



KENYA URBAN ROADS AUTHORITY

Efficient and safe urban roads

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P.O. Box 41727-00100, GPO, NAIROBI

Ref. No. KURA/EO/SCM/3/Vol.29 (78)

Date: 13th October, 2021

To All Bidders,

- RE: 1. UPGRADING TO BITUMEN STANDARD OF BANISA TOWNSHIP ROADS
TENDER NO. KURA/DEV/HQ/256/2021-2022
2. CONSTRUCTION OF BUTE TOWNSHIP ROADS
TENDER NO. KURA/DEV/HQ/255/2021-2022
3. CONSTRUCTION OF ELDAS TOWNSHIP ROADS
TENDER NO. KURA/DEV/HQ/257/2021-2022
4. CONSTRUCTION OF HABASWEIN TOWNSHIP ROADS
TENDER NO. KURA/DEV/HQ/258/2021-2022
5. UPGRADING TO BITUMEN STANDARDS OF MANDERA TOWNSHIP ROADS
TENDER NO. KURA/DEV/HQ/259/2021-2022

ADDENDUM NO.1.

This is to notify all bidders that an addendum has been issued for the above mentioned tenders. All bidders are required to take note of this addendum and incorporate it in their bid before tender submission.

S/No	Contract Name.	Tender No.	Addendum No.2
1.	Upgrading to Bitumen Standards of Banisa Township Roads	KURA/DEV/HQ/256/2021-2022	- Replace page 131 with the indicated page in Appendix I - Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix II
2.	Construction of Bute Township Roads	KURA/DEV/HQ/255/2021-2022	- Replace page 128 with the indicated page in Appendix III - Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix IV
3.	Construction of Eldas Township Roads	KURA/DEV/HQ/257/2021-2022	- Replace page 144 with the indicated page in Appendix V - Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix VI

4.	Construction of Habaswein Township Roads	KURA/DEV/HQ/258 /2021-2022	• Replace page 144 with the indicated page in Appendix VII • Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix VIII
5.	Upgrading to Bitumen Standards of Mandera Town Roads Phase II	KURA/DEV/HQ/259 /2021-2022	• Replace page 133 with the indicated page in Appendix IX • Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix X

The submission date changes to 22nd October, 2021 and the tender opening date also changes to 25th October, 2021.

Details of the addendum can be accessed on www.kura.go.ke.


 Saadia Haji Adankhalif
FOR: DIRECTOR GENERAL

S/N o	Contract Name.	Tender No.	Addendum No.2
1	Upgrading to Bitumen Standards of Banisa Town Roads	KURA/DEV/HQ/256/2021-2022	• Replace page 131 with the indicated page in Appendix I • Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix II
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3	Construction of Eldas Township Roads	KURA/DEV/HQ/257/2021-2022	• Replace page 144 with the indicated page in Appendix V • Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix VI
4	Construction of Habaswein Township Roads	KURA/DEV/HQ/258/2021-2022	• Replace page 144 with the indicated page in Appendix VII • Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix VIII
5	Upgrading to Bitumen Standards of Mandera Town Roads Phase II	KURA/DEV/HQ/259/2021-2022	• Replace page 133 with the indicated page in Appendix IX • Replace the entire Bills of Quantities with the indicated Bills of Quantities in Appendix X

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CONSTRUCTION OF HABASWEIN TOWNSHIP ROADS
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Appendix VII


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GENERAL

Special Specification is supplementary to the Standard Specification and the two must be read in conjunction. In any case where there appears to be conflict between the two then the Special Specifications will take precedence.

In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specifications of Design Manual for Roads and Bridges of the Ministry of Transport and communication of the Republic of Kenya, Kenya Bureau of Standards (KeBS), BS, ASTM, AASHTO and in that order. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approved by the Engineer and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer shall be final and binding on the Contractor.

Where reference is made in the Contract to specific standards codes to be met by the materials, plant, and other supplies to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards as on the date of the bid and codes/design manual in effect shall apply, unless otherwise expressly stated in the contract. Where such standards and codes/design manual are national, or relate to a particular country or region, other internationally recognised standards which ensure a substantially equal or higher performance than the standards and codes/design manual specified will be accepted subject to the Engineer's prior review and written approval. The difference between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least 28 days prior to the date when the Contractor desires the Engineer's approval. In the event that the Engineer determines that such proposed deviations do not ensure substantially equal performance, the Contractor shall comply with the standards specified in the documents.

101 Location and Extent of Site

The roads to be upgraded are located in Habaswein Township in Wajir County as shown in the maps below. Habwein town centre to Habaswein Aipstrip, Amasajida Secondary and Bulla Kassim Borehole.

The existing alignments comprises of gravel/earth road and is approximately 7.5 Km long.

The site of the works shall be within the road reserve and any other places as may be designated in the Construction Contract.

102 Extent of Contract

The major works to be executed under the Contract comprise mainly of but are not limited to the following:

- (i) Site clearance
- (ii) Earthworks
- (iii) Pavement Construction as follows:
 - a) Earthworks.
 - b) Construction of subgrade from imported material to receive the pavement layers as per the specifications.
 - c) Construction of a 150mm thick layer of natural gravel material as sub-base layer for carriageway and walkways/cycle tracks base.
 - d) Construction of a 150mm thick layer of cement improved gravel for carriageway base layer.



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Appendix VIII



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CONSTRUCTION OF HABASWEIN TOWNSHIP ROADS
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Bill of Quantities					Page: 1
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
BILL 1	PRELIMINARY AND ADMINISTRATION OVERHEADS				
1.01	Provide and maintain the Engineer's office as per the specifications	Lump Sum	1.00		
1.02	Provide and maintain furniture and equipment for the Engineer's office as specified for the Contract period and as detailed in Appendix to Bill Item № 1.02.	Lump Sum	1.00		
1.03	Provide Engineers's Laboratory structure , Laboratory equipment and reagents for use by the Engineer's Representative's and his staff for entire duration of the contract as detailed in Appendix to Bill № 1.03	Lump Sum	1.00		
1.04	Allow a provisional sum of KShs. 2,000,000 for offsite Material Testing as directed by the Engineer	PC Sum	1	2,000,000	2,000,000
1.05	Extra over item 1.04 for contractors overheads and profits	%			
1.06	Provide,fuel,insure and maintain with driver, 1 No. new 4WD station wagon vehicle Diesel propelled, with engine capacity of not less than 3000cc for the exclusive use by the Resident Engineer inclusive of the first 4000km per vehicle month	v. mth	24		
1.07	Extra over item 4000km on item 1.07 for contractors overheads and profits.	km	1000		
1.08	Provide,fuel,insure and maintain with driver 1No. new 4WD double cabin Diesel propelled, with engine capacity of not less than 2500cc for the exclusive use by the Resident Engineer inclusive of the first 4000km per vehicle month	V. Month	24		
1.09	Extra over item 4000km on item 1.10 for contractors overheads and profits.	km	4000		
1.10	Allow a Provisional Sum of KShs 2,500,000 for the Engineer's miscellaneous account to be spent in whole or part as instructed by the Engineer and to be reimbursed against receipts.	Prime Cost	1	2,500,000	2,500,000
1.11	Extra over item on item 1.10 for contractors overheads and profits.	%			
1.12	Provide, erect and maintain publicity signs as instructed by the	№	4		


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	Engineer.				
1.13	Allow for attendance upon the Engineer by the following staff in accordance with Clause 137 of Special Specification as detailed in Appendix B 1.13 of the Bills of Quantities	Lump Sum	1		
1.14	Allow a Provisional Sum of KShs 1,000,000 for the Engineer's staff mobile phone airtime charges	Prov. Sum	1	1,000,000	1,000,000
1.15	Include a percentage on Item 1.14 for the Contractor's Overheads and Profit	%			
1.16	Provide PC Sum of Kshs. 4,000,000 for Engineer site staff allowances in accordance to clause 137 of Special Specifications.	PC Sum	1	4,000,000	4,000,000
1.17	Include a percentage on Item 1.16 for the Contractor's Overheads and Profit	%			
1.18	Provide PC Sum of Kshs. 5,000,000 to facilitate attendance of site meetings.	PC Sum	1	5,000,000	5,000,000
1.19	Include a percentage on Item 1.18 for the Contractor's Overheads and Profit	%			
1.20	Provide and maintain survey equipment for the Engineer's office as specified for the Contract period detailed in Appendix C1.20 of the Bills of Quantities	Lump Sum	1		
	Total Carried Forward to Summary:				
BILL 4	SITE CLEARANCE				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
4.01	Clear site on road reserve including removal of trees, hedges, bushes, and other vegetation or deleterious organic material, grub up roots in accordance with the specifications	m ²	80,000		-
4.02	Removal of top soil to a maximum depth of 200 mm including removal of grass and other vegetation as directed by the Engineer.	m ³	20,000		-
4.03	Demolish / Scarify Existing pavement of any material on footpaths, bushbays, carriageways and parking lots and cart away to spoil	m ³	100		-


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4.04	Excavate, remove and dispose existing culverts, OG pipes, IBD and drain lining of any material	m	1200		-
	(a) Stone masonry	m ³	500		-
	(b) Plain Concrete	m ³	200		-
	(c) Reinforced Concrete	m ³	200		-
	(e) Dismantling				
	(i) MS Pipes and Guard rails	m	100		-
	(ii) Fencing	m	3000		-
4.05	Allow a Prime Cost sum of Ksh. 5,000,000.00 for removal and reinstatement of services and demolition of structures and buildings on the road reserve.	PC Sum	5,000,000.00	1	5,000,000.00
4.06	Extra Over on Item 4.05 for the Contractors Overheads and Profit.	%			
4.07	Allow a Prime Cost sum of Ksh. 300,000.00 for carrying and payment for EIA and NEMA Licenses and other environmental mitigation measures.	PC Sum	300,000.00	1	300,000.00
4.08	Extra Over on Item 4.07 for the Contractors Overheads and Profit.	%			
	Total Carried Forward to Summary:				-
BILL 5	EARTHWORKS				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
	<i>No separate payments shall be made for the overhaul of the material and the cost of such haulage shall be included in the rates and or prices.</i>				
5.01	Cut to fill in soft material	M ³	9,750		-
5.02	Compaction below Cuts	M ³	14,625		-
5.02	As Item 5.01 but in hard material	m ³	4,875		-


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5.03	As Item 5.01 but in hard material (using jack hammer)	m ³	2,438		-
5.04	Cut to spoil in soft material	m ³	19,500		-
5.05	Fill in soft material to 95% MDD (AASHTO T99) in layers of 150mm each in accordance with Cl. 502, 504, 505, 508, 511, 512 & 513 of the specs.	m ³	19,500		-
5.06	Provide, spread, water, process and compact 300 mm improved subgrade to 100% MDD (AASHTO T99) in two layers of 150 mm thickness.	m ³	29,250		-
5.07	Provide and fill in hard material as per standard specifications.	m ³	1,170		-
5.08	Rock fill as directed by the Engineer	m ³	325		-
	Total Carried Forward to Summary:				-
BILL 7	EXCAVATION AND FILLING FOR STRUCTURES				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
	<i>NOTE: No separate payment shall be made for the haulage for these items as they shall be deemed to have been included in the Contractor's rates.</i>				
7.01	Excavation in soft material for box culvert.	m ³	2250		-
7.02	River training in soft material as directed by the Engineer.	m ³	1500		-
7.03	Backfill to structures in soft material.	m ³	500		-
7.04	As for item 7.01 but in hard material.	m ³	500		-
7.05	Provide, place and compact rockfill below structures as directed by the Engineer.	m ³	2000		-
7.06	Provide and place porous fill material behind wingwalls and abutment.	m ³	500		-
7.07	Provide and place gabion boxes (2x1x1m) where instructed by the Engineer.	m ²	1200		-
7.08	Provide and place rockfill to gabions	m ³	500		-


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7.09	Provide and place filter fabric to abutment and wingwalls (As Terram 280 g/m ² or otherwise approved)	m ²	1000		-
	BILL 7 SUB-TOTAL CARRIED TO SUMMARY PAGE				-
BILL 8	CULVERTS AND DRAINAGE WORKS				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
	<i>No separate payments shall be made for the overhaul of the material and the cost of such haulage shall be included in the rates and or prices.</i>				
8.01	Excavate in soft material to the range of depths stated below for pipe culverts, subsoil drains, headwalls, wing walls, aprons, toe walls, drop inlets, mitre drains, cut off drains, outfall to free flowing, catch water drains and median drains including support of trench sides, backfilling and compacting as specified or as instructed by the Engineer.	m ³	15,000		-
8.02	As Item 8.01 but hard material (requiring no blasting)	m ³	1,500		-
8.03	Provide, lay, joint and backfill with suitable material 300mm I.D. concrete pipes for service ducts	m	200		-
8.04	Provide, lay, joint and backfill with suitable material 450mm I.D. concrete pipes	m	100		-
8.05	Provide, lay, joint and backfill with suitable material 600mm I.D. concrete pipes	m	1000		-
8.06	Provide, lay, joint and backfill with suitable material 900mm I.D. concrete pipes	m	100		-
8.07	Provide, lay, joint and backfill with suitable material 1200mm I.D. concrete pipes	m	60		-
8.08	Provide and place A142 fabric mesh reinforcement or equivalent for item 8.07	m ²	1000		-


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8.09	Provide, place and compact Class 15(20) concrete to beds, surrounds and haunches including all formwork and provision and placing of reinforcement as shown in the drawings.	m ³	256		-
8.10	Provide and place Class 25/20 concrete for side walls, top slabs, trenches, drains, retaining walls, toe walls, head walls, rest crushed sand including formwork and wing walls and aprons, 20% natural and provision and placing of reinforcement as shown on the drawings or as instructed by the Engineer.	m ³	250		-
8.11	Excavate in any material provide and joint 600x360 mm invert block drains (IBD) precast concrete channels with single side precast side slabs of 600x225x75 mm as lining for storm water drain including bedding and backfilling with selected material as directed by the Engineer.	m	15000		-
8.12	Extra over item 8.13 for precast side slabs of 600x225x75mm.	m ²	8100		-
8.13	Provide and place 200mm thick stone pitching including grouting to outfall drains as detailed in the drawings or as directed by the Engineer	m ²	200		-
	Total Carried Forward to Summary:				-
BILL 9	PASSAGE OF TRAFFIC				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
9.02	Allow for the passage of traffic through the works	Km	10		-
	Total Carried Forward to Summary:				-
BILL 12	NATURAL MATERIAL BASES AND SUBBASES				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
12.01	Provide gravel Sub-base material, haul, spread, compact at least 100% M.D.D. (AASHTO T-180) and shape to level and tolerance	M ³	10,125		-

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12.02	Provide 2% improved gravel material for base layer, haul, spread, compact at least 100% M.D.D. (AASHTO T-180) and shape to level and tolerance	m ³	10,125		~
	Total Carried Forward to Summary:				~
BILL 14	CEMENT AND LIME TREATMENT				
	<i>Note: No overhaul will be paid for separately under these items as it shall be deemed to have been included in the Contractor's rates</i>				
14.01	Provide and spread cement as an improvement agent for base	Ton.	850.50		-
14.02	Mix and process natural material or graded crushed stone with improvement agent for pavement layers as instructed by the Engineer or as specified	m ³	20,250.00		-
14.03	Curing of cement treated base and sub-base layers	m ²	67,500.00		-
	Total Carried Forward to Summary:				~
BILL 15	BITUMINOUS SURFACE TREATMENT				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
15.01	Clean and prepare surfaces of main carriageway, slip roads, shoulders, bus bays, accesses and junctions, provide, heat and spray on the same MC 30 cutback bitumen prime coat at a rate of spray in the range of 1.0 litre/m ² to 1.2 litres/m ² or as instructed by the Engineer	L	63,000		-
15.02	Clean and prepare surfaces of main carriageway, slip roads, shoulders, bus bays, accesses and junctions, provide, heat and spray two coats of K1-60 bitumen emulsion as tack coat on the bituminous layer in Item 15.01 at a spray rate in the range of 0.3 litre/m ² to 0.8 litre/m ² or as instructed by the Engineer	L	42,000		-
	Total Carried Forward to Summary:				~
BILL 16	BITUMINOUS MIXES				
Item	Description	Units	Quantity	Rate	Amount


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No.					(KSh)
16.01	Prepare surfaces, provide, mix, lay and compact Asphaltic Concrete (AC) (Type 1) as binder course on base with bitumen and 0/20 mm aggregates on prepared surface of asphalt base layer of carriageway	m ³	2475		-
	Total Carried Forward to Summary:				-
BILL 17	CONCRETE WORKS				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
17.01	Provide, place and compact class 15/20 for blinding	m3	100		-
17.02	Provide, place and compact class 25/20 concrete for the box culverts and foundations or as instructed by the Engineer	m3	100		-
17.03	Provide, place and compact class 30/20 concrete for box culvert works and as may be instructed by the Engineer	m3	100		-
	FORMWORK				
	Provide, erect and afterwards dismantle, remove and provide formed finished surfaces				
17.04	Provide Formwork to achieve class F2 Finish	m2	600		-
17.05	Provide Formwork to achieve class F3 Finish	m2	500		-
	REINFORCEMENT				
	Provide, bend and fix into position				
17.08	High yield steel bars to BS 4461 of sizes 16mm and above	Tonne	10		-
17.09	As item 17A.07 but of size 12mm and below	Tonne	15		-
	Total Carried Forward to Summary:				-
BILL 20	ROAD FURNITURE REPAIR AND MAINTENANCE				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)

2.
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20.01	Provide and lay hot applied thermoplastic road marking compound in approved colour and shade (ASTM 9) for road marking on bituminous surface on centerline, 100 mm, edge line 150 mm wide 3.0 mm thick, using fully automatic extrusion machine and using pre-melter for melting thermoplastic material including cleaning the surface of all dirt, dust, and other foreign matter, complete with demarcation at site/pre-marking, finishing and managing the traffic movements. Marking to be done as per the specifications, detailed drawings and as instructed by the Engineer.	M ²			
	(i) For lane marking (broken lines) with yellow paint, 100 mm wide	M ²	750		
	(ii) For edge lines (continuous line) with white paint, 150 mm wide	M ²	2250		
20.02	Provide and lay cement concrete kerb/divider for road edge and traffic islands in concrete Class 25/20 as per the drawings and as instructed by the Engineer complete with all leads and lifts. Pre-cast/cast-in-situ kerb / divider				
	(i) Raised kerbs	m	6,000		
	(ii) Flush kerbs	m	18,000		
20.03	Provide and place approved road signs (Area < 1m ²) as directed by the Engineer;				
	i) Warning Signs	No.	5		
	ii) Priority, Prohibitory and Mandatory signs	No.	5		
	iii) Standard Informatory Signs	No.	5		
20.04	Place and provide gauge 16 steel pipe Bollards of diameter 150mm and 1.0 m above the ground, embedded to a depth of 0.5m at place painted and fitted and refrectozed as shown on the drawing and as directed by the	No	100		

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	Engineer. Rate to include filling with concrete minimum class 15/20				
20.05	Provide and place 100mm-diameter high density smooth internal bore pvc pipe, having a minimum wall thickness of 5mm and surrounded / microtunneled with concrete min. class 15/20 as shown on the drawings and as directed by the Engineer. Ducts should be orange in colour.	m	500		
20.06	Provide and install retro-reflective reflective road studs (cat's eyes) as per the drawings and as instructed by the Engineer	No	500		
	Total Carried Forward to Summary:				
BILL 21: MISCELLANEOUS BRIDGE WORKS					
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
21.01	Provide and apply bituminous waterproof to abutments and wingwalls in two layers at a rate of 0.55L/m ² as shown in the drawings or as directed by the Engineer.	m ²	1,000.00		
21.02	Provide and place as directed by the Engineer P.V.C. pipes of diameter 50mm to form weep holes in abutment and wingwalls.	m	250.00		
21.03	Provide and fix new flexbeam guardrails including all posts, nuts, bolts, washers, etc. as shown on drawings.	m	500.00		
	Total of Bill Carried Forward to Summary				
BILL 22	BILL No 22: Day Works				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
Note:	<i>Any plant employed upon Day works which have power rating lower than that specified, shall be paid for at rates lower than those in the Schedule of Day works. The reduction in the payable rate shall be in proportion to the power rating below that</i>				

2.
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	<i>specified.</i>				
22.01	Crawler Dozer with Hydraulic Ripper				
	(a) 100-135 Kw rated flywheel power	hr	5		~
	(b) 136-185 Kw rated flywheel power	hr	5		~
	(c) 186-250 Kw rated flywheel power	hr	5		~
22.02	Motorized rubber tyred single engine scrapers				~
	(a) Up to 16m3 heaped capacity	hr	5		~
	(b) 17-26 m3 heaped capacity	hr	5		~
22.03	Motorized rubber tyred twin engine scrapers				~
	(a) Up to 16 m3 heaped capacity	hr	5		~
	(b) 17-26 m3 heaped capacity	hr	5		~
22.04	Motor Graders with Hydraulic Ripper or Scarifier				~
	(a) 80-110 Kw rated flywheel power	hr	5		~
	(b) 111-120 Kw rated flywheel power	hr	5		~
	(c) 121-160 Kw rated flywheel power	hr	5		~
22.05	Tracked Excavator Cranes				~
	(a) 20-28t max working load	hr	4		~
	(b) 28.1-36.1t max working load	hr	4		~
	(c) 36.1-56t max working load	hr	4		~
22.06	Excavators hydraulic wheeled dual purpose				~
	(a) 0.6-0.8m3 rated bucket capacity	hr	4		~
	(b) 0.81-1.0m3 rated bucket capacity	hr	4		~
22.07	Wheeled loaders 4X4 articulated				~
	(a) 1.5-2.0 m3 SAE rated capacity	hr	4		~
	(b) 2.01-3m3 SAE rated capacity	hr	4		~

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	(c) 3-5 m3 SAE rated capacity	hr	4		-
22.08	Crawler Loaders with Hydraulic Ripper				-
	(a) 0.8-1.3m3 SAE rated capacity	hr	4		-
	(b) 1.31-1.99 m3 SAE rated capacity	hr	4		-
	(c) 2-2.5 m3 SAE rated capacity	hr	4		-
22.09	Rollers Towed vibratory including tractor				-
	(a) 6.5-8.8 t un-ballasted weight	hr	4		-
	(b) 8.6-11.7 t un-ballasted weight	hr	4		-
22.10	Road Roller deadweight (Steel Three Wheel)				-
	(a) 6.5 -8.8 t un-ballasted weight	hr	4		-
	(b) 8.6-11.7 t un-ballasted weight	hr	4		-
22.11	Roller rubber tyredself propelled				-
	(a) up to 1 t per wheel	hr	4		-
	(b) 1.1 t -2.0 t per wheel	hr	4		-
22.12	Roller Vibratory single roll Rubber tyred, 8.3-10.5 t un-ballasted weight	hr	4		-
22.13	Vibrating plate compactor 114-200 kg operating weight	hr	4		-
22.14	Compressor rated by normal delivery of free air per minute complete with all tools				-
	(a) 6.0-7.4 m3/mm	hr	5		-
	(b)7.5-9.7m3/min	hr	5		-
	(c) 9.8-25.5m3/min	hr	5		-
22.15	Mobile rubber tyred rough terrain crane 23-40T max working load	hr	5		-
22.16	Small dumpers 751kg-1.2t max rated payload	hr	5		-
22.17	Pumps(Inclusive of all hoses				-
	(a) 50-76mm delivery	hr	5		-
	(b) 77-101mm delivery	hr	5		-

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22.18	Rubber tyred tractors including trailer. 50-70kw rated flywheel power	hr	5		-
22.19	Concrete mixers (wet capacity)				-
	(a) up to 100 litres	hr	4		-
	(b) 101-200 litres	hr	4		-
	(c) 201-300 litres	hr	4		-
22.20	Transit Mixer 4.5 m ³ /hour	hr	4		-
22.21	Concrete pump of 45 and 30 m ³ capacity	hr	4		-
22.22	Concrete poker vibrator	hr	4		-
22.23	Concrete pump of 45 and 30 m ³ capacity	hr	4		-
22.24	Lorries - Flatbed				-
	(a) up to 7.5t gross vehicle weight	hr	4		-
	(b) 7.6-12.0t gross vehicle weight	hr	4		-
22.25	Lorries - Tippers				-
	(a) up to 11t gross vehicle weight	hr	4		-
	(b) 11-17t gross vehicle weight	hr	4		-
	(c) 17.1- 25t gross vehicle weight	hr	5		-
22.26	Van, Pickup or similar utility vehicle				-
	(a) up to 1 t carrying capacity	hr	5		-
	(b) 1.1-2.6 t carrying capacity	hr	5		-
22.27	Self propelled water or fuel tanker				-
	(a) 3500-4550 litre capacity	hr	5		-
	(b) 4551-7000 litre capacity	hr	5		-
	(c) 7001-12000 litre capacity	hr	5		-
22.28	Bitumen pressure distributor				-
	(a) 3500-4550 litre capacity	hr	5		-
	(b) 4551-9000 litre capacity	hr	5		-


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22.29	Hot mix plant - 60 tonnes per hour	hr	5		~
22.30	Wet mix plant - 60 tonnes per hour	hr	5		~
22.31	Hydrostatic paver & finisher with sensor control	hr	5		~
22.32	Batching and mixing plant 15-20 m³ capacity	hr	5		~
22.33	Concrete paver finisher with 40 HP motor	hr	5		~
22.34	Chip spreader	hr	5		~
22.35	Mechanical broom	hr	5		~
22.36	Kerb making machine	hr	5		~
22.37	Road marking machine	hr	5		~
22.38	Electric generator				~
	(a) 100 KVA	hr	5		~
	(b) 125 KVA	hr	5		~
22.39	Crusher Plant	hr	5		~
22.40	Pulvimixer	hr	5		~
22.41	LABOUR				~
	(a) Unskilled Labour	hr	5		~
	(b) Skilled Labour	hr	5		~
	(c) Artisan	hr	5		~
	(d) Plant Operator	hr	5		~
	(e) Driver	hr	5		~
	(f) Foreman	hr	5		~
	(g) Office attendants and chainmen	hr	5		~
	(h) Blaster (Certified)	hr	5		~
	MATERIALS				~
	All items of materials must be priced to comply with the Specifications.				~
22.42	Ordinary Portland Cement	tonne	2		~

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22.43	Hydrated Lime	tonne	2		~
22.44	Mild Steel				~
	(a) Up to and including 16 mm diameter	tonne	2		~
22.45	High Yield Steel				~
	(a) Up to and including 16mm diameter	tonne	2		~
	(b) Over 16mm diameter	tonne	2		~
22.46	Aggregates for Concrete				~
	(a) Fine	m3	5		~
	(b) coarse	m3	5		~
22.47	Shuttering Timber				~
	(a) F1 finish	m2	5		~
	(b) F2 finish	m2	5		~
	(b) F3 finish	m3	5		~
22.48	Chippings				~
	(a) Class 3 any size	m3	5		~
	(b) fine aggregate	m3	5		~
22.49	Cutback Bitumen and emulsion				~
	(a) 80/100 penetration grade bitumen	litre	10		~
	(b) MC 3000 cut-back bitumen	litre	10		~
	(c) MC 70 cut-back bitumen	litre	10		~
	(d) K-160 bitumen emulsion	litre	10		~
22.50	Gabion mesh, size 1.0 m x 1.0 m x 1.0 m	m2	5		~
22.51	Stone for gabions	m3	5		~
22.52	Dynamite stick explosives	kg	5		~
22.53	Explosive fuse	m	5		~
22.54	Detonators	No			

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			5		-
	Total Carried Forward to Summary:				-
BILL 23	CONCRETE PAVING BLOCKS				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
23.01	Supply, lay and compact 60mm thick coloured light duty precast concrete paving blocks with a 25 N/mm ² Cube crushing strength conforming to BS 6717 Part 1 of 1986 or Kenya Bureau of Standard equivalent including 30mm thick dust sand/quarry dust.	m ²	16000		-
	Total Carried Forward to Summary:				-
	BILL № 25: CROSS CUTTING ISSUES				
Item No.	Description	Units	Quantity	Rate	Amount (KSh)
25.01	Provide a provisional sum of KShs 1,000,000 for Training of Engineers and Technical Staff as instructed.	Prov. Sum	1		-
25.02	Include a percentage on Item 25.01 for the Contractor's Overheads and Profit.	%			
25.03	Implement HIV/AIDS awareness campaign amongst the workers for the duration of the Contract	mont h	24.00		-
25.04	Allow for the availability of condoms to workers and staff for the duration of Contract	mont h	24.00		-
25.05	Allow for the engagement of specialist HIV sub contractor to deal with prevention and awareness activities as per programme to be approved by the Engineer	mont h	24.00		-
	Total Carried Forward to Summary:				-


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GRAND SUMMARY OF BILL OF QUANTTTIES			
BILL ITEM	DESCRIPTION		AMOUNT
1	Preliminary and General items		
4	Site Clearance and Top Soil Stripping		
5	Earth Works		
7	Excavation and Filling of Structures		
8	Culverts and Drainage Works		
9	Passage to Traffic		
12	Natural Material fo Subbase and Base		
14	Cement and Lime Treatment		
15	Bituminous Surface Treatment and Surface Dressing		
16	Bituminous Mixes		
17	Concrete Works		
20	Road Furniture		
21	Miscellaneous Bridge Works		
22	Schedule of Dayworks		
23	Concrete Paving Blocks		
25	CROSS CUTTING ISSUES		
(A)	SUB-TOTAL (1)		
(B)	Add 2.5% VARIATION OF PRICE of sub-total (1)		
(B)	Add 1.5% CONTIGENCY SUM of sub-total (1)		
(C)	SUB-TOTAL (2) = (A+B)		
(D)	Add ...16% VAT of sub-total (2)		
GRAND TOTAL CARRIED FORWARD TO FORM OF BID AS BID SUM 1 (D+E)			


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APPENDIX A1.02 TO BILL ITEM 1.02: FURNITURE AND EQUIPMENT FOR R.E.'S OFFICE					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	1. ENGINEER'S MAIN OFFICE AND FURNITURE				
A1.02/1.01	Executive Desk	No	4		
A1.02/1.02	Desk with lockable drawer	No	4		
A1.02/1.03	Chairs executive (swivel type)	No	4		
A1.02/1.04	Lockable steel cabinets (with 4 drawers)	No	8		
A1.02/1.05	Bookshelf 2 door with drawers & shelves 2m long	Set	2		
A1.02/1.06	Bookshelf 3 door with drawers & shelves 2m long	No	2		
A1.02/1.07	Stapling machine (Ofrex) and pins	No	4		
A1.02/1.08	Paper punch	No	3		
A1.02/1.09	3m tape measures	No	4		
A1.02/1.10	Scientific calculator (Fx 951MS or above)	No	2		
A1.02/1.11	Fully equipped first aid kit	No	2		
A1.02/1.12	Waste paper basket	No	3		
A1.02/1.13	Electric heater fans	No	3		
A1.02/1.14	Padlock	No	5		
A1.02/1.15	Wall clocks battery powered	No	5		
A1.02/1.16	Filling trays	No	10		
A1.02/1.17	Chairs (standard desk type)	No	10		
A1.02/1.18	Triplicate book	No	5		
A1.02/1.19	Diary	No	10		
A1.02/1.20	Inventory Book	No	5		
A1.02/1.21	Rulers	No	4		
A1.02/1.22	Hard cover note books (4quire)	No	10		
A1.02/1.23	Survey Books (Rise and Fall)	No	5		
A1.02/1.24	Field note books	No	10		

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A1.02/1.25	Rims of Conqueror printing paper	No	100		
A1.02/1.26	A4 Envelops 50No. per packet	No	5		
A1.02/1.27	B5 Envelops 50No. per packet	No	5		
A1.02/1.28	B6 Envelops 50No. per packet	No	5		
A1.02/1.29	Payment voucher books	No	5		
A1.02/1.30	Engineer's pens(Uniball)0.7mm 10No.	No	20		
A1.02/1.31	Pens (Bic Ball points) 25 in a Pkt	No	4		
A1.02/1.32	Cellotape	No	4		
A1.02/1.33	Office glue stick	No	4		
A1.02/1.34	Dictionary	No	4		
A1.02/1.35	Photocopy / Printing papers (Reams)	No	4		
A1.02/1.36	Masking tape	No	10		
A1.02/1.37	Highlighters (Dozens)	No	5		
A1.02/1.38	Spring files	No	10		
	Total carried to Bill Item 1.02				
	APPENDIX B1.03 TO BILL ITEM 1.03- FURNITURE, EQUIPMENT AND REAGENTS FOR THE ENGINEER'S LABORATORY				
	1. FURNITURE				
B1.03/1.01	Desk 2.2x0.9 m with chair and lockup drawers	No	2		
B1.03/1.02	Desk chair (standard)	No	6		
B1.03/1.03	Stationery cupboard, 1.2 m ³ , lockable	No	1		
B1.03/1.04	Steel filing cabinet, 4 drawers, lockable	No	1		
B1.03/1.05	Steel filing cabinet, 2 drawers, lockable	No	1		
B1.03/1.06	Bookshelf, 3 shelves 1.2 m long (to hold box files)	No	1		
B1.03/1.07	Table - 6 m ²	No	1		



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B1.03/1.08	Two Plate electric cooker	No	1		
B1.03/1.09	Fire extinguisher, 10 litre capacity, CO2 type	No	4		
B1.03/1.10	Complete first aid kit	No	2		
	EQUIPMENT				
	(The following equipment shall be purpose made for use in theEngineer's laboratories and shall comply with the relevant British (BS) or American (AASHTO) Standard)				
	2. General Equipment				
B1.03/2.01	Automatic CBR Proctor Compaction press, 50 tonnes capacity with an adjustable distance between platens of 530mm-250mm, rammer weights and automatic count selector	No	1		
B1.03/2.02	Set of guards for above press.	No	1		
B1.03/2.03	Compaction mould complete with base plate and extension collar, 101.6 mm dia x116.43 mm high	No	6		
B1.03/2.04	2.49kg. Compaction hammer, drop regulated to 304.8mm	No	1		
B1.03/2.05	4.535kg compaction hammer, drop regulated to 457.2mm	No	1		
B1.03/2.06	Electric vibrating Kango Hammer fitted with steel tamper(BS1377) with support frame	No	1		
B1.03/2.07	Straight edge 300 mm long with handles	No	6		
B1.03/2.08	Steel Tamper (BS1377) compatible with Kango hammer	No	2		
B1.03/2.09	Compaction mould 152.4 mm. dia x 116.43 mm complete with base plate and extension collar, 101.6 mm	No	6		
B1.03/2.10	Galvanized metal tray 1m x 0.5m x 75 mm deep	No	6		
B1.03/2.11	75mm brush	No	4		


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B1.03/2.12	Semi-automatic balance, 25kg Capacity accurate to 1g, including weights	No	3		
B1.03/2.13	20mm BS Sieve, 300mm diameter	No	2		
B1.03/2.14	Stop Clock	No	2		
B1.03/2.15	Thermostatically controlled electric oven 105-1100C, capacity 0.225 m ³	No	1		
B1.03/2.16	Moisture content tins, 75 mm dia, Cadmium or aluminium plated	No	60		
B1.03/2.17	Cone penetrometer with gauge and automatically controlled test cup	No	1		
	3. Density (Sand replacement method BS 1377)				
B1.03/3.01	Metal containers 450mm diameter	No	4		
B1.03/3.02	Stainless steel tray 305mm diameter	No	4		
B1.03/3.03	Metal tray with 150 mm diameter hole in the centre, 300mmx300mm square or equivalent area, 40mm deep	No	2		
B1.03/3.04	Metal tray with 200mm diameter hole in the centre, 500mm x 500mm square, 50 mm deep	No	2		
B1.03/3.05	Steel pegs for fixing tray in position	No	40		
B1.03/3.06	Sand pouring cylinder, 150 mm diameter	No	1		
B1.03/3.07	Sand pouring cylinder, 215 mm diameter	No	1		
B1.03/3.08	Cold steel chisel 20mm x 300mm	No	6		
B1.03/3.09	Cold steel chisel 10mm x 250mm	No	6		
B1.03/3.10	1.5kg hammer	No	3		
B1.03/3.11	Scoop for removing excavated material from hole, 250 mm long handle	No	3		
B1.03/3.12	100mm brush, soft	No	3		
B1.03/3.13	50mm brush, soft	No	3		
B1.03/3.14	Primus gas stove	No	3		

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B1.03/3.15	Calibrating can 150 mm diameter x 150 mm deep	No	4		
B1.03/3.16	Ditto but 200 mm diameter x 250 mm deep	No	4		
	4. Density (Nuclear Density method AASHTO T238)				
B1.03/4.01	Nuclear moisture/density gauge (Troxler 3411B or similar approved)	No	1		
B1.03/4.02	Hole forming device (drill rod)	No	3		
B1.03/4.03	Guide for above	No	3		
B1.03/4.04	5. CBR (AASHTO T193)				
B1.03/4.05	CBR load frame (electric and hand operated)	No	1		
B1.03/4.06	Stabilising bar for the above	No	1		
B1.03/4.07	Proving ring for above, 10 kN and 28 kN capacity	set	2		
B1.03/4.08	Penetration gauge range 0 - 25mm	No	2		
B1.03/4.09	CBR piston including bracket	No	2		
B1.03/4.10	Swell measurement tripod complete with guage calibrated in 0.01mm divisions	No	3		
B1.03/4.11	CBR mould, 152.4 mm dia x 178 mm high, complete with perforated base plate and extension collar 50.8 mm high that can be fitted to either side of mould	No	60		
B1.03/4.12	Perforated swell plate 150 mm dia with an adjustable centre post				
B1.03/4.13	of rust proof metal provided with a lock-nut	No	60		
B1.03/4.14	2.25 kg split surcharge weight	No	4		
B1.03/4.15	Set of annular surcharge weights	No	50		
B1.03/4.16	Solid base plate for CBR mould	No	3		
B1.03/4.17	Static compaction displacer discs 1 No x 61.4 mm, 1 No x 50.8mm and 2 No x 38.8 mm thick	set	2		
B1.03/4.18	Disc lifting handle	No	2		



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B1.03/4.19	Central extruder, complete with 20kN hydraulic jack and accessories	No	1		
B1.03/4.20	Proving ring for the above	No	2		
B1.03/4.21	CBR piston including bracket	No	2		
B1.03/4.22	Swell measurement tripod complete with guage calibrated in 0.01mm divisions	No	3		
B1.03/4.23	Soaking tank for CBR mould sufficient for 50 moulds	No	1		
	6. Relative Density of Aggregates (BS 812)				
B1.03/6.01	Wire mesh basket with apertures not greater than 6.5 mm large enough to contain 2.5 kg of aggregate	No	2		
B1.03/6.02	A stout watertight container in which the basket can be freely suspended	No	2		
B1.03/6.03	Soft absorbent cloth (tea towel)	No	40		
B1.03/6.04	Shallow tray of area not less than 0.065 m ²	No	2		
B1.03/6.05	An airtight container of similar capacity to the basket	No	2		
B1.03/6.06	Pycnometer of 1 litre capacity	No	4		
B1.03/6.07	Semi automatic 5 kg balance accurate to 0.1g to be of size and type to permit the basket containing the sample to be suspended in water(to be supplied with weights)	No	1		
B1.03/6.08	Hairdrier (electric)	No	2		
B1.03/6.09	7. Flakiness (BS 812)				
B1.03/6.10	Thickness gauge (various sizes)	No	2		
B1.03/6.11	8. Sieve Analysis (BS 1377)				
B1.03/6.12	BS Sieve 300mm diameter in sizes 75, 63, 50, 37.5, 28, 20, 14,10, 6.3, 5 and 4 mm, plus lid and receiver	Set	2		
B1.03/6.13	BS Sieve 200mm diameter in sizes 2, 1, 0.6, 0.5, 0.425,0.300,0.150 and 0.075 mm, plus lid and receiver	Set	2		

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B1.03/6.14	Electric sieve shaker	No	1		
B1.03/6.15	BS sieve 200mm diameter 0.425 and 0.075 mm	set	1		
B1.03/6.16	1 m x 1 m x 75mm deep galvanized metal tray	No	10		
B1.03/6.17	Riffle box with 50mm slots (BS 1377)	No	2		
	9. Miscellaneous Equipment				
B1.03/9.01	Wheel barrow	No	4		
B1.03/9.02	Dustpan and brush	No	4		
B1.03/9.03	Shovel	No	6		
B1.03/9.04	Pick axe with handle	No	6		
B1.03/9.05	Metal scoop, large (150mm wide)	No	4		
B1.03/9.06	Metal scoop, medium (100mm wide)	No	6		
B1.03/9.07	Garden trowel	No	6		
B1.03/9.08	Steel tray 0.3m x 0.3m x 0.01m deep	No	20		
B1.03/9.09	3.5 kg hammer	No	2		
B1.03/9.10	7kg hammer	No	2		
B1.03/9.11	Rubber mallet (1kg)	No	4		
B1.03/9.12	Cold chisel	No	12		
B1.03/9.13	Oven, electric thermostatically controlled to any temperature between 100 and 1500C, 0.225 cu.m. minimum capacity including dial thermometer range 0-1600 0 C (BS 1377)	No	1		
B1.03/9.14	3 metre straight-edge including calibrated wedges	No	2		
B1.03/9.15	500mm x 500mm x 10mm plate glass (BS 1377)	No	4		
B1.03/9.16	Steel rod 75mm long x 3.2mm diameter	No	4		
B1.03/9.17	Palette knife 200mm long blade	No	3		
B1.03/9.18	Palette knife 100mm long blade	No	4		

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B1.03/9.19	BS sieve 450mm diameter, 37.5mm	No	1		
B1.03/9.20	BS sieve 450mm diameter, 20mm	No	1		
B1.03/9.21	BS sieve 450mm diameter, 5mm	No	1		
B1.03/9.22	BS sieve 450mm diameter, 0.425mm	No	2		
B1.03/9.23	BS sieve 450mm diameter, 0.3mm	No	2		
B1.03/9.24	BS sieve 450mm diameter, 0.075mm	No	2		
B1.03/9.25	Set of lid and receiver for metal scoop and steel trays	No	2		
B1.03/9.26	BS Sieve brush	No	10		
B1.03/9.27	Measuring cylinder set, 25 ml, 100 ml, 500 ml, 1000 ml, 2000 ml	set	3		
B1.03/9.28	Glass jar capacity 5 litres with lid	No	10		
B1.03/9.29	200mm x 200mm x 20mm cadmium plated or aluminium tin	No	30		
B1.03/9.30	Electronic balance capacity 1000 g, accurate to 0.01gm.	No	1		
B1.03/9.31	Balance 2000 g capacity accuracy to 0.1g (manual), including weights	No	1		
B1.03/9.32	Balance 50kg capacity accurate to 10gm including weights	No	1		
B1.03/9.33	Still for producing distilled water	No	1		
B1.03/9.34	Polythene or glass 20 litres storage vessel with tap at bottom	No	3		
B1.03/9.35	Stiff broom	No	5		
B1.03/9.36	Vernier calipers, 150mm	No	2		
B1.03/9.37	Vernier calipers, 250mm	No	2		
B1.03/9.38	Pestle and mortar	No	2		
B1.03/9.39	Linear shrinkage mould (BS 1377)	No	8		
B1.03/9.40	Liquid Limit Device	No	2		
B1.03/9.41	Average least dimension gauge	No	2		



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B1.03/9.42	Lockable tool box containing: 1 pr"Molegrips", 2 x 150mm screwdriver, 2 x 200 mm screwdriver, 2 x 300 mm screwdriver,(1 standard and 1 Phillips head of each) adjustable spanners 200mm and 300 mm, 1 pair round nosed pliers, 1 pair general purpose pliers,	No	1		
B1.03/9.43	Plastic or metal bucket including lid,10 litres capacity	No	5		
B1.03/9.44	Plastic or metal bucket including lid,20 litres capacity	No	5		
B1.03/9.45	Polythene wash bottle (500 ml)	No	6		
B1.03/9.46	Thermometer, range -10°C to 150°C, glass (BS 593)	No	4		
B1.03/9.47	Laboratory thermometer, range + 0°C to + 250°C (BS 593)	No	2		
B1.03/9.48	Maximum and minimum thermometer (BS692)	No	2		
B1.03/9.49	Rain gauge	No	5		
B1.03/9.50	Portable dial thermometer + 50°C to +250°C accurate to $\pm 3\%$	No	3		
B1.03/9.51	Ditto with 0.75m long stem	No	1		
B1.03/9.52	Pocket thermometer + 50°C to +250°C accurate to $\pm 3\%$ with 0.1 m stem	No	2		
B1.03/9.53	5 litre capacity steel storage containers with leak and dust proof lids for storage of bitumen samples	No	100		
B1.03/9.54	Hotplate 200mm diameter with Simmerstat heat control unit.	No	2		
B1.03/9.55	450mm diameter x 150mm deep metal mason's basin	No	10		
	11. Concrete: Slump and Cube Manufacture (BS 1881)				
B1.03/11.01	Slump cone, tamping rod and base	Set	3		
B1.03/11.02	Concrete cube mould, 150mm cube	No	30		
B1.03/11.03	Soaking tank for cubes (capacity 50 No.)	No	1		

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B1.03/11.04	Cube tamping bars	No	3		
	12. Concrete: Cube Compression Testing				
B1.03/12.01	Concrete compression machine to BS1610 Grade A with 300mm gauge, rectangular platens, capacity 1560 kN with load spacer	No	1		
B1.03/12.02	Safety guard for above	No	1		
B1.03/12.03	50mm distance piece	No	1		
B1.03/12.04	70mm distance piece	No	1		
B1.03/12.05	Electro-mechanical load pacer, 100 mm or equivalent distance piece	No	1		
	13. Aggregate and Chippings				
B1.03/13.01	Sand equivalent to AASHTO T176 including graduated plastic cylinder, rubber stopper, irrigation tube weighted foot assembly, siphon assembly, 85ml tin box (57mm dia.), 100 mm dia wide mouth funnel, stop clock, mechanical shaker and 10 litre jar	Set	1		
B1.03/13.02	Beaker 250ml	No	2		
B1.03/13.03	Aggregate Crushing Value Apparatus, 130 mm nominal diameter, including plunger and base plate	No	1		
B1.03/13.04	Tamping rod and metal measure for above	Set	2		
B1.03/13.05	Los Angeles Abrasion to ASTM standards	No	1		
B1.03/13.06	Set of 12 abrasive charges	No	1		
B1.03/13.07	Thermometer, 0°C to +50°C	No	2		
B1.03/13.08	Thermometer, 0°C to +250°C	No	2		
B1.03/13.09	Reagent grade Silica gel, 500g container	No	100		
B1.03/13.10	Aggregate Crushing Value apparatus, 150mm nominal diameter, including plunger and base plate	No	1		

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B1.03/13.11	Tamping rod and metal measure for above (BS 812)	set	1		
B1.03/13.12	Transverse distribution of spray test for bitumen distributor (tray test to BS 1707) equipment	set	1		
B1.03/13.13	Steel tray 20 mm deep x 0.1 m ² (for measuring bitumen spray quantity)	No	2		
B1.03/13.14	Purpose-made detachable handle 1.5m long to pick above trays	No	2		
	14. Bitumen Spray Test (BS 1707) and Penetration Test				
B1.03/14.1	Transverse distribution of spray test bitumen distributor (depot tray test to BS 1707) or equivalent.	Set	1		
B1.03/14.2	Steel tray 20 mm deep x0.1m ² (for measuring bitumen spray rates) with purpose made detachable handle 1.5m long	No	2		
B1.03/14.3	(a) ELE - Automatic bitumen penetrometer (EL 46-5380/01) with accessories with IP 38oC thermometer	No	1		
	(b) Penetration test cup	No	3		
	(c) Certified bitumen penetration needle	No	3		
	15. Marshall Test (ASTM D 1559)				
B1.05/15.01	Thermometer (50oC - 250oC), 50mm diameter with 180mm stainless steel stem	No	2		
	16. Bitumen Extraction Test				
	A) Extractor Bottle Method BS 598 Part 2				
B1.03/16.01	Electronic top pan balance 4kg capacity, sensitive to 0.1gm	No	1		
B1.03/16.02	Flat bottomed scoop	No	3		
B1.03/16.03	Steel garden trowel	No	2		
B1.03/16.04	Large steel spoon	No	2		
B1.03/16.05	Heat resistant gloves	pair	10		

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B1.03/16.06	Foot pump for pressurising air water assemblies up to a maximum of 700KN/m ² and fitted with flexible hose approximately 1.2m long and connector	No	2		
B1.03/16.07	Steel bottle 600ml capacity with 49mm rubber stopper	No	2		
B1.03/16.08	Steel bottle 2500ml capacity with 71mm rubber stopper	No	2		
B1.03/16.09	Steel bottle 7000ml capacity with 71mm rubber stopper	No	2		
B1.03/16.10	Flask funnel for fitting to the 700ml steel bottle with rim of funnel retaining sieve 200mm nominal diameter	No	2		
B1.03/16.11	Bottle roller compact bench mounted unit designed to rotate 2 bottles simultaneously about longitudinal axis	No	1		
B1.03/16.12	Pressure filter complete with cutting tool for making hole in the filter paper	No	1		
B1.03/16.13	Filter funnel to take 200mm nominal diameter sieves	No	2		
B1.03/16.14	Centrifuge complying with BS 598	No	1		
B1.03/16.15	Binder recovery	No	1		
B1.03/16.16	Volumetric flask 250ml, 500ml, 1000ml and 2000ml capacity	set	2		
B1.03/16.17	Recovery still for Dichloromethane	No	1		
	B) Hot Extractor Method BS 598 Part 2				
B1.03/16.18	Hot extractor complete with wire gauze container gasket, cork lid and support assembly	No	2		
B1.03/16.19	Dean and Stark receiver with condenser to suite Trichloroethylene	No	2		
B1.03/16.20	Gyratory compactor ELE Servo Pac or equivalent with 1 x100mm and 1 x 150mm moulds	No	1		


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B1.03/16.21	PRD Vibrating hammer compactor complete with 6 moulds, 7 base plates from ELE	No	1		
B1.03/16.22	Tamping foot 102mm diameter and 146mm diameter and shanks to fit the supplied vibratory hammer	Set	2		
	17. Consumables				
B1.03/17.01	Paraffin wax	Kg	50		
B1.03/17.02	Gas	Kg	1,000		
B1.03/17.03	Gunny sack	No	400		
B1.03/17.04	Plastic bag 900x450x1000 gauge	No	2,000		
B1.03/17.05	Plastic bag 450x300x1000 gauge	No	2,000		
B1.03/17.06	Filter paper 150mm diameter Whatman No. 5 (Boxes of 100)	No	40		
B1.03/17.07	Filter paper 400mm diameter Whatman No. 5 (Boxes of 100)	No	20		
B1.03/17.08	Filter paper 100mm diameter Whatman No. 5 (Boxes of 100)	No	20		
B1.03/17.09	Filter paper 400mm diameter Whatman No. 54 (Boxes of 100)	No	5		
B1.03/17.10	Filter paper 270mm diameter with 33 diameter hole at centre Whatman No. 5 (Boxes of 100)	No	15		
B1.03/17.11	Trichloroethylene	kg	1,000		
B1.03/17.12	Dichloromethane	kg	1,000		
B1.03/17.13	Cotton waste	kg	400		
	Total of Appendix B1.03 Carried to Bill No.1 item 1.03				

	APPENDIX B1.13 TO BILL ITEM 1.13-attendance upon the Engineer by the following staff				
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B1.14/1.0	Assistant Engineer	M.mth	24		-
B1.14/1.1	Inspector of works	M.mth	48		-
B1.14/1.2	Labaratory Technician	M.mth	24		-
B1.14/1.3	Survey Assistant	M.mth	48		-
B1.14/1.4	Labaratory Assistant	M.mth	48		-
B1.14/1.5	Environmentalst/Socialogist	M.mth	24		-
B1.14/1.6	Office Assistants	M.mth	24		-
B1.14/1.7	Levellers	M.mth	24		-
B1.14/1.8	Secretary	M.mth	24		-
B1.14/1.9	General Attendants	M.mth	48		-
	Total of Appendix B1.13 Carried to Bill No.1 item 1.13				-

APPENDIX C1.20 TO BILL ITEM 1.20- PROVIDE ND MAINTAIN SURVEY EQUIPMENT					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
				(KSHS)	(KSHS)
C1.08 /1.01	Engineer's digital Level machine with all its supporting accessories, that meets the requirements as indicated in the special specification	No	1		-
C1.08 /1.02	Digital Levelling staff 5m with levelling bubble (Leica/topcon or similar approved)	No	6		-
C1.08 /1.03	Scientific calculators [CasioFX 570 or equivalent]	No	3		-
C1.08 /1.05	Trimble Geo 7X Handheld or equivalent Data Collector with a powerful 1GHz ARM Cortex A8 i.MX53, 8GB flash storage, IP65 rating, and sunlight-optimized display, with the integrated dual-mode cellular modem.	No	2		-
C1.08 /1.06	Suunto 9 Multisport GPS Watch with BARO and Wrist-Based Heart Rate (Black)On long ultra runs, with unlimited battery life for recording distance and track accurately, as GPS is a heavy drain on the battery. Must be with a FusedTrack algorithm that combines GPS and motion sensor.	No	2		-


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C1.08 /1.07	Provide a Tow way Radio Communiaction Walkie Talkie with at least 16 Memory Channels, 50 CTCSS /105 CDCSS, Battery Saving Features, Low Voltage Alert, VOX, Scanning, & Monitor Functions, English Voice Prompt, PC Programmable, Voice Scramble & Encryption, Emergency Alarm, High Illumination Flashlight and Transmitter Time-Out Timer (TOT) or equivalent.	No	4		~
C1.08 /1.08	200m range laser distance measuring machine	No	3		~
C1.08 /1.09	Bosch GWM 32 Professional Measuring Wheel or equivalent with min wheel diameter (circumference): 318.5 mm (1 m), Max. measured value: 9999.9 m: Telescopic handle, Material: Aluminium and Measurement accuracy: 1 dm/100 m	No	2		~
C1.08 /1.10	Roll of tracing/matte film paper	No	4		~
C1.08 /1.11	GPS System - Leica GS09 GNSS system, with at least three rovers and a controller. The controller to have colour display, touch screen&stylus, CF card slot and alphanumeric keyboard, GLONASS, RTCM/CMR, RTK unlimited, network RTK, 5Hz positioning, and raw data logging. The system to incorporate Refrence line, DTM stake out, RoadRunner and Volume calculation. the system to include all acceossories i.e batteries with professional charger, Min 8GB memory card, compactFlash PC card adaptor, data transfer cables,modems and antennas, poles and accessories, tripod and software.	No	1		~
	Total carried to Bill Item 1.20				~


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