Republic of Macedonia
Municipality Zelino

PROJECT APPRAISAL DOCUMENT

“Street reconstruction and construction of sidewalks and stormwater system in the Municipality Zelino”

World Bank
Municipal Services Improvement Project

Skopje, November 2014

The Project's Appraisal Document was prepared by the Center for Promotion of Sustainable Agricultural Practices and Rural Development – CeProSARD

CeProSARD
Str. Orce Nikolov 172
1000 Skopje, R. Macedonia
Tel/fax: + 389 2 3061 391
http://www.ceprosard.org.mk

CeProSARD would like to express many thanks for their generous and immense contribution to:

WB MSIP team – PMU office, Skopje
Mr. Fatmir Izairi
Mr. Adil Emini
All representatives from the municipality staff who participate at the interviews
All residents who participate at the focus group

Skopje, November 2014

TABLE OF CONTENTS

Tables

Figures

1.

INTRODUCTION

The project assumes reconstruction of the local road with construction of sidewalks and stormwater system.The total length of the street which is the subject of this appraisal is 632.11m, from which a part of the road "Branch 1" has a length of 192.62m and a part of the road "Branch 2" has a length of 439.49m. The project cost is lower than the credit capacity of the municipality, which provides the loan repayment. The relevance of the project comes from the fact that the biggest part of the municipality residents is directly influenced by negative implications of the inadequate surface of streets and sidewalks, in addition to stormwater due to lack of stormwater system. However, it should also be emphasized that some of these streets are the main traffic arteries in the different districts, whereby it can be inferred that the implementation of the project will have a wider indirect benefit on the community living in the municipality Zelino. The main purpose of the proposed technical solution is to provide a long range improvement of the street by maximizing the technical life of the surface, thus meeting the needs of the community in the municipality Zelino. At the same time, the purpose of the technical design is to provide convenience and safety for pedestrians and traffic by controlling stormwater flows, within prescribed limits and to retain within each catchment as much stormwater and run-off as possible given the planned use of the terrain and its civil engineering characteristics. The proposed technical solution is in-line with the existing standards and positive regulation for this kind of projects, which implies that the implementation of the project is technically feasible.

The project is in accordance to the Program for Development of the municipality Zelino for 2014 and it will contribute towards achieving the vision of the municipal administration for providing full coverage of transport and communal (utility) infrastructure throughout the municipal territory. The Mayor and the municipal administration strive to achieve full coverage of a transport, stormwater and other communal (utility) infrastructure throughout the municipal territory. It can be inferred that the implementation of the project will undoubtedly contribute towards improvement of the quality of life and well-being of the citizens of the municipality Zelino. Municipality has implemented various similar projects in the past, some of which in collaboration with international institutions, which implies that, is able to implement large construction projects such as this one.

The project is relevant to the development objective of the MSIP because it is considered both as cost-efficient and cost-effective, over a long run and also useful for the health of the citizens and the environmental protection. No adverse social or environmental impacts were identified.

The cost-benefit analysis (CBA) showed the project is acceptable and desirable for implementation according to the methods used. In addition, the project will cause significant unquantifiable benefits such as increasing the traffic safety and comfort, increasing the traffic capacity and communications, ensuring a feeling of security by pedestrians, enhancing the commercial activities, as well as extending the outdoor social and recreational activities for the residents living on the street. The present condition of the street causes frequent interruption of traffic and forces the citizens to search for alternative routes, which ultimately results in fall of productivity. Additionally, the implementation of the project is expected to lead towards reduction of the municipal costs for constant repairs of the street. Once the project is implemented, the municipality will spend less money for repairs and reallocate them to other municipal services. Flood control will not only reduce the municipal spending, but also private spending on repairs, thus enabling reallocation of the funds to other more beneficial, i.e. productive use. The implementation of the project is also expected to increase the property value for houses and other residential or commercial objects on the streets, thus increasing the growth of revenues from property taxes.

Furthermore, it is very difficult to relate the benefits of projects of this kind with the economic development and poverty levels in a certain municipality in a short-term. However, taking into account that increasing the quality of the transport infrastructure and increase in productivity are linked with decreasing poverty, the project will definitely have a wide positive impact on the economic growth and the poverty level, not only in a short term but also in the longer term perspective.

2.

PROJECT DESCRIPTION

2.1 General Information on the municipality Zelino

The municipality Zelino is located in the north pedestal of the mountain Suva Gora, right of river Vardar, approximately 500m altitude in the Polog region in the north-western part of the Republic of Macedonia. Through the municipality cross the highway M-4 that connect the municipality in the west with the city of Tetovo and in the east with the city of Skopje. The location of the municipality is marked with an orange colour on the figure below.

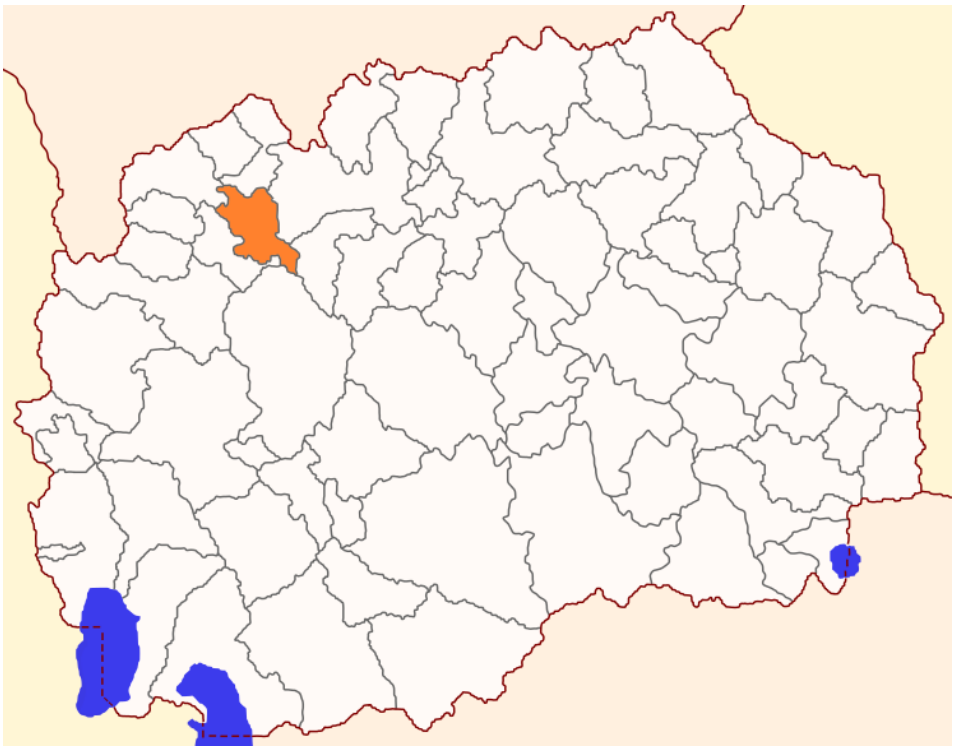


Figure 1 Location of the municipality Zelino
Source: State statistical office

Municipality Zelino is surrounded by 6 municipalities. These are: Jegunovce to the north, Saraj and Sopiste to the east, to the south is Makedonski Brod, municipalities Brvenica and Tetovo to the west. It covers an area of 201km^2. The municipality extends on the right side of the road Tetovo-Skopje. The distance from Tetovo is 8km, while from Skopje is 35km. Zelino is a rural municipality where all its local communities are rural.

It has very good geographic position and traffic connection, because through it passes the highway E-65, which connects the municipality with the city of Ohrid on south Macedonia and Skopje and Kumanovo on the north.

Figure 2 Settlements within the municipality Zelino
Source: State Statistical Office

According to the morphological structure, the territory of the municipality comprises 18 local communities: Zelino, Strimnica, Dolna Leshnica, Gorna Leshnica, Trebosh, Palatica, Ozormishte, Debarce, Grupcin, Ciflik, Larce, Kopacin Dol, Novo Selo, Rogle, Merovo, Lukovica, Sedlarevo and Cerovo. The total number of population that lives in the municipality Zelino is 27,329 from which most of them are Albanian, with more than 99% share, while less than 1% of the population is from Macedonian and other nationality (last revised Census of population and households, 2005).

The relief of the municipality Zelino is mostly flat. The southeast lays the Mountain Suva Gora, and on north the mountain Zeden. Most hydrological potential of the municipality is the accumulation Kozjak. Through the municipality crosses river Vardar and Pena. River Vardar flows out of the village Vrutok and Shara Mountain and covers 80% of the territory of the Republic of Macedonia. River Pena divides the area of the city of Tetovo into two parts and in the local community Zelino flows into the river Vardar.

The climate in municipality Zelino is part of the climate features of the Polog valley. The area is influenced by continental climate with cold winters and hot and rainy summers. Average annual temperature is 11˚C. Quantities of average annual precipitation can reach 500mm/m^2, with peaks from November to February and minimum values from July to September. Fogs occur in late autumn and winter period from February to March. In the winter month's very common inversion are the air masses. The most frequent winds come from the north direction with an average speed of 2.1m/s. The local winds blow from the Shara Mountain with lower intensity. Windiest is in spring. The maximum wind speeds are in April with an average speed of 3.4m/s and in July and December are 1.5m/s.

2.2 Demographic and economic profile of the municipality Zelino

2.2.1 Demographic profile

Municipality Zelino, according to the number of inhabitants, belongs to the larger municipalities in the country. The total population of the municipality is 27,329 inhabitants, or about 2% of the total population of the Republic of Macedonia, of whom 4,110 live in the municipality centre Zelino. The total number of households is 5,226, i.e. 5.2 inhabitants live in every household. They are far above the average in the country, which on other hand tells us about overcrowding in those areas.

Table 1 Main macroeconomic indicators

Macroeconomic indicators	Unit	Municipality Zelino	Polog Region	Republic of Macedonia
Demography				
Total population	Number	27,329	318,458	2,064,032
Natural growth rate	%	11.2	4.0	1.9
Total households	Number	5,226	69,089	564,237
Average households members	Number	5.2	4.6	3.6
Total dwellings	Number	5,325	78,544	698,143
Immigrated residents (within the country)	Number	85	1,015	6,475
Emigrated residents (within the country)	Number	90	981	7,915
Infrastructure				
Local roads	km	139	1,483	9,471
Health and social institutions	Number	10	371	3,315
Transport and storage institutions	Number	44	507	6,095
Water supply, sewage disposal and waste management institutions	Number	4	37	306
Education				
Educational institutions	Number	5	93	1,025
Children at age 6-14 that attend school in school year 2012/2013	Number	3,149	31,427	195,311
Population literacy at age 10 and more	Number	18,619	245,088	1,693,044
Women literacy at age 10 and more	Number	9,121	120,207	829,755
Economy				
Active business subjects	Number	282	7,236	71,290
GDP per capita	MKD		105,728	223,357
Employment (working population between 15 years and more)				
Total employed	Number	916	35,543	678,838
Total employed women	Number	52	9,284	271,307
Activity rate	%	29.2	32.8	57.2
Employment rate	%	6.0	16.4	40.6
Unemployment rate	%	70.8	67.3	42.8
Total unemployed	Number	3,536	35,411	277,219

Source: State statistical office, MAKStat database 2013; revised Census of population and households 2005

Natural growth rate is about 4 times higher than the country average. Size and dynamics of the population in the municipality are influenced by numerous factors: population movements, tradition, socio-economic and other conditions. More detail analysis of the macroeconomic indicators of the municipality Zelino, compared to the macroeconomic data of the Polog Region and the Republic of Macedonia are shown in Table 1.

The following table represents the age distribution in the total population. The analysis of data shows that municipality Zelino has a big number of population younger than 15 years (22.4%), which is by 5pp more compared to the population on same area in Polog region and Republic of Macedonia.

Table 2 Age repartition

Repartition	Municipality Zelino		Polog Region		Republic of Macedonia	
	Number	Share	Number	Share	Number	Share
0	384	1.4	1,600	0.5	23,133	1.1
1-2	735	2.7	2,011	0.6	46,267	2.2
3-4	768	2.8	14,192	4.5	46,716	2.3
5-6	779	2.9	7,031	2.2	44,844	2.2
7-9	1,177	4.3	10,500	3.3	67,790	3.3
10-14	2,264	8.3	20,414	6.4	121,033	5.9
15-19	2,597	9.5	26,037	8.2	139,531	6.8
20-24	2,647	9.7	29,942	9.4	157,352	7.6
25-27	1,478	5.4	29,091	9.1	98,525	4.8
28-29	952	3.5	26,247	8.2	65,833	3.2
30-34	2,403	8.8	24,294	7.6	161,602	7.8
35-39	2,162	7.9	23,854	7.5	152,914	7.4
40-44	2,060	7.5	23,622	7.4	146,373	7.1
45-49	1,822	6.7	21,504	6.8	147,435	7.1
50-54	1,438	5.3	17,102	5.4	141,479	6.9
55-59	1,044	3.8	13,145	4.1	134,495	6.5
60-64	798	2.9	9,967	3.1	116,906	5.7
65-69	646	2.4	7,871	2.5	85,217	4.1
70-74	507	1.9	5,699	1.8	69,620	3.4
75-79	374	1.4	3,068	1.0	53,915	2.6
80 and more	270	1.0	1,150	0.4	42,678	2.1
unknown	24	0.1	117	0.0	374	0.0
Total	27,329	100	318,458	100	2,064,032	100

Source: State Statistical Office, MAKStat Database 2013

The following table represents the gender repartition in the total population. As it can be seen, 50.4% of the total population in the municipality are male, while 49.6% are female, implying that the male population is the prevailing one. Gender structure of the whole country shows that the male population is bigger or almost the same as female population. However, the increased number of male population compared to the male population in Polog region and Republic of Macedonia is probably because Zelino is completely rural municipality.

Table 3 Gender repartition

Gender	Municipality Zelino		Polog Region		Republic of Macedonia	
	Number	Share	Number	Share	Number	Share
Male	13,769	50.4	160,258	50.3	1,033,990	50.1
Female	13,560	49.6	158,200	49.7	1,030,042	49.9
Total	27,329	100	318,458	100	2,064,032	100

Source: State Statistical Office, MAKStat Database 2013

Zelino is a rural municipality and all local communities are rural - there is no urban population. In contrast, the

population structure in the Republic of Macedonia, there is 57.8% urban population.

In relation to the ethnic affiliation of the citizens, the prevailing population in the municipality Zelino is Albanians, representing 99.3% of the total population. There are few other families with Macedonian and other nationality. Albanian population dominates in the Polog Region while Macedonians are the biggest population in the country. Population repartition is represented in the following table.

Table 4 Minorities repartition

Repartition	Municipality Zelino		Polog Region		Republic of Macedonia	
	Number	Share	Number	Share	Number	Share
Macedonians	71	0.3	58,079	18.2	1,317,981	63.9
Albanians	27,134	99.3	235,012	73.8	530,568	25.7
Turks	2	0.0	17,394	5.5	77,959	3.8
Roma	-	-	4,717	1.5	53,879	2.6
Vlachos	-	-	30	0.0	9,695	0.5
Serb	1	0.0	977	0.3	35,939	1.7
Bosnians	5	0.0	251	0.1	17,018	0.8
Others	116	0.4	1,998	0.6	20,993	1.0
Total	27,329	100	318,458	100	2,064,032	100

Source: State Statistical Office, Revised Census Data 2005

According to the data available, there is a slight decline in the number of live births in the municipality Zelino, albeit with a slower dynamics (see Table 5) resembling the trend of data for the region Polog and Republic of Macedonia.

Table 5 Live births number in Zelino

Gender	Municipality Zelino			Polog Region			Republic of Macedonia		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Male	193	202	208	1,870	1,843	809	11,752	12,243	12,093
Female	170	172	176	1,729	1,695	731	11,018	11,325	11,045
Total	363	374	384	3,599	3,538	1,540	22,770	23,568	23,138

Source: State Statistical Office, MAKStat Database 2013

2.2.2 Economic profile

When analysing the labour market, the available data show that 4,452 of the municipal population is considered economically active, of which 916 are employed, while there are 50% more unemployed. Finally, 10,783 persons are considered as economically inactive.

Table 6 Employment repartition

		Municipality Zelino		Polog Region		Republic of Macedonia	
		Number	Share	Number	Share	Number	Share
Economically active	All	4,452	29.2	70,954	32.7	956,057	57.2
	Employed	916	20.6	35,543	50.1	678,838	71.0
	Unemployed	3,536	79.4	35,411	49.9	277,219	29.0
Economically inactive		10,783	70.8	145,959	67.3	716,403	42.8
Total		15,235	100	216,913	100	1,672,460	100

Source: State Statistical Office, MAKStat database 2013

At the level of the Republic of Macedonia, as well as in the region Polog dominates small businesses that account for about 98% of the total economy and rest of the 2% belongs to medium and large enterprises. Active business subjects are given in the Table 7.

Table 7 Active business entities by sectors (situation as at 31 December 2013)

Sector	Municipality Zelino		Polog Region		Republic of Macedonia	
	Number	Share	Number	Share	Number	Share
Agriculture, forestry and fishing	12	4.3	149	2.1	2,866	4.0
Mining and quarrying	1	0.4	17	0.2	164	0.2
Manufacturing	40	14.2	911	12.6	7,918	11.1
Electricity, gas, steam and air conditioning supply	0	0.0	6	0.1	132	0.2
Water supply, sewerage, waste management and remediation activities	4	1.4	37	0.5	306	0.4
Construction	57	20.2	650	9.0	4,322	6.1
Wholesale and retail trade; repair of motor vehicles and motorcycles	84	29.8	2,933	40.5	25,429	35.7
Transportation and storage	44	15.6	507	7.0	6,095	8.5
Accommodation and food service activities	12	4.3	600	8.3	4,482	6.3
Information and communication	0	0.0	81	1.1	1,446	2.0
Financial and insurance activities	2	0.7	28	0.4	390	0.5
Real estate activities	0	0.0	13	0.2	485	0.7
Professional, scientific and technical activities	3	1.1	382	5.3	5,817	8.2
Administrative and support service activities	4	1.4	100	1.4	1,514	2.1
Public administration and defence; compulsory social security	1	0.4	19	0.3	258	0.4
Education	5	1.8	93	1.3	1,025	1.4
Human health and social work activities	10	3.5	371	5.1	3,315	4.7
Arts, entertainment and recreation	1	0.4	75	1.0	1,179	1.7
Other service activities	2	0.7	264	3.6	4,147	5.8
Activities of households as employers	-	-	-	-	-	-
Activities of extraterritorial organizations and bodies	-	-	-	-	-	-
Total	282	100	7,236	100	71,290	100

Source: State Statistical Office, Statistical Yearbook, 2014

According to the State Statistical Office, private enterprises are operating mainly in wholesale and retail trade with 30% and in construction 20%. Transport and storage takes 15.6%, followed by manufacturing 14.8%.

The most prevalent in the agrarian structure are the forest with 9,046ha, cultivated agrarian soil with 4,736ha and pastures 1,779ha. The lowland settlements have larger cultivating area (Zelino, Dobarce, Larce, Rogle and Trebos), there are good conditions for development of farming, while in some higher villages there are opportunities for development of forestry and cattle breeding. The largest forest surfaces are in the local communities' areas of Larce, Lukovica, Merovo, Cerovo, Sedlarevo, and Dobarce, the smallest part is in Grupcin, while the mountainous local community of Sedlarevo has largest surfaces of pastures.

Table 8 Structure of the agricultural area in the local communities

Local community	Absolute altitude	Area (km^2)	Structure of the agricultural area (ha)			
			Agricultural land	Pastures	Forests	Total
Zelino	609	199.6	4,736	1,779	9,046	15,561
Gorna Lesnica	740	6.5	134	18	364	516
Grupcin	480	6.7	254	111	32	397
Dobarce	640	12.4	521	18	643	1,182
Dolna Lesnica	515	5.5	68	5	463	536
Zelino	470	15.9	603	244	648	1,495
Kopacin Dol	550	4.9	130	9	339	478
Larce	680	20.4	452	152	1,405	2,009
Lukovica	930	40.9	135	22	1,505	1,602
Merovo	780	15.4	326	124	1,016	1,466
Novo Selo	530	5.4	222	16	205	503
Ozormiste	407	1.6	149	1	8	158
Palatica	407	2.2	196	0.1	14	210
Rogle	530	5.8	282	18	200	500
Sedlarevo	1,240	29.7	350	948	770	2,068
Strmnica	470	6.4	238	16	364	618
Trebos	420	4.4	371	1	56	428
Cerovo	660	11.9	157	26	877	1,060
Ciflik	505	3.6	148	50	137	335

Source: Municipalities in the Republic of Macedonia, 2006

2.3 General description of the Project

Current situation

The project assumes reconstruction of existing street that starts from a place called "Kaj Matranchite" to the old local community, and covers two parts: Branch 1 and Branch 2. The street reconstruction will include construction of sidewalks and stormwater system. The street is located in the village Zelino. The current situation of the street Branch 1 and Branch 2 is shown in the following pictures.

Figure 3 Current situation of the street planned for reconstruction

Figure 4 Current situation of the street planned for reconstruction
Source: Archive of CeProSARD[1]

In accordance with the data obtained from the municipality, 894 residents live on the street, which is 3.66% of the total number of inhabitants in the municipality.

This street with both branches, in accordance with the regulations of the country, is classified as a local residential street. It is important to note that this is the main street of the village that connects locations of existing facilities and locations provided for construction of residential, commercial and public sector. Through both branches the street connects the central area of the village Zelino with other parts of the municipality, as well as settlements in other municipalities in the region.

Along the existing road there is no sewerage, although the residential facilities were constructed in 1980. For the last 30-40 years this street has existed without stormwater system, which was not built at the time of their construction. The infrastructure on the street has fallen into such disrepair that an expansive reconstruction is required, so as to extend their useful life. The lack of adequate stormwater system caused a number of health and environmental hazardous impacts, as well as traffic inconvenience for the residents on this street, and as a result they have been constantly complaining to the Mayor and the municipal administration about the situation. Therefore, the main purpose of the proposed technical solution is to provide a long range improvement of the street by maximizing the technical life of the surface, thus meeting the needs of the community in the municipality Zelino.

Future situation

The total length of the two branches of the local street, which are the subject of this evaluation is 632.11m, or "Branch 1" has a length of 192.62m and "Branch 2" length of 439.49m.

The alignment of local streets is made in accordance with the General Urban Plan (GUP) and follows the terrain configuration and spatial limitation of the field, and the available data on existing and planned infrastructure facilities. The drafted technical documentation is in accordance with the laws and regulations in the areas of design, urban planning and the applicable standards for reconstruction of streets and construction of stormwater system.

The objectives of the technical solution of the project are:

- To provide traffic comfort, convenience and safety for the pedestrians and traffic by improving the surface and sidewalks, as well as their carrying characteristics;

[1]The team of CeProSARD during August 2014 made an insight of the current state of the subject location planned for reconstruction

- To ensure that stormwater system of residential and commercial facilities located on the flood-prone are occurs only on very rare occasions and that the velocity/depth conditions during these events are below prescribed limits;

- To ease traffic on the street, thus improving safety and reliability for pedestrians and goods movement;

- To satisfy various social, recreational and residential needs of the citizens in the all area in the municipality.

The benefits expected from the project implementation (elaborated in detail in Chapter 6 below) are related to increasing the traffic safety and comfort, increasing the traffic capacity and communications, ensuring a feeling of security by pedestrians, enhancing the commercial activities, as well as extending the outdoor social and recreational activities for the residents living on the street. The present condition of the street causes frequent interruption of traffic and forces the residents to search for alternative routes, which ultimately results in fall of productivity. Additionally, the implementation of the project is expected to lead towards reduction of the municipal costs for constant repairs of the streets. Once the project is implemented, the municipality will spend less money for repairs and reallocate them to other municipal services. The implementation of the project is also expected to increase the property value of houses and other residential or commercial objects on the streets, thus increasing the growth of revenues from property taxes.

The implementation of the project is expected to have environmental impact as well as positive impact on the health of the population, thus influencing higher productivity. It will also retain within each catchment as much stormwater and run-off as possible given the planned use of the terrain and its civil engineering characteristics which will not only reduce the municipal spending, but also private spending on repairs, thus enabling reallocation of the funds to other more beneficial, that is productive use.

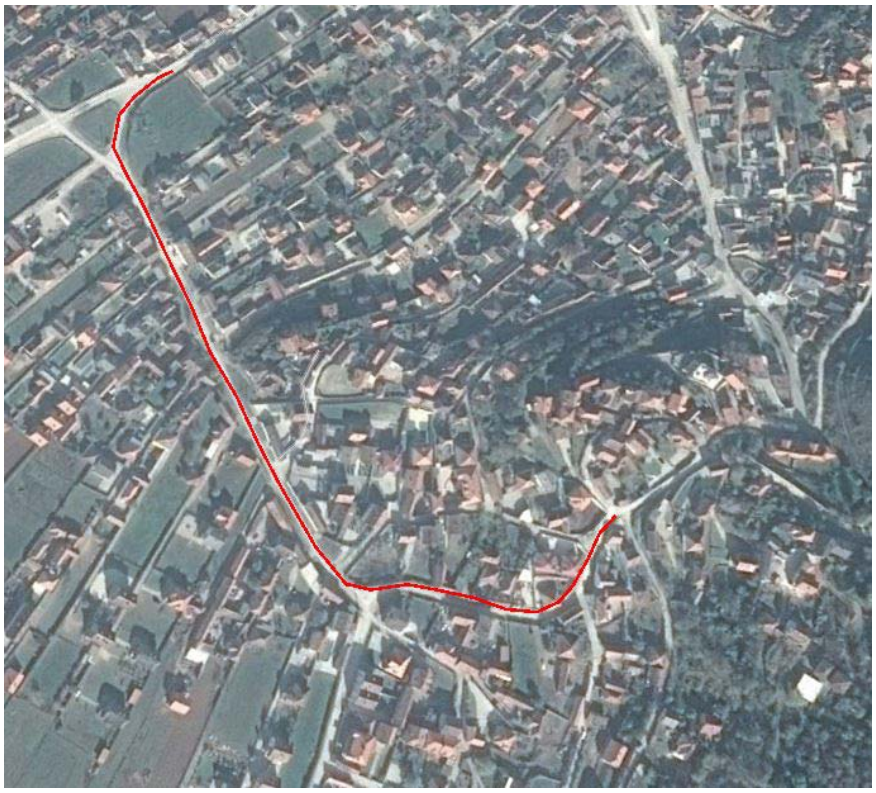


Figure 5 Micro location of the street which is subject of the project

Figure 6 Macro location of the street and the distance from the river Vardar
*Note: The Street that are subject of this appraisal are marked in red

Strategic goals

If implemented, the project will contribute towards accomplishment of the strategic goals in the area of infrastructure of the municipality Zelino. As elaborated in the Annual Program for Communal Utilities of the municipality Zelino, which are all adopted by the Municipal Council in 2014, the municipal administration strives to see the municipality Zelino with a full coverage of transport and communal (utility) infrastructure throughout its territory.

It is important to note that no stormwater system has been previously constructed on this street. This project will add to the accomplishment of the strategic goal of the municipality in a manner that will lead towards increasing the coverage of stormwater system.

This will undoubtedly contribute towards improvement of the quality of life and well-being of all citizens of the municipality Zelino. The lack of adequate storm water on the street subject to this appraisal caused a number of health and environmental hazardous impacts for the residents on this street and as a result they have been constantly complaining to the Mayor and the municipal administration about the situation. In addition, the project is considered strategically important since the streets that are subject to the reconstruction are considered one of the main residential/traffic arteries in the municipality. As explained earlier, the implementation of the project will undoubtedly contribute towards increasing traffic safety and comfort, increasing the traffic capacity and communication, ensuring a feeling of security by pedestrians, enhancing the commercial activities, as well as extending the outdoor social and recreational activities for the residents living on the streets. This in turn will increase the quality of life and well-being of the citizens. It is also important to state that the municipality has the intention to improve the transportation network in all districts and to invest in stormwater system wherever deemed necessary. It solves the problems that were persistent for many years. Those, who will be not covered by this project, can expect that will be provided with such public good subsequently. With the implementation of this strategically important project, the municipality is sending a strong signal that plans to solve this issue on the whole municipal area.

3.

SOCIAL IMPACT

3.1 Sociological study

This study is based upon the methodological concept of World Bank summarized as Five Entry Points, One Result. This concept requires exploration of five components: social diversity and gender, institutions, rules and behaviour, stakeholders, participation and social risk. The assessment anticipated field research to get available information on interest and attitudes of stakeholders.

The research was based on meeting with a focus group and face to face interviews with the municipality representatives in order to give a social assessment about the project on reconstruction of a municipal street with construction of sidewalks and stormwater system.

The interviews were organized with four officials from the municipality: mayor of the municipality Zelino and advisors from different political sides. Between the interviewers there was one woman. They all presented their opinions about the role and influence of various stakeholders in the process of decision making relevant to the project, as well as the level of information, capacities and readiness of the citizens to support the project.

Taking their delegation and duties into account, the above mentioned officials proved to be useful interpreters of the opinions of the citizens since being their representatives and having frequent meetings with them, they are very familiar with the needs, attitudes and opinions of the local population and the project. The answers from the interviews are very indicative a very good insight in the local processes to the project.

The focus group consisted of municipal residents both directly and indirectly users of the project. Most of the participants were from the local community Zelino. There were 13 participants in the focus group from whom two women, one retired and one representative who work outside the country.

3.1.1 Social diversity and gender

In the municipality Zelino, in the street which is a subject of this appraisal there are residents from different social groups (minorities, gender, language, people who work outside the country, etc.) By age groups are mainly young but also old people, some of them are people with a special needs and help.

The prevailing nationality in the municipality Zelino is the Albanian with 99%. The representative of the other ethnicities in the municipality speaks its own language in the informal communication. Some of the young people are leaving the municipality, moving into the bigger cities or in other country, but most of them stay in the municipality creating their own families. Residents who live at the street subject to this project are nearly equal considering male and female population. In general, the municipality is rural area and all population is considered rural.

The main priorities of the municipality Zelino is improving the quality of life of the residents, improving the infrastructure, reconstruction of the streets and roads and new facilities for water supply, communal services, etc. According to the female population, the most important issues are construction of kindergarten (since there is no kindergarten in the municipality) and construction and improvement of road infrastructure due to the need for safety transport of the kids and school children. At the same time, the advisors of the community added the construction of kindergartens as a priority because of the birth rate rising and also reconstruction of local streets which will contribute to improving the living of all the residents in the municipality.

Asked about the number of beneficiaries of the project, the interviewees expressed their opinion that all of the residents in the municipality will be beneficiaries of the project. The residents who live in the other rural communities will have benefits from reconstruction of the street as well, considering the fact that most of the residents come to work and bring their children to school in the local community Zelino or the city of Tetovo. This is because the street subjected to this project is one of the most important communication local streets. This street connects the residents of the local community Zelino with the elementary school, Mosque, the city of Tetovo and other local communities, such as: Leshnica, Falishte, Slivnica and Brvenica, and Celopek.

The reconstruction of this street will be beneficial for the safety of women with children, school children, elderly people and residents with special needs.

3.1.2 Institutions, rules and behaviour

According to the interviewees' opinions the selected coordinator must provide guarantees for the realization of the project. The municipal Council might request information from the mayor in reference to the project's realization at any time. In addition, based on experience with other projects and the overall existing streets and stormwater system in the municipality Zelino, the municipal administration has the capacity to maintain the streets after the implementation of the project. In addition, the municipality has an administration, 38 employed, which has experience to monitor the progress of the project.

The municipality will be responsible for maintenance of the street, and the Public Communal Enterprise will continue with maintaining the streets in summer cleaning the sand and grass from the street and in the winter cleaning the street from snow. The Public Communal Enterprise has a capacity of 9 full time employees and 16 volunteers. The local communities are not directly included in the maintenance, but they can contribute by request of the residents and municipality.

According to the interviews the private companies will have great benefits from the reconstruction of the street. The construction will provide easy access to all consumers, which will increase the earnings and trade services. This information was confirmed by the focus group participants, especially in the interest for opening new businesses from foreign investments.

3.1.3 Stakeholders

There are several important stakeholders of the project. The interviewees fully agree that the most influent participant in the process of decisions making at the municipal level are the mayor and the municipal council. Residents, as an organized group of stakeholders, articulate their opinions directly to the council and the mayor, trough the local communities present in the municipality and they can influence the decisions making process, as their opinions are always taken into consideration by the mayor and the council.

The interviewees stated that the project is supported by all councillors representing different political parties in the municipal council, which means that a political consensus is achieved on this issue and that the councillors are considering the project as one of the top priorities of the municipality Zelino. In respect of the residents, the opinion of most interviewees is that all of them support or will support the project, because it is in the general interest at the municipal level. The focus group participants confirm the need of the reconstruction of the street and construction of stormwater system. The stormwater system was discussed as very important issue in order to prevent the flooding of the private houses of the residents who live at that street.

One very important question that was discussed is related to the potential *"feeling of inequality among the citizens and possibility they could endanger the realization of the project in order to get some personal or group benefits?"* The interviewees and focus group participants stated that there is not risk or problems that can appear during the implementation of this project because, like they stated it is for everyone's benefit and good.

3.1.4 Participation

The residents have submitted their complaints about the current situation in the street that is subject of this appraisal, which again implies that the residents are fully in favour of the project. They are well informed about this project by constant posting on the website of the municipality and local communities, as well as by direct interview and discussions with the mayor in each local community. They can make their influence about the necessary changes if there is a need.

As elaborated earlier, since this project is expected to influence the overall living standard in the municipality, it is expected that the residents will support the project.

3.1.5 Social risks

High social risk for carrying out the project cannot be perceived. In the municipality Zelino, the municipal council consist of 19 representatives from 3 different political parties. Out of the total number of councillors 11 support the mayor, while 8 are in opposition. In spite of their political orientation, the councillors cannot endanger the realization of the project. As elaborated earlier, the councillors have already expressed their support for the project.

Interviewees presented a wide range of priorities in many fields that are within the local government competencies. They identified the construction or rehabilitation of the infrastructure (communal) facilities, the local economic development, increasing the employment rate, construction of stormwater system, use of renewable energy sources, improvement of social aid and social protection to vulnerable groups, etc. Without exceptions, all of the interviewees said that the one of the highest priority is full coverage of stormwater system, throughout the municipality Zelino, while also the need of reconstruction of the streets in the rural areas.

Additionally, it was discussed in detail whether the residents are fully informed of the intended reconstruction of the street that is subject to this Appraisal. In that way, there is no risk for resident not to be informed about the reconstruction of the street.

It is very important to state that the municipality has the intention to improve the transportation network in all local communities and to invest in stormwater system wherever deemed necessary. It solves the problems that were persistent for many years. With the implementation of this strategically important project, the municipality is sending a strong signal that plans to solve this issue on the whole municipality area.

Since the street is the subject of this Appraisal, it is set on municipal (state) property; no expropriation is expected to be raised.

3.2 Other fields of considerations

The reconstruction of the street in the municipality Zelino which is subject to this Appraisal is expected to improve the overall population living conditions in the municipality. The implementation of the project is expected to create savings in the item of the municipal budget for the streets maintenances on the long term basis. The implementation of the project is also expected to improve local public finances in a sense that once the street is reconstructed, the municipality will spend less money for repair and reallocate them to other municipal services. Moreover, increased property value as a result of the improved infrastructure will result in growth of revenues from property taxes.

For safe walking of children to school, there is an emergency need of sidewalks construction. For prevention of flooding of residential houses there is also a need for construction of stormwater system. These project activities will bring welfare of the local population, but will also lower the costs for taking children to and from the school by car and repairs of the gardens due to the frequent flooding's.

3.3 Resettlement issues

The project is not a subject to resettlement issues because it involves reconstruction and rehabilitation of already existing street in the municipality territory. The reconstruction of the street will improve the transport and will allow development of new small businesses. Constructed infrastructure network will bring investments, especially from the migrated population in the foreign countries. The increased number of businesses will open new jobs for the local population and contribute to the employment of young people. In that way, decreasing of the emigration is expected.

3.4 Conclusion on the project potential success and recommendation

The project is expected to be socially successful for the following reason:

- The project is relevant because it is considered both cost-efficient and cost effective over a long run and also useful for the improvement of the community living in the municipality Zelino;

- The project is of a highest municipal priority for the public administration and for residents;

- The stakeholders are very motivated by the realization of the project;

- The project is not a subject to a resettlement issues;

- No expropriation issue is expected to be raised during the implementation of the project.

The main drivers of the change that will bring about prosperity are the municipal authorities (mayors, councillors, public enterprise managers) who have initiated and made the decision for seeking funding from the World Bank funded MSIP. Since the problem of bad infrastructure exists for many years it has been publicly declared and discussed on many occasions. Direct beneficiaries of the project are the residents in the local community Zelino living on selected street (894 persons), which is 3.3% of the municipal population.

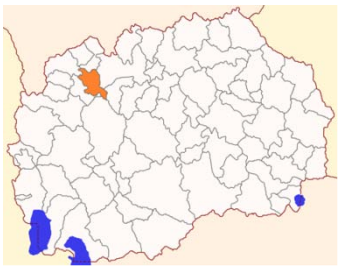
A part of the vulnerable and poor groups identified by the municipality and the public enterprise (disabled and elderly people), as well as kids and school children have special needs considering sidewalks and stormwater system that will ease their movement. Gender balance needs to be incorporated in the strategic approach of the municipality and public communal enterprise towards all development efforts.

High socials risks for carrying out this project cannot be perceived. There are no issues connected with ethnic distribution of population or inter-village rivalry: the action will allow benefits for both Albanian and Macedonian population, it will cover the majority of citizens in the municipality and there are no land ownership (expropriations and resettlements) concerns that need to be resolved.

4.

ENVIRONMENTAL IMPACT

The Municipality of Zelino is located in the north-western part of the Republic of Macedonia in Polog Region (shown on Figure below). It covers an area of 201km^2, there are 18 settlements with total number of population of 27,329.The road network in the municipality is under-developed, the communication between settlements is with partly asphalted local roads and most of the roads are macadam type of road and unpaved road.



The project covers activities on reconstruction of local street with construction of sidewalks and storm water system in the settlement Zelino. The street connects settlement Zelino with other settlements in the municipality, as well as with other municipalities. Around 900 residents live along the street, which is 3.7% of the total number of inhabitants in the municipality.

The project assumes technical solution for reconstruction of the existing local street from a place called "Kaj Matranchite" covering two branches: “Branch 1” and “Branch2” (the location is presented in Figure 7).

The local street “Branch 1” is the only traffic connection of the area called “Kaj Matrancite” with the main street. Its longitudinal profile has big varies from 3.5% up to 14% because of the specific terrain configuration.

The other local street “Branch 2” is built in asphalt with different thickness, a changeable width and without sidewalks. The sides of the street is not shaped and leveled and the water stands in the mud. Its longitudinal profile ranges from 0.85% to 7.76%.

The total length of the street that will be reconstructed is 632.11m, which a part of the road “Branch 1” has a length of 192.62m and a part of the road “Branch 2” has a length of 439.49m. Width of the street varies from 5 to 5.5m.

The technical solution for reconstruction envisages drain system for dewatering of the road sub base for the two branches and storm water system for the street “Branch 2”. The storm water on the street "Branch 2" starts from km 0+000.00 and ends up at km 0+419.28 where will be connected to the recently constructed storm water system by the municipality of Zelino. The main line of the stormwater system within this project is placed on the right side under the sidewalk, while from km 0+419.28 to km 0+729.14 is passing on the left side of the road and continues through existing channels toward final recipient River Vardar.

For the construction of storm water system it is necessary to dig trenches 1m deep, with a width of 1 to 1.5 m. All atmospheric water will be collected in two layered polypropylene sewage pipes, which will be placed in these trenches.

Location of the project

The main project activities are taking place at a local street (Branch 1 and Branch 2), which is located in the center of the settlement Zelino (in a place called "Kaj Matranchite"). Location of the project is shown in Figure 7 where two branches of the local street are shown as well as the planned storm water system. Along the project location there is residential area, mainly family houses. In the immediate vicinity of the project location there are religious buildings, catering facilities, municipal building, the river Vardar (500 m of project activities) and slopes of Suva Gora mountain. 20 km from the project activities is located artificial water accumulation Kozjak and 41km from the same location is located mountain massif Jakupica.

Figure 7: Location of construction activities in settlement Zelino

Main sub-project activities with environmental impact

The construction activities that will have an impact on the environment will be carried out in three stages: preparatory stage (preparation of the location for reconstruction) constructive phase (reconstruction of both branches of the local street and storm water system) and operational phase (flow of the traffic along the local street, functioning of the dewatering along the streets and proper maintenance of street and storm water system in good condition).

The reconstruction of both streets includes several activities:

- Preparation works, mechanical removal of the existing asphalt, relocation of the existing poles and leveling of the existing manholes;
- Digging in a wide range of the existing base material and soil;
- Mechanical removal of the existing concrete interlock tiles pavement;
- Digging a trench for the drain system;
- Placing, leveling of the crushed stone material in 2-3 layers;
- Placing of concrete curbs;
- Placing of new asphalt layer;
- Digging the trench for the drain pipe and storm water system including construction of all elements.

For the construction of storm water system it is necessary to dig trenches 1m deep, with a width of 1 to 1.5 m. All atmospheric water will be collected in two layered polypropylene sewage pipes, which will be placed in these trenches.

The main raw materials which will be used for the construction of the “Branch 1” and “Branch 2” will be: bitumen emulsion, sand, asphalt, concrete layer, oil for construction machinery, etc.

Main environmental impacts and sensitive receptors

The project will contribute to improvement in the mobility of municipal population and will ensure proper dewatering through the storm water system improving the convenience and safety for pedestrians and traffic by

controlling storm water flows. The implementation of this project will contribute to the development of community living not only in the municipality of Zelino but also in the neighboring municipalities and beyond.

Before the start of reconstruction activities, the Contractor should provide fencing, marking and putting signs on the construction site and should also provide use of personal protective equipment for workers in accordance with the good construction practice. This should be done in order to minimize the negative impacts on the safety of workers and the population living near the reconstruction site (very important as there are family houses and administrative building along the street).

The *preparatory stage* includes preparation of the ground for the reconstruction phase such as: clearing the ground (removal of existing soil), removal of land area, cutting and removal of asphalt and mechanical excavation of excess land, marking and securing of the reconstruction site, leveling of the existing manholes, and relocation of several poles. This phase also includes setting up of mobile toilets for the workers and adequate containers for waste collection. This phase will last short time and environment impacts will be local, short-term with low significance.

The preparation of the Traffic Management Plan is essential to be adopted prior the start of the activities in order to prevent the adverse environmental impacts and to ensure regular transportation of goods and people across the settlements within the municipality of Zelino. The Plan should include the re-routing directions and works time schedule. Also of essential importance is informing the general public about the project activities (start, timeframe and re-routes of traffic). The Information note/ Press need to be prepared by the municipal staff and announced via municipality board, web page or municipality newspaper just in time. This is very important especially prior the asphalting of the both branches of the local street.

As a result of *reconstruction activities that will be undertaken in the second phase* it is expected to result with following emissions: exhaust and suspended dust material in the air generated from construction machinery, waste water produced by construction workers and storm water sewage, mixed municipal waste and waste resulting from construction activities, noise, vibrations from the operation of construction equipment and impact on flora and fauna.

In the process of the reconstruction phase of the local street branches, as air emissions will occur: fugitive dust emissions during cleanup and removal of ground, soil, dust emissions during loading and transport of excavated material, emissions from mobile sources of pollution - construction machinery and fugitive emissions of volatile organic components by applying bitumen emulsion and asphalt mixture.

The main environmental impact on water resources during reconstruction activities is improper waste management near the water resources (river Vardar and its tributary river Pena). According to the Regulation on Classification of waterways, lakes, reservoirs and groundwater ("Official Gazette of RM" No. 18/99) the water characterization of river Pena and river Vardar (in that part of catchment area) are III class. This means that these rivers are polluted, with large organic load (hypertrophy and low degree of self-purification) and also means that they cannot be used for bathing recreation, water sports and fish growing. In the wider vicinity of the subject location is located Kozjak, artificial water accumulation used for recreational fishing. The reconstruction activities will not have a direct negative impact on the water quality, but the improper waste management (if the waste streams are disposed on the river banks) could significantly impact water quality.

Different waste streams could be found on the construction sites and implementation of the waste hierarchy principles is essential. The Contractor needs to communicate with municipal staff as well as with management of Public Communal Enterprise "Mirmbajtja" at the beginning of the project in order to get instructions where to dispose the waste streams. The keeping records of temporary and final disposal of waste are important as well.

The noise will appear as a result of the operation of construction machines that will be working during the reconstructive phase or vehicles for transport and delivery of construction materials and machinery for the implementation of reconstruction activities. The sensitive recipients of the increased level of noise are workers who will operate the machinery and residents in residential facilities that live nearby construction site. Limit values for basic indicators of environmental noise are defined in Law on noise sensitive protection ("Official Gazette of RM" No. 79/07, 120/08, 1/09). According to this law, the project area is located in the second degree of protection against noise and the maximum allowed noise level should be 45dBA for night and 55dBA for evening and day.

In or near the project location there are no registered endemic, protected and endangered animal or plant species or protected areas and habitats that will be negatively affected by the construction activities.

At *operational phase* environmental impacts of project activities are expected to be insignificant. The expected emissions in this phase are: emissions from mobile sources of pollution (vehicles) sewage storm water and noise.

Other mitigation measures that need to be applied before and during reconstruction activities are included in the following Environmental Mitigation Plan. The main responsibility for implementation of the mitigation measures lay to the sub-contractor and supervisor (nominated by the municipality) on daily basis. Some of the measures should be applied by the municipal staff in coordination with local Traffic Police Department (announcement of the traffic regime) and other institutions (recording the waste quantities and regular communal inspection).

According the national legislation, the Environmental Impact Assessment Report for reconstruction project was prepared in period April 2014 (Company "Enviro resources" DOO) and it was adopted by the mayor (Mr.Izairi Fatmir). The Report contains the main project goals, project activities, photos of the locations where the reconstruction activities will be performed. The Report provides mainly general environmental mitigation measures for storm water system.

The detailed relevant Environmental Mitigation Plan and Monitoring Plan are presented in the following tables.

Environmental Mitigation Plan

Potential impact	Impact scale	Proposed mitigation measures	Responsibility
Project activity: set the protective signalization for achieving safe transport of the route and the connecting streets - under construction			
Possible negative social and health impact on the population, drivers and workers because: - Lack of signs placed on security measures at the beginning of reconstruction work - Injuries occur because of passage near the reconstruction site along the street (both branches)	Local/ from the "Kaj Matranchite") to the centre of settlement Zelino Short term/minor	• Preparation of plan for traffic management together with the municipality staff • Information through local media/local newsletter for activities related to construction activities – beginning and finishing with work every day and certain location of the activities, working time frame and traffic access to other streets • Providing adequate marking of the construction site • Marking construction material near the road • Ensuring warning tapes and signs • Not allowed entrance for non-employed to the site where the construction activities are taking place • Measures undertaken to protect the safety and health of workers (first aid, protective clothing for workers, appropriate machinery and tools)	Contractor, Supervision by municipality staff (sewage inspector / environmental inspector / traffic engineer)
• Project activity: Street reconstruction and construction of sidewalks and storm water system in the Municipality Zelino			
Possible adverse social and health impacts to the citizens and traffic as well as for the workers due to: - Unsafe start of construction works - Not compliance with health and safety at work procedures - Inappropriate public access	Local/ from the"Kaj Matranchite") to the centre of settlement Zelino Short term/minor	Application of good practice for marking out the construction site including: • Ensure the marking out the construction site • Forbidden entrance of non-employed persons within the fence • Adequate warning tapes and signage need to be provided • Health and Safety measures should be applied: a) Security measures like: perimeter fence, life jackets, use of proper protective clothing and equipment by employees, warning signs for the public around the construction site; b) Maintain a good level of personal hygiene-have on site installations for washing, cleaning; c) Health protection-fist aid kits and medical service on sites d) Apply the emergency and normal first aid procedure for any injury if such occur through construction work; • The roads should be kept clean	• Contractor – Bidder • Supervisor

Potential impact	Impact scale	Proposed mitigation measures	Responsibility
• Project activity: Street reconstruction and construction of sidewalks and storm water system in the Municipality Zelino			
Possible impacts on landscape and visual aspects	Local/ from the "Kaj Matranchite") to the centre of settlement Zelino Short term/minor	• Good construction practices have to be implemented – including fencing and protection of construction site according to national legislation; • Minimization of the construction area as much as possible (careful planning and design of the project activity according the Traffic Management Plan for a certain period of time); • Fully clean-up of the construction site immediately after accomplishment of reconstruction activities section by section; • Collection of the generated waste on daily basis, selection of waste, transportation and final disposal on appropriate places (according the type of waste – more details under Waste management issue).	• Contractor – Bidder • Supervisor
Possible emissions by transportation vehicles and impact on air quality due to: - gases emissions of dust-suspended particulates; - emissions from the mobile sources (vehicles and construction machinery) of CO_2, NOx, SO_2, PAH.	Local/ from the Kaj Matranchite (Gornamaala) to the centre of settlement Zelino Short term/minor	• Reconstruction site, transportation routes and materials handling sites should be water-sprayed on dry and windy days; • Construction materials should be stored in appropriate places covered to minimize dust; • Vehicles and construction machinery will be required to be properly maintained and to comply with relevant emission standards; • Conduction of regular maintenance of the vehicles and construction machinery in order to reduce the leakages of motor oils, emissions and dispersion of pollution; • Vehicle loads likely to emit dust need to be covered; • Usage of protective masks for the workers if the dust seems to be appeared; • Information for population of the urban communities for the construction activities should be delivered through local radio/ TV so to use other streets in the period while providing construction activities at the projected locations; • Restriction of the vehicle speed within the construction location; • Burning of debris from ground clearance not permitted.	• Contractor – Bidder • Supervisor
Possible noise disturbance as a result of outdoor equipment usage and transportation vehicles driving around the construction site	Local/ from the "Kaj Matranchite") to the centre of settlement Zelino	• As it is a mixed area the level of noise should not exceed more than 55dB during the day and evening and below 45dB during the night; • The construction work should be not permitted during the nights, the operations on site shall be restricted to the hours 7.00 -19.00; • The workers should be provided with ear protective devices (ear muffs and/or ear plugs);	• Contractor – Bidder • Supervisor

Potential impact	Impact scale	Proposed mitigation measures	Responsibility
	Short term /major	• Use of appropriate and technically functional equipment and mechanization.	
Possible adverse environmental impact and health effects could be occurred as a result of generation of the different waste streams The inappropriate waste management and not in time collection and transportation of waste streams	Local/ from the"Kaj Matranchite") to the centre of settlement Zelino Short term/major	• Identification of the different waste types at the reconstruction site (soil, sand, asphalt, pieces of asphalt, road surfacing, bottles, food, parts of pipes, paper, broken concrete etc.); • Classification of waste according the national List of Waste (Official Gazette no.100/05): The main waste would be classified under the Waste Chapter 17 "Construction and demolition wastes (including excavated soil)" with the waste code 17 01 – Waste from concrete, bricks, 17 05 04 – Excavated soil, 17 09 04 – Mixed waste from construction site, 17 03 - bituminous mixtures; • Small amount of solid municipal waste could be found (food, beverages), as well as packaging waste (paper, bottles, glass, etc.)	• Contractor – Bidder • Supervisor • CSE "Mirmbajtja"
		• Transportation and final disposal of the inert and communal waste by the Public Utility Enterprise-CSE "Mirmbajtja"; • The contract with the company for waste collection and transportation should be signed for collection and transport of waste to the municipal landfill; • The construction waste should be promptly removed from the site, should be re-used if it is possible; • The materials should be covered during the transportation to avoid waste dispersion; • Burning of construction waste should be prohibited; • Fulfilment of the Annual Report for non-hazardous waste management by the Mayor of Municipality and reporting to the Ministry of Environment and Physical Planning; • Possible hazardous waste (motor oils, vehicle fuels) should be collected separately and authorized collector and transporter should be sub-contracted to transport and finally dispose the hazardous waste	• Municipality staff (Communal Inspector/ • Environmental Inspector) • CSE "Mirmbajtja"
Soil pollution The negligible impacts on soil arising from reconstruction activities are expected. The compaction of soil can be	Local/ from the"Kaj Matranchite") to the centre of settlement	The possible mitigation measures for minimization of the soil pollution could be: • Transportation vehicles should be enclosed to avoid potential leakage; • Promptly clean-up spills of transported material on construction sites; • Proper positioning of the water drainage system on the construction site; • All roads and asphalt surfaces should be maintained clean in order to prevent	• Contractor – Bidder • Supervisor

Potential impact	Impact scale	Proposed mitigation measures	Responsibility
expected due to vehicle movement, ground contamination from the spillage of materials such as vehicle fuel, motor oils, asphalt, inert waste, construction waste.	Zelino Short term /minor	runoffs from them into the ground water and other water flows; • Not to keep fuel, oil or lubricants along the alignment, especially not in the vicinity of draining structures; • To be set portable toilet that will be cleaned and maintenance on time.	
Operational phase	• No environmental risks are expected		

Environmental Monitoring Plan

What Parameter is to be monitored?	Where Is the parameter to be monitored?	How Is the parameter to be monitored?	When Is the parameter to be monitored (frequency of measurement)?	Why Is the parameter to be monitored?	Cost		Responsibility	
					Constr.	Oper.	Reconstruction of local street and storm water system in Municipality of Zelino	Operations of the street
Project stage: start-up of the project activity: "Street reconstruction and construction of sidewalks and storm water system in the Municipality Zelino" (marking the construction site)								
Traffic Management Plan prepared	On the reconstruction/construction site	Visual check and reporting to the Municipality staff	At the beginning of the project activities (before the works start)	To ensure safety and easy re-route of the traffic across around roads/access streets			Contractor - Bidder /Supervisor Municipality of Zelino /Traffic Engineer	
Information prepared and announced about the traffic redirection	At the municipality public relation office	Information/ Press release prepared and announced	At the beginning of the project activities (before the works start)	To inform citizens of settlement Zelino about reconstruction works			Municipality of Zelino/Traffic Engineer	
Safety traffic flow within the local street	At the spot	Visual monitoring	During the project implementation	To ensure the coordinated traffic flow within settlement Zelino			Municipality staff/ Traffic Engineer	

What Parameter is to be monitored?	Where Is the parameter to be monitored?	How Is the parameter to be monitored?	When Is the parameter to be monitored (frequency of measurement)?	Why Is the parameter to be monitored?	Cost		Responsibility	
					Constr.	Oper.	Reconstruction of local street and storm water system in Municipality of Zelino	Operations of the street
The safety protection measures applied for the residents	On the reconstruction site	Visual checks	At the beginning of the reconstruction work (first day) Every working day during the project activities	To prevent community health and safety risks – mechanical injuries			Contractor - Bidder /Supervisor Municipality of Zelino /Environmental Inspector	
The OH&S measures applied for the workers	On the reconstruction site	Visual check	Before start of the project activities and each of working day	To avoid occupational and safety risks (injuries)			Contractor - Bidder /Supervisor	
Separated hazardous and non-hazardous waste	On the construction site	Visual monitoring and reporting	During the project activities	To avoid disposal of hazardous waste on municipal landfill			Contractor - Bidder / Municipal staff	
Fulfilled Annual Report for transportation and disposal of waste	Local self-government administration	Review of documentation – Identification Waste List	After the accomplishment the task of collection, transportation of waste on daily/ monthly basis	To improve the waste management and hazardous waste management on local and national level			Mayor of Municipality of Zelino/Director of the CSE “Mirmbajtja”	

5.

TECHNICAL SOLUTION

5.1 Description

The project assumes technical solution for reconstruction of the existing local street from a place called "Kaj Matranchite" to the old local community, which would cover two branches: “Branch 1” and “Branch2”. The project includes construction of sidewalks and stormwater system. The street is located in the local community Zelino and connects this local community with other local communities in the municipality, as well as with other municipalities.

According to the regulations of the country the street is classified as a local residential street. The plan for the project is made in accordance with the General Urban Plan (GUP), follows the terrain configuration, spatial limitation of the field, and the available data on existing and planned infrastructure facilities. The technical documentation is in accordance with the laws and regulations in the field of design, urban planning and the applicable standards for street reconstruction and construction of stormwater system.

5.2 Analysis, evaluation and potential amendments

According to a European standards and world adopted definition, the street reconstruction is a project whereby many or all meaningful elements of an existing street are being removed and replaced. This would include sidewalks, bituminous or concrete pavement, sub base and items apart to these elements.

The total length of the street that will be reconstructed is 632.11m, whereas the width varies from 5.0 to 5.5m (see Table 10 below).

Table 9 Technical characteristics of the local street provided for reconstruction

Street	Length (m)	Width of the street (m)
Branch 1	192.6	5.0
Branch 2	439.5	5.5
Total	632.11	/

Source: Project’s technical documentation

Due to the fact that the project considers the existing streets, geotechnical investigations and street sizing have not been carried out. The structure, sizes and layers of the proposed technical design for the streets are based on the positive regulation and standards applicable for this kind of traffic on these streets.

5.2.1 Local Street “Branch 1”

The existing street – “Branch 1” is the only traffic connection of the area called “Kaj matrancite” with the main street. Due to the terrain configuration the longitudinal profile is with big slope that varies from 3.5% up to 14%.The existing alignment is shaped with 4 vertical curves and 5 directions with minimal vertical cross gradient i_{min}=2.5%, and maximal vertical cross gradient i_{max}=5%.The existing street is 5m wide, paved with concrete interlock tiles, without, and no space for sidewalks to be built. The reconstruction of the street “Branch 1” includes paving of the existing roadway with asphalt layer, and construction of drainage system to dewater the road base. The technical solution for the reconstruction envisages the following activities:

- Relocation of several poles and levelling of the existing manholes;
- Mechanical removal of the existing concrete interlock tiles pavement;
- Digging a trench for the drain system, placing of perforation PVC pipe with D=100mm, placing of different granulated crushed stone material in several layers;
- Digging in a wide range of the existing material including transportation to the authorized disposal, compacting of the surface;

- Placing, levelling and compaction of the crushed stone material in 2-3 layers;
- Placing of concrete curbs 18/24, MB40 considering all entrances or the streets that crosses with street "Branch 1";
- Placing of new asphalt layer BNHS 16A, 7cm thick.

The normal cross profile structure:

- BNHS 16A thick 7cm;
- Crushed stone layer thick 30cm;
- Concrete curbs prefabricated 18/24.

5.2.2 Local Street "Branch 2"

The existing street "Branch 2" is built in asphalt with different thickness, a changeable width that varies from 3.5 - 4.5m, and without sidewalks. The sides of the streets are not shaped and levelled and the water stands in the mud. This situation very often provokes floods and the water drains in the road substructure and affects the road sub base. The section of the street that is part of this project is with a length of 439.5m and it starts from the T-shaped intersection, where the street "Branch1" ends. The technical design on reconstruction of the street envisages widening of the roadway up to 5.5m formed with two roadway lanes 2x2.75m, construction of sidewalks with different widths 2.0m wide on the left side and 1.2m on the right side of the street looking from the start pint of the design. The total carriageway width is 8.7m. The technical design of the alignment defines 3 vertical curves and 4 directions, minimal longitudinal inclination of 0.85%, maximal longitudinal inclination of 7.76% and minimal cross gradient I_{min}=2.4%. Design envisages construction of drain system for dewatering of the road base and storm water system for dewatering of the roadway surface. The preliminary works, besides clearing, marking and securing of the site, preparation of the surface, and digging of the soil, have to include levelling of the existing manholes, and relocation of several poles. The technical solution for the reconstruction of "Branch2" envisages the following activities:

- Preparation works, mechanical removal of the existing asphalt, relocation of the existing poles and levelling of the existing manholes;
- Digging in a wide range of the existing base material and soil including transportation to the authorized disposal site;
- Digging the trench for the drain pipe and stormwater system including construction of all elements;
- Placing of crushed stone material in layers, with levelling and well compaction according the designed level points and longitudinal slopes and cross falls;
- Placing of the concrete curbs 18/24cm, and 6/20/100cm, MB 40;
- Placing of concrete interlock tiles 8/11/20 cm over previously prepared surface well compacted surface and laid 5cm thick layer of fine send;
- Lying of asphalt BNHS16A, 7cm thick layer;
    - BNHS 16A thick 7cm;
    - Thick base coarse layer made of crushed stone material 30cm;
    - Concrete curbs prefabricated 18/24.

Sidewalks structure:

- Interlock concrete tiles, 8cm thick;
- A layer of fine send, 5cm thick;
- Base coarse layer made of crushed stone material, 25cm thick.

5.2.3 The stormwater system

Dewatering of the underground water as well the surface water is of the great importance for the durability of the structures. The technical solution for reconstruction envisages drain system fort dewatering of the road sub base for the two streets and storm water system for the street “Branch2”. The storm water on the street "Branch2" starts from km 0+000,00 and ends up at km 0+419.28 where will be connected to the recently constructed stormwater system by the municipality Zelino. The main line of the stormwater system within this project is placed on the right side under the sidewalk, while from km 0+419.28 to km 0+729.14 is passing on the left side of the road and continues through existing channels toward final recipient river Vardar.

The hydrological calculations of the amount of precipitation, and the overall design of stormwater system have been made assuming the intensity of rainfalls i=0.7175mm/min for precipitation with repeatability of 2 years duration of 20 minutes.

The horizontal disposition of the stormwater system is following the right side of the street “Branch2” from km 0+00 up to 0+419.28, and passing under the street to connect to the recently constructed storm water system that continues on the left side of the street “Branch2”. The main stormwater collector is placed under the sidewalk. Due to the designed alignment of the street with maximal inclination of J= 7.45 %, the solution for the main collector assumes cascade disposition of manholes with maximal slope of the collector of 4%.

The storm water system will be constructed of two-layer polypropylene drainage pipes (PP-HM) SN8 with diameter that varies from ID=250mm in a length of381.84m and ID=400mm in a length of 37.44m. The connection with the street gullies will be performed with PP-HM pipes with ID=160mm. The technical design for the stormwater system includes construction of 16 revision manholes produced of polyethylene (PE) rotomolding technology with heavy steel cover fixed in RC top slab. The roadway surface water will be discharged through 17 street gullies produced with rotomolding technology with PE corrugated pipes with OD=500, with cast iron grid with ID=400mm.

The underground drain system will follow the alignment cross falls of the roadbed and will dewaters the standing water from the road base. The drain system consist of perforated PVC pipe with D=100mm and different sized granulated layers of crushed stone material. The pipe will be connected to the stormwater system through the gullies.

5.2.4 Alternative solutions

To provide technical solution a few alternative approaches have been considered in detail. An alternative option for implementation of a stormwater system would be to construct open channels, natural surface channels or canals across the streets subject to this PAD, which would capture the stormwater and take it to the nearest river Vardar. Design variants for open channels include dry swales, wet swales and grass channels. However, the engineering characteristics and the configuration of the terrain are such that do not allow for construction of an open channels, natural surface channels or canals. This is the major reason why the engineers in the municipality and the designer of the project consider that there is no other alternative design for implementation of a stormwater system in the district. The project is designed according to the existing standards, norms and regulations. In addition it is important to state that the existing stormwater system in the municipality Zelino in particular, follow the same standards provided by the existing legal and technical regulation (laws, regulations, rules, guidelines and standards) for implementation of stormwater system.

5.3 Conclusions and recommendations

The project is in line with the existing positive regulation and standards in the country. The project is part of the General Urban Plan (GUP). In the preparation of the documentation were used surveying situations in scale R 1:2500 for the municipality Zelino. With further detail recording and computer data processing basic layers have been made for which were used as a base for elaboration of the technical documentation of the project.

For determination of catchment areas and intensity of precipitation of stormwater system are been used calculations and technical documents valid in Macedonia.

The technical design is in line with the positive regulation, i.e. all applicable laws, secondary legislation and civil engineering and urban-planning standards in the area of streets and stormwater systems. It is worth mentioning that the municipality Zelino has proposed the construction of stormwater and reconstruction of these streets as of its utmost priority based on public hearings and various complaints with the citizens. The various benefits of the implementation of the project are elaborated in the subsequent chapters of the PAD.