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# Visual Impact Assessment of Free Standing Billboards in the Road Landscape near Elektrėnai (Lithuania)

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***Abstract* – Free standing billboards (FSBs) have a significant negative visual impact on landscape. In majority of foreign countries the construction of FSBs is regulated by various legal instruments, guidelines, and control manuals. In Lithuania the construction of FSBs considering visual impact is poorly regulated by juridical and spatial planning means. Considering this situation methodological guidelines for regulation of FSB construction taking into account their visual impact were created. The guidelines are a part of the Landscape Guidelines for the Roads and Railways of National Significance [10] which is a manual set to fulfil the requirements of the European Landscape Convention [4] to broaden the knowledge on this subject and to integrate landscape issues into all matters that influence the state and the future of landscape. The aim of the article is to show the possibilities of application of the guidelines by performing visual impact assessment of FSBs in the road landscape near the town of Elektrėnai on one of the main highways of Lithuania: A1 Vilnius-Kaunas-Klaipėda. The proposed stages of FSB visual impact assessment are the following: analysis of landscape spatial structure designating visual spaces perceived from separate road sections; analysis of FSB layout possibilities designating visual spaces protected from FSB construction and visual spaces as FSB construction areas; establishment of possible visual contrast level of FSB, and establishment of FSB location in visual space and visual contrast character according to the Identity Index context (Similarity, Identity, Difference Index) theory and results of evaluation of aesthetic potential of the visual space. In the performed research we used the possibilities of spatial data management and analysis of geographic information systems (GIS) and basically implemented the first three stages of FSB visual impact assessment. The fourth stage was not implemented because it deals mainly with technical issues of FSBs. We tried to solve questions that are most important on the level of spatial planning when developing special plans for FSB construction.**

***Keywords* – Free standing billboards, landscape, visual impact assessment.**

In majority of foreign countries the construction of free standing billboards (FSBs) is regulated by various legal instruments, guidelines, and control manuals. Restrictions for FSBs are established considering road category, road engineering elements, road environment, and the area where the road is paved. The restrictions are based on the negative effect of outdoor advertisement to the road users (e.g. distraction or disorientation) and the negative impact on landscape (i.e., landscape visual pollution) [6]. For example, the regulation of FSB construction is very strict in Denmark, Finland, and Scotland. Particular attention is paid to both traffic safety and landscape in these countries. It is allowed to construct FSBs only in urban areas. Natural and rural landscape of these countries is explicitly valued as national asset [14].

In Lithuania the construction of FSBs is prohibited in road lanes and protection zones [11]. Installation of outdoor advertisement in objects of cultural heritage and their areas and protection zones as well as in protected areas is permitted only in cases prescribed by the Laws of Lithuania after getting consent from the authorities responsible for the protection of the mentioned objects and territories [13]. On other occasions the construction of FSBs is practically out of control: there are no regulating documents determining construction and installation conditions for FSBs in Lithuania. Therefore, FSBs on roadsides in Lithuania become an aesthetic problem of landscape. The main negative visual aspects of FSBs are the following: excessive concentration, extremely different and/or aesthetically poor FSB design, inadequate size, many FSBs of different types in one visual space, chaotic layout, unsuitable location, and so on. The largest Lithuanian cities (Vilnius, Kaunas, Klaipėda) seeking to control the construction of FSBs within the administrative boundaries have developed special plans [7], [9], [21] in which the FSB construction areas are designated; FSB type, size and other characteristics are established.

Altogether, the Western European experience dealing with FSB construction issues does not fully reflect the situation in our country. FSB construction, if not prohibited, is strictly limited and regulated, and the FSB size does not reach the "giant" FSB scale [6]. Therefore, in order to solve specific problems, experience of other countries (i.e. Australia and Republic of South Africa), where FSB categories are defined, is relevant [17], [18].

Considering the situation in our country and worldwide experience of FSB construction regulation, *methodological guidelines for regulation of FSB construction taking into account their visual impact were created* [6]. The guidelines are a part of the Landscape Guidelines for the Roads and Railways of National Significance [10] which is a manual set to fulfil the requirements of The European Landscape Convention [4], to broaden knowledge on this subject and to integrate landscape issues into all matters that influence the state and the future of landscape. The aim of the article is to show the possibilities of application of the guidelines by performing visual impact assessment of FSBs in road-landscape near the town of Elektrėnai on one of the main highways of Lithuania: A1 Vilnius-Kaunas-Klaipėda.

## I. Methods

The proposed stages of FSB visual impact assessment are the following: analysis of landscape spatial structure designating visual spaces perceived from separate road sections; analysis of FSB layout possibilities designating visual spaces protected from FSB construction and visual spaces as FSB construction areas; establishment of possible visual contrast level of FSB and of FSB location in visual space and visual contrast character according to SID theory and the results of evaluation of aesthetic potential of the visual space [6], [10]. These guidelines can be used in preparing special plans of FSB construction in urban and suburban landscapes. We state that FSBs have to be removed from rural and natural landscapes because positive influence of outdoor advertising on landscape is impossible.

In the performed research we also used the possibilities of spatial data management and analysis of geographic information systems

(GIS) and basically implemented the first three stages of FSB visual impact assessment. The fourth stage was not implemented because it deals mainly with technical issues of FSBs. We tried to solve the questions that are most important on the level of spatial planning when special plans for FSB construction are prepared.

So the main methodological stages implemented in the research were the following:

*1. Analysis of landscape spatial structure.*

Limits of visual spaces (VS) and the road section from which VS are perceived were identified and marked.

Visual spaces are spaces which are directly perceived as integral formations from any observing point located inside them [5], [15]. The size of them according to the viewing radius can vary from 5–10 metres to several kilometres considering the structure of the Lithuanian landscape [6].

The area was assessed from spatial (observing location as the road section was identified) and quantitative (spaces of visual use were established) points of view. This determined the size of the existing and possible FSB visual impact zone considering the road location.

The main quantitative and qualitative indicators of visually perceived landscape spatial structure were also evaluated: size of VS, configuration, vertical and horizontal closure, visual connections between different VSs, hierarchy of VSs (number of VS ranks), integrity of VS, naturalness, variety, and degree of dominance of objects forming the VS.

*2. Analysis of FSB layout possibilities.*

Function, cultural and historical significance, visual impressiveness of the spaces were determined in this stage.

The construction sites for FSBs were designated according to the following criteria:

K1 – visual quality of landscape (it was evaluated using the data of previous research of landscape aesthetic potential [8]);

K2 – function of the area (FSBs can be constructed in industrial areas, zones of technical or social infrastructure, mixed residential areas, etc., which are designated according to the type of land use [19]);

K3 – distance from the objects of natural and cultural heritage (FSBs cannot be constructed in the areas and protection zones of natural and cultural heritage objects);

K4 – distance from the road transport service and recreation infrastructure (FSBs can be constructed as a part of transport service and recreation infrastructure complex);

K5 – distance from residential areas (FSB construction in residential areas is unacceptable).

*3. Establishment of the possible visual contrast level of FSBs*

*During this stage the possible visual contrast level of FSBs was established.*

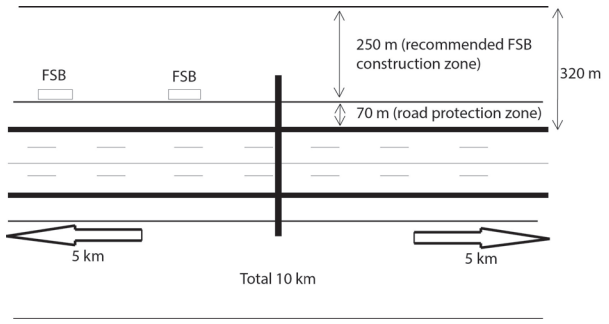
The Identity Index context (SID) theory [20] states that the type and levels of contextuality can be quantitatively determined by the identity index. This index can be used to define the extent to which FSBs will be identical with, similar to or different from its context. Visual contrast of FSBs can reach the second or third level, whereas advertising seeks to draw attention by its nature.

The most visually active objects are called dominants. Accents are the elements which draw our attention and can be distinguished from the contextual environment. The majority of homogenous elements form the background. This leads to a potential FSB contrast level: dominant or accent.

The level of FSB visual contrast depends on the conception of landscape formation. FSBs can be perceived as visual accents in agrarian urbanized landscape, forested or agrarian slightly urbanized landscape. In urban landscape (e.g. industrial, commercial, mixed residential areas) they can be accents or dominants.

## II. Results

At first we selected the research area. We decided to analyze the section (10 km long) of one of the main highways of Lithuania A1 Vilnius-Kaunas-Klaipėda near the town of Elektrėnai. The main reason why we selected this area is the density of FSBs near this road. There are 116 FSBs between Vilnius and Kaunas near the road A1 (length~100 km). The biggest number of FSBs is between Žiežmariai and Rumšiškės and in the sector of Vievis–Elektrėnai–Bačkonys. The analyzed area was established according to the prepared methodological guidelines on regulation of FSB construction [6], [10]. The selected research area is 5 km to and 5 km beyond the entrance to Elektrėnai because the road does not cross the administrative border of the town but borders with it. The selected road section was specified on the basis of additional data: the length of the analyzed section was between 43.5 km to 53.5 km of the road A1. The database GDB10LT of geo-base M1: 10000 of the Republic of Lithuania was used for the designation of the analyzed area. The analyzed area is designated as a buffer zone of 320 m in width on both sides of the selected road section: the road protection zone is 70 m wide (measured from the edge of the road) and the recommended FSB construction zone [6] is 250 m wide (measured from the limit of the road protection zone) (Fig. 1).

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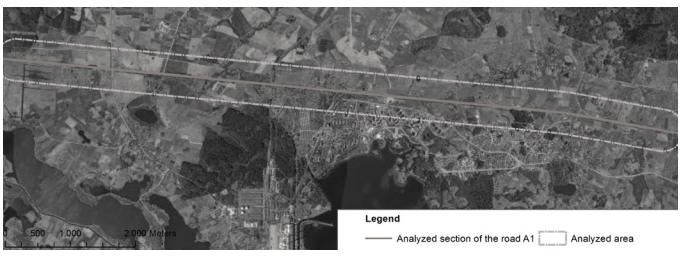


b).

Fig. 1. a) The scheme of designation of the analyzed area and b) its location on the orthophotographic mathematical basis ORT10LT [2].


Fig. 2. The scheme of the designation of forests and developed areas as visual obstacles and water bodies using database GDB10LT [2].

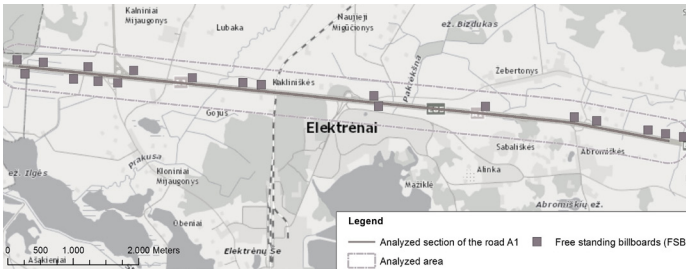


Fig. 3. The scheme of the existing FSB locations.

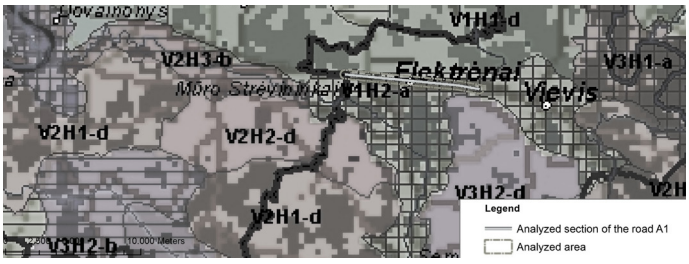


Fig. 4. The scheme of evaluation of landscape visual structure according to the data of The Study of Identification of Landscape Spatial Structure Diversity and its Types in the Republic of Lithuania [12].

After the designation of the analyzed area we performed the analysis of landscape spatial structure (*methodological stage 1*). In order to evaluate the landscape spatial structure we identified the location of forest, developed areas (as visual obstacles) and water bodies (as basis of VS) (Fig. 2).

We also identified the location of the existing FSBs in the analyzed area (Fig. 3). There are 19 FSBs in the analyzed area. The average distance between them is 919 m, the smallest distance – 270 m, the biggest distance – 4 km. According to the methodological guidelines the recommended distance between FSBs varies from 200 to 350 m. Taking into account that the existing FSBs in most cases are larger than the recommended in the guidelines [6], we can state that the density of the existing FSBs is too high, especially in the western and eastern parts of the analyzed area.

At first landscape visual structure was evaluated according to the data of The Study of Identification of Landscape Spatial Structure Diversity and its Types in the Republic of Lithuania [12]. It determines that the analyzed area falls into the range V1H2-a. This code describes the main landscape spatial characteristics. Index V characterizes the vertical fragmentation of landscape (visual expressivity of landscape), index H – the horizontal fragmentation and indexes a, b, c, d – the visual dominance of landscape structure.

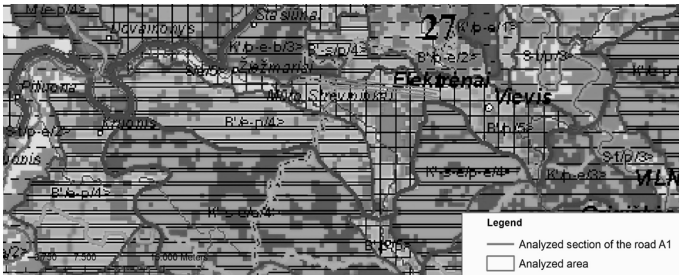


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Fig. 5. The scheme of evaluation of natural basis and cultivation character of landscape spaces according to a) the data of The Study of Identification of Landscape Spatial Structure Diversity and its Types in the Republic of Lithuania [12] and b) an example of visual character of landscape.

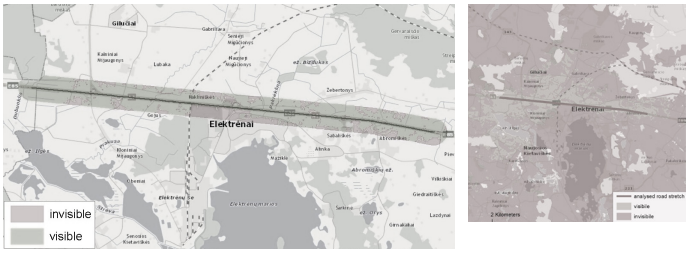
Considering this particular case (Fig. 4):

- Index V1 means that the contextual landscape has a slight vertical fragmentation: there is a wavy landscape with shallow valleys and complexes of two level video-tops (hierarchy of VS);
- Index H2 means that the contextual landscape is prevailed by semi-open landscape spaces, for the most part directly perceived as integral formations;
- Index a means that the complex of vertical and horizontal dominants is expressed in landscape spatial structure.

These characteristics of landscape spatial structure let us to conclude that the existing and future FSBs can be very well viewable in landscape VS and make high visual contrast with vertical and horizontal dominants of the landscape structure.

In order to evaluate the character of natural basis and cultivation of landscape spaces, landscape physio-morphotops determined in the study are also taken into account. The analyzed area falls into the range B'/p/5. According to this code the contextual landscape is described as clayey wavy plateau landscape with forests prevailed by pines. Considering the character of cultivation it is an agrarian slightly urbanized landscape (Fig. 5).

To further elaborate the analysis of landscape spatial structure INTERVISIBILITY function of GIS was used. This GIS function is typified by the phrase LINE OF SIGHT and determines the visibility of sight lines through potential obstructions. It is a graphic depiction of the area that can be seen from specified target areas. Intervisibility functions rely on digital elevation data to define the surrounding topography. The areas visible from the analyzed road section were mapped using this procedure (Fig. 6). The land surface data where en-




a). b).

Fig. 6. a) The scheme of buffer zone areas visible from the analyzed road section and b) the scheme of VS perceived from the analyzed road section.

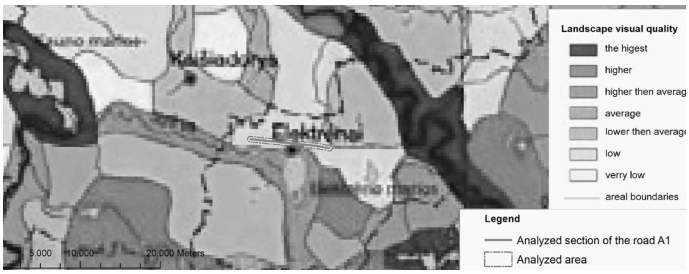
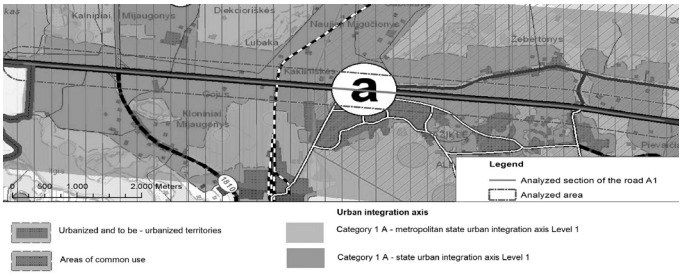



Fig. 7. The scheme of evaluation of aesthetic potential of the analyzed area and contextual landscape [8].

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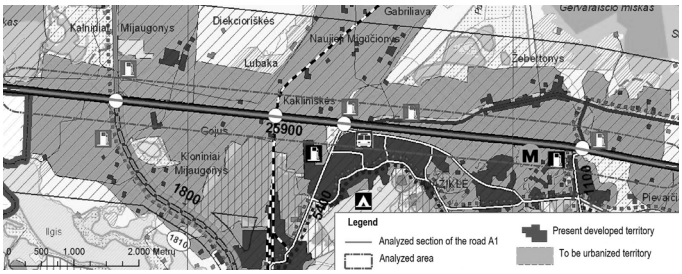



b).

Fig. 8. Schemes of evaluation of solutions of the comprehensive plan of Elektrėnai municipality: a) proposals of spatial structure development and b) proposals of transport system development [3].

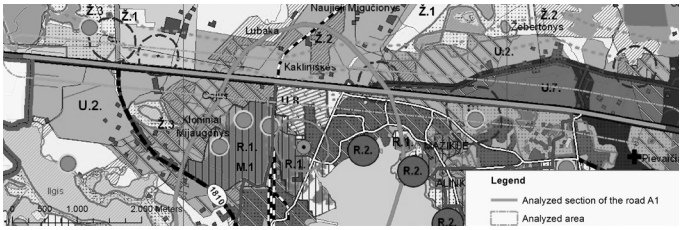



Fig. 9. The scheme of evaluation of solutions of the comprehensive plan of Elektrėnai municipality: land use and protection regulations [3].

hanced with data on vegetation and urbanization. Scale 1:10000 vector database of urbanization and vegetation was used (GDB10LT) for this purpose. Approximate height of buildings (~5–20 m) and vegetation (~8 m) was added to the height point data by joining the attributes of these layers spatially.

The average viewing radius of VSs is 800 m. This means that VSs are large considering the character of Lithuanian landscape and that FSBs are well seen in such spaces. The configuration of VS is complex and they are quite integral.

After finishing the analysis of landscape spatial structure we evaluated the layout possibilities of FSBs referring to the proposed criteria (*methodological stage 2*).

Considering the criterion K1 (landscape visual quality) the data of previous research of landscape aesthetic potential was analyzed [8], [12]. According to the data of landscape aesthetic potential analysis performed in 2008, aesthetic potential of the analyzed area and contextual landscape is *higher than average* (to the South from the analyzed area), *low* (in the analyzed area and to the North from the analyzed area) and *lower than average* (to the West and to the East from the analyzed area) (Fig. 7).

Taking into account the possible zones of visual influence of the existing and new FSBs which are bigger than the analyzed area and proximity of landscape area with *higher than average* aesthetic potential it is possible to construct a single FSB using the following installation and layout requirements [6]:

a) modular integrity of FSB size and shape (small FSB: advertising area 4.5–18 m$^2$, height – not more than 7.5 m; medium size FSB: advertising area 18–36 m$^2$, height – not more than 7.5 m; large FSB: advertising area 36–108 m$^2$, height – not more than 12 m; FSB rectangular advertising area plane must be oriented horizontally; the height and length ratio should be 1:2, 1:2.5, 1:3, or 1:4);

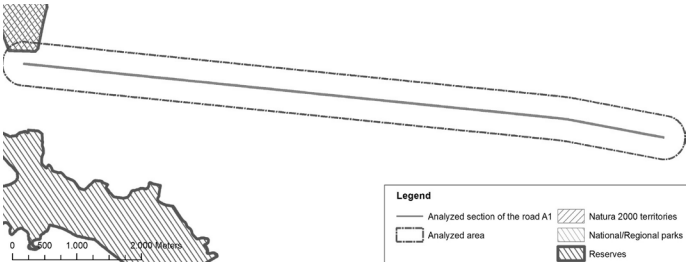
b) modular integrity of the interval between FSBs (between small FSBs – not less than 200 m, between medium size FSBs – not less than 250 m, and between large FSBs – not less than 350 m);

c) uniformity of construction, material and representativity of FSBs.

Considering the criterion K2 (function of the area) we analyzed the data of the comprehensive plan of Elektrėnai municipality [3]. According to the solutions of the plan all of the analyzed area falls into the category of urbanized territories (Fig. 8).

According to the comprehensive plan the sites of the analyzed area where the construction of FSB is forbidden are the following: agrarian areas reccomended for the planting of forest, areas for common use of gardeners' societies, areas of forest, residential areas, protected areas, and areas of common use. The most preferable area of FSB construction is commercial, industrial and logistics zone in the eastern part of the analyzed area (Fig. 9.).

Considering the criterion K3 (distance from objects of natural and cultural heritage) we evaluated the data of cadastral database of protected areas [1], the register of objects of cultural heritage [16] and the comprehensive plan of Elektrėnai municipality [3]. According to the data of the cadastral database of protected areas we determined that the part of "Natura 2000" area falls within the analyzed area (in the western part). It is Strošiūnai pinewood (LTKAI0008) which is important for the protection of habitats and is a part of Strošiūnai state landscape reserve.

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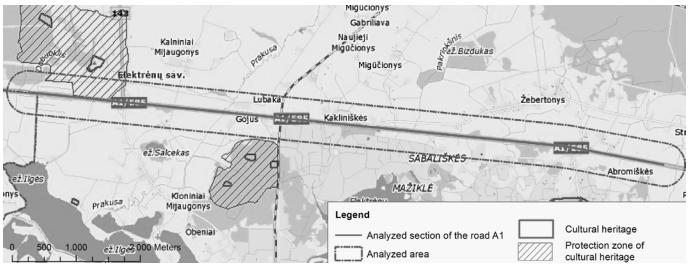


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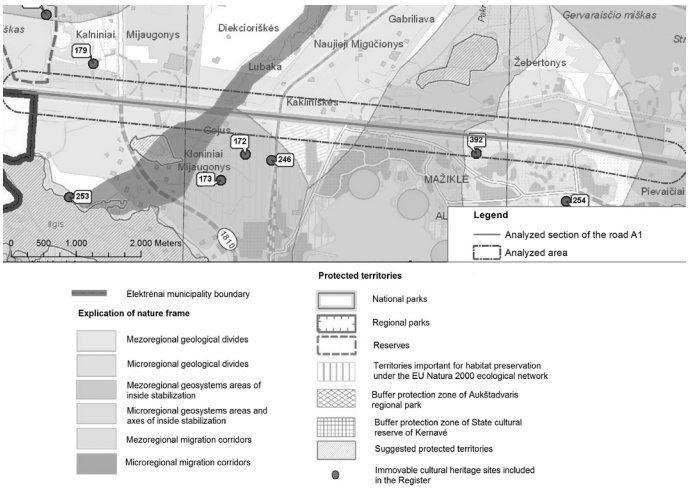
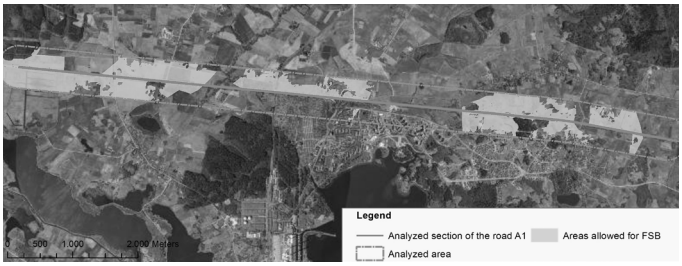



c).

Fig. 10. a) Schemes of evaluation of the data of cadastral database of protected areas [1], b) register of objects of cultural heritage [16] and c) comprehensive plan of Elektrėnai municipality: natural and cultural heritage [3].

According to the data of the register of objects of cultural heritage, the part of the protection zone of Mijaugoniai castle-hill with settlement (monument of cultural heritage) falls within the analyzed area in the western part, and in the eastern part there is a chapel-mausoleum of families of De Raesai and Broel-Pliateriai. According to the data of the comprehensive plan of Elektrėnai municipality the parts of the microregional and mezoregional migration corridors and microregional geosystems inner stabilization areas fall within the analyzed area. The eastern part of the analyzed area falls into the microregional geo-ecological divide. In these areas of the natural framework existing landscape naturalness has to be supported and strengthened, and construction of FSBs is not recommended (Fig. 10). FSBs also cannot be constructed in the areas and protection zones of natural and cultural heritage objects which fall into the analyzed area.

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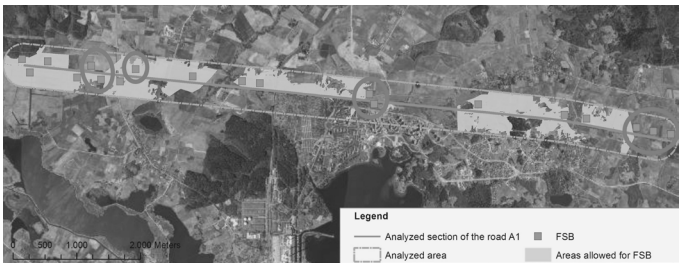


b).

Fig. 11. a) The scheme of areas allowed for FSB construction and b) their overlapping with the existing FSBs (the removed FSBs are marked with red circles).

Considering the criterion K4 (distance to the road transport service and recreation infrastructure) according to the data of the comprehensive plan of Elektrėnai municipality [3] (Fig. 8b)) locations for three new gas stations are proposed where FSBs can be constructed as a part of transport service infrastructure complex.

Considering the criterion K5 (distance from residential areas), the data of the comprehensive plan of Elektrėnai municipality (land use and protection regulations) (Fig. 9) and the existing spatial structure of contextual landscape (Fig. 2) let us state that FSB construction is unacceptable in the town area of Elektrėnai and other none-categorised residential areas (single homesteads or their groups) which fall into the analyzed area.

Possible FSB construction areas in the analyzed area are designated using OVERLAY function of GIS. First of all we designate parts of the analyzed area where FSBs cannot be constructed (residential areas, areas of natural and cultural heritage, natural framework, etc.). Then these parts of the buffer zone are overlaid with the areas visible from the analyzed road section, thus zones where FSBs can be constructed are obtained (Fig. 11).

Figure 11b) shows that 7 of 19 FSBs are built in inappropriate locations and should be removed. One FSB in the western part of the analyzed area should be removed too because the distance between FSBs is less than 350 m. The overall number of the removed FSBs is 8 out of 19.

The possible visual contrast level of FSBs (*methodological stage 3*) in the larger part of the analyzed area can be the level of *accents* because the contextual landscape is agrarian slightly urbanized landscape in which FSBs cannot be perceived as dominants. FSBs can *dominate* only in the commercial, industrial and logistics zone of the analyzed area proposed by the comprehensive plan of Elektrėnai municipality.

## Conclusion

1. Today FSBs are an aesthetic problem of Lithuanian landscape. They are the source of visual pollution in the spaces representing historic landscape, panoramic views of Lithuanian cities and towns, spaces of hilly laky and forested natural landscape and other scenic views of natural, rural or urban landscape visual type. The main negative visual aspects of FSBs are the following: excessive concentration, extremely different and/or aesthetically poor FSB design, inadequate size, many FSBs of different types in one visual space, chaotic layout, unsuitable location, and so on.

2. Considering this situation in our country and worldwide experience of FSB construction regulation, methodological guidelines for regulation of FSB construction taking into account their visual impact were created. The proposed stages of FSB visual impact assessment are the following: analysis of landscape spatial structure, analysis of FSB layout possibilities, establishment of the possible visual contrast level of FSB, and establishment of FSB location in visual space and visual contrast character.

3. In the performed research we used possibilities of spatial data management and analysis of geographic information systems (GIS) and successfully implemented the first three stages of FSB visual impact assessment. The fourth stage was not implemented because it deals mainly with technical issues of FSBs. We tried to solve the issues that are most important on the level of spatial planning when preparing special plans for FSB construction.

4. The main results of the research show that 8 of 19 FSBs should be removed from the analyzed area near highway A1 near the town of Elektrėnai because they are built in inappropriate locations (in residential areas, areas of natural and cultural heritage, natural framework, etc.) or the density of FSBs is too high (in the western part of the analyzed area).

5. The possible visual contrast level of FSBs in the larger part of the analyzed area can be the level of *accents* because the contextual landscape is agrarian slightly urbanized landscape in which FSBs cannot be perceived as dominants. New FSBs can be built only in the areas allowed for FSB construction in the following manner: one FSB in one VS. The following FSB installation and layout requirements should be used: modular integrity of FSB size and shape; modular integrity of the interval between FSBs; uniformity of construction and material and representativity of FSBs.

## References

1. Cadastral database of protected areas [online]. *State Service of Protected Areas Under the Ministry of the Environment of the Republic of Lithuania* [cited 23.05.2014]. www.vstt.lt
2. Ministry of Agriculture of the Republic of Lithuania, National Land Service. *Databases GDB10LT, ORT10LT.*
3. Elektrėnų savivaldybės teritorijos bendrasis planas (Comprehensive plan of Elektrėnai municipality), 2009 [online]. *Elektrėnai municipality* [cited 23.05.2014]. http://www.elektrenai.lt/go.php/lit/Bendrasis_planas/2797
4. European Landscape Convention (Florence, 2000) [online]. *Council of Europe* [cited 23.05.2014]. http://www.coe.int/en/web/landscape
5. **Kamičaitytė-Virbašienė, J.** *Metodinės rekomendacijos kraštovaizdžio formavimo individualiam darbui atlikti* (Mokomoji knyga). Kaunas: Vilniaus pedagoginio universiteto leidykla [i.e. Vilnius], 2011. 53 pl. (Methodical recommendations for individual work of landscape formation (a course book)).
6. **Kamičaitytė-Virbašienė, J., Samuchovienė, O.** Free Standing Billboards in a Road Landscape : Their Visual Impact and Its Regulation Possibilities (Lithuanian Case). *Environmental Research, Engineering and Management.* Kaunas, 2013, No. 4(66), p. 66–78.
7. Kauno miesto išorinės vaizdinės reklamos specialusis planas (Special plan of Kaunas city outdoor advertisement), 2006 [online]. *Kaunas municipality* [cited 23.05.2014]. http://www.kaunas.lt/index.php?3385250692
8. **Kavaliauskas, P.** *Kraštovaizdžio samprata ir planavimas.* Vilnius: Vilniaus universtitetas, 2011. 245 p. (Landscape Concept and Planning).
9. Klaipėdos miesto vizualinės informacijos bei išorinės reklamos specialusis planas (Special plan of Klaipėda city visual information and outdoor advertisement), 2005 [online]. *Klaipėda municipality* [cited 23.05.2014]. http://www.klaipeda.lt/go.php/lit/Specialieji-planai-ir-schemos/1753
10. *Kraštovaizdžio formavimo gairės valstybiniams keliams ir geležinkeliams* (Landscape guidelines for the roads and railways of national significance). Kaunas: LR Aplinkos ministerija, 2013. 136 pl.
11. Lietuvos Respublikos Kelių įstatymo pakeitimo įstatymas (Law on roads of the Republic of Lithuania), 2002, No. IX–1113 [online]. *Lietuvos Respublikos Seimas* [cited 20.05.2014]. http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=188756&p_tr2=2
12. Lietuvos Respublikos kraštovaizdžio erdvinės struktūros įvairovės ir jos tipų identifikavimo studija : II dalis. Lietuvos kraštovaizdžio erdvinės raiškos identifikavimo ir lokalizavimo analizė (The study of identification of landscape spatial structure diversity and its types of the Republic of Lithuania) 2013 [online]. *Lietuvos Respublikos Aplinkos ministerija* [cited 20.05.2014]. http://www.am.lt/VI/files/File/krastovaizdis/leidiniai/studijos-II_dalis++.pd
13. Lietuvos Respublikos Reklamos įstatymo pakeitimo įstatymas (Law on advertising of the Republic of Lithuania), 2013, No. XII–315 [online]. *Lietuvos Respublikos Seimas* [cited 20.05.2014]. http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=449267&p_tr2=2
14. *Outdoor Advertising Control Practices in Australia, Europe and Japan.* United States, FHWA International Technology Scanning Program, 2011 [online, cited 23.05.2014]. https://www.planning.org/partnerships/2012/pdf/scanfinalreport.pdf
15. **Purvinas, M.** Kraštovaizdžio erdvinės struktūros pirminiai vienetai ir jų galimos charakteristikos (The primary units of landscape spatial structure and their potential characteristics). *Statyba ir architektūra*, XIV. Vilnius, 1975, t. 4, pl. 5–21.
16. Register of objects of cultural heritage [online]. *Centre for the Lithuanian cultural heritage* [cited 23.05.2014]. www.kpd.lt
17. *Roadside Advertising Guide.* Queensland Government, Department of Main Roads. Queensland, 2009. 202 p.
18. *South African Manual for Outdoor Advertising Control.* South Africa, Department of Environmental Affairs and Tourism (edited by F.Jordaan). Pretoria: CTP, 1998. 124 p.
19. Teritorijų planavimo normos (Standards of territorial planning), 2014 [online]. *The Ministry of the Environment of the Republic of Lithuania* [cited 23.05.2014]. http://www.am.lt/VI/files/File/TPUAD/TP%20nauji/2013-12-31%20Teritoriju%20planavimo%20normos.pdf
20. **Turner, T.** *Landscape planning and environmental impact design.* London: UCL Press, 2003. 425 p.
21. Vilniaus miesto išorinės vaizdinės reklamos specialusis planas (Special plan of Vilnius city outdoor advertisement), 2003 [online]. *Vilnius municipality* [cited 23.05.2014]. http://www.vilnius.lt/index.php?2728112018

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