

ENVIRONMENTAL IMPACT ASSESSMENT OF SPORT AND RELAX CENTRE

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Abstract

Environmental impact assessment process for plans, structures, facilities and other activities is applied in developed countries for several decades and is one of the main tools of preventive environmental protection and sustainable development. Environmental Impact Assessment is a process that identifies; estimates; assesses and provides information on negative and positive effects of the proposed project on the environment and health, and specifies in detail the measures to mitigate the possible negative effects before approving the project and its implementation. The thesis is aimed at assessing the impact of sports and relaxation centre Kavečany on the environment. Multi-criteria analysis method was used to compare the impacts of the proposed sports and relaxation centre in the area of Kavečany with the state if the activity is not carried out. Results showed a higher quality of the environment in the village, in the case of the proposed activity implementation.

Keywords: Environmental Impact Assessment, Kavečany, Sport and Relax centre

1 INTRODUCTION

The process of environmental impact assessment (EIA) is undoubtedly the important environmental tool to protect the environment and ensure sustainable development. This process is essentially a study that identifies, evaluates, assesses and provides information on the impacts of the proposed project/activity on the environment and specifies in detail the measures to mitigate adverse impacts before approval of the project.

This paper is based on legislative and methodological documents relating to the assessment process of environmental impact, especially EIA Directive 2014/52/EU amending the EIA Directive 2011/92/EU and Act No. 24/2006 Coll. on Environmental Impact Assessment – national Law in Slovakia. The aim of this assessment is a comprehensive finding, description and evaluation of the anticipated impacts of the proposed activity on the environment, including a comparison with the existing state of the environment at the site of the activity in its expected impact. Impact assessment of selected activities ensure a high level of environmental protection and contribute to the integration of environmental

considerations in granting activities with a view to promoting sustainable development. That assessment serves as a technical basis for the issuing of a license to operate under special regulations.

The aim of the thesis is to assess the effects of sport and recreation centre Kavečany on the environment as required by the European Union, in particular in Slovakia under Act no. 24/2006 Z.z. as amended. The result of the research is a comparison of the proposed activity with the current state of the area.

2 MATERIALS AND METHODS

2.1 Multicriteria analysis

In the EIA process is always necessary to consider at least two alternatives of the proposed action: I) zero alternative – if there is no activity (current state of the environment) and II) alternatives of the proposed activity – variants of the activity that usually differ in locality (site of construction), used technology, time of implementation, etc.). The purpose should be to find the optimal solution, in practice a choice called "preferred option".

The selection of the optimal alternative is enjoyed by various methods, particularly by multicriteria analysis. The general procedure of

multicriteria evaluation of alternatives includes six relatively discrete steps [1]:

- The creation of purpose-oriented set of evaluation criteria,
- Setting the weights of the evaluation criteria,
- Assessment of the results (consequences, benefits, but also potential damages or losses of alternatives), it is a partial assessment of the alternatives,
- Assessment of the risks associated with implementing of the alternatives,
- Determination of the preference order of alternatives and selection of the best option.

Summary quality of the environment for the geographical regions is determined, by substantial (cardinal) properties of the individual components of the environment, the quality of which we can assess by the available analytical and diagnostic indicators. These partial indicators can create a catalog of indicators criteria (character) whose values are precisely determined analytically using the scientific bases of prognosis or experimental estimation [2]. Total indicator of environmental quality (TIEQ) method is used to determine the value of a comprehensive land use in terms of humanly influenced environment quality.

It is calculated according to:

$$TIEQ = U_j = \sum_{j=1}^n f_j \left(P_j^{(y)} \right) W_j^{(N)} \quad (1)$$

Where U_j is function of benefit, P_j is criterion, W_j is weight.

TIEQ is a multicriteria method that fully utilizes the criteria catalog. Its structure is hierarchical, adaptive and basically the whole society allows you to select the preferred option of a conventional set of alternatives or to give a preferential position of alternatives to a given set of criteria.

2.2 Environment of study area

The proposed activity – sport and relax centre Kavecany is proposed outside the built-up area of village Kavecany (Fig. 1) with the number of inhabitants 1,235. The cadastral territory of village Kavecany falls under the governing Region (Fig. 2) – surroundings of Kosice district. Kavecany is located northwest of the Kosice City at an altitude of 453 m asl.

The site lies in terms of global climate classification in northern temperate climatic zone with regular changes of four seasons and

variable weather, with a relative distribution of rainfall during the year. Average annual temperatures are in the range of 10°C.



Figure 1. Study area



Figure 2. Location of study area within Slovakia and Europe

Area of the village is 1,049.6 ha (10.5 km²). From this area the greater part of cadastral area

of Kavecany is an agricultural land – it occupies 618.3 hectares, which largely consists of arable land and permanent grassland. Non-agricultural land 431.3 hectares consists largely of built-up area and forest land.

From the original architecture of the residential buildings in Kavecany it kept nothing. The oldest buildings are from the 19th and 20th centuries. Religious monument is the only national monument St. Peter and Paul church, which was built in 1783.

A very important indicator by analyzing the labor market is rate of economic activities in the area. Business activities in the village are characterized by 66 legal entities and sole traders [3].

Kavecany village is due to its location and altitude a popular area for relaxation and sports activities in a really clean environment.

The surrounding countryside offers the possibility of many hiking traces. The ski area offers opportunities for skiing. In the nearby ZOO visitors can admire 151 kinds of animals from five continents with a total of 845 individuals. The area of ZOO is app. 11 ha. There are a lot of cultural and educational programs and attractions not only for children in the ZOO during the year.

The bobsleigh run in Kavecany is the first attraction of its kind built in Slovakia. It is a sports and recreation facility for children and adults. The track is 800 meters long and it is possible to drive up to 50-60 km speed.

The new cycle track has a length of 13.5 kilometers, resulting in an interesting forest.

In the city of Kavecany the newly built playground in the center of the village and at the same time started a recovery area of a football field and the construction of the multipurpose sport field.

The main transport infrastructure linkages the city of Kosice and village Kavecany by public transport.

The village has a Municipal office, which is a public institution that provides state administration in its scope.

The state of technical infrastructure is very good. According to the Environmental Regionalization of Slovakia, the area of interest has an environment of high quality.

Local pollution sources currently represent mainly households (discharge of sewage). The situation has significantly improved the

construction of sewerage and wastewater treatment plants. The intensity of the noise load is low.

The area of interest falls within the locality with the minimal air pollution by basic pollutants. There are no natural sources of radiation. The study area has low radon risk.

2.3 Sport and relax centre

A brief description of the technical and technological solution is following.

The centre has three entities of special purpose [4]:

- Health Center
- Restaurant
- Accommodation.

The building is designed as a relaxing resort for summer and winter recreation (Fig. 3) with catering and accommodation services with a capacity of 60 people.

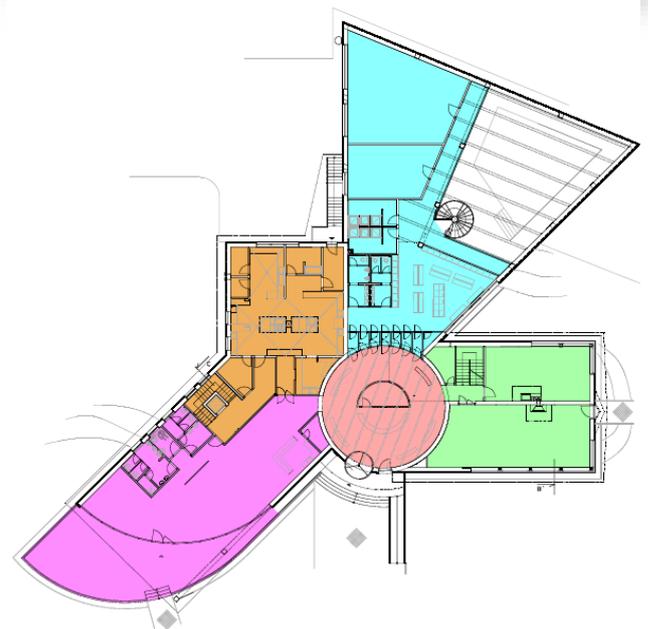


Figure 3. Sport and relax centre

The health center consists of a pool hall and wellness center, which involves several treatments such as sauna, solarium, Jacuzzi etc. The complex of buildings includes exterior constructions – ten wooden cottages, each for 5 persons, situated near the forest. There are also two multifunctional playgrounds, children's

playground and park seating area which creates space for relaxation.

During the operation of the whole complex it is counted with twelve permanent workers [4].

The complex is integrated into a garden relaxation area near forest. It is located about 5 km from Kosice City. The purpose is its attractiveness to entice potential of customers.

3 RESULTS

The environmental impact assessment of sport and relax centre Kavečany includes the comparison of alternatives of proposed activity and the proposal of optimal alternative. The intention is drafted in one variant and a comparison with zero alternative:

- Alternative 0 – the zero alternative – if no activity is implemented.
- Alternative 1 – the first variant – the environmental impact assessment of the proposed sport and relax centre Kavečany.

Alternative 1 is proposed in existing recreational area. Any other Alternative would be financially highly demanding.

Comparison of alternatives of proposed activity and the proposal of optimal alternative is based on method of Total Indicator of Environmental Quality (TIEQ).

The first step of this evaluation is Creating a set of criteria and determining their importance (weight) for the selection of the optimal alternative.

We have defined a total of nine criteria (Catalogue of criteria), which we have divided into four groups according to aspects – technical, economic, environmental and social (Tab. 1).

Table 1. Catalogue of criteria

Criteria / Pi	Alternative 0 / A0	Alternative 1 / A1
Time of construction / P1	0 years / 10 points	1 year / 4 points
Time of operation / P2	0 years / 7 points	30 years / 5 points
Using of renewable sources of energy / P3	No / 0 points	Yes / 8 points
Investment costs / P4	0 €/ 10 points	2 000 000 € / 0 points
Operation costs / P5	0 €/ 10 points	300 000 € / 2 points

Waste production / P6	Minimal / 8 points	Middle / 3 points
Land occupation / P7	0 / 10 points	26,000 m ² / 10 points
Job opportunities / P8	0 / 0 points	12 / 10 points
Increasing the living standards / P9	Partially / 3 points	Yes / 10 points

The points associated with each criterion were stated based on experts' suggestions. Authors' proposals were discussed with professionally qualified persons working in the field of environmental impact assessment as well as civil engineers.

The ranking method was used to state the weights of criteria and the equation (1) was used to calculate the Total Indicator of Environment Quality.

The results are presented in Tab. 2.

Table 2. Total Indicator of Environmental Quality

Pi	A0			A1		
	w _i ^(N)	U _i (0)	TIEQ	w _i ^(N)	U _i (I)	TIEQ
P1	0,078	0,083	0,006	0,078	0,917	0,071
P2	0,094	0,083	0,008	0,094	0,917	0,087
P3	0,117	0,917	0,107	0,117	0,083	0,010
P4	0,083	0,083	0,007	0,083	0,917	0,076
P5	0,156	0,054	0,008	0,156	0,914	0,142
P6	0,128	0,083	0,011	0,128	0,917	0,117
P7	0,072	0,083	0,006	0,072	0,917	0,066
P8	0,150	0,917	0,138	0,150	0,083	0,012
P9	0,122	0,917	0,122	0,122	0,083	0,010
Σ			0,403			0,592

The results prove that a higher preference has the first alternative – proposal and construction of sport and relax centre – that is the optimal alternative for the study area.

4 CONCLUSION

The main contribution of the present paper is using of theoretical knowledge of the issue, evaluation on the state of the environment in the area of Kavečany and applications of the graphical and analytical method – Total indicator of environmental quality (TIEQ) to select the optimal variant of the action in the decision-making process in order to preserving

environmental quality for further sustainable development of society in the study area.

Assessment of the expected impact in terms of their importance and the time course of action are as follows.

The most important anticipated negative impacts:

- Increase in traffic volumes (insignificant).
- Noise emissions from transport and technological equipment (insignificant).
- The impact on agricultural land (moderately important).

The most important anticipated positive effects:

- Extending the opportunities for recreation of region's population.
- Intensification of tourism in the area.

It is not realistic to expect that implementation of the planned activity will spark connection, which may significantly affect the current state of the environment in the affected area of nature conservation, natural resources and cultural heritage. The proposed activity will be performed in the undeveloped area of the village Kavecany. From zoning point of view it is a long-term stable territory with an explicit function of urban construction of multi-storey buildings.

The concept of the building is designed in accordance with generally applicable laws, decrees and regulations. There are no proposed additional functional units or technologies, that the inquiry procedure conditional on the impact of construction on the environment. There are no obvious territorial limits or restrictive regulations of which would impede the further development of complex functions. Similarly, the future development of construction complex in structure further proposed scope of the surroundings will have no negative effects. It can be concluded that the investment project is functioning without negative effects on the traffic situation. Transport connection is real. The proposed activity - in addition to the above, are not related any more due to the context of a technical nature.

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