Technical Report about the regulation of navigation activities along the Vipava river in the municipality of Nova Gorica

Project partner: MONG

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1. INTRODUCTION

In the framework of the VISFRIM project (*WP3.2 – DEVELOPMENT OF ADVANCED TOOLS FOR FLOOD RISK ESTIMATION AND COST-BENEFIT ANALYSIS OF MITIGATION MEASURES; Task 3.2.2 - Cost-benefit analysis of flood mitigation measures and preparation of the relative technical documentation*) the Municipality of Nova Gorica ordered the elaboration of technical documentation for the regulation of navigation along the Vipava river. It analyzes the subject area and external factors that can affect the possibility of navigation. This analysis is the **basis for: planning navigation activities and its regime; determining the navigation area and entry/exit points**. As such, the document represents the professional basis for the preparation of the local community's act on navigation in the area of the municipality. The subject document represents the first version of the study as a draft for further coordination and obtaining project conditions.

Image 1: Vipava river.

2. SUMMARY OF ESSENTIAL ACTS

The study starts with a summary about essential acts and plans dealing with the navigation on the Vipava river, including: the Act on Navigation on Inland Waters, the Water Act, the Nature Conservation Act, the Environmental Protection Act, the Spatial Arrangement Act, the

Regulation on the Content and Plan for the Preparation of a More Detailed Flood Risk Reduction Plan and the Flood Risk Reduction Plan. One of the documents considered is also the Regulation on Conditions and Restrictions for the Implementation of Activities and Interventions in Areas Threatened by Floods and Related Inland Water and Sea Erosion, which states that the planning of new spatial arrangements in areas of floods and related erosion, where elements of risk already exist, must take into account the conditions and restrictions from Annexes 1 and 2 of this regulation, by also ensuring that the planning of a new land use does not increase the existing level of risk in and out of the area. For this purpose, while planning the construction of new arrangements, comprehensive measures to reduce flood risk must be also evaluated and their implementation must be completed before the construction begins. In areas, that are not designated as areas of significant flood impact and where the flood zone is not defined, conditions and restrictions for interventions may be determined on the basis of simplified criteria. In detail conditions and restrictions are determined on the basis of the hazard class of the area, depending on the flood water depths and the thickness of washed away and deposited weathered rock material associated with a return period of 100 years.

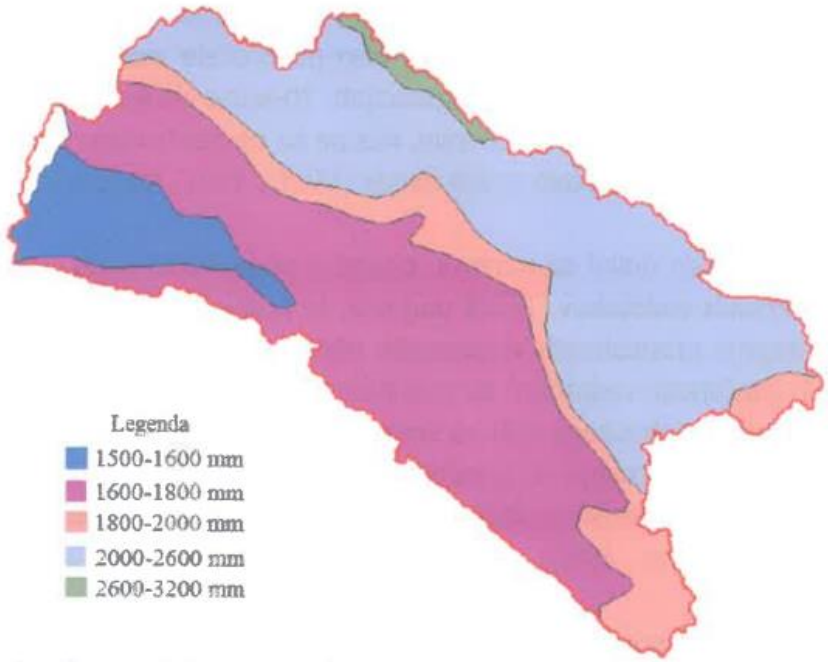
Spatial interventions in accordance with the unified Classification of Types of Constructions (CC-SI)	**Conditions and restrictions**		
	Hazard class		
	high	medium	low
215 Ports, navigable routes, barriers and dams and other water objects			
2151 Ports and navigable routes			
21510 Ports and navigable routes	_2	_2	+
2152 Barriers and dams			
21520 Barriers and dams	+	+	+
2153 Conducting and drain channels, irrigation and drainage systems			
21530 Conducting and drain channels, irrigation and	_2	_2	+

drainage systems			
2412 Other construction facilities for sports, recreation and leisure			
24121 Marinas with corresponding port devices	_2	_2	+
24122 Other construction facilities for sports, recreation and leisure	_2	_2	+

Table 1: Spatial interventions in accordance with the unified Classification of Types of Constructions (CC-SI).

3. DESCRIPTION OF THE AREA

The above-cited summary is later followed by a comprehensive description of the interested area and the Vipava river in terms of watercourse, underground waters, geology, hydrographic network, climate characteristics, agriculture, existing flood prevention measures, magnitude of flood peak flows.



Slika 5.4: Povprečne letne višine padavin na porečju Vipave v obdobju 1971–2000 (ARSO)

Image 2: Average annual precipitation in the Vipava river basin between 1971 and 2000.

	Section					
Variant			1	2	3	4
		Maximum runoff (100 years) Causing precipitation (h)				
1	Vipava do Bele	9 h	64.8	83.7	68.8	65.1
2	Bela do izliva	3 h	53.7	62.5	56.4	53.1
3	Močilnik do izliva	5 h	77.2	97.8	79.4	80.2
4	Skupaj Vipava po sotočju z Močilnikom	All the upper sections 9 h	170.7	213.6	178.5	173.3
5	Vipava pred Hubljem	9 h	183.5	223.2	193.2	184.2
6	Hubelj pred sotočjem	6h	128.1	123.4	132.7	123.4
7	Vipava pod Hubljem	Upper sections 9h				
8	Vipava pred Branico	12h	293.8	321.4	307.2	288.5
9	Branica	9h	73.7	64.2	83.9	64.2
10	Vipava po izlivu Branice	Upper sections 12h	365.9	384.2	389.2	351.3
11	Vipava pred Lijakom	12h	370.3	390.0	394.6	361.0
12	Lijak	6h	113.5	124.7	108.5	152.7
13	Vipava pod Lijakom	Upper sections 12 h	457.9	486.8	477.5	481.1
14	Vipava - Miren	12h	462.1	491.0	480.1	486.7

Table 2: Centennial waters for the considered area for all four types of possible precipitation.

4. IMPACT OF INTERVENTIONS

In previous years watercourses were not considered as habitats and source of biodiversity: therefore they were not regulated and managed according to what the Water Directive 2000/60 presently demands.

From the point of view of natural conservation, the navigable area is classified as a Natura 2000 special protection area, i.e. an area of ecological importance because of its natural value.

Image 3: Nature protected areas.

The impact of navigation on the habitat and animal populations will be small because of the limited number of authorized vessels and the definition of specific entry/exit points. Interventions and works must be planned in such a way that the state of the watercourse or stagnant water body does not deteriorate or does not prevent the improvement of the state of the watercourse or stagnant water body. The study also analyzed bridging facilities – limitations on the Vipava river, dams, gates (transverse structures) and public infrastructure (train bridges, water pipes, telecommunication, …) and their influence on navigation. It proposes an appropriate way of marking this infrastructure to ensure safety on the river and the creation of exit and entry points on the areas where transversal objects are present.

5. NAVIGATION PLANNING

The Act on Navigation on Inland Waters:

- regulates the safety of navigation on inland waters;

- determines the conditions that must be met by navigation areas, vessels and floating devices and people who operate vessels, ports and other places for access to the water area;
- defines the elements of the navigation regime;
- regulates registration of vessels and floating devices, lifting of sunken objects and regulates control over navigation safety.

The core part of the elaborated study is therefore the planning of navigation regime by taking into account regulations on water, nature, safety, spatial arrangement, etc. The study also considers the management of the entry and exit points as well as the maintenance of the navigation area; analyzes the spatial conditions for the establishment of entry and exit points, taking into account the topographic, geo-mechanical, hydrological, climatic, traffic and environmental conditions and the influence that vessels can have on the environment.

5.1. NAVIGATION AREAS AND ENTRY AND EXIT POINTS IN THE MUNICIPALITY OF NOVA GORICA

Navigation area is a part of continental waters, that are deep and wide enough for safe navigation, considering the type of vessels. In the navigation area it is necessary to determine the navigation zones and regime, build a port and entry and exit places, appropriately mark the navigation area and establish information and warning boards.

Essential factors for the possibility of using the watercourse for navigation are the small average depth of the riverbed (and thus the relatively low water level), obstacles on the bottom of the bed, as well as natural and artificial obstacles.

In order to prepare the professional basis for determining the navigation regime, a field survey was conducted, viewing locations proposed for entry and exit points for vessels.

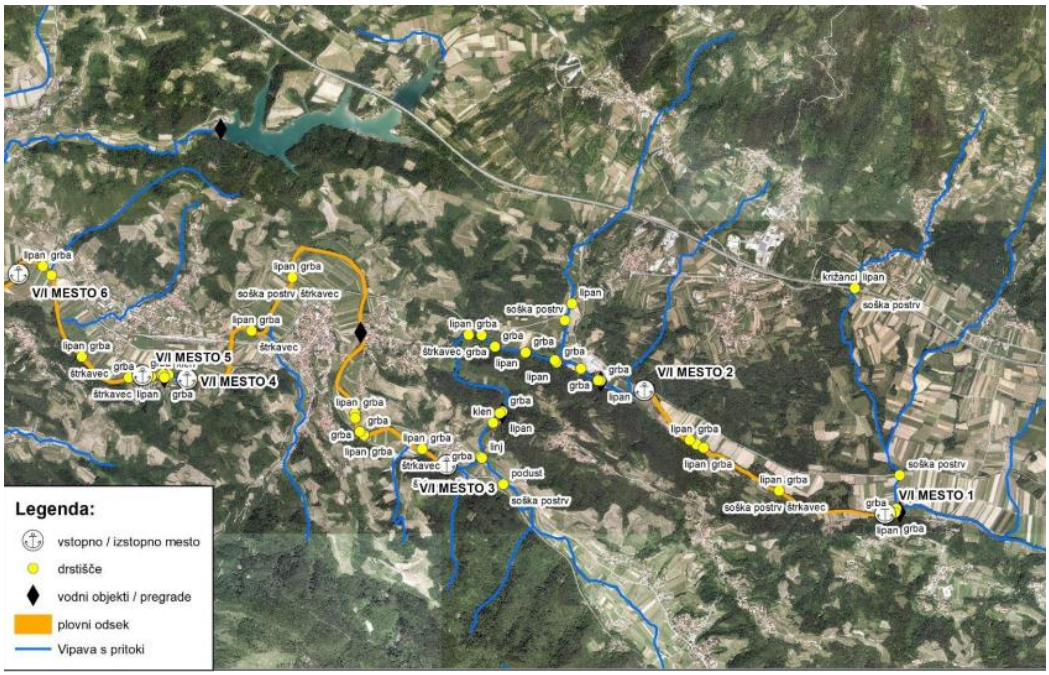


Image 4: Overview map of the Vipava river and its tributaries in the area of the Municipality of Nova Gorica, with special focus on the considered navigation area, including entry and exit points, locations of spawning grounds of fish species and locations of barriers.

Image 5: Overview map of the Vipava river and its tributaries in the area of the Municipality of Nova Gorica, with special focus on the considered navigation area, including ecologically important areas.

The first location of the entry and exit point for vessels is located at the dam in Pekel. At the entry/exit point there is an operating small hydroelectric plant. The study suggests that access can be done on the left bank, where the road runs. The dam is passable neither for vessels nor for fish: so the entry point must be planned upstream of the dam and the exit point downstream.

Image 6: Dam at Pekel.

The second location of the entry and exit point for vessels is located in the village of Saksid, downstream from road bridge. The proposed entry/exit point downstream of the bridge is accessible from the right bank where Camp Lisjak is located; upstream from the bridge, access to water is more difficult. The design of the entry and exit point on the left bank is not optimal, as a road runs along the left bank, protected by the fence. Optimal access to water is located at the site determined by Gauss-Krüger coordinates: GKY = 403645; GKX = 82196. From the point of view of fishermen, the location is also acceptable.

Image 7: Entry and exit point on the right bank, downstream from the bridge in Saksid.

A field tour was conducted on the Vipava rapids, located southern of the Budihni settlement location, determined by Gauss-Krüger coordinates: GKY = 402840; GKX = 82525. Rapids consist of large rocks and stones, which can be unfavorable from the point of view of navigation. During the field trip the rapids were passable for fish. As far as the section of rapids represents a potential entrance/exit point, the study suggests installing a warning sign, as the rough shape of the rapids can represents an obstacle to vessels.

Image 8: Rapids on Vipava in Budihni.

The third location of the potential entry and exit point for vessels is located at the bridge in the settlement Zalošče. Downstream of the bridge there is a gradual threshold, impassable for vessels. The study suggests that an exit point is constructed upstream of the bridge in the area of gravel bars on the left bank of the site, determined by Gauss-Krüger coordinates: GKY = 402855 ; GKX = 83397. An entry point can be arranged downstream of the gradual threshold, on the left bank. The right bank access is not optimal due to existing buildings.

Image 9: Left bank gravel dune in Zalošče upstream of the bridge - proposed exit point.

The fourth location of the entry and exit point for vessels is located at the small hydroelectric plant Gradišče, which is on the left bank of the river Vipava. For the purpose of hydropower use, a dam with a height of about 5 m was built over the entire width of the Vipava river, which is completely impassable for fish and also for all types of vessels. There is also a discharge from a small hydroelectric plant on the right bank. The mentioned hydropower channel crosses the Konjščak stream, which was completely dry at the time of a visit. The

study suggests that the exit and entry point are located on the right bank of the Vipava: the exit point should be above the dam and the entry point opposite the hydropower channel to Vipava.

Image 10: Suggested location of the entry point on the right bank, on the opposite side of the MHE Gračišče.

The fifth location of the entry and exit point for vessels is located between Prvačina and Dombrava, at the site determined by Gauss-Krüger coordinates: GKY = 399500; GKX = 83937. Optimal access to the riverbed is from the right bank, which is less steep than the left one. Above the banks there are agricultural lands. As the Vipava river narrows in this area, it would be reasonable to warn users due to the occurrence of rapids.

Image 11: The proposed right-bank location of the entry and exit point at the dune between Prvačina and Dombrava.

6. RELATION TO THE VISFRIM OBJECTIVES

The study is the basis for determining the navigation regime in a previously determined area. Both the navigation regime and the navigation area are determined on the basis of an **interdisciplinary approach**, that take into account opinions from all stakeholders affected by the "navigation" (water management authorities, environmental protection authorities, ...). Primarily the navigation area, in its function, has to assure safety and health to users, including also protection against high water/floods to the greatest possible extent.

As part of determining the navigation area, entry and exit points must be identified in suitable/safe places and **arranged in such a way as to have a minimum spatial impact**, considering the possibility of appropriate action and timely withdrawal in case of high waters. Therefore, knowledge of both the hydrological and hydraulic features of the area is necessary,

which also includes knowledge of high-water flows (flow with a 20-year, 50-year, 100-year return period), flood reach areas (previously mentioned as high water flows) and previous flooded areas. Thus, the determination of characteristic and high-water flows (within the framework of the navigation regime, Qmin and Qmax, i.e. the minimum and maximum flow at which navigation is still permitted) and flooding areas is considered too. Based on the hydrological and hydraulic analysis, the adequacy of the individual entrance/exit point during high water/floods and the situation in the navigable area with different flows is checked. The implementation of individual flood protection measures (structural or non-structural) is also evaluated, such as appropriate maintenance procedures which involve regular inspections of waters and removal of obstacles on the river and on its banks, **by also contributing to the prevention of flood safety degradation**.

Relazione tecnica sulla disciplina delle attività di navigazione lungo il fiume Vipacco nel comune di Nova Gorica

Nell'ambito del progetto VISFRIM (*WP3.2 – Development of advanced tools for flood risk estimation and cost – benefit analysis of mitigation measures; Task 3.2.2 - Cost-benefit analysis of flood mitigation measures and preparation of the relative technical documentation*) il Comune di Nova Gorica ha appaltato l'elaborazione di documentazione tecnica per la regolamentazione della navigazione lungo il fiume Vipacco. Tale studio analizza l'area di intervento ed i fattori esterni che possono influire sulla possibilità di navigazione, comprese le alluvioni fluviali. Questa analisi è la base per pianificare le attività di navigazione e il suo regime ed individuare l'area di navigazione ed i punti di ingresso/uscita. In quanto tale, il documento rappresenta la base tecnica per la predisposizione dell'atto comunale sulla navigazione.

Tehnično poročilo o ureditvi dejavnosti plovbe na reki Vipavi v občini Nova Gorica

V okviru projekta VISFRIM (*DS3.2 – Razvoj naprednih orodij za oceno poplavne ogroženosti in analizo stroškov in koristi ukrepov; Aktivnost 3.2.2 – Analiza stroškov in koristi omilitvenih ukrepov za zmanjševanje poplavne ogroženosti in priprava ustrezne tehnične dokumentacije*) je Mestna občina Nova Gorica naročila izdelavo tehnične dokumentacije za ureditev plovbe na reki Vipavi. Poročilo analizira predmetno območje in zunanje dejavnike, ki lahko vplivajo na možnost plovbe, vključno s poplavljanjem reke. Ta analiza je osnova za: načrtovanje dejavnosti plovbe in njenega režima; določitev območja plovbe in vstopno/izstopnih točk. Dokument kot tak predstavlja strokovno podlago za pripravo akta lokalne skupnosti o plovbi na območju občine.