demand analysis acceptable?

The description of the demand analysis is not satisfactory and the results provided look overall overestimated and not reliable at their comparison with real/observed traffic data, population and traffic growth rates. Despite this, a sensitivity test undertook as part of our analysis and reducing the demand by 70%, shows the results of the economic analysis are still positive, thus confirming the project adds value to society. The traffic levels which can be reasonably expected for the future within this reduced demand scenario would still require the adopted technical project layout solution [See § 3.3 and recommendation and suggestions box B.3.3].

(g) Are the results of the Financial Analysis acceptable?

The information included in the application dossier documentation is not consistent, which hampers the quality of the financial analysis and does not facilitate its assessment. In particular we understand that the application form is updated but not the CBA report. Despite this the results of the financial analysis are acceptable [See recommendations and suggestions box B.4.1].

(h) Is the value of EU contribution correctly estimated?

The project is not revenue generating, therefore the funding gap method is not applicable. The amount of the EU contribution is correctly estimated [See recommendations and suggestions box B.4.1].

(i) Are the foreseen socio-economic benefits likely to be attained?

Due to the adoption of over-optimistic demand assumptions, we are of the opinion that the benefits are over-estimated (in particular travel time savings which represent more than 65% of the total benefits) [See recommendations and suggestions box B.4.2].

(j) Are the results of the Cost Benefit Analysis acceptable?

The positive result of the socio-economic analysis is over-estimated. Despite this, by reducing the demand by 70% find the results of the analysis are still positive [See recommendations and suggestions box B.4.2].

5.2 Concluding remarks

The information included in the application dossier is not entirely consistent. Some information seems to have been recently updated (i.e. the one relating to the calculation of the funding gap and EU contribution). Some other is showing incongruences by comparing the application form and its annexes (CBA report and environmental certificates). Furthermore some inconsistencies are also found within the application form, between the updated data and the original data referring to the financial and economic analysis as included in the CBA report (i.e. Table E.1.2 and Table H.1 in the application form).

The mentioned inconsistencies hamper the quality of the application and do not facilitate the appraisal of the application. Several assumptions are also not explicitly mentioned and we are of the opinion that the demand is over-estimated. Despite this, as part of our analysis we were able to replicate the results of the CBA and more relevant we find that the project is generating added value for society even assuming a reduction in the demand by 70% (worth noting what we did is a sensitivity test not corresponding to the risk analysis undertaken by the applicant as part of their CBA analysis, which in any case further support the case to invest in this project).

The project may thus be approved by the Commission, subject to clarifications on project costs and appropriate consideration of the relevance of the inconsistencies mentioned in our analysis.

We are also of the opinion that an application encompassing the three stages of the project would be more appropriate in particular if the project is aimed at representing a "*TEN-T alternative*" to the North-South existing corridor.

KN-02-13-255-EN-N