



COST ESTIMATION MANUAL FOR BRIDGE REPAIR WORKS

Edition 2 | 2025



**The Project for Strengthening of Capacity Development on
Bridge Management System in the Republic of Kenya**



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DOCUMENT MANAGEMENT

Document status:

This document has the status of a Manual. Users shall apply the contents there-in to fully satisfy the requirements set out.

The content of the manual is based on current practice in Kenya and latest practices in the road sector – locally, regionally and internationally.

Notification of errors and requests for amendments:

While all care and consideration has been applied in the compilation of this document, the Ministry accepts no responsibility for failure in any way related to the application of this manual or any reference documents cited in it.

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FOREWORD

The Government of Kenya through its Vision 2030, Kenya's long-term development strategy aimed at transforming the country into a middle income country, has prioritized infrastructure as a foundational enabler of the economic recovery strategies to re-position the economy on a steady and sustainable growth trajectory. In the 4th Medium Term Plan (2023-2027) of the Vision 2030 priority for an increased investments in improving infrastructure so as to lower the cost of doing business and improve national competitiveness and productivity have been identified as core themes for infrastructure development and management.

With full implementation of Performance Based Contracting (PBC) and continued funding from RMLF, there has been tremendous improvement in road maintenance in the country. However, not enough attention has been paid to having a structured program that deals with maintenance of highway structures. Thus, the Bridge Management System (BMS) project was initiated to address management and repair of structures in Kenya. This is particularly important, as the structures form an integral part of the road network.

This manual details how to cost the bridge repairs from first principles taking into consideration the international best practice, locally available resources, and their prices. The content of this manual should serve as a guide to the construction industry including policymakers, road agencies, county governments, private consultants, and contractors during the project cycle of bridge management.

The manual should be read jointly with the technical specifications and Bridge Repair Manual to understand the quality of materials and standard of workmanship when carrying out bridge repair.

The Cost Estimation Manual for Bridge Repair was developed through a technical Sub-Working Group under the Ministry of Roads and Transport with support from the Japan International Cooperation Agency (JICA). The Bridge Repair Sub-Working Group consisted of members drawn from KRB, KeNHA, KeRRA, KURA, KWS, KIHBT, NCA, MTRD, State Department for Roads, and Japanese Experts who provided their valuable advice through a series of meetings. Their contribution and dedication are recognized and acknowledged with appreciation. We are particularly grateful to the JICA Team for their assistance in drafting the Cost Estimation Manual for Bridge Repair and their assistance in capacity building for road maintenance and management.



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The Ministry would like to appreciate the government departments and agencies that constituted the Bridge Repair Sub-Working Group (BR SWG) that worked to develop this manual. In this regard, special thanks go to:

State Department for Roads (SDR)
Kenya Roads Board (KRB)
Kenya National Highways Authority (KeNHA)
Kenya Rural Roads Authority (KeRRA)
Kenya Urban Roads Authority (KURA)
Kenya Wildlife Service (KWS)
Kenya Institute of Highways and Building Technology (KIHBT)
National Construction Authority (NCA)
Materials Testing and Research Directorate (MTRD)

This Manual benefited greatly from the dedication of various individuals who were part of the BR SWG that reviewed several materials and held workshops to develop a well-benchmarked document for posterity. In line with this, special recognition goes to the below-named individuals for their immense contributions to the process:

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ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
CBR	California Bearing Ratio
JICA	Japan International Cooperation Agency
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KNBS	Kenya National Bureau of Statistics
KRB	Kenya Roads Board
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Service
MDAs	Ministries, Departments, and Agencies
MDD	Maximum Dry Density
MoRT	Ministry of Roads and Transport
MTD	Mechanical and Transport Division
MTRD	Materials Testing and Research Directorate
PPRA	Public Procurement Regulatory Authority
PVC	Polyvinyl Chloride
RMS	Road Management System
VAT	Value-added Tax

1 INTRODUCTION

The Kenya Vision 2030 is the long-term vision which aspires that Kenya becomes a globally competitive and prosperous country by the year 2030. The plan is anchored on three pillars: The Economic, the Social and the Political. Infrastructure is considered one of the foundations and enablers of macroeconomic stability to support the three main pillars. The Fourth Medium Term Plan 2023-2027 (MTP IV), which is currently under implementation, outlines the role of the sector in providing cost-effective infrastructural facilities and services for the 21st century. The roads sub-sector falls under infrastructure, which is one of the foundations of the three pillars, and its programmes and projects include expansion and maintenance of roads. In line with the above, the Cost Estimation Manual (CEM) for Bridge Repair Works was developed by the Ministry of Roads and Transport with support from the Japan International Cooperation Authority (JICA) and officially published in 2024 and revised in 2025. It provides a basis for accurate and cost-effective construction and maintenance of bridges as envisaged in MTP IV.

Cost Estimation Manual (CEM) for Bridge Repair Works forms part of the Bridge Maintenance Manuals publications as shown in Table 1.1.

Table 1.1 Bridge maintenance management guideline and manuals

S/No.	Document title	Document description	Category
1.	Bridge Maintenance Management Guideline	Guideline for implementation of bridge maintenance management	Guideline
2.	Inspection Manual for Bridges – Principal	Manual for all bridge inspections	Bridge Inspection
3.	Bridge Inspection Manual for ARBICS and PBC	Manual for routine and annual bridge inspections	
4.	Bridge Inspection Handbook	A pocket size guideline carried to site for bridge inspections	
5.	Bridge Repair Manual	Manual for bridge repair methodologies	Bridge Repair
6.	Standard Specification for Bridge Repair in Kenya	Works specifications outlined in the Bridge Repair Manual	
7.	Cost Estimation Manual for Bridge Repair Works	Manual for Cost Estimation of bridge repair works	

1.1 Purpose of the Manual

This manual gives instructions for estimating the cost of bridge maintenance and repair works, by considering all inputs. This is to provide a standardized procedure for pricing bridge works activities in Kenya, to ensure uniformity in planning and evaluation of the rates by Contractors, Ministries, Departments, and Agencies (MDAs), and County Governments.

1.2 Application of the Manual

This manual is to be applied in the preparation of the Engineer's cost estimate for tender documentation by procuring entities and provides a benchmark for the evaluation of bidding prices. The manual may be used for the formulation of annual work plans by MDAs and County Governments and as an auditing tool for ongoing road works. It can also be used as a reference for bidders to prepare their bidding documents while considering their unique cost settings.

1.3 Manual Review

This manual is developed from a cost survey process as documented in the guideline and as such a review of the same is expected to be carried out every two years.

2 CONTENTS OF THE MANUAL

2.1 Work Items and Coding

Work items covered in this manual are shown in Appendix A. These are the common types of works which are to be implemented in bridge maintenance works in Kenya.

The coding for each work item is derived from the Standard Specification for Bridge Repair in Kenya.

2.2 Cost Configuration

The bridge works consist of various work items that are aggregated into a work package. The total cost of any work package is provided in Equation 2.1 and Figure 2.1.

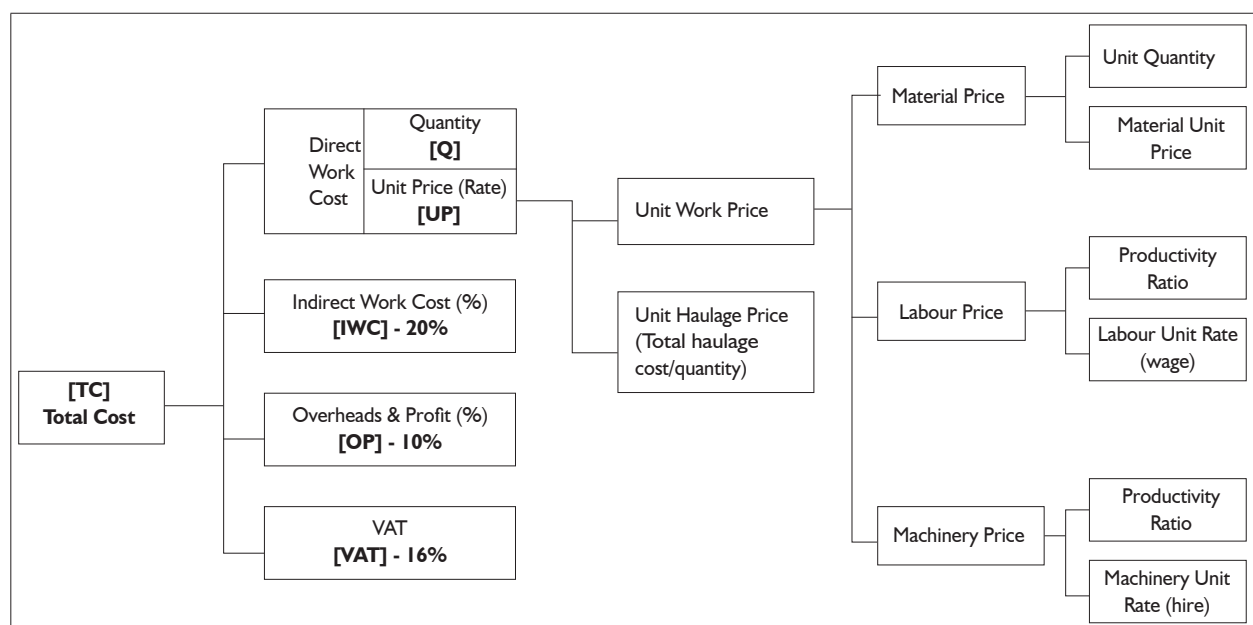


Figure 2.1 Cost configuration

$$TC = \sum (Q \times UP) \times (1 + IWC) \times (1 + OP) \times (1 + VAT) \dots\dots\dots \text{Equation 2.1}$$

Direct work cost is the accumulation of all input costs for the execution of each work item. This is a product of quantity by its unit price. The combination of unit work price (a pure work price assuming that all the resources are on site) inclusive of the haulage cost constitute the Unit Rate.

Indirect Work Costs are costs related to management and administration. It is a percentage of Direct Work Costs.

Overheads and profit are a percentage of Direct and Indirect Work Costs. Value-Added Tax (VAT) is a percentage determined by taxation regulations.

2.3 Price List and Source

The Unit Work Price consists of the Material, Labour and Machinery Unit Rate.

The material, labour and machinery rates used for cost estimation by procuring entities are basically derived from official price indices given by government entities. They are open to the public and are based on nation-wide market surveys, they can be assumed to be the average prices in Kenya.

- **Material Price:** Material Price List from Kenya National Bureau of Statistics (KNBS).
- **Labour Price:** The Regulation of Wages (General) (Amendment) Order, The Labour Institution Act, Ministry in charge of Labour.
- **Machinery Price;** Equipment Hire Rate List from Mechanical and Transport Department, Ministry in charge of Roads.

For this manual, labour, material and machinery prices are provided for the Nairobi Region.

It is recommended that prices inputs for the other regions to be surveyed and included in the subsequent editions of the manual.

The recommended prices are to be revised every two years. The prices may be updated in an ad-hoc basis when substantial changes take place.

When some of material and machinery prices are not covered in the recommended price indices, the average market prices acquired from the survey by the cost estimate engineer or provisional prices by referring to similar items are used. Those prices should be revised immediately once the recommended prices are available.

All prices are to be coded based on Road Management System (RMS) coding system. The prices of labour, material and machinery used in the manual with their sources are shown in the Appendix B.

2.3.1 Methodology

2.3.1.1 Selection of the survey area

The survey area constituted of one region based on the unit rates are for the initial development of the Cost Estimation Manual for Bridge Repair Works 2025.

Table 2.1 Survey areas

Regions	Surveyed Areas (2025)
Nairobi	I. Nairobi

Primary Data Collection

In the city, information was obtained by visiting suppliers (wholesale suppliers, major hardware shops, warehouses, contractors and manufacturers).

Online surveys were also employed to retrieve information from available price lists on the internet and this was verified during the field surveys.

Secondary Data Collection

Table 2.2 shows the sources of official rates obtained from relevant government bodies and other recognised organisations that were used to update the manual rates.

Table 2.2 Sources of official rates

Item	Source	Document
Labour Rates	The Labour Institution Act	Regulation of Wages (General) (Amendment) Order, 2024
Material	Kenya National Bureau of Statistics	KNBS Price List
Fuel Rates	Energy and Petroleum Regulatory Authority (EPRA)	Pump Price List
Machinery	Mechanical and Transport Department (MTD)	MTD Hire Rate List

2.3.1.2 Unit Price Analysis

Labour

The contractors were selected based on the work contracted by the Road Agencies.

The labour unit rates selected were obtained from contractors. However, in cases where the average wage rates from the contractors were comparatively lower, the minimum unit rates set in the Regulation of Wages (General) (Amendment) Order, 2024 were used.

Table 2.3 Sources of labour unit price

Priority	Source of Data
1.	Contractor
2.	Documented Labour Law

Material

The selection of suppliers in this category was done at random i.e. based on the availability of the material. It was done through visits to contractors and Road Agencies regional offices, the internet, phone and email communication and recommendations.

The procedure determining the material unit price was:

1. The price from the market survey was considered first;
2. The prices in the market survey were collected from a minimum of three suppliers, where possible. The surveyed prices were averaged to provide one unit price from the market,

3. Comparison of the base indices and current indices was conducted to obtain the price adjustment factor(s), and;
4. If an item was not available in the market; the international price was searched for and the cost of transport, import duties and profits factored in.

Table 2.4 Sources of material unit price

Priority	Source of Data
1.	Market Survey
2.	Kenya National Bureau of Statistics (KNBS)
3.	Road Authorities, eg. KeNHA, KURA, KeRRA

Equipment

The equipment lessors were selected at random; either through the internet, visits or recommendations from the Regional RAs offices and contractors.

The prices were compared between the two sources of data. However, prices from the market survey were prioritised.

The procedure determining the equipment unit price was:

1. The price from the market survey was considered first;
2. The prices in the market survey were collected from a minimum of three suppliers, where possible. The surveyed prices were averaged to provide one unit price from the market;
3. Comparison of the market survey prices were compared by the rates of the equipment given by MTD; and,
4. If the equipment was not available in the market; the international price was searched for and the cost of transport, import duties and profits factored in.

Table 2.5 Sources of equipment unit price

Priority	Source of Data
1.	Market Survey
2.	Mechanical and Transport Division (MTD)

2.4 Haulage Cost

Site location is a major parameter to determine the Unit Rate so that haulage cost to transport material or equipment should be carefully estimated. In this manual, haulage cost estimated using the criteria in Table 2.6.

The calculated total haulage cost is divided by given quantity of the work item and added to unit work price to get a Unit Rate of the work.

Table 2.6 Haulage price estimation

Type of Vehicle:	(specify)	
Vehicle price per hour (or dry hire rate) = A		Ksh/hr
Fuel price per hour B = (C/D)*E		Ksh/hr
Fuel cost per liter = C		Ksh/litre
Average fuel consumption rate = D		km/litre
Average speed during transport = E		km/hr
Driver wage per hour F = G/8hr		Ksh/hr
Driver wage per day = G		Ksh/day
Turnboy wage per hour H = I/8hr		Ksh/hr
Turnboy wage per day = I		Ksh/day
Total price per hour of transport J=A+B+F+H		Ksh/hr

2.5 Unit Quantity and Productivity

Unit quantity of material (the amount of material used per unit of work), labour productivity (the number of people required per unit of work), and machinery productivity (the number hours/days of machinery operation needed per unit of work) are determined with the following references:

- Standard Specification for Bridge Repair in Kenya;
- Standard drawings; and,
- Average productivity rates from site surveys and site experiences.

2.6 Indirect Work Costs

Indirect Work Costs are the costs related to management and administration. It is expressed as a percentage of Direct Work Cost.

Indirect work costs include the following items;

- Human resource management costs (e.g. recruiting, staff welfare, transportation, insurance, etc.);
- Site staff allowances;
- Management costs (e.g. site office maintenance, office equipment, communication, transportation, etc.);
- Safety measures; and,
- Social charges (e.g. local taxes, public charges and welfare).

2.7 Overheads and Profit

Overheads and profits are expressed as a percentage of the sum of Direct and Indirect Work Costs. Overheads and profit include the following items:

- Head office staff salaries and allowances;
- Head office management costs (e.g. office maintenance, office equipment, communication, transportation, etc.);
- Corporate social charges (e.g. insurance, tax and welfare, etc.);
- Research and development;
- Advertisement and publicity;
- Depreciation costs of fixed assets; and,
- Profit margin (bonuses, dividends to shareholders, internal reserves, etc.).

3 UNIT RATES LIST (NAIROBI)

No.	Work Category	Code	Work Item Name	Unit	Unit Rate (KSh)	Unit Rate - Indirect cost, overhead/profit included - (KSh)
1.1	Cleaning	10201	Cleaning of Girders	m ²	629	830
1.2		10202	Cleaning of Deck	m ²	333	440
1.3		10203	Cleaning of Substructure	m ²	924	1,220
2	Touch-up Painting	10300	Touch-up Painting	m ²	3,179	4,196
3	Epoxy Coating on Concrete Surfaces	10400	Epoxy Coating on Concrete Surfaces	m ²	1,099	1,450
4	Plastering	10500	Patching Repair with Concrete C30	m ³	84,029	110,919
5	Removal and Disposal of Obstructions from Structures Openings	10600	Removal and Disposal of Driftwoods and Plants	m ³	3,858	5,093
6	Partial Replacement of Stone Masonry	10700	Partial Replacement of Stone Masonry	m ³	3,849	5,081
7	Partial Replacement of Gabion Wire Mesh and/or Missing Stone	10800	Partial Replacement of Gabion Wire Mesh and/or Missing Stone	m ²	7,049	9,304
8	Epoxy Injection	10900	Epoxy Injection	m	4,844	6,394
9	Patching	11000	Patching Repair with Concrete C30 (With Formwork)	m ³	95,117	125,555
10	Caulking	11100	Caulking (Active cracks)	m	6,191	8,173
11	Carbon Fibre Sheet Bonding to Deck Slab	11200	Carbon Fibre Sheet Bonding to Deck Slab	m ²	11,731	15,484
12.1	Steel Plate Bonding	11301	Steel Plate Bonding (Injection Method)	m ²	15,580	20,566
12.2	Steel Plate Bonding	11302	Steel Plate Bonding (Pressure attaching method)	m ²	42,617	56,254
13	Partial Deck Slab Replacement	11400	Partial Deck Slab Replacement	m ³	56,586	74,693
14.1	Waterproofing on Deck Slab	11501	Waterproofing on Deck Slab (Rubberized Membrane)	m ²	5,617	7,415
14.2	Waterproofing on Deck Slab	11502	Waterproofing on Deck Slab (Asphalt Compound Membrane)	m ²	7,826	10,331
15	Fast Setting Concrete for Continued Deck Slab	11600	Fast Setting Concrete for Continued Deck Slab	m ³	80,069	105,691
16	Protective Mortar	11700	Protective Mortar	m ²	22,194	29,296
17	Protective Coating	11800	Protective Coating	m ²	932	1,231
18	Recasting Concrete / Grout	11900	Recasting Concrete / Grout	m ³	95,503	126,064
19.1	Carbon Fibre Sheet / Plate Bonding to Concrete Girder	12001	Carbon Fibre Sheet Bonding to Concrete Girder (Carbon fibre sheet, Whole Area)	m ²	24,810	32,750
19.2	Carbon Fibre Sheet / Plate Bonding to Concrete Girder	12002	Carbon Fibre Sheet Bonding to Concrete Girder (Carbon fibre sheet, Grid)	m ²	20,516	27,081
19.3	Carbon Fibre Sheet / Plate Bonding to Concrete Girder	12003	Carbon Fibre Plate Bonding to Concrete Girder (Carbon fibre plate)	m ²	15,962	21,069
20	Jacketing with Concrete	12100	Jacketing with Concrete	m ³	182,087	240,355

No.	Work Category	Code	Work Item Name	Unit	Unit Rate (KSh)	Unit Rate - Indirect cost, overhead/profit included - (KSh)
21	Repainting	12200	Repainting	m ²	3,689	4,869
22	Steel Plate Adding	12300	Steel Plate Adding	m ²	83,239	109,876
23	Carbon Fibre Plate Bonding	12400	Carbon Fibre Plate Bonding	m ²	15,881	20,963
24	Tightening / Retightening of High-Tension Bolt	12500	Tightening / Retightening of High-Tension Bolt	Number	1,374	1,814
25	Anti-Corrosion Paint	12600	Anti-Corrosion Paint	m ²	4,964	6,552
26	Asphaltic Plug Joint	12700	Asphaltic Plug Joint	m	10,544	13,917
27	Replacement of Expansion Joint	12800	Replacement of Expansion Joint	m	196,086	258,834
28.1	Replacement of Bearing	12901	Replacement of Bearing - Steel Type	Number of Bearing	1,828,905	2,414,155
28.2	Replacement of Bearing	12902	Replacement of Bearing - Elastomeric Type	Number of Bearing	224,629	296,511
29	Extension of Bearing Seat	13000	Extension of Bearing Seat	m ³	55,979	73,893
30.1	Jack up Girder	13101	Jack up Girder (concrete girder)	No. of Jacks	2,142,650	2,828,298
30.2	Jack up Girder	13102	Jack up Girder (Steel)	No. of Jacks	2,142,650	2,828,298
31	Repainting Steel Bearing	13200	Repainting Steel Bearing	m ²	3,348	4,420
32	Slope Protection with Foundation Supported by Piles	13300	Slope Protection with Foundation Supported by Piles	m ²	15,535	20,507
33	Gabion Mattress	13400	Gabion Mattress	m ²	7,393	9,759
34	Masonry Slope Protection Repair	13500	Slope Patching	m ²	10,383	13,705
35	Nylon Fibre Gabion	13600	Nylon Fibre Gabion	m ³	6,485	8,560
36	Major Repair Method in Steel Bridges	13800	Stop hole	No. of holes	166	219
37	Major Repair Method in Steel Bridges	13900	Repair of heat damage on steel bridge	m ²	105,234	138,909
38	Timber Bridge	14000	Repair of Splitting of Timber Sections by Split Banding	Number	4,222	5,573
39	Timber Bridge	14100	Repair of Severely Split Timber by Anti-Split Bolt	set	55,009	72,612
40.1	Timber Bridge	14200	Repairing Splitting Timber Stringer (Replacement)	m	4,527	5,976
40.2	Timber Bridge	14300	Repairing Splitting Timber Stringer (Relieving)	m	13,552	17,889
41	Timber Bridge	14400	Repairing Split and Rotten Corbels	Number	70,398	92,925
42	Timber Bridge	14500	Replacing Severely Split Spiking Planks	m	1,942	2,563
43	Timber Bridge	14600	Replacing Timber Crosshead/Cap Wales/ Half Caps	Number	719,909	950,280
44	Timber Bridge	14700	Repairing Timber Deck	m ²	1,925	2,541
45	Timber Bridge	14800	Repairing Timber Kerbs	m	2,548	3,363
46	Replacing Timber Corbels	14400	Replacing Timber Corbels	Number	70,398	92,925
47	Timber Bridge	14900	Installation of Flashing	Number	1,509	1,992
48	Repair of Masonry Bridges	15000	Repointing Stonework and Replacing Stonework	m ²	2,939	3,880
49	Repair of Masonry Bridges	15100	Repair of Split or Cracked Blocks or Mortar	piece	111	147
50	Repair of Masonry Bridges	15200	Repair of Bulging Sidewall (Spandrel Wall)	m ²	7,679	10,136

No.	Work Category	Code	Work Item Name	Unit	Unit Rate (KSh)	Unit Rate - Indirect cost, overhead/profit included - (KSh)
51.1	Repair of Masonry Bridges	15300	Stabilising Abutment or Wing Wall Movement (From the top)	Number	287,345	379,295
51.2	Repair of Masonry Bridges	15350	Stabilising Abutment or Wing Wall Movement (From the side)	Number	287,442	379,423
52	Repair of Masonry Bridges	15400	Repair Arch Cracking	m	5,854	7,727
53	Major Repair Methods in Underpinning Foundations	15500	Pit or Mass Concrete Underpinning	m ³	457,413	603,785
54	Major Repair Methods in Underpinning Foundations	15600	Pile Underpinning	Number	915,274	1,208,162
55.1	Major Repair Methods in Underpinning Foundations	15700	Jack Pile Underpinning	Number	358,567	473,308
55.2	Major Repair Methods in Underpinning Foundations	15750	Jack Pile Underpinning	Number	231,880	306,082
56	Major Repair Methods in Underpinning Foundations	15800	Root or Angle Piling Underpinning	Number	850,004	1,122,005
57	Major Repair Methods in Underpinning Foundations	15900	Underpinning Columns/Piers/Piles	Number	53,346	70,417
58	Major Repair Methods in Underpinning Foundations	16000	Underpinning Columns/Piers/Piles	Number	123,620	163,179
59.1	Major Repair Methods in Underpinning Foundations	16100	Mud Jacking (Slab Jacking) Repair Method	m ²	397	524
59.2	Major Repair Methods in Underpinning Foundations	16150	Mud Jacking (Slab Jacking) Repair Method	m ³	7,720	10,191
60.1	Major Repair Methods in Underpinning Foundations	16200	Polyurethane Concrete Raising Method	m ²	731	965
60.2	Major Repair Methods in Underpinning Foundations	16250	Polyurethane Concrete Raising Method	m ³	179,060	236,359
61	Repair/Restoration of Protection Works	16300	Jacketing	m ³	513,948	678,411
62	Repair/Restoration of Protection Works	16400	Grassing	m ²	245,811	324,471
63	Repair/Restoration of Protection Works	16500	Stone Pitching/Revetment	m ²	213,990	282,467
64	Repair/Restoration of Protection Works	16600	Reinstatement of Damaged or Scoured River Bed Level using Groundsill	m ²	62,728	82,801
65	Under Water Repairs	16700	Pressure Injection of Cracks Underwater	m	4,481	5,915
66	Under Water Repairs	16800	Under Water Concrete Repairs	m ³	104,979	138,572
67	Under Water Repairs	16900	Under Water Concrete Repairs	m	74,717	98,626

APPENDICES

APPENDIX A: WORK ITEMS AND CODING

No.	Work Category	Code	Work Item Name	Unit	Description
1.1	Cleaning	10201	Cleaning of Girders	m ²	Remove debris on the girder surfaces by sweeping, shovelling and/or high-pressure water/air or other mechanical devices.
1.2		10202	Cleaning of Deck	m ²	Remove manually and/or mechanically debris on top, sides and underneath the bridge deck and stairs on footbridges including expansion joints and drainage systems.
1.3		10203	Cleaning of Substructure	m ²	Remove manually and/or mechanically debris on the bearings, bearing seats, exposed surfaces of the abutments and piers.
2	Touch-up Painting	10300	Touch-up Painting	m ²	Prepare the affected steel surface areas, collect, and store all paint debris, apply primer and undertake touch-up painting.
3	Epoxy Coating on Concrete Surfaces	10400	Epoxy Coating on Concrete Surfaces	m ²	Clean cracks on concrete surfaces of widths less than 0.3mm, apply epoxy sealant of 50 mm width(s) stripes and cure.
4	Patching	10500	Patching Repair with Concrete C30	m ³	Remove defective concrete, clean concrete and/or rebar surfaces, apply epoxy bonding agent to concrete and rebar, place Concrete Class 30 and cure.
5	Removal and Disposal of Obstructions from Structures Openings	10600	Removal and Disposal of Driftwoods and Plants	m ³	Manually or mechanically remove driftwoods and plants around the inlets and outlets of structures, and cart to spoil (designated area).
6	Partial Replacement of Stone Masonry	10700	Partial Replacement of Stone Masonry	m ³	Remove all the loose masonry stone and mortar, prepare the resultant surface and lay the masonry stones with cement mortar and cure.
7	Partial Replacement of Gabion Wire Mesh and/or Missing Stone	10800	Partial Replacement of Gabion Wire Mesh and/or Missing Stone	m ²	Restore damaged section of the gabion wire mesh and replace the missing stones.
8	Epoxy Injection	10900	Epoxy Injection	m	Clean cracks on concrete surfaces, install pipe fittings, seal cracks at the surface, fitting of injector and inject the epoxy resin and cure.
9	Patching	11000	Patching Repair with Concrete C30 (With Formwork)	m ³	Remove defective concrete, clean concrete and/or rebar surfaces, fix formwork, apply epoxy bonding agent to concrete and rebar, place Concrete Class 30 and cure.
10	Caulking	11100	Caulking (Active cracks)	m	Clean the active cracks on the concrete surface, prepare for caulking, drill holes and fix injection pipes, inject flexible epoxy grout and cure.
11	Carbon Fiber Sheet Bonding to Deck Slab	11200	Carbon Fiber Sheet Bonding to Deck Slab	m ²	Prepare concrete surface, apply primer and epoxy resin for undercoat, install transverse and/or longitudinal layer(s) of carbon fibre sheet and protect.
12.1	Steel Plate Bonding	11301	Steel Plate Bonding (Injection Method)	m ²	Prepare the surface, set up steel plate on the slab, seal the plate, inject epoxy resin, cure and paint.
12.2	Steel Plate Bonding	11302	Steel Plate Bonding (Pressure attaching method)	m ²	Prepare the surface, set up steel plate on the slab, seal the plate, inject epoxy resin, cure and paint.
13	Partial Deck Slab Replacement	11400	Partial Deck Slab Replacement	m ³	Remove the deteriorated concrete, clean up the substrate and reinforcement, set up formwork, place of new rebar and concrete including curing and removal of formwork.
14.1	Waterproofing on Deck Slab	11501	Waterproofing on Deck Slab (Rubberized Membrane)	m ²	Prepare leaking deck surface, apply primer and subsequent three coats of rubberized membrane (basecoat, intercoat, top coat), apply tack coat; provide, place and compact Type I asphaltic concrete.

No.	Work Category	Code	Work Item Name	Unit	Description
14.2	Waterproofing on Deck Slab	11502	Waterproofing on Deck Slab (Asphalt Compound Membrane)	m ²	Prepare leaking deck surface, apply primer, place melted asphaltic compound inclusive of silica sand protection, cure, place and compact Type I asphaltic concrete.
15	Fast Setting Concrete for Continued Deck Slab	11600	Fast Setting Concrete for Continued Deck Slab	m ³	Remove defective deck slab concrete and its adjacent surfaces to its full depth, set up formworks, clean the existing rebar (and place additional longitudinal/transverse rebar), apply epoxy resin to prepared surface, place fast-setting mortar and cure.
16	Protective Mortar	11700	Protective Mortar	m ²	Prepare concrete surface, provide, mix and apply Polymer Cement Mortar (PCM) emulsion and Lithium Nitrite; and cure.
17	Protective Coating	11800	Protective Coating	m ²	Prepare the surface, provide, mix and apply three layers of acryl urethane protective coating.
18	Recasting Concrete / Grout	11900	Recasting Concrete / Grout	m ³	Remove the damaged concrete, prepare exposed concrete and rebar, apply bonding agent to the prepared surface, fix formwork, place cement-sand grouting mortar, cure and dismantle formwork.
19.1	Carbon Fibre Sheet / Plate Bonding to Concrete Girder	12001	Carbon Fibre Sheet Bonding to Concrete Girder (Carbon fibre sheet, Whole Area)	m ²	Prepare concrete surface, apply primer, adjust unevenness with putty, apply epoxy resin for undercoat, install two layers of carbon fibre sheet including the overcoating in between and protect the surface.
19.2	Carbon Fibre Sheet / Plate Bonding to Concrete Girder	12002	Carbon Fibre Sheet Bonding to Concrete Girder (Carbon fibre sheet, Grid)	m ²	Prepare concrete surface, apply primer, adjust unevenness with putty, apply epoxy resin for undercoat, install two layers of carbon fibre sheet grid (full lining of 50 m ² or more, to be reinforced per bridge) including the overcoating in between and protect the surface.
19.3	Carbon Fibre Sheet / Plate Bonding to Concrete Girder	12003	Carbon Fibre Plate Bonding to Concrete Girder (Carbon fibre plate)	m ²	Prepare concrete surface, apply primer, adjust unevenness with putty, apply epoxy resin and pressure-attach the carbon fibre plate and protect the surface.
20	Jacketing with Concrete	12100	Jacketing with Concrete	m ³	Remove the deteriorated concrete, add new rebar, set-up formwork, place, compact C30/30 concrete, cure and dismantle formwork.
21	Repainting	12200	Repainting	m ²	Prepare the deteriorated steel surface (for 1st and 2nd grade) and fill the voids with epoxy putty, apply one layer of primer, two layers of polyurethane aluminium paint and record the repainting details on the girder web.
22	Steel Plate Adding	12300	Steel Plate Adding	m ²	Prepare and treat steel surface, drill holes for high tension bolt (HTB), assemble flat and angular plate, apply epoxy caulking to fill the voids, tighten the HTB, paint and record the painting details on the steel member.
23	Carbon Fibre Plate Bonding	12400	Carbon Fibre Plate Bonding	m ²	Prepare steel plate surface, adjust unevenness with putty, apply epoxy resin as undercoat, bond the carbon fibre plate to the existing steel where the section loss is more than 20%.
24	Tightening / Retightening of High-Tension Bolt	12500	Tightening / Retightening of High-Tension Bolt	Number	Remove loose or deteriorated High Tension Bolt (HTB), prepare the surface and clean the rust, fasten the loose or newly installed HTB and check using Rotation Angle Method, finish the surface preparation by applying grease and paint (Polyurethane Aluminium Paint and Anti-corrosion Paint).
25	Anti-Corrosion Paint	12600	Anti-Corrosion Paint	m ²	Prepare the corroded steel plate (sectional loss of more than 10% but less than 20%) with wire brush, disc grinder or sand blasting, mix paint with agitator (electric mixer with steel blades) and paint the surface.
26	Asphaltic Plug Joint	12700	Asphaltic Plug Joint	m	Dismantle existing asphaltic plug joint, chip existing concrete surface, install steel frame, drill anchor rebar holes, add rebar frame/anchor, place and compact 1st Layer flexible asphalt (Type I), provide and install expansion sheet and add and compact 2nd layer of flexible asphalt (Type I).

No.	Work Category	Code	Work Item Name	Unit	Description
27	Replacement of Expansion Joint	I2800	Replacement of Expansion Joint	m	Cut existing concrete surface and chip off/dismantle existing expansion joint, provide and install the new expansion joint, place and compact C30/30 concrete and cure.
28.1	Replacement of Bearing	I2901	Replacement of Bearing - Steel Type	Number of Bearing	Dismantle existing bearing, chip the bearing base, cast new bearing base and provide and install new steel bearings.
28.2	Replacement of Bearing	I2902	Replacement of Bearing - Elastomeric Type	Number of Bearing	Dismantle existing bearing, chip the bearing base, cast new bearing base and provide and install new elastomeric bearings.
29	Extension of Bearing Seat	I3000	Extension of Bearing Seat	m ³	Chip the existing surface, drill and fit the horizontal anchors (core boring), fix new rebar including formwork, place, compact C30/30 concrete and cure.
30.1	Jack up Girder	I3101	Jack up Girder (concrete girder)	No. of Jacks	Provide necessary materials and equipment for jacking PC/RC girders, install the jacks, jack up the girders, carry out the required recommended repairs to completion and jack down the girders, dismantle the temporary jack supports and clean up the site.
30.2	Jack up Girder	I3102	Jack up Girder (Steel)	No. of Jacks	Provide necessary materials and equipment for jacking steel girders, install the jacks, jack up the girders, carry out the required recommended repairs to completion and jack down the girders, dismantle the temporary jack supports and clean up the site.
31	Repainting Steel Bearing	I3200	Repainting Steel Bearing	m ²	Prepare the defective steel bearing surface, apply primer (zinc-rich) and polyurethane aluminium paint (top coat epoxy resin).
32	Slope Protection with Foundation Supported by Piles	I3300	Slope Protection with Foundation Supported by Piles	m ²	Excavate the scoured area, drive the treated wooden pegs, provide and fix formwork, place, compact concrete foundation of mass concrete Class 20 and cure. Install gabion mattress complete with rock fill. Backfill, on slopes, with two layers gravel in layers of 150 mm, then provide, place grouted masonry stones and cure.
33	Gabion Mattress	I3400	Gabion Mattress	m ²	Excavate the scoured area, place filter fabric, install gabion mattress and backfill with stones (50 –150 mm).
34	Masonry Slope Protection Repair	I3500	Slope Patching	m ²	Remove loose material around the damaged masonry slope protection (extended minimum 500 mm), provide and compact 300 mm gravel in two layers of 150 mm thick each, provide and place the masonry stone including grouting mortar and cure.
35	Nylon Fibre Gabion	I3600	Nylon Fibre Gabion	m ³	Provide and place boulders into the specified nylon fibre gabion bags, mechanically transport and place the filled nylon gabion bags to the scoured area as required.
36	Major Repair Method in Steel Bridges	I3800	Stop hole	No. of holes	Survey and measure the cracks on the steel, decide where to drill the holes, drill the existing plate and paint the holes.
37	Major Repair Method in Steel Bridges	I3900	Repair of heat damage on steel bridge	m ²	"First, identify and carefully remove the heat-damaged section using methods such as cutting or grinding. Next, prepare and install a new component to replace the removed section, ensuring it meets the original design specifications. Finally, complete the installation by welding, bolting, and painting the new component to match the original design, ensuring corrosion protection and structural integrity. This procedure focuses solely on the metal parts of the steel bridge. Concrete and road accessories are addressed separately according to the relevant specifications and cost estimation manual."
38	Timber Bridge	I4000	Repair of Splitting of Timber Sections by Split Banding	Number	Place and tighten clamps in appropriate locations.
39	Timber Bridge	I4100	Repair of Severely Split Timber by Anti-Split Bolt	set	Drilling of stringers, settlement of braces and secure with bolts.

No.	Work Category	Code	Work Item Name	Unit	Description
40.1	Timber Bridge	I4200	Repairing Splitting Timber Stringer (Replacement)	m	Removal of kerbs, decking and stringers and replacement of new stringers and kerbs.
40.2	Timber Bridge	I4300	Repairing Splitting Timber Stringer (Relieving)	m	Place a hydraulic jack on the crosshead, jacking it up, bolting timber packers, rolled steel joists(RSJ) or universal steel beams(UB) to the crosshead, and jacking it down.
41	Timber Bridge	I4400	Repairing Split and Rotten Corbels	Number	Removal of kerbs, decking, stringers and corbels and replacement of new corbels, stringers, decking and kerbs.
42	Timber Bridge	I4500	Replacing Severely Split Spiking Planks	m	Removal of kerbs, decking and spiking planks and replacement of new spiking planks, decking and kerbs.
43	Timber Bridge	I4600	Replacing Timber Crosshead/ Cap Wales/Half Caps	Number	Removal of kerbs, decking, stringers, corbels and half caps and replacement of new half caps, corbels, stringers, decking and kerbs.
44	Timber Bridge	I4700	Repairing Timber Deck	m ²	Removal of kerbs and decking and replacement of new decking and kerbs.
45	Timber Bridge	I4800	Repairing Timber Kerbs	m	Removal & replacement of kerbs.
46	Replacing Timber Corbels	I4400	Replacing Timber Corbels	Number	Removal of kerbs, decking, stringers and corbels and replacement of new corbels, stringers, decking and kerbs.
47	Timber Bridge	I4900	Installation of Flashing	Number	This pertains to preventive maintenance, which involves the application of flashing to areas that are susceptible to decay when exposed to moisture.
48	Repair of Masonry Bridges	I5000	Repointing Stonework and Replacing Stonework	m ²	Removal of defective masonry stones, cleaning surface of masonry, mixing of mortar, replacement of masonry stones and mortar placing and curing.
49	Repair of Masonry Bridges	I5100	Repair of Split or Cracked Blocks or Mortar	piece	Removal of defective portions, coating bonding agent, mortar mixing, mortar placing and curing.
50	Repair of Masonry Bridges	I5200	Repair of Bulging Sidewall (Spandrel Wall)	m ²	The repair of bulging sidewalls includes identifying and marking the affected area, removing bulging stones, installing tie rods with anchor plates and stone veneer, and repairing cracked mortar.
51.1	Repair of Masonry Bridges	I5300	Stabilising Abutment or Wing Wall Movement (From the top)	Number	The concrete plate and abutment wall are drilled, mud is injected using pressure, unevenness is corrected, and the drilled holes are filled with non-shrink mortar.
51.2	Repair of Masonry Bridges	I5350	Stabilising Abutment or Wing Wall Movement (From the side)	Number	The concrete plate and abutment wall are drilled, mud is injected using pressure, unevenness is corrected, and the drilled holes are filled with non-shrink mortar.
52	Repair of Masonry Bridges	I5400	Repair Arch Cracking	m	Clean the active cracks on the concrete surface, prepare for caulking, drill holes and fix injection pipes, inject flexible epoxy grout and cure.
53	Major Repair Methods in Underpinning Foundations	I5500	Pit or Mass Concrete Underpinning	m ³	Digging of a pit, concrete mix work, construction of temporary foundation of concrete, settlement of I-beams, digging of a pit, concrete mix work, concrete placing, removal of temporary foundation and filling with soil.
54	Major Repair Methods in Underpinning Foundations	I5600	Pile Underpinning	Number	The foundation is divided into sections of 1.2 to 1.5m, each addressed individually. A hole is made in a pier, a needle beam inserted, and bearing plates placed for support. Then, a foundation pit is excavated, and a new foundation is laid. This process is repeated for each section.
55.1	Major Repair Methods in Underpinning Foundations	I5700	Jack Pile Underpinning	Number	Jack Pile Underpinning is a method used to adjust the height level of a structure by driving piles into the supporting layer, and jacking up the structure to a predetermined height. This technique ensures stability and level adjustment of structures.
55.2	Major Repair Methods in Underpinning Foundations	I5750	Jack Pile Underpinning	Number	Additional piles for jack pile underpinning

No.	Work Category	Code	Work Item Name	Unit	Description
56	Major Repair Methods in Underpinning Foundations	I5800	Root or Angle Piling Underpinning	Number	Drilling with air flushed percussion auger, boring with concrete drilling equipment, installation of steel lining, concrete mix and concrete placing.
57	Major Repair Methods in Underpinning Foundations	I5900	Underpinning Columns/Piers/Piles	Number	Settlement of Jack piles / concrete bearing pad, hydraulic jacks, precast concrete beams / steel beams, precast concrete short beams, bolting and jack up.
58	Major Repair Methods in Underpinning Foundations	I6000	Underpinning Columns/Piers/Piles	Number	Settlement of Jack piles / concrete bearing pad, hydraulic jacks, precast concrete beams / steel beams, precast concrete short beams, bolting and jack up.
59.1	Major Repair Methods in Underpinning Foundations	I6100	Mud Jacking (Slab Jacking) Repair Method	m ²	Drilling of holes (0.5 m depth)
59.2	Major Repair Methods in Underpinning Foundations	I6150	Mud Jacking (Slab Jacking) Repair Method	m ³	Mud is injected using pressure.
60.1	Major Repair Methods in Underpinning Foundations	I6200	Polyurethane Concrete Raising Method	m ²	Drilling holes on the concrete slab (0.5 m deep)
60.2	Major Repair Methods in Underpinning Foundations	I6250	Polyurethane Concrete Raising Method	m ³	The concrete plate is drilled, polyurethane is injected using an injection gun, unevenness is corrected, and the drilled holes are filled with non-shrink mortar.
61	Repair/Restoration of Protection Works	I6300	Jacketing	m ³	Remove the deteriorated concrete, add new rebar, set-up formwork, place, compact Class 30 concrete, cure and dismantle formwork.
62	Repair/Restoration of Protection Works	I6400	Grassing	m ²	Survey and measure the cracks on the steel, decide where to drill the holes, drill the existing plate and paint the holes.
63	Repair/Restoration of Protection Works	I6500	Stone Pitching/Revetment	m ²	Provide stone pitching including grouting of ratio 1:4 cement to mortar.
64	Repair/Restoration of Protection Works	I6600	Reinstatement of Damaged or Scoured River Bed Level using Groundsill	m ²	Groundsill construction restores riverbeds damaged by erosion or scouring. It involves installing structures to stabilize and protect the riverbed, especially near bridges and weirs. This prevents further erosion and safeguards infrastructure, ensuring the river's stability and the surrounding area's safety.
65	Under Water Repairs	I6700	Pressure Injection of Cracks Underwater	m	Clean the active cracks on the concrete surface, prepare for caulking, drill holes and fix injection pipes, inject flexible epoxy grout and cure in the sheet pile wall.
66	Under Water Repairs	I6800	Under Water Concrete Repairs	m ³	Remove defective concrete, clean concrete and/or rebar surfaces, fix formwork, apply epoxy bonding agent to concrete and rebar, place Concrete Class 25 and cure in the sheet pile wall.
67	Under Water Repairs	I6900	Under Water Concrete Repairs	m	Cofferdam installation and removal

APPENDIX B: LABOUR, MATERIAL AND EQUIPMENT PRICE LIST FOR NAIROBI

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
1.	Labour	22.50.001	Support Staff		Person Day	604	Min. Wages Order, 2024
2.		22.50.002	Unskilled labour		Person Day	722	Min. Wages Order, 2024
3.		22.50.005	Artisans G2		Person Day	1,076	Min. Wages Order, 2024
4.		22.50.007	Skilled Labour: Overseer		Person Day	1,296	Min. Wages Order, 2024
5.		22.50.101	Skilled Labour: Operator		Person Day	1,824	Min. Wages Order, 2024
6.	Machinery	22.61.101	Truck Flat bed : 2.5 - 5 Tonnes		Hour	1,642	2025 Market Price
7.		22.61.102	Truck with crane	4t	Hour	2,500	2025 Market Price
8.		22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029	2025 Market Price
9.		22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		Hour	4,543	2025 Market Price
10.		22.63.101	Bulldozer	BD65EX	Hour	5,545	2025 Market Price
11.		22.63.102	Excavator	130-150hp	Hour	5,150	2025 Market Price
12.		22.63.103	Backhoe loader	130-150hp	Hour	3,673	2025 Market Price
13.		22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	1,570	2025 Market Price
14.		22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	2,607	2025 Market Price
15.		22.64.005	Pneumatic Roller: 10T, 130HP		Hour	3,102	2025 Market Price
16.		22.65.008	Road Marking Machine		Hour	1,535	2025 Market Price
17.		22.65.101	Melting pod (for paint)	200 - 350kg	Hour	1,533	2025 Market Price
18.		22.67.001	Grass cutter	150cm, 35hp	Hour	810	2025 Market Price
19.		22.67.004	Bitumen Sprayer H/Operated	200L	Hour	504	2025 Market Price
20.		22.67.005	Vibrator P/Tamper		Hour	806	2025 Market Price
21.		22.67.101	Milling machine	197hp	Hour	3,826	2025 Market Price
22.		22.67.102	Resurface machine	120hp	Hour	-	
23.		22.67.103	Road heater	63hp	Hour	-	
24.		22.67.104	Asphalt finisher	37H	Hour	5,000	2025 Market Price
25.		22.67.105	Power suction car	4t	Hour	5,733	
26.		22.67.106	Muddy water processing machine		Day	-	
27.		22.67.107	Boring machine	81kw	Day	-	2025 Market Price
28.		22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444	2025 Market Price
29.		22.67.109	Asphalt/Bitumen cutter		Hour	1,564	2025 Market Price
30.		22.67.110	Chip spreader		Hour	4,028	2025 Market Price
31.	Material	22.61.101	Truck Flat bed : 2.5 - 5 Tonnes		Hour	1,642	2025 Market Price
32.		22.61.102	Truck with crane	4t	Hour	2,500	2025 Market Price
33.		22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029	2025 Market Price
34.		22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		Hour	4,543	2025 Market Price
35.		22.63.101	Bulldozer	BD65EX	Hour	5,545	2025 Market Price
36.		22.63.102	Excavator	130-150hp	Hour	5,150	2025 Market Price
37.		22.63.103	Backhoe loader	130-150hp	Hour	3,673	2025 Market Price
38.		22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	1,570	2025 Market Price
39.		22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	2,607	2025 Market Price
40.		22.64.005	Pneumatic Roller: 10T, 130HP		Hour	3,102	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
41.	Material	22.65.008	Road Marking Machine		Hour	1,535	2025 Market Price
42.		22.65.101	Melting pod (for paint)	200 - 350kg	Hour	1,533	2025 Market Price
43.		22.67.001	Grass cutter	150cm, 35hp	Hour	810	2025 Market Price
44.		22.67.004	Bitumen Sprayer H/Operated	200L	Hour	504	2025 Market Price
45.		22.67.005	Vibrator P/Tamper		Hour	806	2025 Market Price
46.		22.67.101	Milling machine	197hp	Hour	3,826	2025 Market Price
47.		22.67.102	Resurface machine	120hp	Hour	-	2025 Market Price
48.		22.67.103	Road heater	63hp	Hour	-	2025 Market Price
49.		22.67.104	Asphalt finisher	37H	Hour	5,000	2025 Market Price
50.		22.67.105	Power suction car	4t	Hour	5,733	2025 Market Price
51.		22.67.106	Muddy water processing machine		Day	-	2025 Market Price
52.		22.67.107	Boring machine	81kw	Day	-	2025 Market Price
53.		22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444	2025 Market Price
54.		22.67.109	Asphalt/Bitumen cutter		Hour	1,564	2025 Market Price
55.		22.67.110	Chip spreader		Hour	4,028	2025 Market Price
56.		22.69.009	Fine aggregates(sand)		m ³	2,674	2025 Market Price
57.		22.70.001	Fine aggregates(stone dust)		m ³	2,733	2025 Market Price
58.		22.70.002	Graded aggregates (ballast)		m ³	2,440	2025 Market Price
59.		22.70.003	water		m ³	462	2025 Market Price
60.		22.70.004	Ordinary Portland Cement	42.5	Kg	24	
61.		22.70.006	Hydrated lime		Kg	26	
62.		22.71.012	Ribbed bars 16mm		t	104,435	2025 Market Price
63.		22.72.001	Precast concrete culvert - 450mm		m	1,954	2025 Market Price
64.		22.72.002	Precast concrete culvert - 600mm		m	2,661	2025 Market Price
65.		22.72.003	Precast concrete culvert - 900mm		m	4,643	2025 Market Price
66.		22.72.004	Precast concrete culvert - 1200mm		m	7,699	2025 Market Price
67.		22.72.016	Coarse aggregates(chippings) - 3/6mm		m ³	2,001	2025 Market Price
68.		22.72.017	Coarse aggregates(chippings) - 6/10mm		m ³	2,149	2025 Market Price
69.		22.72.018	Coarse aggregates(chippings) - 10/14mm		m ³	2,444	2025 Market Price
70.		22.72.019	Coarse aggregates(chippings) - 14/20mm		m ³	2,422	2025 Market Price
71.		22.72.020	Stone dust		m ³	2,091	2025 Market Price
72.		22.72.021	Gravel material (murrum)		m ³	1,492	2025 Market Price
73.		22.72.022	Hardcore		m ³	1,273	2025 Market Price
74.		22.72.023	Crusher run material (Graded crushed stone)		m ³	2,005	2025 Market Price
75.		22.72.024	Quarry waste material		m ³	2,114	2025 Market Price
76.		22.72.101	Precast concrete culvert - 300mm		m	1,289	2025 Market Price
77.		22.72.102	Stone		m ³	1,273	2025 Market Price
78.		22.72.103	Gully pot with grating		Set	12,724	2025 Market Price
79.		22.72.104	Invert block drain	600*330*355	No.	511	2025 Market Price
80.		22.72.105	Invert block drain	600*760*190	No.	843	2025 Market Price
81.		22.72.106	Side Slab concrete block	3'*9"*24"	No.	233	2025 Market Price
82.		22.72.107	Manhole cover slab	1220*150	No.	5,634	2025 Market Price
83.		22.72.108	Soil (soft)		m ³	833	2025 Market Price
84.		22.72.109	Soil (hard)		m ³	913	2025 Market Price
85.		22.73.002	Premix - AC Type I (cold)		m ³	20,570	2025 Market Price
86.		22.73.003	Premix - AC Type I (hot)		m ³	22,400	2025 Market Price
87.		22.73.004	Dense Bitumen Macadam		m ³	22,434	2025 Market Price
88.		22.73.006	Bituminous sealant (K-160)		litre	103,678	2025 Market Price
89.		22.73.012	MC 30 Bitumen		litre	133	2025 Market Price
90.		22.73.013	80/100 Pen grade bitumen		litre	113	2025 Market Price
91.		22.74.002	Fuel	Diesel	litre	171	2025 Market Price
92.		22.77.001	Mesh wire 8' x 4' gauge 18		m ²	780	2025 Market Price
93.		22.77.101	Gabion mesh	2m*1m = 2m ²	No.	3,385	2025 Market Price
94.		22.77.102	Gabion Mattress	10mm	m ²	2,967	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
95.	Material	22.77.103	Flat metal plate	1/16-1/18	m ²	968	2025 Market Price
96.		22.77.104	Steel pipe	2inch	m	629	2025 Market Price
97.		22.77.105	Bolts with nuts	8cm	Set	251	2025 Market Price
98.		22.77.106	Brackets		No	126	2025 Market Price
99.		22.77.107	Steel angle	125*5mm	kg	271	2025 Market Price
100.		22.77.108	Steel plate	450*3mm	kg	190	2025 Market Price
101.		22.77.109	Steel bollard	SGP. 5B. 125A	kg	378	
102.		22.77.110	Mesh wire	A142	m ²	277	2025 Market Price
103.		22.77.111	Cast iron manhole cover	600*450 heavy duty with frame	No.	11,783	2025 Market Price
104.		22.78.101	Cypress	for fixed deck	m ³	49,045	
105.		22.78.102	Wooden formwork panel		m ²	763	2025 Market Price
106.		22.79.003	Road marking paint yellow		litre	1,189	2025 Market Price
107.		22.79.004	Road marking paint white		litre	1,214	
108.		22.79.005	Thermoplastic paint yellow	premixed with primer and glass beads	Kg	452	2025 Market Price
109.		22.79.006	Thermoplastic paint white	premixed with primer and glass beads	Kg	424	2025 Market Price
110.		22.79.012	Reflective 'cat' eyes		No	827	
111.		22.79.013	Reflective mark posts	White PVC post 1400	No.	1,535	2025 Market Price
112.		22.79.101	Road marking paint black		litre	1,146	2025 Market Price
113.		22.79.104	Reflective paint		litre	1,458	2025 Market Price
114.		22.79.105	White paint		litre	771	2025 Market Price
115.		22.79.106	Black paint		litre	824	2025 Market Price
116.		22.79.107	Road Kerb	12.25*24.5	No.	410	2025 Market Price
117.		22.79.108	Road channel	9.8*12.25	No.	221	2025 Market Price
118.		22.79.109	Duct Pipe (PVC 150)		m	401	2025 Market Price
119.		22.79.110	Equipment for lead pipe jacking	196kN	Day	31,200	2025 Market Price
120.		22.79.111	Equipment for lead pipe jacking (fixing part)		Day	1,352	2025 Market Price
121.		22.79.112	Equipment for lead pipe jacking (moving part)		Day	104	2025 Market Price
122.		22.79.113	Equipment for Underground pipe jacking	196kN	Day	19,404	2025 Market Price
123.		22.79.114	Equipment for Underground pipe jacking (fixing part)		Day	12,480	2025 Market Price
124.		22.79.115	Equipment for Underground pipe jacking (moving part)		Day	9,148	2025 Market Price
125.		22.79.116	Water stopper		No.	2,417	2025 Market Price
126.		22.79.117	Concrete anchor		No.	237	2025 Market Price
127.		22.79.118	Water stop cement		Kg	194	2025 Market Price
128.		22.79.119	Aggregation(jacking)		kg	10	2025 Market Price
129.		22.79.120	Aggregation(washing)		kg	10	2025 Market Price
130.		22.79.121	Shank-rod	90mm	No.	294,948	2025 Market Price
131.		22.79.122	Driving-adapter		No.	1,575	2025 Market Price
132.		22.79.123	Drilling-Pipe		No.	51,228	2025 Market Price
133.		22.79.124	Ring-bit		No.	100,903	2025 Market Price
134.		22.79.125	Water-swivel		No.	94,250	2025 Market Price
135.		22.79.126	Cutter-set		No.	45,794	2025 Market Price
136.		22.79.127	Core-tube		No.	46,238	2025 Market Price
137.		22.79.128	Magnifying-bit		No.	501,191	2025 Market Price
138.		22.79.129	Earth bar	10*1500mm	No.	342	2025 Market Price
139.		22.79.130	Lighting pole	7.6m	No.	26,933	2025 Market Price
140.		22.79.131	Lighting pole	10.0m	No.	78,000	2025 Market Price
141.		22.79.132	Cable	for light	m	346	2025 Market Price
142.		22.79.133	Accessories	for light	Set	6,935	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
142.	Material	22.79.134	Lamp		No.	14,942	2025 Market Price
143.		22.79.135	Control panel		No.	37,406	2025 Market Price
144.		22.79.136	Cable	for control panel	m	1,146	2025 Market Price
145.		22.79.137	Accessories	for control panel	Set	40,796	2025 Market Price
146.		22.79.138	Meter		No.	5,474	2025 Market Price
147.		22.79.139	Grass		m ²	697	2025 Market Price
148.		22.79.140	Red soil		m ³	1,228	2025 Market Price
149.		22.79.141	Manure		m ³	4,629	2025 Market Price
150.		22.79.142	Warning triangular sign	600mm	No.	14,542	2025 Market Price
151.		22.79.143	Priority triangular sign	600mm	No.	14,542	2025 Market Price
152.		22.79.144	Standard informatory sign		No.	18,500	2025 Market Price
153.		22.79.145	Non-standard informatory sign	less than 1 m ²	No.	28,444	2025 Market Price
154.		22.79.150	Guardrail Beam	4m	No.	11,609	2025 Market Price
155.		22.79.151	Guardrail Post	140 mm dia, 6 gauge	m	4,741	2025 Market Price
156.		22.79.152	Bolts with nuts and washers (short)		No.	140	2025 Market Price
157.		22.79.153	Bolts with nuts and washers (long)		No.	190	2025 Market Price
158.		22.79.154	Fuel	Petrol	litre	185	2025 Market Price
159.		22.79.155	Pick up truck		Day	9,943	2025 Market Price
160.		22.79.156	Truck	2 ton	Day	9,943	2025 Market Price
161.		22.79.157	Thinner		litre	471	2025 Market Price
162.		22.79.158	Ordinary Portland Cement	22.5	Kg	14	2025 Market Price
163.		22.79.159	Pulveriser		Hour	5,000	2025 Market Price
164.		22.79.160	Hessian cloth		m ²	176	2025 Market Price
165.		22.79.161	K-160		litre	104	2025 Market Price
167.		22.79.162	Reflecting Glass Beads		kg	167	2025 Market Price
168.		22.79.163	Electricity		Kw/h	26	2025 Market Price
169.		22.79.164	Beam Straightener		Hour	11,088	2025 Market Price
170.		22.80.001	Generator	Petrol, 6KVA	day	N/A	2025 Market Price
171.		22.80.002	Water Pressure Machine	Electrical, 2700 PSI	day	N/A	2025 Market Price
172.	Machinery	Mach-001	Agitator (Electric Mixer with steel blade)	1725 BPM, Motor horsepower 1.5	Day	579	2025 Market Price
173.		Mach-002	Agitator (Electric Mixer with steel blade)	1725 BPM, Motor horsepower 1.5	No.	N/A	
174.		Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	48	2025 Market Price
175.		Mach-004	Air blower	Engine, Power supply or Rechargeable	No.	N/A	
176.		Mach-005	Air blower	Engine, Power supply or Rechargeable	No.	N/A	
177.		Mach-006	Air blower	Engine, Power supply or Rechargeable	No.	N/A	
178.		Mach-007	Air compressor	150CFM, 4250LPM	Day	N/A	
179.		Mach-008	Air duster gun with adjustable air flow and higher flow nozzle	For surface, preparation & epoxy injection	Day	N/A	
180.		Mach-009	Air duster gun with adjustable air flow and higher flow nozzle	For surface, preparation & epoxy injection	No.	N/A	
181.		Mach-010	Backhoe	"(01) Heap : 0.28 m ³ Flat pile : 0.2 m ³ "	Hour	6,125	2025 Market Price
182.		Mach-011	Backhoe	"(02) Heap : 0.45 m ³ Flat pile : 0.35 m ³ "	Hour	N/A	
183.		Mach-012	Backhoe	"(09) Heap : 0.8 m ³ Flat pile : 0.6 m ³ "	Hour	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
184.	Machinery	Mach-013	Blasting (Abrasive sand blaster)	Sand Blast Machine, Blast Polishing agent, Airblast gun and dust collector	Day	10,000	2025 Market Price
185.		Mach-014	Broom	Removing debris	No.	N/A	2025 Market Price
186.		Mach-015	Brush (Wire brush)	Wire brush	No.	160	2025 Market Price
187.		Mach-016	Chisel (Handy power Chisel)	Operating pressure=6.2 bar, air requirement=280l/min, impact rate=3000BPM	No.	N/A	
188.		Mach-017	Chisel (Handy power Chisel)	Operating pressure=6.2 bar, air requirement=280l/min, impact rate=3000BPM	Day	206	2025 Market Price
189.		Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke= 166mm, Air Consumption = 1.5m³/min, BPM= 1050	Day	7,500	2025 Market Price
190.		Mach-019	Concrete Breaker	Weight = 30 kg, Piston Stroke= 144mm, Air Consumption = 1.8m³/min, BPM= 1200	Day	N/A	
191.		Mach-020	Concrete Breaker	Air Consumption=3.5-3.7m³/min, Discharge Pressure = 0.7MPa	Day	N/A	
192.		Mach-021	Concrete Cutter / Concrete cutting grinder	Blade diameter 55-140 cm	Day	10,166	2025 Market Price
193.		Mach-022	Concrete Cutter / Concrete cutting grinder	Horizontal blade diameter 60-100 cm	Day	N/A	
194.		Mach-023	Concrete drilling machine		Day	5,999	2025 Market Price
195.		Mach-024	Concrete drilling machine		No.	N/A	2025 Market Price
196.		Mach-025	Concrete mixer	30 litres	Day	5,500	
197.		Mach-026	Concrete mixer		No.	N/A	
198.		Mach-027	Concrete vibrator	Electrical or engine	Day	2,167	2025 Market Price
199.		Mach-028	Core drilling machine with core drill bit	□26-130 mm	Day	6,250	2025 Market Price
200.		Mach-029	Crane (Crawler crane)	(01) 16 t	Hour	N/A	
201.		Mach-030	Crane (Crawler crane)	35t	Hour	N/A	
202.		Mach-031	Crane (Crawler crane)	(02) 40 t	Hour	N/A	
203.		Mach-032	Crane (Crawler crane)	(03) 50 t	Hour	N/A	
204.		Mach-033	Crane (Crawler crane)	(04) 60 t	Hour	N/A	
205.		Mach-034	Crane (Crawler crane)	(05) 70 t	Hour	N/A	
206.		Mach-035	Crane (Crawler crane)	(06) 80 t	Hour	N/A	
207.		Mach-036	Crane (Crawler crane)	(07) 90 t	Hour	N/A	
208.		Mach-037	Crane (Crawler crane)	(08) 100 t	Hour	N/A	
209.		Mach-038	Crane (Crawler crane)	(09) 120 t	Hour	N/A	
210.		Mach-039	Crane (Crawler crane)	(10) 200 t	Hour	N/A	
211.		Mach-040	Crane (Rough terrain crane)	(04) 16 t	Hour	23,400	2025 Market Price
212.		Mach-041	Crane (Rough terrain crane)	(05) 20 t	Hour	N/A	
213.		Mach-042	Crane (Rough terrain crane)	(06) 25 t	Hour	N/A	
214.		Mach-043	Crane (Rough terrain crane)	55t	Hour	N/A	
215.		Mach-044	Crane (Rough terrain crane)	(11) 65 t	Hour	N/A	
216.		Mach-045	Crane (Rough terrain crane)	90t	Hour	N/A	
217.		Mach-046	Disc grinder equipment	GWS 24-230H	Day	N/A	
218.		Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875	2025 Market Price
219.		Mach-048	Disc grinder equipment		Day	N/A	
220.		Mach-049	Disc grinder equipment	GWS 24-230H	No.	N/A	
221.		Mach-050	Disc grinder equipment	GWS 26 - 230H	No.	N/A	
222.		Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193	2025 Market Price
223.		Mach-052	Disc grinder disc	(02) Outer diameter 150mm	No.	N/A	
224.		Mach-053	Disc grinder disc	(03) Outer diameter 180mm	No.	N/A	
225.		Mach-054	Drain pipe	110 mm	No.	2,400	2025 Market Price
226.		Mach-055	Drain pipe	160 mm	No.	N/A	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
227.	Machinery	Mach-056	Dump truck	(02) 4 t	Hour	2,417	2025 Market Price
228.		Mach-057	Dump truck with crane	(02) 4 t, 2.9 t crane	Hour	3,542	2025 Market Price
229.		Mach-058	Electric drill	(01) □14□- 32 mm	Day	350	2025 Market Price
230.		Mach-059	Epoxy injection	Cylinder 50 cc	No.	278	
231.		Mach-060	Epoxy injection	Electric pump, Output pressure= 1000psi	No.	N/A	
232.		Mach-061	Epoxy injection	Finishing, For setting repair material	kg	N/A	
233.		Mach-062	Epoxy injection	Infusion metal fittings	No.	369	2025 Market Price
234.		Mach-063	Epoxy injection	Measuring cup	No.	N/A	
235.		Mach-064	Epoxy injection	Pressurization rubber band	No.	N/A	
236.		Mach-065	Epoxy injection pump with accessories		No.	N/A	
237.		Mach-066	Formwork (Steel Formwork)	Corner angle form	Day	N/A	
238.		Mach-067	Formwork (Steel Formwork)	Corner form	Day	N/A	
239.		Mach-068	Formwork (Steel Formwork)	Flat	Day	N/A	
240.		Mach-069	Formwork (Steel Formwork)	Haunch form	Day	N/A	
241.		Mach-070	Gas burner	Torch	No.	N/A	
242.		Mach-071	Generator	(01) 5 kVA	Day	4,667	2025 Market Price
243.		Mach-072	Generator	(02) 15 kVA	Day	N/A	
244.		Mach-073	Generator	(03) 20 kVA	Day	N/A	
245.		Mach-074	Generator	(04) 25 kVA	Day	N/A	
246.		Mach-075	Generator	(05) 45 kVA	Day	N/A	
247.		Mach-076	Generator	(06) 100 kVA	Day	N/A	
248.		Mach-077	Generator	(07) 125 kVA	Day	N/A	
249.		Mach-078	Generator	(08) 150 kVA	Day	N/A	
250.		Mach-079	Generator	(09) 2.0kVA	Day	N/A	
251.		Mach-080	Hammer	Chipping hammer with bit (i.e. Hydraulic, Mechanical or Pneumatic)	Day	N/A	
252.		Mach-081	Hammer	Double face sledge hammers	No.	N/A	
253.		Mach-082	Hammer	Hand hammer	No.	1,033	2025 Market Price
254.		Mach-083	Hammer	Mallet	No.	N/A	
255.		Mach-084	Hammer	Nail hammer	No.	N/A	
256.		Mach-085	Hammer	Rubber mallet	No.	N/A	
257.		Mach-086	Hammer	Small	No.	N/A	
258.		Mach-087	Hammer	Test hammer	No.	N/A	
259.		Mach-088	Hammer	Wooden maul	No.	N/A	
260.		Mach-089	High pressure washer	4.9MPa	Day	4,500	2025 Market Price
261.		Mach-090	High pressure water blaster	8.0MPa, 10.0 liters/min.	m ²	N/A	
262.		Mach-091	High-frequency converter	3.0 kVA	No.	N/A	
263.		Mach-092	High-frequency generator	2.4-2.5 kVA	No.	N/A	
264.		Mach-093	High-frequency inverter	1.2-1.3 kVA	Day	N/A	
265.		Mach-094	High-frequency inverter	5.8/7.75kVA, 20-200/315/400A,frequency 60/50hz	No.	N/A	
266.		Mach-095	Hot metal spraying equipment		m ²	N/A	
267.		Mach-096	Hydraulic Jack	(01) 150t (1,471 kN)	Day	N/A	
268.		Mach-097	Hydraulic Jack	(02) 200t (1,961 kN)	Day	1,830	2025 Market Price
269.		Mach-098	Hydraulic Jack	(03) 250t (2,451 kN)	Day	N/A	
270.		Mach-099	Hydraulic Jack	(04) 320t (3,138 kN)	No.	N/A	
271.		Mach-100	Hydraulic Pump system	750 W	No.	N/A	
272.		Mach-101	Impact wrench (Special fastener for HTB.)	M16-24	Day	128	2025 Market Price
273.		Mach-102	Inspection (Ground penetrating Radar)	(01) 5□200mm	Day	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
274.	Machinery	Mach-103	Inspection (Inspection vehicle)	Trailer or Truck Mounted Bridge Inspection Units (8-22m)	Day	25,000	2025 Market Price
275.		Mach-104	Inspection (Reinforcing bar probe / Rebar detector)	Searching Depth=200 mm	Day	N/A	
276.		Mach-105	Inspection (Schmidt Hammer / Concrete rebound hammer)	10-60 MPa	Day	N/A	
277.		Mach-106	Inspection (X-ray penetrating equipment)		No.	N/A	
278.		Mach-107	Jack hammer	1250 BPM	Day	N/A	
279.		Mach-108	Jack hammer	2450 BPM	Day	N/A	
280.		Mach-109	Jack hammer concrete drill bit	3.4-28 mm	Day	N/A	
281.		Mach-110	Jack hammer concrete drill bit	4-30 mm	Day	N/A	
282.		Mach-111	Jack hammer concrete drill bit	3.4-28 mm	No.	N/A	
283.		Mach-112	Jack hammer concrete drill bit	4-30 mm	No.	N/A	
284.		Mach-113	Ladder (Expand ladder (Approaching work place))	Stepladder, h=2.5m	No.	N/A	
285.		Mach-114	Paint brush	Compound, glues, fiberglass, undercoating, grease, oil, paint and paint remover	No.	430	2025 Market Price
286.		Mach-115	Paint roller	Handy type	No.	N/A	
287.		Mach-116	Paint roller	Extension pole	Day	569	2025 Market Price
288.		Mach-117	Pavement Asphalt mini cooker	Asphalt mini cooker	Day	1,458	2025 Market Price
289.		Mach-118	Power disk cutter	Blade=22.2 - 35.56 mm	Day	N/A	
290.		Mach-119	Safety goggle	Protection against liquid splashes and dust.	No.	N/A	
291.		Mach-120	Sand paper	Water resisting	No.	N/A	
292.		Mach-121	Saw Blade	Circular Saw Blade=115 - 190 mm	No.	N/A	
293.		Mach-122	Saw Blade	Concrete saw Blade 300 mm	No.	6,789	2025 Market Price
294.		Mach-123	Saw Blade	Wood cutting Electric or Engine, Cutting length=39.5 cm	No.	N/A	
295.		Mach-124	Scaffolding	Angle steel pipe 100mm x 100mm x 3.2m	Month	N/A	
296.		Mach-125	Scaffolding	Angle steel pipe 100mm x 100mm x 3.2m	No.	N/A	
297.		Mach-126	Scaffolding	Base plate - pipe diameter=48.6mm	Month	N/A	
298.		Mach-127	Scaffolding	Brace	Month	N/A	
299.		Mach-128	Scaffolding	Bracket	Month	N/A	
300.		Mach-129	Scaffolding	Chain (03) d=6.0 mm, l=5m	Month	N/A	
301.		Mach-130	Scaffolding	Chain (03) d=6.0 mm, l=3-5m	No.	N/A	
302.		Mach-131	Scaffolding	Cuplock (L=2.4m)	Month	N/A	
303.		Mach-132	Scaffolding	Cuplock vertical 3.00m, 3.2mm (St52)	Month	N/A	
304.		Mach-133	Scaffolding	Cuplock vertical 2.50m, 3.2mm (St52)	Month	N/A	
305.		Mach-134	Scaffolding	Cuplock vertical 2.00m, 3.2mm (St52)	Month	N/A	
306.		Mach-135	Scaffolding	Cuplock vertical 1.50m, 3.2mm (St52)	Month	N/A	
307.		Mach-136	Scaffolding	Cuplock vertical 1.00m, 3.2mm (St52)	Month	N/A	
308.		Mach-137	Scaffolding	Fixed triple clamp (pipe diameter=48.6mm)(Forged Double coupler(1.5"x1.5")(Type I)	Month	N/A	
309.		Mach-138	Scaffolding	Vice clamp (pipe diameter=48.6mm)(Forged swivel coupler(1.5"x1.5")(Type I)	Month	N/A	
310.		Mach-139	Scaffolding	Guard post (03) 1219 mm, 2.3 kg	Month	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
311.	Machinery	Mach-140	Scaffolding	Guard rail	Month	N/A	
312.		Mach-141	Scaffolding	Jack base (250 mm, 3.9 kg)	Month	N/A	
313.		Mach-142	Scaffolding	Jack (460 mm, 4.9 kg)	Month	N/A	
314.		Mach-143	Scaffolding	Joint Pin 225 mm, 13, 0.55 kg	Month	N/A	
315.		Mach-144	Scaffolding	Joint pipe diameter=48.6mm	Month	N/A	
316.		Mach-145	Scaffolding	Movable scaffolding - Overall height=2969 mm, height of work platform=0.91-1.91 m, width=1.84 m, length=0.60 m	Month	N/A	
317.		Mach-146	Scaffolding	Net - Size = 15 mm	Month	N/A	
318.		Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000	2025 Market Price
319.		Mach-148	Scaffolding	Pipe Support	Month	N/A	
320.		Mach-149	Scaffolding	Pipe (01) I=1000-5500 mm, d=48.6 mm, t=2.4mm	Month	N/A	
321.		Mach-150	Scaffolding	(01) 1829 mm x 240, 500 o4 1050 mm	Month	N/A	
322.		Mach-151	Scaffolding	Platform / catwalk/walking board - 1219 mm x 240, 500 or 1050 mm	Month	N/A	
323.		Mach-152	Scaffolding	Platform / catwalk/walking board - 1.8m	Month	N/A	
324.		Mach-153	Scaffolding	Scissor lift (Hydraulic) H=12m	Day	N/A	
325.		Mach-154	Scaffolding	Simple vertical plumb (01) w=610 mm, h=1700 mm	Month	N/A	
326.		Mach-155	Scaffolding	Simple vertical plumb (02) w=762 mm, h=1700 mm	Month	N/A	
327.		Mach-156	Scaffolding	Stair guard rail (01) w=450 mm, h=1725 mm	Month	N/A	
328.		Mach-157	Scaffolding	Stair guard rail (02) w=650 mm, h=1725 mm	Month	N/A	
329.		Mach-158	Scaffolding	Steel stairs (01) Stair bay=1829mm, Stair height=1955mm, Stair length=2677mm, Stair width=450mm	Month	N/A	
330.		Mach-159	Scaffolding	Steel stairs (02) Stair bay=1829mm, Stair height=2000mm, Stair length=2710mm, Stair width=450mm	Month	N/A	
331.		Mach-160	Scaffolding	Steel stairs (03) Stair bay=2048mm, Stair height=2000mm, Stair length=2860mm, Stair width=450mm	Month	N/A	
332.		Mach-161	Scaffolding	Steel stepladder (07) h=1735mm, 17 kg	Month	N/A	
333.		Mach-162	Scaffolding	Steel stepladder (07) h=1735mm, 17 kg	No.	N/A	
334.		Mach-163	Scaffolding	U-shaped clamp - Fixed type	Month	N/A	
335.		Mach-164	Scaffolding	U-shaped clamp - Free type	No.	N/A	
336.		Mach-165	Scaffolding	Vertical Plumb (01) w=914 mm, h=1700 mm, 13.7 kg	Month	N/A	
337.		Mach-166	Scaffolding	Vertical Plumb (02) w=1219 mm, h=1524 mm, 16.7 kg	Month	N/A	
338.		Mach-167	Scaffolding	Vertical Plumb (03) w=1219 mm, h=1700 mm, 14.4 kg	Month	N/A	
339.		Mach-168	Scaffolding	Vertical Plumb (04) w=1219 mm, h=1700 mm, 15.6 kg	Month	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
340.	Machinery	Mach-169	Scaffolding	Vertical Plumb (05) w=1219 mm, h=1930 mm, 20.5 kg	Month	N/A	
341.		Mach-170	Scaffolding	Wood L=4.0m x t = 3.5 cm x w=24cm	Month	N/A	
342.		Mach-171	Scaffolding	Step Plate (01) 600 mm x 250 mm	Month	N/A	
343.		Mach-172	Scaffolding	Step Plate (02) 900 mm x 250 mm	Month	N/A	
344.		Mach-173	Scaffolding	Shore brace system (0 -3m height)	m ² / Month	N/A	
345.		Mach-174	Scaffolding	Shore brace system for slab (3m - 6m height)	m ² / Month	N/A	
346.		Mach-175	Scaffolding	Shore brace system for slab (6m - 12m height)	m ² / Month	N/A	
347.		Mach-176	Scraper	Stainless	No.	N/A	
348.		Mach-177	Shovel	"Round point or Squarir point, Removing debris"	No.	N/A	
349.		Mach-178	Torque wrench	(09) M16-25	No.	N/A	
350.		Mach-179	Torque wrench	(09) M16-24	Day	111	
351.		Mach-180	Trowel	Stainless steel	No.	N/A	
352.		Mach-181	Trowel (Engine)	Worker with power trowel tool finishing concrete floor, screed, smooth concrete surface / finisher	Day	N/A	
353.		Mach-182	Trowel (Engine)	Worker with power trowel tool finishing concrete floor, screed, smooth concrete surface / finisher	No.	N/A	
354.		Mach-183	Truckcrane	(02) 4.9 t	Hour	N/A	
355.		Mach-184	Truckcrane	(11) 120 t	Hour	N/A	
356.		Mach-185	Truckcrane	(12) 160 t	Hour	N/A	
357.		Mach-186	Truckcrane	(13) 200 t	Hour	N/A	
358.		Mach-187	Truck-mounted concrete pump	(01) Vertical reach 23.7m, 55-60m ³ /h	Day	113,080	2025 Market Price
359.		Mach-188	Vibratory compactor (Combined vibration roller) / finisher	(02) 2.4-2.6 t	Day	8,000	2025 Market Price
360.		Mach-189	Vibratory compactor (Combined vibration roller) / finisher	(04) 5-7 t	Day	N/A	
361.		Mach-190	Vibratory compactor (Combined vibration roller) / finisher	11-12 t	Day	N/A	
362.		Mach-191	Vibratory compactor (Combined vibration roller) / finisher	(06) 10.5-12 t	Day	N/A	
363.		Mach-192	Vibratory compactor (Vibration compactor rammer) / finisher	(01) 60-80 kg	Day	5,500	2025 Market Price
364.		Mach-193	Vibratory compactor (Vibration manual roller compactor)	(01) 0.5-0.6 t	Day	N/A	
365.		Mach-194	Vibratory compactor (Vibration manual roller compactor)	(04) 0.8-1.1 t	Day	N/A	
366.		Mach-195	Vibratory compactor (Vibration plate compactor) / finisher	(02) 70-80 kg	Day	5,833	2025 Market Price
367.		Mach-196	Water jet spray with hose for washing Bearing	24-27 Mpa	Day	N/A	
368.		Mach-197	Water jet spray for washing Bearing		Day	N/A	
369.		Mach-198	Water tank	5000 litres	Day	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
370.	Machinery	Mach-199	Water tank	5000 litres	No.	N/A	
371.		Mach-200	Welder (Alternating current arc welder machine)	(01) 300A	Day	N/A	
372.		Mach-201	Welder (Alternating current arc welder machine)	(02) 500A	Day	N/A	
373.		Mach-202	Arc welding machine	300 A	Day	3,750	2025 Market Price
374.		Mach-203	Welder (arc welding)	500 A	Day	N/A	
375.		Mach-204	Welding (Carbon dioxide metal welding machine)	500A	Day	N/A	
376.		Mach-205	Welding (Carbon dioxide metal welding machine)	500A	No.	N/A	
377.		Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280	2025 Market Price
378.		Mach-207	Welding rod oven / dryer	(03) 100 kg	No.	N/A	
379.		Mach-208	Winch	Baby hoist 150 - 200 kg	Day	N/A	
380.		Mach-209	Winch	Chain block (01) 1-3 t	Day	N/A	
381.		Mach-210	Winch	Lever block 0.75-3 t	Day	N/A	
382.		Mach-211	Slinging equipment	1.6 t-2.5 t	Day	N/A	
383.		Mach-212	Slinging equipment	3t-6.3t	Day	N/A	
384.		Mach-213	Wood	(01) Stiff/Hardwood (i.e. Mahogany), 9.0x9.0x400 mm	No.	N/A	
385.		Mach-214	Wood	(01) Stiff/Hardwood (i.e. Mahogany), 10.0x10.0x400 mm	No.	472	2025 Market Price
386.		Mach-215	Wooden Pegs	(12) Diameter 15 cm, Length 4.0 m	No.	6,613	2025 Market Price
387.		Mach-216	Treated Wooden Pegs	(12) Diameter 20 cm, Length 2.0 m	No.	3,306	2025 Market Price
388.		Mach-901	Chain Saw	Engine, 300-400mm	Day	N/A	
389.		Mach-902	Injection pump	Electric	Day	277	
390.		Mach-903	Injection pump	Electric	Month	N/A	
391.		Mach-904	Altitudes Mobile Vehicle	8m	Day	N/A	
392.		Mach-905	Altitudes Mobile Vehicle	9.9m	Day	19,307	2025 Market Price
393.		Mach-906	Altitudes Mobile Vehicle	12m	Day	N/A	
394.		Mach-907	Altitudes Mobile Vehicle	15m	Day	N/A	
395.		Mach-908	Altitudes Mobile Vehicle	17m	Day	N/A	
396.		Mach-909	Altitudes Mobile Vehicle	22m	Day	N/A	
397.		Mach-910	Altitudes Mobile Vehicle	23m	Day	N/A	
398.		Mach-911	Altitudes Mobile Vehicle	25m	Day	N/A	
399.		Mach-912	Altitudes Mobile Vehicle	27m	Day	N/A	
400.		Mach-913	Altitudes Mobile Vehicle	32m	Day	N/A	
401.		Mach-914	Power saw		Day	500	2025 Market Price
402.		Mach-921	Magnetic hole drilling machine	50MM 1200W	Day	858	2025 Market Price
403.		Mach-922	Pump		Day	6,242	2025 Market Price
404.		Mach-923	Air flushed percussion auger	(New Rotary Drill Air DTH Drilling Rig Machine)	hour	8,000	2025 Market Price
405.		Mach-924	Stool	Steel 2.03 x 2.03 x 86.10KG = UC	PC	32,718	2025 Market Price
406.		Mach-925	Generator	10kW Diesel	hour	5,000	2025 Market Price
407.		Mach-926	Vibratory Pile Driver		Day	54,000	2025 Market Price
408.		Mach-927	Arc air gouging equipment	Dimensions 245 mm x 450 mm x 610 mm	Day	2,049	2025 Market Price
409.		Mach-928	Electric heater	160kw Metal Heating Machine Induction Heater	Day	8,819	2025 Market Price
410.		Mach-929	Thermocouple/Infrared Thermometer		Day	355	2025 Market Price
411.		Mach-930	Fan		Day	146	2025 Market Price
412.		Mach-931	Water-cooled heat exchanger		Day	331	2025 Market Price
413.		Mach-932	Cooling tower		Day	3,234	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
414.	Machinery	Mach-933	Non-Destructive Testing Equipment	Ultrasonic testing devices	Day	3,929	2025 Market Price
415.		Mach-934	Non-Destructive Testing Equipment	Magnetic particle inspection equipment	Day	672	2025 Market Price
416.		Mach-935	Non-Destructive Testing Equipment	Radiographic testing equipment	Day	2,096	2025 Market Price
417.		Mach-936	Non-Destructive Testing Equipment	Dye penetrant inspection	Day	218,178	2025 Market Price
418.		Mach-937	Mechanical Testing Equipment	Tensile testing machines	Day	51,430	2025 Market Price
419.		Mach-938	Mechanical Testing Equipment	Hardness testers	Day	402	2025 Market Price
420.		Mach-939	Coating Inspection Tools	Adhesion testers	Day	2,401	2025 Market Price
421.		Mach-940	Coating Inspection Tools	Coating thickness gauges	Day	2,220	2025 Market Price
422.		Mach-941	Load Testing Equipment	Load cells	PC	79,871	2025 Market Price
423.		Mach-942	Load Testing Equipment	Strain gauges	PC	48,036	2025 Market Price
424.		Mach-943	Gas burner	Torch	Day	53	2025 Market Price
425.	Material	Mate-001	Admixture for consistency		kg	N/A	
426.		Mate-002	Air Entraining Agent		kg	N/A	
427.		Mate-003	Anchor bolts	Channel bolt	No.	N/A	
428.		Mate-004	Anchor bolts	Continuous thread stud	No.	1,054	2025 Market Price
429.		Mate-005	Anchor bolts	Eye bolt	No.	N/A	
430.		Mate-006	Anchor bolts	Hook bolt (1/2 inch x 4-1/2 inch - Wedge Anchor Zinc Plated Heavy Duty Fastener for Concrete)	No.	N/A	
431.		Mate-007	Anchor bolts	L-shape, with nut (260293 5/8 x 12-Inch Anchor Bolt)	No.	N/A	
432.		Mate-008	Aramid fiber sheet	Tensile strength=2060N/mm2 (3K Carbon Fiber Aramid Fabric Cloth Sheet Woven 180g/m2)	m2	N/A	
433.		Mate-009	Asphalt compound		kg	6,353	2025 Market Price
434.		Mate-010	Bearing (fixed)	1,500-2,000 kN	No.	1,689,449	2025 Market Price
435.		Mate-011	Bearing (fixed)	2,250-3,000 kN	No.	N/A	2025 Market Price
436.		Mate-012	Bearing (movable)	1,500-2,000 kN	No.	1,493,298	2025 Market Price
437.		Mate-013	Bearing (movable)	2,250-3,000 kN	No.	N/A	
438.		Mate-014	Carbon fiber Plate	400*500*2.5 mm	No.	N/A	
439.		Mate-015	Carbon fiber Plate	400*500*4.0 mm	No.	N/A	
440.		Mate-016	Carbon fiber sheet	400*500*4.5 mm	No.	N/A	
441.		Mate-017	Carbon fiber sheet	400*500*5.0 mm	No.	N/A	
442.		Mate-018	Checkered plate	for tempolary work	t	N/A	
443.		Mate-019	Chemical anchor	Film tube capsule	No.	N/A	
444.		Mate-020	Chemical anchor	Glass tube capsule	No.	3,408	2025 Market Price
445.		Mate-021	Coating remover	Alcohol-based organic solvent	liter / kg	N/A	
446.		Mate-022	Coating remover	Aqueous coating remover	liter / kg	N/A	
447.		Mate-023	Coating remover	Emulsion	liter / kg	N/A	
448.		Mate-024	Coating remover	Softening agent	liter / kg	N/A	
449.		Mate-025	Coating remover	Solvent-based	liter / kg	N/A	
450.		Mate-026	Compound	Ready-To-Use Joint Compound, Off-White, 1.75 pt	kg	6,282	2025 Market Price
451.		Mate-027	Concrete / Ready mixed concrete	Class 20	m ³	N/A	
452.		Mate-028	Concrete / Ready mixed concrete	Class 25	m ³	N/A	
453.		Mate-029	Concrete / Ready mixed concrete	Class 30	m ³	N/A	
454.		Mate-030	Concrete / Ready mixed concrete	Class 40	m ³	17,651	2025 Market Price
455.		Mate-031	Concrete anchor with steel bar	D10(1m) + Concrete Anchor(22.79.117)	No.	303	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
456.	Material	Mate-032	Concrete nail	D=2.77-4.57mm, L=38-90mm	kg	515	2025 Market Price
457.		Mate-033	Concrete surface treatment	Epoxy resin primer	liter / kg	N/A	
458.		Mate-034	Concrete surface treatment	Permeable ethylsilane	kg	N/A	
459.		Mate-035	Concrete surface treatment	Silane	kg	N/A	
460.		Mate-036	Concrete surface treatment	Silane and siloxane	liter / kg	N/A	
461.		Mate-037	Concrete surface treatment	Silicate	liter / kg	N/A	
462.		Mate-038	Hessian cloth	For concrete curing	m ²	105	2025 Market Price
463.		Mate-039	Emulsion	for special anti-corrosion paint	kg	N/A	
464.		Mate-040	Epoxy anchor bolt for jack base bracket	for jack up girder	No.	1,054	2025 Market Price
465.		Mate-041	Epoxy anchor bolt for jack base bracket	Epoxy anchor bolt 20mmø x 900mm	No.	N/A	
466.		Mate-042	Epoxy anchor bolt for jack base bracket	Epoxy anchor bolt 16mmø x 900mm	No.	N/A	
467.		Mate-043	Epoxy anchor bolt for jack base bracket	Epoxy anchor bolt 12mmø x 900mm	No.	N/A	
468.		Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching or plastering	kg	1,725	2025 Market Price
469.		Mate-045	Epoxy grout	for caulking	kg	N/A	
470.		Mate-046	Epoxy primer	for carbon fiber sheet bonding or plate bonding	kg	N/A	
471.		Mate-047	Epoxy putty	for carbon fiber sheet/steel plate bonding	kg	3,369	2025 Market Price
472.		Mate-048	Epoxy resin	for bonding coat to concret, or for epoxy coating on the crack, epoxy injection,	liter / kg	5,208	2025 Market Price
473.		Mate-049	Epoxy resin adhesive	for Bonding coat to concrete, grout, recasting concrete	liter / kg	8,097	2025 Market Price
474.		Mate-050	Epoxy Resin Based high performance anchoring mortar		litre	N/A	
475.		Mate-051	Epoxy resin coating (second coat)	Concrete surface treatment material□/ Surface covering material	liter / kg	3,879	2025 Market Price
476.		Mate-052	Epoxy resin coating (top coating / finish coating)	Concrete surface treatment material□/ Surface covering material	liter / kg	N/A	
477.		Mate-053	Epoxy sealant	for steel plate bonding, one-component	kg	3,100	2025 Market Price
478.		Mate-054	Epoxy zinc-rich primer	for repainting	kg	N/A	
479.		Mate-055	Expansion sheet	for Asphaltic plug joint	m ²	3,500	2025 Market Price
480.		Mate-056	Filter Fabric Sheet	under gabion mattress	m ²	148	2025 Market Price
481.		Mate-057	Flat plate and angular plate	L Shape Steel Flat Bracket with Powder Coating as Mending Plate, Right Angle Brackets, Connecting Brackets, L Strap. Corner Metal Plate with Holes, L Plate for Truss framing	No.	N/A	
482.		Mate-058	Flexible Asphalt (asphalt-rubber chip)		ton	52,260	2025 Market Price
483.		Mate-059	Formwork	Plywood formwork	No.	N/A	
484.		Mate-060	Gabion Mattress	Nylon fiber	No.	882	2025 Market Price
485.		Mate-061	Gas	Acethylene gas (03) 50.0 liter	No.	19,500	2025 Market Price
486.		Mate-062	Gas	Hydrogen gas bottle / cylinder	m ³	N/A	
487.		Mate-063	Gas	Oxygen gas bottle / cylinder	m ³	N/A	
488.		Mate-064	Gas	Propane gas bottle / cylinder	m ³	425	2025 Market Price
489.		Mate-065	Grout	Non shrinkage	kg	141	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
490.	Material	Mate-066	Grout Injection equipment and tools	Caulking Gun Cement Lime Pump Grouting Mortar Sprayer Applicator Grout Filling Tools	No.	N/A	
491.		Mate-067	Handy cordless LED work light		No.	N/A	
492.		Mate-068	Hardener	4 Kg (Tin Can)	kg	3,115	2025 Market Price
493.		Mate-069	High tension bolt (HTB, F10T)	(HTB, F10T) M16	Set	N/A	
494.		Mate-070	High tension bolt (HTB, F10T)	(HTB, F10T) M20	Set	N/A	
495.		Mate-071	High tension bolt (HTB, F10T)	(HTB, F10T) M22	Set	N/A	
496.		Mate-072	High tension bolt (HTB, F10T)	(HTB, F10T) M24	Set	N/A	
497.		Mate-073	High tension bolt (HTB, S10T)	(HTB, S10T) M16	Set	N/A	
498.		Mate-074	High tension bolt (HTB, S10T)	(HTB, S10T) M20	Set	393	2025 Market Price
499.		Mate-075	High tension bolt (HTB, S10T)	(HTB, S10T) M22	Set	N/A	
500.		Mate-076	High tension bolt (HTB, S10T)	(HTB, S10T) M24	Set	N/A	
501.		Mate-077	Masonry materials	Masonry gravel	t	1,273	2025 Market Price
502.		Mate-078	Mortar (Portland cement mortar)	Cement 1 : Sand 1	m ³	N/A	
503.		Mate-079	Mortar (Portland cement mortar)	Cement 1 : Sand 2	m ³	14,880	2025 Market Price
504.		Mate-080	Mortar (Portland cement mortar)	Cement 1 : Sand 3	m ³	12,174	2025 Market Price
505.		Mate-081	Mortar (Portland cement mortar)	Cement 1 : Sand 4	m ³	N/A	
506.		Mate-082	Mortar (Portland cement mortar)	Cement 1 : Sand 5	m ³	N/A	
507.		Mate-083	New Expansion Joint	Finger type & butt type	m	148,992	2025 Market Price
508.		Mate-084	Rubber Bridge expansion joint Model 200(Movement 50mm)	"1830mm*274mm*40mm*12mm, L=10-18m"	No.	N/A	
509.		Mate-085	Rubber Bridge expansion joint Model 400(Movement 102mm)	"1830mm*590mm*54mm*20mm, L=10-18m"	No.	N/A	
510.		Mate-086	Modular Bridge Expansion joint	"CGF-C-2 (See tab on modular bridge expansion), L=10-18m"	No.	N/A	
511.		Mate-087	Modular Bridge Expansion joint	"CGF-C-4 (See tab on modular bridge expansion), L=10-18m"	No.	N/A	
512.		Mate-088	Modular Bridge Expansion joint	"CGF-Z-2 (See tab on modular bridge expansion), L=10-18m"	No.	N/A	
513.		Mate-089	Nuts	High strength, Alloy, M6-24	No.	N/A	
514.		Mate-090	Paint	Base resin	kg	4,206	2025 Market Price
515.		Mate-091	Paint	Intermediate coat, epoxy resin	kg	3,879	2025 Market Price
516.		Mate-092	Paint	Primer, Zinc-rich	kg	3,693	2025 Market Price
517.		Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016	2025 Market Price
518.		Mate-094	Paint	Primer / under coating, phenolic resin	kg	N/A	
519.		Mate-095	Paint	Thinner	liter	N/A	
520.		Mate-096	Paint	Top coat, epoxy resin	kg	990	2025 Market Price
521.		Mate-097	Gabion wire mesh		m ²	N/A	
522.		Mate-098	Stone masonry		m ³	1,273	2025 Market Price
523.		Mate-099	PCM (Polymer Cement Mortar)		kg	272	2025 Market Price
524.		Mate-100	Plain hardened washers (zincification)	Various sizes M6 - M24	No.	N/A	
525.		Mate-101	Plain hardened washers (zincification)	M2 M2.5 M3 M4 M5 M6 M8 M10	No.	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
526.	Material	Mate-102	Plain hardened washers (zincification)	M12 M14 M16 M18	No.	N/A	
527.		Mate-103	Plain hardened washers (zincification)	M20(20mm DIN Metric 125 Flat Washer Zinc)	No.	N/A	
528.		Mate-104	Polymer cement mortar (PCM)	Patching / Plastering	m³	N/A	
529.		Mate-105	Portland cement	High early strength portland cement, 25kg	No.	N/A	
530.		Mate-106	Portland cement	Normal Portland cement, 25kg	No.	N/A	
531.		Mate-107	Portland cement	Portland blast-furnace slag cement, 25kg	No.	N/A	
532.		Mate-108	Portland cement	Super high early strength portland cement, 25kg	No.	N/A	
533.		Mate-109	Premixed type fast setting mortar	25 kg	No.	N/A	
534.		Mate-110	Rubber bearing	Fix	No.	N/A	
535.		Mate-111	Rubber bearing	Move	No.	N/A	
536.		Mate-112	Rubber bearing	Horizontal force dispersing	No.	N/A	
537.		Mate-113	Rubber bearing	Base isolation	No.	N/A	
538.		Mate-114	Rubber membrane	t= 1.14mm	m²	N/A	
539.		Mate-115	Sand bag	48 cm x 62 cm	No.	N/A	
540.		Mate-116	Sealant		kg	3,100	2025 Market Price
541.		Mate-117	Shrinkage-compensating mortar	25kg	No.	N/A	
542.		Mate-118	Silica fume	0.5 kg	No.	3	2025 Market Price
543.		Mate-119	Mild Steel Reinforcement Ribbed High Tensile Bars	D6	Kg	N/A	
544.		Mate-120	Mild Steel Reinforcement Ribbed High Tensile Bars	D8	Kg	N/A	
545.		Mate-121	Mild Steel Reinforcement Ribbed High Tensile Bars	D10	Kg	N/A	
546.		Mate-122	Mild Steel Reinforcement Ribbed High Tensile Bars	D12	Kg	N/A	
547.		Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116	2025 Market Price
548.		Mate-124	Mild Steel Reinforcement Ribbed High Tensile Bars	D20	Kg	119	2025 Market Price
549.		Mate-125	Mild Steel Reinforcement Ribbed High Tensile Bars	D25	Kg	N/A	
550.		Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	147	2025 Market Price
551.		Mate-127	Mild Steel Reinforcement Ribbed High Tensile Bars	D34	Kg	N/A	
552.		Mate-128	Mild Steel Reinforcement Ribbed High Tensile Bars	D38	Kg	N/A	
553.		Mate-129	Mild Steel Reinforcement Ribbed High Tensile Bars	D40	Kg	N/A	
554.		Mate-130	Mild Steel Reinforcement Ribbed High Tensile Bars	D48	Kg	N/A	
555.		Mate-131	Mild Steel Reinforcement Ribbed High Tensile Bars	D50	Kg	N/A	
556.		Mate-132	B.R.C Mesh Reinforcement type A	A252 3.95Kg/sm	m²	N/A	
557.		Mate-133	B.R.C Mesh Reinforcement type A	A142 2.22Kg/sm	m²	N/A	
558.		Mate-134	B.R.C Mesh Reinforcement type A	A198	m²	N/A	
559.		Mate-135	Steel plate	Cold rolling sheet metal	ton	190,314	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
560.	Material	Mate-136	Superplasticizer / plasticizer		kg	N/A	
561.		Mate-137	Tack coat	finish coat	t	N/A	
562.		Mate-138	Temporary light / lamp	Equivalent to 500W	No.	N/A	
563.		Mate-139	Temporary light stringer	10-light	No.	N/A	
564.		Mate-140	Temporary support material for jacking up motion	Steel Saddle	No.	1,140	2025 Market Price
565.		Mate-141	Water reducing agent		kg	N/A	
566.		Mate-142	Zinc coated steel	Plate (1.0x914x1829)	plate	N/A	
567.		Mate-901	Boulder	50-150 mm	m ³	1,000	2025 Market Price
568.		Mate-902	Carbon fiber sheet	200g/m2, tensile strength=3,400N/mm, t=0.111mm	m ²	2,877	2025 Market Price
569.		Mate-903	Carbon fiber sheet	300g/m2, tensile strength=3,400N/mm, t=0.167mm	m ²	N/A	
570.		Mate-904	Carbon fiber sheet	400g/m2, tensile strength=3,400N/mm, t=0.222mm	m ²	N/A	
571.		Mate-905	Carbon fiber sheet	600g/m2, tensile strength=3,400N/mm, t=0.333mm	m ²	N/A	
572.		Mate-906	Lithium Nitrite		kg	8,400	2025 Market Price
573.		Mate-907	Carbon fiber plate	GM512 t=1.2 x w=50mm	m	N/A	
574.		Mate-908	Carbon fiber plate	GM520 t=2.0 x w=50mm	m	22	2025 Market Price
575.		Mate-909	Carbon fiber plate	GM1012t=1.2 x w=100mm	m	N/A	
576.		Mate-910	Carbon fiber plate	HM512t=1.2 x w=50mm	m	N/A	
577.		Mate-911	Carbon fiber plate	HM520t=2.0 x w=50mm	m	N/A	
578.		Mate-912	Carbon fiber plate	HM1020t=2.0 x w=100mm	m	N/A	
579.		Mate-913	Suspended Scaffolding	Type A1, h < 1.5m	m ² /month	355	2025 Market Price
580.		Mate-914	Suspended Scaffolding	Type A2, h >= 1.5m	m ² /month	393	2025 Market Price
581.		Mate-915	Floor Sheet Protection	Floor	m ² /month	66	2025 Market Price
582.		Mate-916	Protection Shelf	Type B, Protection Shelf	m ² /month	42	2025 Market Price
583.		Mate-917	Wooden Protection	Type B, Wooden Protection	m ² /month	92	2025 Market Price
584.		Mate-918	Sheet Protection	Type B, Sheet Protection	m ² /month	35	2025 Market Price
585.		Mate-919	Middle Stage	Type C	m ² /month	38	2025 Market Price
586.		Mate-920	Middle Stage (Concrete Breaking)	Type D	m ² /month	293	2025 Market Price
587.		Mate-921	Protection Shelf(Oneside)	Type E, Sheet Protection	m ² /month	337	2025 Market Price
588.		Mate-922	Protection Shelf(Oneside)	Type E, Sheet and Wood Panel Protection	m ² /month	374	2025 Market Price
589.		Mate-923	Scaffolding around piers	Type F	m ² /month	15	2025 Market Price
590.		Mate-924	Scaffolding around piers	Type F, Sheet Protection	m ² /month	2	2025 Market Price
591.		Mate-925	Scaffolding around piers	Type F, Wood Panel Protection (Handrail)	m ² /month	1	2025 Market Price
592.		Mate-926	Scaffolding around piers	Type F, Sheet Protection (Handrail)	m ² /month	1	2025 Market Price
593.		Mate-927	Scaffolding around piers	Type F, Transform from Handrail to Protection Shelf	m ² /month	2	2025 Market Price
594.		Mate-928	Scaffolding around piers	Type F, Add Wood Panel Protection to Protection Shelf	m ² /month	4	2025 Market Price
595.		Mate-929	Scaffolding around piers	Type F, Add Sheet Protection to Protection Shelf	m ² /month	2	2025 Market Price
596.		Mate-930	Prefabricated scaffolding	Type G	m ² /month	259	2025 Market Price
597.		Mate-931	Suspended Scaffolding	Type H, for paint, h < 1.5m	m ² /month	207	2025 Market Price
598.		Mate-932	Suspended Scaffolding	Type I, for paint, h >= 1.5m	m ² /month	245	2025 Market Price
599.		Mate-933	Suspended Scaffolding	Type I, Protection Shelf	m ² /month	N/A	
600.		Mate-934	Suspended Scaffolding	Type I, Protection Shelf, Add Wood Panel Protection	m ² /month	148	2025 Market Price

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
601.	Material	Mate-935	Suspended Scaffolding	Type I, Protection Shelf, Add Wood Panel Protection (Both side)	m ² /month	186	2025 Market Price
602.		Mate-936	Suspended Scaffolding	Type I, Protection Shelf, Add Wood Panel Protection (One side)	m ² /month	N/A	
603.		Mate-937	Suspended Scaffolding	Type I, Protection Shelf, Add Sheet Protection (Both side)	m ² /month	64	2025 Market Price
604.		Mate-938	Suspended Scaffolding	Type I, Protection Shelf, Add Sheet Protection (One side)	m ² /month	N/A	
605.		Mate-939	Access scaffolding	Type K, Access scaffolding (S)	m/month	2,438	2025 Market Price
606.		Mate-940	Access scaffolding	Type K, Access scaffolding (M)	m/month	N/A	
607.		Mate-941	High strength, non-flow epoxy bedding and repair mortar		kg	1,451	2025 Market Price
608.		Mate-942	Rapid concrete hardener admixture		kg	800	2025 Market Price
609.		Mate-943	Elastomeric Bearing (fixed)	1,500-2,000 kN	No.	132,941	2025 Market Price
610.		Mate-944	Elastomeric Bearing (movable)	1,500-2,000 kN	No.	132,941	2025 Market Price
611.		Mate-951	Clamp	8"	PC	3,800	2025 Market Price
612.		Mate-952	Hardwood	13 m long, 8 inch diameter	piece	21,486	2025 Market Price
613.		Mate-953	Stringers	13 m long, 8 inch diameter	PC	21,486	2025 Market Price
614.		Mate-954	Timber packer	10" by 4" 10 m long (32.8 ft)	set	30,286	2025 Market Price
615.		Mate-955	RSJ or UB	610*229*101 10 m long	set	384,560	2025 Market Price
616.		Mate-956	Cobels	6" by 4" 2 m long (6.6 ft)	PC	3,307	2025 Market Price
617.		Mate-957	Spiking plank	6" by 4" 1 m long (3.3 ft)	m	1,653	2025 Market Price
618.		Mate-958	Half caps	13 m long, 8 inch diameter	PC	21,486	2025 Market Price
619.		Mate-959	Decking	6" by 4" 1 m long (3.3 ft)	m ²	1,652	2025 Market Price
620.		Mate-960	Kerbs (Timber)	(4" by 4") x 2	m	2,218	2025 Market Price
621.		Mate-961	Flashing	1 m x 1 m	PC	652	2025 Market Price
622.		Mate-962	Masonry stone	Dressed stone, 1 foot long.	PC	45	2025 Market Price
623.		Mate-963	Slurry	(soil and water)	m ³	5,640	2025 Market Price
624.		Mate-964	Non shrink mortar		kg	137	2025 Market Price
625.		Mate-965	Water		litre	0	2025 Market Price
626.		Mate-966	I-Beam	610x229x101 5 m long	PC	192,280	2025 Market Price
627.		Mate-967	Bearing sheet	8"x8"x3/4"	m ²	2,346	2025 Market Price
628.		Mate-968	Wood	6" by 4" 1 m long (3.3 ft)	m ²	2,162	2025 Market Price
629.		Mate-969	Steel toe	Assumed cone 0.2 m high and 0.3 m diameter	PC	14,050	2025 Market Price
630.		Mate-970	steel lining	Assumed diameter of 1 m and a length of 1 m; thickness of 16 mm	m	149,866	2025 Market Price
631.		Mate-971	Ribbed bars	16mm	Ton	112,693	2025 Market Price
632.		Mate-972	jack pile	Height of stool: 1 m, assumed diameter 300 mm, RC	No.	8,314	2025 Market Price
633.		Mate-973	Concrete bearing pad	0.4 x 0.5 x 0.4 RC	No.	1,694	2025 Market Price
634.		Mate-974	Precast concrete beams/steel beam	Assumed 5.0 x 0.2 x 0.45 m RC Beam	No.	11,914	2025 Market Price
635.		Mate-975	Precast concrete beams/steel beam	Assumed 2.5 x 0.2 x 0.45 m RC Beam	No.	5,957	2025 Market Price
636.		Mate-976	Precast concrete beams	Assumed 2.5 x 0.2 x 0.45 m RC Beam	PC	5,957	2025 Market Price
637.		Mate-977	Bolts & nuts	M24 1000 m long	Set	3,375	2025 Market Price
638.		Mate-978	Polyurethane		m ³	147,243	2025 Market Price
639.		Mate-979	Grass		m ²	697	2025 Market Price
640.		Mate-980	Stone	(22.72.022)	m ³	N/A	2025 Market Price
641.		Mate-981	Concrete block	3x2x1.5 m RC Block	PC	238,289	2025 Market Price
642.		Mate-982	Gouging Carbon		kg	1,250	2025 Market Price
643.		Mate-983	Insulating material		m ²	1,100	2025 Market Price
644.		Mate-984	Masonry block	200 x 200 x 400	piece	70	2025 Market Price
645.		Mate-985	Masonry block	304.8 x 133 x 200	piece	N/A	

No	Item	Code	Name	Type	Unit	Unit Price 2025 (KSh)	Source
646.	Material	Mate-986	Tie rod	D8	m	N/A	
647.		Mate-987	Tie rod	D10	m	N/A	
648.		Mate-988	Tie rod	D12	m	N/A	
649.		Mate-989	Tie rod	D16	m	N/A	
650.		Mate-990	Tie rod	D20	m	N/A	
651.		Mate-991	Tie rod	D25	m	454	2025 Market Price
652.		Mate-992	Tie rod	D32	m	N/A	
653.		Mate-993	Tie rod	D45	m	N/A	
654.		Mate-994	Tie rod	D54	m	N/A	
655.		Mate-995	Plastic sheath	D32 Polyvinyl Chloride (PVC)	m	N/A	
656.		Mate-996	Plastic sheath	D40 PVC	m	N/A	
657.		Mate-997	Plastic sheath	D50 PVC	m	155	2025 Market Price
658.		Mate-998	Plastic sheath	D60 PVC	m	N/A	
659.		Mate-999	Plastic sheath	D70 PVC	m	N/A	
660.		Mate-1000	Plastic sheath	D75 PVC	m	N/A	
661.		Mate-1001	Cover plate	200mm x 200mm x 20mm	m ²	2,386	2025 Market Price
662.		Mate-1002	Cover plate	300mm x 300mm x 30mm	m ²	N/A	
663.		Mate-1003	Sheet Pile	PU400x125(60kg/m)	ton	281,928	2025 Market Price
664.		Mate-1004	Sheet Pile	PU400x125(60kg/m)	ton/Day	940	2025 Market Price
665.		Mate-1005	H-shape Steel	203x152mm(52kg/m)	ton	128,562	2025 Market Price
666.		Mate-1006	H-shape Steel	203x152mm(52kg/m)	ton/Day	429	2025 Market Price

APPENDIX C: UNIT PRICE CALCULATION TABLE (NAIROBI REGION)

No. 1.1

Work Category Cleaning
Code 10201
Work Item Name Cleaning of Girders
Description Remove debris on the girder surfaces by sweeping, shovelling and/or high-pressure water/air or other mechanical devices.

B1 Cleaning the surface of steel plate (Cleaning Girders)
Unit m²
Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0		-	
M1	High Pressure Washer Equipment		hour	697.0	1.000	697	Assumed quantity
M2	Water Bowser		hour	4,675.6	1.000	4,676	Assumed quantity
	Subtotal					5,715	
	Miscellaneous Cost		%		10.000	572	% of Subtotal (Expand ladder, etc.)
	Total					6,287	
	Per unit					629	Total/Quantity

Note

- The unit price does not include haulage cost.
- Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

* Percent of Miscellaneous Cost should needs to be surveyed.

M1 High Pressure Washer Equipment per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					697	

Note

- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Water Bowser		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					4,676	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 1.2

Work Category	Cleaning
Code	10202
Work Item Name	Cleaning of Deck
Description	Remove manually and/or mechanically debris on top, sides and underneath the bridge deck and stairs on footbridges including expansion joints and drainage systems.
BI	Bridge Deck Cleaning
Unit	m ²
Quantity	10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0		-	
M1	High Pressure Washer Equipment		hour	697.0	0.500	349	Assumed quantity
M2	Water Bowser		hour	4,675.6	0.500	2,338	Assumed quantity
	Subtotal				-	3,029	
	Miscellaneous Cost		%		10.000	303	% of Subtotal (Hand shovel, Shovel, Expand ladder, etc.)
	Total					3,332	
	Per unit					333	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 High Pressure Washer Equipment

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0		-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					697	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Water Bowser

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker: 6000-8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					4,676	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 1.3

Work Category Cleaning
 Code 10203
 Work Item Name Cleaning of Substructure
 Description Remove manually and/or mechanically, debris on the bearings, bearing seats, exposed surfaces of the abutments and piers.

BI Cleaning of bridge seat and substructures
 Unit m²
 Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0			
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	High Pressure Washer Equipment		hour	697.0	1.500	1,046	Assumed quantity
M2	Water Bowser		hour	4,675.6	1.500	7,013	Assumed quantity
	Subtotal					8,401	
	Miscellaneous Cost		%		10.000	840	% of Subtotal (Hand shovel, Shovel, Expand ladder, etc.)
	Total					9,242	
	Per unit					924	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 High Pressure Washer Equipment

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					697	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Water Bowser

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					4,676	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 2

Work Category	Touch-up Painting
Code	10300
Work Item Name	Touch-up Painting
Description	Prepare the affected steel surface areas, collect, and store all paint debris, apply primer and undertake touch-up painting.
Unit	m ²
Quantity	10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of the Steel Surface		m ²	1,618.2	10.000	16,182	
B2	Touch-up Painting		m ²	1,560.8	10.000	15,608	
	Total					31,790	
	Per unit					3,179	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Preparation of the Steel Surface
Unit	m ²
Quantity	10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	1.000	11,000	Assumed quantity
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	2.000	320	Cup wire brush Assumed quantity
M1	Generator		hour	907.3	1.000	907	Assumed quantity
M2	Disc Grinder		hour	437.2	1.000	437	Assumed quantity
M3	Sand Blaster		hour	1,384.5	1.000	1,385	Assumed quantity
M4	Air Blower		hour	140.5	1.000	140	Assumed quantity
	Subtotal					14,711	
	Miscellaneous Cost		%		10.000	1,471	% of Subtotal
	Total					16,182	
	Per unit					1,618	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Touch-up Painting
Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Primer	Primer, Zinc-rich	kg	3,692.5	2.900	10,708	Assumed quantity 10.0 m ² x 29kg/100m ² = 2.9kg
Mate-096	Polyurethane aluminium paint	Top coat, epoxy resin	kg	989.6	2.900	2,870	Assumed quantity 10.0 m ² x 29kg/100m ² = 2.9kg
	Subtotal					14,190	
	Miscellaneous Cost		%		10.000	1,419	% of Subtotal
	Total					15,608	
	Per unit					1,561	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Assumed quantity
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-			
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	Assumed Quantity
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Sand Blaster

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-013	Blasting (Abrasive sand blaster)	Sand Blast Machine, Blast Polishing agent, Airblast gun and dust collector	Day	10,000.0	0.125	1,250	
	Miscellaneous Cost		%		-		
	Total					1,385	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Blower

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 3

Work Category	Epoxy Coating on Concrete Surfaces
Code	10400
Work Item Name	Epoxy Coating on Concrete Surfaces
Description	Clean cracks on concrete surfaces of widths less than 0.3mm, apply epoxy sealant of 50 mm width(s) stripes and cure.
Unit	m ²
Quantity	10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of Concrete Surface (cleaning of cracks)		m ²	271.1	10.000	2,711	
B2	Application of Epoxy Sealant		m ²	755.5	10.000	7,555	
B3	Curing		m ²	72.2	10.000	722	
	Total					10,988	
	Per unit					1,099	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Preparation of Concrete Surface (Cleaning of Cracks)
Unit	m ²
Quantity	10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	1.000	907	Assumed quantity
M2	Disc Grinder		hour	437.2	0.500	219	Assumed quantity
M3	Air Blower		hour	140.5	0.500	70	Assumed quantity
M4	High Pressure Washer Equipment		hour	697.0	0.250	174	Assumed quantity
M5	Water Bowser		hour	4,675.6	0.250	1,169	Assumed quantity
	Subtotal					2,711	
	Miscellaneous Cost		%		10.000	`	% of Subtotal
	Total					2,711	
	Per unit					271	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Application of Epoxy Sealant
 Unit m²
 Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.500	538	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-053	Epoxy sealant	for steel plate bonding, one-component	kg	3,100.1	1.600	4,960	Assumed quantity 16kg/100m ² x 10.0 m ² = 1.60kg
	Subtotal					6,868	
	Miscellaneous Cost		%		10.000	687	% of Subtotal
	Total					7,555	
	Per unit					756	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Curing
 Unit m²
 Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					722	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					722	
	Per unit					72	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	-	-	
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-	-	
	Total					140	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 High Pressure Washer Equipment per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					697	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Water Bowser per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					4,676	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 4

Work Category	Plastering
Code	10500
Work Item Name	Patching Repair with Concrete C30
Description	Remove defective concrete, clean concrete and/or rebar surfaces, apply epoxy bonding agent to concrete and rebar, place Concrete Class 30 and cure.
Unit	m ³
Quantity	1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Remove defective concrete		m ³	17,862.0	1.000	17,862	
B2	Coating Bonding Agent		m ²	3,940.8	11.400	44,925	5 m *2 m+ 14 m *0.1 m
B3	Concrete Placing		m ³	524.7	1.000	525	
B4	Concrete mix work (Class 30)		m ³	19,307.5	1.000	19,308	
B5	Curing		m ²	141.0	10.000	1,410	Assumed Quantity
	Total					84,029	
	Per unit					84,029	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Remove Defective Concrete
Unit	m ³
Quantity	1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.00	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.00	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper/ Breaker		hour	1,255.8	4.00	5,023	Assumed quantity
M2	Compressor		hour	2,192.3	4.00	8,769	
	Subtotal					16,238	
	Miscellaneous Cost		%		10.000	1,624	% of Subtotal
	Total					17,862	
	Per unit					17,862	Total/Quantity

Note 1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2	Coating Bonding Agent
Unit	m ²
Quantity	11.40

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching/ plastering	kg	1,725.2	22.800	39,334	Assumed quantity

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
Mate-032	Concrete nail	D=2.77-4.57mm, L=38-90mm	kg	515.2	2.000	1,030	Assumed quantity
	Subtotal					40,841	
	Miscellaneous Cost		%		10.000	4,084	% of Subtotal
	Total					44,925	
	Per unit					3,941	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Concrete Placing

Unit m³

Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					477	
	Miscellaneous Cost		%		10.000	48	% of Subtotal
	Total					525	
	Per unit					525	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Concrete Mix Work (Class 30)

Unit m³

Quantity 1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	42.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
M3	Concrete Mixer		hour	1,693.8	0.667	1,129	
22.70.003	Water		m ³	462.0	0.350	162	Assumed Quantity
	Subtotal					17,552	
	Miscellaneous Cost		%		10.000	1,755	% of Subtotal
	Total					19,307	
	Per unit					19,308	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Curing
Unit m²
Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Assumed Quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	1.000	462	Assumed Quantity
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM = 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Compressor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	5.300	909	Assumed quantity
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-	-	
	Total					2,192	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Concrete Mixer								per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator			1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.005	Artisans G2			1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour			722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day	
22.50.001	Support Staff			604.0	-	-	1 day = 8 hours, 1 hour = 0.125day	
22.79.154	Fuel			184.5	3.000	554	Assumption; 3 litres per hour	
Mach-025	Concrete mixer			5,500.0	0.125	688		
	Miscellaneous Cost		%	-	-			
	Total					1,694		
Note	1. Quantities are based on Kenyan experiences.							

No. 5

Work Category	Removal and Disposal of Obstructions from Structures Openings
Code	10600
Work Item Name	Removal and Disposal of Obstructions from Structures Openings
Description	Manually or mechanically remove driftwoods and plants around the inlets and outlets of structures, and cart to spoil (designated area).
B1	Removal and Disposal of Driftwoods and Plants
Unit	m ³
Quantity	30.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	5.000	3,610	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	1.000	604	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
M1	Truck		hour	3,504.9	8.000	28,039	1 hour/m x Quantity x 1 Truck Assumed quantity
M2	Backhoe		hour	7,977.9	8.000	63,823	1 hour/m x Quantity x 1 Backhoe Assumed quantity
M3	Power Saw		hour	981.0	8.000	7,848	1 hour/m x Quantity x 2 Power Saw Assumed quantity
	Subtotal					105,221	
	Miscellaneous Cost		%		10.000	10,522	% of Subtotal
	Total					115,743	
	Per unit					3,858	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Truck per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	176	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	5.320	912	Based on average fuel efficiency per horsepower in Japan 0.041l/hp*133hp=5.32l
Mach-056	Dump truck	(02) 4 t	Hour	2,416.7	1.000	2,417	
	Miscellaneous Cost		%	-			
	Total					3,505	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Backhoe per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l Assumed quantity
Mach-010	Backhoe	(01) Heap : 0.28 m ³ Flat pile : 0.2 m ³	Hour	6,125.0	1.000	6,125	
	Miscellaneous Cost		%	-	-	-	
	Total					7,978	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Power Saw per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-914	Power saw		Day	500.0	0.125	63	Assumed quantity
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumed quantity
	Sub total					934	
	Miscellaneous Cost		%	-	5.000	46.72	
	Total					981	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 6

Work Category	Partial Replacement of Stone Masonry
Code	10700
Work Item Name	Partial Replacement of Stone Masonry
Description	Remove all the loose masonry stone and mortar, prepare the resultant surface and lay the masonry stones with cement mortar and cure.
BI	Partial Replacement of Stone Masonry
Unit	m ³
Quantity	2.000

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	0.125	76	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-098	Stone masonry		m ³	1,273.0	2.000	2,546	Assumed quantity
Mate-079	Mortar (Portland cement : Sand 1 : Sand 2)	Cement 1 : Sand 2	m ³	14,879.9	0.200	2,976	Assumed quantity
MI	Vibratory compactor		hour	1,218.9	0.500	609	Assumed quantity
	Subtotal					6,999	
	Miscellaneous Cost		%		10.000	700	% of Subtotal
	Total					7,699	
	Per unit					3,849	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

MI Vibratory Compactor per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-195	Vibratory compactor (Vibration plate compactor) / finisher	(02) 70-80 kg	Day	5,833.3	0.125	729	
22.74.002	Fuel	Diesel	litre	171.5	1.000	171	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					1,219	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 7

Work Category Partial Replacement of Gabion Wire Mesh and/or Missing Stone
 Code 10800
 Work Item Name Partial Replacement of Gabion Wire Mesh and/or Missing Stone
 Description Restore damaged section of the gabion wire mesh and replace the missing stones.

BI Partial Replacement of Gabion Wire Mesh
 Unit m²
 Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.77.101	Gabion mesh	2m*1m = 2m ²	No.	3,385.0	1.000	3,385	
22.72.102	Stone		m ³	1,273.0	2.000	2,546	
	Subtotal					6,408	
	Miscellaneous Cost		%		10.000	641	% of Subtotal
	Total					7,049	
	Per unit					7,049	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

No. 8

Work Category	Epoxy Injection
Code	10900
Work Item Name	Epoxy Injection
Description	Clean cracks on concrete surfaces, install pipe fittings, seal cracks at the surface, fitting of injector and inject the epoxy resin and cure.
Unit	m
Quantity	300

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Cleaning of cracks		m	231.6	300.000	69,480	
B2	Installation of Pipe Fitting		m	2,078.1	300.000	623,430	
B3	Sealing of Cracks at the Surface		m	707.0	300.000	212,100	
B4	Fitting of Injector		m	1,239.4	300.000	371,820	
B5	Injection of Epoxy		m	25.8	300.000	7,740	
B6	Curing of Injected Material		m ²	2,809.4	60.000	168,564	
	Total					1,453,134	
	Per unit					4,844	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Cleaning of Cracks
Unit	m
Quantity	300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	16.000	14,517	Assumed quantity
M2	High Pressure Washer Equipment		hour	697.0	8.000	5,576	Assumed quantity
M3	Water Bowser		hour	4,675.6	8.000	37,405	Assumed quantity
M4	Air Blower		hour	140.5	8.000	1,124	Assumed quantity
	Subtotal					63,159	
	Miscellaneous Cost		%		10.000	6,316	% of Subtotal
	Total					69,475	
	Per unit					232	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Installation of Pipe Fitting
Unit m
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	15.000	16,140	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	15.000	10,830	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-059	Epoxy injection	Cylinder 50 cc	No.	278.0	1,500.000	417,035	5 pieces/m Quantities are based on Japanese cost estimation manual
Mate-049	Epoxy resin adhesive	for Bonding coat to concrete, grout, recasting concrete	litre / kg	8,096.8	15.000	121,452	0.010kg/piece Assumed quantity (0.194 x 0.05 = 0.010kg/piece)
	Subtotal					566,753	
	Miscellaneous Cost		%		10.000	56,675	% of Subtotal
	Total					623,428	
	Per unit					2,078	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Sealing of Cracks at the Surface
Unit m
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-116	Sealant		kg	3,100.1	59.000	182,904	0.194kg/m Quantities are based on Japanese cost estimation manual (NEXCO 31-52).
	Subtotal					192,822	
	Miscellaneous Cost		%		10.000	19,282	% of Subtotal
	Total					212,105	
	Per unit					707	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Fitting of Injector
Unit m
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	63.000	328,090	0.210kg/m Quantities are based on Japanese cost estimation manual (NEXCO 31-52).
	Subtotal					338,008	
	Miscellaneous Cost		%		10.000	33,801	% of Subtotal
	Total					371,809	
	Per unit					1,239	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Injection of Epoxy
Unit m
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	4.000	4,304	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					7,044	
	Miscellaneous Cost		%		10.000	704	% of Subtotal
	Total					7,748	
	Per unit					26	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Curing of Injected Material
 Unit m²
 Quantity 30.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-941	High strength, non-flow epoxy bedding and repair mortar		kg	1,451.0	52.448	76,100	5 kgs covers 2.86 SM
	Subtotal					76,621	
	Miscellaneous Cost		%		10.000	7,662	% of Subtotal
	Total					84,283	
	Per unit					2,809	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	-	-	
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 High Pressure Washer Equipment per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	
	Miscellaneous Cost		%	-	-	-	
	Total					697	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Water Bowser

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker: 6000-8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					4,676	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Blower

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 9

Work Category	Patching
Code	11000
Work Item Name	Patching Repair with Concrete C30 (With Formwork)
Description	Remove defective concrete, clean concrete and/or rebar surfaces, fix formwork, apply epoxy bonding agent to concrete and rebar, place Concrete Class 30 and cure.
Unit	m ³
Quantity	1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Remove defective concrete		m ³	17,862.0	1.000	17,862	
B2	Cleaning of surface of concrete and rebar		m ²	551.5	11.400	6,287	
B3	Formwork Fixing		m ²	1,221.9	2.800	3,421	
B4	Applying Epoxy Bonding to Concrete and Rebar		m ²	4,061.8	11.400	46,305	
B5	Concrete mix		m ³	19,307.5	1.000	19,308	
B6	Concrete Placing		m ³	524.7	1.000	525	
B7	Curing		m ²	141.0	10.000	1,410	
	Total					95,117	
	Per unit					95,117	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Remove Defective Concrete
Unit	m ³
Quantity	1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M2	Compressor		hour	2,192.3	4.000	8,769	
	Subtotal					16,238	
	Miscellaneous Cost		%		10.000	1,624	% of Subtotal
	Total					17,862	
	Per unit					17,862	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Cleaning of Surface of Concrete and RebarUnit m²

Quantity 11.4

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0		-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
M3	High Pressure Washer Equipment		hour	697.0	1.000	697	Assumed quantity
M4	Water Bowser		hour	4,675.6	1.000	4,676	
	Subtotal					5,715	
	Miscellaneous Cost		%		10.000	572	% of Subtotal
	Total					6,287	
	Per unit					552	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Formwork FixingUnit m²

Quantity 9.10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.375	404	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	10.920	8,332	9.1 x 1.2(loss margin) = 10.9
Mate-032	Concrete nail	D=2.77-4.57mm, L=38-90mm	kg	515.2	2.000	1,030	Assumed quantity
	Subtotal					10,108	
	Miscellaneous Cost		%		10.000	1,011	% of Subtotal
	Total					11,119	
	Per unit					1,222	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Applying Epoxy Bonding to Concrete and Rebar
 Unit m²
 Quantity 11.4

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching or plastering	kg	1,725.2	22.800	39,334	Assumed quantity
22.71.012	Ribbed bars 16mm		t	104,435.0	0.012	1,253	Assumed quantity
Mate-032	Concrete nail	D=2.77-4.57mm, L=38-90mm	kg	515.2	2.000	1,030	Assumed quantity
	Subtotal					42,095	
	Miscellaneous Cost		%		10.000	4,209	% of Subtotal
	Total					46,304	
	Per unit					4,062	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Concrete Mix
 Unit m³
 Quantity 1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	42.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
M5	Concrete Mixer		hour	1,693.8	0.667	1,129	
22.70.003	water		m ³	462.0	0.350	162	Assumed Quantity
	Subtotal					17,552	
	Miscellaneous Cost		%		10.000	1,755	% of Subtotal
	Total					19,307	
	Per unit					19,308	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Concrete Placing
Unit m³
Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					477	
	Miscellaneous Cost		%		10.000	48	% of Subtotal
	Total					525	
	Per unit					525	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Curing
Unit m²
Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	1.000	462	Assumed Quantity
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM=1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Compressor per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	5.300	909	Assumed quantity
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-			
	Total					2,192	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 High Pressure Washer Equipment per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					697	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Water Bowser per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker: 6000-8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					4,676	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Concrete Mixer per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 1 hour = 0.125day
22.79.154	Fuel	Petrol	Litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-		
	Total					1,694	

Note 1. Quantities are based on Kenyan experiences.

No. 10

Work Category	Caulking
Code	11100
Work Item Name	Caulking (Active Cracks)
Description	Clean the active cracks on the concrete surface, prepare for caulking, drill holes and fix injection pipes, inject flexible epoxy grout and cure.
Unit	m
Quantity	200

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Cleaning of cracks		m	224.0	200.000	44,800	
B2	Preparation for caulking		m	1,024.6	200.000	204,920	
B3	Drilling of holes and fixing of injection pipes		m	1,577.3	200.000	315,460	
B4	Injecting the Epoxy Grout		m	2,964.8	200.000	592,960	
B5	Curing of Injected Material		m	400.6	200.000	80,120	
	Total					1,238,260	
	Per unit					6,191	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Cleaning of Cracks
Unit	m
Quantity	200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	6.000	5,444	Assumed quantity
M2	High Pressure Washer Equipment		hour	697.0	6.000	4,182	Assumed quantity
M3	Water Bowser		hour	4,675.6	6.000	28,054	Assumed quantity
	Subtotal					40,729	
	Miscellaneous Cost		%		10.000	4,073	% of Subtotal
	Total					44,802	
	Per unit					224	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Preparation for Caulking

Unit m

Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	4.000	4,304	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-I 16	Sealant		kg	3,100.1	50.000	155,004	Assumed quantity
M1	Generator		hour	907.3	16.000	14,517	Assumed quantity
M5	Disc Grinder		hour	437.2	16.000	6,995	Assumed quantity
	Subtotal					186,300	
	Miscellaneous Cost		%		10.000	18,630	% of Subtotal
	Total					204,930	
	Per unit					1,025	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Drilling of Holes and Fixing of Injection Pipes

Unit m

Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	4.000	4,304	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-062	Epoxy injection	Infusion metal fittings	No.	368.8	700.000	258,128	Assumed quantity
M1	Generator		hour	907.3	16.000	14,517	Assumed quantity
M6	Electric drill		hour	271.8	16.000	4,348	Assumed quantity
	Subtotal					286,777	
	Miscellaneous Cost		%		10.000	28,678	% of Subtotal
	Total					315,455	
	Per unit					1,577	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Injecting the Epoxy Grout
Unit m
Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.458	1,890	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.917	3,138	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.458	1,053	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-902	Injection pump	Electric	Day	276.7	5.833	1,614	Spacing between ports varies between 150 mm to 500 mm L = 300mm, Assumed quantity
Mate-048	Epoxy resin	for bonding coat to concrete, or epoxy injection,	litre / kg	5,207.8	100.000	520,778	Assumed quantity (It depends on the depth of crack).
MI	Generator		hour	907.3	11.667	10,585	Assumed quantity
	Subtotal					539,059	
	Miscellaneous Cost		%		10.000	53,906	% of Subtotal
	Total					592,965	
	Per unit					2,965	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Curing of Injected Material
(To cut injection pipes and fill the holes with epoxy patching compound)
Unit m
Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.250	324	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.500	538	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-026	Compound	Ready-To-Use Joint Compound, Off-White, 1.75 pt	kg	6,281.7	11.000	69,099	Assumed quantity
MI	Generator		hour	907.3	2.000	1,815	Assumed quantity
M5	Disc Grinder		hour	437.2	2.000	874	Assumed quantity
	Subtotal					72,830	
	Miscellaneous Cost		%		10.000	7,283	% of Subtotal
	Total					80,113	
	Per unit					401	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp=1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	-		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 High Pressure Washer Equipment per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					697	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Water Bowser per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000-8000Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					4,676	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Concrete Chipper / Breaker per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM=1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-		
	Total					1,256	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Disc Grinder		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Electric Drill		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-058	Electric drill	(01) Ø14 - 32 mm	Day	350.0	0.125	44	
	Miscellaneous Cost		%	-	-	-	
	Total					272	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 11

Work Category	Carbon Fibre Sheet Bonding to Deck Slab
Code	11200
Work Item Name	Carbon Fibre Sheet Bonding to Deck Slab
Description	Prepare concrete surface, apply primer and epoxy resin for undercoat, install transverse and/or longitudinal layer(s) of carbon fibre sheet and protect.
Unit	m ²
Quantity	300

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of concrete		m ²	257.2	300.000	77,160	
B2	Application of primer		m ²	992.9	300.000	297,870	
B3	Surface smoothing using epoxy putty		m ²	1,099.9	300.000	329,970	
B4	Application of Epoxy Resin for Undercoat		m ²	992.9	300.000	297,870	
B5	Installation of Longitudinal Layer CFS		m ²	7,125.8	150.000	1,068,870	
B6	Installation of Transversal Layer CFS		m ²	7,125.8	150.000	1,068,870	
B7	Surface Protection		m ²	1,261.9	300.000	378,570	
	Total					3,519,180	
	Per unit					11,731	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Concrete
Unit	m ²
Quantity	300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	3.000	3,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet 300.0 / (3 x 50) = 2.0
M1	Generator		hour	907.3	24.000	21,775	
M2	Disc Grinder		hour	437.2	24.000	10,493	
M3	Air Blower		hour	140.5	24.000	3,371	
	Subtotal					70,149	
	Miscellaneous Cost		%		10.000	7,015	% of Subtotal
	Total					77,164	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Application of Primer
Unit m²
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Surface Smoothing using Epoxy Putty
Unit m²
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	87.600	295,092	Assumed quantity
	Subtotal					299,984	
	Miscellaneous Cost		%		10.000	29,998	% of Subtotal
	Total					329,983	
	Per unit					1,100	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Application of Epoxy Resin for Undercoat
 Unit m²
 Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Installation of Longitudinal Layer CFS
 Unit m²
 Quantity 150.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-902	Carbon fibre sheet	200g/m ² , tensile strength = 3,400N/mm, t=0.111mm	m ²	2,876.8	150.000	431,520	Assumed quantity
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	100.500	523,382	150.0 m ² x 0.67 g/m ² = 100.5 g/m ² (0.101 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	
	Subtotal					971,696	
	Miscellaneous Cost		%		10.000	97,170	% of Subtotal
	Total					1,068,866	
	Per unit					7,126	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Installation of Transversal Layer CFS
 Unit m²
 Quantity 150.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-902	Carbon fibre sheet	200g/m ² , tensile strength = 3,400N/ mm, t=0.111 mm	m ²	2,876.8	150.000	431,520	Assumed quantity
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy injection	litre / kg	5,207.8	100.500	523,382	150.0 m ² x 0.67 g/ m ² = 100.5 g/ m ² (0.101 kg/ m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	
	Subtotal					971,696	
	Miscellaneous Cost		%		10.000	97,170	% of Subtotal
	Total					1,068,866	
	Per unit					7,126	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Surface Protection
 Unit m²
 Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-051	Epoxy resin coating (second coat)	Concrete surface treatment material	litre / kg	3,878.9	87.000	337,468	29kg/100 m ² Assumed quantity
	Subtotal					344,158	
	Miscellaneous Cost		%		10.000	34,416	% of Subtotal
	Total					378,574	
	Per unit					1,262	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	-		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 12.1

Work Category	Steel Plate Bonding
Code	11301
Work Item Name	Steel Plate Bonding (Injection Method)
Description	Prepare the surface, set up steel plate on the slab, seal the plate, inject epoxy resin, cure and paint. The steel plate bonding for deck slab has two types, namely, wide plate and narrow plate. Wide plates are used for strengthening the slab in both the main reinforcing bar and distribution bar directions. Narrow plates are used for strengthening the slab in one direction only. The bonding of steel for deck slab is achieved using either the injection method or pressure attachment method.
Unit	m ²
Quantity	50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Surface preparation		m ²	176.5	50.000	8,825	
B2	Setting of Steel Plate on the Slab		m ²	9,838.4	50.000	491,920	
B3	Sealing of steel plate		m ²	660.9	50.000	33,045	
B4	Injection of epoxy resin		m ²	3,303.4	50.000	165,170	
B5	Curing for edges of the plates and Painting of concrete surfaces		m ²	1,601.2	50.000	80,060	
	Total					779,020	
	Per unit					15,580	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Surface Preparation
Unit	m ²
Quantity	50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	4.000	3,629	
M2	Disc Grinder		hour	437.2	4.000	1,749	
M3	Air Blower		hour	140.5	4.000	562	
	Subtotal					8,025	
	Miscellaneous Cost		%		10.000	802	% of Subtotal
	Total					8,827	
	Per unit					177	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Setting of Steel Plate on the Slab
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-135	Steel plate	Cold rolling sheet metal	ton	190,313.5	1.963	373,490	t=5mm, Number of plate = 100
Mate-031	Concrete anchor with steel bar	D10(1m) + Concrete Anchor (22.79.117)	No.	303.4	225.000	68,263	Anchor bolts shall be placed in two or more rows with a spacing of 50 cm or less. Assumed quantity
Mach-902	Injection pump	Electric	Day	276.7	2.000	553	Injection pipe Anchor bolts shall be placed in two or more rows with a spacing of 50 cm or less.
	Subtotal					447,198	
	Miscellaneous Cost		%		10.000	44,720	% of Subtotal
	Total					491,918	
	Per unit					9,838	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Sealing of Steel Plate
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	8.000	26,949	Assumed quantity 50.0 m ² x 16kg/100 m ² = 8.00kg
	Subtotal					30,043	
	Miscellaneous Cost		%		10.000	3,004	% of Subtotal
	Total					33,047	
	Per unit					661	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Injection of Epoxy Resin
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-902	Injection pump	Electric	Day	276.7	2.000	553	
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	25.000	130,195	0.5 kg per SM
MI	Generator		hour	907.3	16.000	14,517	
	Subtotal					150,157	
	Miscellaneous Cost		%		10.000	15,016	% of Subtotal
	Total					165,172	
	Per unit					3,303	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Curing for Edges of the Plates and Painting of Concrete Surfaces
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	14.500	53,541	Assumed quantity $50.0 \text{ m}^2 \times 29\text{kg}/100 \text{ m}^2 = 14.5\text{kg}$
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	14.500	14,349	Assumed quantity $50.0 \text{ m}^2 \times 29\text{kg}/100 \text{ m}^2 = 14.5\text{kg}$
	Subtotal					72,782	
	Miscellaneous Cost		%		10.000	7,278	% of Subtotal
	Total					80,060	
	Per unit					1,601	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583		
	Miscellaneous Cost		%	-	-	-		
	Total					907		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109		
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193		
	Miscellaneous Cost		%	-	-	-		
	Total					437		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6		
	Miscellaneous Cost		%	-	-	-		
	Total					140		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 12.2

Work Category	Steel Plate Bonding
Code	11302
Work Item Name	Steel Plate Bonding (Pressure attaching method)
Description	Prepare the surface, apply epoxy resin, pressure attach the steel plate, cure the edges of the plate and paint. Steel plate bonding for girders involves use of narrow steel plates installed in the longitudinal direction of the concrete girder. The bonding of steel plates to concrete members is achieved using pressure attachment method.
Unit	m ²
Quantity	50.00 (25m x 2m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Surface preparation		m ²	176.5	50.000	8,825	
B2	Application of Epoxy Resin		m ²	38,606.4	50.000	1,930,320	
B3	Pressure attachment of steel plate		m ²	2,232.4	50.000	111,620	
B4	Curing for edges of the plates and Painting of concrete surfaces		m ²	1,601.2	50.000	80,060	
	Total					2,130,825	
	Per unit					42,617	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Surface Preparation
Unit	m ²
Quantity	50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	4.000	3,629	
M2	Disc Grinder		hour	437.2	4.000	1,749	
M3	Air Blower		hour	140.5	4.000	562	
	Subtotal					8,025	
	Miscellaneous Cost		%		10.000	802	% of Subtotal
	Total					8,827	
	Per unit					177	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Application of Epoxy Resin
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-135	Steel plate	Cold rolling sheet metal	ton	190,313.5	1.963	373,490	t=5mm, Number of plate = 100, Density of steel= 7850 kg/m ³
Mate-049	Epoxy resin adhesive	for bonding coat to concrete, grout, recasting concrete	litre / kg	8,096.8	170.000	1,376,456	t=2mm, 1700kg/m ³
	Subtotal					1,754,838	
	Miscellaneous Cost		%		10.000	175,484	% of Subtotal
	Total					1,930,322	
	Per unit					38,606	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Pressure Attachment of Steel Plate
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-031	Concrete anchor with steel bar	D10 (1m) + Concrete Anchor (22.79.117)	No.	303.4	225.000	68,263	Anchor bolts shall be placed 0.5m pitches. (25/0.5) x (2/0.5) = 200
Mach-214	Wood	(01) Stiff/ Hardwood (i.e. Mahogany), 10.0 x 10.0x400 mm	No.	472.0	60.000	28,320	(2 x 1.2) / 0.4 x 25.0 = 60
	Subtotal					101,475	
	Miscellaneous Cost		%		10.000	10,147	% of Subtotal
	Total					111,622	
	Per unit					2,232	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Curing for Edges of the Pates and Painting of Concrete SurfacesUnit m²

Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	14.500	53,541	Assumed quantity 50.0 m ² x 29kg/100m ² = 14.5kg
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	14.500	14,349	Assumed quantity 50.0 m ² x 29kg/100m ² = 14.5kg
	Subtotal					72,782	
	Miscellaneous Cost		%		10.000	7,278	% of Subtotal
	Total					80,060	
	Per unit					1,601	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	-	-	
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125 mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 13

Work Category	Partial Deck Slab Replacement
Code	11400
Work Item Name	Partial Deck Slab Replacement
Description	Remove the deteriorated concrete, clean up the substrate and reinforcement, set up formwork, place of new rebar and concrete including curing and removal of formwork.
Unit	m ³
Quantity	1.5 (A = 2 x 3 = 6m ² , t = 0.25m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Removal of Deck Slab Concrete		m ³	17,862.0	1.500	26,793	
B2	Preparation of Old Concrete and Rebar		m ³	2,484.9	1.500	3,727	
B3	Setting of Formworks		m ²	1,119.3	6.000	6,716	
B4	Cutting of Existing Rebar and Addition of New Rebar		No.	423.9	30.000	12,717	
B5	Concrete mix work		m ³	19,307.5	1.500	28,961	
B6	Concrete Placing		m ³	2,734.1	1.500	4,101	
B7	Curing and Removal of Formworks		m ²	310.5	6.000	1,863	
	Total					84,879	
	Per unit					56,586	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Removal of Deck Slab Concrete
Unit	m ³
Quantity	1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M2	Compressor		hour	2,192.3	4.000	8,769	
	Subtotal					16,238	
	Miscellaneous Cost		%		10.000	1,624	% of Subtotal
	Total					17,862	
	Per unit					17,862	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Preparation of Old Concrete and RebarUnit m³

Quantity 1.5

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching or plastering	kg	1,725.2	1.740	3,002	(A = 2 x 3 = 6m ² , t = 0.25m) 29kg/100m ² Assumed quantity
	Subtotal					3,389	
	Miscellaneous Cost		%		10.000	339	% of Subtotal
	Total					3,727	
	Per unit					2,485	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Setting of FormworksUnit m²

Quantity 6.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.13	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	7.200	5,494	Assumed quantity 6.00 x 1.2 (loss margin) = 7.20 m ²
	Subtotal					6,105	
	Miscellaneous Cost		%		10.000	611	% of Subtotal
	Total					6,716	
	Per unit					1,119	Total/Quantity

- Note
1. Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Cutting of Existing Rebar and Addition of New Rebar
 Unit No.
 Quantity 30.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116.0	46.800	5,430	Assumed quantity D16: 1.56kg/m x 1.0m x 30 = 46.80 kg
M3	Generator		hour	907.3	2	1,815	Assumed quantity
M4	Disc Grinder		hour	437.2	2.000	874	Assumed quantity
M6	Arc Welding Machine		hour	1,415.5	2.000	2,831	Assumed quantity
	Subtotal					11,562	
	Miscellaneous Cost		%		10.000	1,156	% of Subtotal
	Total					12,718	
	Per unit					424	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Concrete Mix Work (Class 30)
 Unit m³
 Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average estimated productivity in Japan (see note)
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average estimated productivity in Japan (see note)
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	52.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
M7	Concrete Mixer		hour	1,693.8	0.667	1,129	
22.70.003	Water		m ³	462.0	0.350	162	Assumed quantity
	Subtotal					17,552	
	Miscellaneous Cost		%		10.000	1,755	% of Subtotal
	Total					19,307	
	Per unit					19,308	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).

B6 Concrete PlacingUnit m³

Quantity 1.5

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.875	2,430	Based on average estimated productivity in Japan (see note)
22.50.005	Artisans G2		Person Day	1,076.0	0.188	202	Based on average estimated productivity in Japan (see note)
22.50.002	Unskilled labour		Person Day	722.0	0.375	271	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
M5	Concrete vibrator		hour	550.6	1.500	826	
	Subtotal					3,728	
	Miscellaneous Cost		%		10.000	373	% of Subtotal
	Total					4,101	
	Per unit					2,734	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Curing and Removal of FormworksUnit m²

Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.021	27	
22.50.005	Artisans G2		Person Day	1,076.0	0.021	22	
22.50.002	Unskilled labour		Person Day	722.0	0.152	110	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	0.100	46	
Mate-038	Cotton mat	For concrete curing	m ²	105.0	1.000	105	
	Subtotal					310	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					310	
	Per unit					311	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA)
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM= 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Compressor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	5.300	909	Assumed quantity
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-	-	
	Total					2,192	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	-	-	
	Total					907	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Concrete Vibrator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-027	Concrete vibrator	Electrical or engine	Day	2,166.7	0.125	271	
22.79.154	Fuel	Petrol	litre	184.5	1.027	190	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l
	Miscellaneous Cost		%	-	-		
	Total					551	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Arc Welding Machine per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280.0	2.000	560	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					1,416	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Concrete Mixer per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator			1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2			1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour			722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff			604.0	-	-	1 day = 8 hours, 1 hour = 0.125day
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-		
	Total					1,694	
Note 1. Quantities are based on Kenyan experiences.							

No. 14.1

Work Category	Waterproofing on Deck Slab
Code	11501
Work Item Name	Waterproofing on Deck Slab (Rubberized Membrane)
Description	Prepare leaking deck surface, apply primer and subsequent three coats of rubberized membrane (basecoat,intercoat, top coat), apply tack coat; provide, place and compact Type I asphaltic concrete.
Unit	m ²
Quantity	100

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of deck surface		m ²	256.8	100.000	25,680	
B2	1st layer (primer)		m ²	970.4	100.000	97,040	
B3	2nd layer (base coat)		m ²	970.4	100.000	97,040	
B4	3rd layer (intercoat)		m ²	970.4	100.000	97,040	
B5	4th Layer (Top Coat)		m ²	970.4	100.000	97,040	
B6	5th layer (Tack coat)		m ²	93.5	100.000	9,350	
B7	Asphalt Pavement		m ³ (5 cm)	27,705.0	5.000	138,525	
	Total					561,7155	
	Per unit					5,617	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Deck Surface
Unit	m ²
Quantity	100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	8.000	7,258	Assumed quantity
M2	Disc Grinder		hour	437.2	4.000	1,749	Assumed quantity
M3	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M8	Air Compressor		hour	1,283.5	4.000	5,134	Assumed quantity
	Subtotal					23,348	
	Miscellaneous Cost		%		10.000	2,335	% of Subtotal
	Total					25,683	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 1st layer (Primer)Unit m²

Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	29.000	87,464	29kg/100m ² Assumed quantity
Mach-I 16	Paint roller	Extension pole	Day	569.0	0.250	142	
	Subtotal					88,218	
	Miscellaneous Cost		%		10.000	8,822	% of Subtotal
	Total					97,040	
	Per unit					970	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 2nd layer (Base coat)Unit m²

Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	29.000	87,464	29kg/100m ² Assumed quantity
Mach-I 16	Paint roller	Extension pole	Day	569.0	0.250	142	
	Subtotal					88,218	
	Miscellaneous Cost		%		10.000	8,822	% of Subtotal
	Total					97,040	
	- 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)					970	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 3rd layer (Intercoat)
 Unit m²
 Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer/ under coating, epoxy based	kg	3,016.0	29.000	87,464	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	0.250	142	
	Subtotal					88,218	
	Miscellaneous Cost		%		10.000	8,822	% of Subtotal
	Total					97,040	
	Per unit					970	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 4th Layer (Top Coat)
 Unit m²
 Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	29.000	87,464	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	0.250	142	
	Subtotal					88,218	
	Miscellaneous Cost		%		10.000	8,822	% of Subtotal
	Total					97,040	
	Per unit					970	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 5th layer (Tack Coat)
 Work Item Name Tack Coat (Bitumen Emulsion)
 Unit m²
 Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	Based on average estimated productivity in Japan (see note)
22.50.005	Artisans G2		Person Day	1,076.0	0.063	67	Based on average estimated productivity in Japan (see note)
22.50.002	Unskilled labour		Person Day	722.0	-	-	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
M5	Bitumen Sprayer		hour	912.5	0.063	57	Based on average estimated productivity in Japan (see note)
22.73.006	Bituminous sealant (KI-60)		litre	103.7	80.000	8,294	
	Subtotal					8,500	
	Miscellaneous Cost		%		10.000	850	% of Subtotal
	Total					9,349	
	Per unit					94	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Asphalt Pavement
 Work Item Name Asphalt Concrete for Surfacing - Hot Mix
 Unit m³ (5cm) (m²)
 Quantity 5 (100.0 m²)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.73.003	Premix - AC Type I (hot)		m ³	22,400.0	5.500	123,200	5.5m ³ /5m ³ x 5.0m ³ = 5.5
M5	Asphalt Finisher		hour	6,502.9	0.125	813	Based on average productivity in Kenya
M6	Roller		hour	4,797.7	0.125	600	Based on average productivity in Kenya
M7	Pneumatic Roller		hour	5,292.7	0.125	662	Based on average productivity in Kenya
	Subtotal					125,932	
	Miscellaneous Cost		%		10.000	12,593	% of Subtotal
	Total					138,525	
	Per unit					27,705	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp=1.0268l	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp=1.03l	
	Miscellaneous Cost		%	-	-	-		
	Total					907		

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109		
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193		
	Miscellaneous Cost		%	-	-	-		
	Total					437		

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Concrete Chipper / Breaker								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.005	Artisans G2		Person Day	1,076.0	-	-		
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day	
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM= 1050	Day	7,500.0	0.125	938		
	Miscellaneous Cost		%	-	-	-		
	Total					1,256		

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Bitumen Sprayer								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 1 hour = 0.125day	
22.67.004	Bitumen Sprayer H/ Operated	200L	Hour	504.0	1.000	504		
	Miscellaneous Cost		%	-	-	-	% of Subtotal	
	Total					913		

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Asphalt Finisher per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	1 day = 8 hours, 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	171.5	5.330	914	Based on average fuel efficiency per horsepower in Japan $0.144\text{ l/hp} \times 37\text{ hp} = 5.33\text{ l}$
22.67.104	Asphalt finisher	37H	Hour	5,000.0	1.000	5,000	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					6,503	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Roller per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	171.5	10.920	1,872	Based on average fuel efficiency per horsepower in Japan $0.084\text{ l/hp} \times 130\text{ hp} = 10.92\text{ l}$
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	2,607.0	1.000	2,607	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					4,798	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Pneumatic Roller per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	171.5	10.920	1,872	Based on average fuel efficiency per horsepower in Japan $0.084\text{ l/hp} \times 130\text{ hp} = 10.92\text{ l}$
22.64.005	Pneumatic Roller: 10T, 130HP		Hour	3,102.0	1.000	3,102	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					5,293	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Air Compressor per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-	-	
	Total					1,284	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 14.2

Work Category	Waterproofing on Deck Slab
Code	11502
Work Item Name	Waterproofing on Deck Slab (Asphalt Compound Membrane)
Description	Prepare leaking deck surface, apply primer, place melted asphaltic compound inclusive of silica sand protection, cure, place and compact Type I asphaltic concrete.
Unit	m ²
Quantity	100

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of Deck surface		m ²	256.8	100.000	25,680	
B2	Primer coating		m ²	970.4	100.000	97,040	
B3	Melting Asphalt Compound		m ²	4,906.8	100.000	490,680	
B4	Application of Asphalt compound		m ²	6.7	100.000	670	
B5	Application of Silica Sand for protection		m ²	117.5	100.000	11,750	
B6	Curing		m ²	90.3	100.000	9,030	
B7	Asphalt Pavement		m ³ (5 cm)	29,554.8	5.000	147,774	
	Total					782,624	
	Per unit					7,826	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Deck Surface
Unit	m ²
Quantity	100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	8.000	7,258	Assumed quantity
M2	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M3	Disc Grinder		hour	437.2	4.000	1,749	Assumed quantity
M4	Air Compressor		hour	1,283.5	4.000	5,134	Assumed quantity
	Subtotal					23,348	
	Miscellaneous Cost		%		10.000	2,335	% of Subtotal
	Total					25,683	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Primer Coating
Unit m²
Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	29.000	87,464	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	0.250	142	
	Subtotal					88,218	
	Miscellaneous Cost		%		10.000	8,822	% of Subtotal
	Total					97,040	
	Per unit					970	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Melting Asphalt Compound
Unit m²
Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	0.250	151	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M5	Asphalt Mix Cooker		hour	434.5	2.000	869	
Mate-009	Asphalt compound		kg	6,352.9	70.000	444,706	0.7 kg per SM
	Subtotal					446,068	
	Miscellaneous Cost		%		10.000	44,607	% of Subtotal
	Total					490,675	
	Per unit					4,907	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Application of Asphalt CompoundUnit m²

Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	504.0	2.000	1,008	
	Subtotal					612	
	Miscellaneous Cost		%		10.000	61	% of Subtotal
	Total					673	
	Per unit					7	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Application of Silica Sand for ProtectionUnit m²

Quantity 100.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-118	Silica fume	0.5 kg	No.	3.4	600.000	2,012	Silica sand, 3 kg/m ²
22.67.110	Chip spreader		Hour	4,028.0	2.000	8,056	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
	Subtotal					10,679	
	Miscellaneous Cost		%		10.000	1,068	% of Subtotal
	Total					11,747	
	Per unit					118	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Curing
Unit m²
Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					90	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					90	
	Per unit					90	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA)
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Asphalt Pavement
Work Item Name Asphalt concrete for surfacing - hot mix
Unit m³(5cm) (m²)
Quantity 5 (100.0 m²)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.73.003	Premix - AC Type I (hot)		m ³	22,400.0	5.500	123,200	5.5m ³ /5m ³ x 5.0m ³ = 5.5
22.73.006	Bituminous sealant (KI-60)		litre	103.7	80.000	8,294	
M6	Bitumen Sprayer		hour	912.5	0.125	114	Based on average productivity in Kenya
M7	Asphalt Finisher		hour	6,502.9	0.125	813	Based on average productivity in Kenya
M8	Roller		hour	4,797.7	0.125	600	Based on average productivity in Kenya
M9	Pneumatic Roller		hour	5,292.7	0.125	662	Based on average productivity in Kenya
	Subtotal					134,340	
	Miscellaneous Cost		%		10.000	13,434	% of Subtotal
	Total					147,774	
	Per unit					29,555	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583		
	Miscellaneous Cost		%	-	10.000			
	Total					907		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Concrete Chipper / Breaker								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.005	Artisans G2		Person Day	1,076.0	-	-		
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day	
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke= 166mm, Air Consumption = 1.5m ³ /min, BPM= 1050	Day	7,500.0	0.125	938		
	Miscellaneous Cost		%	-	-			
	Total					1,256		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Disc Grinder								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109		
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193		
	Miscellaneous Cost		%	-	-			
	Total					437		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Compressor								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours 1 hour = 0.125day	
22.50.005	Artisans G2		Person Day	1,076.0	-	-		
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours 1 hour = 0.125day	
22.50.001	Support Staff		Person Day	604.0	-	-		
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056		
	Miscellaneous Cost		%	-	-			
	Total					1,284		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Asphalt Mix Cooker per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-117	Pavement Asphalt mini cooker	Asphalt mini cooker	Day	1,457.9	0.125	182	
	Miscellaneous Cost		%	-	-	-	
	Total					434	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Bitumen Sprayer per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 1 hour = 0.125day
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	504.0	1.000	504	
	Miscellaneous Cost		%	-	-	-	% of Subtotal
	Total					913	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Asphalt Finisher per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	1 day = 8 hours, 1 hour = 0.125day
22.74.002	Fuel	Diesel	litre	171.5	5.330	914	Based on average fuel efficiency per horsepower in Japan 0.144l/hp*37hp = 5.33l
22.67.104	Asphalt finisher	37H	Hour	5,000.0	1.000	5,000	
	Miscellaneous Cost		%	-	-	-	% of Subtotal
	Total					6,503	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Roller per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.74.002	Fuel	Diesel	litre	171.5	10.920	1,872	Based on average fuel efficiency per horsepower in Japan 0.084l/hp*130hp=10.92l
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	2,607.0	1.000	2,607	
	Miscellaneous Cost		%	-	-	-	% of Subtotal
	Total					4,798	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M9 Pneumatic Roller per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.74.002	Fuel	Diesel	litre	171.5	10.920	1,872	Based on average fuel efficiency per horsepower in Japan 0.084l/hp*130hp=10.92l
22.64.005	Pneumatic Roller: 10T, 130HP		Hour	3,102.0	1.000	3,102	
	Miscellaneous Cost		%	-	-	-	% of Subtotal
	Total					5,293	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 15

Work Category	Fast Setting Concrete for Continued Deck Slab		
Code	I 1600		
Work Item Name	Fast Setting Concrete for Continued Deck Slab		
Description	Remove defective deck slab concrete and its adjacent surfaces to its full depth, set up formworks, clean the existing rebar (and place additional longitudinal/transverse rebar), apply epoxy resin to prepared surface, place fast-setting mortar and cure.		
Unit	m ³		
Quantity	1.5	(t = 0.25m)	

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Removal of deck slab concrete		m ³	17,862.0	1.500	26,793	
B2	Setting of formworks		m ²	1,097.3	6.000	6,584	
B3	Addition of longitudinal/Transverse rebar		ton	142,191.7	0.225	31,993	
B4	Clean up inside formwork		m ²	2.9	8.500	25	
B5	Apply Epoxy Resin to Existing Concrete Surface for Proper Bonding to Fast-setting Concrete		m ²	3,965.9	2.500	9,915	
B6	Wet the Formwork		m ²	8.9	8.500	76	
B7	Concrete mixing		m ³	28,723.5	1.500	43,085	
B8	Concrete placing		m ³	524.7	1.500	787	
B9	Curing		m ²	141.0	6.000	846	
	Total					120,103	
	Per unit					80,069	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Removal of Deck Slab Concrete
Unit	m ³
Quantity	1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Unit	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M2	Compressor		hour	2,192.3	4.000	8,769	
	Subtotal					16,238	
	Miscellaneous Cost		%		10.000	1,624	% of Subtotal
	Total					17,862	
	Per unit					17,862	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Setting of FormworksUnit m²

Quantity 9.10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.375	404	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	10.920	8,332	9.1 x 1.2(loss margin)= 10.9
	Subtotal					9,078	
	Miscellaneous Cost		%		10.000	908	% of Subtotal
	Total					9,986	
	Per unit					1,097	Total/Quantity

- Note
1. Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Addition of Longitudinal/Transverse Rebar

Unit ton

Quantity 0.225

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.71.012	Ribbed bars 16mm		t	104,435.0	0.248	25,848	Assumed quantity 0.225 x 1.1(loss margin)=0.248
M3	Generator		hour	907.3	1.000	907	
M4	Disc Grinder		hour	437.2	1.000	437	
M5	Welder (arc welding)		hour	1,415.5	1.000	1,416	
	Subtotal					29,085	
	Miscellaneous Cost		%		10.000	2,908	% of Subtotal
	Total					31,993	
	Per unit					142,192	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Clean up Inside FormworkUnit m²

Quantity 8.5

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.031	23	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M2	Compressor		hour	2,192.3	0.250	548	
	Subtotal					23	
	Miscellaneous Cost		%		10.000	2	% of Subtotal (Hand shovel, Shovel, Expand ladder, etc.)
	Total					25	
	Per unit					3	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Apply Epoxy Resin to Existing Concrete Surface for Proper Bonding to Fast-setting ConcreteUnit m²

Quantity 11.4

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-114	Paint brush	Compound, glues, fiberglass, undercoating, grease, oil, paint and paint remover	No.	430.1	3.000	1,290	Assumed quantity
Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching or plastering	kg	1,725.2	22.800	39,334	Assumed quantity
	Subtotal					41,101	
	Miscellaneous Cost		%		10.000	4,110	% of Subtotal
	Total					45,212	
	Per unit					3,966	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Wet the Formwork
Unit m²
Quantity 8.5

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.031	23	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	0.100	46	Assumed quantity
	Subtotal					69	
	Miscellaneous Cost		%		10.000	7	% of Subtotal
	Total					76	
	Per unit					9	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Concrete Mixing (Class 30)
Unit m³
Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	Based on average productivity in Kenya
22.70.004	Ordinary Portland Cement		Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
Mate-941	Rapid concrete hardener admixture		litres	800.0	10.700	8,560	
M8	Concrete Mixer		hour	1,693.8	0.667	1,129	
22.70.003	Water		m ³	462.0	0.350	162	
	Subtotal					26,112	
	Miscellaneous Cost		%		10.000	2,611	% of Subtotal
	Total					28,723	
	Per unit					28,724	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Concrete Placing
Unit m³
Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					477	
	Miscellaneous Cost		%		10.000	48	% of Subtotal
	Total					525	
	Per unit					525	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B9 Curing
Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Based on average estimated productivity in Japan (see note).
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	1.000	462	Assumed Quantity
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM=1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Compressor per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	5.300	909	Assumed quantity
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-			
	Total					2,192	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Welder (Arc Welding) per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280.0	2.000	560	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					1,416	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Water Bowser

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					4,676	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 High Pressure Washer Equipment

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	0 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	
	Miscellaneous Cost		%	-	-	-	
	Total					697	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Concrete Mixer

per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator			1,824.0	0.125	228	1day = 8 hours, 1hour = 0.125day
22.50.005	Artisans G2			1,076.0	0.125	135	1day = 8 hours, 1hour = 0.125day
22.50.002	Unskilled labour			722.0	0.125	90	1day = 8 hours, 1hour = 0.125day
22.50.001	Support Staff			604.0	-	-	1day = 8 hours, 1hour = 0.125day
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-	-	
	Total					1,694	
Note	I. Quantities are based on Kenyan experiences.						

No. 16

Work Category	Protective Mortar
Code	11700
Work Item Name	Protective Mortar
Description	Prepare concrete surface, provide, mix and apply Polymer Cement Mortar (PCM) emulsion and Lithium Nitrite; and cure.
Unit	m ²
Quantity	50.0 (t = 0.03m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Surface preparation		m ²	257.2	50.000	12,860	
B2	PCM, Lithium Nitrite and Emulsion mix work		m ³	697,120.3	1.500	1,045,680	
B3	Application of PCM with Lithium Nitrite		m ³	978.4	1.500	1,468	
B4	Curing		m ²	993.8	50.000	49,690	
	Total					1,109,698	
	Per unit					22,194	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Surface Preparation
Unit	m ²
Quantity	300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	3.000	3,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet 300.0 / (3 x 50) = 2.0
M1	Generator		Unit	907.3	24.000	21,775	Assumed quantity
M2	Disc Grinder		hour	437.2	24.000	10,493	Assumed quantity
M3	Air Blower		hour	140.5	24.000	3,371	Assumed quantity
	Subtotal					70,149	
	Miscellaneous Cost		%		10.000	7,015	% of Subtotal
	Total					77,164	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 PCM, Lithium Nitrite and Emulsion Mix Work

Unit m³
Quantity 1.50

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.188	243	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.188	202	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.750	542	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-099	PCM (Polymer Cement Mortar) emulsion		kg	271.8	2,625	713,382	1750kg/m ³ x 1.5 m ³ = 2625 kg
Mate-906	Lithium Nitrite		kg	8,400.0	28.125	236,250	7.5kg/m ³ / 40%(water solution) x 1.5 m ³ = 28.125kg
	Subtotal					950,619	
	Miscellaneous Cost		%		10.000	95,062	% of Subtotal
	Total					1,045,680	
	Per unit					697,120	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Application of PCM with Lithium Nitrite

Unit m³
Quantity 1.50

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	4.000	4,304	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					9,784	
	Miscellaneous Cost		%		10.000	978	% of Subtotal
	Total					10,762	
	Per unit					7,175	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Curing
Unit m²
Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Based on average estimated productivity in Japan (see note)
22.70.003	Water		m ³	462.0	0.100	46	Based on average estimated productivity in Japan (see note)
	Subtotal					994	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					994	
	Per unit					994	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 17

Work Category	Protective Coating
Code	11800
Work Item Name	Protective Coating
Description	Prepare the surface, provide, mix and apply three layers of acryl urethane protective coating.
Unit	m ²
Quantity	50

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Surface preparation		m ²	257.2	50.000	12,860	
B2	Mixing acryl urethane protective coating materials		m ²	580.4	50.000	29,020	
B3	Application of protective coating		m ²	94.7	50.000	4,735	
B4	Mixing top coat materials		m ²	217.6	50.000	10,880	
B3	Application of protective coating		m ²	94.7	50.000	4,735	
	Total					46,615	
	Per unit					932	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Surface Preparation
Unit	m ²
Quantity	300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	3.000	3,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet 300.0 / (3 x 50) = 2.0
M1	Generator		hour	907.3	24.000	21,775	
M2	Disc Grinder		hour	437.2	24.000	10,493	
M4	Air Blower		hour	140.5	24.000	3,371	
	Subtotal					70,149	
	Miscellaneous Cost				10.000	7,015	% of Subtotal
	Total					77,164	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Mixing acryl Urethane Protective Coating Materials
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.375	404	
22.50.002	Unskilled labour		Person Day	722.0	0.750	542	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-090	Paint	Base resin	kg	4,205.9	4.400	18,506	Acryl urethane-based coating 0.11 kg/m ² x 50.0 m ² = 4.4 kg Base resin : Hardener = 4:1
Mate-068	Hardener	4 Kg (Tin Can)	kg	3,115.2	1.100	3,427	Acryl urethane-based coating 0.11 kg/m ² x 50.0 m ² = 1.1 kg Base resin : Hardener = 4:1
M1	Generator		hour	907.3	3.000	2,722	
M3	Agitator		hour	206.8	3.000	621	
	Subtotal					26,382	
	Miscellaneous Cost		%		10.000	2,638	% of Subtotal
	Total					29,020	
	Per unit					580	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Application of Protective Coating
 Unit m²
 Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-116	Paint roller	Extension pole	Day	569.0	1.000	569	Assumed quantity
Mach-114	Paint brush	Compound, glues, fiberglass, undercoating, grease, oil, paint and paint remover	No.	430.1	3.000	1,290	Assumed quantity
	Subtotal					4,305	
	Miscellaneous Cost		%		10.000	431	% of Subtotal
	Total					4,736	
	Per unit					95	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Mixing Top Coat MaterialsUnit m²

Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.375	404	
22.50.002	Unskilled labour		Person Day	722.0	0.750	542	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	5.500	5,443	Top coat, epoxy resin 0.11 kg/m ² x 50.0 m ² = 5.5 kg
M1	Generator		hour	907.3	3.000	2,722	
M3	Agitator		hour	206.8	3.000	621	
	Subtotal					9,892	
	Miscellaneous Cost		%		10.000	989	% of Subtotal
	Total					10,881	
	Per unit					218	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Application of Top CoatingUnit m²

Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-116	Paint roller	Extension pole	Day	569.0	1.000	569	Assumed quantity
Mach-114	Paint brush	Compound, glues, fiberglass, undercoating, grease, oil, paint and paint remover	No.	430.1	3.000	1,290	Assumed quantity
	Subtotal					4,305	
	Miscellaneous Cost		%		10.000	431	% of Subtotal
	Total					4,736	
	Per unit					95	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268 l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Agitator		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-001	Agitator (Electric Mixer with steel blade)	1725 BPM, Motor horsepower 1.5	Day	578.7	0.125	72	
	Miscellaneous Cost		%	-	-		
	Total					207	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Blower		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 18

Work Category	Recasting Concrete / Grout		
Code	11900		
Work Item Name	Recasting Concrete / Grout		
Description	Remove the damaged concrete, prepare exposed concrete and rebar, apply bonding agent to the prepared surface, fix formwork, place cement-sand grouting mortar, cure and dismantle formwork.		
Unit	m ³		
Quantity	0.125	((W) 5 m x (H) 0.5m x (D) 0.05m)	

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Removal of damaged concrete		m ³	17,862.0	0.125	2,233	
B2	Preparation of old concrete and rebar		m ³	1,659.4	0.125	207	
B3	Cutting of deteriorated rebar and adding new rebar		No	423.9	3.000	1,272	
B4	Setting formworks		m ²	1,119.3	2.750	3,078	
B5	Mixing of mortar		m ³	15,912.0	0.125	1,989	
B6	Mortar grouting		m ²	922.7	2.750	2,537	
B7	Curing and removal of formworks		m ²	226.0	2.750	622	
	Total					11,938	
	Per unit					95,503	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Removal of Damaged Concrete
Unit	m ³
Quantity	1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M2	Compressor		hour	2,192.3	4.000	8,769	Assumed quantity
	Subtotal					16,238	
	Miscellaneous Cost		%		10.000	1,624	% of Subtotal
	Total					17,862	
	Per unit					17,862	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Preparation of Old Concrete and Rebar
 Unit m³
 Quantity 1.500

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching or plastering	kg	1,725.2	1.088	1,876	((W) 5 m x (H) 0.5m x (D) 0.05m) W x H x 29kg/100m ² Assumed quantity
	Subtotal					2,263	
	Miscellaneous Cost		%		10.000	226	% of Subtotal
	Total					2,489	
	Per unit					1,659	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Cutting of Deteriorated Rebar and Adding New Rebar
 Unit No
 Quantity 30.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116.0	46.800	5,430	Assumed quantity D16: 1.56kg/m x 1.0m x 30 = 46.80 kg
M3	Generator		hour	907.3	2.000	1,815	Assumed quantity
M4	Disc Grinder		hour	437.2	2.000	874	Assumed quantity
M5	Arc Welding Machine		hour	1,415.5	2.000	2,831	Assumed quantity
	Subtotal					11,562	
	Miscellaneous Cost		%		10.000	1,156	% of Subtotal
	Total					12,718	
	Per unit					424	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Setting Formworks

Unit m²
Quantity 6.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	7.200	5,494	Assumed quantity (2.5m ² + 5m x 0.05m) 6.00 x 1.2(loss margin) = 7.20m ²
	Subtotal					6,105	
	Miscellaneous Cost		%		10.000	611	% of Subtotal
	Total					6,716	
	Per unit				-	1,119	Total/Quantity

- Note
1. Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Mixing of Mortar

Unit m³
Quantity 1.000

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	52.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
M7	Concrete Mixer		hour	1,693.8	0.667	1,129	
22.70.003	Water		m ³	462.0	0.350	162	
	Subtotal					14,465	
	Miscellaneous Cost		%		10.000	1,447	% of Subtotal
	Total					15,912	
	Per unit					15,912	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Mortar Grouting
Unit m²
Quantity 2.75

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) t = 30mm Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) t = 30mm Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	
22.50.001	Support Staff		Person Day	604.0	-	-	
M3	Generator		hour	907.3	0.125	113	
M6	Truck-mounted concrete pump		hour	14,453.3	0.125	1,807	
	Subtotal					2,307	
	Miscellaneous Cost		%		10.000	231	% of Subtotal
	Total					2,538	
	Per unit					923	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Curing and Removal of Formworks
Unit m²
Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.021	27	
22.50.005	Artisans G2		Person Day	1,076.0	0.021	22	
22.50.002	Unskilled labour		Person Day	722.0	0.152	110	Based on average estimated productivity in Japan (see note)
22.70.003	water		m ³	462.0	0.100	46	
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					205	
	Miscellaneous Cost		%		10.000	21	% of Subtotal
	Total					226	
	Per unit					226	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM=1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Compressor per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	5.300	909	Assumed quantity
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-			
	Total					2,192	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Arc Welding Machine per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280.0	2.000	560	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					1,416	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Truck-mounted Concrete Pump

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-187	Truck-mounted concrete pump	(01) Vertical reach 23.7m, 55-60m ³ /h	Day	113,080.0	0.125	14,135	
	Miscellaneous Cost		%	-	-		
	Total					14,453	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Concrete Mixer

per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator			1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2			1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour			722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff			604.0	-	-	1 day = 8 hours, 1 hour = 0.125 day
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-		
	Total					1,694	
Note	1. Quantities are based on Kenyan experiences.						

No. 19.1

Work Category	Carbon Fibre Sheet / Plate Bonding to Concrete Girder
Code	12001
Work Item Name	Carbon Fibre Sheet Bonding to Concrete Girder (Carbon fibre sheet, Whole Area)
Description	Prepare concrete surface, apply primer, adjust unevenness with putty, apply epoxy resin for undercoat, install two layers of carbon fibre sheet including the overcoating in between and protect the surface.
Unit	m ²
Quantity	121.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of concrete		m ²	257.2	121.000	31,121	
B2	Application of primer		m ²	992.9	121.000	120,141	
B3	Adjustment of unevenness with putty		m ²	5,428.0	121.000	656,788	
B4	Application epoxy resin for undercoat		m ²	992.9	121.000	120,141	
B5	Installation of CFS (1 st layer)		m ²	7,442.2	121.000	900,506	
B6	Over coating resin application		m ²	992.9	121.000	120,141	
B7	Installation of CFS (2 nd layer)		m ²	7,442.2	121.000	900,506	
B8	Surface protection		m ²	1,261.9	121.000	152,690	
	Total					3,002,034	
	Per unit					24,810	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Preparation of Concrete
Unit	m ²
Quantity	300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	3.000	3,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet 300.0 / (3 x 50) = 2.0
M1	Generator		hour	907.3	24.0	21,775	Assumed quantity
M2	Disc Grinder		hour	437.2	24.0	10,493	Assumed quantity
M3	Air Blower		hour	140.5	24.0	3,371	Assumed quantity
	Subtotal					70,149	
	Miscellaneous Cost		%		10.000	7,015	% of Subtotal
	Total					77,164	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Application of Primer
Unit m²
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Adjustment of Unevenness with Putty
Unit m²
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	438.000	1,475,461	146kg/100m ² Assumed quantity
	Subtotal					1,480,353	
	Miscellaneous Cost		%		10.000	148,035	% of Subtotal
	Total					1,628,389	
	Per unit					5,428	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Application Epoxy Resin for Undercoat
 Unit m²
 Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Installation of CFS (1st layer)
 Unit m²
 Quantity 150.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-902	Carbon fibre sheet	200g/m ² , tensile strength = 3,400N/mm, t = 0.111mm	m ²	2,876.8	165.000	474,672	150.0 x 1.1 (loss margin) = 165.0m ²
Mate-048	Epoxy resin	for bonding coat to concrete,	litre / kg	5,207.8	100.500	523,382	150.0 m ² x 0.67 g/m ² = 100.5 g/m ² (0.101 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	Assumed quantity
	Subtotal					1,014,848	
	Miscellaneous Cost		%		10.000	101,485	% of Subtotal
	Total					1,116,333	
	Per unit					7,442	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Over Coating Resin Application
 Unit m²
 Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Installation of CFS (2nd layer)
 Unit m²
 Quantity 150.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-902	Carbon fibre sheet	200g/m ² , tensile strength = 3,400N/mm, t = 0.111mm	m ²	2,876.8	165.000	474,672	
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	100.500	523,382	150.0 m ² x 0.67 g/m ² = 100.5 g/m ² (0.101 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	Assumed quantity
	Subtotal					1,014,848	
	Miscellaneous Cost		%		10.000	101,485	% of Subtotal
	Total					1,116,333	
	Per unit					7,442	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Surface Protection
Unit m²
Quantity 300.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-051	Epoxy resin coating (second coat)	Concrete surface treatment material / Surface covering material	litre / kg	3,878.9	87.000	337,468	Assumed quantity
	Subtotal					344,158	
	Miscellaneous Cost		%		10.000	34,416	% of Subtotal
	Total					378,574	
	Per unit					1,262	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3	Air Blower		per hour				
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 19.2

Work Category	Carbon Fibre Sheet / Plate Bonding to Concrete Girder		
Code	I2002		
Work Item Name	Carbon Fibre Sheet Bonding to Concrete Girder (Carbon fibre sheet, Grid)		
Description	Prepare concrete surface, apply primer, adjust unevenness with putty, apply epoxy resin for undercoat, install two layers of carbon fibre sheet grid (full lining of 50 m ² or more, to be reinforced per bridge) including the overcoating in between and protect the surface.		
Unit	m ²		
Quantity	121.00	(11 x 11)	

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of concrete		m ²	257.2	121.000	31,121	
B2	Application of primer		m ²	992.9	85.000	84,397	
B3	Adjustment of unevenness with putty		m ²	5,428.0	85.000	461,380	
B4	Application epoxy resin for undercoat		m ²	992.9	85.000	84,397	
B5	Installation of CFS (1 st layer)		m ²	7,442.2	110.000	818,642	
B6	Over coating resin application		m ²	992.9	110.000	109,219	
B7	Installation of CFS (2nd layer)		m ²	7,442.2	110.000	818,642	
B8	Surface protection		m ²	877.9	85.000	74,622	
	Total					2,482,419	
	Per unit					20,516	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Preparation of Concrete
Unit	m ²
Quantity	300.00 (A x B)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	3.000	3,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet 300.0 / (3 x 50) = 2.0
M1	Generator		hour	907.3	24.0	21,775	Assumed quantity
M2	Disc Grinder		hour	437.2	24.0	10,493	Assumed quantity
M3	Air Blower		hour	140.5	24.0	3,371	Assumed quantity
	Subtotal					70,149	
	Miscellaneous Cost		%		10.000	7,015	% of Subtotal
	Total					77,164	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Application of Primer

Unit m²

Quantity 300.00 (Area of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Adjustment of unevenness with putty

Unit m²

Quantity 300.00 (Area of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	438.000	1,475,461	146kg/100m ² Assumed quantity
	Subtotal					1,480,353	
	Miscellaneous Cost		%		10.000	148,035	% of Subtotal
	Total					1,628,389	
	Per unit					5,428	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Application Epoxy Resin for UndercoatUnit m²

Quantity 300.00 (Area of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Installation of CFS (1st layer)Unit m²

Quantity 150.00 (Both Direction of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-902	Carbon fibre sheet	200g/m ² , tensile strength = 3,400N/mm, t = 0.111mm	m ²	2,876.8	165.000	474,672	150.0 x 1.1(loss margin) = 165.0m ²
Mate-048	Epoxy resin	for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	100.500	523,382	150.0 m ² x 0.67 g/m ² = 100.5 g/m ² (0.101 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	Assumed quantity
	Subtotal					1,014,848	
	Miscellaneous Cost		%		10.000	101,485	% of Subtotal
	Total					1,116,333	
	Per unit					7,442	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Over Coating Resin ApplicationUnit m²

Quantity 300.00 (Both Direction of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Installation of CFS (2nd layer)Unit m²

Quantity 150.00 (Both Direction of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-902	Carbon fibre sheet	200g/m ² , tensile strength = 3,400N/mm, t = 0.111mm	m ²	2,876.8	165.000	474,672	
Mate-048	Epoxy resin	for bonding coat to concrete,	litre / kg	5,207.8	100.500	523,382	150.0 m ² × 0.67 g/m ² = 100.5 g/m ² (0.101 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	Assumed quantity
	Subtotal					1,014,848	
	Miscellaneous Cost		%		10.000	101,485	% of Subtotal
	Total					1,116,333	
	Per unit					7,442	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Surface ProtectionUnit m²

Quantity 300.00 (Area of Carbon Fibre Sheets)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-051	Epoxy resin coating (second coat)	Concrete surface treatment material / Surface covering material	litre / kg	3,878.9	60.000	232,737	Assumed quantity
	Subtotal					239,427	
	Miscellaneous Cost		%		10.000	23,943	% of Subtotal
	Total					263,369	
	Per unit					878	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3	Air Blower		per hour				
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 19.3

Work Category	Carbon Fibre Sheet / Plate Bonding to Concrete Girder		
Code	I2003		
Work Item Name	Carbon Fibre Plate Bonding to Concrete Girder (Carbon fibre plate)		
Description	Prepare concrete surface, apply primer, adjust unevenness with putty, apply epoxy resin and pressure-attach the carbon fibre plate and protect the surface.		
Unit	m ²		
Quantity	25.0	(50m x 0.5m)	

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of concrete		m ²	257.2	25.000	6,430	
B2	Application of primer		m ²	992.9	25.000	24,823	
B3	Adjustment of unevenness with putty		m ²	5,428.0	25.000	135,700	
B4	Application of epoxy resin on CFP		m ²	992.9	25.000	24,823	
B5	Installation of CFP		m ²	7,329.9	25.000	183,248	
B6	Pressure attachment of CFP		m ²	960.6	25.000	24,015	
	Total					399,038	
	Per unit					15,962	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Concrete
Unit	m ²
Quantity	300.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	3.000	3,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet 300.0 / (3 x 50) = 2.0
M1	Generator		hour	907.3	24.000	21,775	Assumed quantity
M2	Disc Grinder		hour	437.2	24.000	10,493	Assumed quantity
M3	Air Blower		hour	140.5	24.000	3,371	Assumed quantity
	Subtotal					70,149	
	Miscellaneous Cost		%		10.000	7,015	% of Subtotal
	Total					77,164	
	Per unit					257	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Application of Primer
Unit m²
Quantity 300.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Adjustment of Unevenness with Putty
Unit m²
Quantity 300.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	438.000	1,475,461	146kg/100m ² Assumed quantity
	Subtotal					1,480,353	
	Miscellaneous Cost		%		10.000	148,035	% of Subtotal
	Total					1,628,389	
	Per unit					5,428	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Application of epoxy resin on CFPUnit m²

Quantity 300.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-093	Paint	Primer / under coating, epoxy based	kg	3,016.0	87.000	262,392	29kg/100m ² Assumed quantity
Mach-116	Paint roller	Extension pole	Day	569.0	3.000	1,707	Assumed quantity
	Subtotal					270,789	
	Miscellaneous Cost		%		10.000	27,079	% of Subtotal
	Total					297,868	
	Per unit					993	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Installation of CFPUnit m²

Quantity 150.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-908	Carbon fibre plate	GM520 t=2.0 x w=50mm	m	22.3	165.000	3,675	150.0 x 1.1(loss margin) = 165.0m
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	188.000	979,064	150.0 m ² x 1.25 g/m ² = 187.5 g/m ² (0.188 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	Assumed quantity
	Subtotal					999,532	
	Miscellaneous Cost		%		10.000	99,953	% of Subtotal
	Total					1,099,486	
	Per unit					7,330	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Pressure Attachment of CFP

Unit m²

Quantity 50.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-214	Wood	(01) Stiff/ Hard- wood (i.e. Mahogany), 10.0 x 10.0 x 400 mm	No.	472.0	50.000	23,600	0.5 x 1.2 / 0.4 = 2 (1m pitch) Length = 50m
Mate-031	Concrete anchor with steel bar	D10(1m) + Concrete Anchor (22.79.117)	No.	303.4	50.000	15,169	1m pitch, Length = 50m
	Subtotal					43,662	
	Miscellaneous Cost		%		10.000	4,366	% of Subtotal
	Total					48,028	
	Per unit					961	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	Assumed quantity
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					140	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 20

Work Category	Jacketing with Concrete
Code	12100
Work Item Name	Jacketing with Concrete
Description	Remove the deteriorated concrete, add new rebar, set-up formwork, place, compact C30 concrete, cure and dismantle formwork.
Unit	m ³
Quantity	5.32 ((W) 1.4 m x (D) 1.9 m x (H) 2.0m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Removal of deteriorated concrete		m ³	17,862.0	1.000	17,862	
B2	Addition of rebar		No	29,664.8	27.000	800,950	
B6	Setting-up formworks		m ²	1,097.3	10.640	11,675	
B7	Placing of concrete		m ³	22,221.5	6.220	138,218	
	Total					968,705	
	Per unit					182,087	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Removal of Deteriorated Concrete
Unit	m ³
Quantity	1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M2	Compressor		hour	2,192.3	4.000	8,769	Assumed quantity
	Subtotal					16,238	
	Miscellaneous Cost				10.000	1,624	% of Subtotal
	Total					17,862	
	Per unit					17,862	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2	Addition of Rebar
Unit	No
Quantity	27

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B3	Drilling anchor hole		No	60.0	27.000	1,620	Assumed quantity Pitch 0.5m, (W)(5.0-0.5)/0.5 x (H)(2.0-0.5)/0.5=27.0
B4	Anchor work		m/No	2,263.8	13.500	30,561	Assumed quantity 0.5m/Anchor hole
B5	Addition of New Rebar		No.	1,501.5	512.000	768,768	Assumed quantity
	Subtotal					800,949	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					800,949	
	Per unit					29,665	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Drilling Anchor Hole

Unit No

Quantity 1.0

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.010	14	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.010	11	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.010	8	
22.50.001	Support Staff		Person Day	604.0	-	-	
M3	Core drilling machine		hour	1,234.0	0.010	13	
M4	Generator		hour	907.3	0.010	9	
	Subtotal					55	
	Miscellaneous Cost		%		10.000	5	% of Subtotal
	Total					60	
	Per unit					60	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears)
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
- * Percent of Miscellaneous Cost should be need to survey.

B4 Anchor work

Unit m/No

Quantity 1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.035	45	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.071	76	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.071	51	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-020	Chemical anchor	Glass tube capsule	No.	3,408.0	0.500	1,704	
Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116.0	1.560	181	Assumed quantity D16: 1.56kg/m x 1.0m x 1 = 1.56 kg
	Subtotal					2,058	
	Miscellaneous Cost		%		10.000	206	% of Subtotal
	Total					2,264	
	Per unit					2,264	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears)
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Addition of New Rebar
Unit No.
Quantity 512.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	21.333	27,648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	42.667	45,909	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	85.333	61,611	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116.0	798.720	92,678	Assumed quantity D16: 1.56kg/m x 1.0m x 512 = 798.72 kg
M4	Generator		hour	907.3	170.667	154,846	Assumed quantity
M5	Disc Grinder		hour	437.2	170.667	74,617	Assumed quantity
M7	Arc Welding Machine		hour	1,415.5	170.667	241,579	Assumed quantity
	Subtotal					698,888	
	Miscellaneous Cost		%		10.000	69,889	% of Subtotal
	Total					768,776	
	Per unit					1,502	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Setting-up Formworks
Unit m²
Quantity 9.10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.13	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.375	404	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	10.920	8,332	9.1 x 1.2(loss margin) = 10.9
Mate-032	Concrete nail		kg	515.2	2.000	1,030	
	Subtotal					9,078	
	Miscellaneous Cost		%		10.000	908	% of Subtotal
	Total					9,986	
	Per unit					1,097	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Placing of Concrete

Unit m³
Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
B8	Concrete mix work		m ³	19,308.1	1.000	19,308	
B9	Curing of concrete		m ²	141.0	1.000	141	
M6	Concrete vibrator		hour	550.6	0.500	275	
	Subtotal					20,201	
	Miscellaneous Cost		%		10.000	2,020	% of Subtotal
	Total					22,222	
	Per unit					22,222	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Concrete Mix Work

Unit m³
Quantity 1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.13	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	52.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
M8	Concrete Mixer		hour	1,693.8	0.667	1,130	
22.70.003	water		m ³	462.0	0.350	162	
	Subtotal					17,553	
	Miscellaneous Cost		%		10.000	1,755	% of Subtotal
	Total					19,308	
	Per unit					19,308	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B9 Curing of Concrete

Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Quantity is based on average estimated productivity
22.70.003	Water		m ³	462.0	1.000	462	
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM= 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Compressor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	5.300	909	Assumed quantity
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-	-	
	Total					2,192	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Core Drilling Machine

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour)
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour)
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-028	Core drilling machine with core drill bit	Ø26-130 mm	Day	6,250.0	0.125	781	
	Miscellaneous Cost		%	-	-	-	
	Total					1,234	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000	-	
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Concrete Vibrator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-027	Concrete vibrator	Electrical or engine	Day	2,166.7	0.125	271	
22.79.154	Fuel	Petrol	litre	184.5	1.027	190	"Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l"
	Miscellaneous Cost		%	-	-	-	
	Total					551	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Arc Welding Machine per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280.0	2.000	560	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					1,416	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Concrete Mixer per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator			1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2			1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour			722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff			604.0	-	-	1 day = 8 hours, 1 hour = 0.125day
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-	-	
	Total					1,694	

Note 1. Quantities are based on Kenyan experiences.

No. 21

Work Category	Repainting
Code	12200
Work Item Name	Repainting
Description	Prepare the deteriorated steel surface(for 1 st and 2 nd grade) and fill the voids with epoxy putty, apply one layer of primer, two layers of polyurethane aluminium paint and record the repainting details on the girder web.
Unit	m ²
Quantity	10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of steel surfaces		m ²	1,636.1	10.000	16,361	
B2	Filling voids		m ²	258.2	10.000	2,582	
B3	Painting		m ²	1,727.2	10.000	17,272	
B4	Paint record on the web of girder to inform the paint work		m ²	67.3	10.000	673	
	Total					36,888	
	Per unit					3,689	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Steel Surfaces
Unit	m ²
Quantity	10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	1.000	11,000	Plastic sheet
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	3.000	480	Cup wire brush Assumed quantity
M1	Generator		hour	907.3	1.001	908	Assumed quantity
M2	Disc Grinder		hour	437.2	1.001	438	Assumed quantity
M3	Sand Blaster		hour	1,384.5	1.001	1,386	Assumed quantity
M4	Air Blower		hour	140.5	1.001	141	Assumed quantity
	Subtotal					14,873	
	Miscellaneous Cost		%		10.000	1,487	% of Subtotal
	Total					16,361	
	Per unit					1,636	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Filling Voids
Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	3.000	480	Cup wire brush Assumed quantity
M1	Generator		hour	907.3	1.001	908	Assumed quantity
M2	Disc Grinder		hour	437.2	1.001	438	Assumed quantity
	Subtotal					2,347	
	Miscellaneous Cost		%		10.000	235	% of Subtotal
	Total					2,582	
	Per unit					258	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Painting
Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.255	330	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.455	1,566	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.315	227	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	0	-	
Mate-092	Primer		kg	3,692.5	2.900	10,708	Assumed quantity 10.0 m ² x 29kg/100m ² = 2.9kg
Mate-096	Polyurethane aluminium paint		kg	989.6	2.900	2,870	Assumed quantity 10.0 m ² x 29kg/100m ² = 2.9kg
	Subtotal					15,702	
	Miscellaneous Cost		%		10.000	1,570	% of Subtotal
	Total					17,272	
	Per unit					1,727	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Paint Record on the Web of Girder to Inform the Paint Work

Unit m²

Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	2.900	2,870	
	Subtotal					612	
	Miscellaneous Cost		%		10.000	61	% of Subtotal
	Total					673	
	Per unit					67	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp=1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Sand Blaster per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-013	Blasting (Abrasive sand blaster)	Sand blast machine, blast polishing agent, airblast gun and dust collector.	Day	10,000.0	0.125	1,250	
	Miscellaneous Cost		%		-		
	Total					1,385	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Blower per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					140	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 22

Work Category Steel Plate Adding
 Code 12300
 Work Item Name Steel Plate Adding

Description Prepare and treat steel surface, drill holes for high tension bolt (HTB), assemble flat and angular plate, apply epoxy caulking to fill the voids, tighten the HTB, paint and record the painting details on the steel member.

Unit m²

Quantity 1.0 (1.0m x 0.5m x 2 = 1.0m², 64 bolts x 2 = 128 Bolts)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Surface preparation		m ²	1,636.0	1.000	1,636	
B2	Surface treatment		m ²	5,541.3	1.000	5,541	
B3	Holes for HTB		No of Holes	362.1	128.000	46,349	
B4	Assembling flat plate and angular plate		No of plate	311.4	2.000	623	
B5	Epoxy caulking		m ²	5,565.7	1.000	5,566	
B6	Tightening high tension bolts		No of plate	167.3	128.000	21,414	
B7	Painting		m ²	1,727.2	1.000	1,727	
B8	Paint record on the web of girder to inform the paint work		m ²	382.9	1.000	383	
	Total					83,239	
	Per unit					83,239	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1 Surface Preparation

Unit m²

Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	1.000	11,000	Plastic sheet 10.0 / (3 x 50) = 1.0
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	3.000	480	Assumed quantity
M1	Generator		hour	907.3	1.001	908	Assumed quantity
M2	Disc Grinder		hour	437.2	1.001	438	Assumed quantity
M3	Air Blower		hour	140.5	1.001	141	Assumed quantity
M4	Sand Blaster		hour	1,384.5	1.001	1,386	Assumed quantity
	Subtotal					14,873	
	Miscellaneous Cost		%		10.000	1,487	% of Subtotal
	Total					16,360	
	Per unit					1,636	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Surface TreatmentUnit m²

Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.020	26	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.060	65	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.040	29	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	1.460	4,918	Assumed quantity 1.0 m ² x 146kg/100m ² = 1 kg
	Subtotal					5,038	
	Miscellaneous Cost		%		10.000	504	% of Subtotal
	Total					5,541	
	Per unit					5,541	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Holes for HTB

Unit No of Holes

Quantity 128

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.889	1,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	8.000	8,608	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.688	1,941	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M5	Electric drill		hour	271.8	21.333	5,797	Assumed quantity
Mate-135	Steel plate	Cold rolling sheet metal	ton	190,313.5	0.079	14,940	Assumed quantity 1.0 x 0.01 x 7.85 = 0.07850 t
22.77.107	Steel angle	125*5mm	kg	271.0	35.800	9,702	Assumed quantity 17.90kg/m x 1.0 x 2.0 = 35.8 kg
	Subtotal					42,139	
	Miscellaneous Cost		%		10.000	4,214	% of Subtotal
	Total					46,353	
	Per unit					362	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Assembling flat plate and angular plate
Unit No of plate
Quantity 2

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.068	88	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.388	417	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.084	61	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
	Subtotal					566	
	Miscellaneous Cost		%		10.000	57	% of Subtotal
	Total					623	
	Per unit					311	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Epoxy caulking
Unit m²
Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.017	22	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.097	104	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.021	15	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fiber sheet/ steel plate bonding	kg	3,368.6	1.460	4,918	146kg/100m2 Assumed quantity
	Subtotal					5,060	
	Miscellaneous Cost		%		10.000	506	% of Subtotal
	Total					5,566	
	Per unit					5,566	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Tightening high tension bolts
Unit No of plate
Quantity 128

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.667	3,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	5.333	5,739	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	5.333	3,851	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M6	Impact wrench		hour	150.5	42.667	6,420	Assumed quantity
	Subtotal					19,465	
	Miscellaneous Cost		%		10.000	1,947	% of Subtotal
	Total					21,412	
	Per unit					167	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Painting
Unit m²
Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.026	33	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.146	157	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.032	23	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Primer	Primer, Zinc-rich	kg	3,692.5	0.290	1,071	Assumed quantity 1.0 m ² x 29kg/100m ² = 0.3kg
Mate-096	Polyurethane aluminium paint	Top coat, epoxy resin	kg	989.6	0.290	287	Assumed quantity 1.0 m ² x 29kg/100m ² = 0.3kg
	Subtotal					1,570	
	Miscellaneous Cost		%		10.000	157	% of Subtotal
	Total					1,727	
	Per unit					1,727	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Paint Record on the Web of Girder to Inform the Paint Work
Unit m²
Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	2.900	2,870	
	Subtotal					3,481	
	Miscellaneous Cost		%		10.000	348	% of Subtotal
	Total					3,829	
	Per unit					383	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp=1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-	-	
	Total					437	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Sand Blaster

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-013	Blasting (Abrasive sand blaster)	Sand blast machine, blast polishing agent, airblast gun and dust collector.	Day	10,000.0	0.125	1,250	
	Miscellaneous Cost		%	-	-	-	
	Total					1,385	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Electric Drill

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-058	Electric drill	(01) Ø14 - 32 mm	Day	350.0	0.125	44	
	Miscellaneous Cost		%	-	-	-	
	Total					272	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Impact Wrench		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-101	Impact wrench (Special fastener for HTB.)	M16-24	Day	127.7	0.125	16	
	Miscellaneous Cost		%	-	-		
	Total					150	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 23

Work Category	Carbon Fibre Plate Bonding		
Code	12400		
Work Item Name	Carbon Fibre Plate Bonding		
Description	Prepare steel plate surface, adjust unevenness with putty, apply epoxy resin as undercoat, bond the carbon fibre plate to the existing steel where the section loss is more than 20%.		
Unit	m ²		
Quantity	25.0	(50m x 0.5m)	

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
B1	Surface preparation of steel plate		m ²	1,430.7	25.000	35,768	
B2	Adjustment of unevenness with Putty		m ²	5,428.0	25.000	135,700	
B3	Application of epoxy resin for undercoat		m ²	1,692.1	25.000	42,303	
B4	Carbon plate bonding		m ²	7,329.9	25.000	183,248	
	Total					397,018	
	Per unit					15,881	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Surface Preparation of Steel Plate
Unit	m ²
Quantity	10.0

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	1.000	11,000	Plastic sheet 10.0 / (3 x 50) = 1.0
M1	Generator		hour	907.3	1.000	907	Assumed quantity
M2	Disc Grinder		hour	437.2	1.000	437	Assumed quantity
M3	Air Blower		hour	140.5	1.000	140	Assumed quantity
	Subtotal					13,006	
	Miscellaneous Cost		%		10.000	1,301	% of Subtotal
	Total					14,307	
	Per unit					1,431	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Adjustment of Unevenness with PuttyUnit m²

Quantity 300.00

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	2.000	1,444	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-047	Epoxy putty	for carbon fibre sheet/ steel plate bonding	kg	3,368.6	438.000	1,475,461	Assumed quantity $300.0 \text{ m}^2 \times 146\text{kg}/100\text{m}^2 = 438.0\text{kg}$
	Subtotal					1,480,353	
	Miscellaneous Cost		%		10.000	148,035	% of Subtotal
	Total					1,628,389	
	Per unit					5,428	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Application of Epoxy Resin for UndercoatUnit m²

Quantity 300.00

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	3.000	3,228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-048	Epoxy resin	for bonding coat to concrete, or for epoxy coating on the crack, epoxy injection,	litre / kg	5,207.8	87.000	453,077	Assumed quantity $300.0 \text{ m}^2 \times 29\text{kg}/100\text{m}^2 = 87.0\text{kg}$
Mach-116	Paint roller	Extension pole	Day	569.0	3.00	1,707	Assumed quantity
	Subtotal					461,474	
	Miscellaneous Cost		%		10.000	46,147	% of Subtotal
	Total					507,622	
	Per unit					1,692	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Carbon Plate Bonding
Unit m²
Quantity 150.00

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	6.000	4,332	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-908	Carbon fibre plate	GM520 t=2.0 x w=50mm	m	22.3	165.000	3,675	150.0 x 1.1(loss margin) = 165.0m
Mate-048	Epoxy resin	for bonding coat to concrete, epoxy injection,	litre / kg	5,207.8	188.000	979,064	150.0 m ² x 1.25 g/m ² = 187.5 g/m ² (0.188 kg/m ²)
Mach-116	Paint roller	Extension pole	Day	569.0	6.000	3,414	Assumed quantity
	Subtotal					999,532	
	Miscellaneous Cost		%		10.000	99,953	% of Subtotal
	Total					1,099,486	
	Per unit					7,330	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (KSh)	Quantity	Sum (KSh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Blower		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 24

Work Category	Tightening / Retightening of High-Tension Bolt
Code	12500
Work Item Name	Tightening / Retightening of High-Tension Bolt
Description	Remove loose or deteriorated High Tension Bolt (HTB), prepare the surface and clean the rust, fasten the loose or newly installed HTB and check using Rotation Angle Method, finish the surface preparation by applying grease and paint (Polyurethane Aluminium Paint and Anti-corrosion Paint)
Unit	Number
Quantity	200

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Remove high tension bolt		Number	200.000	22,060	24,000	
B2	Surface preparation		Number	200.000	12,600	16,320	
B3	Fastening HTB		Number	200.000	90,180	66,300	
B4	Quality control of HTB fastening		Number	200.000	1,480	2,020	
B5	Surface preparation for bolts		Number	200.000	9,260	10,160	
B6	Painting		Number	200.000	139,280	87,660	
	Total				274,860	206,460	
	Per unit				1,374	1,032	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1 Remove High Tension Bolt

Unit Number

Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.222	288	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.889	956	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.222	160	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	0.222	202	
Mach-082	Hammer	Hand hammer		1,033.3	8.000	8,267	Assumed quantity
Mate-061	Gas	Acetylene gas (03) 50.0 litre	No.	19,500.0	0.500	9,750	Assumed quantity - to be used for selected bolts
Mach-058	Electric drill	(01) Ø14 - 32 mm	Day	350.0	0.889	311	Assumed quantity
Mach-101	Impact wrench (Special fastener for HTB.)	M16-24	Day	127.7	0.889	114	Assumed quantity
	Subtotal					20,048	
	Miscellaneous Cost		%		10.000	2,005	% of Subtotal
	Total					22,053	
	Per unit					110	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Surface Preparation
 Unit Number
 Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.222	288	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.889	956	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.222	160	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	7.111	6,452	Assumed quantity
M2	Disc Grinder		hour	437.2	7.111	3,109	Assumed quantity
M3	Electric drill		hour	271.8	1.778	483	Assumed quantity
	Subtotal					11,449	
	Miscellaneous Cost		%		10.000	1,145	% of Subtotal
	Total					12,594	
	Per unit					63	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Fastening HTB
 Unit Number
 Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.222	288	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.889	956	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.222	160	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate--074	High tension bolt (HTB, S10T)	(HTB, S10T) M20	Set	393.5	200.000	78,696	Set: a bolt and a nut
M1	Generator		hour	907.3	1.778	1,613	Assumed quantity
M4	Impact Wrench		hour	150.5	1.778	267	Assumed quantity
	Subtotal					81,982	
	Miscellaneous Cost		%		10.000	8,198	% of Subtotal
	Total					90,180	
	Per unit					451	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Quality Control of HTB Fastening
 Unit Number
 Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.250	324	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.500	538	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	0.250	227	Assumed quantity
M4	Impact Wrench		hour	150.5	0.500	75	Assumed quantity
	Subtotal					1,345	
	Miscellaneous Cost		%		10.000	134	% of Subtotal
	Total					1,479	
	Per unit					7	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Surface Preparation for Bolts
 Unit Number
 Quantity 200.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.262	340	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.524	564	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.262	189	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	10.000	1,600	Cup wire brush Assumed quantity
M1	Generator		hour	907.3	2.096	1,902	Assumed quantity
M2	Disc Grinder		hour	437.2	2.096	916	Assumed quantity
M5	Sand Blaster		hour	1,384.5	2.096	2,902	Assumed quantity
	Subtotal					8,413	
	Miscellaneous Cost		%		10.000	841	% of Subtotal
	Total					9,254	
	Per unit					46	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Painting
 Unit Number
 Quantity 200.00 Area of Bolt = $0.435\text{m}^2/\text{set}$ (M20, L=80mm)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.020	1,322	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	5.820	6,262	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.260	910	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	25.230	93,162	Assumed quantity $200.0 \times 0.435 \text{ m}^2 \times 29\text{kg}/100\text{m}^2 = 25.2\text{kg}$
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	25.230	24,967	Assumed quantity $200.0 \times 0.435 \text{ m}^2 \times 29\text{kg}/100\text{m}^2 = 25.2\text{kg}$
	Subtotal					126,623	
	Miscellaneous Cost		%		10.000	12,662	% of Subtotal
	Total					139,285	
	Per unit					696	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan $0.15\text{l}/\text{hp} \times 6.8\text{hp} = 1.026\text{l}$
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Electric Drill		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-058	Electric drill	(01) Ø14 - 32 mm	Day	350.0	0.125	44	
	Miscellaneous Cost		%	-	-	-	
	Total					272	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Impact Wrench		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-101	Impact wrench (Special fastener for HTB.)	M16-24	Day	127.7	0.125	16	
	Miscellaneous Cost		%	-	-	-	
	Total					150	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Sand Blaster		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-013	Blasting (Abrasive sand blaster)	Sand blast machine, blast polishing agent, airblast gun and dust collector.	Day	10,000.0	0.125	1,250	
	Miscellaneous Cost		%	-	-	-	
	Total					1,385	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 25

Work Category	Anti-Corrosion Paint		
Code	12600		
Work Item Name	Anti-Corrosion Paint		
Description	Prepare the corroded steel plate (sectional loss of more than 10% but less than 20%) with wire brush, disc grinder or Sand Blaster, mix paint with agitator (electric mixer with steel blades) and paint the surface.		
Unit	m ²		
Quantity	20	(10m x 2m)	

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of steel surface		m ²	1,444.1	20.000	28,882	
B2	Mixing paint		m ²	1,792.4	20.000	35,848	
B3	Painting		m ²	1,727.2	20.000	34,544	
	Total					99,274	
	Per unit					4,964	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Steel Surface
Unit	m ²
Quantity	20.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.139	180	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.278	300	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.139	101	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	2.000	22,000	Plastic sheet
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	3.000	480	Assumed quantity
M1	Generator		hour	907.3	1.114	1,010	Assumed quantity
M2	Disc Grinder		hour	437.2	1.114	487	Assumed quantity
M3	Sand Blaster		hour	1,384.5	1.114	1,542	Assumed quantity
M4	Air Blower		hour	140.5	1.114	156	Assumed quantity
	Subtotal					26,256	
	Miscellaneous Cost		%		10.000	2,626	% of Subtotal
	Total					28,881	
	Per unit					1,444	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Mixing Paint
Unit m²
Quantity 20.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.025	32	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.025	27	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.025	18	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-001	Agitator (Electric Mixer with steel blade)	1725 BPM, Motor horsepower 1.5	Day	578.7	1.600	926	Assumed quantity
Mate-090	Paint	Base resin	kg	4,205.9	5.800	24,394	Acryl urethane-based coating Assumed quantity, 29kg/100m ²
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	5.800	5,740	Assumed quantity, 29kg/100m ²
M1	Generator		hour	907.3	1.600	1,452	
	Subtotal					32,589	
	Miscellaneous Cost		%		10.000	3,259	% of Subtotal
	Total					35,848	
	Per unit					1,792	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Painting
Unit m²
Quantity 20.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.510	661	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.910	3,131	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.630	455	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	5.800	21,417	Assumed quantity 20.0 m ² x 29kg/100m ² = 5.8kg
Mate-096	Paint	Top coat, epoxy resin	kg	989.6	5.800	5,740	Assumed quantity 20.0 m ² x 29kg/100m ² = 5.8kg
	Subtotal					31,403	
	Miscellaneous Cost		%		10.000	3,140	% of Subtotal
	Total					34,543	
	Per unit					1,727	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583		
	Miscellaneous Cost		%	-	10.000			
	Total					907		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109		
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193		
	Miscellaneous Cost		%	-	-			
	Total					437		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Sand Blaster								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours 1 hour = 0.125day	
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-013	Blasting (Abrasive sand blaster)	Sand blast machine, blast polishing agent, airblast gun and dust collector.	Day	10,000.0	0.125	1,250		
	Miscellaneous Cost		%	-	-			
	Total					1,385		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Blower								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6		
	Miscellaneous Cost		%	-	-			
	Total					140		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 26

Work Category	Asphaltic Plug Joint
Code	12700
Work Item Name	Asphaltic Plug Joint
Description	Dismantle existing asphaltic plug joint, chip existing concrete surface, install steel frame, drill anchor rebar holes, add rebar frame/anchor, place and compact 1 st Layer flexible asphalt (Type I), provide and install expansion sheet and add and compact 2 nd layer of flexible asphalt (Type I).
Unit	m
Quantity	10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Dismantle existing damaged asphalt joint sealant		m ³	41,277.8	0.260	10,732	
B2	Chipping surface concrete		m ³	42,635.6	0.500	21,318	
B3	Install steel frame		No	418.6	80.000	33,488	B4, B5 and B6
B7	Pouring Flexible asphalt (Asphalt leveling course)		m ³	16,245.9	0.520	8,448	
B8	Installation of expansion sheet		m ²	4,423.4	5.200	23,002	
B9	Pouring Flexible asphalt (Asphalt surface course)		m ³	16,245.9	0.520	8,448	
	Total					105,435	
	Per unit					10,544	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Dismantle Existing Damaged Asphalt Joint Sealant
Unit	m ³
Quantity	0.26

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.260	337	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.684	736	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.411	296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		Unit	1,255.8	2.189	2,749	Assumed quantity
M3	Air Compressor		hour	1,283.5	1.095	1,405	Assumed quantity
M4	Concrete Cutter		hour	1,589.0	2.189	3,479	Assumed quantity
M5	Handy Power Chisel		hour	344.0	2.189	753	Assumed quantity
	Subtotal					9,757	
	Miscellaneous Cost		%		10.000	976	% of Subtotal
	Total					10,732	
	Per unit					41,278	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Chipping Surface ConcreteUnit m³

Quantity 0.50

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.083	2,242	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Chipper / Breaker		hour	1,255.8	6.667	8,372	Assumed quantity
M3	Air Compressor		hour	1,283.5	3.333	4,278	Assumed quantity
M4	Concrete Cutter		hour	1,589.0	2.189	3,479	Assumed quantity
	Subtotal					19,380	
	Miscellaneous Cost		%		10.000	1,938	% of Subtotal
	Total					21,318	
	Per unit					42,636	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Install Steel Frame

Unit No

Quantity 80.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B4	Drilling anchor hole		m/No	117.6	80.000	9,411	Assumed quantity $10.0 / 0.5 \times 4 = 80$
B5	Rebar (frame)		m	420.7	50.000	21,035	$10m \times 4 + 0.5m \times 10/0.5$ (50cm pitch) = 50m
B6	Rebar anchor		No	3,021.4	80.000	241,712	Assumed quantity $10.0 / 0.5 \times 4 = 80$
	Subtotal					30,446	
	Miscellaneous Cost		%		10.000	3,045	% of Subtotal
	Total					33,491	
	Per unit					419	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Drilling Anchor Hole

Unit m/No

Quantity 0.15

Concrete drilling machine

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.004	5	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.008	8	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.004	3	2 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M2	Generator		hour	907.3	0.030	27	Assumed quantity
M6	Concrete drilling machine		hour	1,068.1	0.060	64	Assumed quantity
	Subtotal					107	
	Miscellaneous Cost		%		10.000	11	% of Subtotal
	Total					118	
	Per unit					784	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Rebar (Frame)

Unit m

Quantity 50.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.650	842	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.300	1,399	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.650	469	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116.0	78.000	9,051	Assumed quantity D16: 1.56kg/m x 50.0m = 78.00 kg 10m x 4 + 0.5m x 10/0.5 (50cm pitch) = 50m
M7	Arc Welding Machine		hour	1,415.5	5.200	7,361	Assumed quantity
	Subtotal					19,122	
	Miscellaneous Cost		%		10.000	1,912	% of Subtotal
	Total					21,034	
	Per unit					421	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Rebar Anchor
 Unit No
 Quantity 1.00 L=0.20m

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.650	842	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.300	1,399	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.650	469	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-123	Mild Steel Reinforcement Ribbed High Tensile Bars	D16	Kg	116.0	0.312	36	Assumed quantity D16: 1.56kg/m x 0.2m x 1 = 0.31 kg
	Subtotal					2,747	
	Miscellaneous Cost		%		10.000	275	% of Subtotal
	Total					3,021	
	Per unit					3,021	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Pouring Flexible Asphalt (Asphalt Levelling Course)
 Unit m³
 Quantity 0.52

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.135	175	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.135	145	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.135	98	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-058	Flexible Asphalt (asphalt-rubber chip)		ton	52,260.0	0.138	7,221	t = 0.035 Assumed quantity
M8	Vibration plate compactor		hour	1,318.3	0.017	23	Assumed quantity
M9	Vibration plate compactor Rammer		hour	1,005.8	0.017	17	Assumed quantity
	Subtotal					7,680	
	Miscellaneous Cost		%		10.000	768	% of Subtotal
	Total					8,448	
	Per unit					16,246	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Installation of Expansion Sheet
 Unit m²
 Quantity 5.20

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.650	842	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.300	1,399	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.650	469	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-055	Expansion sheet	for Asphaltic plug joint	m ²	3,500.0	5.200	18,200	Assumed quantity
	Subtotal					20,911	
	Miscellaneous Cost		%		10.000	2,091	% of Subtotal
	Total					23,002	
	Per unit					4,423	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B9 Pouring Flexible Asphalt (Asphalt Surface Course)
 Unit m³
 Quantity 0.52

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.135	175	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.135	145	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.135	98	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-058	Flexible Asphalt (asphalt-rubber chip)		ton	52,260.0	0.138	7,221	t = 0.035 Assumed quantity
M8	Vibration plate compactor		hour	1,318.3	0.017	23	Assumed quantity
M9	Vibration plate compactor Rammer		hour	1,005.8	0.017	17	Assumed quantity
	Subtotal					7,680	
	Miscellaneous Cost		%		10.000	768	% of Subtotal
	Total					8,448	
	Per unit					16,246	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m³/min, BPM = 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-		
	Total					1,256	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Compressor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	10.000		
	Total					1,284	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Concrete Cutter

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-021	Concrete Cutter / Concrete cutting grinder	Blade diameter 55-140 cm	Day	10,166.3	0.125	1,271	
	Miscellaneous Cost		%	-	10.000		
	Total					1,589	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Handy Power Chisel

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-017	Chisel (Handy power Chisel)	Operating pressure=6.2 bar, air requirement = 280l/min, impact rate = 3000BPM	Day	206.3	0.125	26	
	Miscellaneous Cost		%	-	-	-	
	Total					344	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Concrete Drilling Machine

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-023	Concrete drilling machine		Day	5,999.0	0.125	750	
	Miscellaneous Cost		%	-	-	-	
	Total					1,068	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Arc Welding Machine

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280.0	2.000	560	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					1,416	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Vibration Plate Compactor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-188	Vibratory compactor (Combined vibration roller) / finisher	(02) 2.4-2.6 t	Day	8,000.0	0.125	1,000	
	Miscellaneous Cost		%	-	-	-	
	Total					1,318	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M9 Vibration Plate Compactor Rammer per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-192	Vibratory compactor (Vibration compactor rammer) / finisher	(01) 60- 80 kg	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-		
	Total					1,006	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 27

Work Category	Replacement of Expansion Joint		
Code	12800		
Work Item Name	Replacement of Expansion Joint		
Description	Cut existing concrete surface and chip off/dismantle existing expansion joint, provide and install the new expansion joint, place and compact C30/30 concrete and cure.		
Unit	m	(Number of lane)	
Quantity	5	1	

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Cut concrete surface		m	1,130.9	5.000	5,655	
B2	Chipping off concrete/ dismantling expansion joint		m	16,853.3	5.000	84,267	
B3	Set up new expansion joint		m	171,869.2	5.000	859,346	
B4	Pouring concrete		m	6,232.7	5.000	31,164	
	Total					980,431	
	Per unit					196,086	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1 Cut Concrete Surface

Unit m

Quantity 5.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.240	311	1 day = 8 hours 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.440	1,549	1 day = 8 hours 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.440	1,040	1 day = 8 hours 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Concrete Saw		hour	1,166.8	1.920	2,240	Assumed quantity
M4	Dump truck with crane		hour	4,245.9	-	-	Assumed quantity
	Subtotal					5,141	
	Miscellaneous Cost		%		10.000	514	% of Subtotal
	Total					5,655	
	Per unit					1,131	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Chipping off Concrete/Dismantling Expansion Joint
 Unit m
 Quantity 5.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.200	1,555	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	7.200	7,747	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	3.000	2,166	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M2	Concrete Chipper / Breaker		hour	1,255.8	9.600	12,055	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
M3	Air Compressor		hour	1,283.5	9.600	12,322	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
M4	Dump truck with crane		hour	4,245.9	9.600	40,761	Assumed quantity
	Subtotal					76,606	
	Miscellaneous Cost		%		10.000	7,661	% of Subtotal
	Total					84,267	
	Per unit					16,853	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Set up New Expansion Joint
 Unit m
 Quantity 5.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.480	622	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.880	3,099	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.200	866	1 day = 8 hours 0.125day (= 1hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-083	New Expansion Joint	Finger type & butt type	m	148,992.0	5.000	744,960	Assumed quantity
Mate-124	Mild Steel Reinforcement Ribbed High Tensile Bars	D20	Kg	119.2	200.000	23,842	Assumed quantity
Mate-031	Concrete anchor with steel bar	D10(1m) + Concrete Anchor (22.79.117)	No.	303.4	25.000	7,585	Assumed quantity
Mate-044	Epoxy bonding (Bonding agent to concrete)	for patching or plastering	kg	1,725.2	0.145	250	Assumed quantity
M4	Dump truck with crane		hour	4,245.9	-	-	Assumed quantity
M5	Concrete Vibrator		hour	550.6	-	-	
	Subtotal					781,224	
	Miscellaneous Cost		%		10.000	78,122	% of Subtotal
	Total					859,346	
	Per unit					171,869	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Pouring Concrete
Unit m
Quantity 5.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.120	156	1 day = 8 hours 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.240	258	1 day = 8 hours 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.240	173	1 day = 8 hours 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-030	Concrete / Ready mixed concrete	Class 40	m ³	17,651.3	1.300	22,947	Assumed quantity
M5	Concrete Vibrator		hour	550.6	1.000	551	
M4	Dump truck with crane		hour	4,245.9	1.000	4,246	Assumed quantity
	Subtotal					28,330	
	Miscellaneous Cost		%		10.000	2,833	% of Subtotal
	Total					31,163	
	Per unit					6,233	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Concrete Saw

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-122	Saw Blade	Concrete saw Blade 300 mm	No.	6,788.8	0.125	849	
	Miscellaneous Cost		%	-	-	-	
	Total					1,167	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM = 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Compressor per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-	-	
	Total					1,284	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Dump Truck with Crane per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-057	Dump truck with crane	(02) 4 t, 2.9 t crane	Hour	3,541.7	1.000	3,542	
	Subtotal					3,860	
	Miscellaneous Cost		%	-	10.000	385.99	
	Total					4,246	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Concrete Vibrator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-027	Concrete vibrator	Electrical or engine	Day	2,166.7	0.125	271	
22.79.154	Fuel	Petrol	litre	184.5	1.027	190	"Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l"
	Miscellaneous Cost		%	-	-	-	
	Total					551	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 28.1

Work Category	Replacement of Bearing		
Code	12901		
Work Item Name	Replacement of Bearing - Steel		
	Type		
Description	Dismantle existing bearing, chip the bearing base, cast new bearing base and provide and install new steel bearings.		
Unit	Number of Bearing	Previous sheet calculated only one side of bearing line. This sheet calculates both sides.	
Quantity	8		

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Dismantle existing bearing and chipping bearing base		Bearing	59,953.4	8.000	479,627	
B2	Cast new bearing seat and set up new bearings		Bearing	1,768,951.8	8.000	14,151,614	
	Total					14,631,242	
	Per unit					1,828,905	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Dismantle existing bearing and chipping bearing base
Unit	Bearing
Quantity	8.00

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	8.294	10,749	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	24.024	25,850	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	11.154	8,053	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	7.722	4,664	
M1	Concrete Chipper / Breaker		hour	1,255.8	192.192	241,345	Assumed quantity
M2	Generator		hour	907.3	66.352	60,201	Assumed quantity
M4	Air Compressor		hour	1,283.5	66.352	85,163	Assumed quantity
	Subtotal					436,025	
	Miscellaneous Cost		%		10.000	43,603	% of Subtotal
	Total					479,628	
	Per unit					59,953	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
- * Percent of Miscellaneous Cost should be need to survey.

B2 Cast new bearing seat and set up new bearings
 Unit Bearing
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	11.600	15,034	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	33.600	36,154	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	15.600	11,263	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	10.800	6,523	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	146.8	80.000	11,745	Assumed quantity
Mate-065	Grout	Non shrinkage	kg	140.6	80.000	11,245	Assumed quantity
Mate-010	Bearing (fixed)	1,500-2,000 kN	No.	1,689,449.2	4.000	6,757,797	Assumed quantity
Mate-012	Bearing (movable)	1,500-2,000 kN	No.	1,493,298.4	4.000	5,973,193	Assumed quantity
Mate-004	Anchor bolts	Continuous thread stud	No.	1,053.7	40.000	42,150	Assumed quantity
	Subtotal					12,865,104	
	Miscellaneous Cost		%		10.000	1,286,510	% of Subtotal
	Total					14,151,614	
	Per unit					1,768,952	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
- * Percent of Miscellaneous Cost should be need to survey.

M1 Concrete Chipper / Breaker per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM = 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Generator		per hour					
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Compressor		per hour					
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM = 1050	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-		
	Total					1,284	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 28.2

Work Category	Replacement of Bearing		
Code	12902		
Work Item Name	Replacement of Bearing - Elastomeric Type		
Description	Dismantle existing bearing, chip the bearing base, cast new bearing base and provide and install new elastomeric bearings.		
Unit	Number of Bearing	Previous sheet calculated only one side of bearing line. This sheet calculates both sides.	
Quantity	8		

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Dismantle existing bearing and chipping bearing base		Bearing	59,953.4	8.000	479,627	
B2	Cast new bearing seat and set up new bearings		Bearing	164,675.9	8.000	1,317,407	
	Total					1,797,034	
	Per unit					224,629	Total/Quantity

Note 1. The unit price does not include haulage cost.

B1	Dismantle existing bearing and chipping bearing base
Unit	Bearing
Quantity	8.00

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	8.294	10,749	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	24.024	25,850	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	11.154	8,053	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	7.722	4,664	
M1	Concrete Chipper / Breaker		hour	1,255.8	192.192	241,345	Assumed quantity
M2	Generator		hour	907.3	66.352	60,201	Assumed quantity
M3	Air Compressor		hour	1,283.5	66.352	85,163	Assumed quantity
	Subtotal					436,025	
	Miscellaneous Cost		%		10.000	43,603	% of Subtotal
	Total					479,628	
	Per unit					59,953	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
- * Percent of Miscellaneous Cost should be need to survey.

B2 Cast new bearing seat and set up new bearings
 Unit Bearing
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	11.600	15,034	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	33.600	36,154	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	15.600	11,263	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	10.800	6,523	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	146.8	80.000	11,745	Assumed quantity
Mate-065	Grout	Non shrinkage	kg	140.6	80.000	11,245	Assumed quantity
Mate-943	Elastomeric Bearing (fixed)	1,500-2,000 kN	No.	132,941.2	4.000	531,765	Assumed quantity
Mate-944	Elastomeric Bearing (movable)	1,500-2,000 kN	No.	132,941.2	4.000	531,765	Assumed quantity
Mate-004	Anchor bolts	Continuous thread stud	No.	1,053.7	40.000	42,150	Assumed quantity
	Subtotal					1,197,643	
	Miscellaneous Cost		%		10.000	119,764	% of Subtotal
	Total					1,317,407	
	Per unit					164,676	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM = 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Generator per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Compressor per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-		
	Total					1,284	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 29

Work Category	Extension of Bearing Seat
Code	I3000
Work Item Name	Extension of Bearing Seat
Description	Chip the existing surface, drill and fit the horizontal anchors (core boring), fix new rebar including formwork, place, compact Classs 30 concrete and cure.
Unit	m ³
Quantity	4

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Chipping		m ³	17,855.4	1.000	17,855	
B2	Horizontal Anchor Drilling (Core boring)		m	2,691.8	8.000	21,534	
B3	Anchor bar fitting		m	3,368.9	18.000	60,640	
B4	Rebar fixing		ton	209,033.0	0.112	23,412	
B5	Formwork fixing		m ²	1,076.9	10.000	10,769	
B6	Pouring concrete		m ³	22,074.2	4.000	88,297	B7
B8	Concrete curing		m ²	141.0	10.000	1,410	
	Total					223,917	
	Per unit					55,979	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Chipping
Unit	m ³
Quantity	1.00 (4m x 1m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	4.000	3,629	Assumed quantity
M2	Concrete Chipper / Breaker		hour	1,255.8	4.000	5,023	Assumed quantity
M3	Air Compressor		hour	1,283.5	4.000	5,134	Assumed quantity
	Subtotal					16,232	
	Miscellaneous Cost		%		10.000	1,623	% of Subtotal
	Total					17,855	
	Per unit					17,855	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Horizontal Anchor Drilling (Core Boring)

Unit m

Quantity 8.00 (16No x 0.5m/No)

(0.5m x 4 x 2 x 4 brackets = 16 m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Generator		hour	907.3	8.000	7,258	Assumed quantity
M4	Core Drilling Machine		hour	1,234.0	8.000	9,872	Assumed quantity
	Subtotal					19,576	
	Miscellaneous Cost		%		10.000	1,958	% of Subtotal
	Total					21,534	
	Per unit					2,692	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Anchor Bar Fitting

Unit m

Quantity 18.00

(Steel bar = 1.0m)

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.630	816	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.278	1,375	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.278	923	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-040	Epoxy anchor bolt for jack base bracket	for jack up girder	No.	1,053.7	32.000	33,720	4 x 2 x 4 concrete blocks = 32 Assumed quantity
Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	146.8	124.600	18,293	Assumed quantity D32:6.23kg/m x 1.0m x 20 = 124.60 kg
	Subtotal					55,127	
	Miscellaneous Cost		%		10.000	5,513	% of Subtotal
	Total					60,640	
	Per unit					3,369	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Rebar Fixing
Unit ton
Quantity 0.112

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.145	189	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.582	626	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.145	105	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	146.8	112.140	16,464	Assumed quantity 6.230kg/m x 18m = 112.1kg
M5	Truck with Crane		hour	4,352.9	0.896	3,900	Assumed quantity
	Subtotal					21,283	
	Miscellaneous Cost		%		10.000	2,128	% of Subtotal
	Total					23,412	
	Per unit					209,033	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Formwork Fixing
Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.100	130	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.200	215	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.400	289	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	12.000	9,156	10.0 m ² x 1.2 (loss margin) = 12.00
Mate-032	Concrete nail		kg	515.2	2.000	1,030	
	Subtotal					9,790	
	Miscellaneous Cost		%		10.000	979	% of Subtotal
	Total					10,769	
	Per unit					1,077	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA)
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Pouring Concrete
Unit m³
Quantity 4

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.500	538	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
B7	Concrete mix work		m ³	19,315.2	4.000	77,261	
M6	Concrete vibrator		hour	550.6	2.000	1,101	Assumed quantity
	Subtotal					80,270	
	Miscellaneous Cost		%		10.000	8,027	% of Subtotal
	Total					88,297	
	Per unit					22,074	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Concrete Mix Work
Unit m³
Quantity 1

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.130	168	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	42.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
M7	Concrete Mixer		hour	1,693.8	0.667	1,130	
22.70.003	water		m ³	462.0	0.350	162	
	Subtotal					17,559	
	Miscellaneous Cost		%		10.000	1,756	% of Subtotal
	Total					19,315	
	Per unit					19,315	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Concrete Curing
Unit m²
Quantity 10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	water		m ³	462.0	1.000	462	
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA).

M1 Generator								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-		
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)	
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp = 1.0268 l	
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583		
	Miscellaneous Cost		%	-	10.000			
	Total					907		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Concrete Chipper / Breaker								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.005	Artisans G2		Person Day	1,076.0	-	-		
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day	
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM=1050	Day	7,500.0	0.125	938		
	Miscellaneous Cost		%	-	-			
	Total					1,256		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Air Compressor								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.005	Artisans G2		Person Day	1,076.0	-	-		
22.50.002	Unskilled labour		Person Day	722.0	-	-		
22.50.001	Support Staff		Person Day	604.0	-	-		
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056		
	Miscellaneous Cost		%	-	-			
	Total					1,284		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Core Drilling Machine								per hour
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day	
22.50.001	Support Staff		Person Day	604.0	-	-		
Mach-028	Core drilling machine with core drill bit	Ø26-130 mm	Day	6,250.0	0.125	781		
	Miscellaneous Cost		%	-	-			
	Total					1,234		

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Truck (with Crane)

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
22.61.102	Truck with crane	4t	Hour	2,500.0	1.000	2,500	
	Miscellaneous Cost		%	-	-	-	
	Total					4,353	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Concrete Vibrator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-027	Concrete vibrator	Electrical or engine	Day	2,166.7	0.125	271	
				184.5	1.027	190	"Based on average fuel efficiency per horsepower in Japan 0.15l/hp*6.8hp=1.0268l"
	Miscellaneous Cost		%	-	-	-	
	Total					551	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Concrete Mixer

per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	-	-	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 1 hour = 0.125 day
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-	-	
	Total					1,376	

Note I. Quantities are based on Kenyan experiences.

No. 30.1

Work Category	Jack up Girder
Code	13101
Work Item Name	Jack up Girder (concrete girder)
Description	Provide necessary materials and equipment for jacking PC/RC girders, install the jacks, jack up the girders, carry out the required recommended repairs to completion and jack down the girders, dismantle the temporary jack supports and clean up the site.
Unit	No. of Jacks
Quantity	8

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of materials, equipment and site cleaning		m ²	624.6	20.000	12,492	
B2	Installation of Jack base frame		No of Jacks Base Frame	335,769.2	8.000	2,686,154	B3, B4, B5 and B6
B7	Jacking up		No. of Jacks	891,927.6	8.000	7,135,421	
B8	Jack down		No. of Jacks Supports	891,927.6	8.000	7,135,421	
B9	Dismantle jacks		No. of Jacks	6,275.6	8.000	50,205	
B10	Dismantle supports		No. of Jacks and Temporary Supports	6,275.6	8.000	50,205	
B11	Verification of measurement		No. of Jacks	1,256.0	8.000	10,048	
B12	Dismantle jacks and temporary supports		No. of Jacks and Temporary Supports	6,275.6	8.000	50,205	
B13	Cleanup site		No. of Jacks	1,381.6	8.000	11,053	
	Total					17,141,202	
	Per unit					2,142,650	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Preparation of Materials, Equipment and Site Cleaning
Unit	m ²
Quantity	20.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	High Pressure Washer Equipment		hour	697.0	2.000	1,394	Assumed quantity
M2	Water Bowser		hour	4,675.6	2.000	9,351	Assumed quantity
	Subtotal					11,357	
	Miscellaneous Cost		%		10.000	1,136	% of Subtotal
	Total					12,492	
	Per unit					625	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Installation of Jack Base Frame
 Unit No of Jacks Base Frame
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B3	Fabrication of steel brackets		ton/Bracket	301,314.9	8.000	2,410,519	
B4	Concrete chipping		m ² /Bracket	4,496.0	8.000	35,968	
B5	Horizontal Anchor Drilling (Core boring)		m/Bracket	2,691.8	8.000	21,534	
B6	Anchor injection works		m/Bracket	27,266.5	8.000	218,132	
	Subtotal					2,686,154	
	Miscellaneous Cost		%			-	% of Subtotal
	Total					2,686,154	
	Per unit					335,769	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Fabrication of Steel Brackets
 Unit ton/Bracket
 Quantity 2.45

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	5.898	7,643	
22.50.005	Artisans G2		Person Day	1,076.0	11.795	12,692	9.632 Person Day / ton
22.50.002	Unskilled labour		Person Day	722.0	5.898	4,258	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-135	Steel plate	Cold rolling sheet metal	ton	190,313.5	2.694	512,728	Bracket 2.45ton 2.45 x 1.1 (loss margin) = 2.69
M5	Arc Welding Machine		hour	1,415.5	94.363	133,571	Assumed quantity
	Subtotal					670,891	
	Miscellaneous Cost		%		10.000	67,089	% of Subtotal
	Total					737,980	
	Per unit					301,315	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Concrete Chipping
 Unit m²/Bracket
 Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.083	108	
22.50.005	Artisans G2		Person Day	1,076.0	0.167	179	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.083	60	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M3	Concrete Breaker		hour	1,255.8	1.333	1,674	Assumed quantity
M4	Generator		hour	907.3	1.333	1,210	Assumed quantity
M6	Air Compressor		hour	1,283.5	0.667	856	Assumed quantity
	Subtotal					4,087	
	Miscellaneous Cost		%		10.000	409	% of Subtotal
	Total					4,496	
	Per unit					4,496	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Horizontal Anchor Drilling (Core Boring)
 Unit m/Bracket
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M4	Generator		hour	907.3	8.000	7,258	Assumed quantity
M7	Core Drilling Machine		hour	1,234.0	8.000	9,872	Assumed quantity
	Subtotal					19,576	
	Miscellaneous Cost		%		10.000	1,958	% of Subtotal
	Total					21,534	
	Per unit					2,692	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Anchor Injection Works
 Unit m/Bracket
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.280	363	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.568	611	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.568	410	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	146.8	59.808	8,781	0.8m x 6.23 kg/m x 12
Mate-049	Epoxy resin adhesive	for bonding coat to concrete, grout, recasting concrete	litre / kg	8,096.8	23.236	188,137	Area of Drilled Hole - Area of Rebar x Number of Anchor Bolt
	Subtotal					198,302	
	Miscellaneous Cost		%		10.000	19,830	% of Subtotal
	Total					218,132	
	Per unit					27,267	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Jacking up
Unit No. of Jacks
Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M8	Jack Up Motion		hour	1,687.1	3,840.000	6,478,272	Bearings x Steel Saddle x days Assumed quantity
	Subtotal					6,486,746	
	Miscellaneous Cost		%		10.000	648,675	% of Subtotal
	Total					7,135,421	
	Per unit					891,928	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Jack Down
Unit No. of Jacks
Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M8	Jack Up Motion		hour	1,687.1	3,840.000	6,478,272	Bearings x Steel Saddle x days Assumed quantity
	Subtotal					6,486,746	
	Miscellaneous Cost		%		10.000	648,675	% of Subtotal
	Total					7,135,421	
	Per unit					891,928	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B9 Dismantle Jack
 Unit No. of Jacks
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.286	2,962	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	9.143	9,838	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.571	3,301	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	8.000	29,540	Assumed quantity
	Subtotal					45,641	
	Miscellaneous Cost		%		10.000	4,564	% of Subtotal
	Total					50,205	
	Per unit					6,276	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B10 Dismantle Support
 Unit No. of Jacks Supports
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.286	2,962	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	9.143	9,838	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.571	3,301	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	8.000	29,540	Assumed quantity
	Subtotal					45,641	
	Miscellaneous Cost		%		10.000	4,564	% of Subtotal
	Total					50,205	
	Per unit					6,276	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B11 Verification of Measurement

Unit No. of Jacks

Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	4.000	2,416	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
	Subtotal					10,048	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					10,048	
	Per unit					1,256	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B12 Dismantle Jacks and Temporary Supports

Unit No. of Jacks and Temporary Supports

Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.286	2,962	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	9.143	9,838	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.571	3,301	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	8.000	29,540	Assumed quantity
	Subtotal					45,641	
	Miscellaneous Cost		%		10.000	4,564	% of Subtotal
	Total					50,205	
	Per unit					6,276	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B13 Clean Up Site
Unit No. of Jacks
Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	4.000	2,416	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
	Subtotal					10,048	
	Miscellaneous Cost		%		10.000	1,005	% of Subtotal
	Total					11,053	
	Per unit					1,382	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 High Pressure Washer Equipment

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	0 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0		-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					697	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Water Bowser

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	High Pressure Washer Equipment
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					4,676	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Concrete Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m³/min, BPM=1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp=1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000	-	
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Arc Welding Machine

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
				280.0	2.000	560	
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	-	-	-	Assumed quantity
	Miscellaneous Cost		%			1,416	
	Total					1,309	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Air Compressor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-		
	Total					1,284	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Core Drilling Machine

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-028	Core drilling machine with core drill bit	Ø26-130 mm	Day	6,250.0	0.125	781	
	Miscellaneous Cost		%	-	-		
	Total					1,234	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Hydraulic Jack

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-097	Hydraulic Jack	(02) 200t (1,961kN)	Day	1,830.4	0.125	229	
Mate-140	Temporary support material for jacking up motion	Steel Saddle	No.	1,140.0	1.000	1,140	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					1,687	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 30.2

Work Category	Jack up Girder
Code	13102
Work Item Name	Jack up Girder (Steel)
Description	Provide necessary materials and equipment for jacking steel girders, install the jacks, jack up the girders, carry out the required recommended repairs to completion and jack down the girders, dismantle the temporary jack supports and clean up the site.
Unit	No. of Jacks
Quantity	8

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Preparation of materials, equipment and site cleaning		m ²	624.6	20.000	12,492	
B2	Installation of Jack base frame		No of Jack Base Frame	335,769.2	8.000	2,686,154	B3, B4, B5 and B6
B7	Jacking up		No. of Jacks	891,927.6	8.000	7,135,421	
B8	Jack down		No. of Jacks	891,927.6	8.000	7,135,421	
D9	Dismantle Jack		No. of Jacks	6,275.6	8.000	50,205	
D10	Dismantle Support		No. of Jacks Supports	6,275.6	8.000	50,205	
D11	Inspection of measurement		No. of Jacks	1,256.0	8.000	10,048	
D12	Dismantle jacks and temporary supports		No. of Jacks and Temporary Supports	6,275.6	8.000	50,205	
D13	Cleanup site		No. of Jacks	1,381.6	8.000	11,053	
	Total					17,141,202	
	Per unit					2,142,650	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1 Preparation of Materials, Equipment and Site Cleaning

Unit m²

Quantity 20.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	High Pressure Washer Equipment		hour	697.0	2.000	1,394	Assumed quantity
M2	Water Bowser		hour	4,675.6	2.000	9,351	Assumed quantity
	Subtotal					11,357	
	Miscellaneous Cost		%		10.000	1,136	% of Sub-total (Hand shovel, Shovel, Expand ladder, etc.)
	Total					12,492	
	Per unit					625	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Installation of Jack Base Frame
 Unit No of Jack Base Frame
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B3	Fabrication of steel brackets		ton/Bracket	301,314.9	8.000	2,410,519	
B4	Concrete chipping		m ² /Bracket	4,496.0	8.000	35,968	
B5	Horizontal Anchor Drilling (Core boring)		m/Bracket	2,691.8	8.000	21,534	
B6	Anchor injection works		m/Bracket	27,266.5	8.000	218,132	
	Subtotal					2,686,154	
	Miscellaneous Cost		%			-	% of Subtotal
	Total					2,686,154	
	Per unit					335,769	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Fabrication of Steel Brackets
 Unit ton/Bracket
 Quantity 2.45

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	5.898	7,643	
22.50.005	Artisans G2		Person Day	1,076.0	11.795	12,692	9.632 Person Day / ton
22.50.002	Unskilled labour		Person Day	722.0	5.898	4,258	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-135	Steel plate	Cold rolling sheet metal	ton	190,313.5	2.694	512,728	Bracket 2.45ton 2.45 x 1.1 (loss margin) = 2.69
M5	Arc Welding Machine		hour	1,415.5	94.363	133,571	9.632 x 8 hour / ton
	Subtotal					670,891	
	Miscellaneous Cost		%		10.000	67,089	% of Subtotal
	Total					737,980	
	Per unit					301,315	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Concrete Chipping
 Unit m²/Bracket
 Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.083	108	
22.50.005	Artisans G2		Person Day	1,076.0	0.167	179	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.083	60	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M3	Concrete Chipper / Breaker		hour	1,255.8	1.333	1,674	Assumed quantity
M4	Generator		hour	907.3	1.333	1,210	Assumed quantity
M6	Air Compressor		hour	1,283.5	0.667	856	Assumed quantity
	Subtotal					4,087	
	Miscellaneous Cost		%		10.000	409	% of Subtotal
	Total					4,496	
	Per unit					4,496	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Horizontal Anchor Drilling (Core Boring)

Unit m/Bracket

Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.000	1,076	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	
22.50.001	Support Staff		Person Day	604.0	-	-	
M4	Generator		hour	907.3	8.000	7,258	Assumed quantity
M7	Core Drilling Machine		hour	1,234.0	8.000	9,872	Assumed quantity
	Subtotal					19,576	
	Miscellaneous Cost		%		10.000	1,958	% of Subtotal
	Total					21,534	
	Per unit					2,692	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Anchor Injection Works

Unit m/Bracket

Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.280	363	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.568	611	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.568	410	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-126	Mild Steel Reinforcement Ribbed High Tensile Bars	D32	Kg	146.8	59.808	8,781	0.8m x 6.23 kg/m x 12
Mate-049	Epoxy resin adhesive	for bonding coat to concrete, grout, recasting concrete	litre / kg	8,096.8	23.236	188,137	Area of Drilled Hole - Area of Rebar x Number of Anchor Bolt
	Subtotal					198,302	
	Miscellaneous Cost		%		10.000	19,830	% of Subtotal
	Total					218,132	
	Per unit					27,267	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Jacking Up
Unit No. of Jacks
Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.000	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.000	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.000	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M8	Jack Up Motion		hour	1,687.1	3,840.000	6,478,272	Bearings x Steel Saddle x days Assumed quantity
	Subtotal					6,486,746	
	Miscellaneous Cost		%		10.000	648,675	% of Subtotal
	Total					7,135,421	
	Per unit					891,928	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Jack Down
Unit Bearing
Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	1.00	1,296	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	6.00	6,456	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.00	722	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M8	Hydraulic Jack		hour	1,687.1	3,840.000	6,478,272	Bearings x Steel Saddle x days Assumed quantity
	Subtotal					6,486,746	
	Miscellaneous Cost		%		10.000	648,675	% of Subtotal
	Total					7,135,421	
	Per unit					891,928	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B9 Dismantle Jack
 Unit No. of Jacks
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.286	2,962	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	9.143	9,838	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.571	3,301	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	8.000	29,540	Assumed quantity
	Subtotal					45,641	
	Miscellaneous Cost		%		10.000	4,564	% of Subtotal
	Total					50,205	
	Per unit					6,276	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B10 Dismantle Support
 Unit No. of Jacks Supports
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.286	2,962	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	9.143	9,838	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.571	3,301	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich	kg	3,692.5	8.000	29,540	Assumed quantity
	Subtotal					45,641	
	Miscellaneous Cost		%		10.000	4,564	% of Subtotal
	Total					50,205	
	Per unit					6,276	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B11 Inspection of measurement
 Unit No. of Jacks
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	4.000	2,416	
	Subtotal					10,048	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					10,048	
	Per unit					1,256	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B12 Dismantle jacks and temporary supports
 Unit No. of Jacks and Temporary Supports
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.286	2,962	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	9.143	9,838	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.571	3,301	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Paint	Primer, Zinc-rich		3,692.5	8.000	29,540	
	Subtotal					45,641	
	Miscellaneous Cost		%		10.000	4,564	% of Subtotal
	Total					50,205	
	Per unit					6,276	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B13 Clean up Site
 Unit No. of Jacks
 Quantity 8.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	2.000	2,592	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	2.000	2,152	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	4.000	2,888	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	4.000	2,416	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
	Subtotal					10,048	
	Miscellaneous Cost		%		10.000	1,005	% of Subtotal
	Total					11,053	
	Per unit					1,382	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 High Pressure Washer Equipment

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	0 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0		-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-089	High pressure washer	4.9MPa	Day	4,500.0	0.125	563	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					697	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Water Bowser

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	High Pressure Washer Equipment
22.50.001	Support Staff		Person Day	604.0	-	-	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.74.002	Fuel	Diesel	litre	171.5	8.190	1,404	Assumed quantity
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	2,029.0	1.000	2,029	
22.70.003	Water		m ³	462.0	2.000	924	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					4,676	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Concrete Chipper / Breaker

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-018	Concrete Breaker	Weight = 20 kg, Piston Stroke = 166mm, Air Consumption = 1.5m ³ /min, BPM= 1050	Day	7,500.0	0.125	938	
	Miscellaneous Cost		%	-	-	-	
	Total					1,256	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.15 l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000	-	
	Total					907	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M5 Arc Welding Machine

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-202	Welder (arc welding)	300 A	Day	3,750.0	0.125	469	1 day = 8 hours, 1 hour = 0.125day
Mach-206	Welding rod	high tensile steel, mild / soft steel or stainless steel	kg	280.0	2.000	560	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					1,416	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M6 Air Compressor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.67.108	Air compressor	150CFM, 4250LPM	Day	8,444.0	0.125	1,056	
	Miscellaneous Cost		%	-	-	-	
	Total					1,284	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M7 Core Drilling Machine per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-028	Core drilling machine with core drill bit	Ø 26-130 mm	Day	6,250.0	0.125	781	
	Miscellaneous Cost		%	-	-	-	
	Total					1,234	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M8 Hydraulic Jack per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125 day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125 day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-097	Hydraulic Jack	(02) 200t (1,961 kN)	Day	1,830.4	0.125	229	
Mate-140	Temporary support material for jacking up motion	Steel Saddle	No.	1,140.0	1.000	1,140	Assumed quantity
	Miscellaneous Cost		%	-	-	-	
	Total					1,687	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 31

Work Category	Repainting Steel Bearing
Code	13200
Work Item Name	Repainting Steel Bearing
Description	Prepare the defective steel bearing surface; apply primer (zinc-rich) and polyurethane aluminium paint (top coat epoxy resin).
Unit	m ²
Quantity	10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Surface preparation for steel bearing		m ²	1,636.1	10.000	16,361	
B2	Painting		m ²	1,712.2	10.000	17,122	
	Total					33,483	
	Per unit					3,348	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Surface Preparation for Steel Bearing
Unit	m ²
Quantity	10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.250	269	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-147	Scaffolding	Net - Size = 3*50m	No.	11,000.0	1.000	11,000	Plastic sheet 10.0 / (3 x 50) = 1.0
Mach-015	Brush (Wire brush)	Wire brush	No.	160.0	3.000	480	Assumed quantity
M1	Generator		hour	907.3	1.001	908	Assumed quantity
M2	Disc Grinder		hour	437.2	1.001	438	Assumed quantity
M3	Sand Blaster		hour	1,384.5	1.001	1,386	Assumed quantity
M4	Air Blower		hour	140.5	1.001	141	Assumed quantity
	Subtotal					14,873	
	Miscellaneous Cost				10.000	1,487	% of Subtotal
	Total					16,361	
	Per unit					1,636	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Painting
Unit m²
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.150	194	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	1.455	1,566	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.315	227	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-092	Primer	Primer, Zinc-rich	kg	3,692.5	2.900	10,708	Assumed quantity 10.0 m ² x 29kg/100m ² = 2.9kg
Mate-096	Polyurethane aluminium paint	Top coat, epoxy resin	kg	989.6	2.900	2,870	Assumed quantity 10.0 m ² x 29kg/100m ² = 2.9kg
	Subtotal					15,565	
	Miscellaneous Cost		%		10.000	1,557	% of Subtotal
	Total					17,122	
	Per unit					1,712	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Generator

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour)
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.79.154	Fuel	Petrol	litre	184.5	1.027	189	Based on average fuel efficiency per horsepower in Japan 0.151l/hp*6.8hp= 1.0268l
Mach-071	Generator	(01) 5 kVA	Day	4,666.7	0.125	583	
	Miscellaneous Cost		%	-	10.000		
	Total					907	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Disc Grinder

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-047	Disc grinder equipment	GWS 26 - 230H	Day	875.0	0.125	109	
Mach-051	Disc grinder disc	(01) Outer diameter 125mm	No.	193.3	1.000	193	
	Miscellaneous Cost		%	-	-		
	Total					437	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Sand Blaster

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-013	Blasting (Abrasive sand blaster)	Sand blast machine, blast polishing agent, airblast gun and dust collector	Day	10,000.0	0.125	1,250	
	Miscellaneous Cost		%		-		
	Total					1,385	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Air Blower

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125 day
22.50.002	Unskilled labour		Person Day	722.0	-	-	
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-003	Air blower	Engine, Power supply or Rechargeable	Day	47.7	0.125	6	Assumed quantity
	Miscellaneous Cost		%	-	-		
	Total					140	

Note I. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 32

Work Category	Slope Protection with Foundation Supported by Piles
Code	13300
Work Item Name	Slope Protection with Foundation Supported by Piles
Description	Excavate the scoured area, drive the treated wooden pegs, provide and fix formwork, place, compact concrete foundation of mass concrete Class 30 and cure. Install gabion mattress complete with rock fill. Backfill, on slopes, with two layers gravel in layers of 150 mm, then provide, place grouted masonry stones and cure.
Unit	m ²
Quantity	5.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Excavation of scoured area		m ³	1,299.2	4.000	5,197	
B2	Placing concrete foundation		m ³	35,033.5	0.380	13,313	B3, B4, B5 and B6
B7	Compaction of gravel filing		m ³	2,719.9	0.900	2,448	
B8	Placing masonry		m ²	10,555.2	1.500	15,833	
B9	Installation of gabion mattress and backfill		m ³	8,177.2	5.000	40,886	B10 and B11
	Total					77,676	
	Per unit					15,535	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Excavation of Scoured Area
Unit	m ³
Quantity	4

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.063	45	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
M1	Backhoe		hour	7,977.9	0.500	3,989	Assumed quantity
M2	Vibratory compactor		hour	1,218.9	0.500	609	Assumed quantity
	Subtotal					4,725	
	Miscellaneous Cost		%		10.000	472	% of Subtotal
	Total					5,197	
	Per unit					1,299	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Placing Concrete Foundation
 Unit m³
 Quantity 0.38

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B3	Formwork		m ²	1,076.9	1.250	1,346	Assumed quantity
B4	Concrete placement (Class 20)		m ³	21,774.4	0.380	8,274	Assumed quantity
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mach-216	Treated Wooden Pegs	(12) Diameter 20 cm, Length 2.0 m	No.	3,305.6	1.000	3,306	Assumed quantity
	Subtotal					13,313	
	Miscellaneous Cost		%			-	% of Subtotal
	Total					13,313	
	Per unit					35,034	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Formwork
 Unit m²
 Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.010	13	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.020	22	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.040	29	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.78.102	Wooden formwork panel		m ²	763.0	1.200	916	100 * 1.2 (loss margin) = 120
	Subtotal					979	
	Miscellaneous Cost		%		10.000	98	% of Subtotal
	Total					1,077	
	Per unit					1,077	Total/Quantity

- Note
- Some of quantities which cannot be identified in Kenya refer to Japanese cost estimation manual with productivity conversion ratio (2.5 for labour and 1/0.7 for machinery) to African nations (JICA)
 - The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Concrete Placement (Class 20)Unit m³

Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
B5	Concrete mix work (Class 20)		m ³	19,145.0	1.000	19,145	
B6	Concrete curing		m ²	141.0	0.250	35	
M5	Concrete vibrator		hour	551	0.250	138	Assumed quantity
	Subtotal					19,795	
	Miscellaneous Cost		%		10.000	1,979	% of Subtotal
	Total					21,774	
	Per unit					21,774	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B5 Concrete Mix Work (Class 30)Unit m³

Quantity 1.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	Based on average productivity in Kenya
22.50.005	Artisans G2		Person Day	1,076.0	0.063	67	Based on average productivity in Kenya
22.50.002	Unskilled labour		Person Day	722.0	0.500	361	Based on average productivity in Kenya
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.004	Ordinary Portland Cement	52.5	Kg	24.0	535.000	12,840	
22.69.009	Fine aggregates(sand)		m ³	2,674.0	0.362	968	
22.70.002	Graded aggregates (ballast)		m ³	2,440.0	0.736	1,796	
M4	Concrete Mixer		hour	1,693.8	0.667	1,130	Assumed quantity
22.70.003	Water		m ³	462.0	0.350	162	Assumed quantity
	Subtotal					17,405	
	Miscellaneous Cost		%		10.000	1,740	% of Subtotal
	Total					19,145	
	Per unit					19,145	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B6 Concrete CuringUnit m²

Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	1.000	462	Assumed quantity
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B7 Compaction of Gravel FillingUnit m³

Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.060	78	
22.50.005	Artisans G2		Person Day	1,076.0	0.060	65	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.060	43	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Backhoe		hour	7,977.9	0.250	1,994	The crane and backhoe are to be used for extreme cases of failure that are of large magnitude. Assumed quantity
M2	Vibratory compactor		hour	1,218.9	0.240	293	Assumed quantity
	Subtotal					2,473	
	Miscellaneous Cost		%		10.000	247	% of Subtotal
	Total					2,720	
	Per unit					2,720	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B8 Placing MasonryUnit m²

Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.020	26	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.120	129	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.120	87	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
M3	Rough Terrain Crane		hour	25,252.9	0.320	8,081	Assumed quantity
Mate-077	Stone masonry		m ²	1,273.0	1.000	1,273	Assumed quantity
Mate-080	Mortar (Portland cement mortar)	Cement 1 : Sand 3	m ³	12,174.0	0.080	974	
	Subtotal					9,596	
	Miscellaneous Cost		%		10.000	960	% of Subtotal
	Total					10,555	
	Per unit					10,555	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B9 Installation of Gabion Mattress and BackfillUnit m³

Quantity 1.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B10	Installation of gabions mattress		m ³	3,273.5	1.000	3,274	Assumed quantity
B11	Backfilling		m ³	4,903.7	1.000	4,904	Assumed quantity
	Subtotal					8,177	
	Miscellaneous Cost		%			-	% of Subtotal
	Total					8,177	
	Per unit					8,177	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B10 Installation of Gabions MattressUnit m³

Quantity 31.80

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.063	67	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.188	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.77.102	Gabion Mattress	10mm	m ²	2,967.0	31.800	94,351	Assumed quantity
M1	Backhoe		hour	7,978	-	-	Assumed quantity
	Subtotal					94,634	
	Miscellaneous Cost		%		10.000	9,463	% of Subtotal
	Total					104,098	
	Per unit					3,274	Total/Quantity

- Note
1. The unit price does not include haulage cost.
 2. Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B11 Backfilling
Unit m³
Quantity 3.60

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.500	538	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.500	1,083	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.72.102	Stone		m ³	1,273.0	3.600	4,583	Assumed quantity
M1	Backhoe		hour	7,978	1.000	7,978	Assumed quantity
M2	Vibratory compactor		hour	1,219	1.000	1,219	Assumed quantity
	Subtotal					16,049	
	Miscellaneous Cost		%		10.000	1,605	% of Subtotal
	Total					17,653	
	Per unit					4,904	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Backhoe

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
Mach-010	Backhoe	(01) Heap : 0.28 m ³ Flat pile : 0.2 m ³	Hour	6,125.0	1.000	6,125	
	Miscellaneous Cost		%	-	-	-	
	Total					7,978	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Vibratory Compactor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	1.000	171	Assumed quantity
Mach-195	Vibratory compactor (Vibration plate compactor) / finisher	(02) 70-80 kg	Day	5,833.3	0.125	729	
	Miscellaneous Cost		%	-	-	-	
	Total					1,219	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Rough Terrain Crane per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
Mach-040	Crane (Rough terrain crane)	(04) 16 t	Hour	23,400.0	1.000	23,400	
	Miscellaneous Cost		%	-	-	-	
	Total					25,253	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M4 Concrete Mixer per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 1 hour = 0.125day
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 1 hour = 0.125day
22.79.154	Fuel	Petrol	litre	184.5	3.000	554	Assumption; 3 litres per hour
Mach-025	Concrete mixer	30 litres	Day	5,500.0	0.125	688	
	Miscellaneous Cost		%	-	-	-	
	Total					1,694	

Note 1. Quantities are based on Kenyan experiences.

M5 Concrete Vibrator per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
Mach-027	Concrete vibrator	Electrical or engine	Day	2,166.7	0.125	271	
22.79.154	Fuel	Petrol	litre	184.5	1.027	190	"Based on average fuel efficiency per horsepower in Japan 0.15l/hp*6.8hp=1.0268l"
	Miscellaneous Cost		%	-	-	-	
	Total					551	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 33

Work Category	Gabion Mattress
Code	I3400
Work Item Name	Gabion Mattress
Description	Excavate the scoured area, place filter fabric, install gabion mattress and backfill with stones (50 – 150 mm).
Unit	m ²
Quantity	31.8

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Excavation of scoured area		m ³	1,131.6	3.600	4,074	
B2	Filter fabric sheet placing		m ²	6,047.7	18.000	108,859	
B3	Installation of gabions		m ²	3,273.5	31.800	104,097	
B4	Backfilling		m ³	5,018.0	3.600	18,065	
	Total					235,094	
	Per unit					7,393	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Excavation of Scoured Area
Unit	m ³
Quantity	4.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.063	45	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
M1	Backhoe		hour	7,977.9	0.500	3,989	Assumed quantity
	Subtotal					4,115	
	Miscellaneous Cost		%		10.000	412	% of Subtotal
	Total		%			4,527	
	Per unit					1,132	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Filter Fabric Sheet Placing
 Unit m²
 Quantity 18.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.063	45	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
Mate-056	Filter Fabric Sheet	under gabion mattress	m ²	147.5	19.800	2,921	18.0 x 1.1 (loss margin) = 19.8
Mach-215	Wooden Pegs	(12) Diameter 15 cm, Length 4.0 m	No.	6,613.2	16.000	105,811	Peg: 2/m ² x Area
	Subtotal					108,858	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					108,858	
	Per unit					6,048	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Installation of Gabions
 Unit m²
 Quantity 31.8

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.063	81	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.063	67	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.188	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.77.102	Gabion Mattress	10mm	m ²	2,967.0	31.800	94,351	Assumed quantity
MI	Backhoe		hour	7,977.9	-	-	Assumed quantity
	Subtotal					94,634	
	Miscellaneous Cost		%		10.000	9,463	% of Subtotal
	Total					104,098	
	Per unit					3,274	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Backfilling
Unit m³
Quantity 3.6

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.500	648	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.500	912	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	1.500	1,083	
22.50.001	Support Staff		Person Day	604.0	-	-	
22.72.102	Stone		m ³	1,273.0	3.600	4,583	Assumed quantity
M1	Backhoe		hour	7,977.9	1.000	7,978	Assumed quantity
M2	Vibratory compactor		hour	1,218.9	1.000	1,219	Assumed quantity
	Subtotal					16,423	
	Miscellaneous Cost		%		10.000	1,642	% of Subtotal
	Total					18,065	
	Per unit					5,018	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Backhoe

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
Mach-010	Backhoe	(01) Heap : 0.28 m ³	Hour	6,125.0	1.000	6,125	
	Miscellaneous Cost		%	-	-	-	
	Total					7,978	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Vibratory Compactor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	1.000	171	Assumed quantity
Mach-195	Vibratory compactor (Vibration plate compactor) / finisher	(02) 70-80 kg	Day	5,833.3	0.125	729	
	Miscellaneous Cost		%	-	-	-	
	Total					1,219	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 34

Work Category	Masonry Slope Protection Repair
Code	I 3500
Work Item Name	Slope Patching
Description	Remove loose material around the damaged masonry slope protection (extended minimum 500 mm), provide and compact 300 mm gravel in two layers of 150 mm thick each, provide and place the masonry stone including grouting mortar and cure.
Unit	m ²
Quantity	10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Removal of damaged protection		m ³	818.8	6.000	4,913	
B2	Compacting of gravel filling		m ³	2,737.8	3.000	8,213	
B3	Patching masonry		m ²	9,070.0	10.000	90,700	
	Total					103,826	
	Per unit					10,383	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Removal of Damaged Protection
Unit	m ³
Quantity	6.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.125	162	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.125	135	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.250	181	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
M1	Backhoe		hour	7,977.9	0.500	3,989	The crane and backhoe are to be used for extreme cases of failure that are of large magnitude. Assumed quantity
	Subtotal					4,466	
	Miscellaneous Cost		%		10.000	447	% of Subtotal
	Total					4,913	
	Per unit					819	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Compacting of Gravel Filling
Unit m³
Quantity 3.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.180	233	
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.180	328	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.180	130	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.72.021	Gravel material (murrum)		m ³	1,492.0	3.000	4,476	Assumed quantity
M1	Backhoe		hour	7,977.9	0.250	1,994	The crane and backhoe are to be used for extreme cases of failure that are of large magnitude. Assumed quantity
M2	Vibratory compactor		hour	1,218.9	0.250	305	Assumed quantity
	Subtotal					7,467	
	Miscellaneous Cost		%		10.000	747	% of Subtotal
	Total					8,213	
	Per unit					2,738	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Patching Masonry
Unit m²
Quantity 3.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.060	78	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	0.360	387	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.002	Unskilled labour		Person Day	722.0	0.120	87	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
22.72.102	Stone masonry		m ³	2,967.0	3.000	8,901	3*0.2(thickness)*1.2=0.720
Mate-080	Mortar (Portland cement mortar)	Cement 1 : Sand 3	m ³	12,174.0	0.225	2,739	(0.3*0.025*3*5)*2
B4	Masonry Mortar Curing		m ²	141.0	3.000	423	
M3	Rough Terrain Crane		hour	25,252.9	0.480	12,121	The crane and backhoe are to be used for extreme cases of failure that are of large magnitude. Assumed quantity
	Subtotal					24,736	
	Miscellaneous Cost		%		10.000	2,474	% of Subtotal
	Total					27,210	
	Per unit					9,070	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B4 Masonry Mortar Curing
Unit m²
Quantity 10.0

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	-	-	
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	1.313	948	Based on average estimated productivity in Japan (see note)
22.50.001	Support Staff		Person Day	604.0	-	-	
22.70.003	Water		m ³	462.0	1.000	462	Assumed quantity
	Subtotal					1,410	
	Miscellaneous Cost		%		-	-	% of Subtotal
	Total					1,410	
	Per unit					141	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Backhoe

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
Mach-010	Backhoe	(01) Heap : 0.28 m ³ Flat pile : 0.2 m ³	Hour	6,125.0	1.000	6,125	
	Miscellaneous Cost		%	-	-	-	
	Total					7,978	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M2 Vibratory Compactor

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	1.000	171	Assumed quantity
Mach-195	Vibratory compactor (Vibration plate compactor) / finisher	(02) 70-80 kg	Day	5,833.3	0.125	729	
	Miscellaneous Cost		%	-	-	-	
	Total					1,219	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.

M3 Rough Terrain Crane		per hour					
Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
Mach-040	Crane (Rough terrain crane)	(04) 16 t	Hour	23,400.0	1.000	23,400	
	Miscellaneous Cost		%	-	-	-	
	Total					25,253	

Note 1. Quantities are based on Kenyan experiences and Japanese cost estimation manual.

No. 35

Work Category	Nylon Fibre Gabion
Code	I 3600
Work Item Name	Nylon Fibre Gabion
Description	Provide and place boulders into the specified nylon fibre gabion bags, mechanically transport and place the filled nylon gabion bags to the scoured area as required.
Unit	m ³
Quantity	10

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Place boulders into nylon fibre gabion bag		m ³	2,008.0	10.000	20,080	
B2	Transport to scoured area		m ³	2,984.6	10.000	29,846	
B3	Place nylon fibre gabion using backhoe		m ³	1,492.3	10.000	14,923	
	Total					64,849	
	Per unit					6,485	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B1	Place Boulders into Nylon Fibre Gabion Bag
Unit	m ³
Quantity	10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.417	540	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.833	602	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
Mate-060	Gabion Mattress	Nylon fibre	No.	882.0	8.065	7,113	Assumed quantity
Mate-901	Boulder	50-150 mm	m ³	1,000.0	10.000	10,000	
M1	Backhoe		hour	7,977.9	-	-	
	Subtotal					18,255	
	Miscellaneous Cost				10.000	1,825	% of Subtotal
	Total					20,080	
	Per unit					2,008	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B2 Transport to Scoured Area
Unit m³
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.417	540	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	
M1	Backhoe		hour	7,977.9	3.333	26,593	
	Subtotal					27,133	
	Miscellaneous Cost		%		10.000	2,713	% of Subtotal
	Total					29,846	
	Per unit					2,985	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

B3 Place Nylon Fibre Gabion Using Backhoe
Unit m³
Quantity 10.00

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	1,296.0	0.208	270	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
22.50.001	Support Staff		Person Day	604.0	-	-	1 day = 8 hours, 0.125day (= 1 hour) Assumed quantity
M1	Backhoe		hour	7,977.9	1.667	13,297	
	Subtotal					13,567	
	Miscellaneous Cost		%		10.000	1,357	% of Subtotal
	Total					14,923	
	Per unit					1,492	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work (e.g. hand tools, scaffoldings, safety gears).
 - 5%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation).
 - 10%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works).

M1 Backhoe

per hour

Code	Name	Type	Unit	Unit price (Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	1,824.0	0.125	228	1 day = 8 hours, 1 hour = 0.125day
22.50.005	Artisans G2		Person Day	1,076.0	-	-	
22.50.002	Unskilled labour		Person Day	722.0	0.125	90	1 day = 8 hours, 1 hour = 0.125day
22.50.001	Support Staff		Person Day	604.0	-	-	
22.74.002	Fuel	Diesel	litre	171.5	8.950	1,535	Based on average fuel efficiency per horsepower in Japan 0.05l/hp*179hp=8.95l
Mach-010	Backhoe	(01) Heap : 0.28 m ³ Flat pile : 0.2 m ³	Hour	6,125.0	1.000	6,125	
	Miscellaneous Cost		%	-	-	-	
	Total					7,978	

- Note
- Quantities are based on Kenyan experiences and Japanese cost estimation manual.