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Designation and supplementation concept of tourist routes in the Tarnowo Podgórne and Kaźmierz communes

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Abstract: The aim of the study was to determine the possibility of designation or supplementation of bicycle routes based on existing road infrastructure. Moreover, indication of new solutions taking into consideration natural resources as well as the tourist and landscape potential of Tarnowo Podgórne and Kaźmierz communes was performed. For these purposes, thematic maps, planning and strategic documents, and environmental study were analysed, as well as necessary field visit were conducted. The analysed areas are located next to each other, but they are characterized by different economic development strategies. There is a lack of tourist routes in the Kaźmierz commune area; hence designation of new routes, which represent a more areal structure, was proposed here. In contrast, there are 6 existing tourist routes in the Tarnowo Podgórne commune area; hence the project includes connective routes and circular routes. The concept also included connection of planned routes in both analysed communes, as well as connection into regional tourist systems routes.

Key words: natural and landscape valorisation, tourist bicycle route

Introduction

Recently tourism has become one of the most important branches of economic development on the world (Kierunki rozwoju... 2008). This situation has several explanations, including infrastructure for services of tourism regional activity. Evaluation of tourist values should not be limited to economic factors, but many other aspects should also be taken into consideration, such as psychological phenomena, social and cultural aspects, or spatial aspects. Location and space mainly create the value of potential tourism development (Niezgoda 2012).

Pedestrian and bicycle trips have been becoming more popular for spending free time together with family and friends. Pedestrian-bicycle routes can create five types of systems: distracted – occurs mainly in areas with a low level of tourism attractiveness and tortuosity, usually not connected with other routes; streaked system – usually located along lakes, river courses, mountains or protected areas; spatial – radial system along some objects and places, such as suburban zones or protected areas; complex system – joins structures with various touristic attractiveness, creates various field systems: squares, circular, triangle and many other; mixed system – joins all of the mentioned systems depending on occurrence of landscape features (Styperek 2002).

According to Dutch organization C.R.O.W. criteria the properly planned and established bicycle trail should meet the follow rules:

- cohesion (i.e. easy identification of trail),
- directness (i.e. minimisation of bypasses),
- attractiveness (i.e. readable infrastructure for tourists),
- safety (i.e. guarantee of safety and minimisation of conflict points),
- comfort (i.e. easy and fast bicycle traffic) (C.R.O.W. and ZG PKE 1999).

The project of pedestrian-bicycle routes should not be created only for inhabitants (daily cycling), but also to encourage a wider group of people (leisure cycling). Daily cyclists, particularly commuters, are mainly focused on functionality, direct access and safety. The journeys of daily cyclists are relatively short (6-8 km), and the destinations are schools, workplaces, leisure facilities, train stations and many other daily destinations. For leisure cycling, the link between the activity destinations and a good infrastructure is important. The journeys are significantly longer (10-30 km) and the routes don't have to directly reach the target, but can include additional attractions (Collection… 2012). According to Rahul and Verma (2014) the travel distance acceptable by pedestrians and cycle tourists is not only dependent on destination, but also on demographic characteristics of inhabitants and local conditions of transport system. The project of pedestrian-bicycle routes should not be created only for increasing sport activity purposes, but also to encourage a wider group of people. Bicycle routes should be adjusted for the abilities of average tourists, taking into consideration interesting aspects of nature and landscape, as well as cultural values of a certain area (Grabowski et al. 2012). Tourist routes should find the rules of technical standards (i.e. type of road surface) and begin from city/towns centres with easy access to public transport (Bodor et al. 2011). Natural resources influencing local touristic values can include lakes, rivers, forests, nature reserves, landscape parks, Natura 2000 areas and natural monuments, while cultural aspects include material objects created by humans and connected with human activities (Tkocz 2008). A properly planned pedestrian-bicycle trail should have the smallest possible negative effect on nature, as well as on its function, such as safety, comfort and attractiveness (Podawca 2007). It should provide safety, comfort and attractions, as well as easy access from other regions (Pisarska and Pisarski 2012).

The main aim of the present study was to designate and supplement tourist routes, taking into consideration the existing infrastructure and natural and cultural values, as well as to compare various possibilities of sustainable tourism development in two different areas, characterised by different environmental, economic and social aspects. The necessity of designation of tourist routes arose as a result of assumptions of planning documents (local strategies), as well as from local community needs (based on discussion with local inhabitants).

Materials and methods

The study included two stages: the first consisted of valorisation of natural and cultural aspects of both areas, while the second phase consisted of designation of the most convenient bicycle routes in a certain area. The first stage included the study of local planning documents such as a study of conditions and directions of land management of both areas with the focus on tourism development, especially tourist routes. Then valorisation of natural-landscape values have been made. For this purpose the point bonitation method proposed by the Department of Environment Management and Protection of Agricultural Academy in Poznan was used (Program Ochrony… 2003). Both commune areas were divided into squares with an area of 1 square km on the map of 1:50 000 scale. Natural, landscape, cultural and other parameters were analysed and points for each parameter were calculated for each square (tab. 1). This was done based on cartographical information, as well as on field visit.

Table 1. Parameters analysed in valorisation and points designated for each parameter

No.	Parameter	Points
Natural and landscape parameters		
1.	Natura 2000 area	1 point for each 0.25 square km
2.	nature reserve	1 point for each 0.03 square km
3.	landscape protected area	1 point for each 0.25 square km
4.	natural monument	1 point for each object
5.	forest area	1 point for every 0.20 square km
6.	meadow and pasture area	1 point for each 0.10 square km, 2 points for area between 0.11-0.50 square km and 3 points for area >0.50 square km
7.	water reservoir bigger than 5 ha	1 point for each 0.02 square km
8.	river	1 point for every 1 km of river course in a non-protected area, 2 points for every 1 km in a landscape protected area
Cultural values		
9.	manor house	1 point for each object
10.	architectural monument	1 point for each object
Other parameters		
11.	relief	1 point for difference of more than 5 m
12.	industrial-commercial zones	minus 1 point for each 10 ha
13.	main roads	minus 1 point for each 1 km of regional road, minus 2 points for each 1 km of national road

The sum of points obtained for these parameters determined natural-landscape values. Squares on the commune boundaries with area below 0.35 square km were excluded. The obtained results in each square were divided by area to achieve appropriate results for comparison and classify into a certain class (tab. 2). The last element of the first stage was verification of obtained results during the field visit. Special attention was paid to physical availability of natural and cultural-historical aspects, possibility of designation of tourist routes and determination of the most favourable variants of trails concerning safety and attractiveness aspects.

The optimal solutions were proposed here, to conduct planned trails throughout areas characterised by outstanding values (based on valorisation), concerning safety aspects and availability (based mainly on field visits) and creating trails complementing the existing tourism system (based on cartographic analysis), at the local and regional scale.

Results

Characteristics of studied object

There were two communes analysed: Tarnowo Podgórne and Kaźmierz. Both are located in the western part of Wielkopolska region. Tarnowo Podgórne borders on the east of Poznan city and consists of a Poznan metropolitan area. Kaźmierz commune is located about 20 km north-east of Poznań (fig. 1).

Tarnowo Podgórne covers an area of 101.6 square km. Most of the area is agricultural (73.5% of the area), but the primary activity is the service sector, which supplies most of the commune's capital. Forests cover just 7.2% of the analysed area. The area has a very good road infrastructure on the local, regional and national scale: national road No. 92, regional No. 184 and 307 and provincial connecting local social centres as well as other towns (Plan Rozwoju… 2008-2013). There is one spatial protected area – the Landscape Protection Area of Lusowskie Lake and Sama Valley (Strategia Rozwoju…

2001). There are several historical parks, natural monuments, tree alleys and two lakes, which can be included as a natural aspects of the analysed area. There are also several other valuable elements, such as manor and farm complexes, churches, palaces, a marble mill, and 18 wayside crucifixes and figurines (Studium Uwarunkowań… 2010). Favourable nature-cultural conditions in the tourism-recreation aspect were considered in spatial policy directions by adjustment of spatial management to tourism and recreation needs, as well as an indication of forest areas for further recreation use in cooperation with administration of National Forest Holding, and protection of cultural and natural areas (Studium Uwarunkowań… 2010).

The Kaźmierz commune area is 128.2 square km, and most of it is agricultural. However, land use is quite different from the second analysed area. Forests cover 15.1% of the area (Program Ochrony… 2010). Two main roads are located in this area – national road and regional road (www.kazmierz.pl). There are much more natural and cultural values in comparison to Tarnowo Podgórne. Natural reserves and several natural monuments are situated here. A field visit revealed many interesting objects positively influencing the natural potential of this area. Cultural elements can also increase the local tourist potential, such as, historical monuments – palaces and building of a horse post office (Studium Uwarunkowań… 2001). The study of land planning and management of commune area determined agriculture as a main function of this area, but it was also emphasized that a supplementary function suppose to be tourism and recreation. In general directions of spatial policy the following activities were indicated: tourism development, enrichment of local tourism attractions (Bytyńskie Lake, manor parks) using proper management, maintenance and exposure of valuable areas. A key element of these activities should also be designation of tourist routes with focus on bicycle trails.

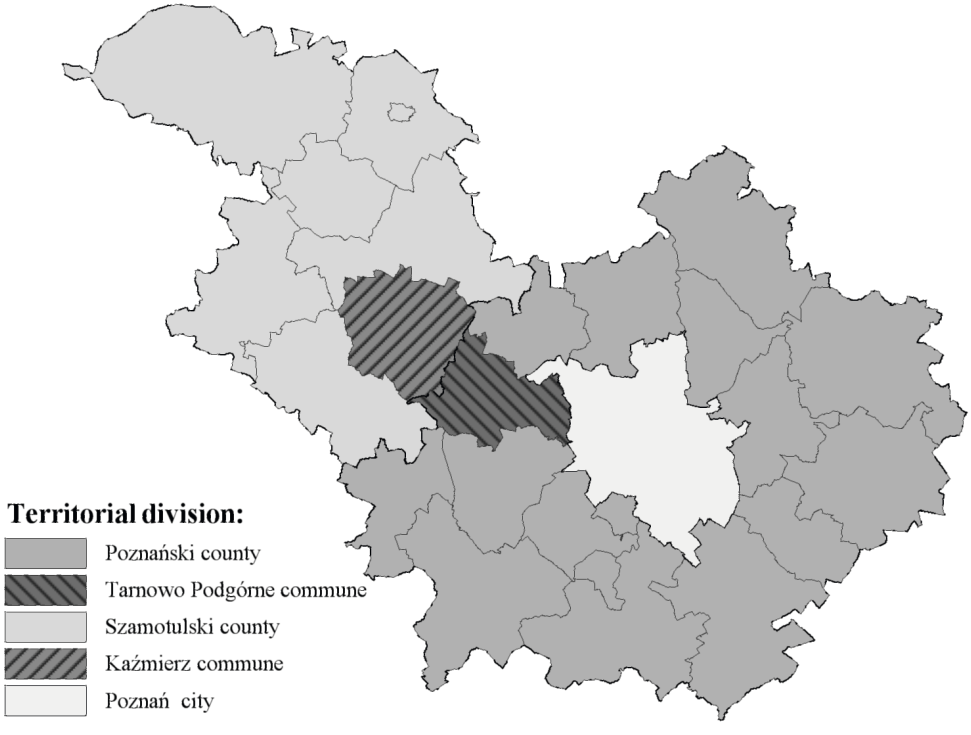

Fig. 1. Location of analysed communes in the region (source: Author's study).

Table 2. Categories of natural-landscape values and results for examined communes

Class	Characteristics	Range of values for one square	Number of squares	Percentage of class
I	Very high level of values	0.0175 to 0.2368	44	16%
II	High level of values	0.0132 to 0.0174	15	5%
III	Medium level of values	0.0088 to 0.0131	12	4%
IV	Low level of values	0.0044 to 0,0087	31	11%
V	Very level of values	- 0.0132 to 0.0043	137	49%
N.C.	Areas not classified	-	38	14%

Natural-landscape valorisation

239 squares were analysed from total number of 277, while 38 were not classified due to lower area than 0.35 square km. According to the natural-landscape methodology, squares were classified into 5 categories based on ranges of values (tab. 2). Very high values were observed in 16% of squares, located in the south-western part of Tarnowo Podgórne commune and the south- and north-western part of Kaźmierz commune. These areas are mainly covered by protected area, forests with high variability of land structure. Medium and high levels of analysed values were noted in 9% of squares and are focused mainly near protected areas or water reservoirs. Areas with a low level of natural-landscape values are mainly located close to forests or meadows and pastures. The highest number of squares were categorised as having a very low level of natural-landscape values. These squares cover mainly agricultural areas, close to roads or industry-commercial zones (fig. 2).

The point bonitation method revealed, that Kaźmierz commune presents higher level of landscape-natural values in comparison to Tarnowo Podgórne. The most attractive forest areas are located in the north and south part of Kaźmierz commune, as well as around Bytyńskie lake. While in the case of Tarnowo Podgórne commune the most attractive areas are located around Kierskie lake and along Sama river valley. The lower and medium level of analysed features was recorded in areas with occurrence of natural or historical monuments and are located nearby industry area in the west part of this commune (fig. 2).

Based on performed valorisation and location of existing routes at both commune areas, an insufficient bicycle infrastructure was recognised. There were not designated previously any bicycle routes at Kaźmierz commune area, while in the case of Tarnowo Podgórne only part of existing routes is located in highly evaluated areas. Moreover, there is lack of connective routes between existing trails (fig. 2, 3).

The concept of bicycle routes designation

In the Tarnowo Podgórne area currently there exist 6 bicycle routes with a total length of 66 km (tab. 3); hence 4 additional trails were proposed with a linking function with the total length of 33 km. The proposed routes also connected the existing local routes with regional ones.

The proposed bicycle routes in the case of Kaźmierz commune, were located at areas with recognised high level of valorisation values (fig. 2). In the case of Tarnowo Podgórne commune the most of proposed bicycle trails supplement existing routes (connective role), hence some of them is located outside of highly evaluated areas (fig. 2, tab. 4). Based on law requirements and the performed inventory, there were not found any objections to proposition of the bicycle trail through the landscape protected area and the Natura 2000 area in both commune areas. The bicycle trail can also be routed through the forest area, because it belongs to the State Treasury, and the routes mainly follow public roads. In the

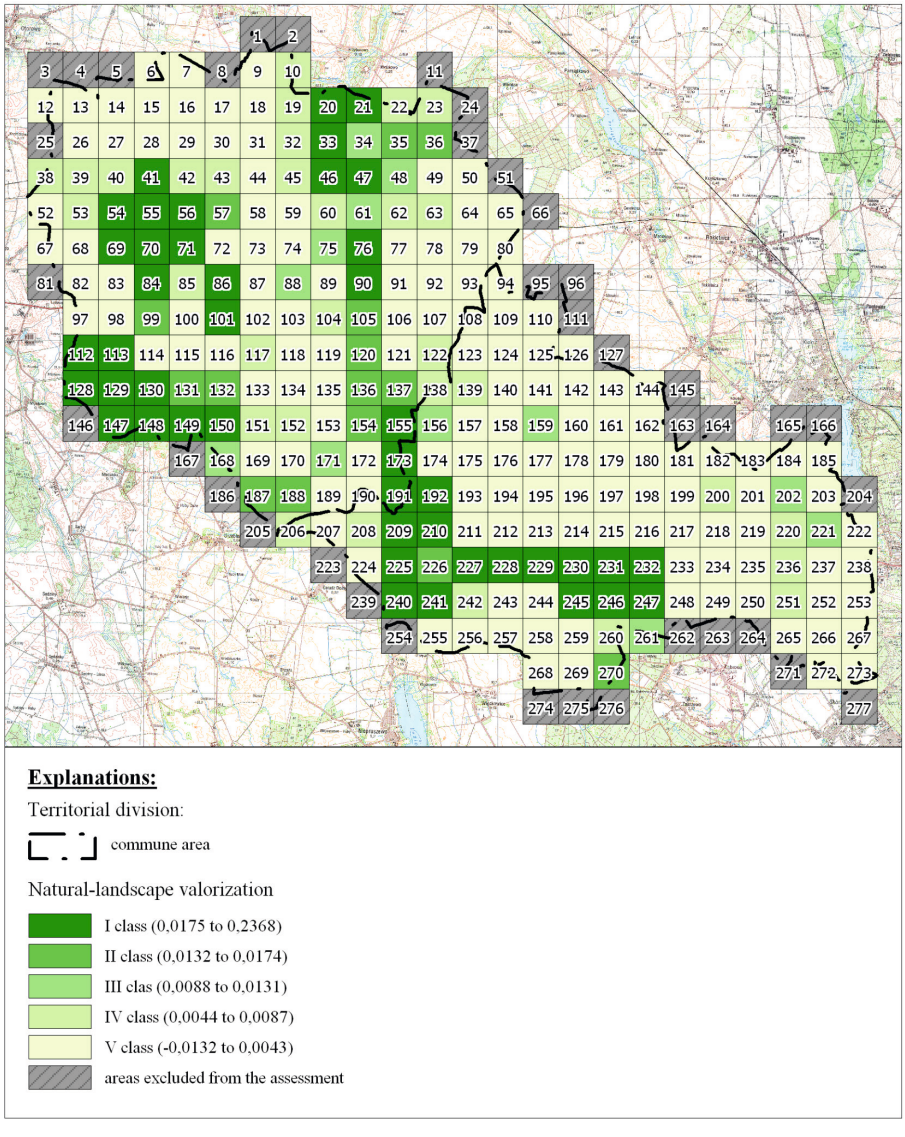

Fig. 2. Spatial distribution of natural-landscape valorisation (source: Author's study, based on Corine Land Cover 2006 and topographic map on a scale of 1:50 000 from the Provincial Centre for Geodesic and Cartographic Documentation in Poznań).

case of nature reserves, the trail follows their boundary or runs close to them and uses public roads, which is in accordance with current legal requirements. Natural monuments are located in the forestry area belonging to the State Treasury or in manor park areas, which are monument objects with various ownership.

The above-proposed routes' attractiveness can be increased by connecting them into existing interregional trails. One solution is connection of trails in both commune areas, and the second option is connection with the Nadwarciański Bicycle Trail and the Poznan Bicycle Ring. The connection to these regional trails can be done from both areas. However, the connection from Kaźmierz commune would take 27 km (fig. 3).

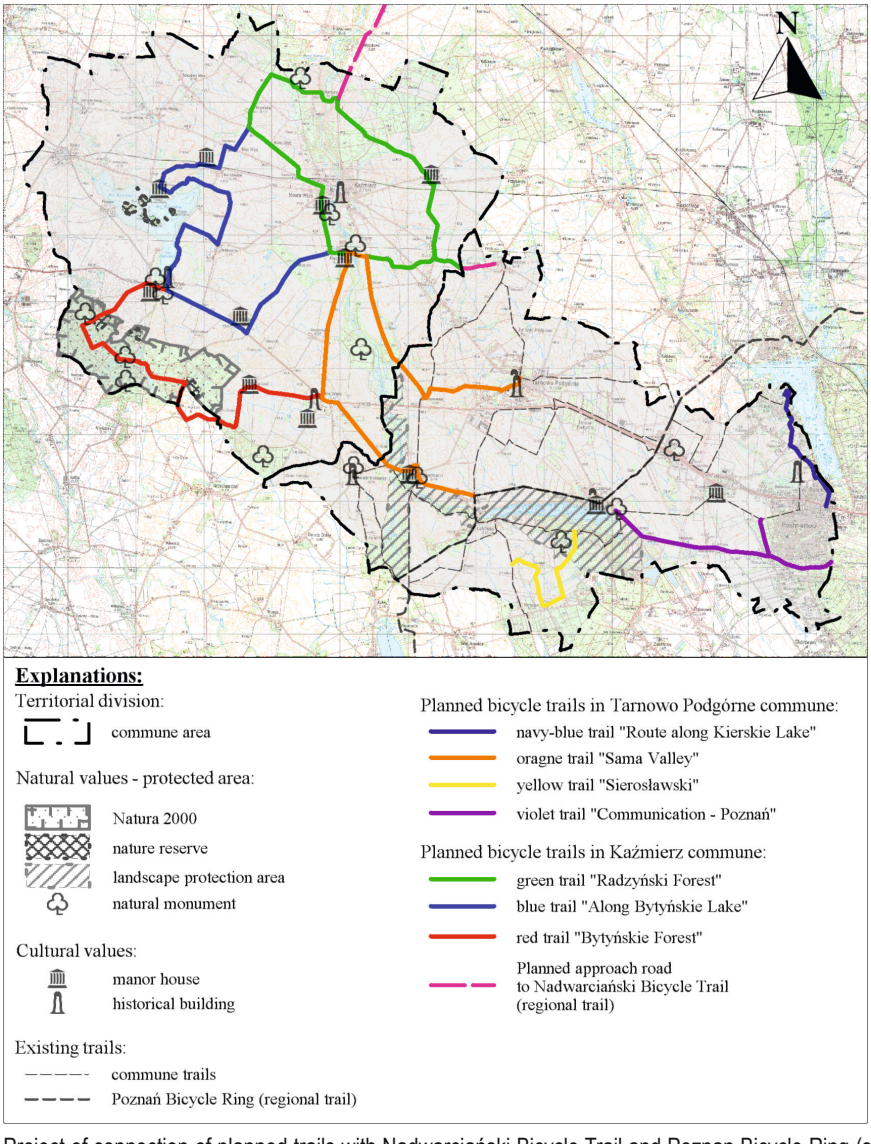

Fig. 3. Project of connection of planned trails with Nadwarciański Bicycle Trail and Poznan Bicycle Ring (source: Author's study, based on topographic map on a scale of 1:50 000 from Provincial Centre for Geodesic and Cartographic Documentation in Poznań).

Table 3. Currently existing bicycle routes at Tarnowo Podgórne.

No.	Distance	Characteristics of trail
1	48 km	Bicycle, principal
2	8 km	Bicycle, loop
3	4 km	Bicycle, connective
4	6 km	Bicycle, loop
5	12 km	Bicycle, principal
6	3 km	Bicycle, connective

Table 4. Characteristics of proposed trails

No.	Name of trail	Distance	Kind of trail	Target group
1	The navy-blue trail ”Route along Kierskie Lake”	4 km	bicycle-pedestrian, communal, connective	- individual tourist, or family with children, - aiming to contact with nature
2	The orange trail - ”Sama Valley”	17 km	bicycle, intercommunal, connective	- individual tourist, or family with children, - aiming to contact with nature and directed to know the cultural aspects
3	The yellow route – ”Sierosławski”	8 km	bicycle communal, connective	- individual tourist, or family with children, - aiming to contact with nature
4	The violet trail - ”Communication – Poznań”	7 km	bicycle-pedestrian, intercommunal connective	- individual tourist, or family with children, - aiming to contact with nature
5	The green route – ”Radzyński Forest”	21 km	bicycle-pedestrian, communal, loop	- individual tourist, or family with children, - aiming to contact with nature and directed to know the cultural aspects
6	The blue trail – ”Along Bytyńskie Lake”	18 km	bicycle, communal, loop	- individual tourist, - aiming to contact with nature and directed to know the cultural aspects
7	The red trail –”Bytyńskie Forests”	21 km	bicycle, communal, connective	- individual tourist, - aiming to contact with nature

Conclusions

• Valorisation of landscape, natural and cultural aspects were evaluated with using point method and on this basis areas with high values were recognized. This was the basis for further designation (or supplementation) of new system of bicycle routes.
• Two different models of spatial systems of bicycle routes (with possibility to use by pedestrian) were proposed in the area of two neighbouring communes. This was connected with existing tourism management, land use and natural aspects. All solutions took into consideration sustainable development rules, including social, economic and natural aspects, with high attention to landscape values.
• Short-distance connective trails were mainly proposed in the Tarnowo Podgórne commune area, which together with the existing system created a streaked-ladder system (connective routes) and a streaked-circular system (trails around the area).
• In the Kaźmierz commune area the system became spatial characteristics, created mainly on the basis of existing important natural and cultural objects.
• The attractiveness of the proposed trails can be increased due to the possibility of joining them into one system, as well as connection of existing regional and interregional trails.

Table 4. Characteristics of proposed trails (continuation)

Cultural values	Technical road conditions	Problematic sections and solutions
1 historical building (towards)	- hard-surfaced road (local road – 3.5 km, cycle track – 0.5 km)	section along regional road No 184 (0.5 km) – the trail would be conducted along existing bicycle road
- 3 historical buildings, - 3 manor houses	- hard-surfaced road (local road - 17 km),	section along national road nr 92 (0.5km) – trail would be conducted along service road
-	- hard-surfaced road (local road - 5 km), - dirt road (3 km)	-
-	- hard-surfaced road (local road - 7 km)	-
- 1 historical building (towards), - 3 manor houses	- hard-surfaced road (local road - 17 km), - dirt road (4 km)	-
- 1 historical building (towards), - 4 manor houses	- hard-surfaced road (local road - 16 km), - dirt road (2 km)	- section along national road 92 (2.6 km) – trail would be conducted along service road
- 1 historical building (towards), - 2 manor houses	- hard-surfaced road (local road - 15 km), - dirt road (6 km)	- section along national road 92 (0.6 km) – trail would be conducted along service road

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