

Serbia Floods Rehabilitation Support
EMERGENCY RECONSTRUCTION WORKS PROJECT
Flood Protection System „Mačva: Sava – Drina“,
West zone

ITEM No.	VOLUME IV: BILL OF QUANTITIES Work description	Unit	Quantity	Unit Price	TOTAL Without VAT
	EMERGENCY RECONSTRUCTION WORKS PROJECT Flood Protection System „Mačva: Sava – Drina“, West zone Section1: BANOVO BROD – SALAŠ CRNOBARSKI - right embankment of the Sava River km: 52+832 - km: 63+753				

A	PREPARATORY WORKS				
A-I	PREPARATORY WORKS FOR THE RECONSTRUCTION OF EMBANKMENT (EMBANKMENT AND SURROUNDING AREA)	Unit	Quantity	Unit Price	TOTAL Without VAT
1	FORMATION OF BUILDING SITE:				
1.1.	<p>Setting up and securing the construction site - providing space for the site at an approved location on: - CL 9110, 9111 and 9112, CM Crna Bara</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Costs of marking and securing the building site and work zone; - Costs of temporary occupation and use of locality for the building site; in case the contractor uses the area outside the boundaries of the said parcel; - Costs of using temporary infrastructure: electricity, water, sewerage, sanitary facilities, parking space for machinery, material and fuel storages. - Costs of restoration of all temporarily used surfaces. <p>The Contractor is liable for all damages that occur as a result of violation of the prescribed measures of protection of surfaces and facilities in the area of the building site.</p>				
	Calculation per construction site	Pcs	2	0.00	0.00
1.2.	<p>Maintaining and providing access roads along the embankment from river side (foreland) and from defended side during the works. width B ~ 3.5 m and L ~ 10920.34 m</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Cost of maintaining and construction of building site roads in the adjoining strip, during the delivery construction works; - Mechanical preparation of the existing road surface in the width of 3,5 m; - Stabilization by multiple bulldozer crossings. <p>The Contractor shall be liable for any damage due to violation of the limits of defined building plots.</p>				
	Calculation per m ²	m ²	76,445.00	0.00	0.00

	<p>GEODETICAL SURVEY TERRAIN WORKS - MARKING OF THE DESIGNED EMBANKMENT ROUTE Marking of the embankment, facilities, service roads and surrounding embankment area (on river side, on defended side of new embankment).</p> <p><u>Item covers</u> complete survey terrain works under the control of the Engineer:</p> <ul style="list-style-type: none"> - Renewal of geodetic alignment elements of the embankment route, roads and locations of objects on the route, marking boundaries and plots of the expropriated area, marking profile in accordance with the security profiles and renewed geodetic points; - Geodetic recording of control cross sections in the opening situation (designed route, by sections of the route with the transitional downstream and upstream sections at a length of 0.5 km, within the limits of the designed embankment with service roads and embankment area in the foreland of 50 m in width), distance of cross sections in accordance with the project at a maximum distance of 50 m, and in the zone pits at a maximum of 10 m; - Preparation of the Survey Technical Documentation of "0" terrain state, in electronic and paper form, in 3 copies. - Highlighting profiles in the field, with writing of profile numbers. <p>Contractor's geodetic recording of the initial situation is subject to a field control by the Engineer.</p>						
	Calculation per m ²	m ²	873,627.00	0.00			0.00
3	<p>FULL VEGETATION REMOVAL, IN THE ZONE OF WORK (designed area of embankment and service roads route, surrounding area on river side (width 15 m) and defended side (10 m) of the levee), depositing to a temporary landfill along the route of the floodplain.</p> <p>Wood mass must be properly cut, stamped graded (firewood and technical wood) and temporarily stored at the sites outside the work zone to a temporary landfill on the river side, and finally on the landfill on CP 5931 CM Drenovac, (distance 15 km).</p> <p>The most favorable schedule delay will be determined by the Engineer (with the prior consent of the PWMC "Srbijavode" as the Beneficiary)</p> <ul style="list-style-type: none"> - Application of fire protection measures <p>Ignition of wood mass is not allowed.</p> <p>Wood mass, properly cut, branded, classified and properly stacked on the previously approved site, belong to the Contractor.</p> <p>The Contractor is obliged to perform the cutting by hiring licensed cutters.</p> <p>Cleaning is done in accordance with the regulations for cutting timber.</p> <p>The Contractor shall take all necessary protective measures.</p> <p>Price shall include proper felling - removal of felled timber completely in a defined zone and according to given description</p> <p>The Contractor has the obligation to pay the prescribed fee for harvested wood.</p>						

3.1	<p>Cutting shrubs and removal of trees up to 7 cm in diameter from the work area on the defended side, completely:</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Combined (manual and mechanical) cutting of shrubs and trees up to 7 cm, with disposal to the side, grinding with the use of toppe for biomass; - Mechanical excavation and extraction of stumps with disposal to the side; - Removal, out of the work zone (loading and transport). <p>The calculation per set: for fully executed works in a defined work zone, on the basis of the situation on the terrain. <u>The estimated area of 45 ha.</u></p>				
	Calculation per set	set	1.00	0.00	0.00
3.2.	<p>Cutting and removal of stumps over 7cm in diameter from the work zone, in full:</p> <ul style="list-style-type: none"> - Machine stump extraction; - Disposal aside, loading, transportation and unloading of stumps and branches to the landfill up to 15.0 km distance on CP 5931 (stumps are disposed in a controlled manner, and the branches are to be meshed. <p>The calculation per set: for fully executed works in a defined work zone, on the basis of the situation on the terrain. <u>The estimated area of 45 ha.</u></p>				
	Calculation per set	set	1.00	0.00	0.00
3.3	<p>Removal of stumps and roots of cut-down trees</p> <p>The item covers:</p> <ul style="list-style-type: none"> - machine stump extraction, - loading, transportation and unloading of stumps and branches at the storage site up to 10 km distance, at CL 8477 and CL 5393 - Timber is at the Contractor's disposal - The calculation for total of executed works in the defined work zone, on the basis of inspection of the situation on the terrain. The estimated area of 45 ha. 				
	Calculation per set	set	1.00	0.00	0.00
3.4.	<p>Removal of vegetation from the land designated for landfills for disposal of surplus materials.</p> <ul style="list-style-type: none"> - Complete cleaning (fully) with direct disposal to a landfill on katastar lots No. 8477 and No. 5393 - The calculation for fully executed works in a defined zone of work, on the basis of the situation on the terrain. - The calculation for total of executed works in the defined work zone, on the basis of inspection of the situation on the terrain. Estimated area of 244 ha. 				
	Calculation per set	set	1.00	0.00	0.00

3.5.	<p>REMOVAL OF SAND BAGS FROM THE PROTECTED SLOPE (RESIDUALS FROM PROTECTION AGAINST FLOOD IN 2014).</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Uncovering a layer of earth above the sacks full of sand along the whole length of the embankment L = 10,920 m; - Mechanical removal of layers of sacks from the slope (3 m x 0,65 m³ / m ~ 2 m³ / m), and tossing them aside; - Removal and depositing, loading to a vehicle; - Transport to the landfill, up to 10 km CP No. 8477 k.o. Crne Bare and CP 5393 k.o. Salas Crnobarski, unloading, placing along the landfill, backfilling and re-cultivation of the landfill . <p>The calculation for the set of executed works in the defined work zone, on the basis of inspection of the situation on the terrain. The estimated area of 10.20 ha</p>				
	Calculation per set	set	1.00	0.00	0.00
3.6.	<p>Removal of layers of the existing asphalt road superstructure L = 35 cm and 4m in width, from the crest of the existing embankment (from km 61+390 to km 61+720)</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Mechanical and manual work on removal (70% -30%) - Loading to a vehicle and transport to the landfill up to 10 km; - Unloading, properly deposited . <p>The calculation per m³</p>				
	Calculation per m ³	m ³	535.00	0.00	0.00
SUMMARY A-I PRELIMINARY WORK FOR RECONSTRUCTION OF EMBANKMENT (EMBANKMENT AND SURROUNDING AREA)					0.00
A-II	PREPARATORY WORKS FOR CONSTRUCTION OF THE FLOOD DEFENSE ACCES ROADS L= 16,578 m'	Unit	Quantity	Unit Price	TOTAL Without VAT
1	<p>FORMATION OF BUILDING SITE: The application of prescribed traffic safety measures in the zone of contact between access roads to the construction site and categorized roads (13 locations).</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - registration, establishment, marking and maintenance of temporary horizontal and vertical signs and road markings in the contact zone with roads of higher order. <p>The calculation for a set of works will be done over the course of work</p>				
	Calculation per set	set	1.00	0.00	0.00

2.	<p>COMPLETE VEGETATION REMOVAL FROM THE ROADWAY STRIP OF ACCESS ROADS ALIGNMENT</p> <p>Wood mass with timber must be properly cut, stamped, graded (firewood and technical wood) and temporarily stored at a storage site along the floodplain, CM Crna Bara and CM Salaš Crnobarski in the river floodplain zone (the site is to be up to 10 km of distance). Ignition of wood mass is not allowed.</p> <p>Wood mass, properly cut, branded, classified and properly stacked on the previously approved site, belong to the Contractor.</p> <p>The Contractor is obliged to perform the cutting by hiring licensed cutters.</p> <p>The Contractor has the obligation to pay the prescribed fee for harvested wood.</p> <p>Cleaning is done in accordance with the regulations for cutting timber. The Contractor shall take all necessary protective measures.</p> <p>Price shall include proper felling - removal of felled timber completely in a defined zone and according to given description</p>				
2.1	<p>Cutting of shrubs and removal of trees up to 7 cm in diameter, completely (13 access roads) L= 16,578m'</p> <p>Item covers:</p> <ul style="list-style-type: none"> - Combined (manual and mechanical) cutting of shrubs and trees up to 7 cm, with disposal to the side, grinding with the use of topper for biomass; - Mechanical excavation and extraction of stumps with disposal to the side; - Removal, out of the work zone (loading and transportation to the secured landfill up to 15.0 km); - The calculation per set: for fully executed works in defined work zone, on the basis of the situation on the terrain <p>Estimated area of 58 ha</p>				
	Calculation per set	set	1.00	0.00	0.00
2.2	<p>Cutting and removal of trees over 7 cm in diameter from the work zone, completely (13 access roads) L=16,578 m':</p> <p>Item covers:</p> <ul style="list-style-type: none"> - Cutting trees, timber, shortening the length of the logs not less than L = 2.0 m; - Disposal aside, loading, transport and unloading of stumps and branches to the landfill up to 15.0 km distance (stumps are disposed in a controlled manner) - Machine stump extraction - Disposal aside, loading, transport and unloading of stumps and branches to the landfill up to 15.0 km distance at the storage site up to 15 km distance at CP 8477 and CP 5393 (stumps are disposed in a controlled manner, and the branches are to be meshed with application of protective measures); - The calculation per set: for fully executed works in defined work zone, on the basis of the situation on the terrain. Estimated area of 58 ha 				
	Calculation per set	set	1.00	0.00	0.00

2.3.	<p>Removal of stumps and roots of cut-down trees The Item covers: - machine removal of stumps; - loading, transportation and unloading of stumps and branches at the storage site up to 10 km distance at CL 8477 and CL 5393. The timber is at the Contractor's disposal; The calculation for the set of executed works in the defined work zone, on the basis of inspection of the situation on the terrain. Estimated area of 58 ha.</p>				
	Calculation per set	set	1.00	0.00	0.00
SUMMARY A-II PREPARATORY WORKS FOR CONSTRUCTION OF THE FLOOD DEFENSE ACCESS ROADS L= 16,578 m					0.00
A-III	PREPARATORY WORKS FOR EXECUTION OF RISKY WORK OPERATIONS	Unit	Quantity	Unit Price	TOTAL Without VAT
	<p>Introduction: 1. The design defines technical solutions and technologies for construction of the embankment from coherent and incoherent material (from the existing embankment and from river borrow pits). 2. The design defines temporary protective structures to reduce flood risk during the delivery of works; 3. The design does not define the organisation nor dynamics of delivery of risky work operations and length of the work sections; 4. Risky work operations: Along the embankment alignment: 1) Partially lowering the elevation of the embankment at the working sections, along the embankment alignment 2) A total demolition of the embankment at certain points for insertion of materials or for wringing of water; The Organisation Plan, Dynamic Plan and Sync work plan are key to reducing the risk of flooding – Contractor shall prepare and submit them for approval.</p>				
	<p>The circumstances that have to be covered by the Organization plan and Dynamic Plan shall be in accordance with the Synchronization plan of works (PWC "Srbijavode") whose scope includes the delivery of risky operations:</p> <p>a) Regular hydrological conditions - preventive measures, b) High water levels (introduced measures of protection against floods - first and second level flood alert, emergency situations)</p> <p>Organization plan and Dynamic Plan must include measures and works which are necessary during the delivery of risky work operations, in case of interruption of work (temporary halt), especially in terms of interruption of work with uncertain completion deadline of risky work operations.</p> <p>The price shall include the complete drafting of the Organisation Plan and Dynamic Plan and their alignment with the Synchronisation Plan</p>				
	Calculation per set	set	1.00	0.00	0.00

SUMMARY A – III : PREPARATORY WORKS FOR EXECUTION OF RISKY WORK OPERATIONS				0.00
TOTAL A: PREPARATORY WORKS				0.00

B	RECONSTRUCTION OF THE EMBANKMENT				
B-I	CONSTRUCTION OF THE BODY OF THE EMBANKMENT (SCREEN AND BALLAST)	Unit	Quantity	Unit Price	TOTAL Without VAT
	<p>NOTE:</p> <p>Duration of works shall depend on the technology of the Contractor, the selected machinery and the state of water levels on the rivers Sava and Drina.</p> <p>Contractor applies work technology which provides:</p> <ul style="list-style-type: none"> - Work without interruption in conditions of high and low water levels and - Safety during the period of implementation of flood protection measures. 				
1	EXCAVATION OF HUMUS				
1.1.	<p>Excavation of humus from the surface which includes: the body of the existing embankment, service roads, work area in the adjoining strip and storage at temporary landfills (for construction of the walls of the cofferdams in the ballast zone, for resoiling of the new embankments and loading ramps).</p> <p>Item covers:</p> <ul style="list-style-type: none"> - mechanical excavation of humus in the layer of t=30 cm (a total of 118,892 m3) - relocation and longitudinal transport by pushing up to 50 m to limits of the construction lot on the protected side (for walls of the dredging cofferdams) and on the non-protected side (for temporary landfills); <p>Calculation per m³ of excavated humus and removed to temporary landfill (a total of 118,892 m3):</p> <ul style="list-style-type: none"> a) For temporary tipping on the protected side for making of cassette walls and topsoiling with humus - embankments (19,098 m3) b) Temporary landfill on the river side of the embankment : <ul style="list-style-type: none"> - for topsoiling of the embankment (82,612 m3) - slopes of oading ramps (2,394 m3) - low quality humus is removed to landfill (14,788 m3) 				
	Calculation per m ³	m ³	118,892.00	0.00	0.00

1.2.	<p>Construction of the temporary "cassette" walls (covered with PVC foil on the ballast side) on the defended side for mounting incoherent material in the ballast area of the embankment (for disposal of dredging mixture of water/sand/gravel). Cassettes are to be formed at section km 52+832 : 56+000. After completion of the embankment body, high quality humus will be used for topsoiling of the slope of the new embankment ballast.</p> <p>The Contractor, on the basis of designed technology of ballast installation on the embankment with the use of incoherent material from the borrow, applies its own technology (optimal number and distribution of cassettes, and provides stability and waterproofing of wall cassettes).</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Cleaning humus material disposed on a temporary landfill of roots, branches and other waste materials; - Removal aside of carrots, sticks and other debris; - Removal of exquisite coherent material up to 100 m to the border of the area; - Forming of refueling cassette walls to the limits of the secured zone in the protected part, all in accordance with the graphic documentation; - Compacting the deposited pure humus by multiple mechanization crossing (forming of a cassette wall necessary to prevent leaking of water); - Purchase and transport of PVC foils, temporary coating the inside of the wall to prevent uncontrolled ingress of water on the plot in the protected area. 				
	Calculation per m ³	m ³	19,098.00	0.00	0.00
2	CONSTRUCTION OF THE EMBANKMENT SCREEN OF COHERENT MATERIAL				
2.1	Excavation of coherent materials from the existing embankment (120,313 m ³)				
	Excavation from the existing embankment (120,313 m ³) to the levels and dimensions provided in the design by means of removal to the side or by direct loading				
	<p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Machine excavation of coherent materials from the body of the embankment, in a wide spoil with removal or by direct loading into a vehicle (for internal transport); - Moving in longitudinal and transverse direction by pushing the material up to 50 m using the machinery; - Inspection of the quality of materials and classification; - Material must meet the physical and mechanical standards specified in the project. <p>(transport along the route is covered by a separate position)</p>				
	Calculation per m ³				
	<p>a) Excavation with the removal to the side.</p> <ul style="list-style-type: none"> - Moving in longitudinal and transverse direction by pushing material using the mechanization up to 50 m. 	m ³	55,451.00	0.00	0.00
	<p>b) Excavation with direct loading to trucks (for transport along the embankment route)</p>	m ³	65,862.00	0.00	0.00

2.2	<p>Preparation of the contact surface in the zone of the new embankment (after removing the humus); (454,450 m³)</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Grooving the bedding of parts of the existing embankment with the use of rippers (layer thickness of 50 cm); - Compacting the contact surface by multiple transition with tamping equipment to obtain the required density $M_s = 30.0$ MPa; Compaction is carried out evenly over the entire width and length of the bedding. - Geomechanical control of subsoil compaction (for every 100 m it is mandatory and upon special request of the Engineer). <p>The costs of field and laboratory tests shall be borne by the Contractor</p>				
	Calculation per m ²	m ²	454,450.00	0.00	0.00
2.3	<p>Longitudinal transport of coherent material from the excavation site of the existing embankment, for installation into the screen of the new embankment.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Transportation of coherent material, loaded directly, from the excavation site of the existing embankment to the installation site, unloading, depositing. - The material is tipped over the previously prepared and compacted bedding in the ballast zone made of cohesive material. <p>Calculation per m³, set of works with transport distances:</p>				
	Longitudinal transport of coherent material from the excavation of the existing embankment (120,313 m ³)				
	a) up to 100 m	m ³	55,451.00	0.00	0.00
	b) up to 500 m	m ³	54,695.00	0.00	0.00
	c) up to 10000 m surplus to the landfill	m ³	10,167.00	0.00	0.00

2.4	<p>Construction of the body of the new embankment by using coherent material from the excavation site of the existing embankment and excavation of soil under the ballast of the future embankment.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Removal of deposited material at a distance up to 50 m, with spreading in layers of 30 cm on the alignment of the new embankment; - Compacting the contact surface by multiple transition; - Required compaction (95% Proctor test). Compaction is carried out evenly over the entire width and length of the cant; - Geo-mechanical control of compaction layers (the thickness of each of the tested compacted layers), for every 100 m is mandatory, and by special request of the Engineer). The costs of sampling and laboratory testing shall be borne by the Contractor; - Material for contraction of the embankment screen must meet geotechnical characteristics for this type of work (clean, without vessels, humus or other organic material); - The material is installed and compacted in accordance with the standards for this type of work. 				
	Calculation per m ³	m ³	120,313.00	0.00	0.00
3	CONSTRUCTION OF THE EMBANKMENT BALLAST				
3.1	<p>Providing incoherent material – riverbed sediment from borrow pits (on upstream and downstream sections of the Sava river) for installation in the embankment ballast, surrounding area and the channel (total amount of 371,706 m³).</p> <p>Characteristics of the materials are presented in Diagram of Particle Size Distribution, according to the Design and TS.</p> <p><u>Item covers:</u></p> <p>Borrow pit of incoherent materials (sediment on the bottom of the Sava river):</p> <ol style="list-style-type: none"> 1. The borrow pits from the riverbed with official permission provided by the Beneficiary (on next section of the river chainage): <ol style="list-style-type: none"> 1) from km 169+300 to km 171+000, 2) from km 180+000 to km 183+000, 3) from km 185+000 to km 188+000, or 2. Other borrow pits at a distance from the construction site - the route of embankment up to 10 km, selected by the Contractor (for which the Contractor shall provide the necessary permission according the Serbian Water Law and subordinate legislation: <ol style="list-style-type: none"> a) previous geological field investigation, survey b) Technical documentation for dredging (made by licensed designer) c) obtaining permission from PWMC (the approximate period for implementation of the procedure: ~3 months) <p>Before the use of borrow pits (1. and 2.), the Contractor must previously carry out surveying, control testing of representative samples of sediment material from the river bottom, and provide a written consent of the</p>				

	<p>Engineer and Beneficiary for installation in the embankment ballast.</p> <ul style="list-style-type: none"> - The installation of incoherent material of particle size distribution shall be approved in the range in accordance with the attached diagram of granulometric structure - Particle Size Distribution Diagram (enclosed in EmW Design). - The fee for the recovered material is not an obligation of the Contractor, according the Serbian Water Law. 				
3.1.1.	<p>Excavation with transport to shore in the area of the embankment alignment:</p> <ul style="list-style-type: none"> - Excavation of incoherent material projected particle-size distribution from borrow pits provided by the investor, or from other (up to 10 km), in the bed of the river Sava, by means of a dredger, accompanied by loading the material onto the vessel; - Excavation is done in accordance with the prescribed conditions for dredging; - Marking, zero status, recording and application of specified dredging technology, control, final recording and study of the amounts taken out, recording of the amounts; - Waterway transport from borrow pits in the bed of the river Sava to the previously provided docking spaces on the coast in the zone of unloading (unloading is covered by a separate position); - The Contractor shall determine the location of the temporary docking space according to the location of installation of material in the ballast of the new embankment. - Providing temporary docking areas on the coast at locations designated by the Contractor, with the application of technical measures for stabilisation of the coast and the conditions for the prescribed mooring and operation (dock exit). - Application of security measures on the fairway in accordance with the regulations of "Plovput" provided by the investor; - The Contractor is obliged to align the technology of transport with the characteristics of watercourses and conditions of the terrain in the concerned section; - Set of all preparatory work, refueling, finishing and auxiliary works, supplies and equipment. 				
	Calculation per m ³	m ³	371,706.00	0.00	0.00

3.1.2.	<p>Unloading - direct insertion by dredging from a vessel into the ballast (into the previously provided cassettes).</p> <p>- Procurement, transport (all internal transports), assembly and disassembly of steel pipelines from the docking space to the cofferdams / temporary landfills on the coast.</p> <p>- Ensuring controlled discharge in the body of the embankment and drainage channels for dredged water, with the use of foil for protection against water penetration;</p> <p>- Dredging the sand into prepared cofferdams, while applying control measures for drainage of dredged water and maintenance of the cofferdam walls and discharge pipes during construction;</p> <p>- Finishing works on the removal of equipment, restoration of the coast in the area of temporary docking spaces to its original state, filling the drainage canals (after completed dredging);</p> <p>- By applying the technology for injection of sand, Contractor defines the number and distribution of cofferdams and the arrangement of temporary docking spaces for vessels.</p>				
	Calculation per m ³	m ³	160,160.00	0.00	0.00
3.1.3	<p>Unloading - directly from the vessel into the temporary landfills on the coast.</p> <p>(total of 211,545 m3).</p> <p>Calculation per m3</p>				
	a) for the body of the embankment (Ballast)	m ³	175,085.00	0.00	0.00
	b) for service roads in the adjoining strip (protected side and flood plains)	m ³	29,517.00	0.00	0.00
	c) for loading ramps	m ³	6,943.00	0.00	0.00
3.2.	<p>Loading incoherent material from temporary storage, transport to up to 10 km, unloading into the cassette in the zone of the future ballast of embankment, deposition in the cofferdam in proper amounts deployed along the alignment for adjoining roads and ramps.</p> <p>a) for the embankment 175,085 m3</p> <p>b) for the service road 29,517 m3</p> <p>c) for the ramps 8,331 m3</p>				
	Calculation per m3	m ³	211,545.00	0.00	0.00

3.3	<p>Removal (at a avarage distance of 100 m) of dredged incoherent material (directly loaded or brought) in layers and installation of sand in the embankment, designed to elevation and dimensions.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> -Excavation in the zone of the cofferdams and moving of sandy material to a coherent part of the embankment; - Relocation of 30% of the previously inserted incoherent material (dredged and transported from the temporary landfill); - Rough spreading in the zone of contact with the coherent part of the embankment; - Securing the conditions for controlled complete drainage and elimination of dredged water, by gravity or by pumping; - Spreading the material in layers of 30 cm; <p>The costs of sampling and laboratory testing shall be borne by the Contractor.</p> <p>Calculation per m3 in compact condition</p>				
	Removal (100 m) of 50% of directly loaded material in cassettes	m ³	80,080.00	0.00	0.00
	Removal (100 m) of 50 of brought material in cassettes	m ³	105,772.00	0.00	0.00
4	<p>FINAL PROFILING OF THE EMBANKMENT BODY (SIZE AND SLOPES ANGLE)</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Profiling of the embankment body, embankments scarping (both sides), with an accuracy of ± 5 cm; - Leveling of the embankment crown with an accuracy of ± 5 cm; - Geodetic control of slope and embankment footprint. 				
	Calculation per m ²	m ²	439,776.00	0.00	0.00
5	RESOILING OF THE SLOPES AND PART OF THE EMBANKMENT CREST WITH HIGH QUALITY HUMUS FROM THE EXCAVATION SITE.				
5.1.	<p>Resoiling - relocation of the assorted humus to the embankment slopes 104,104 m3 (from cassette walls 19,098 m3, from riverside landfill 82, 612 m3), to the slopes of access ramps (2,394 m3).</p> <p><u>The Item covers:</u></p> <ul style="list-style-type: none"> - Excavation of assorted materials from the walls of the cofferdams and from the temporary landfills along the embankment alignment; -Transport - relocation to up to 100 m and tipping of humus along the slopes, the crest of the embankment. 				
	Calculation per m ³	m ³	104,104.00	0.00	0.00
5.2.	<p>Flattening of the humus (104,104 m3)along the slopes and part of the crown of the embankment, thikness d=30 cm.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Mechanical and manual (80% -20%) flattening of the humus to the embankment crest and slopes and embankment ramps; - The accuracy of bottoming of the surface must be within the requested deviations of ± 3 cm. 				

	Calculation per m ²	m ²	347,015.00	0.00	0.00
5.3	<p>Loading and transport to the landfill (10 km) of low quality (surplus) humus from the walls of the cofferdams.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Loading of humus from the walls of the cofferdams (after resoiling the ballast and adjoining ramps with high quality material). - Transport to the landfills (15 km), unloading, tipping, rough spreading in layers, across the surface of the landfill, final landscaping. 				
	Calculation per m ³	m ³	14,788.00	0.00	0.00
6	GRASSING OVER OF CREST AND SLOPES				
6.1	<p>Grassing over of crest and slopes with selected mixtures of deep-tillering grass.</p> <p><u>The item covers:</u></p> <ul style="list-style-type: none"> - Purchase and transportation of grass mixture (screw meadow, orchard grass, trefoil, French ryegrass, red clover); - Seeding of the surfaces; - Care until germination; <p>The required amount of grass is approximately 45 kg / ha, with the addition of 200 grams of fertilizer per 1 m² of grassed-over surface</p> <p>The grassing over is considered to be successful when there is an 80% of the surface covered with grass.</p>				
	Calculation per m ²	m ²	347,015.00	0.00	0.00
7	STABILIZATION OF THE EMBANKMENT CROWN (B=4 m)				
7.1	<p>Procurement, transport and installation of CSA (crushed stone aggregate)</p> <p><u>Items covers:</u></p> <ul style="list-style-type: none"> - Procurement, transport of crushed stone into two factions: CSA 0/63 d = 0.2 m to the undercarriage structure and CSA 0 / 31.5 mm d = 0.1 m for superstructure; - Internal transport to 50 m and depositing material at the crown of the embankment; - Roughly spreading material, leveling, planning and compaction of the embankment crown in layers (Ms=40 MPa) installation of protective compaction of gravel surfacing with the crest of the embankment (width 4.0 m, d = 0.3 m); - The material must meet all standards in terms of quality for this type of work (Approved material); - In all according to the Design. 				
	Calculation per m ³	m ³	15,070.00	0.00	0.00
SUMMARY B - I:					0.00
CONSTRUCTION OF THE EMBANKMENT BODY (SCREEN AND BALLAST)					
B-II	CONSTRUCTION OF SERVICE ROAD SURROUNDING THE EMBANKMENT - DRAINAGE "CARPET" IN THE ZONE OF BALLAST	Unit	Quantity	Unit Price	TOTAL Without VAT

1	Construction and profiling the body of road surrounding the embankment on the defended side: L = 10,920 m				
1.1.	<p>Consolidation and additional strengthening of sub-soil for the construction of the service road on the defended side Multiple machinery crossing with the consolidation of the terrain to the required compaction $M_s=30$ MPa. With additional improvement of the soil in terms of filtration stability.</p> <p><u>Items covers:</u></p> <ul style="list-style-type: none"> - Placement of nonwoven polypropylene geotextile on the prepared formation soil of the service road (before placement of the final layer of sand and a layer of crushed stone). - Supply, transport and installation of a attested nonwoven PP geotextile. - Sequence continuation of geotextiles is to be performed by overlapping the pieces at min. 20 cm. - The Contractor should include the necessary overlappings in the total surface which is to be covered with geotextile. - Before laying the geotextile, the formation soil must be flattened and levelled, without major protrusions and without roots, or other materials that might cause damage (perforation) to the geotextile. - Before laying the geotextile, the Contractor shall submit the Declaration of performance - DoP for geotextiles, for approval to the E - Geotextile must meet the following technical specifications: Tensile strength ≥ 22 kN/m (EN ISO 10319) Elongation at break $\geq 55\%$ (EN ISO 10319) Puncture resistance (CBR test) ≥ 3500 N (EN ISO 12236) Dinamic perforation ≤ 15 mm (EN ISO 13433) <p>Calculation per m² of surface covered with geotextile</p>				
	Calculation per m ²	m ²	36,037.00	0.00	0.00
1.2	<p>Making of the road drainage substructure on defended side (incoherent material is transported from the temporary landfill)</p> <p><u>Item includes:</u></p> <ul style="list-style-type: none"> - Roughly spreading of coherent material transported from the temporary storage in layers of 30 cm in the zone of service roads on defended side - Compaction evenly over the entire width, with the application of prescribed measures for achieving compaction; $M_s = 40.0$ MPa; 				
	Calculation per m ³	m ³	35,420.00	0.00	0.00

1.3.	<p>Construction of the final road layer- crushed stone (CSA) width of 3.5 m thickness d = 30cm</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Internal transport to 50 m and disposal of materials within the road construction zone; - Installation of material in layers CSA 0/63 d = 0.2 m, CSA 0 / 31.5 d = 0.1 m with leveling and compacting (Ms=40 MPa) the material in layers in accordance with the designed slopes; - In terms of quality material must meet all standards required for this type of work; - Completely in accordance with the graphic documentation of a project. 				
	Calculation per m ³	m ³	22,605.00	0.00	0.00
SUMARRY: B-II CONSTRUCTION OF SERVICE ROAD SURROUNDING THE EMBANKMENT - DRAINAGE "CARPET" IN THE ZONE OF BALLAST					0.00
B-III	CONSTRUCTION OF LOADING RAMPS	Unit	Quantity	Unit Price	TOTAL Without VAT
1	<p>Construction of the ramp bodies (crest width 5 m, longitudinal gradient 10%-13% and slope gradient 1:2) by installing incoherent material.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Rough spreading of coherent material transported from the temporary storage in layers of 30 cm in the zone of the approach ramps; - Internal transport to up to 50 m; - Compaction evenly over the entire surface, while applying the rescribed measures for achieving the desired compaction (Ms=30 MPa); - Geo-mechanical control of the compaction of the ramps' base (at each ramp mandatory, and upon special request of the Engineer). <p>The costs of sampling and laboratory testing shall be borne by the Contractor.</p>				
	Calculation per m ³	m ³	6,943.00	0.00	0.00
2	<p>Final profiling of loading ramps according to the design and angle of the levee slope</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Profiling body of ramps, scarping of slopes (both sides), with an accuracy of ± 5 cm; - Leveling the crown of ramp with an accuracy of ± 5cm; - Geodetic control of slope and dimensions of ramps. 				
	Calculation per m ²	m ²	13,674.00	0.00	0.00
3	<p>Top soiling of ramp slope with quality humus compost from the landfill.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Longitudinal displacement (up to 20 m), the deposited material (humus); - Spreading and planning in the layer d = 30 cm; 				
	Calculation per m ³	m ³	2,394.00	0.00	0.00

4	<p>Placing the final layer of crashed stone on the crown of reconstructed ramp width of 5 m and 30 cm thick.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Procurement, transport and installation of crushed stone in two fractions CSA 0 / 31.5 mm and CSA 0/63; - Internal transport to 50m and disposal of materials within the road construction zone; - Installation of material in layers CSA 0/63 d = 0.2 m, CSA 0 / 31.5 d = 0.1 m with leveling and compacting the material in layers (Ms=30 MPa) in accordance with the designed slopes; - In terms of quality material must meet all standards specified for this type of work; - In accordance with the graphic documentation of the design. <p>Calculation per m3 of compacted material</p>				
	Calculation per m ³	m ³	2,050.00	0.00	0.00
5	<p>Grassing slope of the ramp with selected mixtures of deep-tillered grass.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Purchase and transportation of grass mixture (black fescue 60%, 20% grass meadow grass, white clover 20%); - Seeding of the surface; - Care to emergence; <p>The required amount of the grass is between 5 to 10 grams per m2 floor area, with the addition of 200 grams of fertilizer per 1 m2 of the surface of the grass.</p> <ul style="list-style-type: none"> - It is believed that cover cropping has failed when it receives 80% of grasslands. <p>Set - work and material.</p>				
	Calculation per m ²	m ²	7,980.00	0.00	0.00
SUMMARY: B-III					
CONSTRUCTION OF LOADING RAMPS					0.00
B-IV	EMBANKMENT CHAINAGE BENCHMARKS AND CONSTRUCTION OF EMBANKMENT GATES	Unit	Quantity	Unit Price	TOTAL Without VAT
1	<p>Construction and installation of embankment gates:</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Making of concrete foundation for pillars of embankment gates, complete marking of the site, earthworks, supply and installation of concrete MB 30 in the formwork; - Purchase and installation of poles for the gate (with an assembly for handling and non-standard locking mechanism) and embankment gates cantilever with a brace (made of steel pipes varying in diameter), with the proper multiple anti-corrosion protection and final visible coating; the gates to be constructed according to the graphic details in the design. <p>Set of work and materials, auxiliary and finishing work on the assembling of the completed ramp.</p>				
	Calculation per set. (materials, auxiliary materials, transportation, work ..)	set	26.00	0.00	0.00

2	Proper labeling of internal of geodetic points of the state network along the embankment alignment.				
	<u>Item covers:</u> -Terrain surveying works, drafting documentation on marking for the entry of data in the cadastre.				
	Calculation per set. (materials, auxiliary materials, transportation, work ..)	set	1.00	0.00	0.00
3	Labeling of chainage of embankment and border of the service road in the protected part, with installation of AB pillars of prescribed dimensions, painted in white.				
	<u>Item covers:</u> -Set of surveying, preparation, earthworks, procurement, transport and installation of pillars.				
	Calculation per piece				
	a) half-kilometer poles 15x15x100 cm	psc	11.00	0.00	0.00
	b) kilometer poles 20x20x100 cm	psc	22.00	0.00	0.00
	c) poles for delimitation of land 10x10x80 cm	psc	220.00	0.00	0.00
SUMMARY: B-IV					0.00
EMBANKMENT CHAINAGE BENCHMARKS AND CONSTRUCTION OF EMBANKMENT GATES					
B- V	ASPHALT AND ROAD OVER THE CREST OF THE EMBANKMENT from km 61+390 to km 61+720	Unit	Quantity	Unit Price	TOTAL Without VAT
1	<u>Item covers:</u> -Procurement, transport and installation of crushed stone in two fractions CSA 0 / 31.5 mm and CSA 0/63; - Internal transport to up to 50 m and tipping of materials in the construction zone with levelling and compacting the material in layers (Ms=30 MPa) completely in accordance with the designed slopes; - In terms of quality, the material must meet all the industry standards; - Completely in accordance with the graphic documentation in the design.				
	Calculation per m ³	m ³	425.00	0.00	0.00
2	Placement of the the base layer made of bituminised crushed aggregate BNS 22				
	<u>Item covers:</u> - Procurement, transport and installation in a layer 6 cm thick.				
	Calculation per m ²	m ²	1,320.00	0.00	0.00
3	Placement of the top layer made of asphalt concrete AB11				
	<u>Item covers:</u> - Procurement, transport and installation in a 4 cm thick layer.				
	Calculation per m ²	m ²	1,320.00	0.00	0.00
SUMMARY: B-V					0.00
ASPHALT AND ROAD OVER THE CREST OF THE EMBANKMENT from km 61+390 to km 61+720					
TOTAL B: RECONSTRUCTION OF EMBANKMENT					0.00

C	CONSTRUCTION OF ACCESS ROADS FOR FLOOD DEFENSE	Unit	Quantity	Unit Price	TOTAL Without VAT
1	<p>Preparation for construction of access roads</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Multiple mechanization crossing with the consolidation of the field to the required compaction (Ms=40 MPa); - In accordance with the Drawings and standards for this type of work. <p>Access roads L=3854 m, B=3.5 m</p> <ul style="list-style-type: none"> - Multiple machinery crossings, with the consolidation of the terrain to obtain the required compaction 40 Mpa - In complete accordance with the graphic designs and the industry standards <p>a) Access road No.1; L=1725.38 m, b=3.5 m, b) Access road No.2; L=2798.25 m, b=3.5 m, c) Access road No.3; L=2072.93 m, b=3.5 m d) Access road No.4; L=997.78 m, b=3.5 m e) Access road No.5; L=1474.49 m, b=3.5 m f) Access road No.6; L=1091.72 m, b=3.5 m, g) Access road No.7; L=1441.46 m, b=3.5 m h) Access road No.8; L=916.72 m, b=3.5 m i) Access road No.9; L=1001.98 m, b=3.5 m j) Access road No.10; L=805.08 m, b=3.5 m k) Access road No.11; L=846.84 m, b=3.5 m l) Access road No.12; L=598.47 m, b=3.5 m m) Access road No.13; L=806.84 m, b=3.5 m</p> <p>Access roads L=16577.944 m, B=3.5m.</p>				
	Calculation per m ²	m ²	58,023.00	0.00	0.00
2	<p>Construction of the superstructure.</p> <p><u>Item covers:</u></p> <ul style="list-style-type: none"> - Procurement, transport and installation of crushed stone aggregate in two fractions: CSA 0 / 31.5 mm and CSA 0/63; - Internal transport to up to 50 m and tipping of materials within the road construction zone; - Installation of material in layers, CSA 0/63 t = 0.2 m, CSA 0 / 31.5 t = 0.1 m; - Compaction evenly over the entire width, with the application of prescribed measures for achieving compaction (Ms=40 MPa); - In terms of quality, the material must meet all the industry standards. <p>Set of works, equipment and material</p> <p>Calculation per m³ in compact position</p>				
	Calculation per m ³	m ³	58,023.00	0.00	0.00
	SUMMARY C : CONSTRUCTION OF ACCESS ROADS FOR FLOOD DEFENSE				0.00
D	WORKS, MEASURES AND EQUIPMENT FOR WORKS DURING PERIODS OF HIGH WATER LEVELS	Unit	Quantity	Unit Price	TOTAL Without VAT

1	PREPARATION: FORMING OF TEMPORARY OBSERVATION POSTS FOR THE NEEDS OF FLOOD CONTROL				
	<u>Item covers:</u> - Supply, transportation and installation of certified water measuring laths, height H: 8 m, VL				
	Calculation per pcs	pcs	2.00	0.00	0.00
2	Temporary emergency closing of the slots in the embankment in case of declaring second level flood alert.				
2.1	Earthworks Closing of holes along the embankment (10 cassettes along the route, 2 holes per cassette, 100 m3 per opening, a total of 2,000 m3) <u>Item covers:</u> - Preparation of openings for the proper installation of new substances, incising batter; - Excavation of material from temporary landfills along the route, removal aside, moving up to 50 m; installation, layered with multiple crossings, to the crown of the embankment				
	Calculation per m ³	m ³	2,000.00	0.00	0.00
2.2	Deployment of machinery during the second level flood alert, upon special order of the Engineer, in accordance with the flood control management policy(PWMC "Srbijavode"). Calculated per hour of deployment, as recorded by the Engineer. Price covers work per hour of man-operated machines (1 construction equipment machine, 3 shifts)				
	1. Excavator with standard jib (140 KC)	h	100.00	0.00	0.00
	2. Excavator with standard jib (100 KC)	h	100.00	0.00	0.00
	3. Excavator with "long - reach" jib	h	100.00	0.00	0.00
	4. Bulldozer (150 KC)	h	100.00	0.00	0.00
	5. Bulldozer (100 KS)	h	100.00	0.00	0.00
	6. Tipper truck (210 KS)	h	100.00	0.00	0.00
	7. Loader (200 KS)	h	100.00	0.00	0.00
2.3	Materials for protection against flood				
	The price covers procurement, transport and temporary storage in a warehouse (PS Kočin Kanal), security. Installation is paid separately. The material is installed by order of the Engineer, at critical locations where protection against floods is being conducted. If not used, the material shall be deposited with the Beneficiary, all according to the Engineer's instruction				
	Jute sacks	kom	5,000.00	0.00	0.00
	PE sacks	kom	10,000.00	0.00	0.00
	PVC foil	m ²	10,000.00	0.00	0.00
	Geotextile (specifications in accordance with technical requirements)	m ²	2,000.00	0.00	0.00

SUMMARY D: WORKS, MEASURES AND EQUIPMENT FOR WORKS DURING PERIODS OF HIGH WATER LEVELS		0.00
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E	MAKING AS-BUILT DESIGNS FOR THE FACILITIES	Unit	Quantity	Unit Price	TOTAL Without VAT
	DESIGN OF BUILT RIGHT SHORE EMBANKMENT ON THE RIVER SAVA <u>Item covers:</u> - Field geodetic control works - Creating a Design of built of embankments, service roads surrounding the embankment, ramps .				
	Calculation of complete made documentation				0.00
SUMMARY E: MAKING AS-BUILT DESIGNS FOR THE FACILITIES					0.00
	TOTAL: A+B+C+D+E Without VAT: EMERGENCY RECONSTRUCTION WORKS PROJECT Flood Protection System „Mačva: Sava – Drina“, West zone Section1: BANOVA BROD – SALAŠ CRNOBARSKI - right embankment of the Sava River from km: 52+832 - km: 63+753				0.00

	RECAPITULATION		
	EMERGENCY RECONSTRUCTION WORKS PROJECT Protection System „Mačva: Sava – Drina“, West zone BANOV BROD – SALAŠ CRNOBARSKI - right embankment of the Sava River from km: 52+832 - km: 63+753		Flood Section1:
A	PREPARATORY WORKS		
A-I	PREPARATORY WORKS FOR THE RECONSTRUCTION OF EMBANKMENT (EMBANKMENT AND SURROUNDING AREA)		0.00
A-II	PREPARATORY WORKS FOR CONSTRUCTION OF THE FLOOD DEFENSE ACCES ROADS L= 16,577.94 m'		0.00
A-III	PREPARATORY WORKS FOR EXECUTION OF RISKY WORK OPERATIONS		0.00
TOTAL A:			0.00
B	RECONSTRUCTION OF THE EMBANKMENT		
B-I	CONSTRUCTION OF THE EMBANKMENT BODY (SCREEN AND BALLAST)		0.00
B-II	CONSTRUCTION OF SERVICE ROAD SURROUNDING THE EMBANKMENT - DRAINAGE "CARPET" IN THE ZONE OF BALLAST		0.00
B-III	CONSTRUCTION OF LOADING RAMPS		0.00
B-IV	EMBANKMENT CHAINAGE BENCHMARKS AND CONSTRUCTION OF EMBANKMENT GATES		0.00
B- V	ASPHALT AND ROAD OVER THE CREST OF THE EMBANKMENT from km 61+390 to km 61+720		0.00

TOTAL B:		0.00
C	CONSTRUCTION OF ACCESS ROADS FOR FLOOD DEFENSE	
TOTAL C:		0.00
D	WORKS, MEASURES AND EQUIPMENT FOR WORKS DURING PERIODS OF HIGH WATER LEVELS	
TOTAL D:		0.00
E	MAKING AS-BUILT DESIGNS FOR THE FACILITIES	
TOTAL E:		0.00
	<p style="text-align: center;">TOTAL Without VAT: RECONSTRUCTION WORKS PROJECT „Mačva: Sava – Drina“, West zone CRNOBARSKI - right embankment of the Sava River from km: 52+832 - km: 63+753</p>	<p style="text-align: center;">A+B+C+D+E EMERGENCY Flood Protection System Section1: BANOVO BROD – SALAŠ</p>
	VAT (20%)	0.00
	TOTAL including VAT:	0.00