

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 143, SECTION: PRIČEVIĆI -PECKA,**  
**km: 16+920.05 - km: 17+069.26, ID-3074**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, preparation of the working plateau, construction of access roads, etc.	lump sum	1.00		
2	Surveying - pegging of road surfaces, elementary and detailed bench marks, with marking protocol.	lump sum	1.00		
3	Felling of trees, clearing of undergrowth and small vegetation.	lump sum	1.00		
<b>TOTAL:</b>					
<b>II EARTH WORKS</b>					
4	Mechanical excavation of earth, and manually to a lesser extent, in 3rd and 4th category of soil for the purpose of constructing drainage trench to the depth of 4m, manhole and pipe culvert. The excavation is to be done 60% mechanically, with an excavator, and 40% manually. Cut the sides regularly and level the bottom. Transportation of excavated soil up to a distance of 5 km to a disposal designated by the Supervisor.	m3	703.90		
5	Supporting of the trench along the entire length on two sides, in the traditional way or with heavy metal formwork. The support is to be done double-sided in order to secure work in the trench. The price includes the delivery of formwork to the construction site, installation, disassembling, clearing and returning to the plant.	m2	877.74		
6	Supply and installation of non-woven geotextile from polypropylene fibres (PP), weighing 300gr/m2, with tensile strength of $\beta z \geq 20$ kN/m, elongation of $\epsilon \geq 55\%$ .	m2	1,387.18		
7	Supply and installation of waterproof geomembrane from thermoplastic synthetic foil made of low-density polyethylene (LDPE), with a thickness of 1.5mm.	m2	664.88		
8	Supply and laying of hard plastic pipes (HDPE), with a diameter of $\varnothing 400$ mm. The pipes are perforated in the upper part. The pipes must be with fittings and joining material.	m1	130.00		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
9	Filling of drainage trenches with crushed stone, with a grain size of 10-25cm. Filling of the trenches to be done in 50-100cm layers. Crushed stone must be firm and clean and resistant to frost, with compressive strength of >120MPa and with excellent resistance properties $\phi > 42^\circ$ .	m3	567.06		
10	Mechanical excavation of earth in bulk excavation, 2nd and 4th category, for the purpose of removing deformed and moved earth of the road fill in the section affected by the landslide. The excavation is to be done 80% mechanically, with an excavator, and 20% manually. The excavation is done by stepped cutting from the top to the bottom. Transportation of excavated soil up to a distance of 5km to a disposal designated by the Supervisor.	m3	1,263.60		
11	Subsoil treatment by wetting, loosening, drying, and compacting. Level the subsoil before compaction. Compact subsoil to 95% of compaction by standard Proctor, i.e. to compressibility module of $M_v = 25\text{MPa}$ .	m2	799.79		
12	Construction of the part of the embankment from mixed mostly sand-gravel material, well-graded. The filling material must be from, with the grain size of 0-60 mm, and sufficient clay binder to bind the course grains. Before spreading, steps with transverse slope are made. The embankment is constructed from mixed material, with the grain size of 0-60mm, bulk density of $\gamma > 19\text{kN/m}^3$ , widely granulated $C_u > 9$ , $c > 5\text{kN/m}^2$ , $\phi > 32^\circ$ . Compaction to be done in layers of 30-60cm. The works include the supply of material, spreading, coarse and fine grading, wetting and compacting of the embankment.	m3	1,327.25		
13	Making of vegetative course with a thickness of 20cm on the slopes of the new embankment. Topsoil is not separately excavated, but selected from the wet soil excavated when removing the original deformed embankment.	m2	1,608.61		
14	Narrow excavation for square manhole in 3rd and 4th category of earth with supporting. The excavation is to be done 60% mechanically, with an excavator, and 40% manually. Cut the sides regularly and level the bottom. Transportation of excavated soil up to a distance of 5 km to a disposal designated by the Supervisor.	m3	74.49		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
15	Narrow excavation in 3rd and 4th category of earth with supporting. The excavation is to be done 60% mechanically, with an excavation, and 40% manually. Cut the sides regularly and level the bottom. Transportation of excavated soil up to a distance of 5 km to a disposal designated by the Supervisor.	m3	16.21		
			<b>TOTAL:</b>		
<b>III CONCRETE WORKS</b>					
Concrete works on the construction of flume, canal, manhole, culvert					
-rectangular shaft at km:16+984.462					
16	Construction of concrete flume from lean MB15 concrete, with the thickness of 30cm and with a cross-fall of 4%.	m1	143.00		
17	Construction of concrete canal for receiving and draining water from the hinterland at the top of the trench. Construct the canals from MB-30 concrete, M-100, with mesh steel reinforcement Q 188 in the middle. Do the canals in tunnel liners.	m1	143.00		
18	Construction of concrete manhole, with rectangular cross-section. The manholes are to be constructed from MB-40 concrete, M-150, with steel reinforcement according to the design. The price includes the grading of the trench bottom, construction of the base from gravel or sand, formwork with the stiffening of the walls and slab, laying of reinforcement, concreting.				
	-concrete:	m3	7.73		
	-reinforcement:	kg	54.46		
19	Hydro insulation of inner walls of the manhole with cement mortar in two coats, with skimming to black gloss, coat with bitulit on the outside.	m2	25.76		
20	Installation of cast iron steps (DIN 1211a) SRPS M.J6.285. After the installation, clean the steps and coat with anticorrosive agents.	pcs	18.00		
21	Installation of cast square cover of the manhole, measuring 680x680mm, with bearing capacity of B125kN (SRPS EN 124)	pcs	18.00		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
22	Construction of concrete culverts. The culverts has a diameter of 1200mm, double reinforced, and made form MB-40 concrete, M-150. At the end of the culvert, construct outlet head from MB -30 concrete, M-150. The price includes the supply, laying and splicing of the culvert and sealing of joints with cement mortar with additive-sealer, by constructing outlet head and subsoil from concrete. The pipes must come with KGF joints.	m1	31.50		
23	Construction of the hydro insulation of the culvert. Insulate the outer side with two coats of bitumen. First apply the cold coat (bitulit), and then the hot coat from bituminous tapes, with a thickness of up to 7mm .	m1	144.48		
-round manhole at km:16+939.455					
24	Supply and laying of reinforced concrete pipes for the manhole, Ø1000mm, with a height of 0.5m, with a cone of H=0.6m. The manholes are to be made from MB-40 concrete, M-150. The price includes the grading of two trenches, construction of base from gravel or sand, laying, installation and sealing of joints, construction of concrete ring on the top. The pipes must come with KGF joints.	pcs	144.48		
25	Hydro insulation of inner walls of the manhole with cement mortar in two layers, with skimming to black gloss, coat with bitulit on the outside.	m2	5.06		
26	Installation of cast round cover of the manhole, measuring 680x680mm, with a bearing capacity of B125kN (SRPS EN 124).	pcs	1.00		
27	Construction of a part of concrete culvert. The culvert is has a diameter of 600mm double reinforced, and made form MB-40 concrete, M-150. At the end of the culvert, construct outlet head from MB -30 concrete, M-150. The price includes the supply, laying, construction of water impermeable concrete ring, fitting into the eexisting and sealing of joints.	pcs	1.00		
28	Construction of the hydro insulation of the culvert. Insulate the outer side with two coats of bitumen. First apply the cold coat (bitulit), and then the hot coat from bituminous tapes, with a thickness of up to 7mm.	m2	2.32		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
Concrete works on the construction of bored piles and capping beam					
29	Construction of bored piles from MB-30, with a diameter of 120 cm. The item includes mechanical excavation in 3rd and 4th category of soil and concreting. During the excavation, the excavated material needs to be plotted. The price includes the concreting of pile superelevation of 50 cm at the top of the pile and later demolition.	m1	479.50		
30	Construction of bored piles from MB-30, with a diameter of 120 cm. The item includes mechanical excavation in 5th and 6th category of soil and concreting. During the excavation, the excavated material needs to be plotted. The price includes the concreting of pile superelevation of 50 cm at the top of the pile and later demolition.	m1	120.00		
31	Concreting of the capping beam, measuring b/h=150/100cm, from concrete of quality MB-30, M-150, with necessary formwork.	m3	223.50		
32	Supply, construction and laying of reinforcement RA400/500, GA240/360 and MAR500/560 for piles and capping beam fully in accordance with the design.	kg	110,328.78		
			<b>TOTAL:</b>		
<b>IV OTHER WORKS</b>					
33	Supply and planting of acacia, willow or conifer trees in the front zone and preferably on the surface of the slope. Where needed, the trees are to be tied with elastic cable wire or rope of Ø8 mm. All nursery trees must have a clearly defined and straight trunk and well developed crown with a minimum of three primary branches, and root of min, 3 pieces, "cultured" nursery trees, of a minimum height of 3m. The price includes the supply, transportation of trees, care, pruning and planting.	m2	8,500.00		
34	Sealing of cracks in the narrow and wider zone of the landslide front with clay cap from inorganic clay of medium and high plasticity. (CI, CI/CH, CH). Compact the clay with compactor.	lump sum	1.00		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
35	Land-scaping of the entire area affected by the remediation.	lump sum	1.00		
36	Geological mapping of excavated material during drilling for piles.	m1	599.50		
37	Supply and installation of equipment for geodetic and geotechnical observation of the structure. The observation is done by establishing a network of bench marks and one inclinometer.				
	- geodetic benchmarks	pcs	6.00		
	- inclinometric structure from a plastic pipe with grooves and secured with a concrete block measuring 0.5 x 0.5 x 0.2 m and protective cap.	m1	12.00		
	- observation of inclinometric structures and geodetic benchmarks	pcs	12.00		
38	Demolition of asphalt surfacing of the road in the section planned by the design for remedy of landslide. The item includes the following: demolition, loading and transportation of demolished material to a disposal determined by the Supervisor within 5km. Calculation per m <sup>2</sup> of demolished road surface.	m <sup>2</sup>	477.59		
39	Grading and rolling of the subgrade. Calculation per m <sup>2</sup> of rolled subgrade.	m <sup>2</sup>	1,363.00		
40	Supply, transportation and incorporation of lower bearing course of the pavement structure from crushed stone aggregate of 0/31mm of continuous granulometric composition, with a thickness of 20cm in compacted state. $0.20 \times 818.44 + 2 \times (0.20 \times 0.26 \times 149.37) = 163.69 + 15.53 = 179.22 \text{ m}^3$ . Calculation per m <sup>3</sup> of incorporated material.	m <sup>3</sup>	179.22		
41	Supply, transportation and incorporation of lower bearing course of the pavement structure from crushed stone aggregate of 0/63mm of continuous granulometric composition, with a thickness of 25cm in compacted state. $0.25 \times 818.44 + 2 \times (0.25 \times 0.74 \times 149.37) = 204.61 + 55.27 = 259.88 \text{ m}^3$ Calculation per m <sup>3</sup> of incorporated material.	m <sup>3</sup>	259.88		
42	Supply, transportation and incorporation of the upper bitumenous base course from BNS22A (8cm thick). Calculation per m <sup>2</sup> of completed course.	m <sup>2</sup>	818.44		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
43	Supply, transportation and incorporation of wearing course of the road surface from AB11 asphalt with the thickness of 4cm in the part of the road section which is being remedied and fitting into the existing road surface. Calculation per m2 of completed course.	m2	818.44		
<b>TOTAL:</b>					
<b>V TRAFFIC SIGNALIZATION AND ROAD FURNITURE</b>					
45	<b>Vertical traffic signalization</b>				
	Standard traffic signs foil class 2				
	Triangular a=90cm				
	I-1	pcs	1.00		
	I-1.1	pcs	1.00		
	I-2.1	pcs	2.00		
	Round f 60cm				
	II-30(40km/h)	pcs	2.00		
	Single pipe carrier				
	2.6 m	pcs	2.00		
2.9 m	pcs	4.00			
46	<b>Horizontal signalization</b>				
	Total under white paint	m2	42.30		
47	<b>Road furniture</b>				
	Guard rail N2W4	m	200.00		
	Oblique guard rail endings N2W4 L=12m	pcs	2.00		
	Reflective studs (catadiopters)	pcs	8.00		
	Delineators	pcs	121.00		
48	<b>Removal of the existing traffic signalization</b>				
	Dismantling of existing signs	pcs	5.00		
	Dismantling of traffic sign posts	pcs	3.00		
49	<b>Temporary traffic signalization</b>	lump sum	1.00		
<b>TOTAL:</b>					

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH WORKS	
III CONCRETE WORKS	
IV OTHER WORKS	
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD IIA SECTION 170: VALJEVO-DEBELO BRDO-ROGACICA-BAJINA**  
**km: 35+500**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, construction of access roads and possible deviations, etc.	lump sum	1.00		
2	Surveying - pegging of road surfaces, elementary and detailed bench marks, with marking protocol.	lump sum	1.00		
3	Felling of trees, clearing of undergrowth and small vegetation.	lump sum	1.00		
<b>TOTAL:</b>					
<b>II EARTH WORKS</b>					
1	Excavation of earth of 2nd and 4th category for the purpose of constructing pipe culvert and manhole. The excavation is to be done 80% mechanically, and 20% manually. The excavation is to be done with supporting and pumping of ground water for the foundation pit. After the excavation, grade the bottom of the pit with accuracy of $\pm 1.5\text{cm}$ and compact the subsoil to the compressibility module of $M_s=15.0\text{MPa}$ . Transportation of excavated soil up to a distance of 5km to a disposal determined by the Supervisor. $20.0 \cdot (6.0+2.0)/2 \cdot 4.4 + (1.6+4.0)/2 \cdot 2.8 \cdot 2 = 367.6$ 8m3 Calculation per m3 of incorporated material.	m3	367.68		
2	Mechanical excavation of earth in cascade excavation, 2nd to 4th category, for the purpose of removing deformed and moved soil of the slope below the road in the section affected by the landslide. The excavation is done with stepped cutting from the top to the bottom. Transportation of excavated soil up to the distance of 5mk to a disposal determined by the Supervisor. Calculation per m3 of removed material.	m3	3,646.81		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
3	Excavation of earth of 2nd to 4th category for the purpose of constructing drainage trench to the depth of 1.5m, with supporting as needed. Cut the sides regularly and level the bottom. Transportation of excavated soil up to the distance of 5mk to a disposal determined by the Supervisor. 115.33*1.5*0.60=103.80m3 Calculation per m3 of removed material.	m3	103.80		
4	Construction of embankment from crushed stone. The size of the incorporated stone is max=15cm. Tip the crushed stone, spread, pile as good as possible, and in the end compact the layer. Crushed stone must be firm and clean and resistant to frost, with compressive strength of >100MPa and with excellent resistance properties $\phi > 35^\circ$ and granulation of Cu >9-30. Compaction is to be done with appropriate mechanical means in layers of 50-80cm. The compaction degree of the layers must be fully in accordance with SPRS U. E1.010 and designed technical requirements. The works cover the supply of material, spreading, coarse and fine grading, wetting and compacting of embankment. Calculation per m3 of completed embankment.	m3	3,125.60		
5	Supply, transportation and incorporation of a filter layer from stone chippings (1-6cm) with the thickness of 40cm. 115.33*0.6*0.4=27.68m3 Calculation per m3 of incorporated material.	m3	27.68		
6	Supply, transportation and installation of non-woven geotextile of the type 300 (300gr/m2) as a filter layer at the joint of the new material of the fill with the old, as protection against siltation. 1111.34+132.60+86.86=1330.80m2 Calculation per m2 of incorporated material.	m2	1,330.80		
7	Supply and laying of HDPE double layer corrugated drain pipe, with a diameter of 200mm on the bottom of the drainage trench. The pipes are perforated on the upper part, and they are supplied with all fittings and material for joining. Introduce the pipe into the shaft at the place of the pipe culvert. Calculation per m of laid pipe.	m	115.33		

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
8	Supply of material and construction of lining of the segmentation trench from crushed stone laid in MB15 concrete, with a total thickness of 25-30cm and width of ~100cm. The price includes the supply and construction of concrete base. Calculation per m of completed lining.	m	89.50		
9	Making of vegetative course with a thickness of 20cm on the slopes of the new embankment. Topsoiling is to be done by using active topsoil material which guarantees durability of the vegetation. $128.48+35.41*(30+21)/2=1031.44m^2$ Calculation per m2 of topsoiled surface.	m2	835.05		
<b>TOTAL:</b>					
<b>III CONCRETE WORKS</b>					
1	Construction of pipe culvert, Ø1000. The item includes the supply, laying and joining of Ø1000 pipes on a layer of concrete base according to the design, fully in accordance with the SRPS U.N1.054 standard. Outlet head is constructed according to the details given in the design, and in accordance with the SRPS U.S4.032 standard. The quality of pipes must comply with the SRPS U.N1.050 standard. Calculation per m of completed culvert.	m	20.00		
2	Construction of the RC manhole with frontal inlet from MB30 concrete, resistant to frost M100, in necessary formwork with mechanical compacting and according to the regulations for this kind of works and fully in accordance with the details in the design. Calculation per m3 of manhole concrete.	m3	3.56		
3	Supply, transportation and construction of RC trapezoidal drainage canal from MB30 concrete, resistant to frost M-100. Calculation per m of completed canal.	m	46.65		
4	Supply, transportation and installation of prefabricated elements with a tooth for draining water from the gutter, from MB30 concrete, resistant to frost M-100. Calculation per m of canal.	m	2.00		
<b>TOTAL:</b>					

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>IV OTHER WORKS</b>					
1	Demolition of asphalt surfacing of the road in the section planned by the design for the replacement of the pipe culvert, i.e. along the edge of the front of material replacement. The item includes the following: demolition, loading and transportation of demolished material to a disposal determined by the Supervisor within 5km. Calculation per m <sup>2</sup> of demolished road surface.	m2	162.89		
2	Supply, transportation and incorporation of lower bearing course of the pavement from crushed stone aggregate of 0/63mm of continuous granulometric composition, with a thickness of 25cm in compacted state. Calculation per m3 of incorporated material.	m2	162.89		
3	Supply, transportation and incorporation of lower bearing course of the pavement from crushed stone aggregate of 0/31mm of continuous granulometric composition, with a thickness of 25cm in compacted state. Calculation per m3 of incorporated material.	m2	162.89		
4	Supply, transportation and incorporation of the upper bitumenous base course from BNS22 (10cm thick). Calculation per m2 of completed course.	m2	162.89		
5	Supply, transportation and incorporation of wearing course of the road surface from AB11 asphalt with the thickness of 4cm in the part of the road section which is being remedied and fitting into the existing road surface. Calculation per m2 of completed course.	m2	162.89		
6	Construction of shoulders from crushed stone aggregate with the size of 0 - 31.5mm. 31.37*0.295=9.25m3 Calculation per m3 of incorporated material.	m3	9.25		
7	Construction of gutter from asphalt-concrete according to the SRPS U.S4.062 standard in the length of ~130m along the left edge of the road. The gutter is made from concrete curb 18/24 with concrete quality of MB30, resistance to frost of M100 on the base from compacted concrete MB15 and asphalt-concrete layer with the thickness of 10cm to the joint with the existing road surface. Calculation per m of constructed gutter.	m	130.00		
<b>TOTAL:</b>					

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>V TRAFFIC SIGNALIZATION AND ROAD FURNITURE</b>					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	28.80		
2	<b>Road furniture</b>				
	Guar rail N2W5	m	100.00		
	Oblique gurad rail endinngs N2W4 L=12m	pcs	2.00		
	Reflective studs (catadiopters)	pcs	10.00		
3	<b>Temporary traffic signalization</b>	lump sum	1.00		
<b>TOTAL:</b>					

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH WORKS	
III CONCRETE WORKS	
IV OTHER WORKS	
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 170, SECTION: SEDLARE - DEBELO**  
**BRDO,**  
**from km 14+960 to km 14+978, ID-3732**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying - pegging of road surfaces, elementary and detailed bench marks, with marking protocol.	lump sum	1.00		
3	Felling of trees, clearing of undergrowth and small vegetation.	lump sum	1.00		
4	Demolition of pavement, transportation and excavation, damaged surface: 56.96 m <sup>2</sup>	m <sup>2</sup>	56.96		
5	Demolition of asphalt surfacing 7cm with transportation up to 3km, surface: 3*40-57=63 m <sup>2</sup>	m <sup>2</sup>	63.00		
<b>TOTAL:</b>					
<b>II EARTH AND DRAINAGE WORKS</b>					
6	Bulk excavation of soil from second to fourth category for the purpose of replacement of deformed and waterlogged ground on the landslide. Excavation is to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated ground to adisposal, determined by the Supervisor to a distance of up to 2 km. This position covers the work in wet conditions. The disposal is to be done in layers of 40 cm and partially compacted. Calculation per m <sup>3</sup> of excavated material.	m <sup>3</sup>	2,162.37		

7	Excavation for the purpose of construction of drainage trenches, manhole and foundations in the soil of second to fourth category, 80% mechanically, 20% manually, with supporting of trenches with strong timber. The excavation of trenches involves work in wet and damp soil with possible pumping of water. Excavated soil is to be transported to a disposal at a distance of up to 2 km. The disposal is to be done in layers of up to 40 cm and partially compacted. Calculation per m3 of excavated material.	m3	151.79		
8	Supply, transportation and incorporation of drainage material from crushed stone with the grain size of 10-25cm of continuous granulation fully in accordance with the design. Calculation per m3 of incorporated material.	m3	7.70		
9	Construction of embankment from rock rubble, partially from excavation, without adding clay, which has the internal friction angle of $\phi \geq 30^\circ$ . Compaction is to be done in layers of 30cm - with 100% compaction by Proctor	m3	3,240.88		
10	Construction of bearing parts of the pavement according to SRPS U.E4.014. Subgrade from crushed stone aggregate of 0/63mm (35cm thickness). Levelling of layers with a grader, with manual repair and rolling with vibrating rollers. $57 \times 1.35 \times 0.35 =$	m3	26.93		
11	Construction of the bearing layer from crushed stone aggregate of 0/31mm (d=25cm). Levelling of layers with a grader, with manual repair and rolling with vibrating rollers. $57 \times 1.35 \times 0.25$	m3	19.24		
12	Construction of the upper bitumenous base course from BNS 32 with the thickness of 7cm according to SRPS U.E4.014	m2	57.00		
13	Construction of the wearing course of asphalt concrete from AB 11 with the thickness of 5cm according to SRPS U.E4.014.	m2	240.00		

14	Supply, transportation and incorporation of non-woven geotextile of the type 300 (300gr/m2) as a filter drainage layer in behind the retaining wall. Calculation per m2 of incorporated material.	m2	323.00		
15	Construction of a clay cap from a layer of compacted clay with the thickness of 20cm. Calculation per m3 $(91.74+10.3)*0.2=$	m3	18.32		
16	Topsoiling of slopes, shoulders and berms in the layer of 20cm mixed with grass seed.	m2	1,628.47		
17	Paving of earthen canals with crushed stone in a 25cm thick layer with sealing of the joints with cement mortar in the ratio 1:3. The price includes the supply and transportation of crushed stone, cement mortar and construction of paving. - $4.0*64m+3.21*(34.81+12.46+10.58)$ - pit - approx. 600m2	m2	856.00		
18	Making of gabions, the price includes the supply of galvanized wire, making of gabion cage from galvanized wire and filling from crushed stone - lime stone	m3	440.62		
			<b>TOTAL:</b>		
<b>III CONSTRUCTION WORKS</b>					
1	Construction of gutters from asphalt with the thicknes of 6cm and width of 50cm with gray prefabricated curb 18/24	m1	44.50		
2	Construction of open concrete canal from MB30, M-150. The item involves concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork.	m1	21.67		
			<b>TOTAL:</b>		
<b>V TRAFFIC SIGNALIZATION AND ROAD FURNITURE</b>					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	5.88		
2	<b>Road furniture</b>				
	Guard rail N2W5	m	56.00		
	Oblique gurad rail endinngs N2W5 L=12m	pcs	1.00		
	Reflective studs (catadiopters)	pcs	6.00		
	Removal of the existing gurad rail	m	56.00		
3	<b>Temporary traffic signalization</b>	lump sum	1.00		
			<b>TOTAL:</b>		

**SUMMARY:**

<b>GROUP OF WORKS</b>	<b>TOTAL</b>
I PRELIMINARY WORKS	
II EARTH AND DRAINAGE WORKS	
III CONCRETE WORKS	
IV TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 170, SECTION: SEDLARE - DEBELO BRDO,**  
**from km 22+130 to km 22+150, ID-3733**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Clearing of undergrowth and small vegetation.	lump sum	1.00		
4	Demolition of damaged structure due to the construction of the drainage trench A-B and construction of the road embankment.	lump sum	1.00		
5	Demolition of the existing pipe culvert of Ø1000.	lump sum	1.00		
<b>TOTAL:</b>					
<b>II EARTH AND DRAINAGE WORKS</b>					
1	Bulk excavation of earth of 3rd and 4th category for the purpose of replacing sladed material in the road embankment and construction of draiange trenches. Excavation to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated soil to a disposal at a distance up to 2 km. This item involves works in wet conditions. Side cut of the embankment: 8076.38m3 trench J-L: 1323.22m3 trench B-I: 3465.75m3 trench M-N: 298.96m3 trench A-B-C: 2469.74m3	m3	15,634.05		

2	Construction of fill on a side cut and backfilling of the drainage trench A-B-C from crushed stone with the size of 10-25cm with continuous granulation, with necessary compaction in layers of 50cm to compressibility module of $M_s=40\text{MPa}$ . The stone must have the internal friction angle of $\phi \geq 35^\circ$ . Fill: 7420.76m <sup>3</sup> trench A-B-C: 1648.69m <sup>3</sup>	m <sup>3</sup>	9,069.45		
3	Filling of drain trenches with crushed stone with the size of 10 -25cm, with continuous granulation fully in accordance with the design. Calculation per m <sup>3</sup> of filled material. trench J-L: 693.13m <sup>3</sup> trench B-I: 1983.54m <sup>3</sup> trench M-N: 188.12m <sup>3</sup>	m <sup>3</sup>	2,864.79		
4	Supply, transportation, cutting, bending and installation of reinforcement for the RC retaining wall and front walls 1, 2 and 3. RA400/500 RC wall: 1055.0kg front walls 1, 2 and 3: 733.9kg Calculation per kg of incorporated steel	kg	1,788.90		
5	Filter layer from thermopressed non-woven geotextile of the type 300, (300 g/m <sup>2</sup> ). Calculation per m <sup>2</sup> of laid geotextile. Cut: 2363.41m <sup>2</sup> trench J-L: 704.15m <sup>2</sup> trench B-I: 1286.52m <sup>2</sup> trench M-N: 368.32m <sup>2</sup> trench A-B-C:1150.09m <sup>2</sup>	m <sup>2</sup>	5,872.49		
6	Backfilling of drain trenches and temporary bulk excavations for trenches with earth material from soil obtained by digging drain trenches. Calculation per m <sup>3</sup> of filled material. trench J-L: 630.09m <sup>3</sup> trench B-I: 2000.45m <sup>3</sup> trench M-N: 110.84m <sup>3</sup> trench A-B-C: 820.61m <sup>3</sup>	m <sup>3</sup>	3,561.99		
7	Construction of clay cap from a layer of compacted clay with the thickness of 30cm above the retaining RC wall.	m <sup>3</sup>	12.00		
			<b>TOTAL:</b>		

III CONCRETE WORKS					
1	Construction of the open concrete canal 1 and 2 from MB30, M-100. The item covers concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork. RC canal 1: L=32.1m, 283.7kg RC canal 2: L=15.2m, 115.1kg Calculation per m1 of constructed canal.	m'	47.30		
2	Supply, transportation and incorporation of MB30 concrete, M-150, for the construction of retaining wall, into preprepared formwork in layers with the thickness of 30cm with mechanical compaction of each layer according to applicable regulations for this kind of works. This item covers necessary carpentry works on the preparation of formwork and scaffolding and concrete curing after concreting. This item also includes the construction of weep holes in the wall.	m3	40.80		
3	Construction of concrete front walls at the outlet of the drain trenches. The item covers necessary planing of the groud, with necessary formwork, fully in accordance with the details from the design. Calculation per m <sup>3</sup> of incorporated concrete. front walls 1 and 2: 25.2m3	m3	39.60		
4	Supply and laying of PVC pipes with Ø300 below the access road for the drainage of water from the prefabricated pipe shaft to the RC canal 1.	m'	5.50		
5	Construction of the prefabricated pipe manhole from prefabricated concrete pipes of Ø1000.	m'	2.50		
			<b>TOTAL:</b>		
IV PAVEMENT					
1	Construction of the lower bearing course of the pavement from a layer of crushed stone, with grain size up to 0-63mm, of continuous granulometric composition, 25cm thick in compacted state, in the length of 88.1m. 1.14*88.1=100.4m3	m3	100.40		

2	Construction of the lower bearing course of the pavement structure from a layer of crushed stone, with grain size up to 0-31mm, of continuous granulometric composition, 20cm thick in compacted state, in the length of 88.1m. 0.8*88.1=70.48m <sup>3</sup>	m <sup>3</sup>	70.48		
3	Demolition of the asphalt surfacing of the road in the section planned by the desing for the construction of new asphalt surfacing in the length of 88.1m. The item includes: demolition, loading and transportation of demolished material to a disposal at a distance of up to 2km. Calculation per m <sup>2</sup> of demolished pavement.	m <sup>2</sup>	519.80		
4	Construction of the upper bitumenous base course from BNS 22, with a thickness of 7cm on the entire width of the road according to SRPS U.E4.014. in the length of 88.1m. 5.9*88.1=519.8m <sup>2</sup>	m <sup>2</sup>	519.80		
5	Construction of the wearing course from asphalt concrete AB 11 with a thickness of 5cm on the entire eidth of the road according to SRPS U.E4.014. in the length of 88.1m. 5.9*88.1=519.8m <sup>2</sup>	m <sup>2</sup>	519.80		
6	Construction of concrete gutter on the left and right side of the road and concrete channel in the zone of the RC wall from MB40.	m'	155.00		
7	Topsoiling of the slopes of the new embankment, shoulders and berms in a layer of 20cm mixed with grass seed.	m <sup>2</sup>	1,635.61		
8	Excavation of earth in front of the spandrel wall in bulk excavation for controlled drainage of water, according to the details from the design. front wall 1: 3.23m <sup>3</sup> front wall 2: 81.74m <sup>3</sup> front wall 3: 84.15m <sup>3</sup>	m <sup>3</sup>	169.12		
			<b>TOTAL:</b>		

V TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	5.52		
2	<b>Road furniture</b>				
	Guardrail H1W5	m	56.00		
	Reflective studs (catadiopters)	pcs	5.00		
	Removal of the existing safety fence	m	56.00		
3	<b>Temporary traffic signalization</b>	lump sum	1.00		
<b>TOTAL:</b>					

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH AND DRAINAGE WORKS	
III CONCRETE WORKS	
IV PAVEMENT	
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 170, SECTION: SEDLARE - DEBELO BRDO,**  
**from km 22+190 to km 22+208, ID-3734**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Clearing of undergrowth and small vegetation.	lump sum	1.00		
<b>TOTAL:</b>					
<b>II EARTH AND DRAINAGE WORKS</b>					
1	Bulk excavation of earth of 3rd and 4th category for the purpose of replacing sladed material in the embankmnet and construction of draiange trenches. Excavation to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated soil to a disposal at a distance up to 2 km. This item involves works in wet conditions. side cut of the embankment: 3875.89m3 trench D-G-H: 1323.22m3 trench F-G: 3465.75m3 trench C-D-E: 298.96m3	m3	7,185.12		
2	Construction of embankment on a side cut and backfilling of the drainage trench A-B-C from crushed stone with the size of 10-25cm with continuous granulation, with necessary compaction in layers of 50cm to compressibility module of Ms=40MPa. The stone must have the internal friction angle of $\phi \geq 35^\circ$ . Embankment: 3177.91m3 trench C-D-E: 367.09m3	m3	3,545.00		
3	Filling of drain trenches with crushed stone with the size of 10 -25cm, with continuous granulation fully in accordance with the design. Calculation per m3 of filled material. trench D-G-H: 724.27m3 trench F-G: 713.45m3	m3	1,437.72		

4	Supply, transportation, cutting, bending and installation of reinforcement for the RC shaft and head wall 4. RA400/500 and MA500/560 RC shaft: 1055.0kg head wall 4: 733.9kg Calculation per kg of incorporated steel.	kg	803.70		
5	Filter layer from thermopressed non-woven geotextile of the type 300, (300 g/m2). Calculation per m2 of laid geotextile. Cut: 1278.73m2 trench C-D-E: 536.38m2 trench D-G-H: 894.66m2 trench F-G: 884.04m2	m2	3,593.81		
6	Backfilling of drain trenches and temporary bulk excavations for trenches with earth material from soil obtained by digging drain trenches. Calculation per m3 of filled material. trench C-D-E: 167.51m3 trench D-G-H: 246.52m3 trench F-G: 646.33m3	m3	1,060.36		
			<b>TOTAL:</b>		
<b>III CONCRETE WORKS</b>					
1	Construction of the open concrete canal 3 and 4 from MB30, M-100. The item covers concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork. RC canal 3: L=47.2m, 470.1kg Rc canal 4: L=74.11m, 760.3kg Calculation per m1 of constructed canal.	m'	121.30		
2	Supply, transportation and installation of separators for the purification of light petroleum products without bypass of the type Oleopator with the capacity of 100l/s (according to EN858-1) and connecting with the RC 'bathtub' and RC manhole with Æ300 pipes.	pcs	1.00		
3	Construction of the RC 'bathtub' behind the RC canal 3 at the inlet to the separator, with MB30 concrete, M-150. The item covers concreting, supply and incorporation of mesh reinforcement with necessary formwork.	m3	0.96		

4	Complete construction of the RC manhole with cover, from MB30 concrete, M-150, under the protection of supporting timbering and pumping of any groundwater. The concrete filling is to be done from the inner formwork to the excavation with pulling out of the timber, fully in accordance with the detail from the design. Calculation per m <sup>3</sup> of incorporated concrete.	m3	7.40		
5	Construction of concrete head wall at the outlet of the drain trench. The item covers necessary planing of the ground, with necessary formwork, fully in accordance with the detail from the design. Calculation per m <sup>3</sup> of incorporated concrete. head wall 4: 14.05m3	m3	14.05		
6	Supply and laying of RC pipes for the construction of culvert inlet of Ø1000, MB40, reinforced with Q785. Around the pipe culvert make a concrete lining from MB30 concrete, according to SRPS U.S4.034. The price includes the construction of the outlet head of the culvert. Calculation per m' of laid pipe.	m'	11.00		
7	Filling of the trench after the construction of the concrete culvert with gravel-sand material, with the grain size of 0-63 mm. The soil from sand-gravel material should be of continuous granulometric composition, with the coefficient of uniformity of Cu>15, coefficient of curvature of Cc=1-3; percentage of particles smaller than 0.06mm up to 5%, CBR >30%; sand equivalent Es>60, compressibility module of Ms=60MPa	m3	77.33		
			<b>TOTAL:</b>		
<b>IV PAVEMENT</b>					
1	Construction of the lower bearing course of the pavement from a layer of crushed stone, with grain size up to 0-63mm, of continuous granulometric composition, 25cm thick in compacted state, in the length of 42.57m. 1.14*42.57+0.92*8.65=56.49m3	m3	56.49		

2	Construction of the lower bearing course of the pavement from a layer of crushed stone, with grain size up to 0-31mm, of continuous granulometric composition, 20cm thick in compacted state, in the length of 88.1m. $0.8*42.57+0.65*8.65=39.7m^3$	m3	39.70		
3	Demolition of the existing pavement of the road in the section planned by the design for the construction of new pavement in the length of 42.57m. The item includes: demolition, loading and transportation of demolished material to a disposal at a distance of up to 2km. Calculation per m2 of demolished pavement.	m2	251.16		
4	Construction of the upper bituminous base course from BNS 22, with a thickness of 7cm on the entire width of the road according to SRPS U.E4.014. in the length of 42.57m. $5.9*42.57=251.16m^2$	m2	251.16		
5	Construction of the wearing course from asphalt concrete AB 11 with a thickness of 5cm on the entire width of the road according to SRPS U.E4.014. in the length of 42.57m. $5.9*42.57=251.16m^2$	m2	251.16		
6	Construction of concrete gutter on the left and right side of the road from MB40.	m'	68.57		
7	Topsoiling of the slopes of the new embankment, shoulders and berms in a layer of 20cm mixed with grass seed.	m2	907.05		
8	Excavation of earth in front of the head wall in bulk excavation for controlled drainage of water, according to the details from the design.	m3	48.70		
9	Paving in front of the head wall 4 with crushed stone with the thickness of 25cm with sealing of joints with cement mortar in the ratio 1:3. The price covers the supply and transportation of crushed stone, cement mortar and paving.	m2	48.95		
			<b>TOTAL:</b>		

V TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	10.56		
2	<b>Road furniture</b>				
	Guard rail H1W5	m	88.00		
	Reflective studs (catadiopters)	pcs	7.00		
3	<b>Temporary traffic signalization</b>	lump sum	1.00		
<b>TOTAL:</b>					

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH AND DRAINAGE WORKS	
III CONCRETE WORKS	
IV PAVEMENT	
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 175, SECTION: BOGDANOVIĆA BRDO -**  
**DIVČIBARE,**  
**from km 35+880 to km 35+900, ID-3600**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Clearing of undergrowth and small vegetation.	lump sum	1.00		
<b>TOTAL:</b>					
<b>II EARTH AND DRAINAGE WORKS</b>					
1	Excavation of earth from 2nd to 4th category for the purpose of constructing gabion wall, pipe culverts and manhole. The excavation is to be done 80% mechanically, and 20% manually. The excavation is to be done with supporting timber and pumping of groundwater from the foundation pit. After the excavation, grade the pit bottom with accuracy of $\pm 1.5\text{cm}$ and compact the subsoil to the compressibility module of $M_s=15.0\text{MPa}$ . Transportation of excavated soil to be done up to a distance of 5km to a disposal determined by the Supervisor. Calculation per $\text{m}^3$ of removed material.	$\text{m}^3$	418.37		
2	Mechanical excavation of earth in side cut excavation, 2nd to 4th category, for the purpose of removing deformed and slided soil of the slope below the road in the section affected by the landslide. The excavation is done with side cut from the top to the bottom. Transportation of excavated soil up to a distance of 5km to a disposal determined by the Supervisor. $134.52 \cdot (30+12+9)/2 + 17.64 \cdot 4 = 3500.82\text{m}^3$ Calculation per $\text{m}^3$ of removed material.	$\text{m}^3$	3,500.82		

3	Excavation of earth in 2nd and 4th category of soil for the purpose of constructing drain trench up to the depth of 1.5m, with supporting as needed. Cut the lateral sides regularly and level the bottom. Transportation of excavated material up to a distance of 5km to a disposal determined by the Supervisor. 79.24*1.5*0.60=71.32m3. Calculation per m3 of removed material.	m3	71.32		
4	Supply, transportation and construction of 'mattress' from coursed crushed stone in the embankment base. The size of the incorporated stone is $d_{max}= 25\text{cm}$ . Tip the crushed stone, spread, arrange as good as possible, and compact in the end. The stone must be firm and clean and resistant to frost, with compressive strength of 100MPa and with good resistance properties $\phi > 42^\circ$ . 8.28*30=248.4m3. Calculation per m3 of completed 'mattress'.	m3	248.40		
5	Construction of embankment from smaller crushed stone. The size of the incorporated stone is $d_{max}= 15\text{cm}$ . Tip the crushed stone, spread, arrange as good as possible, and compact in the end. The stone must be firm and clean and resistant to frost, with compressive strength of 100MPa and with good resistance properties $\phi > 35^\circ$ and granulation of $C_u > 9-30$ . Compaction to be done by appropriate mechanical means in layers of 50-80cm. The compaction degree of the layers must be fully in accordance with SPRS U. E1.010 and designed technical solutions. The works cover the supply of material, spreading, coarse and fine grading, wetting and compacting of the embankment. Calculation per m3 of constructed embankment.	m3	3,252.42		
6	Supply, transportation and incorporation of filling behind the gabion wall from crushed stone material, with the grain size of $d_{max}=15\text{cm}$ . Calculation per m3 of incorporated material.	m3	294.12		
7	Supply, transportation and incorporation of filter layer from stone chippings (1-6cm) with the thickness of 40cm. 79.24*0.6*0.4=19.02m3. Calculation per m3 of incorporated material.	m3	19.02		

8	Supply, transportation and incorporation with mechanical compaction of crushed stone 0-31.5mm for securing foundation ground of the gabion wall in the section along the drain trench. $0.67 \times (49.4 + 2 \times 1.0) = 34.44 \text{m}^3$ . Calculation per m3 of incorporated material.	m3	34.44		
9	Supply, filling and compacting of base layer from gravel material to compaction degree of $M_s = 25 \text{MPa}$ in a 20 cm thick layer over previously planed and compacted subsoil of the foundation joint of the gabion wall. Unit price covers all necessary work, material, machinery and transportation of necessary material. $2.5 \times 49.4 = 123.5 \text{m}^3$ . Calculation per m2 of constructed layer.	m2	123.50		
10	Supply and laying of non-woven geotextile as lining of the 'bed' from polypropylene fibers (PP), with tensile strength of geotextile of $\beta_z \geq 60 \text{ kN/m}$ , elongation of $\epsilon \leq 20\%$ . $35.46 \times 30 + 10 \times 0.8 \times 2 = 1079.8 \text{m}^2$ Calculation per m2 of laid geotextile.	m2	1,079.80		
11	Supply, transportation and incorporation of non-woven geotextile of the type 300 (300gr/m2) as a filter layer at the joint of the new fill material with the old, in order to protect against siltation. $36.20 \times (30 + 21) / 2 + 134.52 \times 2 = 1192.14 \text{m}^2$ Calculation per m2 of incorporated material.	m2	1,192.14		
12	Supply, transportation and incorporation of non-woven geotextile of the type 300 (300gr/m2) as a filter layer of drain filling behind the gabion wall, in order to protect against siltation. Calculation per m2 of incorporated material.	m2	458.25		
13	Supply, transportation and making of the filling of gabion cages from crushed stone. The crushed stone should be of the size of 10-25cm, piled in a regular shape, resistant to water. The internal friction angle of the crushed stone should be greater than $40^\circ$ , and compressive strength $\beta_p > 100 \text{MPa}$ . $8.00 \times 49.4 = 395.2 \text{m}^3$ . Calculation per m3 of incorporated material.	m3	395.20		

14	Supply and laying of gabion cages, made from double twisted hexagonal steel mesh, with tensile strength of $bz=380-550N/mm^2$ . The wires are hard galvanized with GALFANOM (alloy of zinc and aluminum, Zn-5%Al) with min. 230-245g/m <sup>2</sup> . Interconnect gabions with steel rings with a diameter of 3.0mm, tensile strength of 170kg/mm <sup>2</sup> , at a distance of 200mm, or with cable wires (binding wires) with a diameter of 3.0mm, hard galvanized or galvanized with galfan. Cage dimensions are 1.0x1.0x1.0-2.5m. 26.0*49.2+8.0*49=1671.2m <sup>2</sup> . Calculation per m <sup>2</sup> of incorporated hexagonal mesh.	m <sup>2</sup>	1,671.20		
15	Supply and laying of HDPE corrugated double layer drain pipe, with a diameter of 200mm on the bottom of the drain trench. The pipes are perforated on the upper side, and they are supplied with all fittings and joining material. Introduce the pipe into the manhole at the place of pipe culvert. The price includes all works, transportation and material for completion of the item. Calculation per m' of laid pipe.	m	79.24		
16	Supply of material and construction of lining of the segmental trench from crushed stone laid into MB15 concrete, with the total thickness of 25-30cm and width of ~100cm. The price includes the supply and construction of the concrete base. 49.43+2*1.0+12.48+15.33=79.24m'. Calculation per m' of completed lining.	m	79.24		
17	Making of the vegetative layer with the thickness of 20cm on the slopes of the new embankment. Topsoiling to be done by using active topsoil material that guarantees durability of the vegetation. 128.48+35.41*(30+21)/2=1031.44m <sup>2</sup> Calculation per m <sup>2</sup> of topsoiled surface.	m <sup>2</sup>	1,031.44		
			<b>TOTAL:</b>		

### III CONCRETE WORKS

1	Construction of pipe culverts, Ø1000. The item includes the supply, laying and joining of Ø1000 pipes on a layer of concrete base according to the design, fully in accordance with the SRPS U.N1.054 standard. The pipes are coated with MB20 concrete fully in accordance with the SRPS U.S4.034 standard. Outlet head is constructed according to the details given in the design, and in accordance with the SRPS U.S4.032 standard. The quality of pipes must comply with the SRPS U.N1.050 standard. Two pipe culverts are being constructed: 'upper' with the length of 13.7m and 'lower' with the length of 6.1m. 13.7+6.1=19.8m'. Calculation per m' of completed culvert.	m	19.80		
2	Construction of the RC manhole with frontal inlet from MB30 concrete, resistant to frost M100, in necessary formwork with mechanical compacting and according to the regulations for this kind of works and fully in accordance with the details in the design. Calculation per m3 of concreted manhole.	m3	3.55		
3	Construction of the RC manhole with frontal inlet and side trench from MB30 concrete, resistant to frost M100, according to the SRPS U.S4.025 standard in separate formwork with mechanical compacting and according to the regulations for this kind of works and fully in accordance with the details in the design. Calculation per m3 of concreted manhole.	m3	3.73		
4	Supply, transportation and construction of RC trapezoidal drainage canal from MB30 concrete, resistant to frost M-100. Calculation per m' of completed canal.	m	38.00		
5	Supply, transportation and installation of prefabricated elements of canal with a tooth for draining water from the gutters, from MB30 concrete, resistant to frost M-100. Calculation per m' of canal.	m	7.50		
			<b>TOTAL:</b>		

**IV OTHER WORKS**

1	Demolition of pavement of the road in the section planned by the design for the replacement of the pipe culvert, i.e. along the edge of the front of material replacement. The item includes the following: demolition, loading and transportation of demolished material to a disposal determined by the Supervisor within 5km. Calculation per m <sup>2</sup> of demolished road surface pavement.	m2	44.13		
2	Supply, transportation and incorporation of lower bearing course of the pavement from crushed stone aggregate of 0/63mm of continuous granulometric composition, with a thickness of 25cm in compacted state. Calculation per m2 of incorporated material.	m1	43.13		
3	Supply, transportation and incorporation of lower bearing course of the pavement from crushed stone aggregate of 0/31mm of continuous granulometric composition, with a thickness of 25cm in compacted state. Calculation per m2 of incorporated material.	m2	44.13		
4	Supply, transportation and incorporation of the upper bitumenous base course from BNS22 (10cm thick). Calculation per m2 of completed course.	m2	44.13		
5	Supply, transportation and incorporation of wearing course of the carriageway from AB16 asphalt with the thickness of 6cm in the part of the road section which is being remedied and fitting into the existing pavement. Calculation per m2 of completed course.	m2	44.13		
6	Construction of shoulders from crushed stone aggregate with the size of 0 - 31.5mm. $79.24 \times 0.082 = 6.50 \text{m}^3$ Calculation per m3 of incorporated material.	m3	6.50		
7	Construction of gutter from asphalt-concrete according to the SRPS U.S4.062 standard in the length of ~200m along the left edge of the road. The gutter is made from concrete curb 18/24 with concrete quality of MB30, resistance to frost of M100 on the base from compacted concrete MB15 and asphalt-concrete layer with the thickness of 10cm to the joint with the existing pavement. Calculation per m' of constructed gutter.	m	200.00		
			<b>TOTAL:</b>		

V TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	2.76		
2	<b>Temporary traffic signalization</b>	lump sum	1.00		
<b>TOTAL:</b>					

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH AND DRAINAGE WORKS	
III CONCRETE WORKS	
IV OTHER WORKS	
VI TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 175, SECTION: BOGDANOVIĆA BRDO -**  
**from km 39+410 to km 39+450, ID-3601**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Preparatory works relating to the clearing of undergrowth with a bulldozer and felling of trees on the part of the slope that is being reconstructed, with transportation up to 2km.	m2	714.00		
4	Demolition of the part of the existing concrete wall on the right side of the road in the length of ~9.0m for the purpose of building the RC wall 1.	lump sum	1.00		
<b>TOTAL:</b>					
<b>II EARTH AND DRAINAGE WORKS</b>					
1	Bulk excavation of the displaced material of the 1st and 2nd category on the slope and bringing the slope inclination into the designed state according to the details from the Design. Bulk excavation is to be done 100% mechanically, with loading and transportation of the excavated material to a length of up to 2km.	m3	940.08		
2	Excavation of the earth of 5th and 6th category for the purpose of founding of the retaining RC wall. The excavation is to be done 100% mechanically. The excavated trenches, as needed, partly support and timber. The excavation of earth involves working in wet conditions with possible pumping of water. Transportation of excavated soil to a length of up to 2km. Foundations of the supporting structure to be executed according to the plans in the Design. RC wall 1: 47.21m3 RC wall 2: 64.52m3	m3	111.73		

3	Excavation of earth of 3rd and 4th category for the purpose of founding of the retaining RC wall. The excavation is to be done 100% mechanically, with an excavator. The excavated trenches, as needed, partly support and timber. The excavation of earth involves working in wet conditions with possible pumping of water. Transportation of excavated soil to a length of up to 2km. Foundations of the supporting structure to be executed according to the plans in the Design. RC wall 1: 96.78m3 RC wall 2: 445.29m3	m3	542.07		
4	Excavation for the purpose of constructing a drain trench in the soil of 3rd and 4th category, 80% mechanically, 20% manually, while supporting the trenches with strong timber. The excavation of the trenches involves working in damp and wet soil with possible pumping of water. Transportation of excavated soil to a length of up to 2km. Calculation per m3 of excavated material.	m3	103.25		
5	Filling of drain trenches and filling behind the RC walls with crushed stone the size of 10-25cm, of continuous granulation fully in accordance with the design. Calculation per m3 of filled material. drainage: 68.14m3 RC wall 1: 107.99m3 RC wall 2 and replacement of material in the fill: 177.14m3	m3	353.27		
			<b>TOTAL:</b>		
<b>III CONCRETE WORKS</b>					
1	Supply, transportation and incorporation of base concrete for the construction of the foundation of the RC walla and RC canal from MB20 concrete. RC wall 1: 9.68m3 RC wall 2: 10.52m3	m3	20.20		

2	<p>Supply, transportation and incorporation of concrete for the construction of retaining wall, of the type MB30, M-150, into preprepared formwork in layers of 30cm with mechanical compaction of each layer according to the applicable regulations for this kind of works.</p> <p>This item covers all necessary carpentry works on the preparation of the formwork and scaffolding, and the curing of concrete after concreting.</p> <p>RC wall 1: 96.64m<sup>3</sup> RC wall 2: 132.39m<sup>3</sup></p>	m <sup>3</sup>	229.03		
3	<p>Supply, transportation, cutting, shaping and laying of ribbed reinforcement RA 400/500 and mesh reinforcement MA 500/560</p> <p>RC wall 1: 5207.74kg RC wall 2: 4629.49kg</p>	kg	9,837.23		
4	<p>Filter layer from thermopressed non-woven geotextile of the type 300, (300 g/m<sup>2</sup>).</p> <p>Calculation per m<sup>2</sup> of laid geotextile.</p> <p>Drainage: 256.37m<sup>2</sup> RC wall 1: 224.00m<sup>2</sup> RC wall 2: 255.77m<sup>2</sup></p>	m <sup>2</sup>	736.14		
5	<p>Construction of clay cap from a layer of compacted clay with the thickness of 30cm above the drain trenches and filling behind the RC walls.</p> <p>Drainage: 12.4m<sup>3</sup> RC wall 1: 25.99m<sup>3</sup> RC wall 2: 10.24m<sup>3</sup></p>	m <sup>3</sup>	48.63		
6	<p>Construction of open concrete canals 1, 2, 3 and 4 from MB30, M-100. The item covers concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork.</p> <p>Calculation per m<sup>1</sup> of constructed canal.</p> <p>RC canal 1: L=50.69m, G=407.5kg RC canal 2: L=26.08m, G=227.2kg RC canal 3: L=44.29m, G=365.3kg RC canal 4: L=14.00m, G=123.7kg</p>	m'	134.91		
7	<p>Construction of prefabricated concrete channel behind the RC wall 1 from MB40</p>	m'	10.00		
8	<p>Construction of concrete gutter on the right side of the road in the zone of the RC wall 2 from MB40</p>	m'	46.00		
9	<p>Construction of weep holes in the body of the RC wall, Ø100</p>	pcs	50.00		

10	Topsoiling of the slope with topsoil layer, 20cm thick, mixed with grass seed.	m2	834.30		
			<b>TOTAL:</b>		
<b>IV PAVEMENT</b>					
1	Construction of the lower bearing course of the pavement structure from a layer of crushed stone, with the grain size of up to 0-63mm, of continuous granulometric composition, 25cm thick in compacted state.	m3	31.10		
2	Construction of the lower bearing course of the pavement structure from a layer of crushed stone, with the grain size of up to 0-31mm, of continuous granulometric composition, 25cm thick in compacted state.	m3	11.54		
3	Construction of the upper bitumenous base course from BNS 22, with a thickness of 8cm according to SRPS U.E4.014.	m2	87.54		
4	Construction of the wearing course from asphalt concrete AB 11 with a thickness of 4cm according to SRPS U.E4.014.	m2	88.32		
	Construction of stabilized shoulders from crushed stone aggregate of 0/31, 10 cm thick	m2	100.00		
			<b>TOTAL:</b>		
<b>V TRAFFIC SIGNALIZATION AND ROAD FURNITURE</b>					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	6.60		
2	<b>Road equipment</b>				
	Guardrail N2W5	m	72.00		
	Oblique guradrail endinngs N2W5 L=12m	pcs	2.00		
	Reflective studs (catadiopters)	pcs	5.00		
3	<b>Temporary traffic signalization</b>	lump sum	1.00		
			<b>TOTAL:</b>		

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH AND DRAINAGE WORKS	
III CONCRETE WORKS	
IV PAVEMENT	
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF II A CLASS NO 175, SECTION: BOGDANOVIĆA BRDO -**  
**DIVČIBARE,**  
**from km 30+250 to km 30+320**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Clearing of the ground from undergrowth and vegetation.	lump sum	1.00		
4	Bulk excavation of earth of 3rd and 4th category for the purpose of replacing deformed and waterlogged soil on the landslide. The excavation is to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated soil to a disposal, determined by the Supervisor, at a distance of up to 2km. The item covers working in wet conditions. The disposal is to be done in layers of 40cm and partially compacted, according to the plan given by the Supervisor. 200.8+113.22	m3	314.02		
5	Excavation for the purpose of constructing drain trenches and culverts in the soil of 3rd and 4th category, 80% mechanically, 20% manually, while supporting the trenches with strong timber. The excavation of the trenches involves working in damp and wet soil with possible pumping of water. Transportation of excavated soil to a disposal determined by the Supervisor at a distance of up to 2km. Part of the excavated soil is not to be transported, but kept for the making of the topsoil layer. The disposal is to be done in layers of 40cm and partially compacted, according to the plan given by the Supervisor.	m3	572.37		
6	Demolition of the pavement base in a layer of 30cm. This item covers demolition, loading and transportation of the demolished material to a disposal determined by the Supervisor up to a distance of 5km.	m2	54.77		

7	Filling of drain canals with crushed stone with the size of 10-25cm, of continuous granulation. Crushed stone should be produced from a rock, which has compressive strength. Water absorption up to 2%.	m3	425.98		
8	Filter layer from thermopressed non-woven geotextile of the type 300, (300 g/m <sup>2</sup> ), for the drain trench and new embankment.	m <sup>2</sup>	1,041.51		
9	Supply and laying of woven geotextile from polyester (RET), with the properties $\beta z=40\text{kN/m}$ , $\epsilon<12\%$ , which wraps the sand-gravel soil or stone debris in the construction of the mattress.	m <sup>2</sup>	329.27		
10	Construction of the mattress from sand-gravel or crushed stone aggregate with the size of 0-31.5mm, wrapped by woven geotextile. Ground from crushed stone aggregate should have: continuous granulometric composition, and properties fully in accordance with the standard for the construction of the final layer of the substructure - SRPS U.E1.010:1981.	m <sup>3</sup>	113.22		
11	Construction of the embankment from sand-gravel or crushed stone aggregate with the grain size of 0-31.5 mm. The ground from sand-gravel or crushed stone aggregate should be of continuous granulometric composition, with the coefficient of uniformity and properties fully in accordance with the standard for the construction of the final layer of the substructure - SRPS U.E1.010:1981.	m <sup>3</sup>	200.80		
12	Construction of the lower bearing course of the pavement from a layer of crushed stone aggregate with the grain size of up to 31.5 mm, with the thickness of 25 cm in compacted state. The material should have medium compressive strength of at least 120 (MPa) in dry state, should be resistant to weathering, water absorption (SRPS B.B8.031) max. 1.6%, should not be prone to degradation due to construction site traffic, weathered grains max. 7%, resistance to abrasion by Los Angeles test max. 40%, should be of continuous granulometric composition, coefficient of uniformity of $CU>15$ , coefficient of curvature of $CC=1-3$ ; $CBR > 80\%$ ; sand equivalent $Es>60$ , compressibility module $M_s = 90\text{MPa}$ ; percentage of particles smaller than 0.06mm up to 5%.	m <sup>3</sup>	18.52		

13	Construction of the upper bitumenous base course from BNS 22, with a thickness of 9cm for the purpose of pavement construction.	m2	74.09		
14	Construction of the wearing course from asphalt concrete AB 11 with a thickness of 4cm for the purpose of pavement construction.	m2	74.09		
15	Construction of asphalt gutter. The price includes the supply, transportation and laying of the 18/24 curb and asphalt.	m1	32.00		
16	Construction of stabilized shoulders and berms.	m2	96.00		
17	Laying of a topsoil layer with the thickness of 20cm on the slopes of the embankment, from the soil obtained by digging drain trenches.	m2	100.00		
18	Construction of clay cap on the surface of the trenches with the thickness of 30cm.	m3	44.48		
19	Supply and incorporation of plastic perforated pipe F300 in the trench.	m1	6.60		
20	Construction of concrete canal, from MB30 concrete, M-150, measuring 50X25X100	m1	60.00		
21	Lean concrete as base under the canal	m3	1.88		
22	Base layer from gravel material under the canal 0.4 X 0.1 X 94m	m3	3.76		
23	Construction of the outlet concrete portal (head walls) from MB 30 concrete, M-150, with formwork.	m3	3.84		
24	Reinforcement for the head wall of the trenches 55.0 x 3 pcs.	kg	165.00		
			<b>TOTAL:</b>		
<b>II TRAFFIC SIGNALIZATION AND ROAD FURNITURE</b>					
1	<b>Horizontal signalization</b>				
	White unbroken line with the width of 0.12m	m2	7.44		
2	<b>Road furniture</b>				
	Guardrail N2W5	m	60.00		
	Oblique guradrail endings N2W5 L=12m	pcs	1.00		
	Reflective studs (catadiopters)	pcs	6.00		
3	<b>Temporary traffic signalization</b>	lump sum	1.00		
			<b>TOTAL:</b>		

**SUMMARY:**

	GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS		
II TRAFFIC SIGNALIZATION AND ROAD FURNITURE		
<b>TOTAL:</b>		

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF IIA CLASS NO 141 SECTION: UB - KOCELJEVA**  
**at km 40+400**

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total dinars
<b>I PRELIMINARY WORKS</b>					
1	Forming of the construction site, security guard service, transportation of machinery, equipment and workers, construction of access roads. Calculation is given as a lump sum.	lump sum	1.00		
2	Clearing and preparation of the ground - manual cutting of thick undergrowth with loading and transportation to a disposal. Calculation is given as a lump sum.	lump sum	1.00		
3	Surveying of designed solution. Calculation is given as a lump sum.	lump sum	1.00		
4	Removal of the existing pavement in approx. 20 cm thick layer, with loading and transportation to a disposal. Calculation is given per m <sup>2</sup> of removed pavement.	m <sup>2</sup>	605.00		
5	Removal of the existing RC canal in a length of 82.5 m, with loading and transportation to a disposal. Calculation is given per m of removed canal.	m	82.50		
6	Disassembling and reassembling of concrete lamppost on the right side of the road. Calculation is given per removed lamppost.	pcs	1.00		
<b>TOTAL:</b>					
<b>II EARTH WORKS</b>					
1	Mechanical excavation of the earth of 2nd and 3rd category from km 0+010 to km 0+100 and in places of cross drains at km 0+020 and 0+060 with mechanical loading and transportation of excess earthen material to a disposal determined by the Supervisor, at a distance of up to 5 km, fully in accordance with the detail from the design. Calculation per m <sup>3</sup> of excavated material.	m <sup>3</sup>	2,122.00		

2	Topsoiling of the embankment slope from km 0+010 to km 0+100 in a layer of 20 cm with topsoil, mixed with grass seed, from a disposal at 60m and the rest with transportation within 5km. This item also includes the topsoiling of shoulders and berms. Calculation per m <sup>2</sup> topsoil.	m <sup>2</sup>	295.00		
3	Topsoiling of the embankment slope from km 0+010 to km 0+100 and on the slopes of cross drains at km 0+020 and 0+060 in a layer of 60 cm with topsoil, mixed with grass seed, from a disposal at 60m and the rest with transportation within 5km. 495+48.86+35.33=579. Calculation per m <sup>2</sup> topsoil.	m <sup>2</sup>	580.00		
4	Supply, transportation and incorporation of CSA with the grain size of up to 0/63 mm into the upper part of the road base, below the sub base layer from km 0+020 to km 0+090, in layers of 50 cm, with compacting of each layer, fully in accordance with the design. Calculation per m <sup>3</sup> of incorporated material.	m <sup>3</sup>	806.00		
			<b>TOTAL:</b>		
<b>III CONCRETE WORKS</b>					
1	Supply, transportation and incorporation of material for the construction of the RC canal on the left side of the road from km 0+010 to km 0+100 and in places of joining with the existing canal, from MB30 concrete resistant to frost and water. Calculation per m <sup>3</sup> of incorporated concrete.	m <sup>3</sup>	11.00		
			<b>TOTAL:</b>		
<b>IV REINFORCEMENT WORKS</b>					
1	Supply, transportation and installation of MA 500/560 reinforcement for the RC canal, on the left side of the road, from km 0+010 to km 0+100 and in places of joining with the existing canal. Fully in accordance with the design. Calculation per kg of installed reinforcement.	kg	539.00		
			<b>TOTAL:</b>		

<b>V DRAINAGE WORKS</b>					
1	Supply, transportation and laying of RC pipe, Ø 30 cm, in places of crossing over the canal, fully in accordance with the design. Calculation per m of pipe.	m	8.00		
2	Supply, transportation and incorporation of filter material wrapped in geotextile at the bottom of the drain, from km 0+010 to km 0+100 and at km 0+020 0+060 into cross drains, from CSA with the fraction of 8/31.5 mm in layers, with compacting of each layer, fully in accordance with the design. $200+18.03+18.93=236.96$ . Calculation per m <sup>3</sup> of incorporated material.	m <sup>3</sup>	237.00		
3	Supply, transportation and incorporation of CSA with the grain size of up to 8/200 mm into the upper part of the deep drain from km 0+010 to km 0+100 and at km 0+020 0+060 in layers of 50 cm, with compaction of each layer, fully in accordance with the design. $674+13.32+16.20=703.52$ . Calculation per m <sup>3</sup> of incorporated material.	m <sup>3</sup>	704.00		
4	Supply, transportation and laying of filter layer from geotextile (surface mass 310 g/m <sup>2</sup> , tensile strength (MD/CMD) 30/30 kN/m, elongation at Fmax (MD/CMD) 13/13%, opening size <7 µm, water permeability 0.035 m/s, drainage 30 l/m <sup>2</sup> s) between the filter material and layer from CSA (8/200), an dalong the edge of the excavation, from km 0+010 to km 0+100 and at km 0+020 0+060 into cross drains, fully in accordance with the design. Calculation per m <sup>2</sup> of laid geotextile.	m <sup>2</sup>	1,605.00		
5	Supply, transportation and installation of wedged concrete flumes along the slope of the embankmnet at km 0+040 and 0+070, fully in accordance with the design. Calculation is given per m of installed concrete flumes.	m	13.00		
6	Supply, transportation and installation of high curbs on the right side of the road from km 0+000 to km 0+110, fully in accordance with the design. Calculation is given per m of installed curb.	m	110.00		
<b>TOTAL:</b>					

VI PAVEMENT					
1	Construction of a new lower sub base course from crushed stone aggregate of 0/63 mm in a layer of 20 cm, fully in accordance with the design. Calculation per m <sup>3</sup> of layer.	m <sup>3</sup>	155.00		
2	Construction of a new upper sub base course from crushed stone aggregate of 0/31.5 mm, in a layer of 15 cm, fully in accordance with the design.	m <sup>3</sup>	98.00		
3	Construction of a bituminous base course from BNS22 A with BIT 50/70, with the thickness of 6cm, fully in accordance with the design. Calculation per m <sup>2</sup> of layer.	m <sup>2</sup>	608.00		
4	Construction of a new wearing course from AB11s with BIT 50/70, in a layer of 4cm, fully in accordance with the details from the design. Calculation per m <sup>2</sup> of the layer.	m <sup>2</sup>	605.00		
			<b>TOTAL:</b>		
VII TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	<b>Vertical traffic signalization</b>				
	Retroreflective round traffic sign, Ø600mm, class II, with anti-gaffitti film				
	II-28	pcs	2.00		
	III-12	pcs	2.00		
	Traffic sign carrier post, steel galvanized pipe, Ø60 mm with PVC cap L=3000	pcs	4.00		
2	<b>Horizontal signalization</b>				
	Unbroken white line with the width of 0.12 m	m <sup>2</sup>	7.00		
	line 5m+5m, with the width of 0.12m	m <sup>2</sup>	12.00		
3	<b>Road furniture</b>				
	Oblique guard rail endings JDO, 12 m	pcs	2.00		
4	<b>Temporary traffic signalization</b>	lump sum	1.00		
			<b>TOTAL:</b>		

**SUMMARY:**

GROUP OF WORKS	TOTAL
I PRELIMINARY WORKS	
II EARTH WORKS	
III CONCRETE WORKS	
IV REINFORCEMENT WORKS	
V DRAINAGE WORKS	
VI PAVEMENT	
VII TRAFFIC SIGNALIZATION AND ROAD FURNITURE	
<b>TOTAL:</b>	

K1

**BILL OF QUANTITIES  
MAIN DESIGN OF LANDSLIDE REMEDY  
ON THE STATE ROAD OF IB CLASS NO 21 SECTION: SLATINA - VALJEVO  
FROM KM 2+912 TO KM 2+988**

No	Item description	Unit	Quantity	Unit price	Total
<b>I PRELIMINARY AND FINISHING WORKS</b>					
1	Preliminary works on the formation of the construction site, delivery of machinery and workers, clearing of the ground from shrubs, trees and vegetation, and laying of temporary traffic signalization.	lump sum	1.00		
2	Marking of the structure by placement of firm points, with wooden pegs or metal studs, and at least one point should be secured as the permanent geodetic benchmark during the entire construction (with concrete geodetic pillar with a metal plate). Permanent point must be linked to the national coordinate system. During the construction, the contractor must regularly maintain all permanent points and placed markings. The price includes surveying of the built retaining wall. Calculation is a lump sum.	lump sum	1.00		
<b>TOTAL PRELIMINARY AND FINISHING WORKS</b>					
<b>II DEMOLITION AND DISASSEMBLING</b>					
1	Demolition of massive concrete retaining walls. The price includes the transportation to a landfill at a distance of up to 25 km. Calculation per m3 of demolished wall.	m3	114.00		
2	Cutting of the pavement surfacing from asphalt concrete and bitumenous layer, with the total thickness of 18 cm. The cutting should be done along the road axis and perpendicularly to the road direction in the length of the supporting structure following the direction of the road axis in order to get a visually acceptable line between the old and new surfacing. Calculation per m1 of cutting.	m1	69.11		
3	Demolition of the pavement surfacing from asphalt concrete and bitumenous layer, with the total thickness of 18 cm within the cut. The price includes transportation to a disposal at a distance of up to 25 km. Calculation per m2 of demolished pavement.	m2	55.76		
<b>TOTAL DEMOLITION AND DISASSEMBLING</b>					

III	EARTH WORKS				
1	Mechanical excavation of earth of 3rd category with the construction of slopes during the construction of the foundation and securing of the excavation from collapsing with supporting timber during the construction of walls. The price includes the transportation to a disposal at a distance of up to 25 km. Calculation per m3 of excavated material.	m3	340.20		
2	Mechanical excavation of earth of 4th and 5th category for the foundations of retaining walls and forming of stone mound behind the wall. The price includes transportation to a disposal at a distance of up to 25 km. Calculation per m3 of excavated material.	m3	349.42		
3	Mechanical and manual excavation of earth of 3rd category during the construction of the canal for draining of water. The price includes transportation to a disposal at a distance of up to 25 km. Calculation per m3 of excavated material.	m3	11.80		
4	Filling over the foundation slab and along the wall with stone mound of the size 31.5-100 mm. The filling should be done in layers of up to 50 cm with mechanical compacting to compaction degree of 30 Mpa, measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	396.59		
5	Filling over the stone mound of the mixture of crushed stone aggregate of 16-31.5 mm and topsoil in the ratio of 25:75, with the thickness of 20 cm with mechanical compacting to compaction degree of 30 Mpa, measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	228.82		
6	Filling of a topsoil layer with the thickness of 20cm over the mixture of crushed stone aggregate and topsoil. Calculation per m3 of filled material.	m3	140.54		
7	Incorporation of sandy gravel into the sub base layer of demolished section of the road. Compaction should be done mechanically. The thickness of the layer is 37 cm. Required compressibility module is 60 MPa measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	14.63		

8	Incorporation of crushed aggregate with the grain size of 0-63 mm in the sub base layer of the demolished section of the road. Compaction should be done mechanically. The thickness of the layer is 25 cm. Required compressibility module is 80 MPa measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	9.89		
9	Incorporation of the base course of crushed stone aggregate with the grain size of 0-31.5 mm u debljini od 20 cm in the sub base layer of the demolished section of the road. Compaction should be done mechanically. The thickness of the layer is 120 MPa measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	7.91		
10	Incorporation of the sub base layer from crushed stone aggregate with the grain size of 0-31.5 mm with the thickness of 20cm as the base for the lean concrete layer during the construction of the canals for the drainage of water. The sub base layer is by 20cm wider than the outer measures of the said structures. The sub base layer should be compacted to compressibility module of 100MPa. Calculation per m3 of incorporated material.	m3	1.88		
			<b>TOTAL EARTH WORKS</b>		
<b>IV</b>	<b>CONCRETE WORKS</b>				
1	Construction of base from lean concrete below the foundation slab of the canal for draining water (10 cm wider and longer on each side), with the thickness of 5 cm, from MB 15 concrete. The price also covers formwork. Calculation per m2 of the base.	m2	7.27		
2	Construction of the RC foundation slab, with the thickness of 40 cm from MB 30 concrete, with frost resistance class of M-150. Formwork should be done and foundation reinforced according to the design, details and static analysis. The concrete should be incorporated and cured according to regulations. Calculation per m3 of the foundation.	m3	59.56		

3	<p>Construction of RC foundation slabs of the inflow manhole and canal for drainage of water, with the thickness of 12 cm, from MB 30 concrete, with frost resistance class of M-150. Formwork should be done and foundation reinforced according to the design, details and static analysis. The concreting should be done over a layer of lean concrete of 5 cm. The concrete should be incorporated and cured according to regulations. The price also cover formwork. Calculation per m3 of the foundation.</p>	m3	0.77		
4	<p>Construction of RC wall, with the thickness of 25 cm at the top and 30 to 35 cm at the base, MB 30, with frost resistance class of M-150, in smooth formwork on the visible sides of the wall. Other formwork is from dressed timber. Concrating should be done in tunnel liners according to the plan of the items. Formwork should be made and the walls reinforced according to the design, details and static analysis. The concrete should be incorporated and cured according to the regulations. The price also includes the formwork with accompanying elements for stiffening and stability, and pipes,Ø100 mm, that are laid into the formwork as weep holes. Calculation per m3 of concrete.</p>	m3	56.18		
5	<p>Construction of RC walls of the inflow manhole and canals for the drainage of water, with the thickness of 12 cm, MB 30, frost resistance class of M-150, in smooth formwork on the visible (inner) side of the walls. Other formwork is from dressed timber. Formwork should be made and the walls reinforced according to the design, details and static analysis. The concrete should be incorporated and cured according to the regulations. The price also includes the formwork with accompanying elements for stiffening and stability. Calculation per m3 of concrete.</p>	m3	1.02		

6	Construction of the upper RC slab of the inflow manhole for drainage of water, with the thickness of 12 cm, MB 30, frost resistance class of M-150. Formwork should be made and the walls reinforced according to the design, details and static analysis. The concrete should be incorporated and cured according to the regulations. The price also includes the formwork with accompanying elements for stiffening and stability. Calculation per m3 of concrete.	m3	0.73		
7	Construction of the bitumenous base course from BNS32sA with the thickness of 11cm with supply, transportation and incorporation of material. Calculation per m2 of incorporated layer.	m2	46.53		
8	Incorporation of upper wearing course from asphalt concrete, with the thickness of 7 cm AB 11-S over BNS layer. Calculation per m2 of incorporated layer.	m2	46.53		
<b>TOTAL CONCRETE WORKS</b>					
<b>V</b>	<b>REINFORCEMENT WORKS</b>				
1	Supply, cleaning, cutting and installation of reinforcement (B 500 and MA 500/560) fully in accordance with the static analysis. Calculation per kg of reinforcement.	kg	9,297.00		
<b>TOTAL REINFORCEMENT WORKS</b>					
<b>VI</b>	<b>MISCELLANEOUS WORKS</b>				
1	Supply, installation and laying of non-woven geotextile TYPAR SF40 (surface mass of 136g/m2, tensile strength of 9.0 kN/m) or equivalent, around the layer of stone mound. During the execution of works fully comply with the instructions of the manufacturer of geotextile (manner of joining, size of overlap, etc.). Calculation per m2 of coated surface.	m2	484.85		
2	Supply, installation and incorporation of cast-iron shaft cover with frame, Ø600mm, into the upper slab of the inflow manhole for the load class of D400, according to EN124. Calculation per piece.	pcs	1.00		
3	Supply, installation and laying of drainage-sewerage pipes with the outer diameter of Ø200mm. Before laying, the pipe needs to be coated with geotextile. Calculation per m'.	m1	47.00		
4	Cleaning of weep holes in order to restore their function. Calculation is a lump sum.	lump sum			

5	Planting of grass and seeds on the topsoil layer, with addition of mineral fertilizer. The price includes: supply of the seeds, planting of the seeds, spading of the seeds, rolling and watering. Calculation per m2 of works and includes all works and material	m2	710.85		
<b>TOTAL MISCELLANEOUS WORKS</b>					

**SUMMARY OF WORKS**

<b>I</b>	<b>PRELIMINARY AND FINISHING WORKS</b>	
<b>II</b>	<b>DEMOLITION AND DISASSEMBLING</b>	
<b>III</b>	<b>EARTH WORKS</b>	
<b>IV</b>	<b>CONCRETE WORKS</b>	
<b>V</b>	<b>REINFORCEMENT WORKS</b>	
<b>VI</b>	<b>MISCELLANEOUS WORKS</b>	
<b>TOTAL WORKS :</b>		

K2

**BILL OF QUANTITIES**  
**MAIN DESIGN OF LANDSLIDE REMEDY**  
**ON THE STATE ROAD OF IB CLASS NO 21 SECTION: SLATINA - VALJEVO**  
**FROM KM 2+930 TO KM 3+100**

No	Item description	Unit	Quantity	Unit price	Total
<b>I PRELIMINARY AND FINISHING WORKS</b>					
1	Preliminary works on the formation of the construction site, delivery of machinery and workers, clearing of the ground from shrubs, trees and vegetation, and laying of temporary traffic signalization.	lump sum	1.00		
1	Marking of the structure by placement of firm points, with wooden pegs or metal studs, and at least one point should be secured as the permanent geodetic benchmark during the entire construction (with concrete geodetic pillar with a metal plate). Permanent point must be linked to the national coordinate system. During the construction, the contractor must regularly maintain all permanent points and placed markings. The price includes surveying of the built retaining wall. Calculation is a lump sum.	lump sum	1.00		
<b>TOTAL PRELIMINARY AND FINISHING WORKS</b>					
<b>II DEMOLITION AND DISASSEMBLING</b>					
1	Demolition of massive concrete retaining walls. The price includes the transportation to a disposal at a distance of up to 25 km. Calculation per m3 of demolished wall.	m3	49.00		

2	Cutting of the pavement surfacing from asphalt concrete and bitumenous layer, with the total thickness of 18 cm. The cutting should be done parallel to the road axis following the direction of the road axis in order to get a visually acceptable line between the old and new surfacing. Calculation per m1 of cutting.	m1	174.83		
3	Demolition of the pavement surfacing from asphalt concrete and bitumenous layer, with the total thickness of 18 cm within the cut. The price includes transportation to a disposal at a distance of up to 25 km. Calculation per m2 of demolished pavement.	m2	123.04		
<b>TOTAL DEMOLITION AND DISASSEMBLING</b>					
<b>III</b>	<b>EARTH WORKS</b>				
1	Removal of a clay layer in a 40 cm thick layer on average from the part of the slope that belongs to the landslide. The removal is done mechanically. The price also includes transportation to a disposal at a distance of 25km. Calculation per m3 of material in compacted state.	m3	444.83		
2	Mechanical excavation of earth of 3rd category with the construction of slopes during the construction of the foundation and drain trenches. The width of the drain trenches is 1.8m. The price includes the transportation to a disposal at a distance of up to 25 km. Calculation per m3 of excavated material.				
a.	for the foundations of retaining walls and formation of stonemound behind	m3	293.90		
b.	for the formation of drain trenches	m3	1,089.16		
3	Mechanical and manual excavation of earth of 3rd category during the construction of the collection manhole for draining of water. The price includes transportation to a disposal at a distance of up to 25 km. Calculation per m3 of excavated material.	m3	96.44		
4	Construction of a sub base layer of gravel with the thickness of 10 cm below the foundation slabs of retaining walls with mechanical compacting to compaction degree of 40 Mpa measured by standard circular plate bearing test. Calculation per m3 of sub base layer.	m2	85.39		

5	Construction of a sub base layer of gravel with the thickness of 20 cm below the canals for drainage of water with mechanical compacting to compaction degree of 40 Mpa measured by standard circular plate bearing test. Calculation per m3 of incorporated material in compacted state.	m3	23.92		
6	Filling of a layer of stone chippings with the granulation of 10-60mm as protection of the drainage-sewerage pipe, in a layer with the thickness of 40 cm. Calculation per m3 of filled material.	m3	53.55		
7	Filling of drain trenches with crushed stone with the granulation of 100-250mm. Calculation per m3 of incorporated stone.	m3	912.40		
8	Filling over the foundation slab and along the wall with stone mound of the size 31.5-100 mm, in the section of the new retaining walls, between the drain trenches. The filling should be done in layers of up to 50 cm with mechanical compacting to compaction degree of 30 Mpa, measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	118.96		
9	Forming of a clay cap with the thickness of 50 cm, on a layer of stone debris during the formation of drain trenches. Calculation per m3 of incorporated clay.	m3	76.16		
10	Filling of the mixture of crushed aggregate of 16-31,5 mm and topsoil in the ratio 25:75, with the thickness of 20 cm with mechanical compacting to compaction degree of 30 Mpa, measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	222.41		
11	Filling of a topsoil layer with the thickness of 20cm over the mixture of crushed stone aggregate and topsoil. Calculation per m3 of filled material.	m3	222.41		
12	Incorporation of sandy gravel into the sub base layer of demolished section of the road. Compaction should be done mechanically. The thickness of the layer is 37 cm. Required compressibility module is 60 MPa measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	7.62		

13	Incorporation of crushed aggregate with the grain size of 0-63 mm in the sub base layer of the demolished section of the road. Compaction should be done mechanically. The thickness of the layer is 25 cm. Required compressibility module is 80 MPa measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	6.79		
14	Incorporation of the bearing layer of crushed stone aggregate with the grain size of 0-31.5 mm u debljini od 20 cm in the sub base layer of the demolished section of the road. Compaction should be done mechanically. The thickness of the layer is 120 MPa measured by standard circular plate bearing test. Calculation per m3 of filled material.	m3	5.43		
			<b>TOTAL EARTH WORKS</b>		
<b>IV</b>	<b>CONCRETE WORKS</b>				
1	Construction of base from lean concrete below the foundation slab of the retaining walls (10 cm wider and longer on each side), with the thickness of 5 cm, from MB 15 concrete. The price also covers formwork. Calculation per m2 of the base.	m2	85.39		
2	Construction of base from lean concrete below the lower slab of the canal for draining water (5 cm wider and longer on each side), with the thickness of 5 cm, from MB 15 concrete. The price also covers formwork. Calculation per m2 of the base.	m2	111.32		
3	Construction of the RC foundation slab, with the thickness of 40 cm from MB 30 concrete, with frost resistance class of M-150. Formwork should be done and foundation reinforced according to the design, details and static analysis. Concreting should be done directly on the rock. The concrete should be incorporated and cured according to regulations. The price also covers formwork. Calculation per m3 of the foundation.	m3	36.72		

4	Construction of RC foundation slabs of the collection manhole and canal for drainage of water, with the thickness of 12 cm, from MB 30 concrete, with frost resistance class of M-150. Formwork should be done and foundation reinforced according to the design, details and static analysis. The concreting should be done over a layer of lean concrete of 5 cm. The concrete should be incorporated and cured according to regulations. The price also covers formwork. Calculation per m <sup>3</sup> of the foundation.				
a.	thickness 12 cm	m <sup>3</sup>	19.36		
b.	thickness 20 cm	m <sup>3</sup>	2.52		
5	Construction of RC wall, with the thickness of 25 cm at the top and 30 to 35 cm at the base, MB 30, with frost resistance class of M-150, in smooth formwork on the visible sides of the wall. Other formwork is from dressed timber. Concreting should be done in tunnel liners according to the plan of the items. Formwork should be made and the walls reinforced according to the design, details and static analysis. The concrete should be incorporated and cured according to the regulations. The price also includes the formwork with accompanying elements for stiffening and stability, and pipes, Ø100 mm, that are laid into the formwork as weep holes. Calculation per m <sup>3</sup> of concrete.	m <sup>3</sup>	24.08		
6	Construction of RC walls of the inflow manhole and canals for the drainage of water, in MB 30 concrete, frost resistance class of M-150, in smooth formwork on the visible (inner) side of the walls. Other formwork is from dressed timber. Formwork should be made and the walls reinforced according to the design, details and static analysis. The concrete should be incorporated and cured according to the regulations. The price also includes the formwork with accompanying elements for stiffening and stability. Calculation per m <sup>3</sup> of concrete.				
a.	thickness 12 cm	m <sup>3</sup>	19.65		
b.	thickness 20 cm	m <sup>3</sup>	2.47		

7	Supply and installation of prefabricated concrete grid for the canal for drainage of water, measuring b/l/d=42/30/8 cm. Calculation per m1.	m1	172.36		
8	Construction and installation of concrete cover of the collection manhole, with the thickness of 8 cm, in MB30 concrete. Calculation per m3 of concrete.	m3	0.07		
9	Construction of concrete flume of drain trenches, with the thickness of 30 cm, in MB20 concrete. Calculation per m3 of concrete.	m3	10.10		
10	Construction of the bitumenous base course from BNS32sA with the thickness of 11cm with supply, transportation and incorporation of material. Calculation per m2 of incorporated layer.	m2	27.16		
11	Incorporation of wearing course from asphalt concrete, with the thickness of 7 cm AB 11-S over BNS layer. Calculation per m2 of incorporated layer.	m2	27.16		
<b>TOTAL CONCRETE WORKS</b>					
<b>V</b>	<b>REINFORCEMENT WORKS</b>				
1	Supply, cleaning, cutting and installation of reinforcement (B 500 and MA 500/560) fully in accordance with the static analysis. Calculation per kg of reinforcement.	kg	11,023.00		
<b>TOTAL REINFORCEMENT WORKS</b>					
<b>VI</b>	<b>MISCELLANEOUS WORKS</b>				
1	Supply, installation and incorporation of geocomposite TenCate Polyfelt PEC 125 (tensile strength of 132 kN/m) or equivalent, around the stone mound of the drainage fill behind the walls and drainage trenches. During the execution of works fully comply with the instructions of the manufacturer of geotextile (manner of joining, size of overlap, etc.). Calculation per m2 of coated surface.	m2	1,742.41		
2	Supply, installation and laying of drainage-sewerage pipes with the outer diameter of Ø200mm. Calculation per m'.	m1	94.58		
3	Cleaning of weep holes in order to restore their function. Calculation is a lump sum.	lump sum	1.00		
4	Drilling of holes for the passage of drainage-sewerage pipes through the existing retaining walls. Calculation per piece.	pcs	4.00		

5	Planting of grass and seeds on the topsoil layer, with addition of mineral fertilizer. The price includes: supply of the seeds, planting of the seeds, spading of the seeds, rolling and watering. Calculation per m2 of works and includes all works and material	m2	1,112.07		
<b>TOTAL MISCELLANEOUS WORKS</b>					

**SUMMARY OF WORKS**

<b>I</b>	<b>PRELIMINARY AND FINISHING WORKS</b>	
<b>II</b>	<b>DEMOLITION AND DISASSEMBLING</b>	
<b>III</b>	<b>EARTH WORKS</b>	
<b>IV</b>	<b>CONCRETE WORKS</b>	
<b>V</b>	<b>REINFORCEMENT WORKS</b>	
<b>VI</b>	<b>MISCELLANEOUS WORKS</b>	
<b>TOTAL WORKS DINARS:</b>		

**K1-K2 TEMPORARY TRAFFIC SIGNALIZATION AND ROAD FURNITURE**

1	Temporary traffic signalization	lump sum	1.00		
<b>TOTAL TEMPORARY TRAFIC SIGNALISATION FOR K1-K2:</b>					

**SUMMARY K1 AND K2**

<b>K1</b>	<b>from KM 2+912 to KM 2+988</b>	
<b>K2</b>	<b>from KM 2+930 to KM 3+100</b>	
<b>K1-K2</b>	<b>K1-K2 TEMPORARY TRAFFIC SIGNALIZATION AND ROAD FURNITURE</b>	
	<b>TOTAL</b>	

## PRICED BILL OF QUANTITIES - MONTAGE OF THE SIGNBOARDS

Scetch of signboard and method statement for montage  
attached

No	DESCRIPTION	UoM	Quantity	Unit Price	TOTAL RSD
I	<b>PREPARATORY WORKS</b>				
1	Mounting and dismounting of the metal pipe scaffold, fully according to standing regulations and PP measures. The scaffold shall be structurally stable, and properly grounded. Working platforms made of 5cm boards shall be placed at 2.00m of height. From the exterior, 5cm boards shall be placed vertically as guards. The scaffold shall be used throughout the montage of the signboard and untill concrete foundation reaches 70% of its load bearing capacity. Same scaffold is to be used for montage of all signboards. Calculated per m2 of vertical projection of the assembled scaffold.	m2	10.00		
	<b>TOTAL</b>				
II	<b>EARTH WORKS</b>				
	Manual excavation of 3rd category soil for signboard foundations. The excavation shall be executed and levelled according to the design and provided elevation points. The sides shall be clean and vertically cut and the bottom levelled. Excavated soil shall be wheelbarrowed, poured and the terrain levelled or loaded onto a lorry and transported to the town landfill. Calculated per m3 of soil, measured in autochthonous state.	m3	5.00		
	<b>TOTAL</b>				
III	<b>CONCRETE WORKS</b>				
	Manufacture of the unreinforced concrete foundation mark MB20; Hight of fuondation is 80cm and other two dimensions 90x60cm. Concrete should be poured over the gravel layer thickness 10cm. The top surface shall be floated and the concrete shall be cured according the regulations. Unit price shall consider gravel layr and all necessary formwork Calculated per m3 of foundation.	m3	4.50		
	<b>TOTAL</b>				
IV	<b>MONTAGE WORKS</b>				
	Installation of steel plates for marking of donor. Table is rectangular in shape, dimensions and materialization according to the sketch, mounted on a steel substructure consisting of steel profiles 80x80x4mm, and metal sheet d = 1mm. The total height of the table is 4m, of which 80cm is anchored into the concrete, and the lower angle of table is at a height of 2.2m above ground level. Calculated per peace of installed signboard	kom	10.00		
	<b>TOTAL</b>				
	<b>TOTAL MONTAGE OF SIGNBOARDS WORK</b>				

**TOTAL SUMMARY  
FOR REMEDY OF TEN LANDSLIDES  
ON THE STATE ROAD OF IIA 150 AND 177 AND IIB 358, 359  
AND 364**

**In Valjevo, Koceljeva and Mionica Municipalities**

I	27 Pricevici - Pecka, from km 16+905 to km 17+025, ID 3074	
II	28 Valjevo - Debelo Brdo - Rogacica - Bajina Basta, km 35+500, ID 3679	
III	29 Sedlare - Debelo Brdo, from 14+978 to km 14+960, ID 3732	
IV	30 Sedlare - Debelo Brdo, from km 22+130 to km 22+150, ID 3733	
V	31 Sedlare - Debelo Brdo, from km 22+190 to km 22+208, ID 3734	
VI	32 Bogdanovica Brdo - Divcibare, from km 35+880 to km 35+900, ID 3600	
VII	33 Bogdanovica Brdo - Divcibare, from km 39+410 to km 39+450, ID 3601	
VIII	34 Bogdanovica Brdo - Divcibare, from km 30+250 to km 30+320, ID 3602	
IX	38 Ub - Koceljeva, km 40+400, ID NV3	
X	48 Koceljeva - Valjevo, km 116+950, ID 3677	
XI	MONTAGE OF THE SIGNBOARDS	
	<b>TOTAL</b>	