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EUROPEAN GAUGE RAILWAY LINE BETWEEN KAUNAS AND THE LITHUANIAN–LATVIAN BORDER. ENVIRONMENTAL IMPACT ASSESSMENT

Environmental impact assessment program

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Customer: **Lietuvos Geležinkeliai AB**

Title of the project: **European gauge railway line between Kaunas and the Lithuanian–Latvian border. Special plan and environmental impact assessment**

Part of the project: **European gauge railway line between Kaunas and the Lithuanian–Latvian border. Environmental impact assessment**

Stage of the project: **Preparation of environmental impact assessment program**

Title of the document: **Environmental impact assessment program**

Position	Name, Surname	Date	Signature
Organizer of EIA documents	Mantas Kaušylas	2015-05-15	

CONTENT

ABBREVIATIONS

EU	European Union
European Ecological Network “Natura 2000”	General network of protected areas of the European Community importance comprising of habitats and areas important for the protection of birds and intended to preserve, maintain and, if necessary, reproduce natural types of habitats, animal and plant species within the area of the European Community
GIS	Geographic Information Systems
pop.	Population
c. mun.	City municipality
EIA	Environmental impact assessment
Potential areas of “Natura 2000”	Localities corresponding to the determined selection criteria of the areas important for the protection of natural habitats and included in the list confirmed by the Minister of Environment
Environmental impact	Prospective change of the environment caused by planned economic activities
r. mun.	Regional municipality
Special plan	Special plan of the European gauge railway line between Kaunas and the Lithuanian–Latvian border
Solution	The document of determined format reasoned by a responsible institution and accredited by appointed method, providing whether the planned domestic activity is permissible or not within the selected place in accordance to the provisions of appropriate legislation or other legal acts, characteristic of the activity and (or) environmental impact
TEN-T	Trans-European Transport Network

Society	One or several physical persons or legal entities, their associations, organizations or groups

INTRODUCTION

Organizer of planned domestic activity

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Lietuvos Geležinkeliai AB under the provided authority of the Minister of Transport and Communication of the Republic of Lithuania by the order No. 3-672 of 16 October 2012 On the Authorization for Lietuvos Geležinkeliai AB, code of legal entity 110053842, registered at address Mindaugas str. 12, LT-03603, Vilnius, tel. No. +370 5 269 2888; +370 5 269 3283, fax No. +370 5 269 2665, e-mail railbaltica@litrail.lt; v.griganaviciute@litrail.lt; s.poskus@litrail.lt, website address www.rail-baltica.lt;

EIA organizer

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Base of EIA preparation

Planned domestic activity (construction and exploitation of the European gauge railway line between Kaunas and the Lithuanian–Latvian border) is provided in the Clause 8.5 Engineering Structures. Construction of the Main Public Railways of Appendix 1 The List of the Types of Planned Domestic Activity Needed for Environmental Impact Assessment to the Law On Planned Domestic Activity for Environmental Impact Assessment.

EIA organizer had indicated to perform EIA replacement under the Law No. 3-260 presented by the Minister of Transport and Communications On the Confirmation of the Program of Planning Works of Special Plan of the European Gauge Railway Line Between Kaunas and the Border of Lithuania – Latvia of 26 June 2014 following Clause 5 of Article 7 of the Law of environmental impact assessment concerning planned domestic activity “The organizer of the planned domestic activity (the customer) can initiate environmental impact assessment without the selection procedure”.

Beginning and end of EIA procedure

Beginning: II quarter of 2015;

End: IV quarter of 2015;

Stage

EIA of the planned economic activity is performed in parallel to the stage of the special plan of the European gauge railway line between Kaunas and the Lithuanian–Latvian border;

EIA and the area planned by special plan

Part of the areas of Kaunas and Panevėžys districts;

1. SHORT DESCRIPTION OF THE ALTERNATIVES CONSIDERED BY THE ORGANIZER OF THE DOCUMENTS OF ENVIRONMENTAL IMPACT ASSESSMENT

The main considered alternatives of the European gauge railway line between Kaunas and the Lithuanian–Latvian border (Table 1 and Appendix 10) are being determined following:

1) Special plan of the European gauge railway line Lithuanian – Poland border – Marijampolė – Kaunas (organizer: VĮ Transporto ir Kelių Tyrimų Institutas);

1) Solutions of the technical project of line Marijampolė – Kazlų Rūda – Kaunas (organizer: Kelprojektas UAB);

2) Results, conclusions and recommendations of the feasibility study of the European gauge railway lines (Rail Baltica) within Estonia, Latvia and Lithuania (organizer: AECOM);

3) Results, conclusions and recommendations of the results of strategic environmental assessment of the European gauge railway line between Kaunas and the Lithuanian–Latvian border (organizer: Sweco Lietuva);

4) Results, conclusions and recommendations of the feasibility study of the reconstruction of Rail Baltica railway section Rokai – Palemonas – Kaunas by constructing a parallel line of 1435/1520 mm track gauge or constructing a line of 1435 mm track gauge along the existing railway line (organizer: Ardanuy);

5) Information, results and conclusions of the report on the special plan of the condition assessment of the European gauge railway line between Kaunas and the Lithuanian–Latvian border (organizer: URS);

6) Information, results and conclusions of the report on the special plan concept and the report of SEA of the European gauge railway line between Kaunas and the Lithuanian–Latvian border (organizer: URS).

Table 1. Main alternatives under consideration

▶ **Alternative No. 1:** Rokai – Palemonas (Kaunas city municipality) – Neveronys (Kaunas district municipality) – Jonava – Pagiriai (Kėdainiai district municipality) – Ramygala – Upytė – Janališkiai (Panevėžys district municipality) – Pušalotas – Joniškėlis – Vaškai – Kiemėnai – Dagiai (Pasvalys district municipality);
▶ **Alternative No. 2:** Rokai – Palemonas (Kaunas city municipality) – Neveronys (Kaunas disctrict municipality) – Jonava – Pagiriai (Kėdainiai district municipality) – Ramygala – Upytė – Janališkiai (Panevėžys district municipality) – Pušalotas – Joniškėlis – Vaškai – Kiemėnai – Kamardė (Pasvalys district municipality);

The main considered alternatives differ by the crossing point (place) of the border of the Republic of Latvia. In case of alternative No. 1 the crossing point is Dagiai (Pasvalys district municipality), in case of alternative No. 2 – Kamardė (Pasvalys district municipality). The tracks of the railway line are situated respectively. It should be noted that the earlier mentioned alternatives also differ by the parameters of the intended railway station in Panevėžys city. In case of alternative No. 1 the passenger and freight railway station is intended to be built; also the connection of freight terminal to the freight station is being considered. In case of alternative No. 2 only the installation of a passenger station beside Panevėžys city is being considered.

It is important to note that the alternatives No. 3 and No. 4 (Table 2) identified within the special plan concept and SPAV report of the European gauge railway line between Kaunas and the Lithuanian – Latvian border (Table 2) are no longer being considered due to refusal to construct the track of railway line through the area of Panevėžys city municipality. The representatives of Latvia also did not agree to cross the Lithuanian–Latvian border at Kiemėnai (Pasvalys district municipality) and Majėnai (Pasvalys district municipality).

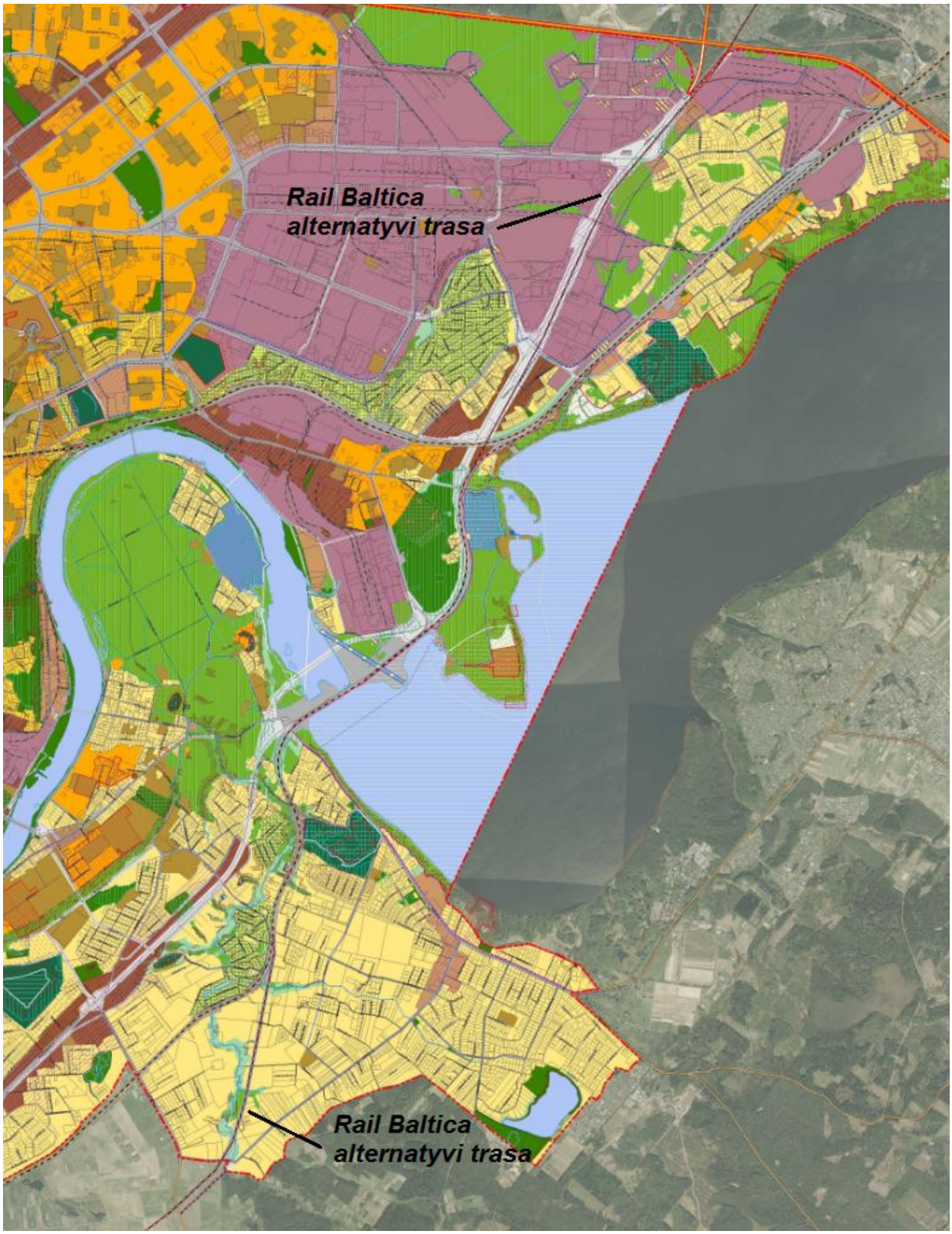
Table 2. Alternatives No. 3 and No. 4 of the special plan concept

▶ **Alternative No. 3:** Rokai – Palemonas (Kaunas city municipality) – Neveronys (Kaunas district municipality) – Jonava – Pagiriai (Kėdainiai district municipality) – Ramygala (Panevėžys district municipality) – Panevėžys – Janališkiai (Panevėžys district municipality) – Pušalotas – Joniškėlis – Vaškai – Kiemėnai (Pasvalys district municipality);
▶ **Alternative No. 4:** Rokai – Palemonas (Kaunas city municipality) – Neveronys (Kaunas district municipality) – Jonava – Pagiriai (Kėdainiai district municipality) – Ramygala (Panevėžys district municipality) – Panevėžys – Pajstrys (Panevėžys district municipality) – Pušalotas – Joniškėlis – Vaškai – Majėnai (Pasvalys district municipality);

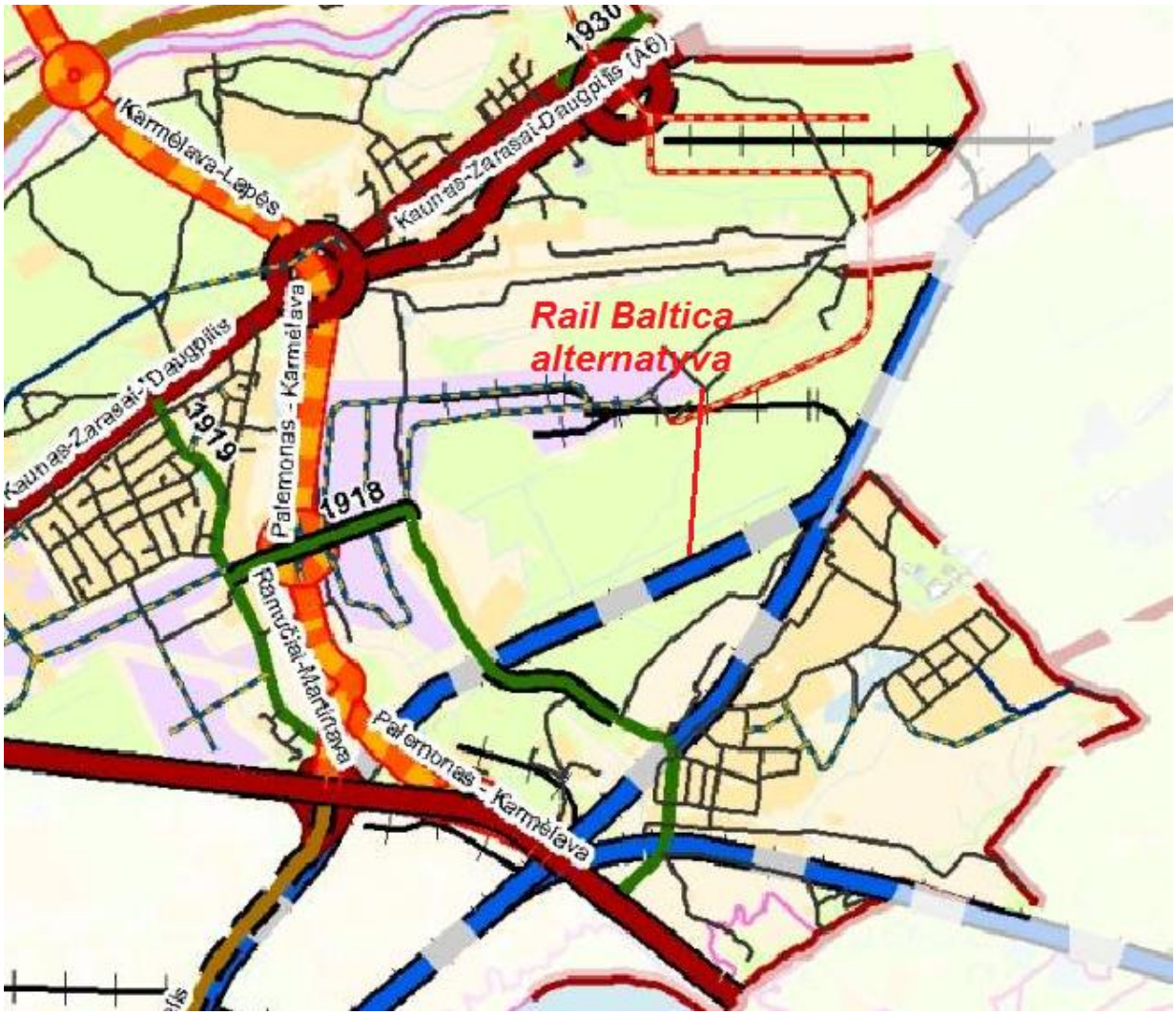
It should be noted that the construction of the track of the railway line through the area of Panevėžys city municipality was dismissed due to limited engineering conditions. It means that there is a big difference of heights between the ground surface and the tracks of the planned railway lines within the intended place of the station at the crossings with Panevėžys bypass and narrow-gauge railway complex. Therefore, installation costs of the alternatives No. 3 and No. 4 of the special plan concept increase and the area for the installation of the freight railway station and the necessary freight terminals does not remain.

Moreover, the track option determined for the section **Rokeliai – Kaunas (alongside Ateities road) – Martinava** is not being considered by the special plan of the European gauge railway line between Kaunas and the border of Lithuania – Latvia, considering the solutions of the general plan of the area of Kaunas city municipality and the general plan of the area of Kaunas region municipality (Picture Picture 1. and Picture Picture 2.) because the track alternative does not partially correspond to the directions of the transport development concept of The Program of National Communication Development for 2014–2022 and The White Papers of the European Commission's Roadmap to a Single European

Transport Area – Towards a Competitive and Resource Efficient Transport System that are being used for the development of the systems of transport bypass reducing transport flows within urbanized areas [2, 15]. It means that the areas of low-rise constructions at Praviena str. and Kražantė str. and also the areas at Inkaras str. and Ugniakuras str. would be limited from both railway lines by the distance of 300–500 m after the installation of the railway line following this option. It should also be noted that in case of this track option it would be necessary to build a new freight station and an intermodal terminal because Kaunas public logistic center and Palemonas freight station would be unreachable by 1435 mm gauge.



Picture 1. Solutions of the general plan of Kaunas city municipality area (source: Kaunas city municipality administration)



Picture 2. Solutions of the general plan of Kaunas district municipality (source: Kaunas district municipality administration)

It should be noted that the feasibility study of environmental impact assessment was performed during the preparation of the reconstruction of Rail Baltica railway section Rokai – Palemonas – Kaunas by installing a parallel track of 1435/1520 mm gauge or constructing an additional track of 1435 mm gauge along the existing railway line. With regards to EIA documentation the Environmental Protection Agency accepted the solution under letter No. (2.6)-A4-2882 dated 09/07/2014 that the planned domestic activity – the reconstruction of Rail Baltica railway section Rokai – Palemonas – Kaunas by installing a parallel track of 1435/1520 mm gauge or constructing an additional track of 1435 mm gauge along the existing railway line is permissible.

Therefore, in case of alternative No. 1 and alternative No. 2 EIA is not being repeatedly performed for railway line at sections Rokai – Palemonas – Kaunas.

2. SHORT DESCRIPTION OF TECHNICAL CHARACTERISTICS, TECHNOLOGICAL PROCESS AND MATERIALS INTENDED TO EXPLOIT, NEED OF NATURAL RESOURCE AND USE OF LAND (BY THE STAGES OF CONSTRUCTION EXPLOITATION)

The technical characteristics of the planned railway line were determined following the conditions determined within the AECOM feasibility study. It means that Rail Baltica will be constructed following modern technical specifications for interoperability (TSI). Initial parameters of the scheme were created in accordance to the new main TEN-T line operating as a composite traffic line. The study includes the following parameters of TSI [4]:

- line category – IV-M;
- infrastructure gauge – GC;
- maximum axle load – 25 tons;
- maximum line speed – 240 km/h (the speed used for the project of railway aligning and geometry);
- maximum train length – 750 m.

It should be noted that the TSI requirements indicated within the AECOM study are updated following Article 4.2.1 of the European Commission's regulation (EU) No. 1299/2014 on technical specifications of the subsystem of the European Union railway system infrastructure dated 18 November 2014. It means that the category of railway lines is a combination of traffic codes where the category is being described by several freight carriage codes when railway line includes composite traffic. In accordance with the information provided in the abomentioned regulation, the line of the planned railway is P2-F1, axle load– 22.5 t, gauge – GC, railway line speed – 200-250 km/h for passenger trains, 100-120 km/h for freight trains. Train length – 740-1050 m. Useful platform length – 200-400 m.

The railway line planned to be installed will be electrified and of double track, of 1435 mm gauge, with stations in Kaunas and Panevėžys.

The AECOM study also includes the denotation that the success of Rail Baltica is reasoned by the services of passenger and freight carriage within one line and, therefore, the option of the high-speed standard services, not the option of the service of high-speed trains. High-speed railway trains must be considerably more powerful than the standard ones in order to go at a very high speed. In order to achieve maximum speed the lines that the trains ride through must be constructed with as fewer curves as possible. In cases when it is impossible to avoid the curves, the turns of bigger radius must be indicated. Stopping distance must also be longer for the trains to slow down safely and permissible deviations of railway constructions must be much more accurate. All this noticeably increases the expense of the construction and exploitation [4]. The information of the requirements raised for the

infrastructure is presented in Table 3 for comparison purposes. The parameters of the requirements are representative, reasoned by typical project parameters only for comparison purposes

Table 3. The parameters of different railways (source: AECOM study)

Parameter	Standard railway	High speed railway
Maximum speed, km/h	200	400
Installed power, MW	4	20
Maximum inclination, pct.	1	3
Maximum radius of the curve, m	1,800	7,200
Average stopping distance, m	2,000	5,500

During the performance of constructional works of the planned railway line the following raw materials, products, energetic and technological sources are intended to be used:

- sand,
- sand – gravel mixture,
- ballast,
- ferroconcrete sleepers,
- railway rails,
- bridge building materials,
- road building materials.

The intended intensity of railway traffic by the railway line Kaunas – the Lithuanian-Latvian border during 2020-2040 is presented in Table 4. It should be noted that the traffic of passenger trains is being intended approximately from 6 a.m. to 12 p.m. at the interval of 2 hours. The traffic of freight trains is intended to be organized at night from 12 a.m. to 6 a.m. Sundays include the works of inspections and supervision of the railway line and, therefore, the schedule of passenger trains is determined differently from the other days of the week [4]:

Table 4. The intensity of train traffic, trains per day (source: AECOM study)

Year	Freight trains	Passenger trains	Total
2020	13	18	31
2030	18	18	36
2040	24	18	42

Taking into account the fact that the planned line is electrified, i.e. the locomotives with internal combustion engines will not be used, and pollution emission to air of railway transport devices is not being intended.

Railway line is planned to be built within national and private land. It also provides that the line will cross forests, therefore, the railway line is also intended to be constructed within forest area.

3. SHORT DESCRIPTION OF THE AREAS LIABLE TO BE SIGNIFICANTLY AFFECTED

The areas that could be significantly affected are determined to be of the width of 2 km, i.e. at 1 km to the both sides from every possible option of the track. The said areas were enlarged up to the width of 6 km in order to evaluate the effect for the protected areas of the planned railway. It means that the width of 3 km continues to both sides of the possible option of the track.

3.1. Areas according to the administrative division

The areas that could be significantly affected are included in the areas of Kaunas city municipality, Kaunas district municipality, Jonava district municipality, Kėdainiai district municipality, Panevėžys district municipality, Panevėžys city municipality, Pasvalys district municipality.
(Table 5 and Appendix 0) [14].

Table 5. Information from municipalities (source: Statistics Lithuania)

Municipality	Population, numbers	Area, ha	Population density, res./ha
Kaunas city municipality	315,993	15,691.01	20.14
Kaunas district municipality	85,998	149,586.87	0.57
Kaišiadorys district municipality	33,786	108,662.78	0.31
Jonava district municipality	46,519	94,351.50	0.49
Kėdainiai district municipality	54,057	167,650.35	0.32
Panevėžys district municipality	39,011	217,689.48	0.18
Panevėžys city municipality	99,690	5,017.27	19.87

Municipality	Population, numbers	Area, ha	Population density, res./ha
Pasvalys district municipality	28,378	128,885.27	0.22

Taking into account that not all, only some of the areas of municipalities can be significant affected, the elderships of the municipalities being crossed by the alternatives of the planned railway track were additionally identified (Table 6 and Appendix 0) [14].

Table 6. Information from elderships (source: Statistics Lithuania)

Municipality	Eldership	Population, numbers	Area, ha	Population density, res./ha
Kaunas c. mun.	Panemunė eldership	14,941	2,475.92	6.03
	Petrašiūnai eldership	14,382	2,849.29	5.05
Kaunas r. mun.	Eldership of Garliava surroundings	6,026	8,359.83	0.72
	Neveronys eldership	3,271	998,04	3.28
	Rokai eldership	911	5,259.58	0.17
	Karmėlava eldership	6,614	4,356.78	1.52
Kaišiadorys r. mun.	Palomenė eldership	1,662	19,993.38	0.08
	Pravieniškės eldership	4,079	4,460.51	0.91
	Rumšiškės eldership	3,833	11,053.95	0.35
Jonava r. mun.	Bukoniai eldership	1,565	10,103.86	0.15
	Dumsiai eldership	2,244	10,165,88	0.22
	Jonava city eldership	30,650	1,232.15	24.88
	Kulva eldership	2,118	10,731.96	0.2

Municipality	Eldership	Population, numbers	Area, ha	Population density, res./ha
	Rukla eldership	2,232	7,637.08	0.29
	Šilai eldership	1,818	14,079.81	0.13
	Upninkai eldership	1,328	17,274.14	0.08
	Užusaliai eldership	2,326	6,822.5	0.34
	Žeimiai eldership	2,238	16,302.2	0.14
Kedainiai r. mun.	Truskava eldership.	1,305	13,535.05	0.1
	Šėta eldership	2,103	14,885.75	0.14
Panevėžys r. mun.	Naujamiestis eldership	2,683	13,661.35	0.2
	Pajstris eldership	2,472	15,474.71	0.16
	Panevėžys eldership	7,142	16,809.44	0.42
	Ramygala eldership	3,698	23,787.38	0.16
	Smilgiai eldership	1,661	13,181.2	0.13
	Upytė eldership	1,531	11,327.41	0.14
	Vadokliai eldership	1,726	16,900.21	0.1
	Miežiškiai eldership	2,424	20,901.76	0.12
Pasvalys r. mun.	Joniškėlis city eldership	1,201	229,27	5.24
	Joniškėlis surroundings eldership	2,693	19,339.29	0.14
	Namišiai eldership	910	5,897.13	0.15
	Pasvalys surroundings eldership	3,334	13,941.18	0.24
	Pasvalys city eldership	7,523	724,84	10.38

Municipality	Eldership	Population, numbers	Area, ha	Population density, res./ha
	Pumpėnai eldership	2,504	14,937.18	0.17
	Pušalotas eldership	1,805	14,333.24	0.13
	Saločiai eldership	2,672	16,390.08	0.16
	Vaškai eldership	2,508	19,190.67	0.13

3.2. Residencies

Information about the residencies remote from the planed railway line at a distance of 1 km is presented in Appendix 1 [10, 14].

3.3. Protected areas

The areas of the European ecological network Natura 2000, reserves, parks, biosphere grounds, other protected areas and the objects of nature heritage were identified as existing remotely from the planned railway line at the distance of 3 km within the areas of track alternatives of the planned railway line. Information about the protected areas and the objects of nature heritage that could be significantly affected is presented in the Appendixes 2, 3 and 10 [12, 16].

3.4. Cultural heritage

Track alternatives of the planned railway line are formed according to the arrangement of cultural heritage in such a way that they would be subject to as little negative influence as possible and would not damage the margins of protection zones of cultural value. Information on the values of cultural heritage and the areas remote from the planned railway line at a distance of 1 km is presented in the Appendixes 4 and 10 [7, 8].

3.5. Water bodies

Information about water bodies that could be significantly affected is presented in the Appendixes 5 and 10 [10].

3.6. Swamps

It should be noted that the alternatives of the planned railway line do not cross peaty areas. The part of crossed swamps is reclaimed or wooded. Information about peaty areas is presented in the Appendixes 0 and 0 [10, 13].

3.7. Geological and hydrogeological areas

In accordance to geomorphological regionalism of Lithuania, all areas of the tracks are included in the region of the lowlands of the Baltics where moraine and limnoglacial plains dominate. The areas being analyzed are composed of the layers of Quaternary system comprising glacial, limnoglacial and fluvioglacial sediments of Late Upper Pleistocen and Late Nemunas. Based on mapping information, the among the analyzed areas the dominant stage is the Baltics. Moraine (g III nm3), limnoglacial (lg III nm3) and fliuvioglacial (f III nm3) layers are accentuated within the areas. Alluvial bedsores (a IV) are being detected within the upper part of the areas, especially at the area of Panevėžys district municipality. The total thickness of Quaternary rocks covering the analyzed areas varies from several (within the northern part of Lithuania) up to 120 (at the surroundings of Kaunas city) meters. The Pre-Quaternary formations – limestone of the Cretaceous period, clay and sand of the Jurassic and Triassic periods, Devonian dolomite and other occurs under the Quaternary. [13].

Northern Lithuanian karst region should be distinguished including the area of 1 000 km^2 within the areas of Biržai and Pasvalys, part of the areas of Panevėžys and Radviliškis region municipalities. Underground voids form due to gypsum melting and kart failures form at the surface of the ground. The area of alternative A identified within AECOM feasibility study and reasoned by Sweco EIA enters the area of this karst region.

The areas of track alternatives identified within the EIA program do not get into the karst region according to the geological exploratory investigations performed. Only the track area beside Dagiai (about 3 km length) includes alternative No. 1 crossing the margin of the karst region. This area includes additionally performed geophysical investigations and the borings drilled down to 30 m depth. It should be noted that within the area of earlier mentioned investigations no karst phenomenon was determined. Generalized analysis will be presented within the EIA report.

Information about watering places identified within the areas of track alternatives of the planned railway line at the distance of 1 km, SAZ zones watering places and the distances to the planned railway line is presented in the Appendix 7 [13].

3.8. Ambient air

Information about ambient air within the areas of track alternatives of the planned railway line is presented according to the data of background air pollution of Kaunas, Jonava, Kėdainiai and Panevėžys cities provided by the Environmental Protection Agency in 2013 [1].

Area of Kaunas city municipality:

- Carbon monoxide 2.24–3.29 mg/m^3
- Nitrogen dioxide 110–140 µg/m^3
- Sulphur dioxide 3–10 µg/m^3
- Solid particles (KD_{10}) 37–50 µg/m^3

Area of Jonava city municipality:

- Carbon monoxide 0.97–2.0 mg/m^3
- Nitrogen dioxide 33–84 µg/m^3
- Sulphur dioxide 4–14 µg/m^3
- Solid particles (KD_{10}) 43–50 µg/m^3

Area of Kėdainiai city municipality:

- Carbon monoxide 1.4–2.3 mg/m^3
- Nitrogen dioxide 12–46 µg/m^3
- Sulphur dioxide 8.3–36 µg/m^3
- Solid particles (KD10) – 16–50 µg/m^3

Area of Panevėžys city municipality:

- Carbon monoxide 0.66–1.8 mg/m^3
- Nitrogen dioxide 54.5–104 µg/m^3
- Sulphur dioxide 4.2–12 µg/m^3
- Solid particles (KD_{10}) 17–40 µg/m^3

3.9. Flora, fauna and other biological diversity

Information about flora, fauna and other biological diversity within the areas of track alternatives of the planned railway line is presented in the Appendixes 0, 0 and 0 [12, 16].

4. INFORMATION ABOUT WHAT ENVIRONMENTAL COMPONENTS AND THEIR INFLUENCES WILL BE ANALYZED DURING THE PERFORMANCE OF THE ASSESSMENT

During the performance of EIA environmental components and the influence will be analyzed in order to determine significant environmental components related with the construction of the European gauge railway line between Kaunas and the Lithuanian–Latvian border and later exploitation, and possible influence for them in accordance to the selected alternative (Table 7).

Table 7. Assessed environmental components and possible influence

No.	Environmental component	Influence (reason and sources)	Possible after effects of the influence
1.	Ambient air	Exploitation of constructional equipment and vehicles during the period of the construction (emissions to air and dustiness)	Short-term reduction of ambient air quality within the environment of constructed railway line and the stations
		Rail transport movement within the sections of railway line, maneuvering within railway stations during the period of exploitation	Long-term reduction of ambient air quality within the environment of railway line and the stations
2.	Surface water	Exploitation of leaky constructional equipment and vehicles during the period of construction and exploitation or passing of oil products and their waste into surface water during extreme situations	Negative influence for surface water quality and biological diversity
		Construction or railway transport infrastructure within the areas of surface water, their protections lanes and zones (installation of the culverts, construction of bridges, installation of reclamation and water off-take ditches)	Negative influence for surface water quality and biological diversity
3.	Geological components including	Exploitation of leaky constructional equipment and vehicles during the period of construction and exploitation or	Pollution of groundwater, underwater and watering places

No.	Environmental component	Influence (reason and sources)	Possible after effects of the influence
	groundwater and underwater	passing of oil products and their waste into groundwater and underwater during extreme situations	
		Construction or railway transport infrastructure (installation of the embankments, culverts, construction of bridges, installation of reclamation, water off-take ditches and other)	Damages of geological structure of the Earth (slumps, other after-effect)
4.	Vegetable soil	Exploitation of leaky constructional equipment and vehicles during the period of construction and exploitation or passing of oil products and their waste on vegetable soil during extreme situations	Pollution of vegetable soil, degradation of fertile materials (micro flora)
		Construction or railway transport infrastructure (installation of embankments, culverts, construction of bridges, installation of reclamation, water off-take ditches and other)	Pollution with constructional waste of vegetable soil, destruction during the period of construction, possible blizzard and erosion of vegetable soil without rehabilitation and appropriate arrangement of damaged ground layers
5.	Landscape	Construction or railway transport infrastructure (installation of embankments, culverts, construction of bridges, installation of reclamation, water off-take ditches and other)	Negative influence for landscape zones and natural carcass
6.	Protected areas	Exploitation of leaky and of inappropriate technical condition constructional equipment and vehicles during the period of construction and exploitation or passing of oil and other products on the protected areas during extreme situations	Negative influence for protected areas, values of protected areas and objects of natural heritage, protected species and biological diversity

No.	Environmental component	Influence (reason and sources)	Possible after effects of the influence
		Construction or railway transport infrastructure (installation of embankments, culverts, construction of bridges, installation of reclamation, water off-take ditches and other)	
7.	Flora	Exploitation of leaky and of inappropriate technical condition constructional equipment and vehicles during the period of construction and exploitation or passing of oil products, other products and their waste to flora areas	Negative influence for flora due to poor air quality, chemical pollution
		Construction or railway transport infrastructure (installation of embankments, culverts, construction of bridges, installation of reclamation, water off-take ditches and other)	Reduction of flora areas (elimination of trees, bushes, grasslands, water flora and other)
8.	Fauna	Exploitation of leaky and of inappropriate technical condition constructional equipment and vehicles during the period of construction and exploitation or passing of oil products, other products and their waste to fauna areas	Negative influence for fauna due to poor air quality, vibration, noise, chemical pollution
		Construction or railway transport infrastructure (installation of embankments, culverts, construction of bridges, installation of reclamation, water off-take ditches and other)	Destruction of fauna areas, fauna degradation due to poor air quality, vibration, noise, chemical pollution Barrier for the migration of animals or fragmentation of habitats and the integrity of the structure of natural carcass is being created

No.	Environmental component	Influence (reason and sources)	Possible after effects of the influence
9.	Cultural heritage values	During the period of construction and exploitation	Aggravation or destruction of the condition of recorded and unexplored (not recorded) values of cultural heritage, eliminated possibilities for the application of other types of cultural heritage and further possibilities to use it as the resource

5. INFORMATION ABOUT WHAT ASPECTS WILL BE USED FOR THE ASSESSMENT OF DOMESTIC ACTIVITY INFLUENCE FOR PUBLIC HEALTH, SOCIAL ECONOMIC ENVIRONMENT

During the performance of EIA the influence of the planned domestic activity for public health and social environment will be assessed. Depending on the selected alternative, the aim is set to determine significant environmental components related to the construction of the European gauge railway line between Kaunas and the Lithuanian–Latvian border and later exploitation, and possible influence for them according to the selected alternative (Table 8).

Table 8. Assessed influence for public health and social economic environment

No.	Environmental component	Influence (reason and sources)	Possible after effect of the influence
1.	Public health	During the period of construction and exploitation	▶ Noise ▶ Vibration ▶ Air pollution ▶ Pollution of surface water, groundwater and underwater ▶ Pollution of vegetable soil
2.	Social and economic environment	During the period of construction and exploitation	▶ Social economic factors such as changing of landowning (negative after effect), establishment of temporary and permanent working places,

No.	Environmental component	Influence (reason and sources)	Possible after effect of the influence
			increase of trade and production, increase of the extent of transport services; ▶ Factors of physical environment such as communication (population mobility – positive and negative after effect), traffic safety, extreme situations (probability of an accidents); ▶ Psychological factors such as conflict situations, discontent with the landowning, impact for the environment and health, extreme situations and other

6. INFORMATION ABOUT THE METHODS TO FORECAST AND ASSESS ENVIRONMENTAL IMPACT THAT ARE INTENDED TO BE USED DURING THE PERFORMANCE OF THE ASSESSMENT, AND INTENDED MEASURES TO AVOID, REDUCE OR COMPENSATE NEGATIVE INFLUENCE FOR THE ENVIRONMENT

It should be noted that EIA will include the forecast composed until 2040. The forecast and assessment methods of the environmental impact intended to be used for the assessment are presented in Table 9.

Table 9. Forecast and assessment methods of possible influence

No.	Environmental component	Forecast and assessment methods of possible influence
1.	Ambient air	Assessment of ambient air at local, regional and global level. Assessment at local level is not being performed. Since the planned railway line will include only organization of electric train traffic, emission to air of the trains using oil products is not intended.

No.	Environmental component	Forecast and assessment methods of possible influence
		The calculation of the alteration of the quantity of annual pollution emission is being performed at regional and global levels (for climate change) for the assessment. The calculation of the alteration includes the assumption that the emission of the trains is equal to zero at the level of electrified railway line. The emission at non-electrified line level is equal to the emission of the trains using oil products. As a comparison, annual emission to air of carbon dioxides (CO2), carbon monoxides (CO), non-methane volatile organic compounds (NMVOC), nitrogen oxides (NOx), di-nitrogen monoxides (N2O), sulphur dioxides (SO2), and solid particles (PM) is being calculated. Calculations are performed following: ▶ assessment methodology LAND 18-2003/M-03 of the pollution discharged to ambient air from locomotives and diesel trains; ▶ international recommendations and guidelines EMEP/EEA, air pollutant emission inventory guidebook;
2.	Surface water	Assessment will be performed by the existing monitoring information of surface water, GIS and the information of database of special conditions of land use of the area of Republic of Lithuania M 1:10 000 [11]. Following the schedule of determination method of the protection zones of surface water bodies and coast protection zones it is intended to assess the margins of protection zones of water bodies and coast protection zones. In cases when planned domestic activity would affect the requirements determined within special conditions of the use of land and forests reduction measurements of negative influence would be intended.

No.	Environmental component	Forecast and assessment methods of possible influence
3.	Geological components including groundwater and underwater	Analysis of existing information, calculations, use of GIS, engineering geological explorations, geophysical investigations, borings within the karst region, underwater investigations, comparison of the results with marginal norms of pollution. Damages of geological structure of the Earth (slumps, other after effects) are being restricted when the planning includes analysis of existing information, information of performed exploratory geological investigations, investigations of suitability of the areas for the construction, GIS and calculations, comparison of the results with marginal norms. The margins of the karst region schemes will be considered during the planning of railway areas. It means that the railway line within the karst region would not be planned in order to avoid geological conditions inappropriate for the construction, except exceptional cases at the border with Latvia. Geophysical investigations are intended to be performed during the planning of the railway line within the area of the karst region. According to the results of the earlier mentioned investigations, it is intended to drill geological borings of 20-30 m depth. It is also intended to perform granulometric investigations for the assessment of the information of the borings and to perform underwater investigations for the assessment of underwater.
4.	Vegetable soil	GIS and information of spatial data set of vegetable soil of the Republic of Lithuania will be used for the performance of the assessment. The type, granulometric composition, and resistance to chemical pollution of vegetable soil are being determined following the abovementioned set [9]. Methodology of road influence for vegetable soils is intended to be used for assessment of the impact for vegetable soil [3]. The measures for the protection of vegetable soil are being determined respectively.
5.	Landscape	Analysis of existing information, general plans of the areas, calculations, use of GIS, and assessment of the requirements for the protection of landscape, determination and realization. The impact for natural carcass, recreational areas, landscape diversity, relief, physiomorphotops, biomorphotops, technomorphotops, videomorphotops, and geochemical toposystems is being assessed.
6.	Protected	Analysis of existing information, calculations, use of GIS, assessment of the

No.	Environmental component	Forecast and assessment methods of possible influence
	areas	requirements for the protection of protected areas, determination and realization, engineering assessment
7.	Flora	Analysis of existing information, calculations, use of GIS, assessment of the requirements for the protection of flora, determination and realization
8.	Fauna	Analysis of existing information, calculations, use of GIS, assessment of the requirements for the protection of fauna, determination and realization
9.	Cultural heritage values	Analysis of existing information, calculations, use of GIS, assessment of the requirements for the protection of cultural heritage values, determination and realization. Assessment is being made on the possible influence of Rail Baltica for the complex of the Narrow Gauge Railway (unique code in the register of Cultural heritage – 21898) not only by mechanical meaning (will damage or will not damage valuable characteristics), but also regarding further possibility to use this complex for cultural tourism of other purposes. The assessment on how accessibility (on foot, by car) of particular objects of cultural heritage will change if the noise raised by the trains will allow to develop recreational activities of reconstructive character in several objects of cultural heritage – i.e. to use as a resource. The assessment in respect of visual pollution, especially at the sections where rather high engineering structures are intended to be constructed (for example, viaducts, the towers of telecommunications, lightning and similar) and when they get into protection zones of the objects of cultural heritage or exists near them (by the distance of 500 m from the objects of cultural heritage). The assessment on how the solutions of the special plan being prepared associate with the general plan of the Republic of Lithuania confirmed by the resolution No. IX-1154 prepared by the Parliament of the Republic of Lithuania on 29/10/2002, and the solutions of general plans of Kaunas and Panevėžys districts also determining the requirements for the protection of cultural heritage. The assessment in respect of archeological heritage – archeological explorations being performed are indicated within the project of investigations (Appendix **Error! Reference source not found.**). The specialist (specialists) of archeological, engineering and architectural / urban

No.	Environmental component	Forecast and assessment methods of possible influence
		heritage having qualification category of inspection specialist or the scientists of these fields of heritage will be invoked (or will be consulted with) for the performance of above mentioned assessments.
10.	Public health	Noise calculations, simulation and comparisons with permissible norms; Vibration calculations

The measures intended for the performance of the prevention of negative influence for the environment, reduction of compensation of the influence are presented in Table 10.

Table 10. Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence

No.	Influence	Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence
1.	Air pollution	▶ In order to avoid air pollution during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements must be used. ▶ In order to avoid air pollution during the period of exploitation only electric trains for the carriage of the passengers and freight must be used.
2.	Surface water	▶ During preparation of technical project of the planned railway line, it is necessary to plan the measures for the reduction of possible negative influence, i.e. appropriate reclamation, water off-take solutions. ▶ It should be forbidden to install building sites closer than 50 meters from the coastal protection lane during the period of construction in order to prevent the pollution and accidents of water bodies. It should also be forbidden to install storages of dangerous materials and oil products, sites of machinery repair and storage, and other constructional objects capable to have negative influence for natural environment within the protection zone of water bodies, if it will not be decided otherwise during the preparation of technical project. ▶ In order to avoid air pollution during the period of railway construction it should be ensured that only construction machinery and motor vehicles

No.	Influence	Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence
		(trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements are used. ▶ All the requirements for the equipment, infrastructure and traffic control helping to reduce the risks of extreme situations and the pollution of surface water in case of it should be followed during the exploitation of the railway.
3.	Geological components including groundwater and underwater	▶ During the performance of technical project of the railway line, geological investigations must be performed and karst phenomenon must be properly explored. Obligatory strengthening of the construction of railway line must be performed after the determination of potential karst situations. ▶ It should be forbidden to install building sites within protection zones of watering places in order to prevent the pollution of underwater and watering places. It should be also forbidden to install the storages of dangerous materials and oil products, the sites of machinery repair and storage, and other constructional objects capable to have negative influence for natural environment within protection zone of water bodies, if it will not be decided otherwise during the preparation of technical project. ▶ In order to avoid the pollution of groundwater and underwater during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements must be exploited. ▶ In order to avoid accidents all the requirements for the equipment, infrastructure and traffic control should be followed during the exploitation of the railway. ▶ In order to protect underwater and watering places from the pollution it should be forbidden to install railway line within protection zones of watering places.
4.	Vegetable soil	▶ Before starting the construction works all vegetable soil existing within the area of the construction must be excavated and stored in piles separately from other materials by protecting against the pollution and

No.	Influence	Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence
		scouring by the rain and surface water. ▶ In order to avoid accidents all the requirements for the equipment, infrastructure and traffic control should be followed during the exploitation of the railway.
5.	Landscape	▶ The landscape typical of the area is taken into consideration in order to reduce negative influence for the landscape during the preparation of technical project of railway line and selecting the constructions of railway bridges or other structures.
6.	Protected areas, flora, forests	▶ It is necessary not to affect hydrologic treatment of protected areas; ▶ It is necessary to consolidate and plant the slopes after finishing of the works of bridge construction in order to avoid the violation of the slopes and the banks of protected areas (possible erosion in the future); ▶ It is necessary not to affect watercourse of the rivers of protected areas; ▶ In order to avoid the pollution of protected areas during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements are exploited; ▶ In order to avoid accidents of the trains, breaks of other extreme situations and the pollution of protected areas due to earlier mentioned factors all the requirements for the equipment, infrastructure and traffic control should be followed during exploitation of the railway line; ▶ It is necessary to ensure that surface water would not get into protected area during the installation of water off-take of the railway line area; ▶ It is necessary to ensure that executing works would not be performed within the protected area; ▶ It is necessary to ensure that constructional waste would not get into the protected area; ▶ It is necessary to ensure building sites and the storages of constructional materials would not be installed within the protected area;
7.	Fauna	**White salmon**

No.	Influence	Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence
		▶ Do not perform construction works during the period of salmon spawning – from the middle of August until October; ▶ It is necessary not to violate hydrologic treatment of Neris river; ▶ It is necessary to consolidate and plant the slopes after finishing of the works of bridge construction in order to avoid violation of the slopes and the banks of protected areas (possible erosion in the future); ▶ It is necessary not to affect watercourse of the river; ▶ In order to avoid the pollution of Neris river during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements are exploited. ▶ In order to avoid accidents of trains, breaks of other extreme situations and pollution of protected areas due to the abovementioned factors all the requirements for the equipment, infrastructure and traffic control should be followed during exploitation of the railway line; **For the protection of other fishes** ▶ It is necessary not to violate hydrologic treatment of Neris river; ▶ It is necessary to consolidate and plant the slopes after finishing of the works of bridge construction in order to avoid violation of slopes and banks of the protected areas (possible erosion in the future); ▶ It is necessary not to affect watercourse of the river; ▶ In order to avoid the pollution of Neris river during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements are exploited. ▶ In order to avoid accidents of trains, breaks of other extreme situations and pollution of protected areas due to the abovementioned factors all the requirements for the equipment, infrastructure and traffic control should be followed during the exploitation of the railway line;

No.	Influence	Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence
		For the protection of otters ▶ It is necessary not to violate hydrologic treatment of Neris river; ▶ It is necessary to consolidate and plant slopes after finishing of the works of bridge construction in order to avoid violation of slopes and banks of protected areas (possible erosion in the future); ▶ It is necessary not to affect watercourse of the river; ▶ In order to avoid pollution of Neris river during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements are exploited. ▶ In order to avoid accidents of trains, breaks of other extreme situations and pollution of protected areas due to the abovementioned factors all the requirements for the equipment, infrastructure and traffic control should be followed during exploitation of the railway line; **For the protection of birds:** ▶ In order to avoid air pollution during the period of railway construction it should be ensured that only construction machinery and motor vehicles (trucks, cranes, graders, loaders and other machinery) corresponding with environmental and technical requirements are exploited; ▶ Temporary noise barriers should be used during the performance of construction works; ▶ In order to avoid air pollution during the period of exploitation only electric trains for the carriage of the passengers and freight must be used; **For the protection of mammals** ▶ The culverts for the mammals – green bridges are to be install in order to avoid the barrier for the migration of mammals, fragmentation of habitats and natural carcass.

No.	Influence	Measures for the performance of the prevention of negative influence for the environment, reduction or compensation of the influence
		▶ All of the railway line is planned to be enclosed with the fence in order to avoid the mortalities of the mammals or injuries after the passage of the train or during the beating.
8.	Cultural heritage values	▶ It is not allowed to damage the margins of immovable heritage values and protection zones during installation of the railway line ▶ The roads are intended to be respectively restructured in order to reduce accessibility of negative influence; ▶ Noise barriers are intended to be installed in order to reduce application of negative influence; ▶ Intersections of two levels with the planned railway line are intended to be installed in order to protect the Narrow Gauge Railway;
9.	Public health	▶ Construction works during the period of rest days and holidays must be restricted during construction of the railway line in order to reduce noise level. Temporary noise barriers must be used during the performance of construction works. ▶ Noise reducing measures – noise-dumping walls were determined for the areas where marginal noise values (within different periods of the day) are exceeded. These walls were determined using noise simulation software “Soundplan”. The height, length of noise walls, the type of noise absorbing materials and particular installation place of noise dumping wall were simulated during the determination of noise dumping walls. The place of noise dumping walls is indicated in Appendix 1 of SEIA report. It should be noted that the places of noise dumping walls can be specified during the preparation of EIA and technical project. ▶ Modern railway technologies and equipment (rails, sleepers, constructions, reinforcements and other) must be installed and used to reduce the noise and vibration.

7. INFORMATION ON SIGNIFICANT NEGATIVE INFLUENCE OF THE PLANNED DOMESTIC ACTIVITY FOR THE ENVIRONMENT OF ANOTHER STATE

The Rail Baltica railway line crosses the border with Latvia. Therefore, significant negative influence for the environment of Latvia is being planned. In addition, it should be noted that the karst region is being crossed at the border with Latvia in accordance to the alternative No. 1. Therefore, negative influence due to karst process is being intended for the construction of the railway line and further exploitation. Also, negative influence of exploited railway line is being intended for karst processes. It should be noted that in case of railway accident within karst region not only surface water or groundwater but also underwater would be polluted both within the areas of Lithuanian and Latvia due to distinctive geology.

It should be noted that the best alternatives (No. 1, 2) were selected according to the results of the multi-criteria analysis implemented in the SEA report. These are the key findings:

1) Alternatives in the Panevėžys r. mun. territory stand out in two directions.The first is avoiding urbanised territories and bypassing Panevėžys city and also planning railway route more to the west (Alternatives No. 1, 2). The other is crossing the territory of Panevėžys c. mun (Alternatives No. 3, 4). In the first case, the railway station of Panevėžys should be arranged in the south-western part – outside of the highway bypass of Panevėžys. This part is expected to be built mixed-use passenger and goods railway station. In the other case, the railway station should be arranged in the north-western part of the city;

2) In the case of alternative No. 3, 4, passengers station should be arraged in the north-western part of the city further away from the urbanised territories. However, due to the intesection with the highway bypass of Panevėžys and the narrow gauge railway complex in the foreseeable station site there is a serious difference in height between the ground and the planned railway line which increases the station installation costs of alternatives No. 3,4, as well as there is no territorial space to install the freight railway station and the necessary cargo terminals.

3) In order to avoid negative consequences for both the railway line which is planned in the karst region (appearing karst sinkholes during the time of railway construction and operation) and the karst region itself (groundwater contamination in case of accidents), the concept of alternative routes have been planned outside the karst region boundaries. In addition, carry out addintional geophysical and geological surveys to identify febrile areas, because the alternative No. 1 crosses the karst region boundaries.

4) Each line option provides two intermediate stations, which are the same for all alternatives. The useful lenght of the station road is 1050 meters. The first intermediate station is planned in the eastern part of Kėdainiai r. mun. territory and the second is planned between Joniškėlis and

Meškalaukis in the Pasvalys r. mun. territory. It should be noted that passengers boarding and disembarking in the intermediate stations is not aticipated.

8. OTHER IMPORTANT INFORMATION

8.1. Offered content of environmental impact assessment

SUMMARY
INTRODUCTION
CONTENT
1. INFORMATION ABOUT THE ORGANIZER (CUSTOMER) OF PLANNED DOMESTIC ACTIVITY
2. INFORMATION ABOUT THE ORGANIZER OF THE DOCUMENTS OF ENVIRONMENTAL IMPACT ASSESSMENT
3. INFORMATION ON THE PLANNED DOMESTIC ACTIVITY
3.1. Description of potentially comprised pollution
3.2. Description of waste formation and disposal
3.3. Description of environmental components that could be affected due to planned domestic activity
3.4. Description and assessment of possible direct and indirect impact of planned domestic activity for ambient air and climate, surface water, geological components, vegetable soil, landscape, protected areas, flora, fauna, immovable cultural values, public health, social and economic environment and interaction between these components
3.5. Applied methods of environmental impact assessment and forecasting, reasoning of their selection
3.6. Description of the measures intended to avoid, reduce, compensate of negative influence or liquidate their after-effect
3.7. Analysis of investigated alternatives by indicating the reasons of their selection in accordance to the best available production methods and possible environmental impact
3.8. Possible extreme situations and the measures to avoid them or liquidate their after-effect
3.9. Analysis of the information of performed environmental monitoring, the draft of intended environmental monitoring
3.10. Summary of the information analyzed within the report
4. DESCRIPTION OF THE PROBLEMS THE CUSTOMER HAD CONFRONTED WITH DURING THE PERFORMANCE OF ENVIRONMENTAL IMPACT ASSESSMENT
LITERATURE

TEXTUAL AND GRAPHIC APPENDIXES

FINDING OF THE SUBJECTS OF THE ASSESSMENT OF EIA REPORT AND THE DOCUMENTATION OF THE DISCUSSION WITH THE SOCIETY

8.2. Information of the society within the stage of program preparation

The organizer of EIA documents presents the EIA program to the society via media, i.e. press and republican press, through notice boards and websites of the municipalities and elderships including areas of the planned domestic activity. The announcement and all EIA program will be placed in the webpages of the organizer and the customer. The organizer performs such steps before presenting the report for EIA subjects for investigation purpose.

8.3. Information within the stage of report preparation

All information about the time and place of the public meeting and about the place where it is possible to familiarize with the project of the report of environmental impact assessment will be announced within the media, i.e. press and republican press, also within the notice boards and websites of the municipalities and elderships including areas of planned domestic activity.

EIA report will be specified in accordance to the offers of the concerned society.

8.4. Information about the acceptance of the decision

After decision of the responsible institution regarding admissibility of the planned domestic activity within the selected place the organizer of the EIA documents informs the society within 10 days by announcing about the accepted solution via media, i.e. press and republican press. This is also done within the notice boards and websites of the municipalities and elderships including areas of the planned domestic activity.

APPENDIXES

Annex 1. Residential areas;

Annex 2. Protected areas;

Annex 3. Objects of natural heritage;

Annex 4. Values of cultural heritage;

Annex 5. Water bodies;

Annex 6. Swamp areas;

Annex 7. Watering places;

Annex 8. Forests;

Annex 9. Schemes of the alternatives;

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