No.

No.

6

10

LABORATORY EQUIPMENT FOR THE ENGINEER

Compaction mould complete with base plate extension collar,

The Contractor shall provide and maintain in good repair for the duration of the Contract, the concrete, soils and bituminous materials testing apparatus listed below which shall be made available to the Engineer not later than three (3) weeks after the Engineer's order to commence the Works and shall continue to be made available for the Engineer's exclusive use throughout the Contract Period. All the equipment shall be purpose made for use in soils testing laboratory and shall comply with the relevant British (BS) or American (AASHTO) Standard.

1) Compaction Test (AASHTO T.99 and T.180)

2)

	101.6mm internal diameter x 116.43mm high	IVO.	10
	- 2.495 kg compaction hammer, drop regulated to 304.8mm	No.	5
٠	- 4.536 kg compaction hammer, drop regulated to 457.2mm	No.	5
-	- Aggregate compaction mould to BS.5835 complete	No.	10
	- Loading frame for the Kango hammer (to BS.5835)	No.	1
	- Electric vibrating Kango hammer with steel tamper	No.	1
	- Steel straight edge 300mm long x 25mm wide x 3mm thick	No.	6
· .	 Compaction mould 152,4mm dia. x 116.43mm high complete with base plate and extension collar 	No.	10
)	Density Test (Sand replacement method BS 1377)		
٠	- Galvanized metal tray 1m x 0.5m x 75mm deep	No.	2
	- 75mm brush	No.	6
	 Semi-automatic balance, 25 kg capacity, accurate to 1 g, including weights 	No.	2
	- Metal containers, 450mm dia.	No.	6
	- Stainless steel tray, 305mm dia.	No.	3
	- Metal tray with 100mm diameter hole in the centre, 300mm x 300mm square	No.	3
	- Metal tray with 150mm diameter hole in the centre, 300mm x 300mm square	No.	3
	 Metal tray with 200mm diameter hole in the centre, 457mm x 457mm square 	No.	3
•	- Steel pegs for fixing tray in position	No.	36
	- Sand pouring cylinder, 100mm diameter	No.	3
	- Sand pouring cylinder, 150mm diameter	No.	3
	- Sand pouring cylinder, 200mm diameter	No.	3
	- Cold steel chisel, 25mm x 300mm long	No.	6
. •	- Cold steel chisel, 10mm x 250mm long	No.	6
	- 1.8 kg hammer	No.	6
	- Scoop for removing excavated material from hole, 250mm long	No.	. 6

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100mm brush, soft

handle

	- Metal dibber	No.	6
	- Scraper	No.	6
	- Steel pointed rod	No.	6
	- Density spoon	No.	6
	- 50mm brush, soft	No.	6
	- Calibrating can, 100mm diameter x 150mm deep	No.	3
	- Calibrating can, 150mm diameter x 200mm deep	No.	3
	- Calibrating can, 200mm diameter x 250mm deep	No.	3
	- Polythene container jars, with neck 125mm diameter and 4 litre capacity	No.	6
· · · · · · · · · · · · · · · · · · ·	- Standard sand 600/300 micron, 50 kg bag	No.	10
3)	Density (Nuclear Density Method, AASHTO T238)	٠.	
-*.	 Nuclear moisture/density gauge (Troxler 3411B or similar approved) 	No.	1
	- Hole forming device	No.	1
	- Guide for the above	No.	1
4)	Atterberg Limits Apparatus to BS 1377		
•	- Casagrande liquid limit apparatus	No.	4
	- Grooving tool	No.	4
	- Liquid limit penetrometer	No.	2
	- Penetration test cone	No.	2
	- Penetration sample cap	No.	2
	- Linear shrinkage mould	No.	20
	- Vernier calliper, 150mm x 0.1mm	No.	2
	- Stainless steel, 3mm dia. and 100mm long	No.	4
5)	Sand Equivalent		
	- Sand equivalent test set	Set	2
6)	Specific Gravity (BS.1377 and BS.812) and Water Absorptio (ASTM D 2041 - 78)	n	
	 Pycnometer for sands and fine aggregate, 1 kg capacity, complete with cone and rubber seal. 	No.	10
	 Glass Plastic or metal bowl having a capacity of at least 1000 ml strong enough to withstand a full vacuum complete with cover fitted with rubber gasket and a hose connection. 	No.	10
	 Volumetric flas having a capacity of at least 1000 ml strong enough to withstand a full vacuum complete with rubber stopper and a hose connection. 	No.	10

An intermediate size heavy wall glass pycnometer having a capacity of approximately 4000 ml or a large size polycarbonate plastic pycnometer having a capacity of at least 10 000 ml complete with a	No.	10
suitable vacuum connection assembly consisting of a vacuum gauge, release valve, and tubing connector, plus a tapered stopper device for maintaining consistent volume regulation.		
A manometer or vacuum gauge suitable for measuring the specified vacuum	No.	1
A constant temperature water bath of a suitable size for the 4000 ml pycnometer	No.	1
Gay Lussac specific gravity bottle, 25ml.	No.	10
Gay Lussac specific gravity bottle, 50ml.	No.	10
Wire mesh basket with apertures not greater than 6.5mm large enough to take 2.5 kg of aggregate	No.	1
Stout watertight container in which the basket can be freely suspended under water	No.	1
End-over-end shaker	No.	1
Gas jar, 300mm high x 75mm dia. with glass plate and rubber stopper	No.	10
Vacuum type desiccator, 200mm dia	No.	2
Vacuum pump, 1 HP, capable of evacuating air from the container to a residual pressure of 30 mm Hg (4.0 kPa) or less.	No.	1
Rubber headed pestle	No.	2
Soft absorbent cloth (tea towel)	No.	20
Shallow tray of area not less than 0.065m ² .	No.	2
Airtight container of similar capacity to the basket	No.	1
5 kg balance accurate to 0.1g capable of suspending the basket plus sample in the watertight container	No.	1
Hair drier	No.	1
Sand absorption cone and tamper	No.	2
Pycnometer for the above	No.	2
akiness Index (BS.812)		
Flakiness sieve, 4.9 x 30mm slot	No.	2
Flakiness sieve, 7.2 x 40mm slot	No.	2
Flakiness sieve, 10.2 x 50mm slot	No.	2
Flakiness sieve, 14.4 x 60mm slot	No.	2
Flakiness sieve, 19.7 x 80mm slot	No.	2
Flakiness sieve, 26.3 x 90mm slot	No.	2
Flakiness sieve, 33.9 x 100mm slot	No.	2
eve Analysis (BS.1377)		
BS sieve 300mm diameter in sizes 75, 63, 50, 37.5, 28, 20, 14, 6.3, 5 and 3.35mm plus lid and receiver	Set	4
D - 65		
3 - 33		
	A constant temperature water bath of a suitable size for the 4000 ml pycnometer Gay Lussac specific gravity bottle, 25ml. Gay Lussac specific gravity bottle, 50ml. Wire mesh basket with apertures not greater than 6.5mm large enough to take 2.5 kg of aggregate Stout watertight container in which the basket can be freely suspended under water End-over-end shaker Gas jar, 300mm high x 75mm dia. with glass plate and rubber stopper Vacuum type desiccator, 200mm dia Vacuum pump, 1 HP, capable of evacuating air from the container to a residual pressure of 30 mm Hg (4.0 kPa) or less. Rubber headed pestle Soft absorbent cloth (tea towel) Shallow tray of area not less than 0.065m ² . Airtight container of similar capacity to the basket 5 kg balance accurate to 0.1g capable of suspending the basket plus sample in the watertight container Hair drier Sand absorption cone and tamper Pycnometer for the above akiness Index (BS.812) Flakiness sieve, 4.9 x 30mm slot Flakiness sieve, 10.2 x 50mm slot Flakiness sieve, 14.4 x 60mm slot Flakiness sieve, 19.7 x 80mm slot Flakiness sieve, 26.3 x 90mm slot Flakiness sieve, 33.9 x 100mm slot Flakiness sieve, 33.9 x 100mm slot Flakiness sieve, 33.9 x 100mm slot Eve Analysis (BS.1377) BS sieve 300mm diameter in sizes 75, 63, 50, 37.5, 28, 20, 14,	A constant temperature water bath of a suitable size for the 4000 ml pycnometer Gay Lussac specific gravity bottle, 25ml. No. Gay Lussac specific gravity bottle, 50ml. Wire mesh basket with apertures not greater than 6.5mm large enough to take 2.5 kg of aggregate Stout waterlight container in which the basket can be freely suspended under water End-over-end shaker Gas jar, 300mm high x 75mm dia. with glass plate and rubber stopper Vacuum type desiccator, 200mm dia Vacuum pump, 1 HP, capable of evacuating air from the container to a residual pressure of 30 mm Hg (4.0 kPa) or less. Rubber headed pestle Soft absorbent cloth (tea towel) No. Shallow tray of area not less than 0.065m². Airtight container of similar capacity to the basket No. 5 kg balance accurate to 0.1g capable of suspending the basket plus sample in the watertight container Hair drier Sand absorption cone and tamper Pycnometer for the above No. akiness Index (BS.812) Flakiness sieve, 4.9 x 30mm slot Flakiness sieve, 10.2 x 50mm slot Flakiness sieve, 10.2 x 50mm slot Flakiness sieve, 19.7 x 80mm slot Flakiness sieve, 26.3 x 90mm slot Flakiness sieve, 33.9 x 100mm slot No. Flakiness sieve, 33.9 x 100mm slot No. BS sieve 300mm diameter in sizes 75, 63, 50, 37.5, 28, 20, 14, 6.3, 5 and 3.35mm plus lid and receiver

		BS sieve 200mm diameter in sizes 2, 1.18, 0.6, 0.425, 0.300, 0.212, 0.150, 0.075 and 0.063mm plus lid and receiver	Set	4
	-	Electric sieve shaker	No.	1
		BS sieve 200mm diameter, 0.425 and 0.075mm	Set	10
	-	Field rocker sieve set	Set	4
9)	CJ	BR Test (AASHTO T.193)		
	-	CBR mould, 152mm dia. x 178mm high, complete with perforated base plate and extension collar 50.8mm high that can be fitted to either end of the mould.	No.	30
		Spacer disk	No.	6
	-	Perforated swell plate with adjustable centre post of rust proofed steel provided with a lock nut.	No.	6
	:	Sliding weight rammer, 2.49 kg	No.	3
		2.27 kg annular surcharge weight	No.	30
	<u>-</u>	Static compaction press, 50 tonnes capacity with an adjustable platten speed between 1mm/min. and 50.8mm/min. (Hydraulic or mechanical operation and hand operated)	No.	1
	-	Set of guards	No.	1
	- '	CBR/Marshall motorised dual speed 60 kN load frame, ASTM	No.	, 1
	-	Stabilising bar for the above	No.	, . 1
	-	Proving ring for above, 10 kN and 50 kN capacity.	Set	. 1
	-	Penetration gauge range 0 - 25mm	No.	1
	-	CBR piston, including bracket	No.	1
,	-	Swell measurement tripod complete with gauge calibrated in 0.01mm divisions	No.	30
		Soaking tank for CBR mould sufficient for 200 moulds	No.	1
	-	Tamping bar, steel 13mm diameter, 380mm long	No.	1
		- Martin All Metabolic Assets (1997年) - The All Metabolic Assets (1997年)		
10)	M	iscellaneous Equipment		
	•	1m x 1m x 75mm deep galvanised metal tray	No.	10
	-	1.5 kg hammer	No.	4
	<u>.</u> .	Riffle box with 10mm slots (BS.1377)	No.	2
	· - .	Riffle box with 20mm slots (BS.1377)	No.	1
	. -	Riffle box with 50mm slots (BS.1377)	No.	1
		Wheel barrow	No.	4
	-	Dustpan brush	No.	4
	-	Plastic funnels, 65mm dia	No.	2
	-	Plastic funnels, 100mm dia	No.	2
	· - ·	Plastic funnels, 140mm dia	No.	2
	-	Shovel	No.	6
		Pick-axe	No.	6
	•	Metal scoop, large, 150mm wide	No.	4

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	Metal scoop, medium, 100mm wide	No.	6
٠_	Schmidt concrete test hammer	No.	1
-	Jack, 20 tonne, lever, frame, sample extruder	No.	1
-	Garden trowel	No.	4
-	Steel rule, 500mm long	No.	3
-	Stop watch was a second	No.	1
. <u>-</u>	Steel tray, 0.3m x 0.3m x 0.01m deep	No.	40
	3.5 kg hammer	No.	4
	7 kg hammer	No.	3
	Complete sand patch test apparatus	No.	1
, -	Cold chisel	No.	6
. <u>-</u>	Oven, electric thermostatically controlled to any temperature between 60 deg. and 149 deg.C, minimum capacity including dial thermometer range 0-160 deg.C (BS.1377).	No.	2
-	Gas for the above oven	No.	2
-	Single plate electric cooker	No.	4
-	3 metre straight edge including calibrated wedges	No.	1
. · <u>-</u>	Desiccator, 300mm dia.	No.	2
-	Straight edge, 300mm long, 25mm wide and 3mm thick	No.	6
- ;	Moisture content tin, 75mm dia. cadmium plate or aluminium	No.	100
-	Concrete beam moulds 150 x 150 x 750mm	No.	24
**	450mm x 450mm x 9mm plate glass (BS.1377)	No.	4
-	Refrigerator 250 litre capacity	No.	1
_	Palette knife 200mm blade	No.	6
٠ _	Palette knife 100mm blade	No.	6
-	BS Sieve brush	No.	8
	200mm x 200mm x 20mm cadmium plated or aluminium tin	No.	50
	Electronic balance capacity 600 g, accurate to 0.001 g	No.	1
. 7	Electronic balance capacity 1600 g, accurate to 0.01 g	No.	1
	Electronic balance capacity 5000 g, accurate to 0.1 g	No.	1
-	Balance (Chain dial) 250 g capacity to 0.01 g	No.	1
	Balance 2000 g capacity accuracy to 0.1 g (manual), including weights	No.	1
•	Balance 4000 g capacity accuracy to 1.0 g (manual), including weights	No.	1
- -	Balance 12000 g capacity accuracy to 1.0 g (manual), including weights	No.	2
-	Balance 50 kg capacity accuracy to 20 g, including weights	No.	1
	Load rings with dial gauges, 10kN	No.	1
-	Load rings with dial gauges, 14kN	No.	1
_	Load rings with dial gauges, 20kN	No.	1
•	Load rings with dial gauges, 28kN	No.	1

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ASTM D2041-78 No 1 - Standard Specifications for Transportation Material and Methods of No. 1 Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881)		i		
- Still for producing distiled water - Polythene or glass 20 litres storage vessel with tap at bottom - Pertol driven core cutting machine with all accessaries - Core cutting compound - Vemier callipers, 250mm - Vemier callipers, 250mm - Benkelman beams - Average least dimension gauge - Lockable tool box containing: - 1 pair "Molegrips", 2x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 120mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg.), 1 set imperial spanners 120m and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg.), 1 set imperial spanners 120m - Plastic or metal bucket including fid, 10 litres capacity - Polythene wash bottle (500ml) - A4 size clipboard - Mercury thermometer, range -10 deg. C to 150 deg. C, glass (BS.93) - Laboratory thermometer, range -10 deg. C to 150 deg. C, glass (BS.93) - Laboratory thermometer, range +50 deg. C to 250 deg. C (BS.593) - No Maximum and minimum thermometer (BS.692) - No Maximum and minimum thermometer (BS.692) - No 10 - Asian gauge - Portable dial thermometer +50 deg. C to 250 deg. C accurate to + - 3% with 0.6m long stem Pocket dial thermometer +50 deg. C to +250 deg. C accurate to + - 3% with 0.6m long stem S litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 - BS.882 - No 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base	to protect of the	- Load rings with dial gauges, 50kN	No.	-1
Polythene or glass 20 litres storage vessel with tap at bottom Petrol driven core cutting machine with all accessaries No. 1 Core cutting compound kg 1,000 Vemier callipers, 250mm No. 2 Benkelman beams No. 2 Lockable tool box containing: 1 pair "Molegrips", 2x 150mm screwdriver 2 x 200mm screwdriver, 2x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed piters, 1 pair general purpose pilers, 1 pairs faced mallet (1 kg), 1 set imperial spanners 1/4" to 15/16", 1 set metric spanners fam to 20mm, 2 type pressure gauge range 0-100 p.s.i. Plastic or metal bucket including lid, 10 litres capacity No. 20 Polythene wash bottle (500ml) No. 10 As size clipboard No. 20 Mercury thermometer, range -10 deg.C to 150 deg.C, glass No. 10 (BS.593) Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) No. 1 Maximum and minimum thermometer (BS.692) No. 1 Rain gauge No. 3 Portable dial thermometer +50 deg.C to 250 deg.C accurate to +-3% with 0.6m long stem. Pocket dial thermometer +50 deg.C to 250 deg.C accurate to +-3% with 0.1m long stem. Posted dial thermometer +50 deg.C to 250 deg.C accurate to +-3% with 0.1m long stem. Standard Specifications Copies of each of the following Standard Specifications: BS.812 No. 1 BS.882 No. 1 BS.882 No. 1 BS.882 No. 1 BS.883 No. 1 ASTM D2041-78 No. 1 ASTM D2041-78 Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. Concrete: Slump and Cube Manufacture (BS.1881) Stump cone, tamping rod and base		- Still for producing distiled water		1
- Petrol driven core cutting machine with all accessaries - Core cutting compound - Vernier callipers, 250mm - Benkelman beams - Average least dimension gauge - Lockable tool box containing: - I pair "Molegrips", 2x 150mm screwdriver 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 150mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 150mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 2 x 200mm - screwdriver, 2 x 300mm screwdriver, 1 standard and 1 phillips - head of each) adjustable spainers 200mm and 300mm, 1 pair - round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced - mailet (1 kg), 1 set imperial spanners 1 fs/r to 15/16°, 1 set metric - spanners 8mm to 20mm, 2 tyre pressure gauge range 0-100 p.s.i. - Plastic or metal bucket including lid, 10 litres capacity - No. 20 - Polythene wash bottle (500ml) - No. 20 - Mercury thermometer, range -10 deg.C to 150 deg.C, glass - No. 10 - Maximum and minimum thermometer (BS.692) - No. 1 - Rain gauge - No. 3 - Portable dial thermometer, range +50 deg.C to 250 deg.C (BS.593) - No. 1 - Pocket dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.6m long stem. - Pocket dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.1m long stem. - Pocket dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.1m long stem. - Pocket dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.1m long stem. - Pocket dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.1m long stem. - Poscet dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.1m long stem. - S litre capacity steel storage container with leak and dust proof li		- Polythene or glass 20 litres storage vessel with tap at bottom		1
- Vernier callipers, 250mm - Benkelman beams - Average least dimension gauge - Lockable tool box containing: 1 pair "Molegings", 2 x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plaite faced mallet (1 kg), 1 set imperial spanners 1/4* to 15/16*, 1 set metric spanners 8 mm to 20mm, 2 tyre pressure gauge range 0-100 p.s.i. - Plastic or metal bucket including lid, 10 litres capacity - Polythene wash bottle (500ml) - A4 size clipboard - Mercury thermometer, range -10 deg, C to 150 deg, C, glass (BS, 593) - Laboratory thermometer, range +50 deg, C to 250 deg, C (BS, 593) - Maximum and minimum thermometer (BS, 692) No. - Rain gauge - Portable dial thermometer +50 deg, C to 250 deg, C accurate to +- 3% with 0.6m long stem. - Pocket dial thermometer +50 deg, C to +250 deg, C accurate to +- 3% with 0.6m long stem. - Pocket dial thermometer +50 deg, C to +250 deg, C accurate to +- 3% with 0.1m long stem. - S litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS, 812 - BS, 882 - BS, 1377 - BS, 1881 - BS, 1894 - BS, 5855, Part 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Stump and Cube Manufacture (BS, 1881) - Stump cone, tamping rod and base		Petrol driven core cutting machine with all accessaries		1
- Vernier callipers, 250mm - Benkelman beams - Average least dimension gauge - Lockable tool box containing: 1 pair "Molegrips", 2 x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg), 1 set imperial spanners 1/4* to 15/16*, 1 set metric spanners 8mm to 20mm, 2 tyre pressure gauge range 0-100 p.s.i. - Plastic or metal bucket including lid, 10 litres capacity - Polythene wash bottle (500ml) - A4 size clipboard - Mercury thermometer, range -10 deg.C to 150 deg.C, glass - (BS.593) - Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) - Maximum and minimum thermometer (BS.692) - Rain gauge - Portable dial thermometer +50 deg.C to 250 deg.C accurate to + 3% with 0.6m long stem Pocket dial thermometer +50 deg.C to 250 deg.C accurate to + 3% with 0.1m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + 3% with 0.1m long stem Sitre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 - BS.882 - BS.1377 - BS.1881 - BS.284 - BS.1377 - BS.1881 - BS.294 - BS.5855, Part 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Stump and Cube Manufacture (BS.1881) - Stump cone, tamping rod and base		- Core cutting compound	kg	1,000
- Benkelman beams No. 2 - Average least dimension gauge No. 2 - Lockable tool box containing: 1 pair "Molegrips", 2 x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 pairs is general purpose pliers, 1 pairs for standard mallet (1 kg), 1 set imperial spanners 1/4" to 15/16", 1 set metric spanners samm to 20mm, 2 tyre pressure gauge range 0-100 p.s.i. - Plastic or metal bucket including lid, 10 litres capacity No. 20 - Polythene wash bottle (500ml) No. 10 - A4 size clipboard No. 20 - Mercury thermometer, range -10 deg.C to 150 deg.C, glass (BS.593) - Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) No. 10 - Maximum and minimum thermometer (BS.692) No. 1 - Rain gauge No. 3 - Portable dial thermometer +50 deg.C to 250 deg.C accurate to + No. 2 - 3% with 0.6m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + No. 10 - 3% with 0.1m long stem 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 No. 1 - BS.182 No. 1 - BS.1831 No. 1 - ASTM D2041-78 No. 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition.		- Vernier callipers, 250mm	_	
- Lockable tool box containing: 1 pair "Molegrips", 2 x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg), 1 set imperial spanners 1/4* to 15/16*, 1 set metric spanners 8mm to 20mm, 2 tyre pressure gauge range 0-100 p.s.i. - Plastic or metal bucket including lid, 10 litres capacity No. 20 - Polythene wash bottle (500ml) No. 10 - A4 size clipboard No. 20 - Mercury thermometer, range -10 deg.C to 150 deg.C, glass (B5.993) - Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) No. 1 - Maximum and minimum thermometer (BS.692) No. 1 - Rain gauge - Portable dial thermometer +50 deg.C to 250 deg.C accurate to +- 3% with 0.6m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to +- 3% with 0.1m long stem 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 - BS.882 - No. 1 - BS.1881 - BS.1377 - No. 1 - BS.1881 - No. 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base		- Benkelman beams	No.	2
1 pair "Molegrips", 2 x 150mm screwdriver, 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg), 1 set imperial spanners 14" to 151/6", 1 set metric spanners 8mm to 20mm, 2 tyre pressure gauge range 0-100 p.s.i. Plastic or metal bucket including lid, 10 litres capacity Polythene wash bottle (500ml) A4 size clipboard No. 20 Mercury thermometer, range -10 deg.C to 150 deg.C, glass (BS.593) Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) No. 10 Maximum and minimum thermometer (BS.692) No. 1 Rain gauge No. 3 Portable dial thermometer +50 deg.C to 250 deg.C accurate to +- No. 2 3% with 0.6m long stem. Pocket dial thermometer +50 deg.C to +250 deg.C accurate to +- No. 3% with 0.1m long stem. 5 litre capacity steel storage container with leak and dust proof lids No. 100 for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 - BS.882 No. 1 - BS.1881 No. 1 ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part 1 and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base		- Average least dimension gauge	No.	2
- Polythene wash bottle (500ml) - A4 size clipboard - Mercury thermometer, range -10 deg.C to 150 deg.C, glass - Mercury thermometer, range +50 deg.C to 250 deg.C (BS.593) - Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) - No. 1 - Maximum and minimum thermometer (BS.692) - No. 1 - Rain gauge - No. 3 - Portable dial thermometer +50 deg.C to 250 deg.C accurate to +- No. 23 with 0.6m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to +- No. 3% with 0.1m long stem Solitre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 - BS.882 - No. 1 - BS.1881 - No. 1 - BS.1924 - No. 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping tod and base Set 2		1 pair "Molegrips", 2 x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm screwdriver, (1 Standard and 1 phillips head of each) adjustable spanners 200mm and 300mm, 1 pair round-nosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg), 1 set imperial spanners 1/4" to 15/16", 1 set metric	No.	1
- A4 size clipboard - Mercury thermometer, range -10 deg.C to 150 deg.C, glass No. 10 - Meximum and minimum thermometer (BS.692) - Rain gauge - No. 1 - Rain gauge - No. 3 - Portable dial thermometer +50 deg.C to 250 deg.C accurate to +- No. 3 - With 0.6m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to +- No. 3% with 0.1m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to +- No. 3% with 0.1m long stem S litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 - BS.882 - No. 1 - BS.1881 - No. 1 - BS.1924 - No. 1 - ASTM D2041-78 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2		- Plastic or metal bucket including lid, 10 litres capacity	No.	20
- Mercury thermometer, range -10 deg.C to 150 deg.C, glass (BS.593) - Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) No. 1 - Maximum and minimum thermometer (BS.692) No. 1 - Rain gauge No. 3 - Portable dial thermometer +50 deg.C to 250 deg.C accurate to + No. 2 3% with 0.6m long stem. No. 10 3% with 0.1m long stem. No. 10 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 No. 1 - BS.882 No. 1 - BS.1881 No. 1 - BS.1881 No. 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2		- Polythene wash bottle (500ml)	No.	10
(BS.593) Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593) No. 1 Maximum and minimum thermometer (BS.692) No. 1 Rain gauge No. 3 Portable dial thermometer +50 deg.C to 250 deg.C accurate to +- No. 2 3% with 0.6m long stem. Pocket dial thermometer +50 deg.C to +250 deg.C accurate to +- No. 10 3% with 0.1m long stem. Sitre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: BS.812 No. 1 BS.882 No. 1 BS.1821 No. 1 BS.1881 No. 1 BS.1924 No. 1 ASTM D2041-78 No. 1 ASTM D2041-78 No. 1 ASTM D2041-78 No. 1 Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition.		- A4 size clipboard	No.	20
- Maximum and minimum thermometer (BS.692) No. 1 - Rain gauge No. 3 - Portable dial thermometer +50 deg.C to 250 deg.C accurate to + No. 2 3% with 0.6m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + No. 3% with 0.1m long stem 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 No. 1 - BS.882 No. 1 - BS.187 No. 1 - BS.1881 No. 1 - BS.1881 No. 1 - BS.1881 No. 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2			No.	10
- Rain gauge - Portable dial thermometer +50 deg.C to 250 deg.C accurate to + - No. 2 3% with 0.6m long stem Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + - No. 3% with 0.1m long stem 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 No. 1 - BS.882 No. 1 - BS.1377 No. 1 - BS.1881 No. 1 - BS.1924 No. 1 - BS.1924 No. 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2		- Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593)	No.	. 1
- Portable dial thermometer +50 deg.C to 250 deg.C accurate to + 3% with 0.6m long stern. - Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + No. 10 3% with 0.1m long stem. - 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 No. 1 - BS.882 No. 1 - BS.1881 No. 1 - BS.1881 No. 1 - BS.1924 No. 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2		- Maximum and minimum thermometer (BS.692)	No.	1
3% with 0.6m long stem. Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + No. 10 3% with 0.1m long stem. In the standard steel storage container with leak and dust proof lids for storage of bitumen samples Standard Specifications Copies of each of the following Standard Specifications: BS.812 No. 1 BS.882 No. 1 BS.1377 No. 1 BS.1881 No. 1 BS.1881 No. 1 BS.1924 No. 1 ASTM D2041-78 No. 1 ASTM D2041-78 No. 1 Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. Concrete: Slump and Cube Manufacture (BS.1881) Slump cone, tamping rod and base Set 2		- Rain gauge	No.	3
3% with 0.1m long stem. - 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812 No. 1 - BS.882 No. 1 - BS.1377 No. 1 - BS.1881 No. 1 - BS.1924 No. 1 - BS.5835, Part 1 No. 1 ASTM D2041-78 No. 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2			No.	2
for storage of bitumen samples 11) Standard Specifications Copies of each of the following Standard Specifications: - BS.812			No.	10
Copies of each of the following Standard Specifications: - BS.812			No.	100
- BS.812 No. 1 - BS.882 No. 1 - BS.1377 No. 1 - BS.1881 No. 1 - BS.1924 No. 1 - BS.5835, Part 1 No. 1 ASTM D2041-78 No 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2	11)	Standard Specifications		÷
- BS.882 No. 1 - BS.1377 No. 1 - BS.1881 No. 1 - BS.1924 No. 1 - BS.5835, Part 1 No. 1 ASTM D2041-78 No 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition, 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2		Copies of each of the following Standard Specifications:		•
- BS.882 No. 1 - BS.1377 No. 1 - BS.1881 No. 1 - BS.1924 No. 1 - BS.5835, Part 1 No. 1 ASTM D2041-78 No 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition, 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2		- BS.812	No.	1
- BS.1377 - BS.1881 - BS.1924 - BS.5835, Part 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2			No.	1
- BS.1881 - BS.1924 - BS.5835, Part 1 - BS.5835, Part 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition, 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2	***		No.	.1
- BS.1924 No. 1 - BS.5835, Part 1 No. 1 ASTM D2041-78 No 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2			No.	1
- BS.5835, Part 1 No. 1 ASTM D2041-78 No 1 - Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2			No.	1
ASTM D2041-78 Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) Slump cone, tamping rod and base Set 2			No.	1
- Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Part I and II, 13th Edition. 12) Concrete: Slump and Cube Manufacture (BS.1881) - Slump cone, tamping rod and base Set 2			No	1
- Slump cone, tamping rod and base Set 2		- Standard Specifications for Transportation Material and Methods of	No.	1
Oranip cone, tamping row and true	12)	Concrete: Slump and Cube Manufacture (BS.1881)		
	*	- Slump cone, tamping rod and base	Set	2
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*.	- Concrete cube mould, 150mm	No.	20
٠	- Soaking tank for cubes, capacity 50 Nos.	No.	1
	- Cube tamping bars for Item 1,252	No.	1
	- Water test set for concrete mixing water	No.	1
	- Potential alkali reactivity of cement-aggregate combinations	No.	. 1
	- Mortar bar container	No.	3
13)	Concrete Cube Compression Testing and Lean Compressive Strength Testing	ncrete	Unconfined
	 Concrete compression machine, to BS.1610 Grade A with 300mm gauge, rectangular platens, capacity 1560 kN with load pacer 	No.	1
	- Safety guard for Item 1,255	No.	1
	- 50mm distance piece	No.	1
:	- 70mm distance piece	No.	1
	- 100mm distance piece	No.	1
	- Mechanical load pacer	No.	1
	- Tamping rod, 16mm dia. x 600mm long	No.	2
	- Tamping bar, 380mm x 25mm square	No.	2
	- Tamping rod, 10mm dia. x 250mm long	No.	2
100	and the state of the control of the state of	N7	1.
	- Electric vibrating hammer 750 watt with tamping food square	No.	1
14)	Potential Alkali Reactivity of Cement-Aggregate Combi		
14)	Potential Alkali Reactivity of Cement-Aggregate Combi		and Mortar
14)	Potential Alkali Reactivity of Cement-Aggregate Combi Bar Container	nation	and Mortar
14)	Potential Alkali Reactivity of Cement-Aggregate Combiner - Comparator mould (25.4 x 25.4 x 285mm)	nation No.	and Mortar 3 1
14)	Potential Alkali Reactivity of Cement-Aggregate Combinant Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator	nation No. No.	and Mortar 3 1
14)	Potential Alkali Reactivity of Cement-Aggregate Combiner - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table	nation No. No. No.	and Mortar 3 1
14)	Potential Alkali Reactivity of Cement-Aggregate Combiner - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm)	nation No. No. No. No.	and Mortar 3 1 1 1
14)	Potential Alkali Reactivity of Cement-Aggregate Combination Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus	No. No. No. No. No.	and Mortar 3 1 1 1
	Potential Alkali Reactivity of Cement-Aggregate Combinator Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer	No. No. No. No. No.	and Mortar 3 1 1 1 1
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245)	No. No. No. No. No. No.	and Mortar 3 1 1 1 1
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245) - Specimen mould including base plate and extension collar	No. No. No. No. No. No.	and Mortar 3 1 1 1 1 1 1 1 10
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245) - Specimen mould including base plate and extension collar - Specimen extractor	No. No. No. No. No. No. No.	and Mortar 3 1 1 1 1 1 2
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245) - Specimen mould including base plate and extension collar - Specimen extractor - Compaction hammer	No. No. No. No. No. No. No.	and Mortar 3 1 1 1 1 2 2
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245) - Specimen mould including base plate and extension collar - Specimen extractor - Compaction pedestal and specimen mould holder	No. No. No. No. No. No. No. No.	and Mortar 3 1 1 1 1 2 2 1
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245) - Specimen mould including base plate and extension collar - Specimen extractor - Compaction hammer - Compaction pedestal and specimen mould holder - Breaking head mould - CBR/Marshall motorised dual speed 60 kN load frame, ASTM	No.	and Mortar 3 1 1 1 1 2 2 1 1
	Potential Alkali Reactivity of Cement-Aggregate Combinar Container - Comparator mould (25.4 x 25.4 x 285mm) - Length comparator - ASTM type flow table - Curing box (60 x 40 x 60cm) - Concrete consistency apparatus - Mortar mixer Marshall Stability Test Equipment (AASHTO T 245) - Specimen mould including base plate and extension collar - Specimen extractor - Compaction hammer - Compaction pedestal and specimen mould holder - Breaking head mould	No.	and Mortar 3 1 1 1 1 2 2 1 1 1 1

	- Water bath with cover at least 150mm deep thermostatically controlled to maintain the temperature of the water at 60 deg.C + 1 deg.C. The tank shall have a perforated false bottom or be equipped with a shelf for supporting specimens 50mm above the bottom of the bath.	No.	2
	- Isomantle electric heater for bowl of laboratory mixer	No.	. 1
	- Thermometer with 50mm dia. and 180mm stainless steel stem (50 to 250 deg.C)	No.	1
•	- ASTM Marshall automatic compactor, electric	No.	1
16)	Bitumen Extraction Test		
٠.	(1) Extractor Bottle Method, B.S.598, Part 2	-	
	- Flat bottomed scoop	No.	2
	- Steel garden trowel	No.	2
	- Large steel spoon	No.	2
	- Water resistant gloves	Pair	3
:.	 Foot pump for pressurising air-water assemblies up to a maximum of 700kN/m² and fitted with flexible hose approximately 1.2m long and connector 	No.	1
1.00	- Steel bottle 600ml capacity with 49mm rubber stopper	No.	1
	- Steel bottle 2500ml capacity with 71mm rubber stopper	No.	-1
	- Steel bottle 7000ml capacity with 71mm rubber stopper	No.	1
	- Flash funnel for fitting to the 700ml steel bottles. The rim of the funnel retains a sieve 200mm nominal diameter	No.	1
	 Bottle roller - A compact bench mounted unit designed to rotate two bottles simultaneously about their longitudinal axis 	No.	1
	- Pressure filter complete with cutting tool for making a hole in the filter paper	No.	. 1
	- Filter funnel to take 200mm nominal diameter sieves	No.	1
	- Centrifuge complying with as B\$ 598	No.	1
	- Binder recovery apparatus	No.	1
	 Volumetric flask 250ml, 500ml, 1000ml and 2000ml capacity of each 	No.	2
	- Recovery still for Dichloromethane	No.	1
	(2) Hot Extractor Methods, B.S. 598, Part 2		
	 Hot extractor complete with wire gauze container, gasket, cork lid and support assembly 	No.	1
	- Dean and Stark Receiver with condenser to suit Trichoroethylene	No.	1

17) Consumables

- Paraffin wax	kg	50
- Gas	kg	1,600
- Gunny sack	No.	400
- Plastic bag, 900 x 450mm x 1000 gauge	No.	2,000
- Plastic bag, 450 x 300mm x 1000 gauge	No.	1,000
- Filter paper 150mm dia., Whatman No.5 (Boxes of 100)	No.	10
- Filter paper 400mm dia., Whatman No.5 (Boxes of 100)	No.	5
- Filter paper 100mm dia., Whatman No.5 (Boxes of 100)	No.	5
- Trichloroethylene (205 litre drum)	No.	2
- Dichloromethane (275 kg drum)	No.	2
- Cotton waste (or drying cloths)	kg	100
- Filter paper 270mm dia., 33mm with dia. hole in centre, Whatman No.5 (Box of 100)	No.	15
- Filter paper 400mm diameter Whatman No.54 (Box of 100)	No.	10
- Registration paper for compaction test	sheets	1,000
- Moisture-density relation test plot paper	sheets	1,000
- Registration paper for Atterberg Limits	sheets	1,000
- Registration paper for Particle size analysis	sheets	1,000
- Registration paper for CBR	sheets	1,000
Subtotal (Laboratory Equipment, Items 2 to 18)		.*
Total (Item 1 to 18)		

SURVEY EQUIPMENT FOR THE ENGINEER

The Contractor shall provide and maintain in good repair for the duration of the Contract, the following survey equipment.

The survey equipment shall be made available in its entirety to the Engineer not later than two weeks after the Engineer's order to commence the Works and shall continue to be made available for the Engineer's exclusive use throughout the Contract Period.

•	Carl Zeiss N13 Automatic Engineers level c/w tripod or similar	No.	3
-	Carl Zeiss TH2 single second theodolite complete with tripod or similar	No.	2
-	Survey umbrellas	No.	2
-	4m Levelling staves with bubble and case	No.	5
-	2.5m Ranging rods	No.	20
-	1m Stainless steel straight edge	No.	2
-	3m aluminium straight edge	No.	3
	30m steel white face tape	No.	3
	100m steel band tape	No.	2
-	3m pocket tape	No.	15
•	Steel tape repair outfit	No.	1

The Contractor shall also make provision for the occasional use by the Engineer, as and when required, of any scheduled equipment during the Maintenance Period.

Any delays to the Contractor or the Contractor's activities caused by the Engineer being unable to perform survey work due to the Contractor's failure to supply the survey equipment in good time shall be deemed to be the Contractor's fault.

BILLS OF QUANTITIES

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PREAMBLE TO THE BILLS OF QUANTITIES

- 1. The Bills of Quantities form part of the Contract Documents and are to be read in conjunction with the Conditions of Contract, Specifications and Drawings.
- 2. The quantities set forth in the Bills of Quantities are intended to represent the character of the work to be carried out. There is no guarantee to the Contractor that he will be required to carry out the quantities of work indicated under any one particular item or group of items in the Bills of Quantities, though on the Contract as a whole the Quantities are believed to represent the overall value of the work to be carried out.
- The prices and rates inserted in the Bills of Quantities will be used for valuing the
 work executed and the Engineer will measure the whole of the Works executed in
 accordance with the Contract.
- 4. The prices and rates inserted in the Bills of Quantities are to be the full inclusive costs of the works described under the items, complete in place and in accordance with the Specifications, including costs and expenses which may be required in and for the construction of the works described, together with any temporary works and installations which may be necessary and all general risks, liabilities and obligations set forth or implied in the documents on which the Contract is based.
- 5. The brief description of the Items in the Bills of Quantities are purely for the purpose of identification and in no way modify or supersede the detailed description given in the Conditions of Contract or Standard Specification and Special Specification for the full directions and description of work and materials.
- 6. A price or unit rate is to be inserted, in ink against each Item in the Bills of Quantities whether quantities are stated or not. If a Tenderer omits to insert a price or unit rate for any item his tender may be disqualified.
- 7. No alteration shall be made to the Bills of Quantities and no extra item shall be inserted. The Tenderer shall satisfy himself that the Contract Sum arrived at by pricing the quantities and Items given is sufficient compensation for constructing and maintaining the whole of the Works in accordance with these Contract Documents.
- 8. The numbering of the bills is not consecutive, but is arranged to correspond to the sections in the Standard Specification.
- 9. Any costs which may be incurred by the Contractor in discharging his obligations under the Contract, and for which no separate specific items are provided in the Bills of Quantities, shall be deemed to have been distributed throughout the Contractor's rates and prices in the Bills of quantities.
- 10. Notwithstanding the descriptions of the methods of disbursement of Lump Sum prices, such payments shall be subject to withholding of retention money under the provisions of Clause 60(2) of the Conditions of Contract until the Limit of Retention Money is reached.

BILL OF QUANTITIES No.1 GENERAL

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
1.01	Provide, furnish and maintain the rent- ed accommodation for the Engineer's Representative and his staff:		:		The second se	
	(1) Type I, 1 No.	Month	30			
	(2) Type II, 5 No.	Month	130			
	(3) Type III, 3 No.	Month	90			
	(4) Type IV, 5 No.	Month	150	•		
.02	Provide, equip and maintain Main Office for the Engineer's Representative and his staff.	No.	1			
.03	Provide and maintain laboratory for the Engineer's Representative and his staff.	No.			·	
.04	Provide and maintain furniture and office equipment for the Engineer's office and Laboratory as listed in the Special Specification, all to the satisfaction of the Engineer.	Lump Sum				
.05	Provide survey and laboratory equipment as listed in the Special Specification.	Lump Sum				· · · · · · · · · · · · · · · · · · ·
.06	Provide with driver and maintain one (1) new 504 Peugeot or equivalent with a minimum engine capacity of 1800 cc approved by the Resident Engineer, inclusive of the first 3000 km travelled in any one month.	Veh. Month	30			
.07	E.O.Item 1.06 for distance in excess of 3000 km travelled in any one month, inclusive of fuels, lubricants, tyres and additional servicing.	km	100,000			

BILL OF QUANTITIES No.1 (Cont) GENERAL

Item	Description	Unit	Quantity	Rate	Amount	
No.					Shillings	Cts
	Brought forward from page 1					
1.08	As for Item 1.06 but three (3) new	Veh.	. 00			
1.00	LWB 4WD Land Rovers or equivalent	Month	90			
	with a minimum engine capacity of	INOUR				
	2300 cc, inclusive of the first 3000 km		ľ			
	travelled in any one month.					
	Bavelled in any one month.					
1.09	E.O.Item 1.08 for distance in excess of	km	400,000			
	3000 km travelled in any one month,		,			
-	inclusive of fuels, lubricants, tyres and					İ
	additional servicing.					
1.10	As for Item 1.06 but three (3) new	Veh.	90			
	Subaru or equivalent with a minimum	Month				
	engine capacity of 1800 cc, inclusive					
	of the first 3000 km travelled in any		}			
	one month.					
1.11	E.O.Item 1.10 for distance in excess of	km	300,000			
	3000 km travelled in any one month,		000,000			
	inclusive of fuels, lubricants, tyres and			÷		
	additional servicing.					
1.12	Prime Cost Sum of Shs.22, 100,000 for					
	removals and alterations to following					
	existing services;	1				1
. 14.7	Her is the second of the second					
	(1) Telecommunication line	P.C.			1,600,000	00
		Sum				
		1		·		
14	(2) Electric lines	P.C.			8,900,000	00
	enalisti series in la	Sum				
:		1.				
	(3) Water pipe lines	P.C.			4,600,000	00
		Sum				
#* .	(4) Railway	P.C.		•	4,500,000	00
j		Sum				
	(5) Sewerage pipe lines	P.C.		•	1,600,000	00
		Sum				
	· · · · · · · · · · · · · · · · · · ·	1 1			1	

BILL OF QUANTITIES No.1 (Cont) GENERAL

Item No.	Description	Unit	Quantity	Rate	Amount	
100.	Brought forward from page 2				Shillings	Cts
	(6) Existing street lighting	P.C.	•		100,000	00
		Sum			100,000	
	(7) Electric fence of National Park	P.C.			500,000	00
İ	PARATE BELLEVANIA	Sum			<u> </u>	
	las Established Company					
	(8) Fence of Kenya Rifles	P.C.			300,000	00
		Sum				
1.13	Include perception of D.C. Charles from	0, 4			ĺ	
1.13	Include percentage of P.C.Sum in Item 1.12 for Contractor's cost and profit.	% of				
	1.12 for Contractor's cost and profit.	Item 1.12				
		1.12				
1.14	Prime Cost Sum of Shs.3,000,000 for	P.C.			3,000,000	00
17	the compensation and aquisition of land.	Sum			3,000,000	ال ا
		J Julia				
1.15	Include percentage of P.C.Sum in Item	% of				-
	1.14 for Contractor's cost and profit.	Item				
		1.14				
	医感觉性病性病性					
1.16	Prime Cost Sum of Shs.600,000 for	P.C.		 	600,000	00
	the Engineer's Miscellaneous Account.	Sum			-	
1.17	Include percentage of P.C.Sum in	% of			<u> </u>	
	Item1.16 for Contractor's cost and profit.	Item				
	pront.	1.16				
1.18	Provide and erect publicity signs	No.	10			
1.10	as directed by the Engineer, all in	110.	10			
	accordance with MOPW DRG.					
	NO.SS/234.		i			
	110.00.201					
1.19	Prime Cost Sum of Shs 500,000	P.C.			500,000	00
,,,,	for rectification of title deeds.	Sum				
			'			
1.20	Include percentage of P.C. Sum in	% of				
	Item 1.19 for Contractor's cost	ltem				
	and profit.	1.19	İ			
	Sub-total carried forward to Summary on pag	e 35				
	Sub-total carried forward to Summary on pag	e 35				

BILL OF QUANTITIES No.4 SITE CLEARANCE AND TOPSOIL STRIPPING

item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
4.01	Clear site in Open Country, including removal of trees, hedges, bushes and other vegetation or objectionable organic material, grub up roots and backfill to	ha	126		Januaringo	
	95% MDD AASHTO T.99 with approved material all in accordance with the Specification.					
4.02	As for Item 4.01 but to clear site in forest area.	ha	45			
4.03	Removal topsoil to a depth as directed by the Engineer and dispose of to spoil dump or stockpile for re-use as directed	m3	106,790			
	by the Engineer.					
4.04	Scarify and remove to stockpile existing pavement material as directed by the	m3	2,720			
: :	Engineer.					
4.05	Demolish existing railway bridge and remove debris to spoil over any	Lump Sum				
	distance, backfill voids and compact to 105% MDD as necessary.		÷			
4.06	Allow a Provisional Sum to be expended	Prov.			500,000	00
	on a daywork basis for the removal of existing structures, fences and other obstructions.	Sum				

git dina sietar merapak di teta

BILL OF QUANTITIES No.5 EARTHWORKS

5.02	Fill in soft material for main road and		Quantity	Rate	Amount	
5.02	Fill in soft material for main road and				Shillings	Cts
5.02	service road, and compact to at least	m3	1,234,300			
1. 1	95% MDD AASHTO T.99.					
	As for Item 5.01 but for slip roads and approach roads.	m3	196,400			
(As for Item 5.01 but hauling from drainage pond excavation works as shown on the Drawings.	m3	7,720			
	As for Item 5.01 but for new railway embankment.	m3	5,480			
5.05	Fill in hard material for main road.	m3	104,900			
5.06	Fill in soft material for central	m3	11,400			
jan i	reserves as shown on the Drawings.					
	Fill in soft material adjacent to	m3	3,310			
8	shoulders as shown on the Drawings.					
: 4	Spoil in unsuitable material such as plack cotton and rubbish.	m3	189,500			
5.09	Spoil in soft material.	m3	5,000			
5.10	Control (1974) - William Control (1974) Spoil in hard material.	m3	1,000			
5.11	Overhaul earthworks in excess of	m3.km	3,432,300			
	1.0 km free haul. The constraints of the constraint					
	Excavation in swamps.	m3	1,000			
5.13 F	Provide and place rockfill in accordance	m3	1,000			
V	with the Specification.				<u> </u>	
	Compact original ground below fills to at least 95% MDD AASHTO T.99	m3	62,600			
	ncluding all necessary scarifying and watering as directed by the Engineer,to					
e	a depth of 150mm below ground level.			· ·		
(Carried forward to page 6	·				

BILL OF QUANTITIES No.5 EARTHWORKS

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 5				Similigs	1019
5.15	E.O.Item 5.01 to 5.05 for compaction of 300mm subgrade material to at least 100% MDD AASHTO T.99 in Fill area.	m3	121,700			
5.16	Compact in-situ subgrade in Cut area to a depth of 300mm below formation	m3	100,200			
	level to at least 100% MDD AASHTO T.99.			*.		
5.17	Compact in-situ subgrade material in Cut area between 150mm and 300mm below underside of imported subgrade material to at least 95% MDD AASHTO T.99.	m3	1,000			
5.18	Compact in-situ subgrade material in Cut area between 0mm and 150mm below underside of imported subgrade material to at least 100% MDD AASHTO T.99.	m3	1,000			
5.19	Provide, place and compact improved subgrade material in locations where directed by the Engineer.	m3	1,000			
5.20	Rock formation levelling in Cut area below lean concrete base level or as directed by the Engineer.	m2	72,100			
5.21	Haul from stockpile and spread on side- slopes and central reserves, lightly roll and compact 75mm thickness of topsoil.	m2	335,700			
	Haul from stockpile and spread on black cotton spoil area, lightly roll and compact 200mm thickness of topsoil in locations as directed by the Engineer.	m2	69,100			
	Carried forward to page 7	·			-	

BILL OF QUANTITIES No.5 EARTHWORKS

Item	Description	Unit	Quantity	Rate	Amount	
No.				****	Shillings	Cts
5.23	Brought forward from page 6 Haul from stockpile and spread on	m3	15,400			
	rubbish spoil area and side borrow area, and compact topsoil or as directed by the Engineer.		10,400			
5.24	Plant fillslopes and cutslopes with selected grass in accordance with the Specification, including the establish-	m2	773,000			
	ment of plant nurseries where required.		-1			
5.25	Provide, place and compact filter material for drainage layer and sand mat	m3	1,000			
	in locations where directed by the Engineer.					
5.26	Fill for new national park boundary dike including demolishing existing dike.	m3	58,300			
5.27	Filter Fabric under, over or					
	around rockfill:	m2	1,000			
			:			
	Sub-total carried forward to Summary on pag	e 35	-			

BILL OF QUANTITIES No.7 EXCAVATION AND FILLING FOR STRUCTURES

item No.	Description	Unit	Quantity	Rate	Amount	
	BRIDGES				Shillings	Cts
7.01	Excavation, compaction at foundation levels, backfilling and removal of	m3	5,330	·		
	excavated material to spoil for struct- ures foundations in soft materials.					
7.02	E.O.Item 7.01 at any location for	m3	1,230			
	excavation in hard materials.			ı		
7.03	Backfilling with selected material behind bridge abutment, wing walls and	. m3	4,980			
	around structures.	·				
7.04	Provide and place porous filter material behind bridge abutments and wing walls.	m3	300			
7.05	Provide and place selected granular fill material.	m3	200	·		
	BOX CULVERTS					
7.06	Excavation, compaction at foundation levels, backfilling and removal of excavated material to spoil for struct-	т3	15,680			
	ures foundations in soft materials.					
7.07	E.O.Item 7.06 at any location for excavation in hard materials.	m3	300			
7.08	Backfilling with selected material behind box culvert walls and around structures.	m3	22,670		-	
7.09	Provide and place porous filter material behind box culvert walls.	m3	1,990			
	Provide and place selected granular fill material.	m3	1,420	· .		
	Carried forward to page 9					

BILL OF QUANTITIES No.7 EXCAVATION AND FILLING FOR STRUCTURES

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 8			·		
7.11	Excavation and backfilling for gabions in soft material.	m3	275			
7.12	Provide, fabricate and place gabion mesh containers as shown on the drawings or as directed by the Engieer.	m2	550			
7.13	Provide and place rockfill to gabions.	m3	275			
	Sub-total carried forward to Summary on page	35				

Description of the second seco

Item No.	Description	Unit	Quantity	Rate	Amount	C
<u></u>	NOTE:				Shillings	Cts
	No separate payment shall be made for					
	the haulage of surplus or unsuitable				•	
	excavated material and the cost of such					
	haulage shall be included in the rates	}	.	-		
	and prices.					
.01	Excavate in soft material for pipe	m3	3,970			
.01	culverts below existing ground level or	1110	3,810	!		
	road formation level including support			• •		
	of trench sides, backfilling and compact-					
	ion at least 95% MDD AASHTO T.99 up to			I		
	new road formation level or ground level					İ
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
te elitue a Heriot	whichever is the lower, dewatering, and					1
	carting surplus material to spoil dump.					
.02	As for Item 8.01 but for inlets and	m3	2,970			
,.UL	outlets of culverts.	1110	2,570	İ		
elîn Lebe	entra minus saaden					
3.03	Excavate in soft material for earth	m3	5,650			
	channel, drain type I.	3110	3,000			
	inamo, mantype i.					
3.04	Excavate in soft material for stone	m3	3,900			
	pitching channel, drain type II.		0,000		1	Ì
	The Little after the control of the					
3.05	Excavate in soft material for concrete	m3	3,690			
	channel, drain type III.		0,000		1	
: :						
3.06	Excavate in soft material for concrete	m3	5,600			
	channel with cascade, drain type VII.		0,000			
	onamor min cascaco, aram typo vin	·				
3.07	Excavate and backfill for gulley pots in	m3	180			
	soft material.			*		
	and the Control of th					
80.8	Excavate and backfill for concrete ditch	m3	540			
	type VI, in soft material.	"""				
	Lie Breefer en fûnkliker bestel					
3.09	Excavate and backfill for gabions in	m3	580			
,.U3	soft material.	טווי				
	Soit malerial. The control of the co					
3.10	Excavate for subsoil drains in soft	m3	460			
. IV	material.	1110	-100			
	materials Considerate Manager (Constitution of the Constitution of					\ .
	Carried forward to page 11					

E. - 10

item No.	Description	Unit	Quantity	Rate	Amount	01.
	Carried forward from page 10			· · · · · · · · · · · · · · · · · · ·	Shillings	Cts
.11	E.O.Item 8.01 to 8.10 at any location for excavation in hard materials.	m3	500			
.12	Provide and place 140 g/m2 filter fabric to subsoil drains.	m2	3,040			باستدارات
13	Provide and place crushed rock backlill to subsoil drains.	m3	420			
14	Provide and place perforated 200mm dia. PVC pipe to subsoil drains.	m	1,265			
15	Provide, lay and joint 300mm I.D. concrete pipes ogee jointed.	m	155			
6	As for Item 8.15 but 600mm I.D.	m	1,031			
7	As for Item 8.15 but 750mm I.D.	m	90			
8	As for Item 8.15 but 900mm I.D.	m	1,067			
9	As for Item 8.15 but 1200mm I.D.	m	294			
	Provide, place and compact class 15/20, concrete bed and surround to concrete pipes, including formwork.	m3	2,520			
	As for Item 8.20 but concrete facing for drain ditch on berm, drain type VIII.	m2	1,280			a de la compansión de l
	Provide, place and compact class 25/20 concrete for headwalls, wingwalls, aprons and toewalls to pipe culverts including all formwork and provision	m3	924			
	and placing of fabric mesh reinforcement as shown on the Drawings.					
	As for Item 8.22 but class 15/20 for concrete channel, drain types III and VII.	m3	1,330			

Item No.	Description	Unit	Quantity	Rate	Amount	
110.	Brought forward from page 11				Shillings	Cts
	Freedom formation about pages 11					
8.24	Provide, place and compact class 20/20	m3	94			ļ
	concrete for concrete ditch, drain type		v .			
	VI including all formwork and placing		ĺ			.
	of reinforcement as shown in the Draw-					
	ings.					-
1.			ļ			}
8.25	Provide, place and compact class 20/20	m3	63			
:	concrete for in-situ gulley pots including					ĺ
	all formwork.		· .			
0.00					·	ļ
8.26	As for Item 8.24 but concrete cover of	No.	168			
i i kw	gulley pot.		: *			
8.27	Provide and place 50mm dia. PVC weep	No.	45			
	holes.	110.	40 [
	To Alexander Callerina House experience].	Ì
3.28	Excavate as necessary, provide all	m2	26,090			
1	materials and construct 150mm thick		<u> </u>			į
	grouted stone pitching to bed and side-					
	slopes of drains, ditches, channels,]	
	groundfaces, inlets and outlets of					
	culverts, including carting of excavated					
	material to spoil, as directed by the				·	ļ
	Engineer.					
3.29	As for Item 8.28 but 250mm building	m2	4 700			
	stone at concrete channel with cascade.	1112	1,730			-
. 447	Storie at concrete chamier with cascade.					
3.30	Cement rendering on building stone.	m2	1,730			
			.,,.00			
3.31	Provide fabricate and place gabion mesh,	m2	430		1	
1	1m thick, as shown on the Drawings or					
	directed by the Engineer.					
	ignormalistic Agradant endel outron, neptings talong in					Ì
3.32	Provide and place mattresses, 0.3m	m2	467			
	thick, as shown on Drawings or direct-					
	ed by the Engineer.					
3.33	Provide and place rockfill to gabions	m3	570			
	and mattresses.					
					<u> </u>	
	Carried forward to page 13					

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 12			47,700 de destina de la company de la California de La company de la California de La company de la California	Offinings	
8.34	Provide and place filter fabric under and/or behind gabions.	m2	335			
			•	*		
3.35	Excavate trench, provide, lay and joint 450 x 225mm P.C.C. invert block drains (I.B.D.)having 300mm dia. channel.	m	507			
8.36	Provide and lay 75mm thick P.C.C. side slabs to I.B.D.Channel.	m2	477			
3.37	Excavate trench, provide, lay and joint	m	15,440			
,,	375 x 250mm P.C.C.invert block drain, drain type IV.		13,440			
3.38	As for Item 8.37 but for on berm, drain	m	740			
	type VIII.	***	140			
3.39	Excavate, provide all materials and construct kerb inlet at busbays as	No	32			
	detailed on the Drawings.		ļ			
	Excavate, provide all materials and construct intake block channel at busbays as detailed on the Drawings.	No	32			
1	Provide and place concrete class 15 for 250 x 150mm in-situ gutters.	m	48			
- 1	Provide and place selected granular fill material for gravel bedding.	m3	79			
. 1	Plant channel slopes with selected grass in accordance with the Specification.	m2	11,330			
	Earth dike of drainage pond.	m3	710			

BILL OF QUANTITIES No.9 PASSAGE OF TRAFFIC

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
9.01	Provide and maintain signs and barriers	km	19			
	in locations as directed by the Engineer.					
•	Maria de la companya della companya		·			
9.02	Construct and maintain 7.0m wide	km	1			
	deviations including drainage, pavement		İ			
	type Deviation-1(Mombasa Road Junction).				}	
9.03	As for Item 9.02 but pavement type]	1
	Deviation-1(Uhuru Monument Junction).	km	1			
			+			
9.04	As for Item 9.02 but pavement type	1 1 1				
	Deviation-2(Ngong Road Junction and	km	1		Į	
	Dagoretti Forest Junction).				į	1
9.05	Construct and maintain 6.0m wide	km	1			
	deviations including drainage,pavement		}	•		
:	type Deviation-3.					1
9.06	Construct and maintain 3.0m wide	km	3			
	deviations including drainage, pavement	,,,,,	ĭ]		<u> </u>	
	type Deviation-4.				1	
	type Deviation 4.					İ
9.07	Reinstatement of deviations and					İ
3.07		Lump	·			
	existing drainages.	Sum				Į
9.08	Reinstatement of existing road after	- m2	70			
	completion of cross-drainage works,		ļ			
	Mombasa Road Junction.					
))			1	
9.09	Reinstatement of existing road after	m2	35			
	completion of cross-drainage works,					
	Kikuyu Junction.					
			<u> </u>			
9.10	Maintenance of the project road (main	Lump				
	road, slip road, approach road and service	Sum				
	road) used for the deviation purpose as				•	Ì
	specified.					
1						
9.11	Improvement of the existing road as					ĺ
	instructed and approved by the Engineer.		1			
	The state of the s					
	(1) Improvement of subgrade material.	m3	100			
	(1) unbiosoment of subgrave materials					
						1.
	Cardial Associate associate	L				
	Carried forward to page 15				1	1

BILL OF QUANTITIES No.9 PASSAGE OF TRAFFIC

item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 14			— Mallandic a 1999 of 1997 and 1898 a state of 1999 and 1990 and 1990 and 1990 and 1990 and 1990 and 1990 and 1990 and 1990 and 1	Official	10.0
9.12	Maintenance of Existing Roads used for heavy construction traffic as specified when and where directed by the Engineer.	km	30			
9.13	Re-carpeting of Existing Roads 6m wide or pro rata as specified when and where	m3	1,800			
134 ²⁷	directed by the Engineer		·			
	(2) Gravel wearing course.	m3	600			
	(3) Graded crushed stone base.	m3	50		·	
	(4) MC 3000 first seal coat at 0.6 l/m2	litre	150			
	(5) Chippings, 3/6mm.	m3	2			
	Carried forward to Summary on page 35					-

BILL OF QUANTITIES No.10 GRAVEL WEARING COURSE

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
10.01	Clear site of the material site.	ha	1			
	Construct access road to the material site in excess of 200m in length.	km	1			
10.03	Excavate and spoil topsoil and over- burden in the material site.	m3	4,000			
10.04	Excavate gravel wearing course material, transport, spread and compact to at least 95% MDD AASHTO T.180 for service roads.	m3	4,320			
	Carried forward to Summary on page 35	1 41				

BILL OF QUANTITIES No.13 GRADED CRUSHED STONE FOR SUBBASE AND BASE

item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
13.01	Provide, spread and compact graded crushed stone to subbase for main road.	m3	84,490			
13.02	As for Item 13.01 but for slip road.	m3	14,020			
	As for Item 13.04 but for approach road and service road.	m3	3,030			
· 13	Provide, spread and compact graded crushed stone to base for slip road, approach road and service roads.	m3	2,150			
13.05	Provide,spread and compact graded crushed stone to shoulders for main road.	m3	43,810			To the second visite which is the second visite of
13.06	As for Item 13.05 but for slip road.	m3	6,360			
13.07	As for Item 13.05 but for approach road and service road.	m3	1,000			
	Carried forward to Summary on page 35					

BILL OF QUANTITIES No.14A LEAN CONCRETE FOR BASE

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
14A/1	Provide, process, mix, transport, spread and compact lean concrete base material for main road at 4% nominal cement content by weight of total mix.	m3	90,340			
14A/2	As for Item 14A/1 but for slip road.	m3	11,150			
14A/3	As for Item 14A/1 but for approach road.	m3	1,020			
14A/4	Protecting and curing lean concrete base.	m2	515,500			
14A/5	Variation in cement content (Provisional).	tonne	200			
	Carried forward to Summary on page 35	· · · · · · · · · · · · · · · · · · ·	<u> </u>			

BILL OF QUANTITIES No.15 BITUMINOUS SURFACE TREATMENT AND SURFACE DRESSING

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
					Jillings	Cla
	NOTE:					
	No haulage will be paid for bitumen or					
	chippings and this shall be included					
	in the following rates and prices.					
	PRIME COAT					
15.01	Prepare surface of base, provide,	litre	411,550			
	transport, heat as specified and spray				·	
	MC 3000 prime coat at at a nominal spray rate of 1.0 litre/m2 for main road.					
	記 All Hamily Material Programs (All Hamily Marchael Parkers) (All Hamily Marchael Parkers) (All Hamily Marchael All Hamily Material Parkers (All Hamily Marchael Parkers) (All Hamily					
15.02	As for Item 15.01 but for slip road.	litre	55,740			
15.03	As for Item 15.01 but for approach	lièra	4:000			
13.00	road.	litre	4,600			
	TACK COAT					
15.04	Prepare surface of binder course,	litre	493,860			
	provide, transport, heat as specified and		430,000			
	spray MC 3000 cut-back bitumen tack					
	coat at nominal spray rate of 0.6 litre/m2 for main road.				٠.	
	ioi inalii foad.					
15.05	As for Item 15.04 but for slip road.	litre	44,220			
15.06	As for Item 15.04 but for approach road.	litre	5,520			
	ivau.	·				
	SURFACE DRESSING					
· .	(Double Surface Dressing)					
15.07	Provide, heat and spray MC 3000 cut-back	litre	209,610		,	
	bitumen at a nominal spray rate of	.*			,	
	1.3 litres/m2 as first seal coat.					
15.08	As for Item 15.07 but at a nominal rate	litre	48,370			
10,00	of 0.3 litre/m2 as second seal coat.		,5,0,0		***	
	Carried forward to page 20					

BILL OF QUANTITIES No.15 BITUMINOUS SURFACE TREATMENT AND SURFACE DRESSING

item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 19				N. T. T. T. T. T. T. T. T. T. T. T. T. T.	
15.09	Provide, transport, lay and roll 10/14mm chippings at a rate of 69 m2/m3.	m3	2,340			
15.10	As for Item 15.09 but 3/6mm chippings at a rate of 250 m2/m3. (Single Surface Dressing)	m3	645			
15.11	Provide, heat and spray MC 3000 cut-back bitumen at a nominal spray rate of 0.6 litres/m2.	litre	3,170			
15.12	Provide, transport, lay and roll 3/6mm chippings at a rate of 189 m2/m3.	m3	28			
-14 A	Carried forward to Summary on page 35	\$147	<u> </u>			

BILL OF QUANTITIES No.16 BITUMINOUS BINDER COURSE AND WEARING COURSE

Item No.	Description	Unit	Quantity	Rate	Amount	
	NOTE:				Shillings	Cts
)		1	
	No haulage shall be paid for in respect					
	of any of the items or materials					
	contained in this Bill of Quantities and					ļ
1, 1	the cost of such haulage shall be deemed		į į			
	to be included in the rates entered					
	below.					
		ļ			1	ļ
16.01	Provide, lay and compact Asphalt Concrete	m3	32,930			
	Binder Course using 5.5% nominal bitumen				1	
$z_{\pm}^{i}=z^{\pm}$	content by weight of total mix for main					
	road.					
					1	
16.02	As for item 16.01 but for slip road.	m3	3,430			
16.03	As for Item 16.01 but for approach road.	m3	460			
16.04	Provide, lay and compact Asphalt Concrete	m3	16,460			
	Wearing Course using 6.5% nominal	1,110	10,-100			
	bitumen content by weight of total mix					
	for main road.					
25.5	All sales refrese tally well end on a light					
16.05	As for Item 16.04 but for slip road.	m3	2,230		•	
ws.						
16.06	As for Item 16.04 but for approach road.	m3	230			l
	History, and the					
16.07	80/100 penetration bitumen binder	litre	Rate only			
	variation.					
	guid auther ear feathraine (t					
16.08	Supply and mix in different active mineral	tonne	100			
	filler as directed by the Engineer.					-
· .						
16.09	As for Item 16.08 but to inert mineral filler.	tonne	50			
· · · · · ·	Carried forward to Summary on page 35	L.				
	Camed to maid to Caminary on page 33				1	

BILL OF QUANTITIES No.17 CONCRETE WORKS

Item No.	Description	Unit	Quantity	Rate	Amount	
	Providing the Control of the Control	-			Shillings	Cts
	BRIDGES				1	
	Consistent of the control of the con					
	Concrete:					
- '	Provide, place and compact the following					
	classes of concrete for insitu works as					
	specified.					
			•			
- 1	Class 15/40 for blinding concrete on all structures.	m3	180			
	an structures.				•	
17.02	Class 25/20 for structural concrete					
	in: grada, epologada e o culto e o o god					
v.*;				:		
	(1) Bridges for Mombasa Road Junction,	m3	2,880			
	Uhuru Monument Junction and Railway.					
	(2) Vehicle bridges.	m3	1,090			
	Property of the second		,		·	
	(3) Pedestrian bridges.	m3	90			
		_				
7.03	Class 30/20 for structural concrete.	m3	2,120			-
7.04	Provide UF2 finish to concrete surface.	m2	5,830			
			0,000			
.	Formwork:					
	Provide, erect and afterwards dismantle					
	and remove the Items specified below:					
7.05	Formwork to achieve class F1 finish:					
	well-relief to the		,			
	(1) Sloping	m2	86		·	
			0.000			
	(2) Vertical	m2	2,660			
	Formwork to achieve class F2 finish:			. :	·	
	Piga Media					
	(1) Horizontal	m2	3,450	•		
	(2) Sloping	m2	218			
	(3) Vertical	m2	9,050			
1	(3) Vernicai	1112	a.unu •		l .	

E - 22

BILL OF QUANTITIES No.17 CONCRETE WORKS

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	C
	Brought forward from page 22				Sminigs	Cts
17.07	Provide and fix in position high tensile steel reinforcement bars to	tonne	202			
	BS 4461 of diameter equal to or less than 16mm.					•
17.08	As for Item 17.07 but of diameter greater than 16mm.	tonne	482			•
17.09	Provide and place 200mm wide waterstops as specified in the Drawings.	m	. 57			· · · · · · · · · · · · · · · · · · ·
17.10	Provide and place 20mm thick joint filler	m2	36			
	BOX CULVERTS					
	Concrete: Provide, place and compact the following classes of concrete for insitu works as					
	specified. pathered bears to be a con-					
	Class 15/40 for blinding concrete on all structures.	m3	588			
17.12	Class 25/20 for structural concrete.			·		
	(1) Box culverts for road.	m3	7,820			
	(2) Box culverts for drainage.	m3	6,320			!
	(3) Box culverts for footpath.	m3	646			
17.13	Provide UF2 finish to concrete surface.	m2	9,880			
	Formwork:					
	Provide, erect and afterwards dismantle and remove the Items specified below:					** The state of th
I	Carried forward to page 24	L	<u></u>			

BILL OF QUANTITIES No.17 CONCRETE WORKS

Item No.	Description	Unit	Quantity	Rate	Amount	T
1101	Brought forward from page 23				Shillings	Cts
1 2 2						
17.14	Formwork to achieve class F1 finish:					
	(1) Vertical	m2	12,120			
						;
17.15	Formwork to achieve class F2 finish:					i
						1
	(1) Horizontal	m2	4,000			
		:				i
	(2) Vertical	m2	7,450			
	in the second se					}
117.16	Provide and fix in position high tensile steel reinforcement bars to	tonne	215			:
	BS 4461 of diameter equal to or less					
	than 16mm.	1				
17.17	As for Item 17.16 but of diameter	tonne	1,225			
	greater than 16mm.					
					:	
17.18	Provide and place 200mm wide waterstops	m	909			
	as specified in the Drawings.					
			İ			
17.19	Provide and place 20mm thick joint	m2	712			
	filler (1919) i (1919		ļ			
		<u> </u>		· · · · · · · · · · · · · · · · · · ·		ļ.
	Carried forward to Summary on page 35					
	ganyga ernikning filosofik die e	1				

BILL OF QUANTITIES No.20 ROAD FURNITURE

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
20.01	Provide and erect standard warning					
1 -	signs:	· .				
	and the engineer of the control of	1		ļ		
	(1) Type W28,1200mm	No.	30			
	(2) Type W29,1200mm	No.	22			
	(3) Type W36,1200mm	No.	3			
	(4) Type W37,1200mm	No.	22			
00.00						1
1	Provide and erect standard priority					1
	signs:		**			
	(1) Type R1,1200mm	No.	10			
20.03	Provide and erect standard prohibitory					
	signs:					
	and the finding magnetic form of the					
	(1) Type P1,1000mm	No.	1			
	(2) Type P25,1000mm	No.	30			
4 14					-	
20.04	Provide and erect standard mandatory					
	signs:	Ì	1			
	Maria de Maria de Maria de Caractería de Car					
	(1) Type M3,1000mm	No.	1			
	(2) Type M4,1000mm	No.	1			
1, 100 to 1	Anna Markette (18 - Anna Anna 11 - 1997)				•	
20.05	Provide and erect non-standard					
	informatory signs (advance direction					
	signs, direction signs, route confirmatory		.			
	signs):	ļ <u> </u>	-			
			1	'		
	(1) less than 1m2	No.	55			
	(2) 3m2-4m2	No.	1			ļ
	(3) 4m2-5m2	No.	8			
	(4) 5m2-6m2	No.	10			
	(5) 6m2-7m2	No.	1			
	(6) 7m2-8m2	No.	12			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(7) 8m2-9m2	No.	12		-	
	(8) 9m2-10m2	No.	1			
	(O) aniz-ronic	110.	'			
20.00	Donal modition to colling as cut the leafer		3,430		•	
20.06	Road marking in yellow or white paint.	m2	3,430		•	
						-
-	Carried forward to page 26	:				

BILL OF QUANTITIES No.20 ROAD FURNITURE

Item No.	Description	Unit	Quantity	Rate	Amount	
	Brought forward from page 25				Shillings	Cts
المال المال						
20.07	Provide and fix flex beam guardrails, all in accordance with the Drawings.	m	8,590			
	all in accordance with the Drawings.	.44				
20.08	Provide and erect road edge marker post.	No.	87			
20.09	Provide and erect road reserve boundary post where directed by the Engineer.	No.	230			
20.10	Plant selected grasses in the central reserves, including the establishment of plant nurseries where required.	m2 ·	32,000			
	To plant horsenes where required.					
20.11	Plant selected shrubs and bushes approved by the Engineer at locations	No.	8,120			
	in the central reserve and road reserve					
	boundary, including the establishment of plant nurseries where required.					
20.12	As for Item 20.11 but selected trees.	No.	226			
20.13	Provide and erect kilometer posts as directed by the Engineer.	No.	58			
20.14	Provide and lay flush kerb,150 x 100mm, Type A	m	119,160			
20.15	Provide and lay flush kerb,150mm x 80mm, Type B.	m.	6,380			
20.16	Provide and lay flush kerb,150mm x 80mm, Type C.	m	3,300			
20.17	Provide and lay flush kerb, 150mm x 80mm,	m	3,900			
	Type D.			:		
20.18	Provide and lay flush kerb,150mm x 80mm, Type E.	m	1,300			
	Carried forward to page 27					

BILL OF QUANTITIES No.20 ROAD FURNITURE

Item No.	Description	Unit	Quantity	Rate	Amount	
<u> </u>	Brought forward from page 26	1			Shillings	Ct
	fixed our gard first ty					
20.19	Quardrant for flush kerb, main road and				Ì	
	slip road:			•		
. "	(1) in-situ 0.5m radius, Type A.	No.	25		· ·	
	(2) in-situ 0.5m radius,Type B.	No.	4			
20.20	Provide and lay raised kerb,125mm x					
	250mm, slip road.				ļ	ļ
4	Earth Complete					
	(1) straight.	m	1,530			
	(2) radius 5m to 1m.	m	72			
00.04	Deside and for spland both 405 span.		.]			
20.21	Provide and lay raised kerb, 125mm x		4			
	250mm, main road.		•			
	(1) straight.	_	256		1	
	(2) radius 5m to 1m.	m	114			
	(E) radius off to this	"				
20.22	Provide and lay ramped kerb.	No.	64			:
		110.	١			
20.23	Provide and erect permanent five strand	m	1,500			
	wire fencing including intermediate and					-
25.0	straining posts in areas specifically				·	
	directed by the Engineer.					
]			Ì
0.24	Provide and erect gates as directed and	No.	8			
	approved by the Engineer.	1 1	·	•		ļ
20.25	Provide and erect double headed	m	3,660			١
	guardrail, all in accordance with the					ŀ
	Drawings.	1				
	Provide stairways for bus stops as	m	53			
** *	specified in the Drawings.					
						4
	Carried forward to Summary on page 35	٠				***************************************
	· 通过电路 医内侧侧 (1986)					
	karbina di keribana jir					
			•			

BILL OF QUANTITIES No.21 MISCELLANEOUS

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
21.01	Supply and apply, in accordance to					
21.01	manufacturer's instructions waterproof-	m2	20,050			
• !	ing materials to top of bridge decks,					
	approach slabs and all structural					
٠.	concrete surfaces in contact with fill					
	material prior to backfilling.					
• 1	material prior to packining.					
21.02	Supply and install in position					
	elastomeric bearings including mortar	-				
	mortar plinth, fixed,	i i].
	(1) 406 x 279 x 18mm	No.	12	•	1	
	(2) 432 x 203 x18mm	No.	37			
	(L) TOLK 200 XTORRIT	110.	3/			
21.03	Supply and install in position					
-1.00	elastomeric bearings including mortar				1.	}
	plinth, movable:				Ì	
	Participation that was a second or second to the con-				1	
	(1) 229 x 152 x 56mm	No.	8			
	(2) 279 x 229 x 37mm	No.	16			
	(3) 279 x 229 x 46mm	No.	22			İ
	(4) 279 x 229 x 65mm	No.	Į.			
	(5) 432 x 203 x 65mm	1	18			
	(0) 432 x 203 x 03mm	No.	12			
1.04	Supply and install joint filler for					
.1.04	expansion joint:		1			
	expansion joint.		İ			1
	(1) 30mm thick.	m2	69			
	(2) 25mm thick.	m2	82			Ì
37 14	(3) 20mm thick.	m2	23			
	(a) Zomin unck.	IIIE	23			
1.05	Supply and install sealant for expansion		1		\	
	joint:				1	
	ionic Advisoration design				Ï	
	(1) 30 x 50mm deep.	m	66			
	(2) 25 x 50mm deep.	"	75			
	(2) 20 x 30mm deep.	"	, ,		l	
1.06	Provide, lay and compact Asphalt Concrete	m3	134			
1.90	Wearing Course for bridge decks.					ļ
	Treating Oddise to bridge decks.		ļ			
1.07	Supply and install flex beam guardrails	m	244			ļ
	including post for vehicle bridge as	[" [- '			
1	detailed on the Drawings.		ļ			
	detailed on the brawings.					
	Corried forward to page 20	<u></u>				+
	Carried forward to page 29					

BILL OF QUANTITIES No.21 MISCELLANEOUS

Item	Description	Unit	Quantity	Rate	Amount	T
No.					Shillings	Cts
1 1 . w	Brought forward from page 28				3	1013
21.08	Provide and erect in position parapet	<u>.</u>	-	•		
21,00	handrails to railway bridge as detailed	m	114			
	on the Drawings.]			
	on the blawings.					
21.09	Provide and erect in position pedestrian		000			
	parapets to footbridges as detailed on	m	282			
	the Drawings.]			
	retagilisan sana		1			
21.10	Provide and install 100mm dia.drain pipe	No.	36			
- 1 13 T	through deck slabs.					
					·	İ
21.11	Provide and place 75mm dia.PVC weep	No.	62			
	holes.					
21.12	Provide and place 200mm dia.perforated	m	1,770			
· · · · ·	PVC pipes.					
21.13	Provide and install 20mm dia. dowel bars	No.	152			
٠.	with caps as specified on the Drawings.					
			-			
21.14	As for Item 21.13 but 40mm dia.	No.	98			
	ing sa katang mengangkan pengangan kanangan dianggan pengangan pengangan pengangan pengangan pengangan pengan Manangangan pengangan pengangan pengangan pengangan pengangan pengangan pengangan pengangan pengangan penganga	[
	Provide, spread and compact graded	m3	132			
	crushed stone to base for road box culverts.					
1 10						
	Provide, lay and compact Asphalt Concrete	m3	142			
	Wearing Course for road box culverts.		Ì			
1.17	Provide and place 200mm dia.PVC weep	No.	30			
	holes from behind the abutments.	110.	SU			
	notes from bottom the abutility lies.					
	Carried forward to Summary on page 35	<u> L</u>		 		
**	Assessment to the second of bridge on	•			İ	

NOTE: PLANT The rate inserted herein are to include all operational and maintenance cost, fuol, oil, grease, drivers and turnboys, wages, supervision, overheads and profits. Only time actually employed upon the works will be paid for and the rates should include for ridle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets.)the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. 2.01 D6 tractor or equivalent, including brade and ripper. 2.02 D7 tractor or equivalent, including brade and ripper. 2.03 D8 tractor or equivalent, including brade and ripper. 2.04 Motor grader CAT140G or equivalent (complete with scarifier). Heavy grid or sheepsfoot roller. hr 100 Heavy grid or sheepsfoot roller. hr 100	Item <u>No.</u>	Description	Unit	Quantity	Rate	Amount	
The rate inserted herein are to include all operational and maintenance cost, fuol, oil, grease, drivers and turnboys, wages, supervision, overheads and profits. Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets.) the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. 2.01 D6 tractor or equivalent, including brade and ripper. 2.02 D7 tractor or equivalent, including brade and ripper. 2.03 D8 tractor or equivalent, including brade and ripper. 2.04 Motor grader CAT140G or equivalent hr 300 (complete with scarifior).			ļ			Shillings	Ct
The rate inserted herein are to include all operational and maintenance cost, tual, oil, grease, drivers and turnloys, wages, supervision, overheads and profits. Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets.)the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. 2.01 D6 tractor or equivalent, including brade and ripper. D7 tractor or equivalent, including brade and ripper. D8 tractor or equivalent, including brade and ripper. D8 tractor or equivalent, including brade and ripper. Motor grader CAT140G or equivalent hr 300 (complete with scarifior).		NOTE:					
The rate inserted herein are to include all operational and maintenance cost, fusl, oil, grease, drivers and turniboys, wages, supervision, overheads and prolits. Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets.) the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. D6 tractor or equivalent, including brade and ripper. D7 tractor or equivalent, including brade and ripper. D8 tractor or equivalent, including brade and ripper. D8 tractor or equivalent, including brade and ripper.	٠.	kay 1. Subawa tu a		ļ			ŀ
all operational and maintenance cost, fusil, dil, grease, drivers and turnboys, wages, supervision, overheads and profits. Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-3,CAT.14,ets.),the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. Of D6 tractor or equivalent, including brade and ripper. Of D7 tractor or equivalent, including brade and ripper. Of B7 tractor or equivalent, including brade and ripper. Of Motor grader CAT140G or equivalent hr 300 (complete with scarifier).		PLANT					
all operational and maintenance cost, fuel, oil, grease, drivers and turnboys, wages, supervision, overheads and profits. Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets),the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. Of D6 tractor or equivalent, including brade and ripper. O7 tractor or equivalent, including brade and ripper. O8 D8 tractor or equivalent, including brade and ripper. O9 D8 tractor or equivalent, including brade and ripper. O9 Motor grader CAT140G or equivalent hr 300 (complete with scarifier).	11,7	Miles and the second of the second]				
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wages, supervision, overheads and profits. Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets.) the power ratings shall not be lower than the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. O1 D6 tractor or equivalent, including brade and ripper. O2 D7 tractor or equivalent, including brade and ripper. O3 D8 tractor or equivalent, including brade and ripper. O4 Motor grader CAT140G or equivalent hr 300 (complete with scarifier).							
Only time actually employed upon the works will be paid for and the rates should include for idle time, travelling and overtime. All items of plant must be priced. Items of Major Plant Employed on Dayworks. Where items of major plant listed in the Schedule of Dayworks are specified by type (e.g. D-6,D-8,CAT.14,ets.),the power ratings shall not be lower than the power ratings of such plant manufactured within the two years prior to the date of tender. Any items of major plant employed upon Dayworks which has a power rating lower than that specified above, shall be paid for at rates lower than those in the Schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above. Of Bractor or equivalent, including brade and ripper. Of Tractor or equivalent, including brade and ripper. Of Bractor or equivalent, including brade and ripper. Motor grader CAT140G or equivalent hr 300 (complete with scarifier).	117						
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D8 tractor or equivalent, including brade and ripper. Motor grader CAT140G or equivalent (complete with scarifier).		- 11	'"	200			
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Motor grader CAT140G or equivalent hr 300 (complete with scarifier).	- 1		"	100			
(complete with scarifier).		ano ripper.					
(complete with scarifier).	ایر	Material of CATA 400 and address	h.	200			
	- 1	- · · · · · · · · · · · · · · · · · · ·	111	300			
95 Heavy grid or sheepsfoot roller. hr 100		(complete with scarifier).		,			
	05	Heavy grid or sheepsfoot roller.	hr	100			
Carried forward to page 31		Carried forward to some 21	<u>L</u>			 	-

Item No.	Description	Unit	Quantity	Rate	Amount	
Circum view inc. Sp., y	Brought forward from page 30				Shillings	Cts
22.06	Vibrating roller,10 ton.	hr	100			
22.07	15 ton pneumatic self-propelled roller.	hr	100			
22.08	16-18 ton smooth wheel roller.	hr	100		·	
22.09	As for Item 22.08 but 6-8 ton.	hr	100			
22.10	Small hand-propelled vibrating roller.	hr	200			
22.11	Rammer and/or compactor.	hr	300			
22.12	1.6 m3 class tractor shovel or equivalent.	hr	200			
22.13	2.3 m3 tractor shovel or equivalent.	hr	100	·		
22.14	0.7 m3 class mechanical excavator (backhoe) or equivalent.	hr	100			
22.15	0.3 m3 class mechanical excavator (backhoe) or equivalent.	hr	200			
22.16	2.3 m3 class wheel loader or equivalent.	hr	200			
22.17	3 m3 class wheel loader or equivalent.	hr	100			
22.18	6 ton tipper lorry.	hr	300	3		
22.19	10 ton tipper lorry.	hr	300			
22.20	6 ton lorry.	hr	300			
2.21	10 ton lorry.	hr	300			
22.22	0.7 to 1 ton pick up car.	hr	200			
22.23	Land Rover.	hr	200		,	
2.24	6 m3/min air compressor.	hr	100			
22.25	10 m3/min air compressor.	hr	100			
2.26	50mm delivery water pump and moter.	hr	200			
	Carried forward to page 32	L				

Item	Description	I bu ta	Δ			-
No.	Describrot	Unit	Quantity	Rate	Amount	
	Brought forward from page 31	<u> </u>		- 	Shillings	Cts
22.27	As for item 22.26 but 75mm.	hr	200			
22.28	Concrete mixer 14/10.					
22.20	Concrete itiixer 14/10.	hr	100			
22.29	Concrete vibrator,poker type.	hr	100		į. Į	
	the state of the s					
22.30	Self-propelled water tanker 9500 litre.	hr	200			
00.04	Pressure bitumen distributor 4500 litre.	1 .			ļ	
22.31	ressure bitumen distributor 4500 litre.	hr	100			
22.32	Lorry for Benkelman beam & plate bearing	hr	300			
	Tests.	"	330			
					-	
	LABOR					
	建筑,但是,为由海南,自由进行。				[]	
	The rates inserted herein are to include					
	all costs of labor such as insurance,					
	accommodation, travelling time, use and maintenance of small tools of the trade,					
	supervision, overheads and profit.					
	Only the actual time engaged upon the					
	works will be paid for.				and the second s	
3 A	garage and the second					
00.00	111.19		50,000			
22.33	Unskilled labor	hr	50,000			
22.34	Working ganger	hr	10,000		i }	
22.35	Artisans - Lennin - L	hr	10,000			
						.
	LATERIAL C					
	MATERIALS					
	All materials are to comply with the					
	Specifications. The rates inserted	1 1				
	herein are to include for delivery to		ĺ			
	the site, storage, handling, overheads and					
	profit.					1
22.36	Ordinary Portland Cement.	tonne	40			
50	ordinary , william out of the					
22.37	Mild steel (any diameter).	tonne	3			
	Carried forward to page 33	<u> </u>				
	Camed formation by page of					

Item No.	Description	Unit	Quantity	Rate	Amount	Ci-
	Brought forward from page 32				Shillings	Cts
22.38	High yield steel (any diameter).	tonne	3			
22.39	Fine aggregate for concrete.	m3	200	· 		
22.40	Coarse aggregate for concrete maximum size 20mm.	m3	100			
22.41	Coarse aggregate for concrete,maximum size 40mm.	m3	100			
			••			
22.42	Graded crushed stone for subbase and base.	m3	100			
22.43	Wrought shuttering timber.	m2	100			
22.44	Unwrought shuttering timber.	m2	100			
22.45	Timbering for trenches.	m2	100		-	
22.46	Cut back bitumen, Grade MC 30.	litre	1,000			
22.47	Cut back bitumen, Grade MC 3000.	litre	1,000			
22.48	Emulsion, KI-60	litre	1,000			
22.48	Straight-run bitumen,Grade 80/100.	fitre	1,000			
22.49	10/14mm nominal size chippings.	m3	200			
22.50	3/6mm nominal size chippings.	m3	200			
	Carried forward to Summary on page 35		·		·	

BILL OF QUANTITIES No.23 PILING

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
23.01	Mobilization of all the necessary plant for the piling operation, setting up on the position of the first pile and removal on completion of the last pile.	L.S.			***************************************	
23.02	Move and set up each pile position.	No.	96			
23.03	Supply of steel pipe piles 500 mm dia., 9 mm thick.	m	816			
23.04	Driving piles of 500 mm dia including positioning and pitching Include for	m	816			
	cutting pile heads to correct level, and filling with concrete.					
	Carried forward to Summary on page 35	<u> </u>		, , , , , , , , , , , , , , , , , , ,		

SUMMARY OF BILLS OF QUANTITIES

Bill	Description		Amount	
No.	And the figures of the state of		Shillings	Cts
Harris I				
. 1	General			
4	Site Clearance and Topsoil Stripping	*		
5	Earthworks			
7	Excavation and Filling for Structures	•		
8	Culverts and Drainage Works		· ·	
9	Passage of Traffic			
10	Gravel Wearing Course			
13	Graded Crushed Stone Subbase and Base		Ì	
14A	Lean Concrete			
15	Bituminous Surface Treatment and Surface Dressing		ļ	
16	Bituminous Binder Course and Wearing Course			
17	Concrete Works			
20	Road Furniture			
21	Miscellaneous			
22	Dayworks			ľ
23	Piling	:		
- 1		<u>.</u> :		
		Total		
			1	.

APPENDIX TO BILL OF QUANTITIES ITEM 1.04 - FURNITURE AND OFFICE EQUIPMENT

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
.04	Provide and maintain furniture and office equipment for the Engineer's				1	***************************************
	office and laboratory as listed in the Special Specification, all to the satisfaction of the Engineer.					
Resid	ent Engineer's Main Office Furniture				NAME OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OWNER OF THE OWNER OWNE	
	- Writing desks (1.5 x 0.9m) with lockable drawers.	No.	5			
	 Writing desks (1.35 x 0.75m) with lockable drawers. 	No.	3			
	- Office tables (1.8 x 0.9m).	No.	2			
	Plan filing cabinets.	No.	2	•		
	Chairs, standard desk type.	No.	12			
	Chairs, executive swivel type.	No.	5			
-	Drawing table stools (0.7m high).	No.	2			
-	Typist desk.	No.	1			
	Typist chairs.	No.	1			
-	Lockable steel cupboards.	No.	5	<u>:</u>		
	Lockable steel filing cabinets (4-drawers).	No.	2	:		
-	Refrigerator of 220 litres capacity.	No.	1			
ŀ	Bookshelves.	No.	5			
	Conference table.	No.	1			
	Chairs for conference table.	No.	8			
-	Drawing benches.	No.	6			
	Carried forward to page 37					+

APPENDIX TO BILL OF QUANTITIES ITEM 1.04 - FURNITURE AND OFFICE EQUIPMENT

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 36				Omings	1013
2. Engir	l neer's Laboratory Furniture					
	- Laboratory benches as specified.	No.	1			
•	- Shelves along outside walls.	No.	1			
	 Writing desks (1.35 x 0.75m) with lockable drawers. 	No.	2			##
	- Chairs, standard desk type.	No.	2			
·	- Laboratory stools (0.7m high).	No.	6			
	 Lockable steel filing cabinet (4-drawers). 	No.	1			
	- Lockable steel cupboard.	No.	1	:		
	- Refrigerator of 220 litre capacity.	No.	1			
	- Bookshelves	No.	1			
3. Engir	eer's Main Office Equipment			į		
	- Camera, single lens reflex type.	No.	. 1			
	- Electric typewriter with self- correcting facilities.	No.	1			
	- Filing trays.	No.	12			
	- Stapling machine (large).	No.	1			
	- Stapling machines (regular).	No.	6			
	- Paper punches, heavy duty.	No.	2		II.	
	- Paper punches, ordinary.	No.	6			
	- Pairs of scissors.	No.	6			
	- Waste paper bins.	No.	8			
	- Desk mounted pencil sharpeners.	No.	6			
	- Electric fans	No.	6			
	Carried forward to page 38					

APPENDIX TO BILL OF QUANTITIES ITEM 1.04 - FURNITURE AND OFFICE EQUIPMENT

em No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 37					
	- Electric heaters.	No.	6			
gw e	- Fire extinguishers.	No.	4			
	- First aid kits.	No.	2			
	- Cooker, 2 plate, electric.	No.	1		\	
	 A0 size drawing board on adjustable metal stand with parallel motion. 	No.	1			
	- A0 size drawing board.	No.	2			
	- A0 size Tee squares.	No.	2			
	- 250mm Set squares 45 degree.	No.	6			
	- 250mm Set squares 60 degree.	No.	6		:	
	- Protractor for tachy plotting with interchangeable scales.	No.	2			
	- Fully divided scales (metric 1/1000, 1/2500, 1/500, 1/1200, 1/2000, 1/50, 1/250, 1/1500).	No.	6			
	- Erasing shield.	No.	2			
	- Circular template.	No.	2			
	- Arrow template	No.	2			
`. ·	- Complete compass set.	No.	1			
	- Set of drawing instruments (Staedtler).	No.	3			
	- Set of Rotring pens complete with set of stencils.	No.	4			
	- Adjustable planimeter, Ott 30010 or equivalent.	No.	1			
	- Protractor 360 degree.	No.	4			
	- Electronic calculator with paper printout, 12 figures, with 10 rolls paper.	No.	1			

APPENDIX TO BILL OF QUANTITIES ITEM 1.04 - FURNITURE AND OFFICE EQUIPMENT

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 38 - Electronic scientilic calculator, 12 figures.	No.	10			
	- IBM compatible micro-computer with 40 MB hard disk, 3.5" floppy drive, monochrome display/graphics, alphanumeric keyboard, MS DOS 3.3, Basic, Lotus 1-2-3, Wordperfect, Wordstar, and 20 Nos.3.5" diskettes.	No.	1			
	 Wide carriage 16-pin dot matrix printer invluding parallel cable(2m) and 20 spare ribbons. 	No.	1			
	Desk-top photocopying machine A3/A4 size, reduction and enlargement facilities.	No.				
	Total to Item 1.04 on page 1	<u> </u>	·			

APPENDIX TO BILL OF QUANTITIES ITEM 1.05 - SURVEY AND LABORATORY EQUIPMENT

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
1.05	Provide survey and laboratory equipment as listed in the Special Specification.				o	
1. Surve	y Equipment					
	 Carl Zelss NI3 Automatic Engineers level c/w tripod or similar. 	No.	3			i
	 Carl Zeiss TH2 single second theodolite complete with tripod or similar. 	No.	2		·	
	- Survey umbrellas.	No.	2		·	
	4m Levelling staves with bubble and case.	No.	5			
	- 2.5m Ranging rods.	No.	20			
	- 1m Stainless steel straight edge.	No.	2			
	- 3m alurninium straight edge.	No.	3			
	- 30m steel white face tape.	No.	3		· .	
	- 100m steel band tape.	No.	2			
	- 3m pocket tape.	No.	15			
	- Steel tape repair outfit.	No.	1			
	Subtotal (Item 1, Survey Equipment)		:			
	NOTE:					
	The following equipment shall be purpose made for use in soils testing laboratory and shall comply with the relevant	,				
	British (BS) or American (AASHTO) Standard.		The state of the s			
2. Comp	action Test (AASHTO T.99 and T.180)					
	- Compaction mould complete with base plate extension collar,101.6mm internal diameter x 116.43mm high.	No.	10			
	Carried forward to page 41	<u> </u>				

APPENDIX TO BILL OF QUANTITIES ITEM 1.05 - SURVEY AND LABORATORY EQUIPMENT

item No.	Description	Unit	Quantity	Rate	Amount Shillings	C.,
	Brought forward from page 40				Simings	Cts
	2.495kg compaction hammer, drop regulated to 304.8mm.	No.	5		:	
	4.536kg compaction hammer, drop regulated to 457.2mm.	No.	5			
	Aggregate compaction mould to BS.5835 complete.	No.	10		and the state of t	
	- Loading frame for the Kango hammer (to BS.5835).	No.	1			
	- Electric vibrating Kango hammer with steel tamper.	No.	1			
	- Steel straight edge 300mm long x 25mm wide x 3mm thick.	No.	6			
	Compaction mould 152.4mm dia.x 116.43mm high complete with base plate and extension collar.	No.	10	·		
3. Dens	ity Test (Sand replacement method BS 1377)					
	- Galvanized metal tray 1m x 0.5m x 75mm deep.	No.	2			
	- 75mm brush.	No.	6			
	 Semi-automatic balance, 25kg capacity, accurate to 1g, including weights. 	No.	2		-	
	- Metal containers, 450mm dia.	No.	6			
	- Stainless steel tray, 305mm dia.	No.	3			
	Metal tray with 100mm diameter hole in the centre, 300mm x 300mm square.	No.	3			
	 Metal tray with 150mm diameter hole in the centre, 300mm x 300mm square. 	No.	3			
	Metal tray with 200mm diameter hole in the centre, 457mm x 457mm square.	No.	3			
	 Steel pegs for fixing tray in position. 	No.	36			
	Carried forward to page 42					-

Item No.	Description	Unit	Quantity	Rate	Amount	
(1 m. mayora a const. og	Brought forward from page 41			7-2	Shillings	Cts
	Sand pouring cylinder, 100mm diameter.	No.	3			
	- Sand pouring cylinder, 150mm diameter.	No.	3		And the second s	
	- Sand pouring cylinder, 200mm diameter.	No.	3			
	- Cold steel chisel, 25mm x 300mm long.	No.	6			
	- Cold steel chisel, 10mm x 250mm long.	No.	6		The second secon	
	- 1.8kg hammer.	No.	6		ANTINA PARA PARA PARA PARA PARA PARA PARA PA	
	- Scoop for removing excavated material from hole, 250mm long handle.	No.	6			
	- 100mm brush, soft.	Ma			-	
		No.	6		navene	
*1,	Metal dibber	No.	6			
	- Scraper	No.	6			
	- Steel pointed rod	No.	6			
i tytu	- Density spoon	No.	6			
	- 50mm brush, soft.	No.	6			
	- Calibrating can,100mm diameter x 150mm deep.	No.	3			
	- Calibrating can, 150mm diameter x 200mm deep.	No.	3			
	- Calibrating can, 200mm diameter x 250mm deep.	No.	3			The state of the s
	 Polythene container jars, with neck 125mm diameter and 4 litre capacity. 	No.	6			
	- Standard sand 600/300 micron, 50kg bag.	No.	10			
Dens	ity(Nuclear Density Method, AASHTO T238)					
	 Nuclear moisture/density guage (Troxler 3411B or similar approved). 	No.	. 1			
	Carried forward to page 43	<u> </u>				

ltem No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 42				Onnings	Ula
	- Hole forming device,	No.	1			
	- Guide for the above.	No.	1			
Attert	perg Limits Apparatus to BS 1377	·				
	- Casagrande liquid limit apparatus.	No.	4			
	- Grooving tool.	No.	4			
	- Liquid limit penetrometer,	No.	2			
	- Penetration test cone.	No.	2			
	- Penetration sample cap.	No.	2			
	- Linear shrinkage mould.	No.	20			,
	- Vernier caliper, 150mm x 0.1mm.	No.	2			
	- Stainless steel, 3mm dia.and 100mm long.	No.	4			
Sand	Equivalent					
Janu						
	- Sand equivalent test set.	Set	2	•		
•	ific Gravity (BS.1377 and BS.812) Vater Absorption (ASTM D 2041 - 78)					
	 Pycnometer for sands and fine aggregate, 1kg capacity, complete with cone and rubber seal. 	No.	10			Line and the second

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 43			·•····································	Simmigs	- Cis
	Glass plastic or metal bowl having a capacity of at least 1000 ml strong enough to withstring a full vacuum complete with cover fitted with rubber gasket and a hose connection.	No	10			
	Volumetric flask having a capacity of at least 1000 ml strong enough to withstand a full vacuum complete with rubber stopper and a hose connection.	No.	10			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	An intermediate size heavy wall glass pycno- meter having a capacity of at least 10,000 ml	No.	10			
	complete with a suitable vacuum connection assembly consisting of a vacuum gauge, relief valve, and a tubing connector, plus a tapered stopper device for maintaining constant volume regulation.					
	A manometer or vacuum gauge suitable for measuring the specified vacuum.	No	1			
	- Gay Lussac-specific gravity bottle,25ml.	No.	10		·	
	- Gay Lussac-specific gravity bottle,50ml.	No.	10			
	Wire mesh basket with apertures not greater than 6.5mm large enough to take 2.5 kg of aggregate.	No.	1			
	Stout watertight container in which the basket can be freely suspended under water.	No.	1			
	- End-over-end shaker	No.	1			
	- Gas jar, 300mm high x 75mm dia. with glass plate and rubber stopper.	No.	10			

tem No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 44					
	- Vacuum type dessicator, 200mm dia.	No.	2			
	 Vacuum pump, 1 HP, capable of evacuating air from the container to a pressure of 30 mm Hg (4.0 kPA) or less. 	No.	1			
:	Alfan Arus and Arus and					
	- Rubber headed pestel	No.	2			
	- Soft absorbent cloth (tea towel).	No.	20			
	- Shallow tray of area not less than 0.065m2.	No.	2		·	
	Airtight container of similar capacity to the basket.	No.				
	 5kg balance accurate to 0.1g capable of suspending the basket plus sample in the watertight container. 	No.	1			
	Hair drier	No.	1			
	- Sand absorption cone and tamper	No.	2			
	Pycnometer for the above.	No.	2			
	e for was discussed in the contract of					
Flakir	ness index (BS.812)			•		
	- Flakiness sieve, 4.9 x 30mm slot.	No.	2			
	- Flakiness sieve, 7.2 x 40mm slot.	No.	2			
	- Flakiness sieve, 10.2 x 50mm slot.	No.	2			
	- Flakiness sieve, 14.4 x 60mm slot.	No.	2			
	- Flakiness sieve, 19.7 x 80mm slot.	No.	2			
	- Flakiness sieve, 26.3 x 90mm slot.	No.	2	i		
, .	- Flakiness sieve, 33.9 x 100mm slot.	No.	2			

item No.	Description	Unit	Quantity	Rate	Amount	_
	Brought forward from page 45				Shillings	Cts
9. Sieve	Analysis (BS.1377) - BS sieve 300mm diameter in sizes 75,63, 50, 37.5, 28, 20, 14, 6.3, 5 and 3.35mm plus lid and receiver.	Set	4			
	- BS sieve 200mm diameter in sizes 2,1.18, 0.6, 0.425, 0.300, 0.212, 0.150, 0.075 and 0.063mm plus lid and receiver.	Set	4			
	- Electric sieve shaker.	No.	1			
	- BS sieve 200mm diameter, 0.425 and 0.075mm.	Set	10			
	- Field rocker sieve set.	Set	4			
10. CBF	R Test (AASHTO T.193)					
	CBR mould,152mm dia. x 178mm high, complete with perforated base plate and extension collar 50.8mm high that can be fitted to either end of the mould.	No.	30			
- :	- Spacer disk.	No.	6			
	Perforated swell plate with adjustable centre post of rust prooted steel provided with a lock nut.	No.	6			
	- Sliding weight rammer, 2.49kg.	No.	3			
	- 2.27kg annular surcharge weight.	No.	30			
	- Static compaction press, 50 tonnes capa. with an adjustable platten speed between 1mm/min. and 50.8mm/min. (Hydraulic or mechanical operation and hand operated).	No.	1			
	- Set of guards.	No.	1			
	- CBR/Marshall motorised dual speed 60kN load frame, ASTM.	No.	1			
	- Stabilising bar for the above.	No.	1			

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 46					
	Proving ring for above,10kN and 50kN capacity.	Set	1			
	- Penetration gauge range 0-25mm.	No.	1			
	- CBR piston, including bracket.	No.	1			
	- Swell measurement tripod complete with gauge calibrated in 0.01mm divisions.	No.	30			
	 Soaking tank for CBR mould sufficient for 200 moulds. 	No.	1			
	- Tamping bar, steel 13mm diameter, 380mm long.	No.	1			
. Mis	cellaneous Equipment 1					
	- 1m x 1m x 75mm deep galvanised metal tray.	No.	10			
. :	- 1.5kg hammer.	No.	4			
	- Riffle box with 10mm slots (BS.1377).	No.	2			
	- Riffle box with 20mm slots (BS.1377).	No.	1			
: .	- Riffle box with 50mm slots (BS.1377).	No.	1			
	- Wheel barrow.	No.	4			
	- Dustpan brush.	No.	4			
	- Plastic funnels, 65mm dia.	No.	2			
	- Plastic funnels, 100mm dia.	No.	2			
-	- Plastic funnels, 140mm dia.	No.	2			
	- Shovel.	No.	6			
	- Pick-axe.	No.	6			i.
	- Metal scoop, large, 150mm wide.	No.	4			
	- Metal scoop, medium, 100mm wide.	No.	6			
	Carried forward to page 48]		-	

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 47				Julia	10.0
	- Schmidt concrete test hammer.	No.	1			
	- Jack, 20 tonne, lever, frame, sample extruder.	No.	1			
	- Garden trowel.	No.	4			A THE STREET STREET
	- Steel rule, 500mm long.	No.	3			
* .	- Stop watch.	No.	1			14-16-b-14-14-14-14-14-14-14-14-14-14-14-14-14-
	- Steel tray, 0.3m x 0.3m x 0.01m deep.	No.	40			
	- 3.5kg hammer.	No.	4			***************************************
	- 7kg hammer.	No.	3			
	- Complete sand patch test apparatus.	No.	1			
	- Cold chisel.	No.	6			
	- Oven, electric thermostatically controlled to any temperature between 60 deg. and 149 deg.C,minimum capacity including dial thermometer range 0-160 deg.C (BS.1377).	No.	2			
	- Gas for the above oven.	No.	2			
	- Single plate electric cooker.	No.	4			
	- 3 metre straight edge including calibrated wedges.	No.	4			
	- Dessicator, 300mm dia.	No.	2			
	- Straight edge, 300mm long, 25mm wide and 3mm thick.	No.	6			
	Moisture content tin, 75mm dia. cadmium plate or aluminium.	No.	100			
	- Concrete beam moulds 150 x 150 x 750mm.	No.	24			
	- 450mm x 450mm x 9mm plate glass (BS.1377).	No.	4			
	- Refrigerator 250 litre capacity.	No.	1			
	Carried forward to page 49					

em No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 48					
	- Palette knife 200mm blade.	No.	6			
	- Palette knife 100mm blade.	No.	. 6			
	- BS Sieve brush.	No.	8			
•	- 200mm x 200mm x 20mm cadmium plated or aluminium tin.	No.	50			
	- Electronic balance capacity 600g, accurate to 0.001g.	No.	1			
	- Electronic balance capacity 1600g, accurate to 0.01g.	No.	1			
	- Electronic balance capacity 5000g, accurate to 0.1g.	No.	1			
	- Balance (Chain dial) 250g capacity to 0.01g.	No.	1			
	- Balance 2000g capacity accuracy to 0.1g (manual), including weights.	No.	1			
	- Balance 4000g capacity accuracy to 1.0g (manual), including weights.	No.	1			
	- Balance 12000g capacity accuracy to 1.0g (manual), including weights.	No.	2			
	- Balance 50kg capacity accurate to 20 g, including weights.	No.	1			
* . 	- Load rings with dial gauges, 10kN	No.	1			
	- Load rings with dial gauges, 14kN	No.	1			
	- Load rings with dial gauges, 20kN	No.	1			
	- Load rings with dial gauges, 28kN	No.	1			
: -	- Load rings with dial gauges, 50kN	No.	1			
	- Still for producing distilled water.	No.	i			

em Vo.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 49		***************************************			
	- Polythene or glass 20 litres storage vessel with tap at bottom.	No.	1			
	Petrol driven core cutting machine with all accessaries.	No.	1			
	- Core cutting compound.	kg	1,000		<u>}</u>	
	- Vernier calipers, 250mm.	No.	2			
	- Benkelman beams.	No.	2			
	- Average least dimension gauge.	No.	2			
	 Lockable tool box containing: 1 pair "Molegrips", 2 x 150mm screwdriver 2 x 200mm screwdriver, 2 x 300mm 	No.	1			
	screwdriver, (1 Standard and 1 Phillips head of each) adjustable spanners 200mm and 300mm, 1 pair roundnosed pliers, 1 pair general purpose pliers, 1 plastic faced mallet (1 kg), 1 set imperial spanners 1/4" to 15/16", 1 set metric spanners 8mm					
	to 20mm, 2 tyre pressure gauge range 0-100 p.s.i.	<u> </u>				
	Plastic or metal bucket including lid, 10 litres capacity.	No.	20			
	- Polythene wash bottle (500ml).	No.	10			
	- A4 size clipboard.	No.	20			
	- Mercury thermometer, range -10 deg.C to 150 deg.C, glass (BS.593).	No.	10			
.*	- Laboratory thermometer, range +50 deg.C to 250 deg.C (BS.593).	No.	1			
	- Maximum and minimum thermometer (BS.692	No.	1			
	- Rain gauge.	No.	3			ļ
	- Portable dial thermometer +50 deg.C to 250 deg.C accurate to + - 3% with 0.6m long stem.	No.	2			

ltem No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 50	- H				10.0
	- Pocket dial thermometer +50 deg.C to +250 deg.C accurate to + - 3% with 0.1m long stem.	No.	10			rigi-di merenama mbaman merenama di mbitati
	- 5 litre capacity steel storage container with leak and dust proof lids for storage of bitumen samples.	No.	100	÷		er de la companya de la companya de la companya de la companya de la companya de la companya de la companya de
40 05-	44-10					
12. Stai	ndard Specifications 1	ļ.:				
	NOTE: Copies of each of the following Standard Specifications:-					
	- BS. 812	No.	1			
	- BS. 882	No.	i			
	- BS. 1377	No.	1			
	- BS. 1881	No.	1			
	BS. 1924	No.	1			
	- BS. 5835, Part 1	No.	1			
	- Standard Specifications for Transporta- tion Material and Methods of Sampling and Testing (AASHTO) Part I and II,13th	No.	1			
	Edition.		ļ			
	- ASTM D 2041-78	No	1			
13. Co	Increte: Slump and Cube Manufacture(BS 1881)					
1. 1.	- Slump cone tamping rod and base.	Set	2		r.	
	- Concrete cube mould,150mm.	No.:	20			
	- Soaking tank for cubes, capacity 50 Nos.	No.	. 1			
	- Cube tamping bars for Item 1.252.	No.	1			
	- Water test set for concrete mixing water.	No.	1			
	Carried forward to page 52					
				· .		

tem No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 51				Ommingo	1013
	 Potential alkali reactivity of cement- aggregate combinations. 	No.	1			
	- Mortar bar container.	No.	3	j		
	crete: Cube Compression Testing and an Concrete Unconfined Compressive Strength Te	esting				
	 Concrete compression machine, to BS.1610 Grade A with 300mm gauge, rectangular plattens, capacity 1560 kN with load pacer. 	No.	1			
· - 4 .	- Safety guard for Item 1.255.	No.	. 1			
	- 50mm distance piece.	No.	1		·	
	- 70mm distance piece.	No.	1			
	- 100mm distance piece.	No.	1			
	Mechanical load pacer. Tamping rod, 16mm dia.x 600mm long.	No.	2			
	- Tamping bar, 380mm x 25mm square.	No.	2			
	- Tamping rod, 10mm dia.x 250mm long.	No.	2			
	- Electric vibrating hammer 750 watt with tamping food square.	. No.	1			
	l ential Alkali Reactivity of Cement- pregate Combination and Mortar Bar Container					
	- Comparator mould (25.4 x 25.4 x 285mm)	No.	3			
	- Length comparator	No.	1			
	- ASTM type flow table	No.	1			
	- Curing box(60 x 40 x 60cm)	No.	[1 4			
. •	- Concrete consistency apparatus	No.				<u> </u>
	- Mortar mixer	No.	'		,	

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
•	Brought forward from page 52				- Commings	010
16. Mar	I shall Stability Test Equipment(AASHTO T 245)					
1	Specimen mould including base plate and extension collar.	No.	10			
	- Specimen extractor.	No.	1			
	- Compaction hammer.	No.	2			
	- Compaction pedestal and specimen mould holder.	No.	2			
	- Breaking head mould.	No.	1			
	- CBR/Marshall motorised dual speed 60 kN load frame, ASTM.	No.	. 1			
	- Electrically operated laboratory mixer 10 litre capacity.	No.	1			
	- Flowmeter.	No.	2			
	- Suitable mechanical mixer.	No.	. 1			
	- Water bath with cover at least 150mm deep thermostatically controlled to maintain the temperature of the water at 60 deg.C + - 1 deg.C. The tank shall	No.	2			
	have a perforated false bottom or be equipped with a shelf for supporting specimens 50mm above the bottom of the bath.					
	- Isomantle electric heater for bowl of laboratory mixer.	No.	1			
	- Thermometer with 50mm dia. and 180mm stainless steel stem (50 to 250 deg.C).	No.	1			
	- ASTM Marshall automatic compactor, electric.	No.	1			

tem No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 53					
. Bitu	l men Extraction Test	:				
:	(1) Extractor Bottle Method, 8.S.598, Part 2					
	- Flat bottomed scoop.	No.	2			
÷	Steel garden trowel.	No.	2			
	- Large steel spoon.	No.	2			
	- Water resistant gloves.	Pair	3			- Andread - Andr
	- Foot pump for pressurising air-water assemblies upto a maximum of 700kN/m2 and fitted with flexible hose approximately 1.2m long and connector.	No.	1			
	- Steel bottle 600ml capacity with 49mm rubber stopper.	No.	1			
÷	- Steel bottle 2500ml capacity with 71mm rubber stopper.	No.	2			
	- Steel bottle 7000ml capacity with 71mm rubber stopper.	No.	1			
	- Flash funnel fpr fitting to the 700ml steel bottles. The rim of the funnel retains a sieve 200mm nominal diameter.	No.	1			
	Bottle roller-A compact bench mounted unit designed to rotate two bottles simultaneously about their longitudinal axis.	No.	1			
	Pressure filter complete with cutting tool for making a hole in the filter paper.	No.	1			
	- Filter funnel to take 200mm nominal diameter sieves.	No.	1			
	- Centrifuge complying with as BS 598.	No.	1			ļ
	- Binder recovery apparatus.	No.	1			
	Carried forward to page 55					1

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
	Brought forward from page 54					10.0
	 Volumetric flask 250ml, 500ml, 1000ml and 2000ml capacity of each. 	No.	2			
:	- Recovery still for Dichloromethane.	No.	1			
	(2) Hot Extractor Method, B.S. 596, Part 2					
	 Hot extractor complete with wire qauze container, gasket, cork lid and support assembly. 	No.	1			a d'est administration de marties est daministre est
	Dean and Stark Receiver with condenser to suit Trichloroethylene.	No.	1			
8. Con	sumables					
	- Paraffin wax.	kg	50			
	- Gas.	kg	1,600			
:	- Gunny sack.	No.	400			
	- Plastic bag, 900 x 450mm x 1000 gauge.	No.	2,000			
٠	Plastic bag, 450 x 300mm x 1000 gauge.	No.	1,000			
	- Filter paper 150mm dia., Whatman No.5 (Boxes of 100).	No.	10			
	- Filter paper 400mm dia., Whatman No.5 (Boxes of 100).	No.	5			ļ 1
	- Filter paper 100mm dia., Whatman No.5 (Boxes of 100).	No.	5			
	- Trichloroethylene (205 litre drum).	No.	2			
	- Dichloromethane (275 kg drum).	No.	2			
	- Cotton waste (or drying cloths).	kg	100		- Average of the second of the	
	- Filter paper 270mm dia., 33mm with dia. hole in centre, Whatman No.5 (Box of 100)	No.	15			
	Carried forward to page 56		<u> </u>	,		

Item No.	Description	Unit	Quantity	Rate	Amount Shillings	Cts
. 3	Brought forward from page 55				Omings	
	- Filter paper 400mm diameter Whatman No.54 (Box of 100).	No.	10			
*	- Registration paper for compaction test.	sheets	1,000			
	Moisture-density relation test plot paper.	sheets	1,000			
	- Registration paper for Atterberg Limits.	sheets	1,000			
	Registration paper for Particle size analysis.	sheets	1,000			
	- Registration paper for CBR.	sheets	1,000			
	Subtotal (Laboratory Equipment, Items 2 to 18)					
	Total (Items 1 to 18) to Item 1.05 on page 1					

