Appendix 1 Brief description of the priority recovery projects

1. **Reconstruction of a bridge on the Kocani – Zrnovci regional road, Municipality of Zrnovci**

The regional road R1309 provides a direct (and the shortest) link between two municipal centers – Zrnovci and Kocani. It also provides a direct link between Zrnovci and the A3/M5 regional road that connects the wider region of eastern Macedonia to the country’s capital.

The floods affecting this region caused major damages on this critically important 81.2-meter long bridge. Site inspections have revealed and documented these damages, verifying that bridge reconstruction is a particularly urgent need, because of the possibility of additional damages that would endanger its structural stability.

In addition to reconstruction needs, the existing technical documentation adequately treats the causes of the damages. For this purpose the rehabilitation projects also includes: a) improvement/stabilization of the riverbed and riverbanks; b) enhanced discharge/conveyance capacity; and c) better protection against erosion at the bridge’s foundations. These interventions are based on sound geodetic, geotechnical, hydrological, hydraulic and structural analyses.

2. **Reconstruction of a bridge on regional road R2346, Municipality of Delcevo**

The R2346 regional road is the only asphalt road/link between Razlovci and Trbotivishte, i.e., the municipal center Delchevo. It also provides a link to other municipal centers – Pehcevo, Berovo, Vinica – as well as to the A3/M5 regional road that connects the wider region of eastern Macedonia to the country’s capital.

The 2015 floods damaged a 62.8-meter long bridge located on this regional road. Site investigations showed that deformations in the bridge structure resulted from incision processes in the riverbed and banks. This has been caused by a change in the direction of the river flow upstream of the bridge. Erosion in the bridge’s foundations threaten its structural stability. Reconstruction works and control of causes of the damage are considered an urgent need if more significant damage and the possible collapse of the bridge is to be prevented.

The current technical documentation is based on a comprehensive set of geodetic, geotechnical, hydrological, hydraulic and structural analyses. Besides the necessary reconstruction works, this specifically analyses the erosion processes, proposing also adequate control measures.

3. **Reconstruction of a bridge/culvert on the regional road R2342, Municipality of Cesinovo – Oblesovo**

This project foresees reconstruction of a damaged bridge/culvert on the R2342 regional road. This road is the main connection between 10 villages and the municipal center of Cesinovo-Oblesovo. It is also a link to other municipal centers – Kochani, Probishtip and Shtip – as well as to the A3/M5 regional road that connects the wider region of eastern Macedonia to the country’s capital Skopje.

The old concrete culvert near the village of Sokolarci was completely destroyed by the floods. In order to allow traffic to flow again, the local community installed a temporary culvert (concrete pipe). The culvert discharge capacity of the temporary culvert is insufficient, reducing the flow of water and further exacerbating the risk of flooding and damages.

The project foresees reconstruction of the culvert (12.67 m long) with an adjusted discharge capacity based on the hydrological and hydraulic features of the riverbed. Besides introducing a better discharge capacity, the existing technical documentation includes stabilization of the erosion processes in the riverbed and banks. The entire technical documentation is based on comprehensive geodetic, geotechnical, hydrological and hydraulic analyses and field investigations.
4. **Stabilization of a landslide on the regional road R2236, Municipality of Probistip**

The floods activated a major landslide on the R2236 regional road on the territory of the Municipality of Probistip. This road connects the municipalities of Probistip and Sveti Nikole. It also joins the road to the municipality of Stip and helps these communities connect to the motorway to Skopje.

The technical documentation for this project includes rehabilitation of the damaged road, and most importantly stabilization of the activated landslide, along with number of preventive measures. The project would result in the same benefits as the previous three projects.

The rehabilitation of proposed transport infrastructure in the mandate of the municipalities of Mogila, Novaci, Sveti Nikole and Konce will commence as soon as the technical documentation is prepared, and the municipalities will be supported to develop it. The type of required interventions in these municipalities mainly include rehabilitation of priority damaged local roads, bridges and protective measures of smaller scale (drainage canals, culverts). Besides the rehabilitation, additional works will be designed and implemented to reinforce vulnerable infrastructure and address the causes of its damages (e.g., erosion processes and instability of terrain).

5. **Rehabilitation of local transport infrastructure in the Municipality of Novaci**

Considering the size of flood impacts on local infrastructure in the Municipality of Novaci, a complex set of interventions are required not only to restore existing infrastructure, but also to prevent its future damages from similar future events. Besides priority local roads in total length 2 km, there is a need of rehabilitating and upgrading existing flood control and other protective structures (e.g., retaining walls). Approximately 6 km long drainage network needs to be cleaned and restored to improve the protection of the priority local transport infrastructure.

6. **Rehabilitation of local transport infrastructure in the Municipality of Mogila**

The rehabilitation projects for the Municipality of Mogila are the most mature compared with the projects proposed by other municipalities. The technical documentation for the majority of interventions is already available that would enable prompt start of works, however, after an additional review and improvement as required. A local road network in total length of 8 km and accompanying protective measures will be rehabilitated with the EU funding.

7. **Rehabilitation of local transport infrastructure in the Municipality of Sveti Nikole**

The most significant intervention in the Municipality of Sveti Nikole will be the rehabilitation of a local bridge (15 m long), and a number of smaller repairs on existing road infrastructure. There is no technical documentation for the proposed rehabilitation projects. This will be provided in the project’s early stages. Special emphasis will be placed on the technical documentation for the bridge. It will include sound hydrological/hydraulic analyses as part of the analysis of causes of the damage. The newly constructed bridge will help reducing future flooding risks and prevent damage.

8. **Rehabilitation of local transport infrastructure in the Municipality of Konce**

A total of 6 km of road network needs to be rehabilitated in the Municipality of Konce. Wishing to provide immediate protection of the existing infrastructure against future floods, the Municipality of Konce already repaired part of existing drainage canals and culverts, in line with existing technical documentation of older date. All these interventions will be subject to expert review and adjustment in the design (if necessary), so as to ensure improved efficiency in the conveyance of flood waves and better protection of transport infrastructure.