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EU PROJECT COMMAND d

Commanding and Operations Mechanism for Multisector Analysis of Nexus Disaster Data

Union Civil Protection Mechanism

TECHNICAL REVIEW/NEEDS ASSESSMENT FOR NORTH MACEDONIA



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1. INTRODUCTORY

COMMAND d is a project devised to help support operations command centre be prepared for disasters at a local level. The results of the project will facilitate and accelerate data reception, GIS analysis/ simulation of developments, and emergency data transfer. Standard operating procedures in crisis situations will be established within the project, which will increase preparedness and enable all participants in the project to connect through a common IT platform.

The aim of the project

Developing system, i.e. an IT platform, which will have the ability to collect, analyse and exchange all data relevant for successful disaster preparedness and emergencies at the local level. The mentioned data will be collected in a common IT entity at the level of all partners, and will be collected from 112 centres, fire services, emergency medical services, water agencies and other sources. The mentioned data will be used for risk assessment and GIS simulation.

Partners in the project:

Coordinator: Zagrebacka County - Croatia.

Partners: Municipality of Tirana - Albania, City of Tuzla - Bosnia and Herzegovina, City of Skopje - Northern Macedonia and Capital City of Podgorica - Montenegro.



1. LEGISLATIVE AND PLANNING FRAMEWORK

a) Introduction

Natural disasters, risks and dangers from modern technologies and global climate changes, often cause great consequences for people and the environment, takes over areas of several countries and even continents. Consequently, in dealing with the consequences, states have become interdependent to undertake a joint coordinated response. For those reasons, the countries in the world decided on a new approach in protection and rescue, in which the partnership for building a more secure world based on common interest and sharing responsibility for saving human lives, through the transfer of technology and the exchange of information and a joint approach in prevention activities and reduction of consequences is a priority of every government.

The government of the Republic of N. Macedonia unreservedly supported and joined this processes.

The protection and rescue of people, the environment, material goods, natural resources, animal and plant life and cultural heritage from natural disasters and other accidents in peace, state of emergency and war in the Republic of N. Macedonia are regulated by the Law on Protection and Rescue and how unique protection and rescue system.

The protection and rescue system is a connected process of successive and interrelated activities namely: prevention, reduction of consequences, preparedness, response and recovery, which are properly processed and represented in all segments and phases of planning and response at local, national, regional and international level.

Investing in prevention and preparedness will multiply the consequences and resources needed for response and recovery.

City of Skopje

City of Skopje - the capital and largest city in Macedonia; it is also the administrative, political, economic, cultural, educational and academic centre. It is located in the northern part of the country, in the centre of the Balkan Peninsula, and on the upper course of Vardar River.

City of Skopje is located at 21° 26' longitude and 42° latitude. Skopje is approximately 245 m above sea level. It stretches on 1,818 km², 9 km width (Vodno – Radisani) and 23 km length (Dracevo – Gjorce Petrov). The city area surface is 225km².



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There are 10 municipalities in the City of Skopje: Aerodrom, Butel, Gazi Baba, Gjorce Petrov, Karpos, Kisela Voda, Saraj, Centar, Cair and Suto Orizari. According to the number of inhabitants, Aerodrom is the largest municipality with 98,382 inhabitants and the smallest is Suto Orizari with 17,357 inhabitants. According to the surface, Saraj is the largest municipality in the City of Skopje with surface of 229 km², and the smallest is Cair with surface of 3.5 km².



Photo 1: Skopje region

City of Skopje, unlike any other local self-government unit in Republic of N. Macedonia, stretches to the areas of municipalities of the City of Skopje.

The city area consists of the areas of the municipalities as follows:

- Aerodrom
- Butel
- Gazi Baba
- Gjorce Petrov
- Karpos
- Kisela Voda
- Saraj
- Centar
- Cair
- Suto Orizari

within the borders stipulated with the Law on the City of Skopje (“Official Gazette of RM” no. 55/04). The ratio between the City and the municipalities in the City of Skopje is stipulated with the Law on the City of Skopje. The Law precisely defines the areas and borders of all municipalities in the City.



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Climate characteristics

The geographical location and orographic features are the main modifiers of the climate in Skopje. The city of Skopje belongs to an area that is influenced by the continental Mediterranean climate. This is where the influences of the continental climate from the north and the Mediterranean climate from the south collide. The main characteristics of this area are harsh and wet winters and dry and hot summers, which are characterized by a large annual fluctuation of the absolute extreme temperatures and increased annual fluctuation of the average monthly temperatures. The average annual air temperature is 12.7C, the average annual maximum temperature is 18.2C, and the minimum is 6C. The coldest month is January with an average temperature of 0.8C, slightly warmer is December, and even warmer is February with 3.2C. In all three winter months, the average minimum temperature is below zero (December -1.9C, February -3.7C). The warmest months are July (24.3C) and August (23.7C), and the highest maximum temperature of 43.4C was registered on 24.07.2007. Air temperatures above 40C are in July and August, above 35C in the period from June to September, and above 30C from March to October.

Winds

In the Skopje valley, the directions of the winds from the north, north - east direction and the winds from the south - east direction are the most frequent. But the orographic conditions have a great influence on the wind directions. In the open eastern part of the Skopje valley, the wind regime is quite different from the city part of the valley. The winds from the north are the most common and they move with an average speed of 3.9 m/s. It is most intense in July with an average speed of 4.6 m/s, and is weakest in May with an average speed of 1.8 m/s. Second in frequency is the wind from the north-east with an average speed of 3.3 m/s. It is present in all months of the year, but is most frequent in March with an average monthly speed of 3.1 m/s. It is least in the months of October and November and if there is one it moves at an average speed of 3.3 m/s. The third most frequent in this part of the valley is the south-east wind which has an average annual speed of 3.3 m/s to 3.5 m/s. Only in July, August and September it has an average speed of 2.2 m/s.

The following can be concluded about the wind regime in the Skopje Valley:

- The eastern part of the valley is quite windy, significantly more than the city part. North and northeast winds prevail, the frequency of which is more pronounced in the summer approach, bringing warm and dry continental air, which increases the evaporation from the soil and vegetation in the valley.



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- A long cold period conditions a long heating season (6 months) which increases the load with atmospheric pollutants, and in the period November-January there is stagnation of air masses and temperature inversions that increase atmospheric pollution.

Sunshine, cloudiness and fog

The average annual amount of sunshine in hours is 2114.0 hours at the measuring point Star Aerodrom and 2083.9 hours at the measuring point Aerodrom Petrovec. The summer months of July and August are the sunniest with 317.6 and 308.4 hours, respectively. In December and January there are 57.0 and 65.0 hours of average monthly sunshine, respectively. The annual amounts of sunshine vary from 1904.2 hours (1951) to 2295.8 hours (1961). The measured average daily energy value of solar radiation on a horizontal surface is 4000 Wh/m². The average annual rainfall is 515 mm. The average monthly precipitation variations reach a maximum in May and November / December, while the lowest are in January/February and August. The dry period lasts from July to September, often with a continuous duration of more than 60 days. Heavy rainfall is common in the valley, especially during the warmer periods of the year. The wettest year is 2014 with a total annual rainfall of 782.9 mm, while the driest year is 2000 with 296.4 mm. The amount of precipitation is low during the warmer period of the year (vegetation period), when water consumption for the sectors identified as main consumers is highest. According to the drought index proposed by De Martonne, the majority of years can be classified as having the characteristics of a dry and semi-dry climate. Also of great importance is the declining trend in the annual values of the De Martonne index, which presents the trend of increasing drought in the region. The average annual humidity in SkopjePetrovec is 70%, while in Skopje-Zajcev Rid 68%. In November, December and January, the average monthly multiyear value of humidity is the same in the entire Skopje Valley, while in other months of the year the average relative humidity is 1 to 3% lower in Skopje-Zajcev Rid compared to Skopje-Petrovec. There is a certain difference in the relative humidity between the urban environment of Skopje and its surroundings. This is especially pronounced during the summer months when there is a noticeable difference between the urban environment and the non-urban area, as well as their impact on humidity. The Skopje Valley is a specific area with fog and temperature inversions. In such weather conditions, air pollution increases. The largest number of foggy days in the year is observed at the site Star Aerodrom and is 81 days, which is much more compared to other sites in the Skopje Valley (Petrovec 29, Trubarevo 32, Dracevo 18 days). In December, fog usually appears, on average after 18 days, which is more than half of the month. The situation is similar with January, when there



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is fog after 16 days and November after 14 days. The Skopje Valley is very sunny - the total value of sunshine is 2136 hours. The average number of clear days during the year is 86, cloudy days 184, and gloomy days 95. The relative humidity is 70%.

Precipitation

The heaviest rainfall occurs in May and October. The lowest values are registered in February and July. The average annual amount of precipitation (1951-2010) ranges from 497.5 mm in the plain part to about 700 mm in the highest parts of Vodno and the low slopes of SCG. During the warm period of the year, there is an occurrence of short-term intense (heavy) rains as it was in August 2016 when it caused a disaster. Droughts are also characteristic, with values below 400 mm measured several times, with extremes in 2000 (297.7 mm).

Demographic characteristics

According to the population and household census of 2002, 506.926 inhabitants lived in the city of Skopje, of which 249.689 (49.2%) were men and 257.237 (50.8%) were women. In the Skopje region according to the 2022 census has population of total 571.040 inhabitants and according to the criteria for a young population aged 0-19 years (participation of about 27.9%) and for the elderly population over 65 (participation of 14.7%), and according to the established average age of the population of 36 years, it is in the stage of demographic aging. The population density is 337.8 inhabitants per km² and is the most densely populated region in the country. There are total of 146.566 households in the City of Skopje, with an average of 3.09 members in one households and a total of 163.745 individual housing units.

b) Legislation

The civil protection system in the Republic of N. Macedonia as well as the activities of participants in the civil protection system are determined by a number of laws and bylaws as follows:

- Constitution of Republic of N. Macedonia (article no.125,126,127 128)
- Law for crisis management (Official Gazette of the Republic of Macedonia no. 29/2005, 36/11, 41/14 and 104/15, 39/16 and 83/18)
- Law for protection and rescue (Official Gazette of the Republic of Macedonia no. 136)
- Law for firefighting (Official Gazette of the Republic of Macedonia, no.168)
- Defense Law (Official Gazette of the Republic of Macedonia no.185),



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- Forest Law (Official Gazette of the Republic of Macedonia no.47/97),
- National Platform for reduction of risks from disasters ,
- Rulebook for the training program for the manager of a fire extinguishing operation and rescue of people and property, as well as the composition of the committee for passing the professional exam for the manager of the fire extinguishing operation and saving people and property (Official Gazette of the Republic of Macedonia no.87/06)
- Rulebook of the method for determining the places for fire protection devices and installations, other firefighting equipment, such as means of extinguishing fire and fire extinguishers, their maintenance in proper condition, special marking and availability to use (Official Gazette of the Republic of Macedonia no.74/06)
- Rulebook on the form and content of the identification form of the leader of the fire fighting operation, the method of its issuance and the method of keeping records of the issued identifications (Official Gazette of the Republic of Macedonia no.75/06)
- Rulebook for the form of the forms, the way of keeping the records of the fires, explosions, fire extinguishing interventions and other events (Official Gazette of the Republic of Macedonia no.60/06)
- Rulebook for the content and method of conducting self-defense training in educational institutions (Official Gazette of the Republic of Macedonia no.48/06)
- Rulebook for formations, ranks, as well as rank insignia in firefighting units (Official Gazette of the Republic of Macedonia no.32/06)
- Rulebook on the rules for performing the service, as well as the minimum criteria for accommodation, technical equipment and means for extinguishing fires that the firefighting units should have (Official Gazette of the Republic of Macedonia no.19/06)
- Rulebook of the type and appearance of the uniform, the type of protective equipment and the method of checking and testing its correctness (Official Gazette of the Republic of Macedonia no.141/20)
- Rulebook for implementation of the training of seasonal firefighters (Official Gazette of the Republic of Macedonia no.19/06)

c) Planning documents

In accordance with the provisions of the Law for protection e rescue, the following planning documents are in force in the City of Skopje:

- Assessment of the impact of the City of Skopje on natural disasters and other accidents



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- Plan for protection and rescue of the City of Skopje from natural disasters and other accidents
- Annual action plan for protection and rescue



d) Disaster Risks

Floods

According to the characteristics of the territory and hydrography, the area of the city of Skopje is exposed to floods caused by the overflow of the river flows, primarily the river Vardar, as well as Lepenec, Markova reka and Treska; torrential watercourses from the Vodno mountain, elevated level of underground water, floods from the high level of water in the atmospheric or sewage network, as well as floods caused by the collapse or overflow of the Matka, Sv.Petka and Kozjak dams.

Catastrophic floods that would cause river beds to overflow are the result of heavy rainfall in the entire catchment area of the Vardar River, that is, when the amount of rainfall would be 80-100mm in a 24 hour period. In case of the occurrence of large waters and the current construction of the water protection facilities, about 8.730 ha would be flooded at $Q=1200\text{m}^3/\text{sec}$. In this area there are mainly agricultural land and part of the urban settlements, as well as rural settlements in the plain parts.

The following neighbourhoods would be affected by flooding: G.Petrov 1, neighbourhood Hrom, Hrom, Dolno Lisiche, Center of the city, Madzari, Hippodrom, Gazi Baba industrial zone, village Ognjanci, village Rzanicino and most of Skopsko pole. The floods caused by the spilling of the tributaries of the Vardar River will be of a local nature and smaller arable agricultural areas, meadows and uncultivated land as well as individual buildings would be threatened by these spills.

Flash floods are the next source of danger that threatens the central city area. On mount Vodno, 4 torrents are registered (Martino Brdo, Murtinec, Kisela Voda and Pripor), while in the wider Skopje region, 134 torrents are registered, which are grouped into 7 torrent series (Vodnjanska, Markova reka, Zelenikovska, G.Petrov, lower course of the river Lepenec, Skopska Cvrna Gora and lower course of the river Pcinja). Some of these torrential flows, especially those that attack the urban area, have been regulated and the significantly larger number of torrential flows are in need of their regulation. The parts of the wider city area that gravitate towards them are exposed to the flash floods from the Vodno torrents. Flash floods are expected to increase in frequency due to the climate change and frequent heavy and short-term torrential rains, as well as due to inadequate planning and urbanization of settlements, illegal construction and irregular and insufficient maintenance.



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Urban floods in the urban area are also caused by the excess of water in the atmospheric or fecal sewage network, which penetrates as surface water due to the inadequate drainage of surface water, the lack of urban greenery or the insufficient capacity of the system. In addition to causing flooding of urban areas, these floods often disrupt traffic and passability through streets due to flooding of underpasses or critical areas.

Dam failure floods are the least likely to occur, but are still part of the flood hazard profile. In order to defend against floods, the City of Skopje has since the seventies of the last century started implementing measures and works, such as the regulation of riverbeds throughout the urban areas, especially the Vardar river throughout the wider area of the city, regulation of torrents, construction of drainage channels across the Skopje field, as well as afforestation of Vodno and other locations to prevent erosion, landslides and drifts.

So far, the floods have caused loss of human lives and great damage to facilities – residential houses, buildings, and infrastructure – roads, streets, bridges, culverts, sewers and agriculture land.

Table 1 shows the participants of civil protection measures and implementation of operational tasks. Participants and operational forces are invited according to the order and needs of the situation on the ground.



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Table 1. Overview of flood tasks and responsible operational forces and participants

No.	TASK (CIVIL PROTECTION MEASURE)	Participants
1.	Organization of implementation of obligations from the Plan for protection and rescue from catastrophes and accidents	Crisis headquarters of the City of Skopje with all capacities, if necessary, crisis headquarters at the national level with necessary capacities from national institutions (for example, Directorate for Protection and Rescue, Crisis Management Center)
2.	Organization and review of the obligations of participants and operational forces of the civil protection system to be involved in flood defence	Directorate for Protection and Rescue, Crisis Management Center, Ministry of Health, Local Self-Government, Red Cross
3.	Principles for protection of endangered critical infrastructure facilities and obligations of critical infrastructure owners	Don't have critical infrastructure law
4.	Organization of other civil protection measures during the response of the civil protection system in floods (including evacuation and disposal)	Directorate for Protection and Rescue, Crisis Management Center, Ministry of Health, Local Self-Government, Red Cross, Trade companies with mechanization
5.	Regulation of traffic	Ministry of Internal Affairs



Earthquakes

City of Skopje belongs to the Vardar seismic zone, where the epicentral area is the most affected by the destructive earthquake effects with the magnitude being from 8 to 9 degrees on the Mercalli scale and the depth of the hypocenters from 2 to 12km. The zone with 8 degrees is located on the side parts of the Skopje basin and the zone with 9 degrees is located in the central part.

Given the seismic characteristics, the city is expected to be affected by future earthquakes whose magnitude cannot be predicted, but the return period of the 1963 earthquake is thought to be in 200 years. Catastrophic earthquakes would threaten the population, facilities and material goods they have, especially in the urban part of the City of Skopje. According to the State Statistics Office, census 2022, 66.125 buildings were built on the territory of Skopje of which 7.1% or 10.935 are considered depreciated apartments (built before 1945 or in the period 1945-1960). The most at risk is the population in the municipality of Centar with around 45.929 inhabitants or 9% of the total population of the City of Skopje.

So far, there have been fatal consequences of an earthquake and the destruction of critical infrastructure, so the same effects are expected in the future. When a catastrophic earthquake occurs, it is to be expected that there will be spillover effects from it and cause subsequent dangers such as floods, fires, technical-technological accidents, infectious diseases, water and soil pollutions etc. Also, as a consequence would be the effect on socio-economic and sustainable development.

Earthquakes in the past

- 518 year – Skupi was destroyed and the earthquake had a strength of 10/11 degrees;
- 1555 year – Catastrophic earthquake;
- 26.07.1963 – 9 degrees according to the Mercalli scale, 200.000 affected citizens, 1070 victims (470 men, 430 women and 170 children), and 3.300 injured. Damage of 15% from the GDP of former Yugoslavia or between 3 and 5 billion USD. 85% of the national wealth of the city was destroyed (infrastructure, industry, housing stock etc)
- 11-14.09.2016 – over twenty earthquakes, the strongest of which was 4.1 degrees. About 50 citizens were injured, damage of 10 million USD.



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Table 2 shows the participants of response and priority tasks in the implementation of civil earthquake protection measures, where each group of bearers has certain tasks and duties and implements civil protection measures in the protection of endangered and injured population, property and the environment.

Table 2. Overview of earthquake tasks and responsible operational forces and participants

No.	TASK (CIVIL PROTECTION MEASURE)	Participants
1.	Organization of rescue and clearing, tasks of participants and operational forces of civil protection that have the capacity to rescue from the ruins at all levels of the system and other information relevant to the operational activities	Crisis Management Center, Territorial Fire Brigade, Ministry of Health, Emergency medical assistance service, special units of the Ministry of Internal Affairs, Directorate for Protection and Rescue and Army of the Republic of N. Macedonia
2.	Organization of protection of critical infrastructure facilities and cooperation with legal entities in order to ensure the continuity of their activities	Ministry of Internal Affairs, Army of the Republic of N. Macedonia, Territorial Fire Brigade, Local Self-Government
3.	Firefighting organization (holders, tasks, competencies and coordination)	Territorial Fire Brigade
4.	Organization of traffic regulation	Ministry of Internal Affairs
5.	Organization of providing medical assistance and medical care	Ministry of Health, Emergency medical assistance service, if needed teams from the private hospitals, Red Cross
6.	Organization of veterinary care	Food and Veterinary Agency
7.	Organization of evacuation	Directorate for Protection and Rescue, Crisis Management Center, Ministry of Internal Affairs, Local Self-Government, Territorial Fire Brigade
8.	Organization of rescue and evacuation of vulnerable groups	Ministry of Labour and Social Policy
9.	Organization of shelter	Directorate for Protection and Rescue
10.	Organization of human sanitation and identification of the dead	State Sanitary and Health Inspectorate, Institute of Public Health, Institute of Forensic Medicine by warrant from prosecution
11.	Organization of hygienic-epidemiological protection	State Sanitary and Health Inspectorate, Institute of Public Health,
12.	Organization of providing food and drinking water	Red Cross, Local Self-Government through public enterprises for water supply, Directorate for Protection and Rescue
13.	Organization of the public information center	Crisis Management Center, National TV and radio
14.	The organization for receiving aid	Red Cross, Local Self-Government, Territorial Fire Brigade
15.	Organization of psychological assistance	Ministry of Health, Ministry of Labour and Social Policy

Epidemics and pandemics

Epidemics of quarantine and other infectious in humans and animals had occurred in the area of the city of Skopje in the past, and there is possibility that will occur in the coming period as well and cause harm to people and animals. Infectious diseases that can appear in the area of the City of Skopje are: salmonella, dysentery, enterocolitis, acute hepatitis (A,B,C,D), meningitis, strep throat, brucellosis, tuberculosis, ascarlatina, influenza (seasonal, avian AH1N1), HIV/AIDS and other diseases. Until 2021, a regular occurrence was the seasonal flu epidemic with the number of patients always exceeding 1.000. Since February 2020, the area of the City of Skopje has been affected by COVID-19, causing health, economic, educational, social and other consequences for the population and economy. Responsible for coordination is the Ministry of Health and health institutions in coordination with institutions and bodies that are responsible in these conditions.

Table 3 shows the participants in the implementation of civil protection measures in epidemics and pandemics.

Table 3. participants in the implementation of civil protection measures in epidemics and pandemics.

No.	TASK (CIVIL PROTECTION MEASURE)	Participants
1.	Organization of preventive measures for cases of epidemics, episodes, plant diseases.	Ministry of Health, Institute of Public Health, Veterinary stations
2.	Organization of implementation of curative measures in case of epidemics, episodes and plant diseases	Ministry of Health, Institute of Public Health, Ministry of Internal Affairs, Veterinary stations
3.	Organization of participation and involvement of additional operational forces and holders in the implementation of measures ordered by the competent services	Crisis Management Center, Directorate for Protection and Rescue, Local Self-Government
4.	Organization of the implementation of sanitation with an overview of legal entities that can provide forces and resources for sanitation	National Government, Local Self-Government
5.	Accidents at waste management facilities	Local Self-Government, Institute of Public Health



Fires

In the area of the City of Skopje, fires in the open air (forest fires) and fires in buildings are characteristic. The reasons for their occurrence are different from the human factor as the most present. So far, the fires have not caused significant damage to the key infrastructure or disturbed the work of the subjects, but they represent a great threat to the forest fund in the region. Due to the forest fires, no epidemics of infections and diseases among the population have been registered so far, but in addition to the destruction of forests and illegal logging, it is also the reason for appearance of diseases in plants such as Pine chetnic (*Thaumatococcus panyocampa*) and Pine sawfly (*pilarka*) (*Diprion pini*). In the period from 2008 to 2014 there were 8.081 fires. Out of the total number of fires, 4.333 or 53% were fires affected agricultural lands, forests, stubbles, wild dums etc. With 3.160 or 39%, various objects were affected, 560 fires or 7% affected vehicles, and with 120 or 1 % other objects (firewood, hay, fodder, etc).

From the total area of forests (76.171 ha), economic forests dominate, which are represented on 62.993 ha and are included in ten forest-economic units on the slopes of the mountains Skopska Crna Gora, Karadzica, Zeden and Suva Gora. PE "Makedonski sumi" – department Karadzica Skopje in the period 2003 -2012, 273 fires occurred in that scope on a total burnt area of 8.264 ha. The most endangered in this area is the population of the municipalities in the City of Skopje: Gazi Baba, Chair, Butel, Kisela Voda and Karposh, as well as the municipalities Petrovec and Ilinden with 15.278 individual residential buildings and the Thessaloniki – Skopje oil pipeline to OKTA refinery. The second most represented category of forests are forests with special purpose ie. forest and hunting reserves (Forest Reserve "Jasen") on an area of 16.560 ha.

The third category is the park forest (on mountain Vodno and the forests in the spring zone of the Rasche spring). Fires in the area can cause consequences for many building and sites protected as natural heritage, monuments, memorial units, religious buildings, archa eological sites and critical infrastructure. Forest fires can also cause traffic probleblems on individual local road routes and short sections to neighboring villages, endanger parts of the railway, as well as cause air and environmental pollution.

Forest fires in more than 90% of cases occur in the priod June-September, when outside temperatures are the highest and when human activities in or near them are most intese. So far, the fires have not caused significant human losses, significant damage to the key infrastructure and the functioning of entities. The disaster risk reduction approach system



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at the local level has sufficient capacity for prevention and early warning, but weak equipment.

Forests under the authority of the City of Skopje: maintained, arranged and protected by the PE "Parkovi i Zelenilo" – Skopje:

-Park Forest Vodno – 4.573 ha

- Park Forest Gazi Baba – 105 ha

-Franch cemetery – 7 ha

Zajcev Rid (Hill) – 5 ha.

Table 4 shows the participants in the implementation of civil protection measures in fires.

No.	TASK (CIVIL PROTECTION MEASURE)	Participants
1.	Development of fire protection and rescue plans; inspection supervision; issuance of fire protection consent for the construction of structures (construction, reconstruction, legalization, fitting, equipping, conversion, etc.) on investment project documentation (elaborations or fire protection project);	Directorate for Protection and Rescue, City of Skopje and Local Self-Government (municipalities), state own forest holdings
2.	Regular maintenance and servicing of all postal, telegraph, telephone, electrical, ventilation, gas, lightning protection and other installations and devices, as well as chimneys, in compliance with the prescribed technical norms and mandatory standards, as well as manufacturer's instructions, for which there must be documentation	Owners of installations, authorized services
3.	Ensure that employees, according to a specially established program, become familiar with the dangers of fire related to the jobs and tasks to which they are assigned, as well as with measures and means for extinguishing fires, practical use of hand-held appliances, devices, equipment and fire- extinguishing means; it is mandatory to check the knowledge of employees at least once a year;	Law for safety and health at work, trainings for local administration employees and licensed persons
4.	It is the obligation to determine measures related to the implementation and improvement of fire protection by a general act, to designate a responsible person who is obliged to take care of the implementation of fire protection measures and to ensure that that person is professionally qualified for the successful performance of protection tasks from fire	Directorate for Protection and Rescue approves (elaborate on protection against fires and explosions), certificate for a professional fire-fighter rescue
5.	Organization of management and coordination of firefighting actions; use of modern equipment and means for extinguishing fires; engagement of operational units; provision of first aid to the injured; evacuation of endangered and injured citizens; protection and rescue of animals; saving plants and plant products; creation of	Directorate for Protection and Rescue, Territorial Fire Brigade, Local Self-Government, Emergency medical assistance service, Ministry of Internal Affairs



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	conditions for quick intervention of protection and rescue services, etc.	
6.	Conduct a fire damage assessment; carry out felling and removal of burned trees, cleaning and preparation of areas for afforestation; development of new afforestation plans; provision of seedlings and afforestation.	Damage assessment commission at local or national level, Local Self-Government, PE Macedonian forest

Erosion and landslides

The most erosive municipalities in the region are Saraj ($Z = 0.53$), Gjorce Petrov ($Z = 0.44$), Aracinovo ($Z = 0.42$), while Aerodrom, Centar, Chair and Shuto Orizari have the lowest value of the erosion coefficient. In the City of Skopje 13 landslides are registered and 31 in other municipalities. Some of these landslides are located on natural slopes, some on artificial slopes (roads). Those on the roads are arranged with appropriate measures, while others are not arranged. In the Skopje region 5.874 ha of erosive areas (EA) and 36.332 ha of areas threatened by erosion (AEI) have been delineated of which in the city of Skopje (EA = 4.355 ha, AEE = 16.026 ha). The municipalities with the largest “erosion areas” are Saraj (2.725 ha), Gjorce Petrov (1.109 ha), Petrovec (577 ha), Studenichani (415 ha), Gazi Baba (295 ha) and Sopshte (244 ha). Municipalities with the largest area at risk of erosion (EA+AEE) in the city of Skopje are: Saraj 6.959 ha, a total of 12% of the territory, Gazi Baba – (3.441 ha), Gjorce Petrov (2.857 ha) and Butel (2.561 ha). Municipalities with the largest area of erosion (EA+AEE) from the Skopje region are: Cucer Sandevo, Studenichani and Petrovec.

Table 5 shows the participants in the implementation of civil protection measures in erosion and landslides.

Table 5. participants in the implementation of civil protection measures in erosion and landslides

No.	TASK (CIVIL PROTECTION MEASURE)	Participants
1.	Organization of rescue and sanitation, tasks of participants and operational protection and rescue forces that have the capacity to rescue from the rubble at all levels of the system and other information relevant for the operational activities of the Civil Protection Headquarters	Directorate for Protection and Rescue, Crisis Management Center, Crisis headquarters of the local self-government, Ministry of Internal Affairs и Army of the Republic of N. Macedonia – special units, Territorial Fire Brigade, Emergency medical assistance service
2.	Organization of protection of critical facilities infrastructure and cooperation with the legal entities with the aim of ensuring the continuity of their activities	Ministry of Internal Affairs
3.	Firefighting organization (implementers, tasks, responsibilities and coordination)	Directorate for Protection and Rescue, Territorial Fire Brigade
4.	Organization of traffic	Ministry of Internal Affairs
5.	Organization of medical care	Ministry of Health
6.	Organization of veterinary care	Directorate for Food and Veterinary
7.	Organization of evacuation	Directorate for Protection and Rescue, Local Self-Government
8.	Organization of rescue and evacuation of vulnerable groups	Ministry of Labour and Social Policy
9.	Organization of care	Directorate for Protection and Rescue



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2. ORGANIZATION AT THE LOCAL LEVEL

Measures and activities in the civil protection system in the City of Skopje are implemented by the following operational forces of the civil protection system:

- Territorial Fire Brigade of the City of Skopje
- Red Cross of the City of Skopje
- Department of Internal Affairs of Skopje – DIA - Skopje
- Directorate for protection and Rescue
- City headquarters for protection and rescue (Spatial forces of the City of Skopje).

Territorial Fire Brigade of the City of Skopje (Department for protection and rescue)

According to the Decision for the organization of the City administration one of the 20 departments is Department for protection and rescue divided in 2 units (year 2021):

- Unit for protection and rescue and administrative support of the Territorial Fire Brigade of the City of Skopje
- Territorial Fire Brigade of the City of Skopje

The Sector for Protection and Rescue/ Unit for protection and rescue and administrative support of the Territorial Fire Brigade of the City of Skopje have the following competencies:

- Performs activities in the field of protection and rescue, crisis management, defense and firefighting in accordance with the law
- Coordinates its work with other departments within the City of Skopje administration.
- Prepare City of Skopje Impact Assessment for Natural Disasters and Other Accidents and Plan for Protection and Rescue of the City of Skopje from Natural Disasters and Other Accidents;
- Prepares an annual action plan for protection and rescue, containing general normative assumptions for the implementation of the National Strategy for Protection and Rescue;



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- Determines the obligations of the public enterprises, institutions and services established by the City of Skopje to eliminate the consequences of natural disasters and other accidents;
- Proposes the amount of funds needed for protection and rescue from the budget of the City of Skopje;
- Prepares a Draft Decision for the establishment of City Staff for protection and rescue;
- Coordinates the activities of public enterprises and institutions established by the City of Skopje regarding protection and rescue and monitors their readiness to act in the event of natural disasters and other disasters;
- Proposes measures and activities to prevent the occurrence and elimination of the consequences of natural disasters and other accidents and proposes and performs activities related to the formation and preparedness of the protection and rescue forces and proposes their engagement, deployment of space forces or republics protection and rescue forces;
- Proposes distribution of humanitarian aid for the affected population in the City of Skopje;
- Monitor the implementation of actions to clear roads, streets and other infrastructure facilities in the event of natural disasters and other accidents;
- Coordinates the activities in the area of protection and rescue with the municipalities in the area of the City of Skopje and proposes directions on which the municipalities in the area of the City of Skopje are obliged to act;
- Performs expert processing of issues relevant to the application of legal provisions, prepares theses for drafting regulations, general acts and information-analytical materials, prepares draft decisions and other regulations, programs and other acts, analyzes, information and other materials, expert-analytical and other materials for the committees of the City Council of Skopje;
- Market research and preparation of technical specification for conducting public procurement for the purposes of the BPPZ;
- Follow the regulations in the field of protection and rescue, firefighting and give advice to employees on their rights, obligations and responsibilities;
- Performing organizational-technical tasks related to the reception and arrangement of the Brigade Commander's post office and assisting in the performance of day-to-day duties;
- Prepares draft acts in the field of firefighting;



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Territorial Fire Brigade of the City of Skopje has the following competencies:

- Extinguishing fires in the area of the City of Skopje
- Removing the immediate danger of fire
- Saving lives of the citizens and protecting property threatened by fires and explosions
- Providing technical assistance in accidents and dangerous situations
- Performs unprofitable services for the purpose of improving the technical equipment and working conditions, which must not make it impossible or hinder the performance of the functions from the previous paragraphs of this paragraph
- Together with the territorial fire-fighting units of the municipalities in RNM determined by law, act as fire-fighting units of the Republic of N. Macedonia for operational actions in extinguishing large fires in the entire territory of the Republic of N. Macedonia
- Providing assistance when requested to extinguish fires in other countries
- Keeping special records for the fires, explosions, extinguishing interventions and interventions for other events according to a unique methodology and reporting to the Directorate for protection and rescue and City of Skopje
- Periodic testing and checking of the correctness of the firefighting equipment available to the Territorial Firefighting Unit
- Ongoing repair and maintenance of mechanics
- Providing fire protection for facilities, delegations, public gathering, sports and other events in coordination with the Ministry of Internal Affairs
- Conducts training in the field of fire protection for members of Army of the Republic of N.Macedonia
- Educating citizens about fire protection, through the media and the organization of other activities
- Territorial Fire Brigade of the City of Skopje has units in the following locations around the city: Taftalidze, Gjorce Petrov, Drachevo and Bit Pazar.
- On the territory of the City of Skopje, three voluntary fire fighting societies have been formed: Kouzon, Chair and Lisiche as well as Union of the Fire Fighting of the City of Skopje which is functioning and particularly active.



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Personnel:

- Department for protection and rescue

- Head of the Department – 1
- Deputy head of the Department -1

- Unit for protection and rescue and administrative support of the Territorial Fire Brigade of the City of Skopje

- Head of the Unit for protection and rescue and administrative support of the Territorial Fire Brigade of the City of Skopje – 0
- Counsellor for protection and rescue – 1
- Junior collaborator for protection and rescue – 2
- Junior collaborator for allocation of resources for protection and rescue – 1
- Independent officer- technical assistant to Brigade Commander - 1

- Territorial Fire Brigade of the City of Skopje

- Brigade Commander - 1
- Deputy Brigade Commander - 1
- Assistant Brigade Commander of the Development and Technique Brigade - 1
- Commander of company - 5
- Deputy Commander of company - 0
- Commander of unite - 23
- Leader of a group – driver - 1
- Leader of a group – 9
- Commander of Command Operations Center - 1
- Firemen – operator in COC – 6
- Platoon commander in the center Avtokomanda - 0
- Firemen - 95
- Firemen - electrician - 4
- Firemen – plumber - 0
- Firemen – driver of a special vehicles - 43



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- Firemen – driver of a special vehicles - auto electrician - 0
- Firemen – driver of a special vehicles - auto mechanic - 1
- Firemen – Fire service technician - 0
- Firemen – mechanical workshop manager - 0
- Firemen - Fire service manager - 1
- Firemen for logistic support - 6
- Firemen – car repairer - 0
- Firemen – warehouseman - 0
- Platoon commander in the subcenter Taftalidze - 0
- Platoon commander in the subcenter Gjorche Petrov - 0
- Platoon commander in the subcenter Bit Pazar - 1
- Platoon commander in the subcenter Drachevo - 1
- Platoon commander - 3
- Firemen – instructor - 0



Table 6: Overview of fire brigades - fire trucks and support vehicles

Vehicle	Model	Year and country of production	km
Firefighting vehicle	Bremash	2009 S.Korea	Unknown
Firefighting vehicle	Man 4912	1987 Germany	Not Working 83982
Firefighting vehicle	DAF FA LF 55	2009 Germany	19569
Firefighting vehicle	FAP 1620	1988 Ex Yu	Not Working 324
Firefighting vehicle	TAM 5500	1980 Ex Yu	Not Working 4346
Firefighting vehicle	Leyland-Snorkel	1973 England	Not Working 282
Support vehicle	Lada Niva	2010 Russia	No info
Support vehicle	Lada Niva	2003 Russia	74810
Support vehicle	TAM 75T5	1983 Ex Yu	Not Working 4553
Firefighting vehicle	TAM 170T	1983 Ex Yu	Not Working 198840
Firefighting/Support vehicle	Toyota Hill	2013 Japan	20378
Firefighting vehicle	DAF LF 45	2010 Germany	26064
Support vehicle	Lada Niva	2000 russia	55636
Support vehicle	Dacia Duster	2013 romania	67821
Firefighting vehicle	TAM	1988 Ex Yu	Not Working 20039
Firefighting vehicle	FAP 1616	1984 Ex Yu	Not Working 1928
Firefighting vehicle	DAF LF 45	2010 Germany	19830
Firefighting vehicle	FAP B7000	1982 Ex Yu	Not Working 4346
Firefighting vehicle	FAP	2000 Ex Yu	Not Working 28263



Firefighting vehicle	Mercedes	1981 Ex Yu	Not Working 29453
Firefighting vehicle	FAP 1620	1988 Ex Yu	Not Working 003574
Firefighting vehicle	Magirus	1976 Germany	Not Working 19575
Firefighting vehicle	TAM 170T	1986 Ex Yu	Not Working 74810
Firefighting vehicle	D.Benz	1985 Germany	Not Working 058847
Support vehicle	Lada Niva	Russia	58868
Firefighting vehicle	FAP	1983 Ex Yu	Not Working 5812
Firefighting vehicle	MAN 4912	1983 Germany	Not Working 63643
Firefighting vehicle	Fap	2001 Ex Yu	Not Working 44685
Firefighting vehicle	Fap B7000	1982 Ex Yu	Not Working 3460
Firefighting vehicle	IVECO	2021 Italy	562
Support vehicle	Mahindra Bolero	2009 India	70755
Firefighting vehicle	DAF FA LF 55	2009 Germany	19569
Firefighting vehicle	MAN TGM	2011 Germany	25810
Firefighting vehicle	FAP 2626	1991 Ex Yu	Not working 11044
Firefighting vehicle	Ford Tranzit	1990 USA	No info
Firefighting vehicle	Mercedes	1980 Germany	Not working 16637
Firefighting vehicle	Mercedes	1990 Germany	Not Working 17373
Firefighting vehicle	Mercedes	1999 Germany	Not Working 11306



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Firefighting vehicle	TAM	Ex Yu	Not Working 19195
Firefighting vehicle	TAM	1990 Ex Yu	Not working 38771
Firefighting vehicle	TAM	1977 Ex Yu	Not Working 26259
Support vehicle	Lada NIVA	2000 Russia	Not Working 107034
Support/Firefighting vehicle	Isuzu	2021 Japan	98
Support vehicle	Lada Niva	2003 Russia	82825
Firefighting vehicle	TAM	1995 Ex Yu	Not working 18491
Firefighting vehicle	Mercedes	1999 Germany	Not working 19569
Support vehicle	Lada Niva	Russia	79070
Firefighting vehicle	Fiat Dukato	1981 Italy	Not working 105643

Red Cross of the City of Skopje

Red Cross of the city of Skopje is a humanitarian organization that works to prevent and alleviate human suffering, protect life and health, improve social situation, ensuring respect and dignity for human being and especially in the case of accidents and disasters, promotes international humanitarian law and human values, encourages voluntary engagement and constant readiness to help, as well as a universal sense of solidarity and humanity. It is part of the system for prevention and response in case of disaster and within organization persons are trained as volunteers divided into 3 teams Team for disaster respons, Team for mountain rescue and Team for water rescue.

Department of Internal Affairs of Skopje – DIA – Skopje

In a crisis situation, the Ministry of Internal Affairs - Department of Internal Affairs of Skopje – DIA – Skopje in the area of protection of life, personal security, property of citizens and protecting national interests, engages the entire potential in human and material – technical means in joint coordination with the entities in the system. According to the Law on Internal Affairs, the protection of life, personal security and property of citizens is also considered as internal affairs. Within its competence, the Ministry provides expert assistance to citizens, legal



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entities and state authorities in the exercise of the prescribed rights and obligations, protection of life and personal security of citizens and property.

Directorate for Protection and Rescue

In order to carry out protection and rescue operations from natural disasters and other accidents, the Directorate for Protection and Rescue was founded as an independent body of the national administration. In realization of issues related with protection and rescue, Directorate implements the following tasks:

- Develops the Plan for protection and rescue from natural disasters and other accidents
- Prepares the Risk assessment from natural disasters and other accidents in cooperation with the competent authorities of the national administration
- Organizes and prepares the protection and rescue system
- Proposes measures for equipping and developing the protection and rescue system in the Republic
- ensures the functioning of the system for the prevention and detection of the occurrence and removal of the consequences of natural disasters and other accidents
- Ensures the timely engagement and efficient use of the Republic's protection and rescue forces and rapid response teams
- ensures full implementation of protection and rescue measures
- Ensures the realization of the strategic and mid-term goals for protection and rescue
- Participates in the filling and implementation of the mobilization of the national forces for protection and rescue
- Perceives the needs for development and equips the national forces for protection and rescue
- Ensures the materials reserves for the needs of protection and rescue
- Performs control and assessment of the readiness of the forces for protection and rescue
- Organizes and implements trainings for the needs of the protection and rescue
- Develops curricula and training programs for protection and rescue
- Plans and implements international cooperation in the field of protection and rescue
- Plans, organizes and ensures training activities and participation in collective protection and rescue system outside the territory of the Republic of N. Macedonia
- Develops professional guidelines in the field of protection and rescue
- Performs identification, assessment of hazards, their gradation and possible



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consequences

- Participates in the inspections of damages caused by natural disasters and other accidents
- Maintains a database of all sources of risks and dangers from natural disasters and other accidents
- Establishes norms and standards for the protection and rescue system in the Republic and performs other tasks established by law.

The Directorate is managed by a director and a deputy director who are elected and dismissed by the Government of the Republic of N. Macedonia for four years.

City headquarters for protection and rescue

The city headquarters coordinates activities in the field of protection and rescue in its area, and the municipalities of the City of Skopje are obliged to cooperate and act according to the directions of the City of Skopje. The commander is the Mayor of the City of Skopje.

Within its competences the City Headquarters for Protection and Rescue is established to coordinate protection and rescue activities in the area of the city of Skopje, in connection with natural disasters and other accidents.



Legal entities of interest to the civil protection system

Legal entities of interest to the civil protection system in the City of Skopje are:

- Municipalities in the City of Skopje (ELS)
- PE „Parkovi i zelenilo“
- PE „Gradski parking“
- PE „Ulici i patista“
- Public transport enterprise – „JSP Skopje“
- PE „Komunalna higijena“
- PE „Vodovod i kanalizacija“
- PE „Deponija Drisla“
- PE for welfare of stray animals „Lajka“
- Public health institution City General Hospital „8 –mi Septemvri“
- Center for Public Health – Skopje
- Emergency medical assistance (IMP) – Skopje
- National Forests – Karadzica Forestry (NF – KF) – Skopje
- PE for protection of the multi-purpose area – „Jasen“
- AD Vodostopanstvo of RNM – Skopsko pole – Skopje
- PE „Makedonija pat“ – Skopje branch
- Trade companies of special importance for work in a crisis situation in agreement with municipalities in the City of Skopje (ELS) – „Rule Tours“ – Skopje, „Zito Luks“ – Skopje, „Zito Skopje“ – Skopje, „Skopski Pazar“ – Skopje, „Fershped“ – Skopje, Veterinary Hospital – Skopje, „Mak stil“- Skopje, „Mital stil“ – Skopje, „Mak control“ – Skopje, „Butel“ – Skopje.

Also, within the broader segment of disaster risk reduction entities that are important for the area of the City of Skopje and which are listed in the assessment and planning documents in the response resources segment, 269 private health institutions from general medicine, 169 dental offices, 41 specialist organizations in gynecology, 73 specialist – consultative offices, 72 pharmacies, 4 private polyclinics, 2 diagnostic laboratories, about 40 PHI University clinics, specialized and general private hospitals, as well as veterinary offices.



3. SWOT ANALYSIS

The SWOT analysis aims to determine the Strengths, Weaknesses, Opportunities, and Threats for the City of Skopje civil protection system:

a. Strengths

- Favorable geographical position
- Good coordination at local and regional level
- Inter-municipal cooperation
- Adoption of strategic documentation
- Experienced and dedicated staff
- Experienced and trained resource
- Existence of good practices and lessons learned
- Positive track record of realized responses to disasters and crises
- Regional, national and international cooperation in this area
- Prepared basic estimates, program and planning documents
- Experience gained during the response to the COVID – 19 pandemic
- Existence of innovative practices
- Willingness to co-finance measures and activities to reduce disaster risks

b. Weaknesses

- Insufficient budget funding for the implementation of measures and activities for prevention, mitigation, preparedness, response and recovery from disaster
- Insufficient funding in the sustainability of critical infrastructure
 - Insufficient maintenance of the existing infrastructure for disaster prevention and mitigation
- Insufficient awareness raising
- Insufficient education and training of the population for protection and self-protection during disasters
- Lack of human and material-technical resources
- Insufficient investment in preventive measures and activities
- Specific arrangement of the City of Skopje vs. Local government within the cit



c. Opportunities

- The City of Skopje needs to be the entity that will be the first to provide prevention and the first to respond to crises and disasters
- Disaster risk reduction through strategic planning is rising higher on the city's agenda
- Realization of activities for sensitization of key interested parties at the local level to reduce risks and disasters
- Implementing nature-based solutions to reduce risks and disasters
- Implementation of measures and activities through regional or cross-border programs
- Establishing partnership and cooperation with the private sector for creating local policies and implementing activities to reduce disaster risks
- NGO's and civil society organizations are one of the key entities for community resilience to disasters

d. Threats

- Continuation of the COVID-19 and occurrence of future epidemics/pandemics
- Modification of the usual way of implementation of different activities as a result of the pandemic
- Impact of climate change
- Lack of financial resources for the implementation of measures and activities to reduce the risks of disasters
- The primary focus is on disaster preparedness and response rather than disaster prevention/mitigation
- Lack of plans for emergency situations and plan for functioning of the municipality in a disaster situation
- Inadequate urban planning
- Outflow of professional staff from the City and the entities of the system



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5. FINAL REMARKS

Considering the state of the civil protection system in the City of Skopje, taking into account the state of the operational forces, it can be concluded that:

- Territorial fire brigade of the City of Skopje – is the main operational resources for dealing with disasters, such as extinguishing fires, saving the lives of citizens and protecting property that is threatened by fires and explosions, providing technical assistance in accidents and dangerous situations and executing on other things in case of accidents and incidents. The City of Skopje within its capabilities provides the necessary conditions for a high-quality and technically expertly prepared fire protection unit, which will be able to act quickly and efficiently in the entire area of the City of Skopje, while in the some time is working on finding funds to renew the vehicle fleet (firetrucks and support vehicles).
- Red Cross of the City of Skopje – always ready with its teams of trained volunteers to get involved in dealing with detected disasters.
- Department of Internal Affairs of Skopje – DIA – Skopje is an indispensable partner in the part of safety and security.
- Directorate for protection and Rescue – organizes and prepares the protection and rescue system, works on development of strategic plans and risk assesment from natural disasaters and other accidents and proposes measures for equipping and developing the protection and rescue system in the Republic.
- City headquarters for protection and rescue - coordinates activities in the field of protection and rescue. In a situation of a crisis Mayor of the City of Skopje ensures coordination of the participants in the crisis management system in the territory of the city of Skopje (together with the mayors of the 10 municipalities that constitute the territory of the City of Skopje).